

# Prince George

## Sustainable Forest Management Plan

March 2010



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**Prince George Sustainable Forest Management Plan Version March 2010**

The following licensees and BC Timber Sales have committed to implement and maintain on a continuous improvement basis the Prince George Sustainable Resource Management Plan.



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Carrier Lumber Ltd.



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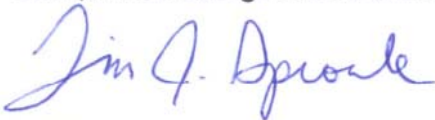
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## Executive Summary

This Sustainable Forest Management Plan (SFMP) is the combined efforts of four major licensees and BC Timber Sales to achieve Canadian Standards Association (CSA) certification to the CSA Z809-02 standard. The signatories to the plan are:

- Carrier Lumber Ltd.
- Canadian Forest Products Ltd.
- BC Timber Sales

The Licensees and BC Timber Sales support business practices that protect and enhance the environment for the use of current and future generations. They are committed to the goals of sustainable forest management and to a process that will continually improve our environmental performance. To achieve these objectives the signatories will:

- **Develop** and **maintain** a scientifically credible, structured, yet flexible framework for SFM at the management unit level that incorporates strategic level requirements.
- **Manage** all operations to comply with or exceed all legal requirements.
- **Encourage** local First Nations to become involved in the development of local SFMPs, while respecting their rights and interests.
- **Provide** opportunities for communities, environmental groups and scientists to participate in planning and implementation in ways that reflect their interests and concerns efficiently in both time and cost and in ways that are effective for both stakeholders and resource managers.
- **Identify, evaluate** and **control** potential environmental risks and implement appropriate preventative measures.
- **Communicate, inform**, and **promote** awareness regarding environmental activities with employees, First Nations, and stakeholders.
- **Develop** and **maintain** a monitoring program accompanied by evaluation and reporting of findings and feedback into decision making that is designed to evaluate and report on the measures of sustainability of social, ecological, and economic values.
- **Commit** timely audits of environmental management systems and SFM parameters, and implement corrective measures as required.

The success of the Prince George Sustainable Forest Management Plan is dependent upon the commitment of the Licensees and BCTS to meet these objectives.

This Sustainable Forest Management plan has been partially developed using information from sustainable forest management plans in the area including the FIA Priority Emphasis Plan for the PGTSA FIA Group in the Prince George Management Unit March 31st, 2003.

The Licensees and BC Timber Sales wish to express their appreciation and gratitude to the individuals that participated in the Prince George Sustainable Forest Management Public Advisory Group. Their active involvement and commitment throughout the entire public advisory group process provided valuable input and insights into the development of the Prince George Sustainable Forest Management Values, Objectives, Indicators, Targets and Variances that are being used as the basis for developing this Sustainable Forest Management Plan.

In addition, the Licensees and BC Timber Sales are very grateful to Dwight Scott Wolfe for facilitating the Public Advisory Group process and to Forest Investment Account for providing funding for the development of this plan.

## 1.0 Introduction

The forests of northern British Columbia have been a source of natural resources for a variety of uses for generations. In the past century, forests have been chiefly valued for their economic potential. However, society is increasingly coming to realize that forests provide a wider set of values that include social and environmental benefits. The forest industry recognizes that the management of a broader range of values from the forest can occur without detriment to its economic potential. This concept is known as "**Sustainable Forest Management**" (SFM) and 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" (*The State of Canada's Forests, 2001/2002*).

To recognize and achieve this wider set of values, SFM requires that these values be considered in operational decision making and implemented during forest operations. This can only be accomplished through a carefully planned management system that ensures both public participation and forest operations are carried out in a systematic and predictable manner that guarantees continual improvement.

Sustainable Forest Management has attracted the attention of consumers of forest products who are increasingly demanding that the goods they purchase be derived from forests that are managed on a sustainable basis. This demand has resulted in the emergence of forest certification as a dominant factor in the forest industry to assure the public that the management of forests satisfies standards that are considered critical to sustain forest values. The forest industry of B.C. is a part of a much larger global forest product marketplace and has increasingly become aware of the importance of certification to maintain its position in this economy. The Prince George Sustainable Forest Management Plan (SFMP) was developed to achieve Canadian Standards Association (CSA) certification to the CSA Z809-02 standard and to provide forest managers with a management system to meet SFM objectives.

The Prince George SFMP is a working document and will continue to evolve and expand as forestry practices and socio-economic forest values change over time.

### 1.1 The Prince George SFMP & CSA Certification

The primary purpose of the Prince George SFMP is to provide an intensive planning document that will meet CSA SFM certification and provide a framework for the participating Licensees and BCTS to implement SFM. The Canadian Standards Association is a not-for-profit membership based association serving business, industry, government and consumers in Canada and the global marketplace. The CSA developed a Sustainable Forest Management Standard in 1996 that was revised in 2002. The Standard describes the requirements for SFM on a Defined Forest Area (DFA) that must be met to achieve certification. This Standard was prepared by the Technical Committee on Sustainable Forest Management and has been approved as a National Standard by the Standards Council of Canada.

The general requirements for sustainable forest management as defined in the Standard are:

- a) compliance with relevant legislation on the Defined Forest Area (DFA);
- b) appropriate values, objectives, indicators, and targets that clearly address the Canadian Council of Forest Ministers (CCFM) SFM criteria and SFM elements in the Standard;
- c) ongoing and meaningful public participation;
- d) progress towards or achievement of performance targets; and
- e) continual improvement in performance.

The Standard provides SFM specifications that include public participation, performance, and system requirements that must be met to achieve certification. These specifications were the framework for the development of the Prince George SFMP.



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The SFMP is not an isolated document in the realm of forest planning as it is linked in many areas to other operational and higher level plans. The SFMP, while in development, has considered the objectives stated in the Prince George LRMP. Although the LRMP is not a higher level plan, it has been recognized by government agencies as a document that reflects the interests of local stakeholders. The SFMP is also linked to licensee's Forest Stewardship Plans (FSP) in that many of the results and strategies of the FSPs are found as indicators in the SFMP. Licensees and BCTS will track results, strategies and indicators, in their respective site plans and environmental management systems.

The licensees and BCTS reviewed each of the indicators in this plan against a series of factors that may pose a risk to the indicator not meeting the identified targets. Some of the main risk factors included: Non-Replaceable Forest Licensees, Small Scale Salvage, changing government policy, sharing and monitoring of data (LLOWG processes), expansion of other resource users (oil and gas, mining, etc.) and other natural events beyond the licensees and BCTS control (i.e. wildfires, forest health outbreaks, floods, etc.),

Through indicator monitoring, agreements to work together and continuous improvement, the licensees and BCTS will significantly reduce the risk of the key concerns noted above.

## 2.0 The Defined Forest Area

The SFMP, like most forest management plans, is generally prepared for a specified area of forest, including land, water, and range, to which the SFMP is applied. This plan defines the Prince George DFA as the Crown Forest land base contained within the Prince George Forest District and the traditional operating areas of the signatory licensees and BCTS. (see Appendix 1 for maps showing traditional operating areas and exclusion areas.)The Operating Areas for each licensee and BCTS is summarized in Table 1.

Table 1: Signatories to the Prince George SFMP

Signatories	Prince George SFMP Signatory Operating areas (gross ha.)	% of Total Operating Areas
Carrier Lumber Ltd.	174,544	9%
Canfor, P.G. Operating Area	1,287,153	65%
B.C. Timber Sales, P.G. Business Area	514,751	26%
Total Operating Area	1,976,478	100%

### 2.1 Biophysical Description

The PG TSA is located in the north-central interior of BC, covers approximately 7.5 million hectare of area and is subdivided into three forest districts; 1) Fort St. James; 2) Vanderhoof; and 3) Prince George.

The Prince George Forest District has a gross area of approximately 3,167,027 hectares of which 2,472,637 hectares (78%) is considered forested. The size of mature Timber Harvesting Landbase (THLB) is 732,097 hectares and is composed of Spruce/Balsam (56.2%), lodgepole pine (37.7%) and Cedar/Hemlock (3.5%) stands. A minor amount of Douglas-Fir and Deciduous leading stands exist and make up 2.6% of the Timber Harvesting Land Base. (MOF Prince George District website).

The Prince George DFA is comprised of a diverse landscape of many different forests and ecosystems. From the moist Rocky and Cariboo Mountains in the north and east to the dry rolling plateau landscape of the south and west there is a wide variety in climate, soils, and topography. The DFA contains a large number of lakes and major rivers such as the Fraser, Nechako, McGregor, Salmon, Blackwater, Chilako, Bowron, Crooked, Willow, and Parsnip (LRMP, 1999). These rivers played an important role in the histories of the First Nations and early European settlement of the region. The forests that occupy the

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DFA are as diverse as the landscape they occupy. White spruce, lodgepole pine, Douglas fir, western red cedar, and many other coniferous and deciduous tree species occupy the land in a wide range of ages, composition, and structure.

### 2.1.1 Natural Disturbance / BEC

The DFA's landscape has also been divided into "Natural Disturbance Units" (NDUs). As referenced by Craig DeLong (2002), the underlying assumption of natural disturbance unit classification is that the biota of a forest is adapted to the conditions created by natural disturbances such as fire, wind, and insects. This SFMP uses NDUs for several of its landscape level objectives. The NDUs in the DFA are:

- 1) **Boreal Foothills (subunit Mountain)**
- 2) **McGregor Plateau**
- 3) **Moist Interior (subunit Mountain)**
- 4) **Omineca (subunit Mountain)**
- 5) **Wet Mountain**
- 6) **Wet Trench (subunits Mountain and Valley)**

NDUs are further divided into "biogeoclimatic classification" (BEC) zones. BEC considers the vegetation potential on a site (bio), the use of soils and geology (geo), and the overriding climatic factors. There are 14 BEC zones in British Columbia, with each zone divided into subzones and variants. There are 4 BEC zones in the DFA:

- 1) **Sub-Boreal Spruce (SBS)**
- 2) **Engelmann Spruce- Sub-alpine Fir (ESSF)**
- 3) **Interior Cedar- Hemlock (ICH)**
- 4) **Alpine Tundra (AT)**

See Appendix 1 for maps of the NDUs and the BEC zones in the DFA

Forest management in the DFA is based on the concepts of NDUs and BECs. By basing forest management decisions on the ecology of a site, the changes associated with forest operations should be more consistent with the patterns and structures of natural disturbance.

As research and technology advance in the field of forestry, land classifications and divisions continue to evolve. This SFMP will consider these changes through future adaptive management processes.

### 2.1.2 Mountain Pine Bark Beetle

The western portion of DFA is currently experiencing a substantial infestation of the Mountain Pine Bark Beetle (*Dendroctonus ponderosae*), an insect that is a natural part of forest ecosystems in the central interior. The causes for the current infestation are complex. Fire suppression activities, from a natural disturbance perspective, have interrupted natural cycles of large uncontrolled wildfires. Due to the absence of these events a large supply of mature lodgepole pine (the viable host for the beetle) was made available through much of the DFA. Historically, cold weather in late October and early November kept mountain pine beetle populations relatively controlled. However, in the last decade warmer weather patterns have developed, resulting in a massive explosion in the pine beetle population across a large area of the central interior.

The exponential growth of beetle populations is affecting both current and future timber supply, as well as causing the decline in the aesthetic qualities of some forest landscapes as large areas of forest die. From an economic perspective, the forest industry is particularly concerned with the utilization of infested timber. If beetle killed trees are not harvested soon after their demise, their wood quality will progressively deteriorate until it becomes unsuitable for use in lumber production. As a result, harvest levels have increased in an attempt to capture the economic value of this timber before it is lost. The Prince George DFA is part of the larger Prince George Timber Supply Area (TSA), occupying 44% of the

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TSA area. In 2004, the PG TSA annual allowable cut (AAC) was increased by 2.9 million cubic meters in order to salvage the beetle-killed timber. Approximately 400,000 cubic meters of this was allocated to the Prince George Forest District. However, this increase in harvesting must be balanced with maintaining other values of SFM. Through the SFMP, management strategies will be developed and implemented to attempt to reduce the impacts of the pine beetle epidemic and restore infested stands to productive forests. The Prince George Licensees and BCTS are committed to management regimes that will promote the overall health of the forest landbase.

### ***2.2 Socio-Economic Description***

The Prince George DFA had a population of 83,259 in 1991 (LRMP, 1999). The City of Prince George is the largest community in the DFA with a population of 72,406 (Govt. of Canada, 2001). Several other small communities are scattered throughout the area, including Bear Lake, Summit Lake, Hixon, Longworth, Penny, Dome Creek, Willow River, Shelley, and Stoner.

The Prince George economy has historically been founded on the forest industry, which accounts for 32% of basic sector employment (LRMP, 1999). While the economy has been diversifying in recent years with strong growth in the commercial and service sectors, the forestry sector continues to play the dominant role in the region's economy.

In addition to mill-related employment, the forest sector provides employment in the form of harvesting operations, silviculture activities, planning and management. The importance of industrial forestry for the DFA highlights the need for sustainable forest management to ensure future resources will be present.

#### **2.2.1 First Nations**

The following First Nation's communities have interests in the DFA: Lheidli T'enneh First Nation, McLeod Lake (Tsekani) First Nation, Nak'azdli Band, Nazko Band, Red Bluff Band, Simpcw First Nation (North Thompson) and the Saik'uz First Nation. Two additional First Nations communities have extended interests into the DFA: Halfway River First Nation and the West Moberly First Nations.

As First Nations have historic, cultural, and economic ties to the DFA, it is important they have an opportunity to provide input into management decisions developed for the DFA. In appreciation of their association with the DFA, the participating Licensees and BCTS prepared this SFMP by providing First Nations with the opportunity to participate in its development. The PG SFMP Steering Committee and the PAG recognize and agree that Aboriginal participation in the public participation process will not prejudice Aboriginal and Treaty Rights.

## **3.0 Developing the SFMP**

The Prince George SFMP was developed to outline how the participating Licensees/ BCTS will conduct forest management within the DFA to meet the goals of SFM and to achieve certification under the CSA Z809-02. This section will provide background information on the Licensees and BCTS who are part of the SFMP, and the public participation process, with emphasis on the Public Advisory Group (PAG). It will also provide an introduction to the values, objectives, indicators, and targets that will address the Canadian Council of Forest Ministers (CCFM) SFM criteria and SFM elements in the Standard.

### ***3.1 The Industry***

The forestry sector dominates the economy within the Prince George Forest District and accounts for 32 percent of basic sector employment. There are 12 major sawmills, three large pulp mills, and numerous value-added manufacturing operations.

Communities in the Prince George District include the City of Prince George, Bear Lake, Summit Lake, Hixon, Longworth, Penny, Sinclair Mills, Willow River, Upper Fraser, McLeod Lake, Nukko Lake,

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Giscome, Shelley, Dome Creek, Aleza Lake, Red Rock, Stoner, Beaverley, Mud River, Punchaw, Strathnaver and Isle Pierre.

The Prince George TSA has an AAC of approximately 14,944,000 m<sup>3</sup> as of October 1, 2004. Currently, the district has an approximate annual harvest level of 5.3 million cubic meters per year (BC MOF 2004b). This is based on recent uplifts to address the increase of mountain pine beetle infested timber. The current cut volume in the DFA is a combination of original district cut, mountain pine beetle uplift and transfer volume. The combined AAC volumes as percentages of the total AAC apportionment to the DFA by the Minister of Forests are as follows (BC MOF 2004b):

**Table 2.0 Prince George TSA AAC Apportionment, Current and Estimated (see Appendix 1 for data source).**

Forest License	PGTSA AAC	%	Prince George Forest District Cut for 2004 (m <sup>3</sup> )	%		Estimated Cut in Prince George For 2005 (m <sup>3</sup> )	%	
<b>Signatories</b>								
Carrier Lumber Ltd.: FL A18158 FL A70174	553,027	5.9	409,910	7.5	64.7	500,000	9.2	70.8
Canfor: FL A40873, FL A18165, FL A18167, FL 57332	3,725,218	39.5	2,285,031	42.0	42.0	2,500,000	46.0	46.0
BCTS (volume advertised)	2,794,588	29.7	1,149,443	21.1	86.9	1,219,729	22.4	93.2
<b>Non-Signatories</b>								
Winton Global : FI A18171,	505,541	5.4	482,641	8.9	50.9	600,000	11.0	57.0
Lakeland Mills: FL A18163	254,102	2.7	342,293	6.3	57.2	250,000	4.6	61.6
<i>Stella-Jones Inc.</i>	47,048	0.5	47,048	0.9	86.8	47,048	0.9	94.1
<i>West Fraser Mills Ltd.</i>	20,320	0.2	20,230	0.4	87.1	20,230	0.4	94.5
<i>Other replaceable forest licensees</i>	1,521,433	16.2	0	0.0	87.1	0	0.0	94.5
<i>Prince George Hardwood NRFL</i>	0	0.0	50,000	0.9	88.0	50,000	0.9	95.4
<i>TRC NRFL</i>	0	0.0	50,000	0.9	89.0	50,000	0.9	96.3
<i>Small Scale Salvage licensees (average)</i>	0	0.0	600,000	11.0	100.0	200,000	3.7	100.0
<b>TOTAL</b>	<b>9,421,277</b>	<b>100.0</b>	<b>5,436,596</b>	<b>100.0</b>		<b>5,437,007</b>	<b>100.0</b>	

### 3.2 The Signatories

A group of Prince George Forest District Licensees and BCTS (the Signatories) have developed an Memorandum of Understanding (MOU) which states/ outlines how they are going to work together in developing a district-wide Sustainable Forest Management Plan (SFMP). The Signatories to the MOU include:

- **Carrier Lumber Ltd.,**
- **Canadian Forest Products Ltd., Prince George Operating Area**

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- **BC Timber Sales, Prince George Business Area**

Participation in the development of the PG SFMP will require the signatories to work within a public process to jointly develop SFM indicators and targets. The Signatories will use the SFM indicators and targets to monitor progress, publicly report, and promote continuous improvement of the PG\_SFMP as agreed to in the signed MOU.

As stated in the MOU, the Signatories agree to the following goals:

1. To jointly develop a SFMP covering the geographic area of the Prince George Forest District that meets the requirements of the CSA SFM standard (Z809-02).
2. To work together over the term of the plan to fulfill the PG SFMP commitments including, data collection and monitoring, participating in public processes, producing public reports, and continuous improvement.

The Signatories have established a steering committee structure to ensure the goals listed above are achieved (refer to as the Licensee Steering Committee which includes BCTS).

The Signatories to this SFMP all possess "volume based" allocations in the Prince George Timber Supply Area (PGTSA). "Volume based" tenures, as opposed to "area based" tenures, have no "fixed area" but allow the tenure holder to harvest a specified volume of timber in the larger Timber Supply Area.

Each company and BCTS has existing initiatives that will contribute to the overall SFM strategy. These may include existing management systems such as ISO 14001 Environmental Management Systems, standard operating procedures, and internal policies. These will have to be re-examined to ensure they are compatible with the procedures outlined in this SFMP.

More information on the individual signatories to this SFMP is as follows:

### **3.2.1 Canadian Forest Products Ltd, Prince George Operating Area (Canfor)**

Canfor is a leading integrated forest products company based in Vancouver, B.C. It is the largest producer of softwood lumber and one of the largest producers of northern softwood kraft pulp in Canada. The company also produces paper, plywood, remanufactured lumber products, oriented strand board (OSB) and several other wood products.

Canfor operates several facilities in the DFA. These include four sawmills (Clear Lake, Polar, Prince George and Rustad) and three pulp and paper operations (Intercontinental Pulp, Northwood Pulp, Prince George Pulp and Paper). They also operate the J.D. Little Forest Centre that contributes to their reforestation efforts.

Since 1999, Canfor has retained an International Organization for Standardization (ISO) 14001 certification of its environmental management system for its forest operations. Canfor also retains certification under the CSA standard for sustainable forest management for its Tree Farm Licenses in Chetwynd, and Prince George, BC, and for its Forest Licenses at Fort St. John, Houston, Quesnel, Mackenzie, Radium, Vavenby, Grande Prairie, Vanderhoof, Fort St. James and Fort Nelson, BC.

#### **Environment Policy (February 2005)**

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

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- 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 systems
- Communicate our sustainable forest management and environmental performance to our Board of Directors, shareholders, employees, customers, and other interested parties

Canfor's Forestry Principles were unveiled in June of 1999 and are a key initiative toward the goal of sustainable forest management. The Forestry Principles provide broad corporate direction to forest management in 10 areas on licensed public lands and is the umbrella document that guides all other planning initiatives within Canfor, including SFM Plans. An overview of the Forestry Principles is provided below:

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

Through our commitment to SFM and Forestry Principles, we are also committed to respecting Aboriginal and treaty rights and to providing opportunities for interested Aboriginal Peoples to have input to our sustainable forest management planning activities.

### 3.2.2 BC Timber Sales, Prince George Business Area (BCTS)

BC Timber Sales is an independent organization within the B.C. Ministry of Forests and Range created to develop Crown timber for auction to establish market price and capture the value of the

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asset for the public. The vision of BC Timber Sales is to be "An effective timber marketer generating wealth through sustainable resource management".

BC Timber Sales has 12 Business Areas and an operational presence in 33 locations across BC. The organization manages 20 percent of the annual provincial Crown harvest. The Prince George DFA is part of the larger Prince George BCTS Business Area, with the Timber Sales Office located in Prince George.

BCTS is committed to certification of its operations and has maintained its ISO 14001 certification in all 12 business areas through its Environmental Management System (EMS). By the end of 2010 it is expected that the organization will be successful in amalgamating under a single ISO 14001 certificate. The BCTS corporate strategy for Sustainable Forest Management (SFM) recognizes all three internationally recognized standards used in British Columbia – Canadian Standards Association (CSA Z809), the Sustainable Forest Initiative and Forest Stewardship Council. BCTS has achieved SFM certification in over 80 percent of its operations.

BCTS is committed to adhering to its Environmental Policy (August 2009) and in relation to the areas covered by this plan the additional requirements of its Sustainable Forest Management (SFM) Policy.

### **Environment Policy** (*August 1, 2009*)

The British Columbia Ministry of Forests and Range, B C 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.

*It is the policy of BCTS to:*

- 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.
- 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.

### **Sustainable Forest Management Policy** (February 5, 2010)

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.

### 3.2.3 Carrier Lumber Ltd. (Carrier)

Carrier Lumber Ltd. of Prince George is a non-integrated forest company that has considerable experience in forestry operations and manufacturing of forest products in the Prince George area.

Carrier Lumber Ltd.'s experience with milling began in 1951 with small bush mills, specializing in salvage and remote operations in the Prince George area. Carrier Lumber Ltd. quickly established a reputation for innovative technology and the ability to undertake difficult projects. In 1976, Carrier built its Tabor Mill facility located in Prince George's BCR Industrial site. The facility consists of a two-line dimensional sawmill that directly employs over 130 people from the local community. Today, Carrier Lumber Ltd. remains one of the few privately owned, independent operations in the Central Interior.

Carrier Lumber Ltd. is committed to Sustainable Forest Management, responsible stewardship of the environment and forest management certification. Carrier Lumber Ltd. has developed and implemented an Environmental Management System to meet the ISO 14001 requirements.

#### **Sustainable Forest Management & Environmental Policy (December 9, 2005)**

CARRIER LUMBER LTD. is committed to Sustainable Forest Management and responsible stewardship of the environment in our Forest Practices. To achieve this objective we are committed to:

- Meeting or exceeding all applicable laws, regulations, policies and other pertinent requirements to which the organization subscribes,
- Meeting or exceeding all applicable laws, regulations, policies and other pertinent requirements as they relate to:
  - Preventing pollution in our forest practices,
  - Respecting Aboriginal and treaty rights,
  - Providing conditions and safeguards to the health and safety of our employees, contractors, and the public in our forest practices,
- Ensuring the Sustainable Forest Management & Environmental Policy is available to the public,
- Providing opportunities for Aboriginal and public participation through a public advisory group,
- Providing the framework for setting and reviewing environmental objectives and targets,
- Documenting, implementing, maintaining and communicating our policy throughout our company,
- Improving knowledge of Forest Management and implementing advances in Sustainable Forest Management through new science and technology,
- Continual improvement in Sustainable Forest Management and environmental management in our forest practices.

### **3.3 The Non-Signatories**

This SFMP was designed as a collaborative effort among the major Licence holders within the Prince George Forest District. The primary Licence type within the DFA is a volume-based Forest tenure. To provide continuity for industry planning processes and public participation, the entire district was included as the DFA for this plan.

In response to the increasing attack of mountain pine beetle in the Prince George TSA, the annual allowable cut (AAC) has been increased by the Ministry of Forests and Range. As a result, it is



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anticipated that Non-Replaceable Forest Licences (NRFL's) will be awarded in 2005/2006. The Licensee Steering Committee recognizes that NRFL's may have an impact on certain measures of SFM within this plan. At this time, these impacts are still uncertain and it is difficult to address the influences of additional Licences based on current knowledge gaps. As the AAC increases and new licenses are awarded within the Prince George Forest District, this SFMP will also be re-visited and updated accordingly in order to continually evolve with District and Provincial initiatives. In response to additional Licences within the DFA, the Licensee Steering Committee may consider revising existing measures, developing additional measures or dropping current measures as required to uphold the principles of SFM.

Efforts will continue to be made by the Licensee Steering Committee to have non-signatory Licence holders become signatory to the SFMP or as a minimum, incorporate non-signatory license data into the SFMP as required. This data is being collected by licensees and BC Timber Sales involved in the Licensee Landscape Objective Working Group (LLOWG). Other license holders are being encouraged to participate in this process in order to meet their landscape objectives as identified in their Forest Stewardship Plans.

The two other major licenses with replaceable forest licenses in the DFA are Lakeland Mills Ltd and Winton Global Lumber Ltd. They have chosen to pursue and maintain SFM certification as part of the larger Sinclair Group of companies.

Licensee Steering Committee members are committed to working with non-signatory Licence holders in conjunction with this plan in order to ensure SFM is achieved across the DFA.

### **3.4 Public Advisory Group**

One of the general requirements of the CSA SFM Z809-02 Standard is for "ongoing and meaningful public participation". Public participation is a crucial part of SFM in Canada as it recognizes the right of members of the public to be involved with the management of publicly owned forests. By participating in the process, citizens can express their views on how public forests are to be managed, and they can enhance their knowledge of SFM.

One of the public participation strategies suggested in the CSA SFM Standard is the formation of a local group of interested and affected parties to provide input on an ongoing basis. This strategy provided the base for the formation of a Public Advisory Group (PAG) whose purpose is to achieve the following CSA SFM Standard's public participation requirements.

Interested parties shall have the opportunities to work with the organization to:

- i) identify and select values, objectives, indicators, and targets, based on the CSA SFM elements and any other elements of relevance to the DFA;
- ii) develop alternative strategies to be assessed;
- iii) assess alternative strategies and select the preferred one;
- iv) review the SFM plan;
- v) design monitoring programs, evaluate results, and recommend improvements; and
- vi) discuss and resolve any issues relevant to SFM in the DFA.

The Licensees/ BCTS established a PAG in the fall of 2004 to assist with developing this SFMP. To promote participation in the PAG, in October 2004 the Licensees/BCTS sent a letter of invitation to approximately 275 individuals as well as five First Nations in the Prince George Forest District, advertised in two local newspapers, and hosted an Open House. The Licensees/ BCTS invited a sixth First Nation, the Red Bluff Band to participate in the PAG process in November 2004. On April 26, 2006 the Simpcw First Nation (North Thompson) was invited to the process. In 2007, the Halfway River and West Moberly First Nations were invited to participate in the PAG process.

Between November 2004 and October 2005, the PAG met on thirteen occasions, with an average of 22 public members at each meeting, to undertake the work necessary to develop the SFMP. By the end of 2004 they had developed a Terms of Reference. Their membership was drawn from a wide range of

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sectors in the Prince George Forest District. Each sector then selected a representative to participate in the PAG. Alternates to the sector representatives, advisors, and observers (that is, members of the general public) were welcome at PAG meetings. In all, fifty members of the public and First Nations attended at least one PAG meeting and/or received the agenda and minutes for each PAG meeting.

After completing the Terms of Reference in December 2004, the PAG began work on the SFMP's Criteria and Elements Performance Matrix. The Licensees/BCTS also created a Continuous Improvement Matrix to assist itself and the PAG in tracking issues that could not be addressed at the current time. After completing the SFMP's Criteria and Elements Performance Matrix in April 2005, the PAG met in September 2005 to review the Forecasting Analysis and decide on an option, and to provide comments on the SFMP to the Licensees/BCTS. In April of 2005 a continuous improvement matrix was updated with the purpose to capture issues presented by PAG members that can contribute to the continuous improvement of sustainable forest management but are either outside the scope of the PAG process or cannot be addressed by the Licensee Steering Committee at the present time. These issues are reviewed at annual PAG meetings for further discussion and prioritization. Over the course of 2006 and 2007 several high priority objectives were worked on through PAG Subcommittees and through general PAG meetings.

See Appendix 2 for a list of the Prince George PAG participants, Appendix 3 for the approved PAG Terms of Reference.

### 4.0 SFM Performance Requirements

The CSA SFM Standard provides a clear set of requirements a SFMP must meet in order to achieve certification. The Standard recognizes that successful implementation of SFM requires both a strong process and comprehensive content. To achieve this, the CSA SFM Standard requires that "values, objectives, indicators, and targets" in the plan clearly address the Canadian Council of Forest Ministers (CCFM) SFM "criteria" and CSA SFM "elements" in the Standard. This section will explain these concepts and how they are related to one another.

#### 4.1 *Criteria and Elements*

The most broadly accepted Canadian forest values created to this point in time are found in the Canadian Council of Forest Ministers (CCFM) criteria and elements. The CSA SFM Standard uses these criteria and elements as a framework for identifying values and to provide consistency in determining local forest values across Canada. The CSA SFM Standard defines criterion and element as follows:

**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 (Montreal Process 1995). Criteria are meant to be broad management objectives that are proven through the repeated, long-term measurement of associated indicators.

**Element:** A concept used to define the scope of each CCFM criterion. Each CCFM criterion contains several elements that serve to elaborate and specify the extent of their associated criterion.

The CCFM Criteria and CSA Elements are outlined in Table 3.

Table 3. CCFM Criteria and CSA Critical Elements

Criteria	Critical Element
Conservation of Biological Diversity	<ul style="list-style-type: none"> <li>• Ecosystem Diversity</li> <li>• Species Diversity</li> <li>• Genetic Diversity</li> <li>• Protected Areas and Sites of Special Biological Significance</li> </ul>
Maintenance and Enhancement of Forest Ecosystem Condition and Productivity	<ul style="list-style-type: none"> <li>• Ecosystem Resilience</li> <li>• Ecosystem Productivity</li> </ul>
Conservation of Soil and Water Resources	<ul style="list-style-type: none"> <li>• Soil Quality and Quantity</li> <li>• Water Quality and Quantity</li> </ul>
Forest Ecosystem Contributions to Global Ecological Cycles	<ul style="list-style-type: none"> <li>• Carbon Uptake and Storage</li> <li>• Forest Land Conversion</li> </ul>
Multiple Benefits to Society	<ul style="list-style-type: none"> <li>• Timber and Non-timber Benefits</li> <li>• Communities and Sustainability</li> <li>• Fair Distribution of Benefits and Costs</li> </ul>
Accepting Society's Responsibility for Sustainable Development	<ul style="list-style-type: none"> <li>• Aboriginal and Treaty Rights</li> <li>• Respect for Aboriginal Forest Values, Knowledge and Uses</li> <li>• Public Participation</li> <li>• Information for Decision-making</li> </ul>

#### 4.2 Values, Objectives, Indicators, and Targets

Using the above Criteria, 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."

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:

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- 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.

The Licensees, BCTS, and the PAG have established indicators and targets. These are found in the Performance Matrix in Appendix 4. 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.

### **4.3 Current Management Practices and Forecasts**

#### **4.3.1 Current Management Practices**

An assessment of the current management practices associated with each indicator will help determine how these practices contribute to SFM. For each indicator in this SFMP the current management practice is briefly described and includes the status of that indicator at the time the plan was written. The status of each indicator in the plan will be evaluated and reported annually in the in the PG SFMP Annual Report (see 4.4.3 Annual Reporting). Using coarse woody debris as an example, a description of current management practices may be the following:

In the Prince George DFA, the current performance standard for harvested blocks is defined in the provincial wide CWD strategy "A Short-term Strategy for Coarse Woody Debris Management in British Columbia's Forests", March 2000. This strategy's objectives include maintaining small, dispersed CWD piles where appropriate to provide denning habitats for furbearers such as pine marten. Other objectives include providing a range of decay and diameter class CWD, and providing both coniferous and deciduous CWD. Standing dead trees can be utilized or stubbed trees can create both CWD and wildlife habitat. The composition and disbursement of CWD and wildlife trees can be managed to reduce impacts from danger trees, wildfire and forest pests or forest disease hazards. Current levels of CWD in the DFA are expected to exceed the stated target for this indicator.

This information may include tables detailing the historic trends in meeting the indicator target. Extrapolating current/ past management practices into the future may not always be a reliable method of predicting the future success of that practice in meeting an indicator's target. However, it is useful in providing a base for developing forecasts where specific modeling information is unavailable or insufficient.

#### **4.3.2 Forecasting and Scenario Analysis**

The CSA SFM Standard requires explicit forecasts for all indicators. Forecasting indicators requires approaches suited to each indicator. These may include mathematical models, GIS models for quantitative indicators, or scenario-building techniques for qualitative indicators.

Some indicators were forecasting using a GIS modeling technique as follows: An SFM indicator-forecasting project covering the area of the plan was initiated in June 2005. The purpose of the project was to forecast the effects of chosen forest management scenarios on the long-term sustainability of the chosen indicators/measures based on the established targets and thresholds developed in the Public Advisory Group process. A digital dataset was developed that included various base forest inventory GIS

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data coverage, timber data GIS coverage, non-timber GIS coverages and, licensee and BCTS cutblocks and roads.

A base case was developed and modeled into the future for about 250 years and is the basis for comparing all other management scenarios. The base case used the best available knowledge about current forestry management practices and the growth of the forest. The beetle epidemic is modeled using the provincial-level projection of mountain pine beetle epidemic, current to April 2005. Several other scenarios were modeled and results presented to the Public Advisory Group. The scenario chosen for moving forward in this plan is the Scenario 4 – SFM Base Case with Incremental Silviculture. This scenario simulates increased site productivity due to improved site index, genetic gain, aggressive restocking, and stand management. Height and volume of all species is increased by 20% uniformly for all future managed stands. Regeneration delay is reduced by 1 year. Minimum harvest ages are adjusted appropriately. A summary report outlining assumptions and results of the basecase, and scenarios, is included in Appendix 13.

However, many of the indicators in this SFMP were forecasted by the scenario-building technique, using a logical “what if” scenario analysis, on how the ecological, environmental, and social values of SFM would be affected if the target for each indicator were not achieved.

Using the coarse woody debris indicator and target used in previous examples, a forecast using the "what if" scenario analysis could be as follows:

As this indicator currently has the target set at 100% consistency, one other scenario should be identified:

- a) What if 50% of cutblocks were consistent with coarse woody debris requirements in operational plans?

If only 50% of cutblocks met coarse woody debris requirements in operational plans there could be several negative impacts to ecosystem health and diversity. Maintaining coarse woody debris is a legal requirement. If insufficient CWD is retained, soil nutrient and moisture retention levels may decrease. Dispersed CWD provides shelter to small animals, as well as young seedlings that require shade and snow retention for survival. CWD piles are valuable denning sites for small furbearers whose numbers may decrease in their absence. By enhancing plant and animal habitat, CWD contributes to the overall health and diversity of the forest ecosystem. Therefore, all Licensee Team members are committed to meeting the target of 100% consistency with operational plan requirements for CWD.

This method is somewhat subjective in predicting the "what if" scenario, but it can highlight how important the individual indicator can be to overall SFM in a manner mathematical models cannot achieve.

Note, “what if” scenarios are strictly hypothetical scenarios used for contrasting the impacts of operational practices on environmental, social and economic indicators. Where those scenarios depict a practice that falls below the legal requirement, the legal requirement will prevail as a minimum. Any forest practice referred to in legislation has a legal requirement. Forest Stewardship Plans also constitute a legal requirement.

### **4.4 Adaptive Management**

The concept of "sustainability" is based on the idea that a value is maintained over time. If the management of the DFA's forests is to be sustainable, forest managers must be able to adapt plans and practices to respond to the inevitable changes to the forest resource. The CSA SFM Standard recognizes this and requires SFM systems to be based on the principle of "adaptive management, which enables and encourages the improvement of management actions and practices based on knowledge gained from experience" (CSA, 2002). Adaptive management is used to achieve continual improvement.

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This is accomplished by regularly monitoring, recording, and assessing the indicators, and then modifying forecasts, activities, and plans, based on this information.

### **4.4.1 Monitoring**

Monitoring of indicators involves the collection of data to verify the achievement of targets. For each indicator in the SFMP a monitoring strategy will be identified. In many cases, established Licensee/ BCTS EMS frameworks, standard operating procedures, and tracking systems will fill this role.

Collecting the data is the first step. The second is to record the information in such a manner that it can be retrieved for analysis and evaluation. All Licensees and BCTS maintain databases of some form, from traditional paper filing systems to electronic GIS databases such as GENUS rmt. For continual improvement to occur the recording of monitoring information must be timely, complete, and accurate. Failure to do so will reduce the quality of analysis, evaluation, and adjustment that is required for SFM to succeed.

### **4.4.2 Analysis, Evaluation and Continual Improvement**

Analysis of data collected during the monitoring phase is important to relate indicator performance to the particular management strategy applied to achieve the target. Without this analysis, it is impossible to learn what changes (if any) are necessary to meet targets or how to implement them.

The analysis, evaluation and continuous improvement phase of SFM is one of the most difficult aspects of the process. The personnel responsible for data analyzing must be objective when determining if changes are required to either the indicators or the strategies used to achieve targets. Cooperation between the PAG and the Licensees/ BCTS is important for continuous improvement of sustainable forest management performance.

### **4.4.3 Annual Reporting**

Communicating the results of the monitoring and analysis stages is important for the process of adaptive management. Without knowledge of the results of indicator performance, the Licensees/ BCTS and the PAG will be unable to recognize problems or take steps to improve them in a timely manner.

The annual report will describe the success of the licensees and BCTS as a team in meeting the indicator targets over the DFA. The report will be available to the public and will allow for full disclosure of forest management activities, successes, and failures. It will include the identification of management practices that are not meeting targets and proposed actions to improve and adaptively manage forestry in the DFA. By creating an annual report, sustainable forest management can be viewed by the public as an open, evolving process that is taking steps to meet the challenge of managing the forests of the Prince George DFA for the benefit of present and future generations.

## **5.0 SFMP Indicators, Targets and Strategies**

In the following section each indicator and target developed by the PAG is discussed in detail. For each indicator the CSA SFM parameters that it addresses are identified (the CCFM criterion, the CSA SFM element, the value, and the objective). These are followed by descriptions of the indicator, current practices, current status and a discussion of how the targets were established and how they are to be met. For each indicator a forecast is made of how the target will impact SFM, particularly its ecological, economic, and social values. Finally, a brief discussion of the monitoring and reporting procedures is made, including a description of who is responsible for these activities.

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Appendix 12 contains Current Indicator Status Summaries by signatory. This appendix will be updated as required to reflect changes in current status for a given reporting period.

The numbers assigned to each indicator correspond to their position in the SFM Criteria and "Elements Performance Matrix"

### **Indicator - 1 Old Forest by Natural Disturbance Unit**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The amount of old forest by NDU/ merged BEC within the DFA	<b>Target:</b> As per the "Landscape Biodiversity Objectives for the PG TSA"  <b>Variance:</b> 0%

Indicator 1 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity
2.1	<b>CSA SFM Element:</b> Forest Ecosystem Resilience
2.1.A	<b>Value:</b> Resilient Forest Ecosystems
2.1.A.a	<b>Objective:</b> Well-balanced ecosystems that support natural processes

#### **Description of Indicator**

This indicator is intended to quantify the amount of the landscape occupied by "old forests" at a point in time. Old forests (late seral) are defined as forests older than 140 years from available forest inventory sources, for all Natural Disturbance Units (NDUs) with the exception of:

- the Moist Interior- plateau sub-unit- all biogeoclimatic ecosystem classification (BEC) variants
- the Omenica Valley SBSdk, SBSdw3, BWBSdk1, SBSmc2, SBSmk1
- the McGregor Plateau- SBS mk1 and SBSmh

where old forests will be considered to be those stands >120 years (Landscape Biodiversity Objectives for the Prince George Timber Supply Area (PG TSA)).

Maintenance of late seral stage stands is crucial for forest management to conserve landscape ecosystem biodiversity. As harvesting usually targets older stands, forest management must consider how harvesting affects the distribution and percentage of seral stands across the landscape. The current Mountain Pine Beetle epidemic presents its own challenges, as older pine leading stands are the most susceptible to infestation. By ensuring the target percentage of old forest by NDU/ BEC within the Defined Forest Area (DFA) is met, the long-term viability of those plant and animal species that depend on these forest types will be maintained. Forest ecosystems will also be more resilient by meeting the targets as a diverse ecosystem with representations from all its variations is more able to adjust to change and disturbances.

The ongoing tracking and measuring of these targets will enable forest managers to plan harvesting for specific NDU's and BEC's without reducing late seral forest stands beyond the limits of natural variability.

As part of the PAG's continuous improvement process, Old Forest Quality was identified as a priority objective to be addressed by BCTS and the Licensees. Although old forest and old interior forest are stratified across the landscape, a strategy was requested by the PAG in order to conserve representative types of old forest.

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Age of the forest alone cannot solely provide an indication of the appropriate and well functioning Old Forest. As such, the Old Forest Quality PAG Subcommittee was formed in April 2006. Several subcommittee meetings were held involving presentations and brainstorming exercises. A FIA project was then initiated to better define and rank old forest in the Prince George Forest District by relative quality. Based on extensive literature reviews and PAG input, a set of Intrinsic indicators (inventory based attributes) and additive indicators (spatially located areas with pre-set high conservation value objectives) were identified. Six intrinsic indicators and five additive indicators were then used to rank old forest polygons (>120 years old or >140 years old) into six quality classes. The accepted model incorporates all intrinsic and all additive indicators included with a ranking completed at the BEC Zone scale. (Manning Cooper and Associates, 2007)

### **Current Practices and Status of Indicator**

The Landscape Objective Working Group (LOWG), which has representation from the Ministry of Agriculture and Lands - Integrated Land Management Bureau (ILMB), Ministry of Forests and Range (MOFR) and timber licensees aided ILMB in the development of landscape biodiversity objectives and old forest retention requirements for the Northern Interior Forest Region, which includes the Prince George DFA. These objectives utilized NDU research conducted by DeLong (2002), and as such, old forest retention objectives have been established for each NDU that occurs within the Prince George DFA. This initiative is not currently practiced in the DFA, but the process has collected substantial data regarding forests in the Prince George District. As such, the current status of late seral forest within the DFA exceeds the minimum levels required as determined through the Licensees Landscape Objective Working Group (LLOWG). Minimum levels of old seral have been used as the basis for the targets identified for this measure so it is apparent that harvesting activities can continue throughout the DFA as long as levels of old seral are closely monitored to ensure the targets are continually achieved or exceeded. Once the LLOWG process is implemented across the DFA, this measure will be more carefully monitored and reported through this process.

A landscape analysis has been conducted across the TSA with the results mentioned above. Some licensees have also been conducting their own analyses to ensure compliance on their part, but the targets are measured across the NDUs, not across operating areas.

The current status for Old Forest as of March 31, 2005 is as follows:



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**Table 4 Old Forest by NDU Merged BEC.**

NDZ	NDU	Total CFLB (ha)	OLD Forest Threshold		Current Status	
			%	(ha)	% of CFLB	Hectares
Boreal Foothills	A1 ESSFwcp3, wc3, mvp2, mv2	7,255	33%	2,394	54%	3,917
McGregor	A2 - ESSf wk2	10,349	26%	2,691	51%	5,295
McGregor	A3 SBSmk1, SBSmh	71,778	12%	8,613	40%	28,558
McGregor	A4 - SBS wk1	219,254	26%	57,006	31%	68,267
Moist Interior	A5 ESSF mv1, 3, wk2	12,396	29%	3,595	47%	5,873
Moist Interior	A6 ESSFwk1	16,417	29%	4,761	51%	8,427
Moist Interior	A7 SBSmh	5,928	17%	1,008	35%	2,075
Moist Interior	A8 SBSmc2, 3	9,145	12%	1,097	52%	4,762
Moist Interior	A9 SBSmw	33,442	12%	4,013	22%	7,433
Moist Interior	A10 SBSwk1	39,088	17%	6,645	39%	15,399
Moist Interior	A11 SBSdw2, dw1	128,564	12%	15,428	37%	48,103
Moist Interior	A12 SBSdw3	179,031	12%	21,484	30%	54,424
Moist Interior	A13 SBSmk1	370,581	12%	44,470	34%	124,234
Wet Mtn.	A14 ESSF wk2	154,009	50%	77,004	86%	132,976
Wet Mtn.	A15 ESSF wc3	27,832	84%	23,379	87%	24,181
Wet Mtn.	A16 SBS wk1	33,914	26%	8,818	41%	13,846
Wet Mtn.	A17 SBS vk	114,671	50%	57,335	72%	82,104
Wet Trench	A18 Eswcp	33,997	80%	27,197	94%	31,906
Wet Trench	A19 ESSFwk2	65,010	48%	31,205	85%	55,407
Wet Trench	A20 ESSFwc3	98,712	80%	78,969	91%	89,530
Wet Trench	A21 ESSFwk1	114,752	48%	55,081	59%	68,086
Wet Trench	A22 ICHwk3	27,175	53%	14,403	71%	19,231
Wet Trench	A23 ICHvk2	145,659	53%	77,199	65%	94,747
Wet Trench	A24 SBSwk1	131,800	30%	39,540	31%	41,071
Wet Trench	A25 SBSvk	152,699	46%	70,242	48%	73,505
Totals		2,203,457	33%	733,577	50%	1,103,355

The current status exceeds the thresholds for each of the NDU's above.

### **Management Strategy for Old Forest Quality**

The following strategies will be implemented in order to provide BCTS and Licensees with a relative old forest quality measure whereby operational planners can evaluate stands of old forests across the landscape:

- Licensees and BCTS will implement the old forest quality predictive model as a tool in operational planning.
- Annually monitor and report out on the area of Good through Best Old Forest Quality by NDU merged BEC in the Prince George Forest District.
- To revisit the model periodically when improved inventory data sets are available specifically to update intrinsic indicators and rankings.

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**Table 4a. Current State of the six rankings of Old Forest Quality by NDU Merged BEC Units.**  
(March 31, 2007)

NDU merged BEC	Total CFLB (ha)	% area of Old Forest Quality predictive model across the Landscape					
		Good					Best
A1 ESSFwcp3, wc3, mvp2, mv2	7,255	0.0%	0.0%	0.5%	7.1%	<b>48.9%</b>	<b>43.5%</b>
A2 - ESSf wk2	10,349	0.0%	0.6%	17.0%	<b>61.1%</b>	18.4%	2.8%
A3 SBSmk1, SBSmh	71,778	0.1%	6.0%	<b>48.3%</b>	<b>38.1%</b>	7.4%	0.1%
A4 - SBS wk1	219,254	0.1%	5.7%	<b>49.0%</b>	<b>33.4%</b>	10.2%	1.6%
A5 ESSF mv1, 3, wk2	12,396	0.0%	0.1%	13.0%	<b>32.4%</b>	<b>41.2%</b>	13.3%
A6 ESSFwk1	16,417	0.0%	0.1%	2.6%	17.5%	<b>35.3%</b>	<b>44.5%</b>
A7 SBSmh	5,928	0.0%	19.7%	<b>59.5%</b>	19.6%	1.1%	0.0%
A8 SBSmc2, 3	9,145	0.0%	0.7%	21.4%	<b>71.6%</b>	6.4%	0.0%
A9 SBSmw	33,442	0.0%	13.2%	<b>63.4%</b>	19.6%	3.8%	0.0%
A10 SBSwk1	39,088	0.1%	3.6%	<b>35.7%</b>	<b>39.0%</b>	17.2%	4.4%
A11 SBSdw2, dw1	128,564	0.3%	18.0%	<b>67.9%</b>	13.2%	0.6%	0.0%
A12 SBSdw3	179,031	0.2%	12.8%	<b>61.3%</b>	<b>23.0%</b>	2.1%	0.5%
A13 SBSmk1	370,581	0.2%	9.7%	<b>47.2%</b>	<b>34.4%</b>	8.5%	0.1%
A14 ESSF wk2	154,009	0.0%	1.5%	16.5%	<b>35.7%</b>	<b>29.7%</b>	16.6%
A15 ESSF wc3	27,832	0.0%	0.7%	<b>24.2%</b>	<b>38.2%</b>	<b>25.7%</b>	11.2%
A16 SBS wk1	33,914	0.0%	4.1%	<b>62.1%</b>	<b>28.7%</b>	3.4%	1.7%
A17 SBS vk	114,671	0.0%	1.0%	<b>26.0%</b>	<b>39.5%</b>	<b>28.1%</b>	5.4%
A18 Eswcp	33,997	0.0%	0.3%	5.2%	<b>23.5%</b>	<b>46.5%</b>	<b>24.6%</b>
A19 ESSFwk2	65,010	0.0%	0.3%	5.5%	<b>21.5%</b>	<b>44.6%</b>	<b>28.2%</b>
A20 ESSFwc3	98,712	0.0%	0.1%	3.9%	16.1%	<b>40.0%</b>	<b>39.8%</b>
A21 ESSFwk1	114,752	0.0%	0.1%	2.0%	14.9%	<b>34.7%</b>	<b>48.3%</b>
A22 ICHwk3	27,175	0.1%	6.3%	<b>40.8%</b>	<b>44.4%</b>	8.2%	0.2%
A23 ICHvk2	145,659	0.0%	1.9%	<b>28.6%</b>	<b>41.6%</b>	23.4%	4.5%
A24 SBSwk1	131,800	0.1%	5.7%	<b>41.3%</b>	<b>38.8%</b>	11.5%	2.6%
A25 SBSvk	152,699	0.0%	2.4%	<b>28.0%</b>	<b>41.3%</b>	<b>23.9%</b>	4.4%
<b>Total</b>	<b>2,203,457</b>	<b>869</b>	<b>59,679</b>	<b>402,834</b>	<b>405,618</b>	<b>285,702</b>	<b>157,383</b>

### **Establishment of Targets and Future Practices**

Targets for this measure were derived from the order establishing landscape biodiversity objectives. Forest Stewardship Plans (FSPs) will be analyzed to ensure they are consistent with the targets and implementation schedule for seral stage. Proposed harvesting will be adjusted if necessary to ensure compliance with targets, and will be reliant on the degree of surplus of old forest that exists.

No targets have yet been established for the Old Forest Quality Strategy. This Strategy is intended to provide guidance for operational planning using the predictive model as a tool in decision making. When planning for future development this is yet another important consideration to be reviewed. Over the next several years, the six old forest quality rankings will be monitored by NDU merged BEC to ensure that a representative sample of old forest quality types are retained over the landscape.

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### Forecasting and Predicted Trends

Forecasting results of the old forest amount indicator under the “Scenario 4 – SFM Base Case with Incremental Silviculture” are shown in table 5.

**Table 5 Old Forest under Scenario 4 - SFM Base Case with Incremental Silviculture**

NDZ	NDU	Target (ha)	Future Forecasting					250 yrs from now (ha)%
			20 yrs from now (ha)	50 yrs from now (ha)	100 yrs from now (ha)	150 yrs from now (ha)	200 yrs from now (ha)	
Boreal Foothills	A1 ESSFwcp3, wc3, mvp2, mv2	2,394	4,661	4,936	6,521	6,167	6,084	5,762
McGregor	A2 - ESSF wk2	2,691	4,197	2,691	2,698	2,853	3,437	2,692
McGregor	A3 SBSmk1, SBSmh	8,613	21,557	18,104	17,367	23,517	23,226	23,441
McGregor	A4 - SBS wk1	57,006	56,982	57,006	57,006	68,817	69,522	70,256
Moist Interior	A5 ESSF mv1, 3, wk2	3,595	3,765	3,374	3,599	3,595	3,596	3,595
Moist Interior	A6 ESSFwk1	4,761	8,139	4,761	4,762	4,762	4,761	4,761
Moist Interior	A7 SBSmh	1,008	3,296	4,259	4,856	5,013	4,945	5,001
Moist Interior	A8 SBSmc2, 3	1,097	3,264	977	1,106	1,669	1,625	1,630
Moist Interior	A9 SBSmw	4,013	5,503	6,482	7,013	10,260	10,108	10,527
Moist Interior	A10 SBSwk1	6,645	11,767	10,625	10,771	12,820	13,130	13,429
Moist Interior	A11 SBSdw2, dw1	15,428	34,462	21,071	23,425	36,091	35,926	36,234
Moist Interior	A12 SBSdw3	21,484	45,228	51,002	58,933	79,570	79,602	81,926
Moist Interior	A13 SBSmk1	44,470	92,871	94,990	96,527	129,741	129,446	130,154
Wet Mtn.	A14 ESSF wk2	77,004	118,262	102,765	102,688	103,683	106,478	102,205
Wet Mtn.	A15 ESSF wc3	23,379	24,048	23,337	22,806	22,938	23,015	23,320
Wet Mtn.	A16 SBS wk1	8,818	10,965	8,818	9,533	11,192	11,453	11,235
Wet Mtn.	A17 SBS vk	57,335	63,524	57,336	57,345	57,340	57,336	57,336
Wet Trench	A18 Eswcp	27,197	30,828	27,116	26,576	27,204	27,166	27,124
Wet Trench	A19 ESSFwk2	31,205	46,710	38,977	37,792	40,022	40,548	38,079
Wet Trench	A20 ESSFwc3	78,969	83,791	77,839	76,360	78,969	78,727	78,728
Wet Trench	A21 ESSFwk1	55,081	64,999	54,852	55,085	55,083	55,085	55,083
Wet Trench	A22 ICHwk3	14,403	18,893	14,398	14,420	14,421	14,439	14,404
Wet Trench	A23 ICHvk2	77,199	78,514	77,199	77,211	77,200	77,199	77,199
Wet Trench	A24 SBSwk1	39,540	39,537	39,540	39,639	39,541	39,540	39,540
Wet Trench	A25 SBSvk	70,242	70,194	70,242	70,286	70,266	70,273	70,242
Totals		733,577	945,956	872,697	884,325	982,734	986,666	983,903

As forest harvesting continues into the future under Scenario 4, the amount of old forest will be reduced to approximately the minimum targets as shown above. From the 50 year forecast results, A8, A21, and A22 slight dip below the target and is assumed due to assumptions of old forest outside of the timber harvesting landbase declining naturally. The Licensees and BCTS are monitoring old forest on an annual basis and will develop strategies to achieve the targets. Additional forecasting of this indicator will occur during the future indicator supply analysis, which is anticipated to be in five-year intervals.

### Monitoring and Reporting Procedures

The LLOWG will convene as required to update the current and future amount of old forest, and the Licensee apportionment (update harvested blocks, newly planned blocks, aging of forest, and Licensee operating area changes). The LLOWG will assess current and anticipated future performances of the

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signatory Licensees/ BCTS in meeting old forest targets and proposed recruitment strategies if targets cannot be met as required.

BCTS and Licensees will annually update the current amount of old forest quality by the six different quality classes across the NDU Merged BECs. Licensees and BCTS will implement these areas in day to day planning activities, and report back to the PAG areas where the model is working and where the model may require refinements based on stand level information.

### **Responsibility and Continuous Improvement Opportunities**

The responsibility for monitoring and reporting this indicator will occur primarily through the LLOWG. Each signatory Licensee/ BC Timber Sales (BCTS) has the following responsibilities:

- 1) to provide a representative to participate in the Licensee LOWG (LLOWG)
- 2) to submit, as requested by LLOWG, an update of newly planned blocks
- 3) to submit, as requested by LLOWG, an update of blocks that have been harvested
- 4) to prepare plans that maintain old forest and old interior forest objectives and trend positively toward meeting young patch size distributions, wherever possible
- 5) as requested by other signatory Licensees/ BCTS, to collaborate in the planning of old forest, old interior forest or young forest patches along licensee operating area boundaries
- 6) to collaborate in planning recruitment strategies for NDU/ BEC units, where old forest or old interior forest targets cannot be met in the short term, and
- 7) to support the LLOWG by providing funding and/ or resources, for projects that have been approved by the signatories, to facilitate implementation, monitoring and adaptive management of the landscape objectives.

In addition to these responsibilities, LLOWG Team will look for opportunities for continual improvement. Substantial loss of old forests in some units is expected due to mortality from the mountain pine beetle infestation and resulting salvage activities. Therefore, the LLOWG has developed a surrogate for old growth, which will include a portion of dead pine stands that contain as many old growth attributes as possible. These surrogate stands are classified as Natural Forest Areas (NFAs). The Licensees/ BCTS have identified the use and value of NFAs as a surrogate to old growth as a possible opportunity for continual improvement.

**Indicator - 2 Old Interior Forest**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The amount of old interior forest by NDU/ merged BEC within the DFA.	<p><u>Target:</u> As per the "Landscape Biodiversity Objectives for the PG TSA"</p> <p><u>Variance:</u> 0%</p>

Indicator 2 addresses the following CSA-SFM criteria, elements, values, and objectives.

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and
2.1	Productivity
2.1.A	<b>CSA SFM Element:</b> Forest Ecosystem Resilience
2.1.A.a	<b>Value:</b> Resilient Forest Ecosystems <b>Objective:</b> Well-balanced ecosystems that support natural processes

**Description of Indicator**

Old interior forest conditions are achieved where the climatic and biotic impact of adjacent younger stands no longer influences environmental conditions. This indicator is important because many species are dependent upon old interior forest conditions for habitat needs. Historically, natural disturbance events such as fire, insects, and wind created diverse landscapes that provided sufficient reserves of mature timber to create ample interior old forest conditions. Sustainable forest management can contribute to creating these conditions by planning harvesting patterns that do not "fragment" the landscape into patch sizes insufficient in area to achieve these goals. By creating interior forest conditions, ecosystem diversity is maintained in the Defined Forest Area (DFA) by creating habitat for plant and animals that depend on these ecosystems. Having a diverse representation of all ecosystem types enhances forest ecosystem resilience by providing habitat for species that contribute to the overall health and productivity of the forest. For example, old interior forests provide habitat for Pileated Woodpeckers that feed on forest pest insects.

**Current Practices and Status of Indicator**

The Landscape Objective Working Group (LOWG), which has representation from ILMB, MOF and timber licensees, aided ILMB in the development of landscape biodiversity objectives for old interior forest conditions for the Northern Interior Forest Region, which included the Prince George DFA. These objectives were established by ILMB in consultation with licensees, BCTS and the MOF and utilize Natural Disturbance Unit (NDU) research conducted by DeLong (2002). Old interior forest retention objectives have been established for each NDU that occurs within the Prince George DFA. The baseline analysis for the establishment of landscape biodiversity objectives across the Prince George TSA used a buffered distance from existing openings and younger age classes to calculate the amount of old interior forest.

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The current status for Old Interior Forest as of March 31, 2005 is as follows:

**Table 6 Old Interior Forest by NDU Merged BEC**

NDZ	NDU	Old Forest Threshold (ha.)	Interior Old Forest Threshold		Current Status	
			%	Ha.	% of OFT	Area (ha.)
Boreal Foothills	A1 ESSFwcp3, wc3, mvp2, mv2	2,394	40%	958	158%	3,784
McGregor	A2 - ESSf wk2	2,691	40%	1,076	153%	4,124
McGregor	A3 SBSmk1, SBSmh	8,613	25%	2,153	138%	11,900
McGregor	A4 - SBS wk1	57,006	10%	5,701	55%	31,223
Moist Interior	A5 ESSF mv1, 3, wk2	3,595	40%	1,438	112%	4,043
Moist Interior	A6 ESSFwk1	4,761	40%	1,904	109%	5,197
Moist Interior	A7 SBSmh	1,008	10%	101	136%	1,368
Moist Interior	A8 SBSmc2, 3	1,097	25%	274	233%	2,555
Moist Interior	A9 SBSmw	4,013	10%	401	99%	3,965
Moist Interior	A10 SBSwk1	6,645	25%	1,661	130%	8,628
Moist Interior	A11 SBSdw2, dw1	15,428	25%	3,857	140%	21,523
Moist Interior	A12 SBSdw3	21,484	10%	2,148	143%	30,693
Moist Interior	A13 SBSmk1	44,470	25%	11,117	145%	64,363
Wet Mtn.	A14 ESSF wk2	77,004	40%	30,802	162%	124,417
Wet Mtn.	A15 ESSF wc3	23,379	40%	9,352	100%	23,437
Wet Mtn.	A16 SBS wk1	8,818	25%	2,204	91%	8,065
Wet Mtn.	A17 SBS vk	57,335	25%	14,334	110%	63,270
Wet Trench	A18 Eswcp	27,197	40%	10,879	113%	30,757
Wet Trench	A19 ESSFwk2	31,205	40%	12,482	164%	51,264
Wet Trench	A20 ESSFwc3	78,969	40%	31,588	104%	82,453
Wet Trench	A21 ESSFwk1	55,081	40%	22,032	86%	47,632
Wet Trench	A22 ICHwk3	14,403	40%	5,761	82%	11,752
Wet Trench	A23 ICHvk2	77,199	40%	30,880	87%	67,530
Wet Trench	A24 SBSwk1	39,540	10%	3,954	45%	17,930
Wet Trench	A25 SBSvk	70,242	25%	17,560	67%	46,942
Totals		733,577	31%	224,619	105%	768,816

The current status exceeds the threshold for each of the NDU's above.

### **Establishment of Targets and Future Practices**

Targets for this indicator were derived from the order establishing landscape biodiversity objectives. It is important that old interior forest objectives be managed with a temporal perspective (i.e. achieving the objectives over time). As stands age, Licensees and BCTS will have to demonstrate how the dynamics of old interior forest will change and be managed. A critical part of 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.

### **Forecasting and Predicted Trends**

Forecasting results of the interior old forest amount indicator under the "Scenario 4 – SFM Base Case with Incremental Silviculture" are shown in Table 7.

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**Table 7 Old Forest Interior under Scenario 4 - SFM Base Case with Incremental Silviculture**

NDZ	NDU	Target (ha)	20 yrs from now (ha)	50 yrs from now (ha)
Boreal Foothills	A1 ESSFwcp3, wc3, mvp2, mv2	958	4,654	4,418
McGregor	A2 - ESSf wk2	1,076	2,540	310
McGregor	A3 SBSmk1, SBSmh	2,153	5,667	4,643
McGregor	A4 - SBS wk1	5,701	18,829	18,208
Moist Interior	A5 ESSF mv1, 3, wk2	1,438	860	743
Moist Interior	A6 ESSFwk1	1,904	3,190	692
Moist Interior	A7 SBSmh	101	2,138	2,558
Moist Interior	A8 SBSmc2, 3	274	698	37
Moist Interior	A9 SBSmw	401	957	935
Moist Interior	A10 SBSwk1	1,661	4,534	3,419
Moist Interior	A11 SBSdw2, dw1	3,857	7,842	3,309
Moist Interior	A12 SBSdw3	2,148	18,580	13,865
Moist Interior	A13 SBSmk1	11,117	32,255	22,132
Wet Mtn.	A14 ESSF wk2	30,802	68,926	28,032
Wet Mtn.	A15 ESSF wc3	9,352	16,258	7,972
Wet Mtn.	A16 SBS wk1	2,204	4,351	1,206
Wet Mtn.	A17 SBS vk	14,334	26,017	13,569
Wet Trench	A18 Eswcp	10,879	23,139	10,864
Wet Trench	A19 ESSFwk2	12,482	22,718	10,353
Wet Trench	A20 ESSFwc3	31,588	57,266	34,907
Wet Trench	A21 ESSFwk1	22,032	37,055	23,017
Wet Trench	A22 ICHwk3	5,761	9,977	4,134
Wet Trench	A23 ICHvk2	30,880	38,596	31,465
Wet Trench	A24 SBSwk1	3,954	13,837	14,156
Wet Trench	A25 SBSvk	17,560	30,556	26,268
Totals		224,619	451,438	281,214

Due to the complexity of calculating interior old forest, forecasting results are only presented into the future for 50 years. Similar to old forest, as forest harvesting continues into the future under Scenario 4, the amount of interior old forest will be reduced to approximately the minimum targets as shown above. From the 50 year forecast results, several NDU areas dip below the target. The Licensees and BCTS are monitoring interior old forest on an annual basis and will develop strategies to achieve the targets. Additional forecasting of this indicator will occur during the future indicator supply analysis, which is anticipated to be in five-year intervals.

### **Monitoring and Reporting Procedures**

The LLOWG 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 LLOWG will assess current and anticipated future performances of the signatory licensees in meeting old interior forest targets and proposed recruitment strategies if targets cannot be met as required.

### **Responsibility and Continuous Improvement Opportunities**

The responsibility of monitoring and reporting this indicator will occur primarily through the LLOWG. The responsibilities of each signatory licensee/BCTS for achieving old interior forest objectives are the same as those outlined in the previous indicator (*Old Forest by Natural Disturbance Unit*).

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In addition to these responsibilities, the LLOWG Team will look for opportunities for continual improvement. Substantial loss of old interior forests in some units is expected due to mortality from the mountain pine beetle infestation and resulting salvage activities. Therefore, the LLOWG has developed a surrogate for old growth, which will include a portion of dead pine stands that contain as many old growth attributes as possible. These surrogate stands are classified as Natural Forest Areas (NFAs). The Licensee Team has identified the use and value of NFAs as a surrogate to old growth and interior old growth as a possible opportunity for continual improvement.

### **Indicator - 3 Young Patch Size Distribution)**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The young forest patch size distribution by NDU within the DFA	<b>Target:</b> As per the "Landscape Biodiversity Objectives for the PG TSA"  <b>Variance:</b> +/- 15%

Indicator 3 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity
2.1	<b>CSA SFM Element:</b> Forest Ecosystem Resilience
2.1.A	<b>Value:</b> Resilient Forest Ecosystems
2.1.A.a	<b>Objective:</b> Well balanced ecosystems that support natural processes

#### **Description of Indicator**

A patch is a forest unit with identifiable boundaries and vegetation different from its surroundings. Often patches are even aged forests established from natural disturbances such as fire, wind or pest outbreaks, or from clearcut harvesting. Patches may be created from a single disturbance event or through a combination of events such as a fire and subsequent salvage harvesting. The result of varying disturbance events over time is a landscape of forest stands and patches of different sizes composed of a variety of species, stocking levels and ages. Many natural disturbance events, such as wildfire have been reduced by forest management practices. In the absence of natural disturbance, timber harvesting is used as a disturbance mechanism and therefore influences the distribution and size of forest patches over much of the Defined Forest Area (DFA). Patch size distribution created by harvesting should emulate the patterns historically created by a natural disturbance regime, where patches varied in size and shape.

<b>Patch Size Categories:</b>
• < 51 hectares
• 51-100 hectares
• 101-1000 hectares
• > 1000 hectares

The indicator addresses the pattern of young forest patches distributed across the landscape, where young forests are defined as stands 0 to 20 years of age. 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 young patch size targets based on historical natural patterns. This indicator will monitor the consistency of harvesting patterns compared to the natural patterns of the landscape.

#### **Current Practices and Status of Indicator**

The Landscape Objective Working Group (LOWG), which has representation from the Ministry of Sustainable Resource Management (ILMB), the Ministry of Forests and Range (MOFR) and timber licensees, aided ILMB in the development of landscape biodiversity objectives for patch size distribution for the Northern Interior Forest Region, which included the Prince George Defined Forest Area (DFA).



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These objectives utilized NDU research conducted by DeLong (2002). Young forest patch size distribution objectives have been established for each NDU that occurs within the Prince George DFA.

As harvesting continues, it is anticipated that the distribution of patches in the appropriate size ranges will be achieved. As Table 8 demonstrates, while current trends will take most patch size distributions toward targets, others will actually be further from achieving objectives due to previous harvesting patterns and the effects of the massive current infestation of mountain pine bark beetle.

The current status as of March 31, 2005 is as follows:

**Table 8 Patch Size Trends**

PATCH SIZE	Current Status				Total	Future Patch Size Trending
	< 50	50-100	100 - 1000	> 1000		
<b>Moist Interior Plateau Target</b>	<b>5%</b>	<b>5%</b>	<b>20%</b>	<b>70%</b>	<b>100%</b>	Trend towards larger blocks in order to reduce the percentage of smaller blocks.
PG (ha)	10,460	10,261	13,283	62,273	96,277	
PG (%)	11%	11%	14%	65%	100%	
<b>Moist Interior Mtn Target</b>	<b>40%</b>	<b>30%</b>	<b>10%</b>	<b>20%</b>	<b>100%</b>	Trend towards smaller blocks in order to reduce the percentage of larger blocks.
PG (ha)	283	866	1,679	825	3,653	
PG (%)	8%	24%	46%	23%	100%	
<b>McGregor Plateau Target</b>	<b>10%</b>	<b>5%</b>	<b>45%</b>	<b>40%</b>	<b>100%</b>	Trend towards the smaller and the larger blocks while trending away from midsized blocks.
PG (ha)	7,131	13,010	43,483	21,486	85,110	
PG (%)	8%	15%	51%	25%	100%	
<b>Wet Trench Valley Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>	<b>100%</b>	Trend towards the smallest and mid-sized blocks and away from the largest blocks.
PG (ha)	9,823	14,636	26,011	68,894	119,364	
PG (%)	8%	12%	22%	58%	100%	
<b>Wet Trench Mtn Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>	<b>100%</b>	Trend towards the smallest and mid-sized blocks and away from the largest blocks.
8463PG (ha)	2,847	5,997	6,609	33,267	48,721	
PG (%)	6%	12%	14%	68%	100%	
<b>Wet Mtn Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>	<b>100%</b>	Trend towards the smallest and mid-sized blocks and away from the largest blocks.
PG (ha)	3,658	6,638	11,993	5,565	27,855	
PG (%)	13%	24%	43%	20%	100%	

### ***Establishment of Targets and Future Practices***

Targets are derived directly from the Order Establishing Landscape Objectives for PG TSA (2004), and are based on the NDU research developed by Craig DeLong (2002). Specific factors will limit how effective the Licensees and BCTS 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 wildfire and the mountain pine beetle epidemic. Specific attention will have to be made to change current trends for those NDU patch sizes that are trending away from targets due to Mountain Pine Beetle infestations. The LLOWG has committed to providing rationale to ILMB for those units and patch sizes that are not trending toward targets when patch size distribution information is updated.

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There are some measures that can be taken to achieve patch size distribution targets. Forest health will have to be closely monitored and addressed before they create excessive patches (either alone or by linking existing cutblocks). This will be particularly challenging in areas of high mountain pine beetle infestation. Harvesting should be planned to connect medium and small patches to create larger patches where there is a surplus of smaller patches and deficit of larger patches. The maintenance of "leave strips" between patches for a minimum of 20 years can be done where the targets for the category are within the desired range.

### ***Forecasting and Predicted Trends***

Forecasting results of the young patch indicator under the "Scenario 4 – SFM Base Case with Incremental Silviculture" are shown in Table 9.

**Table 9 Patch Size under Scenario 4 - SFM Base Case with Incremental Silviculture**

PATCH SIZE	Future Forecasted Condition			
	< 50	50-100	100 - 1000	> 1000
<b>Moist Interior Plateau Target</b>	<b>5%</b>	<b>5%</b>	<b>20%</b>	<b>70%</b>
20 yrs from now (%)	8%	3%	8%	81%
50 yrs from now (%)	22%	7%	20%	51%
<b>Moist Interior Mtn Target</b>	<b>40%</b>	<b>30%</b>	<b>10%</b>	<b>20%</b>
20 yrs from now (%)	4%	10%	25%	60%
50 yrs from now (%)	21%	8%	20%	52%
<b>McGregor Plateau Target</b>	<b>10%</b>	<b>5%</b>	<b>45%</b>	<b>40%</b>
20 yrs from now (%)	13%	6%	19%	62%
50 yrs from now (%)	26%	9%	29%	36%
<b>Wet Mountain Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>
20 yrs from now (%)	10%	5%	6%	79%
50 yrs from now (%)	23%	8%	24%	45%
<b>Wet Trench Mountain Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>
20 yrs from now (%)	17%	11%	21%	51%
50 yrs from now (%)	32%	11%	38%	18%
<b>Wet Trench Valley Target</b>	<b>20%</b>	<b>10%</b>	<b>60%</b>	<b>10%</b>
20 yrs from now (%)	13%	8%	23%	56%
50 yrs from now (%)	25%	13%	52%	9%

Due to the complexity of calculating young patch, forecasting results are only presented into the future for 50 years. The patch size categories were not part of the modeling constraints applied during forecasting analysis and therefore the forecasts are simply reported out patch size values. As a result, the future forecast condition shows that for most of the categories, there is a trend away from the targets overtime, particularly in relation to larger openings. The final design of patches is an operational planning exercise and not a modeling exercise.

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Planning foresters designing patches into the future will be developing and refining short time span (likely 5-year) operational forecasts and monitoring these on an ongoing basis so that patches trend toward the targets.

### **Monitoring and Reporting Procedures**

Patch size targets based on natural disturbance types will be monitored through the Licensee Landscape Objective Working Group (LLOWG). Patch size distribution is reported as per the LLOWG reporting protocols. In order to demonstrate that the young forest patch size distribution objectives are being achieved the Forest Licensees and BCTS will report out patch size distribution every 5 years. The next reporting period is in March 2010. Targets and indicators will be applied based on these reporting protocols. Strategies are being developed by the LLOWG to assist operational planners to assess how new harvest block proposal will fit with existing young patch size distribution. Data sources used in the monitoring process include forest cover inventory, NDU maps, adjacent licensee planning and harvest history information, and database data. Forest cover inventory information with updates from Licensees and BCTS based on harvesting activities will be reported according to the reporting protocol to ensure forest management is moving toward patch size targets identified through the LLOWG and this SFMP.

### **Responsibility and Continuous Improvement Opportunities**

The responsibility of monitoring and reporting this indicator will occur primarily through the LLOWG. The responsibilities of each signatory Licensee/ BCTS for achieving old interior patch size objectives are the same as those outlined in the first indicator.

## **Indicator - 4 Landscape Level Biodiversity Reserves**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The amount of landscape level biodiversity reserves within the DFA	<p><u>Target:</u> Hectares set aside to maintain natural forest conditions across the DFA as per the latest Prince George Timber Supply Review</p> <p><u>Variance:</u> -1%</p>

Indicator 4 addresses the following CSA-SFM criteria, elements, values and objectives.

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems
1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.3	<b>CSA SFM Element:</b> Genetic Diversity
1.3.A	<b>Value:</b> Genetic Diversity
1.3.A.a	<b>Objective:</b> Maintain Natural Genetic Diversity
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity
2.2	<b>CSA SFM Element:</b> Forest Ecosystem Productivity
2.2.A	<b>Value:</b> Productive Ecosystems
2.2.A.a	<b>Objective:</b> Maintain ecosystem conditions that are capable of supporting naturally occurring species.

### **Description of Indicator**

Distributing biodiversity reserves, at a variety of scales (small and large), throughout the managed forest will provide for a mix of vegetation age, structure, and composition that will support a variety of species dependant upon ecosystem diversity.

There are two levels of Biodiversity Reserves: The **stand level**, which include mapped wildlife tree patches and riparian reserve areas, and at the **landscape level**, which includes provincial parks and all

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other large reserve areas that are removed from the timber harvesting land base. This indicator evaluates the amount of productive forest put into landscape level biodiversity reserves for each biogeoclimatic variant. The indicator is related to three SFM parameters and provides for ecosystem diversity, and genetic diversity and forest ecosystem productivity.

Landscape biodiversity reserves provides for ecosystem diversity by creating a variety of different forest types, ages, structures, and composition across a broad area. Maintaining landscape level reserves promotes the distribution of a variety of unmanaged biogeoclimatic variants across the planning area, and therefore ensures that a variety of forest stand types are maintained. This same variety will include a mix of species, and diversity within species that will promote genetic diversity. By providing for ecosystem and genetic diversity, forest ecosystem productivity is enhanced from a wide range of species and habitats all contributing to a well functioning and resilient system.

### **Current Practices and Status of Indicator**

Government currently classifies landscape level retention through higher level and strategic planning initiatives. Some examples of this include Crown Land Plans and the Parks and Protected Areas Strategy.

The current status is shown on Table 10.

**Table 10 Landscape Level Retention**

<b>Landscape Reserve</b>	<b>Reserve Area (ha)</b>		<b>Total Area (ha)</b>
Protected Areas & Parks	269,788		256,295
Old Growth Management Areas	Dome	31,780	31,780
	Slim	56,310	56,310
	Humbug	35,487	35,487
Herrick Old Growth Reserve	4,481		4,481
Recreational Parks	224,879.57		
Reserves from the Crown Land Plan	45,324		45,324
Caribou High	94,468		94,468
<b>Total:</b>			<b>524,145</b>

### **Establishment of Targets and Future Practices**

Landscape level baseline targets for each of the variants were established from a review of the current status of parks/ protected, wildlife/habitat reserves from the Crown Land Plan, and other large-scale reserves from the Timber Supply Review process. The Licensees and BCTS did not establish these reserve areas, but have participated in the process of their allocation, mainly through the participation on various land-use planning processes which were coordinated and led by the Provincial Government over the past number of years. The Licensees and BCTS will continue to work with the various Government Agencies responsible for land-use planning and advocated for the continued protection of landscape-level reserves consistent with the baseline targets.

### **Forecasting and Predicted Trends**

The target for this indicator is to maintain the number of hectares in landscape level reserves as identified in the Prince George Timber Supply Review. Avoidance of any forestry activities in these reserves will help to maintain the set number of hectares. The use of a "what if" scenario is beneficial in identifying anticipated future trends for a measure such as this. As this measure currently has the target set at 100% consistency, one other scenario should be identified:

- a) What if only 50% of the landscape level biodiversity reserves were maintained?

If only 50% of the landscape level biodiversity reserves were maintained there could be negative impacts to ecosystem health and diversity. These reserves serve as natural enclaves in which forest success can proceed without additional disturbance from man-made activities. As a result, ecosystems representative of their respective regions are maintained into the future. This will help to ensure ecosystem health and diversity are maintained. If these reserves are diminished, ecosystem health and diversity may be negatively impacted.

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### Monitoring and Reporting Procedures

Landscape level reserves are calculated as a ratio of the total productive forest area allocated as landscape-level reserves to the total productive forest area in the Defined Forest Area (DFA). Licensees/BCTS will continue to work with Government Agencies to promote the designation of landscape level reserves. All Licensees and BCTS maintain and update spatial data of all landscape-level reserves consistent with land-use and boundary designations from Provincial Agencies. Where significant changes to the designation of reserve areas or inventories have occurred, an automated GIS query is run to assess performance relative to the stated target. Performance relative to the stated target will be assessed and reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### Responsibility and Continuous Improvement Opportunities

Planning Departments are responsible for working with the Government Agencies land-use planning processes. Opportunities for developing new landscape level reserves should be made in consideration of other objectives (protected species, old growth protection) and the current mountain pine bark beetle infestation.

### **Indicator - 5 Stand Level Retention**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The average percentage of stand level retention in harvested areas within the DFA	<u>Target:</u> >7% annually within the DFA, with a minimum of 3.5% by block and no maximum %. <u>Variance:</u> 0%

Indicator 5 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems
1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.3	<b>CSA SFM Element:</b> Genetic Diversity
1.3.A	<b>Value:</b> Genetic Diversity
1.3.A.b	<b>Objective:</b> Sustain Natural Genetic Diversity

### Description of Indicator

As noted in the previous section, biodiversity reserves can occur at the stand level. Stand level retention consists primarily of wildlife tree patches (WTPs) and riparian management areas. WTP's are forested patches of timber within or immediately adjacent to a harvested cutblock while riparian management areas are associated with water features. Stand retention provides a source of habitat for wildlife, to sustain local genetic diversity, or to protect important landscape or habitat features, such as mineral licks and raptor nesting sites. Maintenance of habitat through stand retention contributes to conservation of ecosystem diversity by conserving a variety of seral stages, structure and unique features at the stand level. These features may include coarse woody debris (CWD) for cover, shrubs for browse, and live or dead standing timber for cavity sites. Stand 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 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 retention in harvested stands also contribute 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

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substantially in size, shape and composition. Thus it is essential to design stand retention to maintain the variability of these characteristics.

### **Current Practices and Status of Indicator**

Each Licensee and BCTS in the DFA manages stand level retention for each cut block. Retention level in each block is documented in the associated Site Plan and recorded in the Licensee's/ BCTS' database systems and reported out in RESULTS on an annual basis.

The current status for average stand level retention for all cutblocks with completed harvesting between April 1, 2004 and March 31, 2005 in the DFA is currently 14.5%. In addition, of these blocks, 98.3% met the minimum 3.5% retention level.

### **Establishment of Targets and Future Practices**

The targets of greater than 3.5 % and greater than an average of 7.0 % are derived from the Forest Planning and Practices Regulation, Section 66: Wildlife Tree Retention. These targets were established by government to ensure an adequate amount of original stand structure is maintained in and/or around a cut block as a result of landscape planning. This is a change from forest planning that was previously assessed at a stand level.

Retention of original stand structure will help to mimic characteristics of natural disturbance in order to maintain or create wildlife habitat in the area affected by harvesting.

It is anticipated that the larger the cut block design, the more retention will be associated with the block. Salvage blocks may have reduced retention in relation to their size compared to non-salvage blocks due to diminished quality of stand level retention features. In all cases, the minimum retention requirements will be maintained.

### **Forecasting and Predicted Trends**

Stand level retention is not easy to quantifiably forecast. However, forecasting of this indicator can be completed with the use of a "what if" scenario to help assess anticipated future trends for stand level retention. This could include two potential scenarios:

- a) What if no stand level retention was prescribed in managed stands?
- b) What if three times the stand level retention was prescribed in managed stands?

The ecological benefit from stand level retention is assumed to increase with the number of retention areas present in managed stands. Benefits increase up to a saturation point where overall value then begins to level off. At this point in time it is not possible to identify this saturation point as each stand has different ecological attributes. If no stand level retention was prescribed, it is expected that biodiversity values would diminish. Wildlife productivity may decline, ecosystem and genetic diversity would decrease and natural patterns across the landscape would not be represented. Conversely, if three times the stand level retention was prescribed in managed stands one could anticipate economic values from the timber resource would not be fully achieved. Silviculture activities such as reforestation could potentially become less efficient and more costly due to smaller harvesting units.

The comparison of the above scenarios implies that a balance of values can be achieved through an identified level of stand retention that lies somewhere in between the two situations. Although this level has not yet been identified through past experience or through scientific findings, the Licensees and BCTS are committed to achieving the indicator target and will strive to continually improve practices, as new information becomes available. Within the Prince George DFA, future trends suggest that stand level retention will remain constant or potentially decrease due to the current mountain pine beetle epidemic.

### **Monitoring and Reporting Procedures**

Information for stand level retention is to be found in Site Plans and Licensee/ BCTS information tracking systems such as GENUS rmt or Informs. Stand level retention will be measured within the Prince George Forest District, by Licensee FDU and by Licensee cut block. Each block must contain at least 3.5% retention and there is no maximum value for retention areas. All cut blocks harvested and completed

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between April 1 and March 31 of each year must have an average of greater than 7.0% retention of the total area of the cut blocks.

Annually, stand retention data will be updated as future blocks are harvested, and then reviewed to ensure targets are being achieved. Results will be reported to the Licensee Steering Committee and the Public Advisory Group (PAG) as part of the SFMP annual report. Retention percentages are also reported to the Ministry of Forests and Range annually through RESULTS for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### ***Responsibility and Continuous Improvement Opportunities***

Individual Licensees and BCTS are responsible for monitoring and reporting stand level retention percentages. In the event a Licensee's/ BCTS' planned blocks in a NDU for the year has less than the NDU's target retention %, notification will be made to other participants. The Licensee will have to:

- a) demonstrate to the others' satisfaction that this will not result in a non-conformance to the overall target,
- b) obtain their consent to proceed if other participants' reserves will aid in avoiding a non-conformance, and
- c) redesign proposed blocks to ensure sufficient stand level retention is created.

A potential opportunity for continual improvement would rely on developing strategies to assess the effectiveness associated with wildlife and biodiversity objectives through stand level retention. The Licensees and BCTS will encourage research to evaluate the success of previous stand level retention in order to improve future WTP design.

### ***Indicator - 6 Wet Trench & Wet Mountain Young Patch Size Distribution***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
Trend towards the percentage of area of patches in 101-500ha range within the Wet Trench and Wet Mountain of the young patch size distribution class 101-1000ha	<u>Target:</u> 75% <u>Variance:</u> -5%

Indicator 6 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity
2.1	<b>CSA SFM Element:</b> Forest Ecosystem Resilience
2.1.A	<b>Value:</b> Resilient Forest Ecosystems
2.1.A.a	<b>Objective:</b> Well balanced ecosystems that support natural processes

### ***Description of Indicator***

As noted earlier, a patch is a forest unit with identifiable boundaries and vegetation different from its surroundings. Often patches are even aged forests established from natural disturbances such as fire, wind or pest outbreaks, or from clearcut harvesting. Patches may be created from a single disturbance event or through a combination of events such as a fire and subsequent salvage harvesting.

Patch size categories used in Prince George Forest District include the following: <51 hectares, 51-100 hectares, 101-1000 hectares and > 1000 hectares. However in the higher elevation areas (Wet Trench and Wet Mountain natural disturbance units) the range of 101- 1000 hectares was to large a range to

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actually account for the natural disturbance ecology. Therefore the range was sub divided into 101-500 hectares and 501-1000 hectares.

The result of varying disturbance events over time is a landscape of forest stands and patches of different sizes composed of a variety of species, stocking levels and ages. Many natural disturbance events, such as wildfire have been reduced by forest management practices. In the absence of natural disturbance, timber harvesting is used as a disturbance mechanism and therefore influences the distribution and size of forest patches over much of the Defined Forest Area (DFA). Patch size distribution created by harvesting should emulate the patterns historically created by a natural disturbance regime, where patches varied in size and shape.

The indicator addresses the pattern of young forest patches distributed across the landscape, where young forests are defined as stands 0 to 20 years of age. 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 young patch size targets based on historical natural patterns. This indicator will monitor the consistency of harvesting patterns compared to the natural patterns of the landscape.

### **Current Practices and Status of Indicator**

The Landscape Objective Working Group (LOWG) which has representation from the Ministry of Agriculture and Lands, the Ministry of Forests and Range (MOFR) and timber Licensees, developed landscape biodiversity objectives for patch size distribution for the Northern Interior Forest Region, which includes the Prince George DFA. These objectives utilized research conducted by DeLong (2002). Young forest patch size distribution objectives have been established for each NDU that occurs within the Prince George DFA.

**Table 11 Patch Size Trends for Wet Trench & Wet Mountain NDU**

PATCH SIZE	100 - 1000		Future Patch Size Trending
	100-500	500-1000	
<b>Wet Mountain Target</b>	<b>75%</b>	<b>25%</b>	Trend towards smaller patch sizes and away from larger patch sizes.
<b>PG (ha)</b>	17,547	8,463	
<b>PG (%)</b>	67%	33%	
<b>Wet Trench Mountain Target</b>	<b>75%</b>	<b>25%</b>	Trend towards smaller patch sizes and away from larger patch sizes.
<b>PG (ha)</b>	4,103	2,506	
<b>PG (%)</b>	62%	38%	
<b>Wet Trench Valley Target</b>	<b>75%</b>	<b>25%</b>	Trend towards larger patch sizes and away from smaller patch sizes.
<b>PG (ha)</b>	9,349	2,644	
<b>PG (%)</b>	78%	22%	

### **Establishment of Targets and Future Practices**

Targets come directly from a review of the natural disturbance dataset for the Prince George TSA based on the NDU research developed by Craig DeLong (2002). Specific factors will limit how effective the Licensees and BCTS 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 wildfire, and insect and disease epidemics.

### **Forecasting and Predicted Trends**

Forecasting results of the Wet Trench & Wet Mountain young patch distribution indicator under the "Scenario 4 – SFM Base Case with Incremental Silviculture" are shown in table 12.



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**Table 12 Patch Size Trends for Wet Trench & Wet Mountain NDU under Scenario 4 – SFM Base Case with Incremental Silviculture**

PATCH SIZE	Future Forecasted Condition	
	101-500 ha	501 – 1000 ha
<b>Wet Mountain Target</b>	<b>75%</b>	<b>25%</b>
<b>20 yrs from now (%)</b>	79%	21%
<b>50 yrs from now (%)</b>	65%	35%
<b>Wet Trench Mountain Target</b>	<b>75%</b>	<b>25%</b>
<b>20 yrs from now (%)</b>	76%	24%
<b>50 yrs from now (%)</b>	58%	42%
<b>Wet Trench Valley Target</b>	<b>75%</b>	<b>25%</b>
<b>20 yrs from now (%)</b>	63%	37%
<b>50 yrs from now (%)</b>	58%	42%

Due to the complexity of calculating young patch, forecasting results are only presented into the future for 50 years. The patch size categories were not part of the modeling constraints applied during forecasting analysis and therefore the forecasts are simply reported out patch size values. As a result, the future forecast condition shows that for most of the categories, there is a trend away from the targets overtime, particularly in relation to larger openings. The final design of patches is an operational planning exercise and not a modeling exercise.

Planning foresters designing patches into the future will be developing and refining a short time span (likely 5-year) operational forecasts and monitoring these on an ongoing basis so that patches trend toward the targets. Additional forecasting of this indicator will occur during future indicator supply analyses, which are anticipated to be at five-year intervals.

### **Monitoring and Reporting Procedures**

Patch size targets based on natural disturbance types will be monitored through the Licensee Landscape Objective Working Group (LLOWG). Data sources used in the monitoring process include forest cover inventory, NDU maps, adjacent licensee planning and harvest history information and GENUS data. Forest cover inventory information with updates from Licensees/BCTS based on harvesting activities will be analyzed on an annual basis to ensure forest management is moving toward patch size targets identified through the LLOWG and this SFMP.

### **Responsibility and Continuous Improvement Opportunities**

The responsibility of monitoring and reporting this indicator will occur primarily through the Licensee LOWG and SFM groups. The responsibilities of each signatory Licensee/ BCTS for achieving old interior patch size objectives are the same as those outlined in the first indicator, "Old Forest and Natural Disturbance Unit".

### **Indicator - 7 Coarse Woody Debris**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of cut blocks consistent with coarse woody debris requirements in operational plans.	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 7 addresses the following CSA-SFM criterion, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.1	<b>CSA SFM Element:</b> Ecosystem Diversity
1.1.A	<b>Value:</b> Well balanced and functioning ecosystems that support natural processes
1.1.A.a	<b>Objective:</b> Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems

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### **Description of Indicator**

Coarse woody debris (CWD) is defined as material greater than 7.5 cm in diameter at one end and a minimum of 2.0 meters in length, in all stages of decay and consists of above-ground logs, exposed roots and large fallen branches (B.C. Ministry of Forests, 2000). CWD is a vital component of a healthy functioning forest ecosystem in that it provides habitat for plants, animals and insects. It is also an important source for soil nutrients and aids in soil moisture retention. Targets for CWD requirements are identified in operational plans, typically the site plan for a specific cutblock.

Despite the fact that there is often an economic incentive to minimize debris that is left behind on site, specific CWD retention levels will be targeted in all areas to be harvested. Removal of logging debris can be detrimental if the habitat needs of organisms are compromised. Thus, retention levels have to balance economic and ecological factors.

### **Current Practices and Status of Indicator**

In the Prince George DFA, the current performance standard for harvested blocks is defined in the provincial wide CWD strategy "A Short-term Strategy for Coarse Woody Debris Management in British Columbia's Forests"(BC MOF, 2000). This strategy's objectives include maintaining small, dispersed CWD piles where appropriate to provide denning habitat for furbearers such as pine marten. Other objectives include providing a range of decay and diameter class CWD, and providing both coniferous and deciduous CWD. Standing dead trees can be utilized or stubbed trees can create both CWD and wildlife habitat. The composition and disbursement of CWD and wildlife trees can be managed to reduce impacts from danger trees, wildfire and forest pests or forest disease hazards. Current levels of CWD in the DFA are expected to exceed the stated target for this indicator.

100% of cut blocks where harvesting was completed between April 1, 2004 and March 31, 2005 in the DFA are consistent with coarse woody debris requirements in operational plans.

### **Establishment of Targets and Future Practices**

The target of 100% consistency with CWD requirements in operational plans reflects the importance Licensees and BCTS place on this indicator. Licensees and BCTS will continue to implement pre-work checklists, interim inspections, and final reviews to ensure targets have been met.

### **Forecasting and Predicted Trends**

The target of 100% consistency with operational plans is expected to be achieved. The exact level of success is difficult to forecast as it is dependent on unpredictable factors such as human error. However, it is important to identify what the accepted target means to sustainable forest management. Coarse woody debris levels can influence ecosystem diversity values of SFM. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for a measure such as this. As this measure currently has the target set at 100% consistency, one other scenario should be identified:

- b) What if 50% of cutblocks were consistent with coarse woody debris requirements in operational plans?

If only 50% of cutblocks met coarse woody debris requirements in operational plans there could be several negative impacts to ecosystem health and diversity. Maintaining coarse woody debris is a legal requirement. If insufficient CWD is retained, soil nutrient and moisture retention levels may decrease. Dispersed CWD provides shelter to small animals, as well as young seedlings that require shade and snow retention for survival. CWD piles are valuable denning sites for small furbearers whose numbers may decrease in their absence. By enhancing plant and animal habitat, CWD contributes to the overall health and diversity of the forest ecosystem. Therefore, all Licensees and BCTS are committed to meeting the target of 100% consistency with operational plan requirements for CWD.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the Site Plan are met. These initial, interim and final checks are part of each Licensee's / BCTS' Environment Management System (EMS). If a non-conformance with the Site Plan occurs in the

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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.

The percentage of forest operations consistent with CWD requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Individual Licensees and BCTS are responsible for monitoring, tracking and reporting coarse woody debris levels in their cutblocks. There are many areas for continuous improvement opportunities to maximize the ecological value of leaving CWD without increasing harvesting costs and adhering to current utilization standards. Improvement opportunities will be site specific and may utilize one or more of the following principles:

- Maintain a wide range of diameter and decay classes.
- CWD accumulations at roadside or landings should be minimized to the extent practical. Dispersing small CWD pile throughout blocks may be more beneficial to creating small mammal habitat.
- Retaining standing live/ dead trees and/or stubs on cutblocks can provide important sources of CWD recruitment
- Larger pieces of CWD are more valuable than smaller pieces.
- Retention of a variety of species is preferred.
- The ecological benefits of CWD within riparian areas can be particularly important.
- The retention of CWD should be harmonized with other silvicultural objectives.
- Mountain pine beetle killed stand may provide high opportunities for CWD recruitment.

### ***Indicator - 8 Species Diversity and Ecosystem Productivity***

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of forest operations consistent with approved provincial Caribou Ungulate Winter Range, Mule Deer Ungulate Winter Range, Species at Risk Notice/Orders and Riparian Reserve requirements as identified in operational plans.	<u>Target:</u> 100%  <u>Variance:</u> 0%

Indicator 8 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.2	<b>CSA SFM Element:</b> Species Diversity
1.2.A	<b>Value:</b> Sustainable populations of flora and fauna native to the DFA
1.2.A.a	<b>Objective:</b> Maintain habitat to support flora and fauna native to the DFA
2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Condition and Productivity
2.2	<b>CSA SFM Element:</b> Forest Ecosystem Productivity
2.2.A	<b>Value:</b> Productive Ecosystems
2.2.A.a	<b>Objective:</b> Maintain ecosystem conditions that are capable of supporting naturally occurring species.

### **Description of Indicator**

#### **CARIBOU UNGULATE WINTER RANGE**

Mountain caribou populations are highly sensitive to disturbance and predation within their habitat. Caribou numbers have been in decline due to a variety of causes. Disturbance within critical habitat can put severe downward pressure on productivity of caribou populations through the loss of habitat and by increasing the potential for predation of mountain caribou populations. Predation is mainly a result of an

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increase in early seral vegetation that attracts deer and moose that in turn attracts predators such as wolves and cougars. Increased road access into critical habitat has also results in increased disturbance from motorized and non-motorized recreation. The caribou's low rate of reproduction results in the population's inability to cope with the increased predation and other pressures mentioned above.

With respect to the conservation of biological diversity, sustainable forest management must consider the flora and fauna native to the DFA and the potential impacts it can have on sensitive species. Having viable caribou populations will also maintain forest ecosystem function as they are a long established species that utilize certain plant communities and are prey for carnivores. Maintaining critical ecosystems that are capable of supporting Mountain Caribou is therefore crucial in meeting the objectives of this indicator.

An "Ungulate Winter Range (UWR)" is defined as an area that contains habitat that is necessary to meet the winter habitat requirements of an ungulate species (Government of B.C., 2001). Mountain Caribou were one of the ungulate species considered in the creation of UWRs. As many UWRs can be directly and indirectly affected by forest harvesting activities it is important that licensees in the Prince George DFA track their location and management objectives. Much of the key habitat (UWR and summer range) has been mapped for over 20 years and has been excluded from the THLB in successive TSRs.

### **Current Practices and Status of Indicator**

The B.C. conservation data center has placed mountain caribou on the provincial red list. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) have listed caribou in the southern mountains of BC as threatened. All cutblocks in approved ungulate winter ranges will be consistent with the management guidelines in the approved Order for Ungulate Winter Range #U7-003. The order prescribes specific objectives to maintain mountain caribou winter range, to provide high suitability snow interception, cover, and foraging opportunities. Site plans prepared for these areas will reflect these objectives.

100% percentage of forest operations from April 1, 2004 to March 31, 2005 in the DFA were consistent with approved provincial Caribou Ungulate Winter Range requirements as identified in operational plans. No blocks were harvested in UWR during this reporting period.

More information on the Order can be found at the Government of BC website  
[http://www.env.gov.bc.ca/wld/uwr/ungulate\\_app.html](http://www.env.gov.bc.ca/wld/uwr/ungulate_app.html)

### **Establishment of Targets and Future Practices**

Due to the declining populations of mountain caribou in the DFA, all Licensees and BCTS are committed to 100% of forest operations to be consistent with approved ungulate winter range order #U7-003. Licensees/ BCTS will continue to prepare and implement Site Plans consistent with the management objectives outlined in that order. These objectives can be obtained in more detail from the above website.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with Caribou Ungulate Winter Range requirements as identified in operational plans. The exact level of consistency is difficult to forecast as conditions depend on variables such as site conditions and human error. However, it is important to identify what the accepted targets mean to SFM. Conservation of caribou winter range values 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 % consistency occurred between forest management operations and approved provincial Caribou Ungulate Winter Range requirements as identified in operational plans?

Implementing only 50% of strategies to protect these values could lead to significant ecological, economic and social impacts. The precarious nature of mountain caribou populations means that failure to manage their winter range properly could decrease their numbers to unrecoverable levels. For example,

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harvesting and road construction performed in a manner inconsistent with the UWR orders could reduce forage opportunities that the caribou depend on for winter survival. Such activities would be inconsistent with the objective to maintain habitats that support flora and fauna native to the DFA. The decline of already low caribou populations would reduce forest function, as they are important consumers of arboreal and terrestrial lichens and a prey source for wolves, bears, and other carnivores. In addition, tourism and recreation activities associated with the viewing of caribou would be negatively impacted by reduced caribou populations. As a result, there would be a negative impact on the economic health of some local businesses.

The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated targets for this measure. Therefore, the Licensees and BCTS will continue to ensure that 100% of all forest operations are consistent with caribou winter range requirements in operational plans. The indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the Site Plan are met. These initial, interim and final checks are part of each Licensee's/ BCTS' Environment Management System (EMS). If a non-conformance with the Site 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 issues can be tracked and mitigated as required.

The percentage of forest operations consistent with caribou winter range management requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

The percentage of forest operations consistent with caribou winter range management requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planners are responsible for being aware of the location of ungulate winter range as specified in Schedule A of the order for Ungulate Winter Range # U7-003 and the management objectives outlined in that order. Foresters responsible for preparing Site Plans must ensure the management activities prescribed in that document are consistent with the management objectives in the order. Harvesting supervisors are primarily responsible for ensuring Site Plan requirements are implemented in the field during harvesting operations. Silviculture foresters are also responsible for ensuring silviculture activities are consistent with ungulate winter range strategies. If problems in implementing the Site Plan objectives persist, corrective and preventative actions will be identified to improve consistency. Now that the mountain caribou is listed as "Threatened" by the Federal government, it has resulted in a Recovery Implementation Group (RIG) being formed 2 years ago and that it has completed an implementation plan that is now before government in Victoria. Implementation of this plan by Government could result in addition lands being either removed from the THLB and additional restrictions on forest management/harvesting activities in mountain caribou habitat. This will be monitored by Licensees and BCTS for continuous improvement opportunities.

### **MULE DEER UNGULATE WINTER RANGE**

The mule deer is an important ungulate found in many parts of the Defined Forest Area (DFA). It is dependent on suitable winter range conditions in order to survive the severe winters that often occur in the DFA. As such, it was included in a list of ungulates for whom Ungulate Winter Ranges were established.

An "Ungulate Winter Range (UWR)" is an area that contains habitat that is necessary to meet the winter habitat requirements of an ungulate species. As many UWRs can be directly and indirectly effected by forest harvesting activities it is important that Licensees and BCTS in the Prince George Define Forest Area track their location and management objectives. UWRs contain unique habitat features (typically large Douglas fir and browse species), so their management contributes to ecosystem diversity. Maintaining mule deer populations will enhance forest ecosystem productivity, as they are a major prey source for carnivores such as wolves, cougars, and bears.

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### **Current Practices and Status of Indicator**

A memorandum of Understanding (MOU) on the Establishment of Ungulate Winter Ranges and Related Objectives was developed in August of 2003. The Ministry of Forests and Range, the Ministry of Water, Land and Air Protection (MWLAP), and the Ministry of Sustainable Resource Management (ILMB) created the MOU to meet UWR objectives across the province to support the Forest Practices Code and the new Forest and Range Practices Act (FRPA). In November of 2003 the Deputy Minister of WLAP signed the order outlining the management objectives to maintain mule deer winter range. All cutblocks in approved ungulate winter ranges will be consistent with the management guidelines in the approved Order for Ungulate Winter Range #U7-013. The order prescribes specific objectives to maintain mule deer winter range, to provide high suitability snow interception, cover, and foraging opportunities. Site plans prepared and implemented for these areas will reflect these objectives.

100% percentage of forest operations from April 1, 2004 to March 31, 2005 in the DFA were consistent with approved provincial Mule Deer Ungulate Winter Range requirements as identified in operational plans. No blocks were harvested in UWR during this reporting period.

More information on the Order can be found at the Government of BC website  
[http://www.env.gov.bc.ca/wld/uwr/ungulate\\_app.html](http://www.env.gov.bc.ca/wld/uwr/ungulate_app.html)

### **Establishment of Targets and Future Practices**

All cutblocks in approved ungulate winter ranges will be consistent with the management guidelines in the approved Order for Ungulate Winter Range #U7-013. The order prescribes specific objectives to maintain mule deer winter range, to provide high suitability snow interception, cover, and foraging opportunities. Site plans prepared and implemented for these areas will reflect these objectives.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with Mule Deer Ungulate Winter Range requirements as identified in operational plans. The exact level of consistency is difficult to forecast as conditions depend on variables such as site conditions and human error. However, it is important to identify what the accepted targets mean to SFM. Conservation of Mule Deer winter range values 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 % consistency occurred between forest management operations and approved provincial Mule Deer Ungulate Winter Range requirements as identified in operational plans?

Implementing only 50% of strategies to protect these values could lead to significant ecological, economic and social impacts. The winter feeding habits of mule deer means that failure to manage their winter range properly could result in an increase in winter mortality. For example, harvesting and road construction performed in a manner inconsistent with the UWR orders could reduce forage opportunities that the mule deer depend on for winter survival. Such activities would be inconsistent with the objective to maintain habitats that support flora and fauna native to the DFA. The decline of mule deer populations would reduce forest productivity, as they are important consumers of grasses and other browse species and are a prey source for wolves, bears, and other carnivores.

The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated targets for this measure. Therefore, the Licensees and BCTS will continue to ensure that 100% of all forest operations are consistent with mule deer winter range requirements in operational plans. The indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the Site Plan are met. These initial, interim and final checks are part of each Licensee's / BCTS' Environment Management System (EMS). If a non-conformance with the Site 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 issues can be tracked and mitigated as required.

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The percentage of forest operations consistent with mule deer winter range management requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

The percentage of forest operations consistent with mule deer winter range management requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planners are responsible for being aware of the location of ungulate winter range as specified in Schedule A of the order for Ungulate Winter Range # U7-013 and the management objectives outlined in that order. Foresters responsible for preparing Site Plans must ensure the management activities prescribed in that document are consistent with the management objectives in the order. Harvesting supervisors are primarily responsible for ensuring Site Plan requirements are implemented in the field during harvesting operations. Silviculture foresters are also responsible for ensuring silviculture activities are consistent with ungulate winter range strategies. If problems in implementing the Site Plan objectives persist, actions will have to be taken to improve consistency. These actions may include more intensive supervision and additional training for equipment operators.

### **SPECIES AT RISK NOTICE/ORDERS**

The indicator is intended to monitor the consistency between forest operations with approved provincial Species at Risk Notice/ Orders requirements as identified in operational plans. Being consistent with these requirements will ensure that the habitats that are required to support these Species at Risk will be maintained. Overall ecosystem productivity will be maintained by ensuring these species continue to play their roles in the healthy functioning of the DFA's forests.

Notices and Orders are legal entities created through Government Regulations. As such, approved species at Risk Notice/ Orders requirements identified in operational plans must be adhered to. Currently, the DFA has one Species at Risk Order, "Category of Species at Risk", which took effect in May, 2004. This provincial order provides a list of species at risk that may be affected by forest or range management on Crown Land and require protection in addition to that provided by other mechanisms (Government of BC, 2004a). This order is shown in more detail in Appendix 5. The DFA also has one Notice, "Indicators of the Amount, Distribution, and Attributes of Wildlife Habitat Required for the Survival of Species at Risk in the Prince George Forest District", designed to manage caribou in the DFA (Government of BC, 2004b). This notice is shown in more detail in Appendix 6.

### **Current Practices and Status of Indicator**

Current practice is for all forest operations to be consistent with these orders and notices.

100% percentage of forest operations from April 1, 2004 to March 31, 2005 in the DFA were consistent with approved provincial Species at Risk Notice/ Orders requirements as identified in operational plans. No blocks were harvested in the minimum area requirement in this notice/order during this reporting period.

### **Establishment of Targets and Future Practices**

The target of 100% of forest operations to be consistent with approved provincial Species at Risk Notice/ Orders requirements as identified in operational plans was established in recognition of the high value all Licensees and BCTS place on Species at Risk management. Operational plans such as Site Plans will continue to prescribe the most recent management techniques for Species at Risk for the areas they cover. Forestry operations will be supervised and reviewed to ensure any SAR requirements in operational plans are achieved on the ground.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with Species at Risk requirements as identified in operational plans. The long-term success of the species at risk 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 species at risk will maintain species diversity within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated

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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 approved provincial Species at Risk Notice/ Orders requirements as identified in operational plans?

If only 50% of forest operations were consistent with the SAR Notice/Orders requirements as identified in operational plans, there could be significant ecological, economic and social impacts. Species at Risk, by their very definition, are vulnerable to disturbance or destruction of even small degrees. Ecologically, the loss or decline of any species at risk 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. As Notices/ Orders are contained in legislation, failure to be consistent with their requirements could result in monetary penalties and costly litigious proceedings. In addition to these ecological and economic impacts, societal values may be reduced if only 50% of forest operations were consistent with approved provincial Species at Risk Notice/ Orders requirements as identified in operational 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 measure. Therefore, the Licensees and BCTS will continue to ensure that 100% of all forest operations are consistent with approved provincial Species at Risk Notice/ Orders requirements in operational plans. The indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Final harvest inspections will continue to be performed where consistency with approved provincial Species at Risk Notice/ Orders requirements as identified in operational plans will be confirmed. Areas of inconsistency will be noted during these inspections and will be entered into an incident tracking database. Annually, inconsistencies will be reported in the SFMP annual report for the operating year of April 1<sup>st</sup> to March 31st

### **Responsibility and Continuous Improvement Opportunities**

Planners are responsible for being aware of Species at Risk, their habitat and plant communities at risk. Foresters responsible for preparing Site Plans must ensure the management activities prescribed in that document are consistent with approved provincial Species at Risk Notice/ Orders requirements. Harvesting supervisors are primarily responsible for ensuring Site Plan requirements are implemented in the field during harvesting operations. Silviculture foresters are also responsible for ensuring silviculture activities are consistent with management requirements. If problems in implementing the Site Plan objectives persist, corrective and preventative actions will be identified to improve consistency. Improvements in operational plan implementation will be adopted if required.

Continual improvement will also involve increasing knowledge of the interactions between harvesting and Species at Risk.

### **RIPARIAN RESERVES**

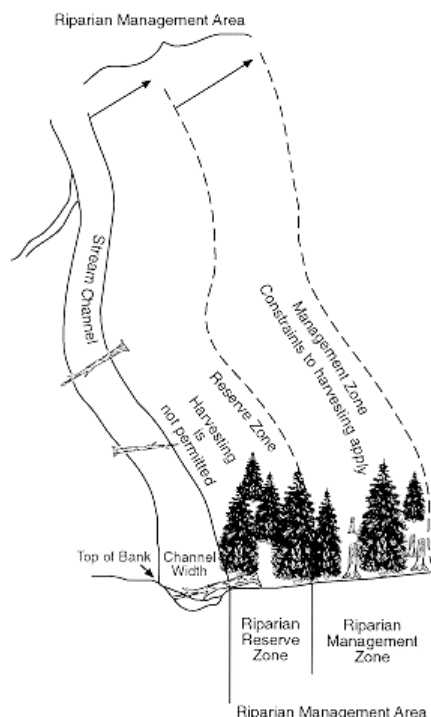
Riparian areas are the zones adjacent to lakes, streams, and wetlands. They encompass the area covered by continuous high moisture content and the adjacent upland vegetation. In British Columbia legislation has identified Riparian Management Areas (RMAs) which consist of a Riparian Management Zone (RMZ) and, where required, a Riparian Reserve Zone (RRZ).

The width of these zones is determined by attributes of streams, wetlands, lakes, and adjacent terrestrial ecosystems and legislated in the Forest Planning and Practices Regulation, sections 47, 48 and 49.. The RRZ, if required, is immediately adjacent to the stream and is maintained as a no-harvest zone. RRZs are proposed and implemented in cutblocks and road construction areas, but they also continue in existence after harvest until a mature stand is re-established. This indicator will ensure that the RRZ that exists after harvesting activities is consistent with what was prescribed in the Site Plan or road construction design



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Identifying and managing RRZs provides for the maintenance of species diversity by conserving riparian and aquatic environments, which are key for the survival of species (flora and fauna) that are dependent on riparian conditions. In addition to providing critical habitat, RRZs also function to conserve water



quantity and quality features by reducing the risk induced by forest harvesting activities to waterbodies. By protecting species diversity and water quality, forest productivity is sustained, as both of these attributes are needed to maintain ecosystem conditions. Thus, the identification, assessment, and tracking of RRZ management are crucial to ensure that riparian areas and waterbodies are not unduly impacted.

Figure 1 **Riparian management area showing the application of a management zone and a reserve zone along the stream channel**

Image Source: Gov. of B.C. <http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/riparian/rmafig01.htm>

### **Current Practices and Status of Indicator**

Currently, riparian reserves are identified in the Site Plan for the cutblock and in the field. A Site Plan is completed prior to harvest for most areas within the DFA. They identify the type of riparian features present within or adjacent to a proposed harvest area, the size of the RMA (which includes the RRZ where applicable), and a prescription for specific activities within the RMZ to protect water quality and habitat values.

Under the various licensees and BCTS' EMS, pre-work forms are completed prior to harvesting to review all applicable RMA objectives, including RRZ location. Licensees and BCTS also complete harvest inspections for all harvested areas to ensure all riparian aspects contained in Site Plans are implemented in the field.

99.6 % of forest operations conducted between April 1, 2004 and March 31, 2005 in the DFA were consistent with riparian reserve requirements as identified in operational plans. Licensees and BCTS will identify the errant activity and correct it so as to achieve 100% conformance with this target in the next reporting period.

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### **Establishment of Targets and Future Practices**

This indicator's target was developed from a review of past practice and performance within the DFA. The target value of 100% has been established to ensure that all riparian management practices, specifically RRZ designation and management, continue to remain consistent with the Site Plan and other operational plans.

RRZs will continue to be documented at the Site Plan stage. All streams, wetlands, and lakes in or immediately adjacent to a planned harvest area will be classified in the field prior to the commencement of operations. Riparian Reserve Zones (RRZ) that meet or exceed the RRZ widths required by legislation will be located and clearly marked in the field. Site specific management practices will be included in Site Plans to maintain regulatory riparian reserve zones, and protect them from significant windthrow where needed.

### **Forecasting and Predicted Trends**

Riparian management has been an important aspect of forest management in the DFA for almost ten years. Licensees and BCTS have gained considerable experience in successfully identifying and protecting riparian features, and this success is predicted to continue. The exact level of consistency is not easy to quantifiably forecast over a defined time frame, as it is operational in nature. 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. The following "what if" scenario consists of one scenario as the current target is set at 100%:

- a) What if less than 100% of blocks with Riparian Reserve Zones were consistent with the RRZ requirements as identified in the operational plans?

Ecological values such as water quantity and quality, and stand level retention could be compromised if less than 100% of blocks with Riparian Reserve Zones were consistent with operational plans. RRZs are an important part of forest management because they can impact many other forest resource values that are important to the DFA. They can provide a buffer for a water body and conserve aquatic habitat conditions such as shade requirements and water temperature. Most fish species are very temperature sensitive and that their distribution is, in part, determined by summer water temperatures. It is a major reason bull trout are not found in most streams on the Nechako Plateau. Water quantity and quality are also protected by maintaining stream bank stability within the reserve. As RRZs can contain upland habitat they can also contribute to stand level retention and overall biodiversity. If less than 100% of RRZs were implemented across the DFA, large areas of riparian habitat could be damaged, water quantity and quality could possibly decrease and stand level retention could decrease. These impacts could influence other economic and social values in the DFA such as tourism and recreation, and potentially reduce quality of life values by decreasing water quality.

### **Monitoring and Reporting Procedures**

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. Annually, inconsistencies will be reported in the SFMP annual report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Individual Licensees and BCTS are responsible for the implementation, monitoring, and tracking of the operational plans for their cutblocks. Continual improvement will involve ongoing review of performance and the EMS will be adjusted where required as tied to pre-works, inspections, and training.

**Indicator - 14 Chief Forester's Standards for Seed Use**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent compliance with Chief Forester's Standards for Seed Use	Target: 100% Variance: 0%

Indicator 14 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.3	<b>CSA SFM Element:</b> Genetic Diversity
1.3.A	<b>Value:</b> Genetic Diversity
1.3.A.b	<b>Objective:</b> Maintain natural genetic diversity

**Description of Indicator**

The Chief Forester's Standards for Seed Use is a component of the Forest and Range Practices Act (FRPA). According to the Act, "The purpose of these standards is to maintain the identity, adaptability, diversity, and productivity of the Province's tree gene resources by:

- a) establishing criteria for the registration of seedlots and vegetative lots used to establish a stand under section 29 of the Act, and
- b) regulating the storage, selection, use and transfer of registered lots.

The Standards were established on November 20<sup>th</sup>, 2004 and became effective on April 1<sup>st</sup>, 2005. They are important to forest management as they directly affect the genetic makeup of the new plantations established in the DFA - plantations that will provide wildlife habitat and timber for future harvesting. Adherence to the Chief Foresters Standards is crucial for sustainable forest management as the standards are designed to establish healthy stands composed of ecologically and genetically appropriate trees. Planting unsuitable genetic stock could result in stands that will not meet future economic and ecological objectives.

**Current Practices and Status of Indicator**

Prior to the FRPA, standards for seed use were described in the *Seed and Vegetative Material Guidebook*, one of the guidebooks that were a component of the Forest Practices Code of British Columbia. by applying those standards, licensees / BCTS reforested harvested areas using seedlings grown from seed genetically appropriate for those locations. Those standards have been in use until the FRPA became effective. Seed was collected either from natural stands (class B seed) or from seed orchards (class A) to create unique seedlots. A seedlot is a quantity of seed having uniformity of species, source, quality, and year of collection (*BC MOF, 1995a*). Licensees and BCTS would use a particular seedlot to grow seedlings to be planted in an area that met the conditions appropriate to that seedlot's genetic background. By choosing a seedlot that was suitable to the site it was to be planted in, the resulting plantation would be adapted to its site, local climate, and endemic forest health problems. Tracking and reporting the seedlots that were used for reforestation has been standard practice for all Licensees and BCTS since 1988 when reforestation activities on Crown land became the responsibility of those conducting the harvesting.

99.9% of the area planted between April 1, 2004 and March 31, 2005 in the DFA was in compliance with the standard of the day (*Seed and Vegetative Material Guidebook*). Note this guidebook formed the basis for the Chief Forester Standard or Seed Use. The Standard did not come into effect until April 1, 2005.

**Establishment of Targets and Future Practices**

The importance of using appropriate seed and vegetative material for reforestation requires a target of 100% compliance with the Chief Forester's Standards for Seed Use. Information needed to determine appropriate seedlot selection will be tracked for each cutblock and may be contained in the site plan. This information will include the seed planning zone the block is in, its elevation, and its latitude and longitude. Seed collection and registration will also adhere to the Standards. Forest management will have to consider seed supply prior to harvesting to ensure appropriate seed is available for reforestation. Forest Stewardship Plans (FSPs) can be reviewed for location of future harvesting and the seed

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requirements can be determined for each planned cutblock. By comparing existing seed supply with the cutblocks' seed requirements Licensees/BCTS can determine if seed needs to be collected or purchased.

### **Forecasting and Predicted Trends**

The exact level of compliance is not easy to quantifiably forecast over a defined time frame, as it is operational in nature. 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. The current target is set at 100% compliance with the Chief Forester's Standards for Seed Use. The following "what if" scenario is used in this analysis:

- a) What if only 50% of cutblocks were reforested with seedlings that met the Chief Forester's Standards for Seed Use?

Failure to use appropriate genetic material for reforestation could have several results. Seedlings may be more prone to climate damage such as frost and drought if seed is planted outside transfer guidelines. Opportunities for enhanced growth and wood quality may be lost if class A seed is not used where possible. If 50% of plantations were faced with higher mortality and poor growth performance due to improper genetic stock, the DFA would eventually be faced with a serious impact to timber supply. The resulting economic impact could be dramatic. However, as Licensees and BCTS have considerable experience in meeting existing standards, no problems are anticipated for achieving target goals.

There may be ecological impacts as well. Plantations established with improper seedlots may not achieve the size, health, and structure needed to provide wildlife habitat. If high mortality and slow growth occurs, the area may be not recover its hydrologic functions and ability to control soil erosion.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will monitor the elevation, longitude, and latitude of their planned cutblocks. While Licensees and BCTS may own their own seed, the Ministry of Forests and Range's Surrey Tree Seed Center is responsible for storing and managing seed and vegetative material. Licensees/BCTS can monitor available seed and vegetative material through the Seed Planning and Registry (SPAR) system and plan their sowing requests accordingly. All reforested cutblocks must have their seedlots tracked, a process that will be achieved using databases such as GENUS. The annual submission to the Crown through RESULTS will include the seedlot(s) used for each cutblock planted during that operational year. Compliance with the target will be monitored through Licensee/BCTS databases, EMS checklists, "Plant Wizard" and internal audits. The results will be reported annually for the operational year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees/ BCTS are responsible for the monitoring, tracking, and reporting of the percent compliance with Chief Forester's Standards for Seed Use. Specifically, the Silviculture Forester must comply with the standards when planning sowing requests, planting prescriptions, cone collections, and registering seedlots. If compliance with the standards is not met the Ministry of Forests and Range will be notified. Use of GIS systems and improved databases may improve compliance by ensuring the best genetic material is matched to the sites planned for reforestation.

## ***Indicator - 18 Harvesting within Landscape Level Reserves***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
Hectares of unauthorized forestry related harvesting or road construction within landscape level biodiversity reserves	<u>Target:</u> 0 ha  <u>Variance:</u> 0 ha

Indicator 18 addresses the following CSA-SFM criteria, element, value and objective:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.4	<b>CSA SFM Element:</b> Protected Areas and Sites of Special Biological Significance
1.4.B	<b>Value:</b> Protected Areas

**1.4.B.a Objective:** Protected Areas are identified and appropriately managed

### **Description of Indicator**

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 Old Growth Management Areas (OGMAs), parks, 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.

### **Current Practices and Status of Indicator**

The area of landscape level biodiversity reserves in the DFA is described in the indicator *Landscape Level Biodiversity Reserves*. Current practice is to adhere to all legislative requirements, including the respecting of protected areas. Using GIS and spatial databases, operational plans are planned and reviewed to ensure no forestry activities are planned within landscape level biodiversity reserves. EMS checklists and active supervision of road construction and harvesting are currently used to ensure operational plans are implemented correctly in the field.

There were no hectares of unauthorized forestry related harvesting or road construction within landscape level biodiversity reserves between April 1, 2004 and March 31, 2005 in the DFA.

### **Establishment of Targets and Future Practices**

A target of 0 ha of unauthorized forestry related harvesting or road construction within landscape level biodiversity reserves 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 reserves, and their implementation must be supervised to ensure their objectives are met. Licensees and BCTS will monitor the location of landscape level reserves over time.

### **Forecasting and Predicted Trends**

Licensees and BCTS have established a target of zero tolerance for trespasses within landscape level biodiversity reserves, and the expectation at this time is to meet the target. 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. The current target is set at 0 ha of unauthorized forestry related harvesting or road construction within landscape level biodiversity reserves. The following "what if" scenario is used in this analysis:

- a) What if a target of  $\leq 10$ ha of unauthorized forestry related activities was established?

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.

Ensuring the target of 0 ha of unauthorized forestry related harvesting within landscape level reserves is met will help ensure the ecological function of these reserves and preserve the values that society places on them.

### **Monitoring and Reporting Procedures**

Monitoring will occur with ongoing supervision of forestry operations and as a component of EMS inspections. The Licensees/ BCTS will ensure the landscape level reserve coverage will be updated on an annual basis. The indicator status will be included in the annual SFMP report for the operational year April 1<sup>st</sup> to March 31<sup>st</sup>.

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### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking and reporting this indicator. If unauthorized harvesting or road construction within landscape level biodiversity reserves the Ministry of Forests and Range, the Ministry of Water, Lands, and Air Protection, and the Ministry of Agriculture and Lands will be notified. Improvements in operational plan development and implementation, either by training, increased supervision or other methods can be adopted if required.

### **Indicator - 19 Areas Planted Consistent with Operational Plans**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of areas planted consistent with operational plans	Target: 100% Variance: -5%

Indicator 19 addresses the following CSA-SFM criteria, element, value and objective:

2.	<b>CCFM Criterion:</b> Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity
2.1	<b>CSA SFM Element:</b> Forest Ecosystem Resilience
2.1.A	<b>Value:</b> Resilient Forest Ecosystems
2.1.A.a	<b>Objective:</b> Well balanced ecosystems that support natural processes

### **Description of Indicator**

Operational plans such as Site Plans prescribe ecologically suitable tree species to be used for reforestation. Ecologically suitable tree species are those coniferous or deciduous tree species that are naturally adapted to a site's environmental condition, including the variability in these conditions that may occur over time. In addition to species selection, the Site Plan also prescribes target densities and suitable microsite selection.

Reforestation efforts should attempt to maintain the existing condition of the forest landbase by regenerating the harvested areas with tree species that are ecologically compatible with the harvested site and the surrounding forest ecosystem. The regenerated forest should have characteristics similar to the surrounding forest ecosystem, which possesses natural resilience to local disturbances (fire, disease, pests, etc.), climatic stresses (temperature and moisture extremes), and site conditions (soil characteristics and nutrient availability). Timber supply calculations assume regenerated forests are meeting certain productivity estimates. Selecting tree species that are ecologically suitable for their sites will ensure sufficient trees will be present to contribute to the maintenance of the productive forest ecosystems and meet future economic objectives. Planting to prescribed densities will also ensure mortality losses do not result in understocked stands.

### **Current Practices and Status of Indicator**

To ensure a minimum regeneration delay and complete stocking, nearly all harvested sites are planted with ecologically suited coniferous species to prescribed densities. Species are prescribed within the site plan on the basis of ecological suitability, and the management objectives for the stand. Densities are prescribed based on forest health concerns and historic levels of natural regeneration in those areas. Once planting is complete a record of the seedlots used, where they were planted, and the year of planting are recorded in databases such as GENUS.

99.9% of areas planted between April 1, 2004 and March 31, 2005 in the DFA were consistent with operational plans.

### **Establishment of Targets and Future Practices**

All Licensees and BCTS will continue to successfully regenerate harvested areas in the manner prescribed in operational plans. A target of 100% consistency with operational plans has been set due to the importance of using ecologically suited species, planting to prescribed densities, and the proven ability of Licensees and BCTS to achieve these goals. A variance of -5% has been allowed to provide some flexibility in the choice of seedlots that may not have been available at the time of the Site Plan's preparation, or to change planting densities due to unforeseen conditions. For example, a spruce seedlot

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may become available that does not meet the transfer guidelines for planting in a cutblock. However, it may be a seedlot that has been selected for resistance to spruce leader weevil, a known pest in the cutblock's area. If consultation with tree improvement experts determines that the seedlot can be planted in the desired site then the best management practice may be to do so. However, such a scenario is not expected to occur often and the overwhelming majority of blocks will be reforested as per the operational plan's guidelines.

### **Forecasting and Predicted Trends**

The target of 100% consistency is expected to be achieved, but the exact level of consistency is not easy to quantifiably forecast over a defined time frame, as it is operational in nature. 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. The current target is set at 100% of areas planted are to be consistent with operational plans. The following "what if" scenario is used in this analysis:

- a) What if only 80% of cutblocks were reforested in a manner consistent with the site plan?

Failure to adhere to the site plan's prescriptions could have several results. Ecologically unsuitable seedlings may be more prone to climate damage such as frost and drought if seed is planted outside transfer guidelines. Planting to densities lower than prescribed may result in some cutblocks becoming NSR (non-sufficiently restocked) if pests, disease, or extreme climate events cause high mortality. If 20% of plantations were faced with higher mortality and poor growth performance due to improper genetic stock or improper planting densities, the DFA would eventually be faced with a serious impact to timber supply. However, as the Licensees and BCTS have considerable experience in meeting current standards, no problems are anticipated for achieving target goals.

### **Monitoring and Reporting Procedures**

All reforested cutblocks have their planting information tracked, a process that will be achieved using databases such as GENUS. This information includes seedlots used, their locations, and final planting densities. The annual submission to the crown through RESULTS will include this information for each cutblock planted during that operational year. Adherence to the target will be monitored through Licensee/ BCTS databases, EMS checklists, and internal audits, and will be reported annually for the operational year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for ensuring planting is consistent with operational plans. Specifically, the Licensee's / BCTS' Silviculture Forester is responsible for the correct implementation of the site plans' planting prescription. If compliance with the Chief Forester's Standards for Seed Use is not met, the Ministry of Forests and Range will be notified. Use of GIS, improved databases, and increased planting supervision may improve conditions if inconsistencies arise.

## **Indicator - 20 Soil Conservation Standards**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of forest operations consistent with soil conservation standards as identified in operational plans	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 20 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Soil and Water Resources
3.1	<b>CSA SFM Element:</b> Soil Quality and Quantity
3.1.A	<b>Value:</b> Soil Conservation
3.1.A.a	<b>Objective:</b> The productive capacity of forest soils within the Timber Harvesting Land Base (THLB) is sustained.

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### **Description of Indicator**

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 measure the success that soil conservation standards are met and that excessive soil disturbance is detected, reported, and corrected.

### **Current Practices and Status of Indicator**

Soil information is collected as a component of site plan preparation, and soil conservation standards are established based on the soil hazards for that block. To be within those limits there are several soil conservation strategies currently used. Forest operations may be seasonally timed to minimize soil disturbance. For example, clayey soils are often harvested when frozen to reduce excessive compaction. EMS prework forms require equipment operators to be aware of soil conservation measures 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 is used where very high soil hazards exist

99.6% of forest operations conducted between April 1, 2004 and March 31, 2005 in the DFA were consistent with soil conservation standards as identified in operational plans. Licensees and BCTS will identify the errant activity and correct it so as to achieve 100% conformance with this target in the next reporting period.

### **Establishment of Targets and Future Practices**

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

### **Forecasting and Predicted Trends**

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. The conservation of soil contributes to biodiversity of ecosystems through conservation of site productivity. Scientific research on the effects of soil disturbance is extensive in British Columbia, but it is not possible to predict when and where soil conservation standards are not achieved. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for an indicator such as this. As the target for this indicator is set at 100%, the analysis of one other potential scenario is useful:

a) What if only 75% of harvested blocks were consistent with soil conservation standards?

There could be serious impacts to the DFA's soil resources if only 75% of harvested blocks met the soil conservation targets identified in the site plan. Soil disturbance in the Prince George DFA includes soil displacement, surface soil erosion, soil compaction and mass wasting. These disturbances occur in varying amounts, but it is important to note that the concentration of disturbances is a key factor to overall site productivity. Dispersal of disturbance across a site is fundamental in lowering the overall impact. While it is impossible to conduct forestry activities without a certain amount of soil disturbance, exceeding the prescribed soil conservation targets would eventually affect ecological, economic and social aspects of SFM. Excessive levels of soil disturbance can alter natural ecosystem functions such as water



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infiltration and drainage. It can also alter the type and health of vegetation on site, potentially affecting wildlife habitat and the perceived public value of the area. The growth rate of trees can be reduced by excessive soil disturbance, which would affect the economic value derived from timber resources. With less ecosystem productivity and less economic return, social values in the DFA would also decrease due to reduced aesthetic appeal and decreased recreation value from visual influences or potential wildlife declines.

Failure to achieve prescribed soil conservation standards could potentially have extensive negative impacts on SFM values across the DFA. Licensees and BCTS will work to ensure that 100% of all cutblocks are consistent with the soil conservation strategies outlined in site plans.

### **Monitoring and Reporting Procedures**

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. Results for this indicator will be included in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking, and reporting this indicator. Specifically, Harvesting Supervisors are responsible for monitoring soil disturbance caused during harvesting activities, and Silviculture Foresters are responsible for silviculture activities. The growing number of beetle killed stands will likely increase soil moisture and may result in a higher potential for soil disturbance. A better understanding of the interaction between harvesting these stand types and the effect on their soils is necessary. The Licensees and BCTS will further investigate this indicator as more information is learned from the influence of mountain pine beetle.

## **Indicator - 21 Cutblock Area Occupied by Permanent Access Structures**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of cutblock area occupied by total permanent access structures	<p><u>Target:</u> ≤ 5% - averaged annually</p> <p><u>Variance:</u> +1%</p>

Indicator 21 addresses the following CSA-SFM criteria, elements, values and objectives:

3.	<b>CCFM Criterion:</b> Conservation of Soil and Water Resources
3.1	<b>CSA SFM Element:</b> Soil Quality and Quantity
3.1.A	<b>Value:</b> Soil Conservation
3.1.A.a	<b>Objective:</b> The productive capacity of forest soils within the Timber Harvesting Land Base (THLB) is sustained.
4.	<b>CCFM Criterion:</b> Forest Ecosystems Contributions to Global Ecological Cycles
4.2	<b>CSA SFM Element:</b> Forest Land Conversion
4.2.A	<b>Value:</b> Forest Land
4.2.A.a	<b>Objective:</b> Minimize the conversion of forest land to non-forest land

### **Description of Indicator**

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

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such, minimizing the amount of land converted to roads and other structures protects the forest ecosystem as a whole.

### **Current Practices and Status of Indicator**

An average of 3.4% of cutblock areas are occupied by total permanent access structures in cut blocks harvested between April 1, 2004 and March 31, 2005 in the DFA.

### **Establishment of Targets and Future Practices**

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

### **Forecasting and Predicted Trends**

The  $\leq 5\%$  target is anticipated to be achieved by all Licensees and BCTS. 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 an 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. Licensees and BCTS are committed to achieving the identified target that, for now, is the maximum percentage. The mountain pine beetle epidemic continues to influence many aspects of this indicator. The smaller salvage patches of past practices resulted in a higher proportion of permanent access structures. It is anticipated in the future that larger blocks will be planned and less road will be required to complete harvesting activities.

### **Monitoring and Reporting Procedures**

All road planning and construction information is maintained within Licensee/ BCTS databases such as GENUS. Each year the databases are queried to report the overall area of 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. The operational year is between April 1<sup>st</sup> and March 31<sup>st</sup>, and the above information will be contained in the annual SFMP report for that period.

### **Responsibility and Continuous Improvement Opportunities**

Forest planners are responsible for ensuring that the over-all level of planned road development provides adequate road access but minimizes reductions to the productive forest land base. Licensee/ BCTS operations personnel are responsible for developing roads and to ensure they do not exceed planned dimensions. There are several opportunities for continuous improvement of this indicator. Licensees and BCTS can standardize road class widths to the narrowest width safety and efficiency can permit. Existing permanent access structures can be restored to the productive land base by rehabilitation methods. Future roads that are planned to be PAS can be designed and built to be temporary access structures that are returned to the net area to be reforested. Finally, alternative harvesting systems can be implemented that reduce the need for inblock roads and landings.

**Indicator - 22 Terrain Management**

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

Indicator 22 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Soil and Water Resources
3.1	<b>CSA SFM Element:</b> Soil Quality and Quantity
3.1.A	<b>Value:</b> Soil Conservation
3.1.A.a	<b>Objective:</b> The productive capacity of forest soils within the Timber Harvesting Land Base (THLB) is sustained.

**Description of Indicator**

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 judgement 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.

**Current Practices and Status of Indicator**

The entire DFA has various types of terrain stability mapping (detailed or reconnaissance) or has been GIS themed (based on TRIM II contours) to identify slopes greater than 60%. The detailed terrain stability mapping (TSM) identifies 5 to 6 terrain classes while the reconnaissance TSM identifies three categories: Stable terrain, potentially unstable terrain, and unstable. The detailed TSM terrain stability classes are:

- I - no stability issues
- II - low likelihood of landslides following timber harvesting or road construction
- III - minor stability problems can develop, low likelihood of landslide initiation following timber harvesting or road construction
- IVR - Moderate likelihood of landslide initiation following road construction but low following timber harvesting
- IV - moderate likelihood of landslide initiation following either road construction or timber harvest
- V - high likelihood of landslide harvesting following timber harvest or road construction.

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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 would 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, Licensees and BCTS provide for internal checks prior to the development project (pre-work meeting), and after completion of the project (final inspection). Inconsistencies are reported and tracked through databases such as GENUS.

100% of forest operations with terrain management requirements on blocks harvested between April 1, 2004 and March 31, 2005 in the DFA were completed in accordance with those requirements.

### **Establishment of Targets and Future Practices**

Licensees and BCTS will continue to strive for 100% of forestry activities to be consistent with the terrain management requirements in operational plans. This target was established to reflect the Licensees' and BCTS' 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.

### **Forecasting and Predicted Trends**

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. Maintenance of slope integrity is vital for soil conservation, because it keeps soil *in situ* where its quantity and quality is preserved. The use of a "what if" scenario is beneficial in identifying anticipated future trends for a measure such as this. As the target for this indicator is set at 100%, the analysis of one other potential scenario is useful:

- a) What if only 50% of forest operations were consistent with terrain management requirements as identified in operational plans?

If only 50% of forest operations met the indicator there would be a significant risk of slope failures as a result of forest operations in the DFA. In addition to the loss or degradation of the site experiencing the failure, the negative impacts could extend beyond the site. If material from a landslide entered a riparian feature such as a stream the resulting sedimentation could harm fish populations. Landslides are generally difficult and costly to rehabilitate and the damage may require significant resources and time to correct. Slope failures can also be aesthetically displeasing and thus failure to achieve prescribed terrain management activities could potentially have negative impacts on social SFM values in the DFA.

### **Monitoring and Reporting Procedures**

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.

This information will be stored in databases such as GENUS and the indicator success for the operational year of April 1<sup>st</sup> to March 31<sup>st</sup> will be included in the annual SFMP report.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking, and reporting this indicator. If forest operations are not consistent with terrain management requirements corrective and preventative actions will be identified to improve consistency. The use of GIS to locate and predict areas requiring terrain management could change as technology improves. Training for key personnel to identify areas of

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concern in the field could also improve their detection. Equipment operators could receive additional training in methods to achieve terrain management objectives.

### **Indicator - 23 Reportable Spills**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The number of legally reportable spills	<u>Target:</u> 0 (annually) <u>Variance:</u> ≤ 3 (annually)

Indicator 23 addresses the following CSA-SFM criteria, element, value and objectives:

3.	<b>CCFM Criterion:</b> Conservation of Soil and Water Resources
3.1	<b>CSA SFM Element:</b> Soil Quality and Quantity
3.1.A	<b>Value:</b> Soil Conservation
3.1.A.a	<b>Objective:</b> The productive capacity of forest soils within the Timber Harvesting Land Base (THLB) is sustained.

#### **Description of Indicator**

The Spill Reporting Regulation of the *BC Waste Management Act* requires any spill in excess of the reportable level for that substance be 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 13 outlines the volumes reportable under the *BC Waste Management Act*.

**Table 13 Reportable Spill Substances and Volumes**

<b>Product</b>	<b>Minimum Volume Spilled that Must be Reported to the PEP</b>
Petroleum Products	100 liters
Petroleum Products into Water	Any Amount
Anti Freeze	5 liters (undiluted)
Anti Freeze into Water	Any Amount

This indicator is intended to monitor the number of spills that occur from forest operations and evaluate the success of measures 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.

#### **Current Practices and Status of Indicator**

All Licensees and BCTS currently have procedures in place for reducing and reporting spills. EMS checklists and monitoring procedures require the proper storage, handling, and labeling of petroleum/ antifreeze products. Such measures 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 measures to be taken in the event of a spill.

The spill events below the legally reportable amounts are tracked differently by each of the Licensees and BCTS. 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.

There were no legally reportable spills by any of the signatories in the DFA from April 1, 2004 to March 31, 2005.

#### **Establishment of Targets and Future Practices**

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

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substances pose to soil and water resources. However, despite the efforts made to control these materials, machinery is fallible and petroleum/ anti-freeze spills may still occur. For these reasons a variance of 3 or less reportable spill incidents per year has been established. Licensees and BCTS will continue to implement their EMS programs for petroleum/anti-freeze spill prevention and if targets are not being met they will take a coordinated approach to determine procedures to do so.

### **Forecasting and Predicted Trends**

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 measure is set at 100%, with a variance of 3 or less reportable spills annually, the analysis of one other potential scenario is useful:

- a) What if there were more than 3 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 higher than 3 spills a year represents a significant failure in the management of petroleum and/ or antifreeze, and represents serious flaws in current practices. While 3 or less reportable spills annually may be the result of unavoidable accidents, more than 3 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 Procedures**

Monitoring procedures are outlined in Licensee and BCTS EMS standard operating procedures. The use of EMS checklists is designed to ensure fuel/ antifreeze handling and storage is as per regulations and the EMS requirements. If a reportable spill occurs corrective and preventative actions will be identified to improve consistency. Licensees and BCTS will track spill events in their EMS databases and their combined performance will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking and reporting this indicator. If targets are not being met there are several areas for improvement. EMS monitoring procedures could be re-examined to reduce incidents. Where possible, new technology could be implemented to prevent or manage spills, or alternatives to petroleum and antifreeze could be used in machinery. Equipment operators could receive additional training to reduce spills, and training to manage the spills if they do occur.

## **Indicator - 24 Riparian Area Conservation**

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

Indicator 24 addresses the following CSA-SFM criteria, elements, values and objectives:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)
5.	<b>CCFM Criterion:</b> Multiple Benefits to Society

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- 5.1 **CSA SFM Element:** Timber and Non-Timber Benefits  
5.1.A **Value:** Short and Long-term Benefits  
5.1.A.b **Objective:** Maintaining a flow of non-timber benefits

### **Description of Indicator**

Riparian areas occur next to the banks of streams, lakes, and wetlands and include both the area dominated by continuous high moisture content and the adjacent upland vegetation that exerts an influence on it (Government of B.C., 1995c). Riparian habitat may be critical for providing wildlife cover, fish food organisms, stream nutrients, large organic debris, stream bank stability and water quality and quantity. The protection and maintenance of riparian values will assure that these values will be conserved for future generations.

This indicator is intended to ensure that the strategies identified in operational plans (such as Site Plans) to conserve riparian values actually have those strategies implemented on the ground. They are also diverse and sensitive habitats that support a wide range of plants and animals. Riparian features are also diverse and well appreciated by humans for recreation, aesthetics, and sustaining water quality.

### **Current Practices and Status of Indicator**

Riparian values are generally identified through the planning process and then verified on the ground during field exercises. Riparian values are initially identified on a map during the preparation of the Forest Stewardship Plan. If harvesting operations are planned for an area that may contain riparian values, additional information is identified in a Site Plan. The Site Plan also prescribes any management activities that are to be taken to conserve the riparian values.

Once a strategy to conserve is included in a Site Plan, there is a legal obligation for the licensee to implement and adhere to the strategy. Harvest and silviculture inspections ensure that strategies are implemented as stated in the Site Plan document.

99.3% of forest operations with riparian management requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements. Licensees and BCTS will identify errant activities and correct them so as to achieve 100% conformance with this target in the next reporting period.

### **Establishment of Targets and Future Practices**

The target of 100% was established to reflect the Licensees' and BCTS' commitment to meeting the legal and environmental goals prescribed in the Site Plans. The identification and conservation of riparian values is a socially and ecologically important component of forest management. Thus, Licensees and BCTS will continue to ensure forest operations will be consistent with riparian requirements as identified in operational plans.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with riparian management requirements. However, the exact level of consistency is difficult to forecast. It is important to identify what the accepted targets mean to SFM. Conservation of riparian values influences ecological, economic and social values 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 % consistency occurred between forest management operations and strategies identified in the Site Plan to conserve riparian values?

Implementing only 50% of strategies to protect these values could lead to significant ecological, economic and social impacts. In an ecological sense, aquatic habitat, biological richness, water quality and species diversity could all be negatively influenced. As a result, economic values could also decrease as healthy ecosystems support sustainable economic values. Social values could also decrease in response to the negative influence on ecological and economic values. If riparian habitat is decreased, wildlife populations could also decrease, thereby reducing recreational hunting values. Fishermen, canoeists,

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kayakers, and others value riparian areas for shelter, camping, and aesthetics. These users may have their recreational experiences diminished by poorly conducted forestry operations.

The above “what if” scenario helps to identify some of the potential future impacts of not achieving the stated targets for this measure. Therefore, the Licensees and BCTS will continue to ensure that 100% of all harvested areas conserve riparian values that have been identified and outlined in the Site Plan, and ensure related strategies are implemented on the ground. The indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the Site Plan are met. These initial, interim and final checks are part of each Licensee's and BCTS' Environment Management System (EMS). If a non-conformance with the Site 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. Any non-conformances with legal obligations to riparian management (such as a reserve being harvested) will be reported to the Ministry of Forests and Range as soon as the incident is detected.

The percentage of forest operations consistent with riparian management requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Harvesting supervisors are primarily responsible for ensuring Site Plan requirements are implemented in the field during harvesting operations. Silviculture foresters are also responsible that silviculture activities are consistent with riparian strategies. If problems in implementing the Site Plan riparian objectives persist, preventative and corrective actions will be identified to improve consistency. Improvements in operational plan implementation will be adopted if required.

## **Indicator - 25 Stream Crossing Management**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of stream crossings that are installed or removed consistent with erosion control plans or procedures	<u>Target:</u> 100% <u>Variance:</u> -5%

Indicator 25 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)

### **Description of Indicator**

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 measure 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.



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### **Current Practices and Status of Indicator**

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

99.0% of stream crossings installed or removed between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with erosion control plans or procedures. Licensees and BCTS will identify errant activities and correct them so as to achieve 100% conformance with this target in the next reporting period.

### **Establishment of Targets and Future Practices**

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

### **Forecasting and Predicted Trends**

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 effect 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:

- a) What if only 50% of stream crossings were installed according to erosion control plans and procedures?

If only 50% of stream crossings were installed and removed according to erosion control plans and procedures, 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 Procedures**

The data sources available to monitor and assess this indicator include:

- Trim Data for stream crossings
- Ownership class of roads within DFA
- EMS Stream crossing checklists
- GIS linework indicating constructed roads
- Interior watershed assessment reports

The percentage of stream crossings installed and removed consistent with erosion control plans, along with inspection results and proposed mitigation measures will be tracked in Licensee/ BCTS EMS databases.

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### **Responsibility and Continuous Improvement Opportunities**

Harvesting supervisors are responsible for overseeing stream crossing installation and removal. If an inconsistency with an erosion and sediment control plan or procedure is discovered this information will be recorded on an activity inspection form and then entered into an incident tracking database or similar system. If problems in implementing erosion and sediment control plans or procedures persist, preventative and corrective actions will be identified to improve consistency.

### ***Indicator - 26 Mitigating Sedimentation***

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

Indicator 26 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)

### **Description of Indicator**

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 (*see previous indicator "Stream Crossing Management"*), or from roads adjacent to water bodies. In addition to the effects of roads, sedimentation may also occur from slope failures that are a result of forestry activities. Once sedimentation occurrences are detected, mitigating actions are taken to stop further damage and to rehabilitate the site. Tracking these mitigation actions contributes to sustainable forest management by evaluating where, when and how sedimentation occurs and the success of correcting it.

### **Current Practices and Status of Indicator**

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

100.0% of unnatural known sedimentation occurrences requiring mitigating actions between April 1, 2004 and March 31, 2005 in the DFA, were completed.

### **Establishment of Targets and Future Practices**

All Licensees and BCTS recognize the potential damage sedimentation can inflict on water bodies and are committed to taking mitigative 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. Licensees and BCTS 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.

### **Forecasting and Predicted Trends**

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:

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- 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.

The Licensees and BCTS 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 Procedures**

All field personnel are responsible for detecting sedimentation occurrences, regardless of the location in the DFA. When sedimentation is detected, the Licensee/ BCTS that is responsible for the crossing, road, or cutblock will be notified. The responsible Licensee/ BCTS 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. This percentage will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

While Licensees and BCTS are responsible for correcting and tracking sedimentation on their areas of activity, it is the responsibility of all field personnel to be vigilant of sedimentation, even if it is occurring at another Licensee's site. Opportunities for improvement include training field personnel to recognize sedimentation occurrences and creating sedimentation response plans so that remediation can be quick and efficient.

## **Indicator - 27 Maintenance of Natural Stream Flow**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of new stream crossings that maintain natural stream flow	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 27 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)

### **Description of Indicator**

When forest roads are constructed it is often necessary to build structures (i.e. culverts, bridges) to cross streams that may be fish-bearing. In order to maintain the number and diversity of fish species, stream crossings cannot be a barrier to their migration. As fish are also an important food source for other faunal species, the success of these stream crossings (i.e. to provide for fish migration) contributes to the maintenance of other faunal species on the DFA. It is the intention for all new fish-stream crossings to maintain natural stream flow. It is also a legal requirement. Stream crossings must also consider the peak flow that could occur in that stream. Careful consideration of culvert size must be made to ensure that the chosen culvert can manage natural high water events. If the culvert cannot handle peak flows, the water can back up and overflow the road, wash out the roadbed, and cause significant sedimentation and stream bank damage. This indicator will measure the success of maintaining fish movement and managing peak flows at all new stream crossings in the DFA.

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### **Current Practices and Status of Indicator**

Streams and crossing structures are identified during operational plan preparation. The streams are surveyed for their potential for bearing fish and qualified personnel determine their probable peak flow volumes. The appropriate culvert size and installation procedure is then prescribed for the stream crossing. EMS pre-work forms are completed prior to the installation and an inspection form is completed by the Licensee supervisor at the time of completion. In addition, many stream crossing structures are inspected over time as part of Licensee's/ BCTS EMS procedures.

100% of stream crossings installed between April 1, 2004 and March 31, 2005 in the DFA, maintained natural stream flow.

### **Establishment of Targets and Future Practices**

Many stream crossings in the past did not consider fish passage or underestimated peak flow volumes. The result was barriers to fish movement and washed out roads. The Licensees and BCTS recognize the importance of installing new stream crossings that maintain natural stream flows, and have set the target at 100% performance.

Stream crossings will continue to be identified in operational plans and procedures implemented to maintain their natural flow.

### **Forecasting and Predicted Trends**

While the indicator target is expected to be achieved, the exact degree of success is not easy to quantifiably forecast. However, it is important to identify what the accepted target means to SFM. Maintaining natural processes such as stream flow is vital to sustainable forest management. 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 new stream crossings maintained natural stream flows?

The above scenario would immediately restrict fish movement in many streams in the DFA. This typically would be seen in cases where the down-stream end of the culvert is suspended above the water channel, a point above which fish could no longer migrate. Besides the obvious impact to the fish population, all species reliant on them upstream from the culvert would be affected. Installing an improper structure that could not manage peak flows would inevitably lead to road flooding, possible washouts, and potentially large volumes of sediment entering the stream.

Reducing road failures and maintaining fish populations will help other values of sustainable forest management. Social values may be protected by the maintenance of recreational opportunities. Reducing road failures means the general public will have continued recreational access to many areas of the DFA. These recreational pursuits may include fishing that has been maintained through proper culvert installation. Economically, significant savings can be realized by avoiding costly harvesting delays from washed out roads.

Meeting the target objective can maintain ecological, social, and economic values of sustainable forest management. Therefore, the Licensees and BCTS are committed to achieving the stated target for the indicator and long term trends are anticipated to show that all new stream crossings will maintain natural stream flows.

### **Monitoring and Reporting Procedures**

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

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for installing new crossings that meet the objectives of this indicator. Specifically, Harvest Supervisors are responsible to oversee the installation of bridges and culverts through EMS checklists and final inspection reports. Using Peak Flow Indices will increase the accuracy of predicting peak flows for watersheds, allowing correct sized culverts or bridges to be

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installed. Completing stream surveys will provide planners with information on which streams require fish management.

### **Indicator - 28 Forest Continuity**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of net area regenerated within 3-years after commencement of harvesting	Target: 100% annually Variance: -10%

Indicator 28 addresses the following CSA-SFM criteria, elements, value and objectives:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)
4.	<b>CCFM Criterion:</b> Forest Ecosystem Contributions to Global Ecological Cycles
4.1	<b>CSA SFM Element:</b> Carbon Uptake and Storage
4.1.A	<b>Value:</b> Uptake and storage of carbon in forest ecosystems
4.1.A.a	<b>Objective:</b> Facilitate carbon uptake and storage within harvested areas
5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non Timber Benefits
5.1.A	<b>Value:</b> Short and Long term benefits
5.1.A.a	<b>Objective:</b> Maintaining a flow of timber benefits

#### **Description of Indicator (3.2.A.a and 5.1.A.a)**

Trees have a profound influence on water quality and quantity. They intercept precipitation, shade streams, bind soil particles, and draw moisture from the soil. When harvesting occurs there can be immediate impacts to the hydrologic cycle. Water tables may rise, water temperatures may increase, and stream levels may become more erratic as the mitigating influence of the forest is absent. By regenerating harvested areas quickly and efficiently, the overall impact to the DFA hydrology should be kept in balance. Maintaining this equilibrium will contribute to sustainable forest management by allowing water quality and quantity to stabilize on a landscape level. Tracking the area regenerated in comparison to the area harvested on a landscape level will ensure that harvesting does not outpace the ability of the DFA to adjust to changes in its hydrology. In addition to hydrological and ecological benefits, prompt reforestation lessens the need for controlling competitive vegetation and benefits society in the short and long term. Regenerated cutblocks improve aesthetics, provide recreational opportunities, and are the economic future of the forest industry.

#### **Current Practices and Status of Indicator (3.2.A.a and 5.1.A.a)**

Regenerating harvested areas is a cornerstone of current forest management. The prompt regeneration of the forest ensures the economic and ecological benefits trees provide to be present for the future. All Licensees and BCTS employ databases such as GENUS to track the planned reforestation activities for every site that requires them. Site plans define the standards to which regenerated blocks will be held to, and the timeframe to which they must reach Free to Grow status. The prescribed legal date for regenerating a cutblock is the "regen" date, and varies depending on the ecosystem association being reforested. As reforestation goals have been set at the cutblock level, monitoring has not been as focussed on how harvested sites and regenerated areas compare on a landscape level.

90.0% of the net area harvested between April 1, 2000 and March 31, 2001 in the DFA, has been regenerated.

#### **Establishment of Targets and Future Practices (3.2.A.a and 5.1.A.a)**

As reforestation occurs one or more years after harvesting there is a lag between when an area is cut and when it is regenerated. Site preparation may have to be done, seedlings have to be grown, and other

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activities may be required before regeneration can occur. Usually, there are no obstacles to regenerating a site within 3 years of harvesting, and thus the target has been set at 100%. However, in some cases there may be need for additional time. The current Mountain Pine Bark Beetle epidemic may result in some areas to be postponed for planting until salvage operations are complete, a process that may take several years. Therefore, while the Licensees and BCTS are committed to a target of 100% the variance of -10% recognizes that in some cases this may not be achievable.

### **Forecasting and Predicted Trends (3.2.A.a and 5.1.A.a)**

While it is expected the indicator target will be achieved, the exact degree of success is not easy to quantifiably forecast. However, it is important to identify what the accepted target means to SFM. The prompt reforestation of harvested areas is vital for maintaining water quality 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 75% of harvested areas were reforested within 3 years of harvesting?

Allowing 25% of harvested areas to remain unplanted after 3 years may cause several problems. Water tables may remain high and spring runoff volumes may be greater due to the lack of snow interception from trees. This will create greater peak flows in streams, possibly increasing erosion and flooding. The lack of shade on smaller streams may increase water temperatures that may be detrimental to fish populations. Besides the impact to water quality, postponing reforestation can lead to other problems. By the time planting occurs, competing vegetation may become so well established that seedling survival and performance is reduced. Wildlife dependant on conifer forests may not recolonize some sites for extended periods. In the long term, timber supply may be reduced from the lag between harvesting and reforestation. The reduced harvesting levels could lead to future community instability.

### **Monitoring and Reporting Procedures (3.2.A.a and 5.1.A.a)**

Each harvested area with legal requirements for regeneration has stocking standards prescribed within a Site Plan. This Site Plan information is tracked and monitored within Licensee databases such as GENUS that also schedule planting and survey dates. Successful regeneration will be determined by regen surveys that may be done at the time of planting or at a later date. Regen declarations will be made through RESULTS to the Ministry of Forests and Range. Using regen information this indicator percent will be reported annually in the SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities (3.2.A.a and 5.1.A.a)**

Licensees and BCTS are responsible for reforestation, surveying, and reporting regeneration information. Specifically, it is the Silviculture Forester's responsibility to coordinate these activities. The Licensees and BCTS will continue to strive to reforest all harvested areas as quickly as possible, and will continue to be informed of new developments in silviculture to achieve targets.

### **Description of Indicator (4.1.A.a)**

As discussed in the *Forest Continuity* indicator, prompt reforestation of harvested areas is a major component of sustainable forest management. In addition to creating wildlife habitat, maintaining hydrologic processes, and providing future timber for harvesting, regenerating cutblocks can absorb significant amounts of carbon through photosynthesis. Because young plantations are typically healthy and rapidly growing, they sequester more CO<sub>2</sub> through photosynthesis than they release through decay. By reducing atmospheric greenhouse gases such as CO<sub>2</sub>, regenerating cutblocks can contribute to reducing climate change. The sooner cutblocks are regenerated after the completion of harvest the sooner this process can begin.

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Tracking plantation establishment will allow forest managers to assess how quickly and successfully regeneration is occurring, and if possible, adjust operations to reduce the time it takes to achieve reforestation.

The indicator does not include those sites harvested under the Bark Beetle Regulation (BBR). The BBR was enacted to facilitate the rapid harvesting of pine beetle infested timber and has since been repealed. However, until Licensees and BCTS have approved FSPs, areas harvested under the BBR will be managed to the standards in the regulation. Many of these sites were small (less than 15 ha), isolated, and destined to be absorbed into larger cutblocks. Due to the logistics of their size, locations, and uncertainties around adjacent harvesting, these sites may have planting postponed beyond the target date of 3 years.

### **Current Practices and Status of Indicator (4.1.A.a)**

Licensees and BCTS are legally required to declare the NAR (Net Area Reforestable) of a cutblock regenerated by a date defined in the Site Plan. The NAR is the area of a cutblock that must be reforested, and does not include permanent access structures (roads), wildlife tree patches, and areas of wetlands or rock. The date regeneration must be accomplished by is called the "regen" declaration date and varies depending upon the ecosystem association it is applied to. For some ecosystem associations the date may be 7 or more years, but most cutblocks are declared to be reforested before the regen period has expired. This prompt reforestation allows seedlings to become established before competing vegetation becomes too developed on the site.

83.4% of the net area harvested between April 1, 2001 and March 31, 2002 in the DFA, has been regenerated.

### **Establishment of Targets and Future Practices (4.1.A.a)**

The Licensees and BCTS have determined that 3 years is sufficient time for a cutblock to be planted once harvesting is complete. Within those 3 years site preparation may be required, such as disc trenching or mounding, and seedlings have to be grown that are appropriate for that site. Compared to many site plan prescribed regen dates, 3 years is an aggressive target to be achieved. However, events may occur that result in some cutblocks not being reforested within this period. Planting may be postponed as adjacent stands are harvested to salvage pine beetle killed timber. There may be insufficient seedlings to complete planting, or new plantations may suffer mortality from pests or extreme weather. In light of these possible events, a variance of -10% has been established.

To achieve this target, forestry operations have to be completed quickly and efficiently. Harvesting schedules, piling and burning of debris and road deactivation schedules all have to consider the target planting date. Silviculture foresters will have to ensure site preparation and seedling acquisition is timed to meet the 3-year target date.

### **Forecasting and Predicted Trends (4.1.A.a)**

The indicator target is achievable based on past performance by licensees and BCTS, and the objective is anticipated to be met. However, while cutblocks may be planned to be regenerated within 3 years from the completion of harvest, the exact level of success that will be achieved is difficult to forecast. Factors such as weather, seedling availability, and ongoing beetle salvage operations may disrupt planting schedules. However, it is important to identify what the accepted target means to SFM. The prompt reforestation of harvested areas is vital for maintaining forest sustainability and reducing atmospheric CO<sub>2</sub>. A "what if" scenario analysis will identify the importance of the target for this indicator:

- a) What if only 50% of harvested areas were reforested within 3 years of harvesting?

Allowing 50% of harvested areas to remain unplanted after 3 years may delay the uptake of atmospheric carbon, reducing efforts to fight climate change. Waiting beyond 3 years could allow competing vegetation to become well established reducing seedling performance once they are planted. Delaying regeneration could also be detrimental to those plant and animals dependent on forest ecosystems. In the long term, timber supply may be reduced from an excessive lag between harvesting and reforestation thereby affecting economic and social values in the DFA.

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### **Monitoring and Reporting Procedure (4.1.A.a)**

Planting and survey data is monitored in Licensee/ BCTS databases such as GENUS. All silviculture activities, including declarations of meeting regen dates and planting, are reported annually to the Ministry of Forests and Range through the RESULTS program. The indicator percent will be reported in the annual SFMP report for the operational year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities (4.1.A.a)**

Licensees' and BCTS' Silviculture Foresters are responsible for the monitoring, tracking, and reporting of this indicator. There are some opportunities for continual improvement. Licensees/ BCTS may consider (if they aren't already) conducting regen surveys at the time of planting to reduce the time to declare regeneration. Scheduling silviculture activities should take every opportunity to reduce the time between activities. For example, site preparation could occur directly after harvesting instead of waiting for the following year.

### **Indicator - 29 Peak Flow Index Calculations (removed and replaced by Indicators 56, 57 and 58)**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of watersheds with Peak Flow Index calculations calculated	<u>Target:</u> 100% by June, 2006 <u>Variance:</u> +7 months

Indicator 29 addresses the following CSA-SFM criteria, element, value and objective:

3.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)

### **Indicator - 30 Free Growing Requirements**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of cut block area that meets Free Growing requirements as identified in Site Plans	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 30 addresses the following CSA-SFM criteria, element, value and objective:

4.	<b>CCFM Criterion:</b> Forest Ecosystem Contributions to Global Ecological Cycles
4.1	<b>CSA SFM Element:</b> Carbon Uptake and Storage
4.1.A	<b>Value:</b> Uptake and storage of carbon in forest ecosystems
4.1.A.a	<b>Objective:</b> Facilitate carbon uptake and storage within harvested areas

### **Description of Indicator**

A free growing stand is 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 (BC MOF 1995b) A free growing assessment is conducted on stands based on a time frame indicated in the Site Plan. The early and 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 fulfil mandates outlines 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 fulfilment of a Licensee's obligation to the Crown for reforestation.

This indicator measures the percentage of harvested blocks that meet free growing obligations across the DFA. While this percentage is important in a legal sense, as Licensees/ BCTS have an obligation to meet free growing standards, it is also important for sustainable forest management. Stands that meet free growing standards are deemed to be have reached a stage where their continued presence and



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development is more assured. They are in numbers, health, and height that make them less vulnerable to competition and more likely to reach maturity. Producing a free to grow stand means that the forest ecosystem will continue to develop. It means that carbon sequestration will also continue, locking up additional green house gases as cellulose in the growing plantation. As more blocks reach free to grow status, they could make a significant local contribution to reducing global climate change.

### **Current Practices and Status of Indicator**

Establishing free growing dates and standards for each harvested stand is a legal requirement. They are recorded and maintained in each Licensee's and BCTS' database, such as GENUS. Each cutblock is surveyed prior to the late free growing date to ensure the free growing standards have been met and that the stand is at target heights, fully stocked, and healthy. The results of all surveys are summarized and maintained in Licensee/ BCTS 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. If all free growing standards are met, the Licensee/ BCTS makes an application to the Ministry of Forests and Range for the cutblock to revert to the Crown's responsibility.

96.1% of the cut blocks required to meet free growing requirements during or before the reporting period of April 1, 2004 and March 31, 2005 in the DFA, met those requirements..

### **Establishment of Targets and Future Practices**

The target for this indicator has been established at 100% to ensure that all harvested areas within the DFA achieve free to grow status within prescribed timelines. Once cutblocks reach the free to grow standard the area reverts back to Crown land and all Licensee/ BCTS obligations are considered complete. A performance target of 100% is not only achievable; it is in the licensee's best interest as the completion of silviculture obligations is an important financial benefit. Until the Crown assumes responsibility for a plantation, the Licensee or BCTS must bear the costs of managing that stand, including surveys, thinning, brushing, and, if necessary, replanting.

### **Forecasting and Predicted Trends**

While it is anticipated that 100% of blocks will meet the indicator target, the exact level of success is not easy to forecast. However, it is important to identify what the accepted target means to SFM. By ensuring harvested blocks within the DFA meet the prescribed free growing date, forest managers are ensuring that the productive capability of the land base is conserved and that the forest resource will be available for future use. 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 measure is 100%, one other potential scenario will be analyzed:

a) What if only 50% of harvested blocks met the prescribed free growing date?

If only half of harvested blocks met the prescribed free growing date the sustainability of the timber resource within the DFA would be in peril. Free growing stands are considered to have reached a state where they can continue to grow in a healthy manner, reasonably free of competition. Stands that have not reached this state may be suffering high pest mortality or competition from other species that may prevent them from becoming commercially viable crop trees. Quite simply, 50% fewer free growing blocks means there will be 50% less area to harvest in the future.

In addition to economic benefits, free growing stands contribute to ecological values of SFM. Achievement of free growing stands ensures that the nutrients and productivity of the site have not been significantly altered from harvest and that the land area has not been converted to another type of vegetative cover. Wildlife dependent on healthy forests also benefit from the creation of free growing stands. A free growing stand also represents an area that is actively storing carbon and contributing to the removal of carbon dioxide from the atmosphere. Having 100% of blocks meeting their free growing dates means that the DFA can make a sizeable contribution to the effort to reduce atmospheric carbon dioxide.

In the long-term, failing to achieve the identified target for this measure could negatively impact economic, ecological and social values across the DFA. As the timber supply and the amount of healthy

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regenerating forests decline, the industries, communities and natural processes that depend on them will also suffer. In the Prince George DFA, trends for the immediate future will likely show that free growing objectives will continue to be achieved on 100% of harvested blocks.

### **Monitoring and Reporting Procedures**

Silviculture obligations such as free growing dates for harvested stands are recorded and maintained in Licensee/ BCTS databases such as GENUS. Once free to grow status has been achieved, the Licensee/ BCTS must submit a report to the Ministry of Forests and Range that will update the status of the cutblock on the government database. These reports must be submitted on an annual basis for all blocks surveyed that operating year. The indicator percent will be included in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

It is the Silviculture Forester's responsibility to monitor, track and report this indicator. Opportunities for continuous improvement could be found in the administration of silviculture activities. Currently, non-conformances generally relate to data base tracking, survey methodology and reporting delays. These issues will be reviewed and, if necessary, a resulting action plan will be developed and implemented to minimize future negative impacts to this indicator.

### ***Indicator - 31 Stand Damaging Agents***

<b>Indicator Statement</b>	<b>Target and Variance</b>
Areas with stand damaging agents will be prioritized for treatment	Target: 100% Variance: -10%

Indicator 31 addresses the following CSA-SFM criteria, element, value and objective:

4.	<b>CCFM Criterion:</b> Forest Ecosystem Contributions to Global Ecological Cycles
4.1	<b>CSA SFM Element:</b> Carbon Uptake and Storage
4.1.A	<b>Value:</b> Uptake and storage of carbon in forest ecosystems
4.1.A.a	<b>Objective:</b> Facilitate carbon uptake and storage within harvested areas
5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.a	<b>Objective:</b> Maintaining a flow of timber benefits

### **Description of Indicator**

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 Prince George 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 and BCTS 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.

It should be noted that prioritizing a stand for treatment might not guarantee the stand would be treated. The size of the stand, the threat the agent poses, the location, and the merchantability of the timber all have to be considered when prioritizing which stands will be treated first. Some stands may have such a low priority that the only "treatment" is to monitor the area until such a point when more active operations are deemed necessary.

Treating areas with stand damaging agents will provide other societal benefits. Burned and diseased killed stands may be aesthetically displeasing, and their harvesting and reforestation will create a more

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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.

### **Current Practices and Status of Indicator**

Prioritizing stands with damaging agents for treatment is part of an overall forest health strategy. Treatment of stands with damaging agents may take several forms. These may include silviculture treatments on plantations with blister rust problems, or falling and burning individual stems to control bark beetles. However, the main treatment employed to manage stand damaging agents is harvesting dead or dying stands, followed by prompt reforestation where required.

All Licensees and BCTS target damaged stands in a similar manner. Each year the volume of damaged timber is assessed within the DFA. Of this volume, licensees / BCTS prioritize planning and harvesting activities based on levels of attack, stage of attack, wood quality and milling capacity/needs. This indicator reports out on the Licensees' and BCTS' success in ensuring areas with stand damaging agents have been assessed and have been prioritized for treatment if required and thereby minimizing value losses.

100.0% of areas with stand damaging agents between April 1, 2004 and March 31, 2005 in the DFA, were prioritized for treatment.

### **Establishment of Targets and Future Practices**

The target for this indicator has been established at 100% to ensure that all areas with stand damaging agents are prioritized within the DFA. The current Mountain Pine Beetle epidemic is, and will remain for the short-term, the focus of Licensees and BCTS stand damaging agent prioritization. Licensees and BCTS will continue conduct annually reviews of planning areas to identify areas with stand damaging agents.

### **Forecasting and Predicted Trends**

The current rapid spread of the Mountain Pine Bark Beetle and the unpredictability of other agents such as fire make it difficult to accurately forecast the success of meeting the indicator target. However, it is important to identify what the accepted target means to SFM. 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 measure is 100%, one other potential scenario will be analyzed:

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

Failure to prioritize 50% of areas with stand damaging agents for treatment 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, uninfested pine stands while other stands are beetle infested or dead, the opportunity to prevent further spread 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 treat 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.

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### **Monitoring and Reporting Procedures**

Each licensee is responsible for monitoring planning areas for stand damaging agents and prioritizing these areas. Reports will be generated at the end of each operating year to identify the percent of areas with stand damaging agents that have been prioritized in the DFA. This information will be included in the annual SFMP report for the year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensee/ BCTS Planning Foresters are responsible for co-ordinating the detection of damaged timber, and Woodlands Managers are responsible for reviewing and updating volume targets each year. Licensees and BCTS are responsible for updating databases such as GENUS with current forest health conditions. Co-ordination with other Licensees for the efficient and timely treatment of DFA stand damaging agents is crucial for this indicator's target to be met.

### **Indicator - 32 Forest Land Conversion**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The total percent of forested land within the Timber Harvesting Landbase that is converted to non-forested land.	Target: <=4% Variance: +0.5%

Indicator 32 addresses the following CSA-SFM criteria, element, value and objective:

4.0	<b>CCFM Criterion:</b> Forest Ecosystems Contributions to Global Ecological Cycles
4.2	<b>CSA SFM Element:</b> Forest Land Conversion
4.2.A	<b>Value:</b> Forest Land
4.2.A.a	<b>Objective:</b> Minimize the conversion of forest land to non-forest land

### **Description of Indicator**

This indicator measures the amount of area developed as permanent access structures (PAS) within the Timber Harvesting Land Base (area converted from forested land to non-forested land). Permanent access structures include roads that will not be rehabilitated. 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.

### **Current Practices and Status of Indicator**

Analysis conducted as of Mar 31, 2006 indicate an average of 1.75 % of the Timber Harvesting Land Base in the DFA has been converted to non-forest land. Permanent access structures constructed between April 1, 2005 and March 31, 2006 contributed .03% to the overall percent above.

### **Establishment of Targets and Future Practices**

The current target of 4% has been determined based on limited data and information. It is certain that the percent of non-forested land will increase in the future as new roads are constructed. How much more road will be required and how much is economically, socially, and environmentally acceptable is difficult to determine. As well, current harvesting has been focused on MPB killed stands which for the most part are found on gentle terrain and in previously roaded areas. Roads constructed following the MPB epidemic may require more new roads in more difficult terrain. A target of 4% was determined by considering TSR 2 predictions for future road areas (5.2% of the THLB) along with the April 1, 2005 to March 31, 2006 data (one year contribution of .03% applied over 50 years may contribute an additional 1.5% to the current status of 1.75% for a total of 3.25% non-forested land). The target of 4% was chosen as an average between the TSR predictions and best known information. This indicator will be monitored and tracked into the future to identify opportunities for improvement.

### **Forecasting and Predicted Trends**

The 4% target is anticipated to be achieved by all Licensees and BCTS. 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

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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 an indicator such as this. As this target identifies a value equal to or less than 4.0%, one other scenario should be identified:

b) What if considerably more than 4.0% of the THLB in the DFA was converted to non-forested land?

Impacts to all three aspects of SFM (ecological, economic, and social) could be expected if considerably more than 4.0% of the THLB in the DFA 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 and non-forested land within the DFA. Licensees and BCTS are committed to achieving the identified target. The mountain pine beetle epidemic continues to influence many aspects of this indicator. The smaller salvage patches of past practices resulted in a higher proportion of permanent access structures. It is anticipated in the future that larger blocks will be planned and less road will be required to complete harvesting activities.

### **Monitoring and Reporting Procedures**

All road planning and construction information is maintained within Licensee/ BCTS databases such as GENUS. Each year the databases are queried to report the overall area of road that has been constructed that year and presented as a percent of the Timber Harvesting Land Base in the DFA. This percent will be reported for the year and added to the ongoing total percent of non-forested land. The query will be used by forest planners to ensure that the amount of forest land conversion is maintained within the target. The operational year is between April 1<sup>st</sup> and March 31<sup>st</sup>, and the above information will be contained in the annual SFMP report for that period.

### **Responsibility and Continuous Improvement Opportunities**

Forest planners are responsible for ensuring that the over-all level of planned road development provides adequate road access but minimizes reductions to the productive forest land base. Licensee/ BCTS operations personnel are responsible for developing roads and to ensure they do not exceed planned dimensions. There are several opportunities for continuous improvement of this indicator. Licensees and BCTS can standardize road class widths to the narrowest width safety and efficiency can permit. Existing permanent access structures can be restored to the productive land base by rehabilitation methods. Future roads that are planned to be PAS can be designed and built to be temporary access structures that are returned to the net area to be reforested. Finally, alternative harvesting systems can be implemented that reduce the need for inblock roads and landings.

## **Indicator - 33 Cut Level Volumes**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The cut level volumes compared to the apportionment across the Timber Supply Area	<p><u>Target:</u> ≤100% Over each 5 year cut control period</p> <p><u>Variance:</u> +10%</p>

Indicator 33 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.a	<b>Objective:</b> Maintaining a flow of timber benefits

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### Description of Indicator

To be considered sustainable, harvesting a renewable resource such as timber can not 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 Prince George DFA is part of the larger Prince George TSA, comprising about 44% 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.

In the summer of 2004, the Chief Forester completed an expedited Timber Supply Review (TSR) and re-determined the AAC for the Prince George TSA. This review was initiated in order to address the severe mountain pine beetle infestation that currently exists in the TSA. The Chief Forester examined conservation values, timber supply, management practices, and the various options and implications of increasing volumes of timber harvested. Currently, the re-apportionment of the AAC has not been finalized.

### Current Practices and Status of Indicator

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 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.

As of December 31, 2004 and 3 years into the cut control period, 54.3 % of the 5 year cut control volume has been harvested by the signatories in the Prince George TSA.

### Establishment of Targets and Future Practices

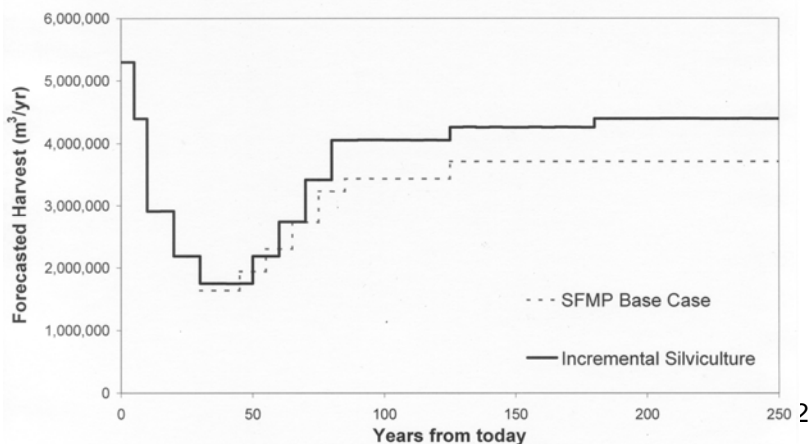
A common method for establishing targets is to benchmark the current harvest levels and extrapolate to the next 5 to 10 years. However, due to the existing mountain pine beetle epidemic in the DFA, increased harvest levels make benchmarking difficult and unpredictable. The Chief Forester apportions AAC within the DFA and the Licensee's/ BCTS are committed to fulfill a 100% of their timber harvesting obligations.

### Forecasting and Predicted Trends

The actual volume harvested by the Licensees and sold by BCTS will be directly related to the forecasted volume over time as per the Prince George SFM Indicator Forecasting project. The results of the harvest levels forecasting under Scenario 4 – Incremental Silviculture are shown in the following figure.

The current annual allowable cut in the Prince George Forest District is 5,300,000 m<sup>3</sup>/year (MoF, Oct 2004).

As seen in the harvest volume forecast figure, the short-term harvest level drops for about 30



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years then levels off under 2 million m<sup>3</sup>/year for an additional 20 years, and then starts to climb until the long term harvest level around 4 million m<sup>3</sup>/year is reached.

The Licensees and BC Timber Sales are working with Ministry of Forests and Range within the Timber Supply Area to review and evaluate the results of the forecasting results and work together to develop strategies to deal with the short-mid term harvest volume fall downs.

Additional forecasting of this indicator will occur during future indicator supply analyses, which are anticipated to be at five-year intervals.

### **Monitoring and Reporting Procedures**

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 1<sup>st</sup> to December 31<sup>st</sup> each year, on an annual basis. BC Timber Sales will track the volume sold annually, and together with the Licensees the cut level as a percentage of apportionment for the most recent 5-year cut control period will be reported in the annual SFMP report. Reporting for BCTS will only include the Prince George Forest District.

### **Responsibility and Continuous Improvement Opportunities**

Planning foresters are responsible for ensuring that the volume planned for harvesting will meet the desired allowable cut volume apportioned across the TSA. The Licensees and BCTS will work cooperatively with the Ministry of Forests and Range to better estimate the AAC and actual harvest level on an annual basis. As better estimates of the current damage from Mountain Pine Bark Beetle are obtained, more accurate AAC determinations will be possible.

### **Indicator - 34 Forestry Related Industrial Fires**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Number of hectares (area) damaged by accidental forestry related industrial fires	<u>Target:</u> <60 ha annually <u>Variance:</u> 5 ha

Indicator 34 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.a	<b>Objective:</b> Maintaining a flow of timber benefits

### **Description of Indicator**

This indicator measures the number of hectares lost to industrial forest fires. As fire can result in catastrophic losses to the timber supply, wildlife, and private property, a high value has been placed on reducing the impact of these fires in the DFA. Accidental industrial fires can be caused by various sources, including escapes from the use of prescribed fire (e.g. burning slash piles) or from human induced error (e.g. machinery, cigarette smoking, etc.).

Industrial fires are usually brought under control quickly due to the availability of fire fighting equipment and Licensee/ BCTS Fire Preparedness Plans. In contrast, naturally caused fires have the potential to quickly grow in size before fire control efforts can be undertaken. However the area and extent of accidental industrial fires must be minimized throughout the DFA in order to contribute to the overall health of the forest and long-term sustainability of the resource.

### **Current Practices and Status of Indicator**

The main cause of accidental industrial related fires in the DFA is the burning of slash piles and operating industrial machinery. All Licensees and BCTS take precautions to prevent accidental fire ignitions and to reduce the spread of fires once they start. These precautions include EMS checklists and inspections of on-site fire equipment, Fire Preparedness Plans, and fire fighting training for some personnel.

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There have been 15.0 hectares damaged by accidental forestry related industrial fires from April 1, 2004 and March 31, 2005 in the DFA by the signatories.

### **Establishment of Targets and Future Practices**

Targets are established from a review of past performance within the DFA. While a target of 0 ha would be the ideal, the Licensees and BCTS set the current target due to the current Mountain Pine Beetle epidemic and resulting widespread stand mortality in the DFA. The overall risk of fires starting and spreading is high due to the large number of dead and dry standing pine. Licensees and BCTS are committed to minimizing the area of accidental industrial fires and will continue efforts to prevent wildfire and control their spread through EMS procedures, training, and prompt initial attack strategies as part of their fire preparedness plans.

### **Forecasting and Predicted Trends**

This indicator is not easy to quantifiably forecast as the ignition and spread of wildfires is dependant on many factors such as weather, slopes, and forest types. However, it is important to identify what the accepted target means to SFM. Accidental forestry related fires affect ecological, economic and social 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 currently has the target set at less than 60 hectares, one other scenario should be identified:

- a) What if there were significantly more than 60 hectares of accidental forestry related fires throughout the DFA?

If there were more than 60 hectares of accidental forestry related fires throughout the DFA ecological values may benefit due to the historic nature of ecosystems in the DFA. However economic and social values could both be negatively impacted. At the worst, loss of human life and property damage may occur. Timber supply, resource values and visual quality may also be compromised, thereby affecting overall economic benefits and social values from forests in the DFA. Failure to achieve the indicator target could also potentially reduce quality of life values for the public within the Prince George DFA. For example, if an accidental forestry related fire destroyed a popular campsite, public recreation values could be reduced.

Negative influences from an increase in accidental forest industry related fires would likely outweigh the potential positive ecological gain. Therefore, the Licensees and BCTS will continue to place high importance on minimizing the impact of accidental industrial fires. Based on historic information, accidental fires have often been less than 60 cumulative hectares across the DFA. However, in light of the current mountain pine beetle infestation it is unknown what the future status of this measure may be.

### **Monitoring and Reporting Procedures**

The British Columbia Ministry of Forests and Range (MoFR) maintains a database of all fires that occur in the province, which includes their cause and their specific location. The Licensees and BCTS (through the MoFR Protection Branch) will likely be involved in fire suppression activities for fires that occur within the DFA. Therefore, Licensees and BCTS will contact the MoFR annually in order to confirm the number of hectares reported as burned along with identification of the source of ignition. The number of hectares of accidental, industrial related fire damaged area will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS will work cooperatively with MoFR Forest Protection Staff to better determine cause and tracking of accidental industrial caused fires. Licensees and BCTS are currently working with Protection staff to develop a Fire Preparedness Plan to counteract the effects of the current, mountain pine beetle infestation within the DFA.



**Indicator - 35 Non-Timber Benefits**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of forest operations consistent with visual quality, cultural heritage, range, riparian, recreation and lakeshore requirements as identified in operational plans.	<u>Target:</u> 100% Annually  <u>Variance:</u> 0%

Indicator 35 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long term benefits
5.1.A.b	<b>Objective:</b> Maintaining a flow of non-timber benefits

**Description of Indicator**

**VISUALS**

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 plans to meet VQOs will help to ensure that visual quality is conserved for future generations.

**Current Practices and Status of Indicator**

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.

100% of forest operations on blocks with visual quality requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

**Establishment of Targets and Future Practices**

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 Prince George DFA.

Licenseses and BCTS will continue to prescribe management activities to achieve VQOs where required.

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### **Forecasting and Predicted Trends**

It is anticipated that 100% of operational plan requirements for VQOs will continue to be achieved. The exact level of success is not easily predicted as conditions vary from one site to another and circumstances, such as forest health and fire, may arise that prevent the requirements from being achieved. However, it is important to identify what the accepted target means to SFM. Conservation of visual quality primarily influences social and economic values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for this indicator. As this indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if only 50 % consistency occurred between forest management operations and strategies identified in operational plans to conserve scenic areas through VQOs?

Implementing only 50% of strategies to protect these areas could lead to social and economic impacts. Although the overall timber supply would likely increase if only 50% of visual quality requirements were met, it would be at the cost of other economic and social values. Visual quality helps businesses that cater to various forms of recreation including lodges, guiding and hunting, fishing and backcountry tours. By not conserving all identified visual values, these businesses could potentially lose customers dissatisfied with the state of the visual resource. Social values attributed to visual quality could also decrease if only 50% of strategies to protect visual quality are implemented. These values are particularly difficult to quantify as one's idea of beauty is individual. It is safe to say a large segment of the population values some landscapes with the visual impacts of harvesting managed in some manner.

Licensees and BCTS will continue to ensure that 100% of all VQO related strategies are implemented on the ground. This will be done through detailed development planning, pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the operational plan are met. These initial, intermediate and final checks are part of each Licensee's and BCTS' EMS/SOP, and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

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

### **Responsibility and Continuous Improvement Opportunities**

Forest Planners are responsible for identifying potential visual concerns at the Forest Stewardship Plan development stage and any harvesting that may affect them. Foresters preparing operational plans are responsible for ensuring that VQO requirements are met through the management activities prescribed in these plans. Harvesting supervisors are responsible for ensuring that forest operations in the field are consistent with visual quality requirements as identified in operational plans.

The Licensees and BCTS realize that the high level of mortality of pine forests in scenic areas will impact the visual quality of some landscapes. Opportunities for rehabilitation of visual landscapes affected by the mountain pine beetle are an area of continual improvement in the DFA.

## **CULTURAL HERITAGE**

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.

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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 Licensees and BCTS to evaluate how successful this implementation is and improve procedures if required.

### **Current Practices and Status of Indicator**

Forest development plans and Forest Stewardship Plans use an Archaeological Predictive Model to assess the potential presence of archaeological resources within proposed harvest areas or road access corridors. Where activities are proposed within zones of high archaeological potential, Licensees and BCTS conduct site level Archaeological Impact Assessments (AIAs) to identify, assess and record any archaeological resources that may be present. Management measures recommended by the archaeologist are incorporated into operational plans.

Archaeological sources are primarily related to First Nations within the Prince George DFA, as they were the first inhabitants of the area. However, an AIA is not biased toward Aboriginal features. Archaeological features that relate to non-Aboriginal people may include artifacts from historical trappers and prospectors, or evidence of old trails and remnants from inhabitants of old lakeside cabins. Features such as these are also identified in AIA surveys and management strategies are developed where appropriate to conserve cultural heritage for both Aboriginal and non-Aboriginal interests.

Conservation strategies are implemented at the site level during harvesting operations so that all identified cultural heritage values will be conserved for future generations. If a non-conformance with the operational plan occurs in the field, this information will be recorded on an activity inspection form and then entered into an incident tracking database or other similar system.

Once a strategy to conserve cultural heritage values is included within an operational plan, there is a legal obligation for the licensee to implement and adhere to the strategy. Harvest and subsequent silviculture inspections ensure that these strategies are implemented as stated in the operational plan.

100% of forest operations on blocks with cultural heritage requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

### **Establishment of Targets and Future Practices**

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. Licensees and BCTS will continue to take measures to ensure forest operations are consistent with cultural heritage requirements as identified in operational plans.

### **Forecasting and Predicted Trends**

It is anticipated that the target of 100% of forest operations will be consistent with cultural heritage requirements. The exact level of success is difficult to forecast as it is operational in nature and is dependent on the nature of the site, and human oversight. However, it is important to identify what the accepted target means to SFM. Conservation of cultural heritage values primarily influences social values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends this indicator. As this indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if only 50 % consistency occurred between forest management operations and strategies identified in operational plans to conserve cultural heritage values?

Implementing only 50% of strategies to protect cultural heritage values could lead to significant cultural loss to both First Nations and the general public within the DFA. Contributions to planning processes by each group would likely be reduced. Aboriginal communities may no longer become involved in development planning as potential infringement of unresolved treaty rights could occur if cultural heritage values are not fully conserved. Members of the general public may also lose faith in forest management and planning processes if the cultural heritage of the Prince George DFA was not recognized as an important value.

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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 Licensees and BCTS will continue to ensure that 100% of strategies are implemented on the ground. They will continue to conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the operational plans are met. These initial, intermediate and final checks are part of each Licensee’s and BCTS’ EMS/SOP and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

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 Licensee and BCTS databases such as GENUS. The indicator percent will be included in the annual SFMP report for the operational year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planning foresters are responsible for identifying areas of cultural heritage during the Forest Stewardship Plan development stage through the Archaeological Predictive Model and through dialogue with First Nations. Foresters responsible for preparing operational plans have to ensure that prescribed management activities are consistent with cultural heritage requirements. Harvesting and Silviculture supervisors are responsible for implementing the operational plan requirements on the ground. Licensees and BCTS are responsible for ensuring any failures to achieve management activities are tracked in their EMS databases and corrective and preventative actions will be identified to improve consistency.

Licensees and BCTS will investigate the possibility of increasing the accuracy of predicting the presence of archaeological sites. Licensees and BCTS, in cooperation with First Nations, the public and local archaeologists, will continue to expand their awareness of cultural heritage values, and explore the effectiveness of strategies utilized to minimize impact to cultural heritage values.

### **RANGE**

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. 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

### **Current Practices and Status of Indicator**

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 contains general management strategies to mitigate negative impacts to range where harvesting is proposed within a range tenure. 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.

83.3% of forest operations on blocks with range management requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

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Licensees and BCTS will identify errant activities and correct them so as to achieve 100% conformance with this target in the next reporting period.

### **Establishment of Targets and Future Practices**

The target for this indicator is established at 100% because the identification, conservation and co-management of range resources are consistent with Sustainable Forest Management. Forest operations will have to implement operational plan requirements for range management objectives to meet the social and economic needs of other users of Crown land.

### **Forecasting and Predicted Trends**

The indicator is not easy to quantifiably forecast, as it is operational in nature and subject to site conditions, and human oversight. However, it is important to identify what the accepted target means to SFM. Conservation of range resources primarily influences economic values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for this indicator. As the indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if only 50 % consistency occurred between forest management operations and range requirements as identified in operational plans?

Implementing only 50% of strategies to protect range resources could lead to sector specific economic impacts and failure to fully utilize the forest resource. Range use and forestry are examples of multiple resource use on the same land base, which diversify the economic returns of the DFA. Loss of range opportunities could reduce the land base to a single use and would limit opportunities for integrated resource management. By implementing only 50% of range requirements, forest practices could potentially remove range barriers, which could in turn result in a significant cost increase for cattle management on range land. It may also increase in cattle trampling and rubbing in young plantations, increasing Licensee and BCTS silviculture costs.

The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated target for this indicator. Therefore, Licensees and BCTS will continue to ensure that 100% of all harvested areas have range requirements implemented on the ground. Licensees and BCTS will continue to conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the operational plan are met. These initial, intermediate and final checks are part of each Licensee's and BCTS' EMS/SOP and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Information that is collected during EMS checklist reviews and harvesting inspections is stored in Licensee and BCTS databases such as GENUS 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.

The indicator percent will be included in the annual SFMP report for the operational year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Harvesting and Silviculture supervisors are responsible for implementing the operational plan requirements on the ground. Licensees and BCTS are responsible for ensuring any failures to achieve management activities are tracked in their EMS databases.

Licensees and BCTS, in cooperation with the Ministry of Forests and Range and Range Tenure holders will continue to explore strategies for both forestry and range users to co-manage forested Crown land and minimize negative impacts from each other's activities.

### **RIPARIAN** **(see Indicator 24) (3.2.A.a)**

#### **RECREATION**

Areas used for industrial forestry are also important to many others for their recreational values. Recreational use may include camping sites for members of the public, and commercial recreation tenures such as lodges. Operational plans, such as Site Plans, describe the activities forest operations must be consistent with to meet recreation objectives. This indicator was designed to monitor the Licensees' and BCTS' success at implementing operational plan requirements for recreation. By monitoring and tracking the consistency of operations with operational plans, forest managers can assess the success of their activities and take steps to improve operations if required. The consideration of non-timber values such as recreation is important to sustainable forest management as it recognizes the multiple benefits forests can provide to society.

#### **Current Practices and Status of Indicator**

Licensees and BCTS currently solicit public and stakeholder input during Forest Development Plan/ Forest Stewardship Plan development. Land and Resource Management Plans (LRMPs) can also provide direction for planning for recreational interests. The Site Plan for a cutblock provides the site-specific requirements that operations have to achieve to meet the needs of recreational users.

Once a recreation strategy is included within a operational plan document, there is a legal obligation for the Licensee or BCTS to implement and adhere to the strategy. Harvest and silviculture inspections ensure that these strategies are implemented as stated in the operational plan.

100% of forest operations on blocks with recreation management requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

#### **Establishment of Targets and Future Practices**

The target for this indicator was established at 100% because the identification and conservation of recreational values is important to many in the DFA. Licensees and BCTS will continue to take measures to ensure forest operations are consistent with recreation requirements as identified in operational plans.

#### **Forecasting and Predicted Trends**

It is anticipated that the target of 100% of forest operations will be consistent with recreation requirements. The exact level of success is difficult to forecast as it is operational in nature and is dependent on such factors as the nature of the site, weather, and human oversight. However, it is important to identify what the accepted target means to SFM as the conservation of recreation values influences social and economic values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for this indicator. As this indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if only 50 % of forest management operations were consistent with recreation requirements identified in operational plans?

Implementing only 50% of strategies to protect recreation values could lead to economic and social losses within the DFA. Inhabitants of and visitors to the Prince George DFA have relied on the forest for a variety of recreational pursuits, such as camping, hunting, hiking, and fishing. As recreational opportunities contribute to the overall quality of life, a decrease in their quality and quantity could result in an overall decline in life quality within the DFA. Recreational tenure holders may also experience economic losses. For example, a lodge that relies on a certain path for trail rides may lose clients if forestry operations disturb their route. Other tenure holders such as Guides may see their businesses decline if forestry operations failed to manage recreational values.

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The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated target for this indicator. Therefore, the Licensees and BCTS will continue to ensure that 100% of recreation requirements are implemented on the ground. Licensees and BCTS will continue to conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the Site Plan are met. These initial, intermediate and final checks are part of each Licensee's and BCTS' EMS/SOP and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

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

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible to solicit public and stakeholder input during Forest Development Plan/ Forest Stewardship Plan development, Sustainable Forest Management Plan continuous improvement and other communication activities to ensure operational plans reflect this input. Harvest and silviculture supervisors are responsible to oversee harvesting and silviculture activities to ensure recreation requirements are met. Licensees and BCTS can request further input from the public to evaluate the success of forestry operations in managing for recreation values and adjust practices to improve performance where required.

## **LAKESHORE**

Lakes and lakeshores provide some of the most ecologically diverse and scenic areas in the Prince George DFA. Their proper management during forest operations is important to maintain a variety of values important to sustainable forest management. Lakeshores are a type of riparian habitat (see *Riparian Area Conservation* indicator for a definition of "riparian") that may be critical for providing wildlife cover, fish food organisms, and supporting unique vegetation communities. They are also highly valued for their recreational and aesthetic properties. The protection and maintenance of lakeshores will ensure that these values will be conserved for current and future generations.

This indicator is intended to ensure that the strategies identified in operational plans (such as Site Plans) to conserve lakeshore values actually have those strategies implemented on the ground. Consideration of the non-timber benefits that lakeshores offer is an important consideration of sustainable forest management.

### **Current Practices and Status of Indicator**

Depending on the size of the lake, the lakeshore area may legally be defined as a Riparian Management Area. In British Columbia legislation, Riparian Management Areas (RMAs) consist of a Riparian Management Zone (RMZ) and, where required, a Riparian Reserve Zone (RRZ). The width of these zones is determined by the size of the lake. The RRZ, if required, is immediately adjacent to the lake and is maintained as a no-harvest zone. RRZs are proposed and implemented in cutblocks and road construction areas, but they also continue in existence after harvest until a mature stand is re-established. Beyond the RRZ, the remaining RMZ may or may not have specific management requirements, which are determined by ecological and social considerations.

Lakeshore values are generally identified through the planning process and then verified on the ground during field exercises. Lakeshore management areas are initially identified on a map during the preparation of the Forest Stewardship Plan. If harvesting operations are planned for an area that may contain lakeshore values, additional information is identified in a Site Plan. The Site Plan also prescribes any management activities that are to be undertaken to conserve the lakeshore riparian values.

Once lakeshore requirements are identified in operational plans, there is a legal obligation for the Licensee or BCTS to implement and adhere to those requirements. Harvest and silviculture inspections ensure that strategies are implemented as stated in the operational plan document.

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100% of forest operations on blocks with lakeshore management requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

### **Establishment of Targets and Future Practices**

The target of 100% was established to reflect the Licensees' and BCTS' commitment to meeting the legal and environmental goals prescribed in operational plans. The identification and conservation of lakeshore values is a socially and ecologically important component of forest management. Thus, Licensees and BCTS will continue to ensure forest operations will be consistent with lakeshore requirements as identified in operational plans.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with lakeshore management requirements. However, the exact level of consistency is difficult to forecast. It is important to identify what the accepted target means to SFM. Conservation of lakeshore values influences ecological, economic and social values 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 lakeshore requirements as identified in operational plans?

Implementing only 50% of lakeshore requirements could lead to significant ecological, economic and social impacts. In an ecological sense, aquatic habitat, biological richness, water quality and species diversity could all be negatively influenced. The broader society also uses lakeshore environments for a variety of uses. Trappers and guides benefit from the wildlife habitat found in these areas. Fishermen, canoeists, kayakers, and others value lakeshores for shelter, camping, and aesthetics. These users may have their recreational experiences diminished by forestry operations that are not consistent with lakeshore requirements. Economically, recreational tenure holders may rely on the ecological and aesthetic attributes of lakeshores to attract clients. Lakeshores not consistent with management requirements may result in a decline in their business as clients choose to stay away.

The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated target for this indicator. Therefore, the Licensees and BCTS will continue to ensure that 100% of all forestry operations are consistent with lakeshore requirements that have been identified in operational plans. The indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the operational plan are met. These initial, interim and final checks are part of each Licensee's and BCTS' Environment Management System (EMS). 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.

The percentage of forest operations consistent with lakeshore requirements will be reported in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Harvesting supervisors are primarily responsible for ensuring operational plan requirements are implemented in the field during harvesting operations. Silviculture foresters are responsible for ensuring silviculture activities are consistent with lakeshore strategies. If problems in implementing lakeshore requirements occur, actions will be taken to improve consistency. These actions may include more intensive supervision, additional training for equipment operators, and additional inspections of lakeshore riparian area layout and identification.



**Indicator - 36 First Order Wood Products**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The number of first order wood products produced from trees harvested from the DFA	Target: ≥ 12 types of products annually Variance: -3

Indicator 36 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long term Benefits
5.1.A.b	<b>Objective:</b> Maintaining a Flow of Non-Timber Benefits

**Description of Indicator**

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/ remanufactured lumber
- \* pulp chips/ OSB chips
- \* plywood veneer
- \* house logs/ raw logs
- \* railway ties
- \* poles
- \* wood shavings
- \* 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.

**Current Practices and Status of Indicator**

Each Licensee currently produces a variety of forest products with different grades and sizes of dimensional lumber being the primary products. BCTS is limited to providing raw logs for sale through an open competitive bid process. Licensees and BCTS also produce specialty wood products such as Japanese select lumber, Machine Stress Rated lumber, and a variety of special order lumber products. Value added manufacturers in the DFA purchase dimensional lumber and certain by-products from Licensee mills to produce products such as log homes, house logs, finger-jointed lumber, and building timbers.

A total of 15 first order wood products were derived from trees harvested between April 1, 2004 and March 31, 2005 in the DFA.

**Establishment of Targets and Future Practices**

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, Licensees and BCTS expect to produce the same number and diversity of first order forest products within the DFA. However Licensees and BCTS 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 -3 products variance from the target of 12.

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### Forecasting and Predicted Trends

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 identifying anticipated future trends. As this indicator currently has a target set at greater than or equal to twelve, one other scenario should be identified:

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

If significantly less than twelve different first order wood products were produced within the DFA economic diversity within the Prince George 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 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 Licensees and BCTS are committed to achieving  $\geq 12$  different first order wood products produced in the DFA.

### Monitoring and Reporting Procedures

In order to track and evaluate this indicator, Licensees and BCTS will report on the number of first order wood products produced. The total number will be included in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### Responsibility and Continuous Improvement Opportunities

Licensees and BCTS are responsible for tracking, monitoring, and reporting the number of first order wood products they produce. The decision to develop and offer additional first order wood products is a business decision to be made by each licensee. Provided markets continue to expand, and expansion of product variety is desirable, there may be room for an increase in the number of first order wood products produced by Licensees in the DFA. The current Mountain pine beetle epidemic will create a huge volume of first order wood products and new markets must be found to absorb them. This may include value-added manufacturers such as furniture makers, luthiers, homebuilders, flooring manufacturers, pellet mills, and similar ventures.

### **Indicator - 37 Volume Advertised Through Competitive Bid**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of DFA volume advertised for sale through open competitive bid	<u>Target:</u> $\geq 20\%$ Annually <u>Variance:</u> -5%

Indicator 37: addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long term Benefits
5.1.A.b	<b>Objective:</b> Maintaining a Flow of Non-Timber Benefits
5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.2	<b>CSA SFM Element:</b> Community and Sustainability
5.2.A	<b>Value:</b> Community well-being
5.2.A.a	<b>Objective:</b> Support opportunities for maintaining a resilient and stable community

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### **Description of Indicator**

Most of the timber harvested in the DFA is collectively cut under major licenses held by Forest Licensees. However, a percentage of the annual volume cut is advertised for sale through open competitive bid. This volume is sold by the Crown through BC Timber Sales (BCTS). BCTS develops and sells publicly owned timber, to establish market prices and optimize net revenue to the Crown. Reliant on the highest bid, BCTS sells units of timber across the DFA to a variety of customers, including sawmill operators, small-scale loggers, and timber processors.

In addition to helping establish market prices and providing revenue to the Crown, BCTS provides the opportunity for customers to purchase timber in a competitive and open market. In this way people who might not have access to Crown timber have an opportunity to purchase it in an equitable manner.

The indicator will evaluate the volume of timber advertised for sale through open competitive bid. This process contributes to the social and economic aspects of SFM by creating opportunities for forest sector employment, and by providing revenue to the Crown that reinvests the money back into the DFA through government programs and institutions. Tracking the indicator will ensure that the volume of timber offered for sale in this manner is sufficient to meet the goals of sustainable forest management.

### **Current Practices and Status of Indicator**

Prior to the passing of Bill 28 (the "Forest Revitalization Act") in 2003, the Chief Forester set the BCTS allocation for each forest district in the province. Bill 28 enabled the reallocation of timber from major licensees to BCTS, and resulted in roughly 20% of the provincial timber allocation being administered by BCTS. Although the exact percentage varies from region to region, in the Prince George DFA, BCTS develops and auctions roughly 20% of the DFA volume allocation.

21.1% of the total volume apportioned between April 1, 2004 and March 31, 2005 in the DFA, was advertised for sale through open competitive bid.

### **Establishment of Targets and Future Practices**

Bill 28 set the target of 20% of the DFA volume advertised for sale through open competitive bid. It was determined that 20% was the value required to statistically determine market prices, one of the main objectives of the open bid concept. The exact volume of timber cut may differ from the volume advertised as the amount sold relies on markets, operating costs, and other variable factors.

### **Forecasting and Predicted Trends**

It is anticipated that the target of 20% of DFA volume will be advertised for sale through open competitive bid. However, the exact level of consistency is difficult to forecast. It is important to identify what the accepted target means to SFM. Selling 20% of DFA volume through open competitive bid creates important opportunities for smaller forestry operators, and provides revenue to the Crown. 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 20%, one other scenario should be identified:

- a) What if significantly less than 20% of DFA volume was advertised for sale through open competitive bid on an annual basis?

Failure to meet the target of 20% could impact economic and social values. It would reduce the opportunities for individuals who do not have a major forest license to have access to Crown timber. This in turn would reduce the economic diversity of the DFA and potentially discourage the development of new forest related businesses. Advertising significantly less than 20% of DFA volume through open competitive bid may also result in an overall decrease in revenue to the Crown. This revenue is reinvested in communities through government spending on education, health care, and social programs. Therefore, a decrease in government revenue may lead to a decrease in social values in the DFA.

Advertising significantly less than 20% of the DFA volume through open competitive bid would likely have a significant impact on the raw material supply to lumber manufacturers in the DFA. This would have the effect of limiting their business success, and their ability to provide direct and indirect employment which would in turn negatively affect associated social values.

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The above “what if” scenario helps to identify some of the potential future impacts of not achieving the stated target for this indicator. Therefore, BCTS will continue to ensure that 20% of DFA volume will be advertised for sale through open competitive bid. The indicator will remain at the target of 20% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

BCTS will track and monitor the volume of timber they annually advertise for open competitive bid. Calculated against the volume harvested annually by Licensees and BCTS, the percentage of DFA volume advertised for sale through open competitive bid will be included in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

BCTS is responsible for monitoring and tracking this indicator. Reporting of this indicator will be the responsibility of both BCTS and Licensees. Continual improvement will be focused on maintaining an even flow of sale opportunities annually. Future conditions may allow Licensees to offer volume from their forest tenures for open competitive bid, although this may come at the cost of social and economic opportunities derived from their manufacturing facilities.

### ***Indicator - 38 Public and Stakeholder Input***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
The number of opportunities given to the public and stakeholders to express forestry related concerns and be involved in planning processes	<u>Target:</u> ≥ 15 Annually <u>Variance:</u> -3

Indicator 38 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.b	<b>Objective:</b> Maintaining a flow of non-timber benefits

### **Description of Indicator**

Forestry activities can impact a wide section of the public and individual stakeholders within the DFA. This indicator was designed to monitor the Licensees' and BCTS' 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 Prince George Licensees' and BCTS' planning framework.

### **Current Practices and Status of Indicator**

There are many opportunities for the public and stakeholders to express forestry-related concerns and to be involved in the planning process. These include Forest Stewardship Plan (FSP) public reviews, FSP amendments, letters to stakeholders soliciting input, Pesticide Management Plan reviews, field tours, newsletters, and websites.

35 opportunities were available to the public and stakeholders to express forestry related concerns and be involved in our planning process from April 1, 2004 and March 31, 2005 in the DFA.

### **Establishment of Targets and Future Practices**

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. Once baseline data is available and collected in 2005 and 2006, the target will be adjusted accordingly to better reflect the needs of the Prince George DFA. Future planning processes will focus stakeholder input on a strategic level, as opposed to current stand level referrals. Licensees and BCTS anticipate the input will be

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relevant to landscape level planning concerns. Incorporating this strategic/landscape level stakeholder input is expected to reduce the individual number of site specific referrals necessary. Until baseline data has been obtained from future planning processes, the Licensees and BCTS have chosen a target that represents a significant number of opportunities to express concerns.

### **Forecasting and Predicted Trends**

This indicator is not easy to quantifiably forecast over a defined time frame. However, it is important to identify what the accepted target means to SFM. The number of opportunities given to the public and stakeholders to express forestry related concerns and be involved in the planning process 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  $\geq 15$ , one other potential scenario should be developed:

- a) What if considerably less than 15 opportunities were given to the public and stakeholders to express forestry related concerns and be actively involved in the planning process?

If there were considerably less than 15 opportunities given to express forestry related concerns be involved in the planning process, adequate attention may not be given to valuable public input. Public input into the development planning process is required to adequately consider other resource values within the DFA. If considerably less than 15 opportunities were given, public participation into forest development planning may decrease and impacts to other resource values such as cultural heritage, non-timber forest resources and biological richness could potentially occur. The oversight of forest planners may impact other resource users in a way that may have been accommodated if the planners had known of the multiple use. For example, the timing of forest operations may impact recreational users. If it was possible, and not done, the timing of those operations may negatively impact the value derived by recreational users.

The general public may grow disillusioned with an industry that does not adequately seek their input and may eventually not support the forestry industry financially or politically. Sustainable forestry relies on the support of an informed public that believes its opinion matters on how Crown forests are to be managed.

Under the Forest and Range Practices Act, more emphasis will be placed on strategic level public input and related planning. This may result in fewer formal opportunities for site-specific public input. However, it is anticipated that the Licensees and BCTS will endeavor to continue to seek out public involvement in operational planning within the DFA. Initial benchmarking data will help to indicate how the future trend of this indicator is likely to proceed.

### **Monitoring and Reporting Procedures**

Each Licensee and BCTS 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 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking and reporting this indicator. While the personnel actively responsible for doing this will vary, they must all ensure the type and number of opportunities will be tracked. Continual improvement will be focused on evaluating the effectiveness of the input at the planning level vs. operational practices.

## **Indicator - 39 Viewing of Access Plans, Operational Plans and SFMPs**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Annually provide a viewing of BCTS and Licensee current access plans, general forest planning and operational plans, and Sustainable Forest Management Plans in the DFA	<p><u>Target:</u> On or before October 1<sup>st</sup> of each year</p> <p><u>Variance:</u> +1 month</p>

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Indicator 39 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.c	<b>Objective:</b> Maintain opportunities to access non-timber benefits by ensuring that individuals and stakeholders who have expressed an identified interest in the planning area (e.g. guides, trappers, recreationists, water licensees, mining tenure holders etc.) are specifically communicated with, during forest planning.

### **Description of Indicator**

Forestry roads provide access for industry and the public to large portions of the DFA. Creating, maintaining, deactivating, and closing these roads is an ongoing process that requires careful planning. Because many non-forestry users of these roads have an interest in their management it is important to provide a viewing of the current access plans of BCTS and Licensees. The input received from such viewings can be used to plan future access management activities.

Sustainable forest management includes non-industrial uses of the forest and access to the forest can influence ecological, economic and social values. For example, constructing a road may provide the public with access to new lakes for fishing, but it may also open areas to hunting and poaching pressure. Closing a road may protect wildlife values in an area, but a local lodge may rely on that road for recreational access. By providing a viewing of access plans and receiving input, BCTS and Licensees will be able to manage forest roads for the broadest spectrum of interests.

Not only will BCTS and Licensees provide a viewing of access plans, but also will provide displays, information and maps on general forest planning, operational activities and SFMP's. Increasing the general public and PAG members' awareness and understanding of the forest planning and development is an important part of sustainable forest management. Although access management is seemingly in the forefront for the public, the incorporation of other forestry activities is important. This will provide members of the public an opportunity to establish communication strategies with the companies. This annual event will also be an advertising venue when seeking new PAG members.

### **Current Practices and Status of Indicator**

No access management plan exists for the entire DFA. Currently, the Licensees and BCTS provide the public with opportunities to review their cutblock and road access information through the forest development planning process. Many public and stakeholder interests contact the Licensees and BCTS for harvest schedules and road access information for the winter. These information requests are particularly common in the late fall, most likely for hunting purposes.

The Licensees and BCTS have held three successful annual Access Management and Forest Activity displays. The most recent display was held on October 12, 2007

### **Establishment of Targets and Future Practices**

The target of providing an annual viewing of current access plans by October 1<sup>st</sup> was established to reflect the Licensees' and BCTS' commitment to receiving input on access management and other forest planning and operational activities. A one-month variance was established to reflect the possibility that completing access plans may run into unforeseen complications.

### **Forecasting and Predicted Trends**

This indicator cannot be quantifiably modeled as the target deadline is either achieved or it isn't. However, a "what if" scenario can be used to illustrate the value of the chosen target in relationship to SFM. As this indicator identifies the target as providing a viewing of BCTS and Licensee current access plans of the DFA, only one other scenario applies for the "what if" scenario analysis:

- a) What if there isn't a viewing provided of BCTS and Licensee current access plans of the DFA by October 1<sup>st</sup>?

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Providing viewings of access plans encourages public input into the planning process. If Licensees and BCTS did not provide this opportunity, the views of the public would not be properly incorporated into forest management planning within the DFA. Access management is implemented in order to control public and industrial access to help conserve other forest resource values, including wildlife habitat, guiding and trapping, hunting, and recreation opportunities. Failure to consider the impacts of access management on these values could result in economic harm to non-forestry industries. In addition to economic impacts, social values derived from recreation could be harmed if access plans do not consider their needs.

The Licensees and BCTS are committed to providing a viewing of current access plans by October 1<sup>st</sup> of each year. Comments will be considered when future access management activities are planned.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will be responsible for coordinating their respective access plans into one viewing on or before October 1<sup>st</sup>. The success in achieving this indicator will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

As stated, Licensees and BCTS are responsible for the monitoring, tracking, and reporting of this indicator. If a viewing is not provided by the deadline, or within the variance period, all participants will review their access planning procedures and determine ways to meet the target date. An area for improvement could be a coordinated Access Management Plan that is prepared by the Ministry of Forests and Range that receives input from Licensees and the public. A single DFA Access Management Plan would provide a comprehensive landscape level plan for the public to review.

## **Indicator - 40 Responses to Written Public Inquiries**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of timely responses to written public enquiries	<u>Target:</u> 100% Annually  <u>Variance:</u> -5%

Indicator 40 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.c	<b>Objective:</b> Maintain opportunities to access non-timber benefits by ensuring that individuals and stakeholders who have expressed an identified interest in the planning area (e.g. guides, trappers, recreationists, water licensees, mining tenure holders etc.) are specifically communicated with, during forest planning.

### **Description of Indicator**

All Licensees and BCTS solicit feedback for their public forest management plans in the DFA. They also receive ongoing general comments and inquiries regarding practices and management of forest lands. These inquiries represent a public concerned with how forest resources are managed, and as such should receive a timely response by all Licensees and BCTS. This indicator has established that a timely response is one that is made within **30 days** of written inquiry.

Due to the level of concern with access management in the DFA, the licensees and BCTS realize that one of the most important mechanisms for identifying and addressing concerns over forestry roads is through daily public input. As mentioned in previous indicators, creating, maintaining, deactivating, and closing these roads is an ongoing process that requires careful planning.

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 forest management decisions that consider views other than those of the forest industry. Responding to written public inquiries is not only respectful of the public, it also forces the forest industry to evaluate their actions and

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commit to them. A forest industry that respects public input will maintain the support of the public, creating a more economically stable and open forest economy.

### **Current Practices and Status of Indicator**

Comments from the public may be provided in many ways, including written letters, e-mails, or faxes to Licensees and BCTS. There may also be written comment made during an in-person meeting between a Licensee or BCTS staff member and the person providing comment, or a comment written by a Licensee staff member dictated by a member of the public over the phone or in person. When this occurs the comment is read back to the person providing the comment to ensure the information is correct.

Currently, Licensees and BCTS respond in a timely fashion to all public concerns in the DFA that involve forest management or practices. Each Licensee and BCTS has its own protocol for answering inquiries and methods of recording this correspondence.

100% of written public inquiries received by signatories between April 1, 2004 and March 31, 2005 in the DFA, were responded to within 30 days of receiving the inquiry.

In addition to tracking general public input the Licensees and BCTS will report out on the number of specific access management inquiries vs. forest planning and operational activity inquiries. This will enhance this reporting process, in order to monitor and address the level of access management concerns over time. By providing a more detailed report of these access management concerns, the Licensees and BCTS will be able to manage forest roads for the wide variety of interests.

### **Establishment of Targets and Future Practices**

The indicator's target of 100% was based on a review of Licensees' and BCTS' past performances. A 5% variance was established, as there are often factors that delay a response. Information may be unavailable that is required for the response, or personnel who may be able to provide input for a response may not be present. Public input is an important aspect of the SFM process. Therefore, it is paramount to ensure that written and documented concerns are dealt with in a timely and thorough fashion. With future reviews and annual reports for this plan, the Licensees/ BCTS will have a better knowledge of how this target will apply to this indicator. 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.

### **Forecasting and Predicted Trends**

It is the intent of all Licensees and BCTS to meet the target, and it is anticipated this goal will be met. The exact level of success is not easy to quantifiably forecast as it relies on unpredictable factors such as human error. 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 timely responses to all written public inquiries?

If there were only 50% of timely responses to all written and documented concerns, adequate attention would not be made to valuable public input. Public 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. For example, a lodge owner may make a written enquiry to learn when hauling is occurring so he knows when to book guests. If he does not receive a response, he may lose his guests and suffer the economic consequences.

The above "what if" scenario analysis implies that a balance of values can be achieved through maintenance of full response to identified public concerns. Therefore, the Licensees and BCTS will continue to provide timely responses to written public inquiries within 30 days of receipt.



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### Monitoring and Reporting Procedures

A review of the number of written public inquiries received versus the number of timely responses put forth by Licensees and BCTS will be analyzed on an annual basis. This information will be recorded and reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31st.

### Responsibility and Continuous Improvement Opportunities

Licensees and BCTS are responsible for monitoring, tracking, and reporting this indicator. Opportunities to improve the performance of this indicator may be linked to the previous indicators *Public & Stakeholder Input* and *Viewing of Access Plans* that are both in the realm of public involvement.

### **Indicator - 41 Communication Strategies**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of communication strategy requirements met	<u>Target:</u> 100% Annually <u>Variance:</u> -5%

Indicator 41 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.1	<b>CSA SFM Element:</b> Timber and Non-Timber Benefits
5.1.A	<b>Value:</b> Short and Long Term Benefits
5.1.A.c	<b>Objective:</b> Maintain opportunities to access non-timber benefits by ensuring that individuals and stakeholders who have expressed an identified interest in the planning area (e.g. guides, trappers, recreationists, water licensees, mining tenure holders etc.) are specifically communicated with, during forest planning.

### Description of Indicator

Licensees and BCTS maintain a list of interested parties that they notify when forestry operations/developments are to occur. These interested parties may be private landowners, lodge operators, trappers, or hunting guides. Strategies have been designed to ensure that information is communicated to these individuals in a timely and efficient manner. This communication considers non-timber users and inhabitants of the DFA and realizes that forestry operations can disrupt lives and businesses. As sustainable forest management includes non-timber values, it is important that the forest industry works with these individuals to minimize impacts and to plan operations that consider their concerns. This indicator is intended to measure the success of meeting communication strategy requirements that are designed to achieve these goals.

Over time, non timbered tenured resource users are updated, transfer or trade tenures, or discontinue tenures. As such the Licensees and BCTS will strive to review internal tenure data sources (trapper, guide, range, water license, woodlot information) annually. With updated resource information, it will be important to send information to new or changing users periodically with an invitation to become involved in the planning process through a communication strategy.

### Current Practices and Status of Indicator

When communication strategies are developed, licensees and BCTS contact various stakeholders and members of the public when forestry operations are to commence in a given area or when preparing FSPs, FDPs and associated amendments. Typically this communication is done by letter, but contact is also made by telephone or face to face meetings. There are specific strategies and protocols to direct this communication to ensure the right information is supplied to all interested parties at the right time. Licensees and BCTS use a variety of tracking systems to record this communication but have not historically reported the percentage of communication strategies that have met requirements.

99.63% of the number of communication strategies required between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

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As discussed above it is important to contact and communicate with all interested parties and other non timbered tenured resource users. Due to the fact that resource users change through time, the following strategy has been added to address establishing new communication strategies within this indicator:

- Licensees will solicit and invite non timbered tenure holders (without a current and established communication strategy) to establish communication strategies with the companies. This invitation will occur every 2 years and will provide for an increased effort to communicate and address access and other issues with resource users.

The Licensees and BCTS will report out on the number of letters set to non timbered tenure holders without a current established communication strategy.

### **Establishment of Targets and Future Practices**

The Licensees and BCTS recognize the importance of meeting communication strategies and have set a target of 100% to reflect this commitment. A -5% variance has been established because occasionally contact cannot be made with some interested parties. This may be the result of changes in addresses, absentee stakeholders, or outdated contact information.

Communication strategies will be mutually agreed upon by the Licensees and BCTS and the interested parties to ensure information is received in a timely manner. Specific issues will have their own communication strategies developed. For example, stands with forest health concerns (such as bark beetles) that are adjacent to private land will have their management discussed with the landowner.

Licensees and BCTS will continue to try and keep contact lists accurate and up to date and will strive to meet all communication strategy requirements.

### **Forecasting and Predicted Trends**

It is the intent of all Licensees and BCTS to meet the target, and it is anticipated this goal will be met. The exact level of success is not easy to quantifiably forecast as it relies on unpredictable factors such as human error. However, it is important to identify what the accepted target means to SFM. The percent of communication strategy requirements that are met 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 only 50% of communication strategy requirements are met?

If only 50% of communication strategy requirements were met, a variety of interested parties would be unaware of the commencement of forest operations. This could damage the economic interests of some of these parties. For example, a lodge may plan to take clients to a lake for fishing. Unfortunately, a Licensee failed to notify them that harvesting was occurring adjacent to the lake and the fishing experience was diminished. Socially, there may be impacts as well. Forestry operations can involve large machinery, large volumes of logging trucks, and high noise levels. All of these can be serious intrusions for people using the forest for recreational purposes, or for nearby landowners.

Communication strategies can prepare them for these activities and allow them to make comments if they wish to question the planned forestry operations. The above "what if" scenario analysis implies that a balance of values can be achieved through meeting communication strategy requirements. Therefore, Licensees and BCTS will continue to meet these requirements to respect the needs of other inhabitants and stakeholders in the DFA.

### **Monitoring and Reporting Procedures**

The Licensees and BCTS will track and monitor this indicator using databases such as Genus. For every area in which forestry operations occur, the list of appropriate interested parties that were contacted in accordance with communication strategy requirements will be reviewed. This information will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking, and reporting this indicator. Opportunities to improve the performance of this indicator may be linked to ongoing technological changes in

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communication, such as the use of email and websites. Licensees/ BCTS may also explore the opportunities of coordinating their communication strategy requirements and share information on stakeholders and interested parties.

### **Indicator - 42 Support of North Central Interior Suppliers and Contractors**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of money spent on forest operations and management in the DFA provided from North Central Interior Suppliers and Contractors	<u>Target:</u> 75% <u>Variance:</u> -5%

Indicator 42 addresses the following CSA-SFM criteria, element, value and objective:

5.	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.2	<b>CSA SFM Element:</b> Community and Sustainability
5.2.A	<b>Value:</b> Community well-being
5.2.A.a	<b>Objective:</b> Support opportunities for maintaining a resilient and stable community

#### **Description of Indicator**

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.

The north central interior is defined in this SFMP as the region that includes communities from 100 Mile House to McKenzie (south to north) and from Smithers to McBride (west to east). The total dollar value of goods and services considered to be local 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 suppliers in north central BC.

#### **Current Practices and Status of Indicator**

A query of the financial data stored within the Licensee's/ BCTS' 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 North Central Interior. Values listed are a weighted average based on the current AAC of each Licensee and BCTS.

More than 88% of monies spent on forest operations and management between April 1, 2004 and March 31, 2005 in the DFA, were spent on north central suppliers and contractors.

#### **Establishment of Targets and Future Practices**

The target was based on the past performance of Licensees/ BCTS and reflects their commitment to supporting North Central Interior businesses.

#### **Forecasting and Predicted Trends**

This indicator is not easy to quantifiably forecast through the modeling process over a defined time frame. However, it is important to identify what the accepted target means to SFM. The use of a "what if" scenario can be beneficial in identifying anticipated future trends for an indicator such as this. The percent of money spent on forest operations and management in the DFA provided from north central interior suppliers is an important aspect of SFM because it directly relates to sustaining the local economy. As the target for this indicator is a value greater than or equal to 75%, one other scenario should be analyzed:

- a) What if none of the money spent in the DFA for forest operations and management was attributable to north central interior suppliers and contractors?

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If the amount of money spent on forest operations and management on the DFA provided from the north central interior suppliers was 0%, two important values could be at risk. The first, and most important of these, would be a reduction in the overall economy of the north central interior. Utilizing services from outside of the north central interior reduces the overall economy and affects local people and businesses. Forest managers sometimes must look to sources outside of the north central interior if the goods or services they require are not available in this region. Otherwise, money spent outside the north central interior simply reduces the overall economy of the region.

The second risk to supporting business from outside of the north central interior is the lack of local knowledge and expertise that could be delivered. Businesses that are located in the north central interior generally conduct most of their activities in this region and therefore have a better understanding of the area and its ecology. By utilizing north central interior suppliers, the public and employees of the forest industry are likely to receive more valuable services based on locally applied knowledge and expertise.

Due to the identified potential impacts this indicator could have on the economy and stability of communities in the north central interior, the Prince George Licensees and BCTS are committed to achieving the stated target for this indicator.

### **Monitoring and Reporting Procedures**

This indicator will be monitored and reported from Licensees'/ BCTS' accounting systems. Licensees/ BCTS will conduct a financial query of expenditures by postal code for suppliers and contractors within the North Central Interior compared to the total dollars spent. The average will be weighted by the Licensee's/ BCTS volume of timber cut. The indicator percentage will be included in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for the monitoring, tracking and reporting of this indicator. Specifically, accounting departments are responsible for querying the information needed to determine the percentage. In the future, Licensees and BCTS may want to focus their spending on businesses in the Prince George DFA, or the Prince George TSA rather than just the north central interior. In this way the communities closest to the DFA receive the most benefit from local forests.

## **Indicator - 43 Payment of Taxes**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of taxes paid on time to the Government	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 43 addresses the following CSA-SFM criteria, element, value and objective:

5.	1)	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.3		<b>CSA SFM Element:</b> Fair Distribution of Benefits and Costs
5.3.A		<b>Value:</b> Fair Distribution of Benefits and Costs
5.3.A.a		<b>Objective:</b> Maintain the Distribution of Benefits and Costs

### **Description of Indicator**

Payment of taxes (including Federal, Provincial, and local government taxes) by Licensees and BCTS is a quantifiable indicator of how the public is receiving a portion of the economic benefits derived from forests. It is important to note that Licensees/ BCTS do not control how municipal and other taxes are spent, and whether the public within the DFA receives these benefits or not. However, it should be assumed that a portion of the monies received from taxes will be returned to communities within the DFA.

The DFA's forests provide many ecological benefits and they also provide significant socio-economic benefits. In order to ensure sustainable socio-economic conditions will continue for local communities associated with the DFA, all taxes will be paid on time.

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### **Current Practices and Status of Indicator**

The Licensees are invoiced for municipal taxes on an annual basis. The invoice is directed to its accounting and payroll departments for immediate processing. The Licensees' accounting and payroll departments also track all provincial sales taxes and federal Goods and Services taxes received and expended and provide money owing to the governments on a monthly basis. Business tax forms are filed annually and business taxes are paid as an annual lump sum or in quarterly installments.

A query of the financial data stored within the Licensees' accounting systems allows for an analysis of the current status and future tracking of tax payments.

100% of all taxes (GST, Corporate, and Property) that were required to be paid to Government between April 1, 2004 and March 31, 2005 in the DFA were paid on time.

### **Establishment of Targets and Future Practices**

A target of 100% was established from a review of past and expected future performance within the DFA. It was also established to reflect the Licensees' commitment to paying all taxes on time.

### **Forecasting and Predicted Trends**

While Licensees intend to pay 100% of all taxes on time, the exact consistency with this indicator is not easy to predict. However, it is important to identify what the accepted target means to SFM. The use of a "what if" scenario can be beneficial in identifying anticipated future trends for an indicator such as this. The percent of taxes paid annually on time is an important aspect of SFM because it indirectly relates to sustaining the local economy, and therefore certain aspects of quality of life for the public. As the target for this indicator is stated as 100%, one other scenario should be analyzed:

a) What if only 50% of taxes were paid annually on time to governments?

If only 50% of taxes were paid annually on time, the economy and quality of life of the DFA could potentially be at risk. Taxes are payments made to communities and governments, and this revenue eventually feeds back into the local economy through various municipal or government services, programs or funding opportunities. Taxes also fund aspects of a community that improve the quality of life, such as parks, swimming pools, arts councils, and music festivals. These features are an important part of a successful and vibrant community.

Due to the significant impact this indicator could have on the local economy, the Licensees are committed to continue to pay 100% of taxes annually on time.

### **Monitoring and Reporting Procedures**

The tax information that will be monitored is available on each Licensee's and BCTS' accounting system and future tracking of this indicator will be completed through an annual analysis of accounting records. The indicator percent will be included in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for monitoring, tracking and reporting of this indicator. Specifically, financial/ accounting personnel are responsible for determining the percentage of taxes paid on time. The Licensees/ BCTS will explore the effectiveness of this indicator in determining whether the public continues to receive economic benefits from the forest industry.

### ***Indicator - 44 Stumpage Paid to Government***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
The percent of stumpage paid on time to Government	<u>Target:</u> 100% <u>Variance:</u> 0%

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Indicator 44 addresses the following CSA-SFM criteria, element, value and objective:

5.	1)	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.3		<b>CSA SFM Element:</b> Fair Distribution of Benefits and Costs
5.3.A		<b>Value:</b> Fair Distribution of Benefits and Costs
5.3.A.a		<b>Objective:</b> Maintain the Distribution of Benefits and Costs

### **Description of Indicator**

The payment of stumpage owing on the timber harvested by Licensees is a quantifiable indicator of how the public in the Prince George DFA is receiving a portion of the economic benefits derived from forests. It is important to note that Licensees do not control how stumpage royalties are spent across the province, or whether the public receives benefits from stumpage or not. However, it should be assumed that a portion of the royalties received from stumpage would be returned to communities within the DFA.

Forests provide many ecological benefits to areas that surround them and also generate significant socio-economic benefits. In order to ensure continual sustainable socio-economic conditions for local DFA communities, all stumpage billings will be paid on time.

### **Current Practices and Status of Indicator**

Each month, the provincial government invoices the Licensees for stumpage. This invoice is directed to the accounting and payroll departments for immediate processing.

100% of all stumpage that was required to be paid to Government between January 1, 2004 and December 31, 2004 in the DFA was paid on time.

### **Establishment of Targets and Future Practices**

Targets are established from a review of past and expected future performance within the DFA. The target also reflects the commitment of the Licensees to ensure all stumpage payments are made on time to government.

### **Forecasting and Predicted Trends**

While Licensees intend to pay 100% of stumpage on time to government, the exact level of consistency with this target is difficult to forecast. However, it is important to identify what the accepted target means to SFM. The use of a "what if" scenario can be beneficial in identifying anticipated future trends for an indicator such as this. The percent of stumpage paid annually on time is an important aspect of SFM because it indirectly relates to sustaining the local economy, and therefore certain aspects of quality of life for the public. As the target for this indicator is 100%, one other scenario should be analyzed:

a) What if only 50% of stumpage was paid annually on time?

If only 50% of stumpage was paid annually on time, the overall economy of the DFA could potentially be at risk. Stumpage is a payment made to the Crown by forest Licensees based on the volume of timber harvested from Crown land. Stumpage payments are revenue for the government and this money eventually feeds back into the local economy through various government services, programs or funding opportunities. Various levels of government also finance programs and projects that improve the social conditions of the DFA. A decline in revenue may threaten these activities, possibly leading to a decline in a community's quality of life.

While Licensees in the DFA have no control how stumpage fees are spent once they are delivered to the government, payment of stumpage fees ensures that the public is ultimately receiving a portion of the economic benefits that are derived from the forest resource. Due to the significant impact this indicator could have on the local economy and quality of life, the Licensees are committed to continue to pay 100% of annual stumpage payments on time.

### **Monitoring and Reporting Procedures**

The stumpage payment information that will be monitored is available on each Licensee's accounting system and future tracking of this indicator will be completed through a yearly analysis of accounting records. The indicator percent will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

**Responsibility and Continuous Improvement Opportunities**

Licensees are responsible for monitoring, tracking and reporting of this indicator. Specifically, financial/accounting personnel are responsible for determining the percentage of stumpage paid on time. The Licensees will explore the effectiveness of this indicator in determining whether the public continues to receive economic benefits from the forest industry.

**Indicator - 45 Loss Time Accidents**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Number of loss time accidents (days) in Woodland Operations	Target: 0 Variance: 0

Indicator 45 addresses the following CSA-SFM criteria, element, value and objective:

5.	1)	<b>CCFM Criterion:</b> Multiple Benefits to Society
5.3		<b>CSA SFM Element:</b> Fair Distribution of Benefits and Costs
5.3.A		<b>Value:</b> Fair Distribution of Benefits and Costs
5.3.A.a		<b>Objective:</b> Maintain the Distribution of Benefits and Costs

**Description of Indicator**

The health and safety of forest workers and members of the public is an important objective that is essential to SFM. All Licensees and BCTS 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 or policy statements. This indicator was developed to track and report out on the number of lost time workplace accidents that occur within the woodlands division of each Licensee company and the field operations of BCTS. Activities conducted outside of woodlands operations have been excluded from this indicator; however Licensees and BCTS currently promote safety in all aspects of forest management operations.

Two types of workplace accidents are the most common within the forest industry. These are lost time accidents (LTAs), and accidents where medical aid or treatment was necessary but no loss of work time was experienced by the employee. Through this indicator, only LTAs will be tracked and monitored.

Monitoring and reporting the number of workplace LTAs will help Licensees and BCTS identify problems with procedures and increase overall awareness in order to prevent future injuries and LTAs.

**Current Practices and Status of Indicator**

The current status for this measure is derived through an analysis of safety reports and a tally of all LTAs.

There were no lost time accidents between April 1, 2004 and March 31, 2005 in the DFA in the Woodland Operations of the signatories.

**Establishment of Targets and Future Practices**

The target for this indicator was established so that Licensees and BCTS would operate toward a goal of no woodlands lost time accidents. Licensees/ BCTS will continue to implement safety programs to reduce accidents and injuries in all aspects of woodland operations.

**Forecasting and Predicted Trends**

While Licensees and BCTS will continue to strive for no loss time accidents, the exact level of success they will have in achieving this is difficult to forecast due to the unpredictable nature of forestry woodland operations. However, it is important to identify what the accepted target means to SFM. The number of time loss 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 an indicator such as this. As this indicator states a target of zero, one other scenario should be analyzed:

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- a) What if more than the target amount of loss time accidents in Woodland Operations occurred each year?

If more than the target amount of woodland operations' LTAs occurred each year, social values and quality of life could decrease in the DFA. Lost time accidents are usually directly related to safety issues in the workplace. If an employee's perceived risk of being injured on the job increased, there would be less incentive to do the required work. Reduced productivity would likely decrease the overall quality of life in the DFA and community stability could also decline. For the Licensee/ BCTS, 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.

Productivity and economics aside, any loss time accident has the potential to have tragic consequences for the worker and his or her family. The target should be achieved for no other reason than it means workers are not being injured on the job. For these reasons, Licensees and BCTS are committed to maintaining safety as a high priority and will work towards achieving the stated target for this indicator.

### **Monitoring and Reporting Procedures**

Each Licensee's woodlands operation and BCTS 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 are recorded for reporting purposes. In addition to queries of Licensee/ BCTS accident record databases, the Workers Compensation Board may also be used as a source for DFA accident reports. The number of LTAs will be included in the SFMP annual report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS are responsible for the monitoring, tracking, and reporting of this indicator. Specifically, personnel on safety committees are to ensure all accidents are recorded in accident record databases. Reviews of these databases may detect areas of concern that could be improved by changing current practices.

## **Indicator - 46 Legally Recognized Treaty Areas**

<b>Indicator Statement</b>	<b>Target and Variance</b>
No unauthorised forestry activities within legally recognized (Province and Federal) treaty areas.	Target: 100% Variance: 0%

Indicator 46 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.1	<b>CSA SFM Element:</b> Aboriginal and Treaty Rights
6.1.A	<b>Value:</b> Aboriginal and Treaty Rights
6.1.A.a	<b>Objective:</b> Recognition and respect for Aboriginal and treaty rights.

### **Description of Indicator**

A treaty is a negotiated agreement that spells out the rights, responsibilities and relationships of First Nations and the Federal and Provincial governments (Government of BC, 2005). Depending on the nature of the treaty, specific First Nations will exercise a variety of rights over the area described in the treaty. Any forestry activities that occur in these areas without the permission of the appropriate First Nation could have serious legal, economic, and social repercussions. Respecting Aboriginal treaty rights is a part of sustainable forest management as it protects social and economic values.

### **Current Practices and Status of Indicator**

There are a variety of First Nations that reside in the Prince George DFA. Historically, only the McLeod Lake (Tsekani) First Nation has been included under a formal treaty with the Crown. This band in the northeast portion of the DFA sought to be included under Treaty 8, which was originally signed in 1899 and to which other bands signed in subsequent years. (Government of Canada, 2004). The McLeod



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Lake band was finally included under Treaty 8 in 2000 by the passing of Bill 10 (Government of B.C., 2000).

To address other outstanding landclaim issues a six-stage treaty process was established in 1992 to negotiate treaties across British Columbia. The Lheidli T'enneh Band has concluded an Agreement in Principle with the federal and provincial governments, and is now in Stage 5 of the six-stage process. The formal ratification of the treaty will occur at the conclusion of Stage 5, however this stage has not been reached at the time of this plan's preparation. Several other First Nations are in Stage 4 of the process, which involves the negotiation of an Agreement in Principle.

The following First Nations are in the DFA:

- Lheidli T'enneh First Nation
- McLeod Lake (Tsekani) First Nation
- Nak'azdli Band
- Nazko Band
- Red Bluff Band
- Saik'uz First Nation
- Simpcw First Nation (North Thompson)

100% of harvesting completed between April 1, 2004 and March 31, 2005 in the DFA, was completed in authorized areas outside legally recognized treaty areas.

### **Establishment of Targets and Future Practices**

The Licensees and BCTS have set a target of no unauthorized forestry activities within legally recognized treaty areas to uphold legal, social, and economic principles of sustainable forest management. To meet the target, Licensees/ BCTS will review the level of legal compliance with duly established Aboriginal and treaty rights as in law and accepted by government. Once a treaty is in place in the DFA the Licensees and BCTS will take steps to ensure compliance with the treaty.

### **Forecasting and Predicted Trends**

While Licensees/ BCTS will take every step possible to avoid unauthorized forestry activities within legally recognized treaty area, their exact level of success in achieving this is difficult to forecast due to the possibility of human error. However, it is important to identify what the accepted target means to SFM. Respecting the legal rights of First Nations in the DFA is an important aspect of sustainable forest management. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator states a target of zero unauthorized activities, one other scenario should be analyzed:

- a) What if there were unauthorized forestry activities within legally recognized treaty areas?

Any unauthorized forestry activity in a legally recognized treaty area could have economic repercussions for both the Licensee/BCTS and the First Nation involved. If the treaty area was relied upon for economic purposes, such as logging, trapping, mushroom picking, etc, the unauthorized activity may damage these resources.

The unauthorized activity may have an impact on social values. If the area in question was a site of cultural significance to the First Nation, such as a village site, cemetery, or sacred place, the damage done could be irreversible to both the location and First Nation/ industry relations.

For these reasons, Licensees and BCTS are committed to preventing any unauthorized forestry activities within legally recognized treaty areas.

### **Monitoring and Reporting Procedures**

The information that is required to monitor this indicator includes a summary of the number of unauthorized forest management operations within legally recognized treaty areas. This information is collected during EMS checklist reviews and harvesting inspections and is stored in Licensee/ BCTS

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databases such as GENUS. The number of incidents will be included in the annual SFMP report for the operational year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Each Licensee's and BCTS' Strategic Planning Forester is responsible for ensuring no activities are planned for legally recognized treaty areas. The Woodlands Manager and harvesting supervisors are responsible for monitoring field operations to ensure no accidental trespasses occur. If an unauthorized activity occurs in a treaty area, the affected First Nation will be contacted immediately and, if required, steps will be taken to rehabilitate any damage. Consultation with First Nations during Forest Stewardship planning processes will provide opportunities for both parties to determine how to best conduct forest operations in the vicinity of legally recognized treaty areas.

### ***Indicator - 47 FSP Referral to First Nations***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
All Forest Stewardship Plan (FSP) and associated major amendments are referred to affected aboriginal bands	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 47 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.1	<b>CSA SFM Element:</b> Aboriginal and Treaty Rights
6.1.A	<b>Value:</b> Aboriginal and Treaty Rights
6.1.A.a	<b>Objective:</b> Recognition and respect for Aboriginal and treaty rights.

### **Description of Indicator**

This indicator is designed to evaluate the success in providing opportunities to Aboriginal people to be involved in forest management planning processes. Specifically, all Forest Stewardship Plans and associated major amendments are to be referred to affected aboriginal bands for their input. Incorporation of First Nations 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.

### **Current Practices and Status of Indicator**

Licensees and BCTS currently have individual working relationships with local First Nations in the DFA. All of these First Nations communities have had the opportunity for participation and input in the SFM planning process. In order to maintain a high level of participation and response, Licensees/ BCTS have also engaged First Nations in their communities as requested, in order to provide an opportunity for involvement in the Prince George SFMP.

100% of Forest Stewardship Plans and associated major amendments completed between April 1, 2004 and March 31, 2005 in the DFA, were referred to the affected aboriginal bands.

### **Establishment of Targets and Future Practices**

The indicator target of 100% was established to reflect the Licensees' and BCTS' commitment to providing First Nations with opportunities to provide input at the Forest Stewardship Plan development stage. Current practices to meet this commitment will be continued and improved where necessary to meet the indicator target.

### **Forecasting and Predicted Trends**

This indicator is not easy to quantifiably forecast over a defined time frame. However, it is important to identify what the accepted target means to SFM. Referring all FSPs and associated major amendments to affected aboriginal bands 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 this indicator. As this indicator has a stated target of referring all FSPs and associated major amendments to affected aboriginal bands, one other potential scenario should be developed:

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a) What if no FSPs or associated major amendments were referred to affected aboriginal bands?

If no FSPs or associated major amendments were referred to affected aboriginal bands, adequate attention may not be given to valuable Aboriginal input. Aboriginal input into the forest planning process is required to adequately consider cultural heritage values within the DFA and to ensure that forest management respects treaty rights. As some areas of cultural significance may not be in legally recognized treaty areas or widely known by the general public, the only way for the forest industry to be aware of them is from First Nations themselves. Failure to refer plans to them may result in significant loss of First Nation's cultural features. Aboriginal participation planning processes could decrease and impacts to other resource values such as cultural heritage, non-timber forest resources and biological richness could potentially occur. Traditional knowledge could also potentially be lost if FSPs and associated major amendments are not referred to the affected aboriginal bands. Economically, Licensees may lose clients if aboriginal members perceive their input is not valued.

It is anticipated that all FSPs and major amendments will be referred to aboriginal bands, and it is hoped that First Nations people become more involved with all forest planning processes.

### **Monitoring and Reporting Procedures**

A list of all First Nations bands and their areas of interest in the DFA will be maintained by all Licensees and BCTS. During Forest Stewardship Plan/ major amendment preparation, all affected bands will be contacted as per each Licensee's communication strategy for referral. A record will be kept of each referral in the Licensee's/ BCTS' referral tracking system. This system will be queried and the indicator percentage will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planning foresters are responsible for referring all FSPs and associated major amendments to the affected aboriginal bands. They are also responsible for updating the referral tracking system to record these referrals. Licensees/ BCTS will work cooperatively with First Nations to solicit their involvement and input into planning processes. Continual improvement will also focus on assessing the effectiveness of these input opportunities.

## **Indicator - 48 Pesticide Management Plan Referrals to First Nations**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of Pest Management Plans (PMPs) and associated major amendments are referred to affected aboriginal bands	<u>Target:</u> 100% <u>Variance:</u> 0%

Indicator 48 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.1	<b>CSA SFM Element:</b> Aboriginal and Treaty Rights
6.1.A	<b>Value:</b> Aboriginal and Treaty Rights
6.1.A.a	<b>Objective:</b> Recognition and respect for Aboriginal and treaty rights.

### **Description of Indicator**

Including Aboriginal communities in planning and communication processes is fundamental to recognizing their unique interests in the DFA's forests and an integral part of sustainable forest management. As pesticides may have to be used in the DFA to meet certain forestry objectives, Pest Management Plans will be prepared to outline their use. As this use may include areas of interest to various First Nations within the DFA the plans need to be referred to them for input. The location and type of pesticide use may change as a result of their consultation.

This indicator will measure the success of Licensees/ BCTS to have all Pesticide Management Plans and associated major amendments to be referred to affected aboriginal bands.

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### **Current Practices and Status of Indicator**

In the past, Licensees/ BCTS have used a variety of pesticides to achieve forestry objectives. The main use has been to control competing vegetation on regenerating cutblocks. Historically, pesticide use was conducted under the auspices of a Pesticide Use Permit (PUP). Referrals to affected aboriginal bands were a component of the PUP application process. On December 31, 1994, the new Integrated Pest Management Act came into effect in British Columbia. Rather than obtain PUPs, industrial users of non-high risk class pesticides are now required to prepare a Pest Management Plan (PMP) as per the requirements under the Act and its regulations. Public consultation is a requirement for PMP preparation.

100% of Pesticide Management Plans and associated major amendments completed between April 1, 2004 and March 31, 2005 in the DFA, were referred to the affected aboriginal bands.

### **Establishment of Targets and Future Practices**

The Licensees and BCTS have set a target of all PMPs and associated major amendments to be referred to affected aboriginal bands to reflect their commitment to seeking First Nations input into the management of forest lands in the DFA. All future PMPs major amendments will be referred to affected aboriginal bands giving them an opportunity to express opinions, knowledge, and concerns on the use of pesticides within the DFA.

### **Forecasting and Predicted Trends**

While Licensees/ BCTS have every intention of referring all PMPs and associated major amendments to affected aboriginal bands, their exact level of success in achieving this is difficult to forecast due to the possibility of human error. However, it is important to identify what the accepted target means to SFM. Respecting the concerns and opinions of First Nations in the DFA is an important aspect of sustainable forest management. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator states a target of 100% of all PMPs and associated major amendments are to be referred to affected aboriginal bands, one other scenario should be analyzed:

- a) What if no PMPs or associated major amendments were referred to affected aboriginal bands?

The use of pesticides in the DFA without First Nations input or knowledge could have economic and social repercussions. First Nations people have historically used many areas within the DFA for a variety of reasons. These include hunting, trapping, berry and mushroom picking and fishing. They have often had concerns over the impact pesticides may have on these resources, and have expressed their interest in being notified of pesticide use in their areas of interest. If they were not given an opportunity to participate in the PMP planning process they would lose faith in the forest industry's commitment to public consultation. The broader public may gain the perception of a forest industry using potential dangerous substances without informing First Nations. The negative publicity of such perceptions may impact the economy of the DFA.

For these reasons, Licensees and BCTS are committed to referring all PMPs and associated major amendments to affected aboriginal bands.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will track and monitor PMP/amendment referrals to First Nations through their referral tracking systems. The percentage of PMPs and associated major amendments that had referrals to affected aboriginal bands will be included in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Each Licensee's and BCTS' Planning Foresters and Silviculture Foresters are responsible for ensuring affected aboriginal bands are referred to in the preparation of PMPs. If pesticides are used in an aboriginal area of interest without their knowledge, the affected First Nation will be contacted immediately and, if required, steps will be taken to consider their input. Consultation with First Nations during PMP planning processes will provide opportunities for both parties to discuss the application of pesticides in the DFA and may provide the Licensees/ BCTS with knowledge on how to minimize the possible negative impacts of pesticide use.

**Indicator – 49 Cultural Heritage Requirements**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The percentage of forest operations consistent with cultural heritage requirements as identified in operational plans	<u>Target:</u> 100% annually <u>Variance:</u> 0%

Indicator 49 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society’s Responsibility for Sustainable Development
6.2	<b>CSA SFM Element:</b> Respect for Aboriginal Forest Values, Knowledge, and Uses.
6.2.A	<b>Value:</b> Aboriginal Forest Values, Knowledge, and Uses.
6.2.A.a	<b>Objective:</b> Incorporation of Aboriginal Forest Values, Knowledge, and Uses in Forest Management.

**Description of Indicator**

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 Licensees and BCTS to evaluate how successful this implementation is and improve procedures if required.

**Current Practices and Status of Indicator**

Forest development plans and Forest Stewardship Plans use an Archaeological Predictive Model to assess the potential presence of archaeological resources within proposed harvest areas or road access corridors. Where activities are proposed within zones of high archaeological potential, Licensees and BCTS conduct site level Archaeological Impact Assessments (AIAs) to identify, assess and record any archaeological resources that may be present. Management measures recommended by the archaeologist are incorporated into operational plans.

Archaeological sources are primarily related to First Nations within the Prince George DFA, as they were the first inhabitants of the area. However, an AIA is not biased toward Aboriginal features. Archaeological features that relate to non-Aboriginal people may include artifacts from historical trappers and prospectors, or evidence of old trails and remnants from inhabitants of old lakeside cabins. Features such as these are also identified in AIA surveys and management strategies are developed where appropriate to conserve cultural heritage for both Aboriginal and non-Aboriginal interests.

Conservation strategies are implemented at the site level during harvesting operations so that all identified cultural heritage values will be conserved for future generations. If a non-conformance with the operational plan occurs in the field, this information will be recorded on an activity inspection form and then entered into an incident tracking database or other similar system.

Once a strategy to conserve cultural heritage values is included within an operational plan, there is a legal obligation for the licensee to implement and adhere to the strategy. Harvest and subsequent silviculture inspections ensure that these strategies are implemented as stated in the operational plan.

100% of forest operations on blocks with cultural heritage requirements that were harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with those requirements.

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### **Establishment of Targets and Future Practices**

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. Licensees and BCTS will continue to take measures to ensure forest operations are consistent with cultural heritage requirements as identified in operational plans.

### **Forecasting and Predicted Trends**

It is anticipated that the target of 100% of forest operations will be consistent with cultural heritage requirements. The exact level of success is difficult to forecast as it is operational in nature and is dependent on the nature of the site, and human oversight. However, it is important to identify what the accepted target means to SFM. Conservation of cultural heritage values primarily influences social values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends this indicator. As this indicator currently has a target set at 100%, one other scenario should be identified:

- b) What if only 50 % consistency occurred between forest management operations and strategies identified in operational plans to conserve cultural heritage values?

Implementing only 50% of strategies to protect cultural heritage values could lead to significant cultural loss to both First Nations and the general public within the DFA. Contributions to planning processes by each group would likely be reduced. Aboriginal communities may no longer become involved in development planning as potential infringement of unresolved treaty rights could occur if cultural heritage values are not fully conserved. Members of the general public may also lose faith in forest management and planning processes if the cultural heritage of the Prince George DFA was not recognized as an important value.

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 Licensees and BCTS will continue to ensure that 100% of strategies are implemented on the ground. They will continue to conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure the commitments specified in the operational plans are met. These initial, intermediate and final checks are part of each Licensee's and BCTS' EMS/SOP and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

### **Monitoring and Reporting Procedures**

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 Licensee and BCTS databases such as GENUS. The indicator percent will be included in the annual SFMP report for the operational year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planning foresters are responsible for identifying areas of cultural heritage during the Forest Stewardship Plan development stage through the Archaeological Predictive Model and through dialogue with First Nations. Foresters responsible for preparing operational plans have to ensure that prescribed management activities are consistent with cultural heritage requirements. Harvesting and Silviculture supervisors are responsible for implementing the operational plan requirements on the ground. Licensees and BCTS are responsible for ensuring any failures to achieve management activities are tracked in their EMS databases and corrective and preventative actions will be identified to improve consistency.

Licensees and BCTS will investigate the possibility of increasing the accuracy of predicting the presence of archaeological sites. Licensees and BCTS, in cooperation with First Nations, the public and local archaeologists, will continue to expand their awareness of cultural heritage values, and explore the effectiveness of strategies utilized to minimize impact to cultural heritage values.

**Indicator - 50 Heritage Conservation Act**

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

Indicator 50 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.2	<b>CSA SFM Element:</b> Respect for Aboriginal Forest Values, Knowledge, and Uses.
6.2.A	<b>Value:</b> Aboriginal Forest Values, Knowledge, and Uses.
6.2.A.a	<b>Objective:</b> Incorporation of Aboriginal Forest Values, Knowledge, and Uses in Forest Management.

**Description of Indicator**

The *Heritage Conservation Act* has as its stated purpose "to encourage and facilitate the protection and conservation of heritage property in British Columbia". The act prohibits activities that will damage specific heritage resources. The Act states a person must obtain a permit from the Minister of Community, Aboriginal and Women's Services before they may:

- damage or alter a burial place with historical or archaeological value;
- damage or alter First Nations rock paintings or carvings with historic or archeological value;
- damage, alter, or remove any heritage object from a site that contains artifacts or other evidence of human habitation or use before 1846.

There are many heritage resources in the DFA that are protected by the Act. Some of the more common features that are of concern for forestry operations are culturally modified trees (trees which were modified by First Nations people's use), cache pits (excavated food storage pits), and pit house sites. Measures must be taken to ensure forest operations are consistent with the Heritage Conservation Act to preserve and manage these features to meet social and cultural needs of First Nations people and the broader community in the DFA.

This indicator is similar to the *Cultural Heritage Requirements* indicator in that it is designed to ensure that forest operations are conducted to conserve cultural features. By ensuring forest operations are consistent with legislation, Licensees/ BCTS contribute to SFM by respecting important First Nations' cultural features that are a testament to their long connection to the Prince George DFA. Tracking the level of consistency will allow Licensees and BCTS to evaluate how successful this implementation is and improve procedures if required.

**Current Practices and Status of Indicator**

The Heritage Conservation Act was passed in 1996 and was the latest in a series of acts designed to protect British Columbia's heritage resources. Licensees and BCTS have adhered to the Act in conserving cultural resources in the DFA at a variety of planning and operational stages.

Known features protected under the Act are relatively easy to plan forest operations around. Forest Development Plans have also used an Archaeological Predictive Model to assess the potential presence of unknown archaeological resources within proposed harvest areas or road access corridors. Where activities are proposed within zones of high archaeological potential, Licensees/ BCTS conduct site level Archaeological Impact Assessments (AIAs) to identify, assess and record any archaeological resources that may be present. Trained archaeologists identify resources that are to be protected under the Heritage Conservation Act.

Specific requirements to conserve cultural resources are prescribed in operational plans. These strategies may include alteration if the appropriate site alteration permit is obtained. Harvest and

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subsequent silviculture inspections ensure that strategies are implemented as stated in the operational plan.

100% of forest operations on blocks harvested between April 1, 2004 and March 31, 2005 in the DFA, were completed in accordance with the Heritage Conservation Act.

### **Establishment of Targets and Future Practices**

The target was established from the legal requirement for all forest operations to be consistent with the Heritage Conservation Act. The target also reflects the Licensees' and BCTS' commitment to manage the cultural and historic values of the DFA in accordance with the law to protect these values for future generations. Licensees/ BCTS will continue to use AIAs to detect unknown resources, determine if they are under the Heritage Conservation Act and will conduct forest operations in a manner consistent with the Act.

### **Forecasting and Predicted Trends**

It is anticipated that the target of 100% of forest operations will be consistent with the Heritage Conservation Act. The exact level of success is difficult to forecast as it is operational in nature and is dependent on the nature of the site, weather, and human error. However, it is important to identify what the accepted target means to SFM. Conservation of cultural features protected under the Heritage Conservation Act primarily influences social values within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for this indicator. As this indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if only 50 % of forest operations were consistent with the Heritage Conservation Act?

The failure to have 100% of forest operations consistent with the Act could lead to significant cultural loss to both First Nations and the general public within the DFA. Contributions to planning processes by each group would likely be reduced. Aboriginal communities may no longer become involved if they felt their history was not conserved in accordance with the law. Members of the general public may also lose faith in forest management and planning processes if the cultural heritage of the Prince George DFA was not recognized as an important value.

In addition to the social and cultural impacts that may occur from forest operations being inconsistent with the Heritage Conservation Act, there may be economic penalties to pay. Significant fines may be levied against companies that were negligent in their responsibilities, and these same companies may lose clients that are angered by the destruction of heritage features.

The above "what if" scenario helps to identify some of the potential future impacts of not achieving the stated target for this indicator. Therefore, Licensees and BCTS will continue to ensure that 100% of forest operations are consistent with the Act.

### **Monitoring and Reporting Procedures**

Licensees and BCTS will continue to conduct pre-work meetings prior to the start of projects, monitoring inspections as the work is progressing and final inspections once the work is complete to ensure forest operations are consistent with the Heritage Conservation Act. These initial, in between and final checks are part of each Licensee's and BCTS' EMS/SOP and the future trend of this indicator will remain at the target of 100% if all processes and protocols are followed.

If a non-compliance with the Act occurs in the field, it will be recorded on an activity inspection form and then entered into an incident tracking database or other similar system. The incident will also be reported to the Heritage Branch of the Ministry of Community, Aboriginal and Women's Services and the Ministry of Forests and Range. The indicator percent will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

Planning foresters are responsible for identifying areas of cultural heritage during the Forest Stewardship Plan development stage through the Archaeological Predictive Model. Foresters responsible for preparing road plans and site plans have to ensure that prescribed management activities are consistent



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with the Heritage Conservation Act (if required). Harvesting and Silviculture supervisors are responsible for implementing the site plan requirements on the ground.

Prince George Licensees and BCTS will investigate the possibility of increasing the accuracy of predicting the presence of archaeological sites. The Licensees/ BCTS, in cooperation with First Nations, the public and local archaeologists, will explore the effectiveness of strategies utilized to minimize impact to cultural resource features.

### **Indicator - 51 PAG Satisfaction with Public Participation**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of PAG (Public Advisory Group) satisfaction with public participation process	<b>Target:</b> 100% (a rank of 5 (very good) for all meetings <b>Variance:</b> -20% (a rank of 4)

Indicator 51 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.3	<b>CSA SFM Element:</b> Public Participation
6.3.A	<b>Value:</b> Public participation in decision making processes
6.3.A.a	<b>Objective:</b> A clear process for a wide public participation in SFM

#### **Description of Indicator**

The PAG is one of the key elements of public involvement in the SFM process. The Prince George PAG provides guidance, input and evaluation during development of the SFMP. It is also instrumental in maintaining links to current local values and forest resource uses within the DFA. Therefore, it is important that the Licensees and BCTS have a positive and meaningful working relationship with the PAG, where the Licensees/ BCTS 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 and BCTS need to be responsive to the satisfaction level of the PAG. Both the PAG and the Licensees and BCTS can recognize the benefits of a well-developed public process. The Licensees/ BCTS gain insight into local values and objectives and the PAG participants learn about the SFM process and the overall goals of sustainable development.

#### **Current Practices and Status of Indicator**

During the first 10 meetings, PAG participants completed 2 formal meeting evaluation. A number of questions were asked under three general headings:

- 1) Meeting and PAG Progress
- 2) Facilitator
- 3) Meeting Logistics

In addition to the questions, the participants were asked to provide suggestions and comments. The 9 meeting evaluations included the question "Are you satisfied with the PAG process". The answers to the question show a general improving trend. The overall average came out at 3.9 for all 9 meetings (78%). This translates as a "good" ranking, with 5 (very good) as the highest possible rating. The most recent meeting as of August, 2005 had a ranking of 4.6 (92%).

A list of questions on the meeting evaluation forms is in Appendix 8, and charts summarizing the questions and answers from meeting evaluations is in Appendix 9.

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### **Establishment of Targets and Future Practices**

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. The -20% variance was established to allow for a score of 4, which is good (4). The variance was established to allow for variations in survey results due to the number completing the evaluations. If the surveys show that the PAG is becoming dissatisfied with the process the Licensees and BCTS will have to determine the causes for the dissatisfaction and adjust the process.

### **Forecasting and Predicted Trends**

This indicator is not easy to forecast as it is dependent on the variations of human opinion. However, it is important to identify what the accepted target means to SFM. The percentage of PAG satisfaction with the public participation process may influence the success of the SFMP. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator currently has a target set at 100% ("very good" rating), one other scenario should be identified:

a) What if none of the PAG participants were satisfied with the public participation process?

If no members of the PAG were satisfied with the public participation process then the entire SFMP process is questionable. Meaningful public participation in SFM is essential if the plan is to succeed or have any validity. Widespread dissatisfaction with the public participation process would suggest that the plan will not address the broader societal values of SFM and that its indicators, targets, and objectives are questionable. If this dissatisfaction was not recognized or corrected, it may result in lower social acceptance of the SFMP and less participation in the PAG.

Due to the importance of having a PAG satisfied with the public participation process, the Licensees and BCTS are committed to achieving the target of 100%. It is expected that in the future most, if not all, of the PAG participants will be satisfied within the target limits.

### **Monitoring and Reporting Procedures**

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 1<sup>st</sup> to March 31<sup>st</sup> and reported in the annual SFMP report.

### **Responsibility and Continuous Improvement Opportunities**

The Licensee Steering Committee is responsible for developing the evaluation forms. The PAG Facilitator is responsible for ensuring the forms are completed after each PAG meeting and to determine the indicator percent based on the summary of these forms. The Licensee Steering Committee must ensure this percent is included in the annual SFMP report. After each PAG meeting the Licensee Steering Committee will meet to discuss results and use the opportunity to propose changes to the public participation process to improve satisfaction if needed.

### ***Indicator - 52 PAG Terms of Reference***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
PAG (Public Advisory Group) Terms of Reference reviewed per year	Target: $\geq 1$ Variance: 0

Indicator 52 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.3	<b>CSA SFM Element:</b> Public Participation
6.3.A	<b>Value:</b> Public participation in decision making processes
6.3.A.a	<b>Objective:</b> A clear process for a wide public participation in SFM

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### **Description of Indicator**

This indicator monitors the reviews of the Terms of Reference document that has been developed in consultation with the PAG, and which has been accepted for use in all future PAG meetings. The Terms of Reference document is an important part of the public participation component of this SFMP. SFM requires public participation and the PAG Terms of Reference ensure these requirements are met in a credible and transparent fashion (see Appendix 3 for the PAG Terms of Reference). The Terms of Reference document will be reviewed at least once annually unless consensus from the group suggests otherwise.

Because British Columbia's forests are primarily publicly owned, it is vital that a SFM initiative involves the public extensively in the forest management planning process. The Prince George PAG represents a diverse range of interests specific to the DFA of this plan. Therefore, the PAG is necessary to ensure that sustainable forest management is achieved. Each member of the PAG must be able to have effective and fair interaction or communication with one another, as well as with the Licensees and BCTS, to ensure all identified values receive adequate consideration. The Terms of Reference document is intended to provide the necessary framework and proper protocol to ensure effective input from PAG representatives.

### **Current Practices and Status of Indicator**

The initial Terms of Reference document was developed by the PAG and accepted as part of the SFMP process on December 9th, 2004. The PAG Terms of Reference will be reviewed at least once annually to ensure it is up to date with the present day context of SFM. The Licensees and BCTS will ensure that PAG members are given adequate notice as to when the Terms of Reference document will be reviewed. This review should be part of a scheduled PAG meeting so that all participants are aware of review timelines. The Licensees/ BCTS will maintain the Terms of Reference document so that any revisions resulting from an annual review will be made and a new document will be distributed to PAG members.

The PAG meeting agenda and scheduling operating guidelines are outlined in section 8.2 of the Terms of Reference (see Appendix 3).

The public advisor group reviewed the terms of reference once between April 1, 2004 and March 31, 2005.

### **Establishment of Targets and Future Practices**

The target for this indicator was identified from a review of other public participation processes and from consultation with the Prince George PAG. Having one or more reviews of the PAG Terms of Reference annually will allow the document to remain timely and achieve its purpose within the PAG.

### **Forecasting and Predicted Trends**

The target of at least one annual review of the PAG Terms of Reference is expected to be achieved. The exact level of success in meeting this target is not easy to quantifiably forecast over a defined time frame. However, it is important to identify what the accepted target means to SFM. Annual review and maintenance of the SFMP PAG Terms of Reference to ensure a credible and transparent process primarily affects the social values identified within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator currently has a target set at 1 or more reviews per year, it is important to identify one other potential scenario:

a) What if the PAG Terms of Reference document was never reviewed?

If the PAG Terms of Reference document was never reviewed, the PAG process would potentially cease to be credible and transparent. This could result in overall dissatisfaction with the PAG and reduced incentive to continue participating in the process. Without local public comment, this plan would potentially not reflect the Prince George DFA as values change over time. Sustainability of the forest resource would then be more difficult to achieve as locally important values might be overlooked without sufficient public input. Another potential effect of never reviewing the PAG Terms of Reference could be a reduced public acceptance of the plan and potential skepticism of the overall process. General understanding of SFM and resulting initiatives may be reduced and future goals identified by the Licensees/ BCTS would be more difficult to achieve.

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From an analysis of the “what if” scenario, it is clear that a balance of values can be achieved with an annual review of the PAG terms of reference. As such, the Licensees and BCTS are committed to reviewing the PAG Terms of Reference at least once a year to ensure a consensus-based public involvement process.

### **Monitoring and Reporting Procedures**

As the review of the PAG Terms of Reference is set to be a part of a scheduled PAG meeting, this will be evident in the PAG meeting minutes. Reviews of the PAG Terms of Reference and any identified changes to the document will be obtained from the minutes of the annual PAG meeting. The indicator will be included in the annual SFMP report for the operating year April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

The PAG is responsible for establishing the timeline for reviews of the Terms of Reference. The Licensee Steering Committee is responsible for ensuring the number of times the Terms of Reference is reviewed is included in the annual SFMP report.

### **Indicator - 53      Number of PAG Meetings**

<b>Indicator Statement</b>	<b>Target and Variance</b>
The number of Public Advisory Group (PAG) meetings per year	<u>Target:</u> ≥3  <u>Variance:</u> -1

Indicator 53 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.3	<b>CSA SFM Element:</b> Public Participation
6.3.A	<b>Value:</b> Public participation in decision making processes
6.3.A.a	<b>Objective:</b> A clear process for a wide public participation in SFM

### **Description of Indicator**

The Prince George PAG is made up of a diverse set of representatives that have various defined interests, values or specific uses of the forest resource within the DFA. The PAG provided valuable input on the initial development of values, indicators, measures and targets for this SFMP. PAG members helped to identify local issues and values for the Prince George DFA for forestry managers to consider during management and planning processes. The PAG will continue to provide guidance, input and evaluation throughout the SFMP process, including all aspects of implementation and continual improvement of the plan over time. This indicator provides information regarding how often the PAG will meet on an annual basis.

### **Current Practices and Status of Indicator**

The PAG met 13 times Between November 4<sup>th</sup>, 2004 and April 9<sup>th</sup>, 2005, to develop the various indicators and targets specific to the Prince George SFMP. Continual interaction with the PAG is considered extremely beneficial for efficient progression towards SFM. PAG participation with the SFMP will also help to demonstrate the achievement of public participation requirements, which will also help in achieving performance audit requirements. As a result, the Licensees and BCTS will continue to build a positive working relationship with the PAG by committing to keeping the PAG well informed of the SFMP process by holding at least one PAG meeting each year.

The public advisor group had 9 meeting between April 1, 2004 and March 31, 2005.

### **Establishment of Targets and Future Practices**

The target for the Prince George DFA PAG was established from a review of other similar PAG processes. Scheduled meetings one or more times a year will allow opportunities for the PAG to have input into the SFMP, input and comment regarding continual improvement of the plan and feedback regarding adaptive management processes that are developed over time. Requirements to convene the PAG will be dependent on the tasks that occur that may require the guidance, input and/or evaluation of

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PAG members. One or more meetings per year is considered necessary to keep the PAG informed and up to date on issues regarding SFM in the Prince George DFA.

### **Forecasting and Predicted Trends**

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 number of PAG meetings per year affects primarily the social values identified within the DFA. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator currently has a target set at greater than or equal to one, one other scenario should be identified:

- a) What if there were no future PAG meetings?

If there were no future PAG meetings for the Prince George SFMP, social values of SFM could potentially be reduced. Without regular PAG meetings, public participation requirements would not be fulfilled. Without local public comment, the plan may not reflect the needs of the Prince George DFA. Sustainability of the forest resource would be more difficult to achieve as locally important values might be overlooked without sufficient public input. Another potential effect of having no PAG meetings would be a reduced public acceptance of the plan and potential skepticism of the overall intent. General understanding of SFM and resulting initiatives would also likely be reduced and future goals identified by the Licensees/ BCTS would be more difficult to achieve.

Due to the impact this indicator could have on important social values of SFM, the Licensees and BCTS are committed to achieving  $\geq 3$  PAG meetings per year.

### **Monitoring and Reporting Procedures**

PAG meetings will be scheduled a minimum of once a year, with more meetings conducted if required. During these meetings, minutes will be recorded indicating the date of the meeting and the members in attendance, along with the items discussed during the meeting. Meeting minutes will be tracked and filed to ensure that Licensees/ BCTS are meeting target requirements. The number of meetings will be reported in the SFMP annual report for the operating year of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

The PAG is responsible for establishing the timeline for meetings. The Licensee Steering Committee is responsible for ensuring the number of meetings during the operating year is included in the annual SFMP report.

Licensees and BCTS will look for ways to maximize the effectiveness of future PAG meetings. One possible improvement may be to explore creating small working groups to work on specific projects and issues.

## **Indicator - 54 Public Sector Participation in the PAG**

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

Indicator 54 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.3	<b>CSA SFM Element:</b> Public Participation
6.3.A	<b>Value:</b> Public participation in decision making processes
6.3.A.a	<b>Objective:</b> A clear process for a wide public participation in SFM

### **Description of Indicator**

The Prince George 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

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representatives from the various public sectors as defined in the Terms of Reference (see Appendix 3, "PAG Terms of Reference, section 6.1, 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 Licensees/ BCTS 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.

### **Current Practices and Status of Indicator**

The process for inviting representative from the defined public sectors for participation in the PAG is defined in section 6.1.2 of the PAG ToR. Of the sectors described in that section, 100% were invited to participate in the PAG. As of April 1, 2005, the PAG included at least one representative from 18 of the 20 ToR listed sectors. Some of the people attending the PAG meetings were affiliated with some of the six First Nations listed in the ToR, but they were not official representatives.

100% of the public sectors as defined in the terms of reference were invited to participate in the PAG process between April 1, 2004 and March 31, 2005.

### **Establishment of Targets and Future Practices**

The target percent was established to reflect the importance the Licensees and BCTS 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.

### **Forecasting and Predicted Trends**

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 an 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 Licensees and BCTS are committed to achieving the target of 100%.

### **Monitoring and Reporting Procedures**

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. The indicator percent will be reported in the annual SFMP report for the operating year of April 1<sup>st</sup> and March 31<sup>st</sup>.

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### **Responsibility and Continuous Improvement Opportunities**

Section 6.1.2 of the ToR outlines the procedure for establishing the invitation list for participating in the PAG process. The PAG SFMP steering committee is responsible for ensuring this indicator percent is included in the SFMP annual report. Opportunities for continuous improvement may include expanding the list of public sectors in the ToR, and continuing to encourage First Nations participation in the SFM process.

### ***Indicator - 55 PAG Satisfaction with Information Presented for Decision Making***

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of PAG satisfaction with amount and timing of information presented for informed decision making	<u>Target:</u> 100% <u>Variance:</u> -20%

Indicator 55 addresses the following CSA-SFM criteria, element, value and objective:

6.	<b>CCFM Criterion:</b> Accepting Society's Responsibility for Sustainable Development
6.4	<b>CSA SFM Element:</b> Information for Decision Making
6.4.a	<b>Value:</b> Informed, fair, and inclusive decision making
6.4.A.a	<b>Objective:</b> Adaptive forest management that is responsive to research, experience and public input.

### **Description of Indicator**

The PAG is one of the key elements of public involvement in the SFM process. The Prince George PAG provides guidance, input and evaluation during development of the SFMP. It is also instrumental in maintaining links to current local values and forest resource uses within the DFA.

In order for the PAG to make decisions in regards to the content of the SFMP, such as indicators, targets, and levels of responsibility, they must have the information to support those decisions. This information must be sufficient in amount and quality and delivered in a timely manner for the PAG to make sound decisions for the SFMP process.

This indicator is intended to measure and report the level of satisfaction the PAG has with the amount and timing of information presented for informed decision making. While it is hoped that there will be high satisfaction with the information, it is also acknowledged that with any group of diverse backgrounds and opinions that it is difficult to achieve unanimous satisfaction in any regard. However, if the SFMP is to succeed, the people who are involved in its evolution must have a certain level of satisfaction with the information they are using to direct that development.

### **Current Practices and Status of Indicator**

Two questions were added to the PAG meeting evaluation forms to address this question. The March 31<sup>st</sup> and April 9<sup>th</sup> PAG meetings answered the questions:

- 1) How timely was the information?
- 2) How satisfied were you with the information?

The March 31<sup>st</sup> PAG participants gave a rating of 4.3 (86%) (good to very good) level of satisfaction and the April 9<sup>th</sup> meeting produced a slightly higher rating of 4.6.

See appendix 8 and 9 for additional details.

### **Establishment of Targets and Future Practices**

The target of 100% satisfaction was established to reflect the Licensees and BCTS commitment to providing the best information possible in a timely manner to the PAG to aid in their decision making. 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 out of 5. The variance still requires that over two-thirds of the PAG should be satisfied with the information provided.

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The PAG participants will complete evaluation forms for each PAG meeting that will survey their opinion on the minutes of previous meetings, agendas, background information, and sources of additional information. The evaluation forms will also survey their level of satisfaction with the timing of this information. An average will be calculated using the summary of the meeting evaluation forms.

### **Forecasting and Predicted Trends**

This indicator is not easy to forecast as it is dependent on the vagaries of human opinion. However, it is important to identify what the accepted target means to SFM. The percentage of PAG satisfaction with amount and timing of information presented for informed decision making may influence the success of the SFMP. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator currently has a target set at 100%, one other scenario should be identified:

- a) What if none of the PAG participants were satisfied with the amount and timing of information presented for informed decision-making?

If no members of the PAG were satisfied with the amount and timing of information presented for informed decision-making then the entire SFMP process is questionable. The PAG was, and is, responsible for the indicators and targets for the plan. These were determined based on the quality of information presented to the PAG. If this information was deemed inadequate, then the plan and its goals may not be realistic, or achievable. This may result in lower social acceptance of the SFMP and less participation in the PAG.

Due to the importance of having a well informed, satisfied PAG, the Licensees and BCTS are committed to achieving the target of 100%. It is expected that in the future most, if not all, of the PAG participants will be satisfied with the amount and timing of the information presented for decision making.

### **Monitoring and Reporting Procedures**

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 1<sup>st</sup> to March 31<sup>st</sup> and reported in the annual SFMP report.

### **Responsibility and Continuous Improvement Opportunities**

The Licensee Steering Committee is responsible developing the evaluation forms. The Facilitator is responsible for ensuring the forms are completed after each PAG meeting, and to determine the indicator percent based on the summary of these forms. The Licensee Steering Committee coordinator must ensure this percent is included in the annual SFMP report.

Licensees/ BCTS will look for ways to provide the best information possible to future PAG meetings. This dissemination of information could utilize guest speakers, academics, recent scientific literature, and other sources of current knowledge.

### ***Indicator - 56 Active Watershed Risk Evaluation***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
The percent of active watersheds with PFI greater than the minimum threshold that have had a watershed risk evaluation completed.	Target 100% Variance -10%

### ***Indicator - 57 Watersheds Assessed by Qualified Professional***

<b><i>Indicator Statement</i></b>	<b><i>Target and Variance</i></b>
The percent of active high risk watersheds that are assessed by a qualified professional	Target 100% Variance 0%



**Indicator - 58 Operations Consistent with Professional Watershed Recommendations**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percent of active operations within high risk watersheds that are consistent with recommendations of Hydrologic assessments.	<u>Target 100%</u>  <u>Variance 0%</u>

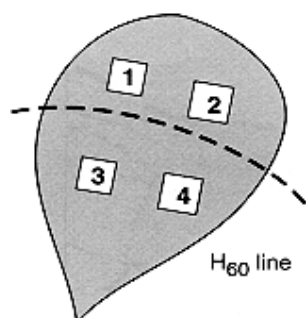
Indicator 56, 57, and 58 addresses the following CSA-SFM criterion, elements, values and objectives:

3.	<b>CCFM Criterion:</b> Conservation of Conservation of Soil and Water Resources
3.2	<b>CSA SFM Element:</b> Water Quality and Quantity
3.2.A	<b>Value:</b> Water Conservation
3.2.A.a	<b>Objective:</b> Maintain water quality and water quantity in the Defined Forest Area (DFA)

**Description of Indicators**

A watershed is an area of land that contributes water to the flow of a stream or river. It is usually delineated as an area above a point on a stream. In the context of this plan an active watershed is one where there are active harvesting operations. 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 (PFI) is a measure 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. Table 15 shows how the peak flow index is calculated for a hypothetical watershed.

**Table 15 Peak Flow Index calculations**



Block no.	Area (ha)	Stand height (m)	ECA (ha)	Weight factor	Weighted ECA
1	20	4	15.0	1.5	22.5
2	30	6	15.0	1.5	22.5
3	20	1	20.0	1.0	20.0
4	30	8	7.5	1.0	7.5
Weighted total ECA =					<b>72.5</b>
Peak flow index = $\frac{72.5}{1000}$ =					<b>0.0725</b>

source: B.C. Ministry of Forests, 2001a

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.

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Predicting the potential impacts of increased peak flow in a particular watershed requires an assessment of the factors that contribute to the sensitivity of the watershed. Watersheds in the northern interior of British Columbia have a wide range of sensitivity to peak flows. The sensitivity of a watershed can be evaluated by examining five parameters; peak flow buffering (lakes and wetlands), terrain stability, watershed relief, channel pattern and channel stability. A full assessment by a qualified hydrologist may be warranted in some situations but the process is time consuming and costly. Employing this approach across the DFA would be cost prohibitive. The process described here can be completed as part of the planning for proposed harvesting in the DFA. It involves evaluating the risk to a particular watershed.

Where the PFI is expected to be above the threshold value as a result of a combination of past and proposed harvesting licensees and BCTS will initiate a watershed sensitivity analysis as part of a risk assessment procedure (Dobson 2007). This assessment will result in a risk rating for individual watersheds. If a the watershed risk ranks high through this process a qualified professional will be consulted to provide a more thorough review and recommendations on proposed harvesting and road construction.

### **Current Practices and Status of Indicators**

Licensees and BCTS initiated a process to delineate watersheds in the DFA and calculate PFIs. The process of delineating watershed boundaries within the DFA proved to be more challenging than anticipated. Once these boundaries were finalized the current peak flow index calculations were completed by May 15, 2007. Work is ongoing to be able to implement indicators 56, 57 and 58, for the 2008-09 reporting year. Harvesting operations completed after March 31, 2008 will be included in the annual report. As of Mar 31, 2007 of the 208 watersheds in the DFA 147 were below the threshold value for initiating a risk assessment.

Table 16 Peak Flow Index Summary for DFA, Mar 31, 2007

Peak flow Index (PFI) Threshold	Number of watersheds	Watershed area (ha)	Action
Below	147 (71%)	1,497,828	No action required
Above	61 (29%)	523,499	Complete risk assessment
total	208	2,021,327	

The number of these watersheds that are active will be determined as of March 31, 2008.

### **Establishment of Targets and Future Practices**

These three indicators are intended to be implemented together and have been recommended as a package by the PAG. The Licensees and BCTS have determined that 100% of active watersheds can be assessed for risk. Where the parameters determining risk result in a watershed being defined as high risk Licensees and BCTS will seek the recommendations of a professional qualified to evaluate the condition of a watershed and the impacts of further development. Where recommendations are in place future operations will be conducted in accordance with those recommendations.

### **Forecasting and Predicted Trends**

The requirement to conduct a watershed assessment has been limited in the past to community watersheds and select few others defined as high priority by strategic planning processes. Licensees and BCTS have been evaluating the risk to watersheds by consulting professionals as required. Standardizing the process to be applied broadly across the DFA will ensure that areas determined to be high risk will be managed appropriately.

While it is expected the indicator targets 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 assessments is the basis for determining where professional recommendations are required. Following through on those recommendations is important for maintaining water quality and overall forest sustainability. A "what if" scenario analysis will identify the importance of the target for this indicator to SFM within the DFA. These indicators and the following "what if" scenario will help to substantiate the proposed targets:

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a) What if only 50% of active watersheds in the DFA with a PFI greater than the minimum threshold had a risk evaluation completed?

Failure to complete evaluations could result in operations being initiated before the parameters defining risk have been properly evaluated. Potentially, some high risk watershed may have operations commence without the overall impact being evaluated. Professional recommendations are required to ensure that water quality and quantity is properly maintained in these high risk watersheds. Although current management is required to account for watershed values, this would result in forest practices that are not conducted based on the best available information on watersheds and therefore may impact water quality and quantity in the long term. 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.

To maintain values of sustainable forest management, the Licensees and BCTS are committed to the targets of evaluating 100% of active watersheds with a PFI greater than the threshold, assessing those that are defined as high risk with the help of a professional and then ensuring that operations are conducted in accordance with recommendations that come out of that assessment.

### **Monitoring and Reporting Procedures**

For those watersheds in the DFA with PFIs higher than the threshold a risk evaluation is required before operations commence. Licensees/ BCTS will develop systems to monitor future planned harvesting to ensure that evaluations are completed. Planners will primarily be responsible for conducting risk evaluations. Evaluations may be conducted using several sources of information such as aerial photography, contour maps and hydrologic maps of the area. Forest cover and past and proposed harvesting will also be used. Much of this information is in a digital form available for use in Geographic Information Systems (GIS). GIS analysis may aid in calculating some of the risk parameters. Licensees and BCTS intend to share information about recent harvesting where operations of more than one licensee exist in a watershed. The annual report will be produced with information about the number of active watersheds within a given reporting period and the proportion of those that were evaluated for risk prior to operations commencing. The report will also contain the proportion of active high risk watersheds that were assessed. Finally, for operations within high risk watersheds, the proportion of those conducted consistent with the recommendations of qualified professional. Databases such as GENUS, or similar systems, will be maintained to provide up to date planning information.

### **Responsibility and Continuous Improvement Opportunities**

Licensees and BCTS have previously completed the process of completing Peak Flow Indices for all watersheds in the DFA. Indicators 56, 57 and 58 had been incorporated into the SFM plan as the next stage of managing for sustainable peak flows. The results of these new indicators will be evaluated over the next few reporting periods to determine if this approach is producing the desired outcome.

## **Indicator - 59 Compliance with Species at Risk and Sites of Biological Importance Management Strategies**

<b>Indicator Statement</b>	<b>Target and Variance</b>
Percentage of forest operations that adhere to licensee specific management strategies for: <ul style="list-style-type: none"> <li>• Species at Risk (plants, plant communities, and important wildlife, fish, and bird species); and</li> <li>• Sites of Biological Significance</li> </ul>	Target: 100%  Variance: -5% 2009 (Reassess 2010)

Indicator 59 addresses the following CSA-SFM criteria, elements, values and objectives:

1.	<b>CCFM Criterion:</b> Conservation of Biological Diversity
1.2	<b>CSA SFM Element:</b> Species Diversity
1.2.A	<b>Value:</b> Sustainable populations of flora and fauna native to the DFA
1.2.A.a	<b>Objective:</b> Maintain habitat to support flora and fauna native to the DFA

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- |         |  |
|---------|--|
| 1.      | <b>CCFM Criterion:</b> Conservation of Biological Diversity  |
| 1.4     | <b>CSA SFM Element:</b> Protected Areas and Sites of Special Biological Significance                 |
| 1.4.A   | <b>Value:</b> Appropriate Management to Conserve Identified Sites of Special Biological Significance |
| 1.4.A.a | <b>Objective:</b> Sites of special biological significance are identified and appropriately managed  |

### **Description of Indicator**

Identification of those animal and bird species and plant communities that have been declared to be at risk is crucial if they are to be conserved. For the purposes of this SFM Plan, Species at Risk are currently identified from the following sources:

- 1) **Endangered or Threatened Species:** As identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Species at Risk Act.
- 2) **Red Listed Animal Species, Forested Plant Communities and Plants:** Defined as taxa being considered for or already designated as extirpated, endangered or threatened. Extirpated taxa no longer exist in the wild in British Columbia, but they do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed.
- 3) **Blue listed Animal Species and Forested Plant Communities:** Defined as taxa considered being of Special Concern in British Columbia. Taxa of Special Concern have characteristics that make them particularly sensitive to human activities or natural events. Blue listed taxa are at a lower level of risk than red listed species.
- 4) **Provincially Identified Wildlife:** Refers to those Species at Risk and Regionally Important Wildlife that the Minister of Water, Land and Air Protection designates as requiring special management attention under the Forest and Range Practices Act.

**Committee on the Status of Endangered Wildlife in Canada (COSEWIC):** This committee is comprised of representatives from federal, provincial territorial and private agencies as well as independent experts in order to assign national status to species at risk in Canada.

Some Species at Risk in British Columbia are found in areas of forestry development. Appropriate management of these species and their habitat is crucial in ensuring populations of flora and fauna are sustained in the DFA. In the Prince George DFA, the application of landscape and stand level biodiversity management measures contribute to the maintenance of most biodiversity needs. These management approaches are "coarse filter" in that they represent general measures to conserve a variety of wildlife species. However, coarse filter guidelines may not be sufficient to ensure the conservation of Species at Risk. Specific management strategies are required to ensure the Species at Risk are maintained within the DFA (see Appendix 5 for a list of Species at Risk in the PG TSA).

Sites of Biological Significance are sites that support red- and blue-listed animal species, plant communities, and rare ecosystems. Sites of Biological Significance also include protected areas, which the Canadian Standards Association defines as "an area protected by legislation, regulation, or land-use policy to control the level of human occupancy or activities" (*Canadian Standards Association, 2002*). Protected areas can include national, provincial parks, multiple use management areas, and wildlife reserves. Sites of Biological Significance include such features as bald eagle or osprey nest, mineral licks, and avalanche chutes. Identification of these sites by forest managers is essential to their protection through the development of management strategies.

Since June of 2005, the licensees have had processes in place to ensure staff are trained to identify Species at Risk and Sites of Biological Significance, and that they have access to current information. Training matrices and records are kept to ensure that new staff, field staff, planning staff and field consultants are trained appropriately.

On March 6<sup>th</sup> 2008, the Prince George Public Advisory Group consented to the consolidation of eight indicators relating to Species at Risk and Sites of Biological Importance. This consolidation was agreed upon as there was duplication amongst the eight indicators, and they were not reflective of the maturation of the process. As a result of the indicator consolidation, there is no net change to the Species at Risk and Sites of Biological Significance process, or the results of the compliance, monitoring and reporting.

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The indicator is intended to monitor the consistency between forest operations and licensee-specific management strategies, as identified in operational plans. The management strategies are consistent with approved provincial Species at Risk Notice/Orders requirements (Appendices 6 and 7) and guidance provided through reports developed for the DFA, the most recent of which is "Identification & Management of Species & Plant Communities At Risk – Prince George Timber Supply Area", authored by Dan Bernier of Timberline Natural Resource Group and Gilbert Proulx of Alpha Wildlife Research & Management Ltd. in April 2009.

Being consistent with these requirements will ensure that the habitats that are required to support these Species at Risk will be maintained. Overall ecosystem productivity will be maintained by ensuring these species continue to play their roles in the healthy functioning of the DFA's forests.

### **Current Practices and State of Indicator**

As per the 2008/09 Annual Report, the licensees have demonstrated 100% consistency between forest operations and the licensee-specific management strategies.

### **Establishment of Targets and Future Practices**

The target of 100% of forest operations adhering to licensee-specific management strategies for Species at Risk and Sites of Biological Significance was established in recognition of the high value the licensees place on Species at Risk management. Operational plans such as Site Plans will continue to prescribe the most recent management techniques for Species at Risk for the areas they cover. Forestry operations will be supervised and reviewed to ensure any Species at Risk requirements in operational plans are achieved on the ground.

### **Forecasting and Predicted Trends**

All forest operations are expected to be consistent with management strategies for Species at Risk and Sites of Biological Significance as identified in operational plans. The long-term success of the Species at Risk 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 Species at Risk 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 the licensee-specific management strategies for Species at Risk and Sites of Biological Significance?

If only 50% of forest operations were consistent with the licensee-specific management strategies for Species at Risk and Sites of Biological Significance, there could be significant ecological, economic and social impacts. Species at Risk, by their very definition, are vulnerable to disturbance or destruction of even small degrees. Ecologically, the loss or decline of any species at risk 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. As Notices/Orders are contained in legislation, failure to be consistent with their requirements could result in monetary penalties and costly litigious proceedings. In addition to these ecological and economic impacts, societal values may be reduced if only 50% of forest operations were consistent with licensee-specific management strategies for Species at Risk and Sites of Biological Significance as identified in operational 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 measure. Therefore, the Licensees and BC Timber Sales will continue to ensure that 100% of all forest operations are consistent with management strategies for Species at Risk and Sites of Biological Significance. The indicator will remain at the target of 100% if all processes and protocols are followed.

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### **Monitoring and Reporting Procedures**

This indicator has a licensee-specific target. The licensees will monitor forest operations to ensure consistency with the licensee-specific management strategies for Species at Risk and Sites of Biological Significance. Areas of inconsistency will be noted and reported in the SFMP annual report for the reporting period of April 1<sup>st</sup> to March 31<sup>st</sup>.

### **Responsibility and Continuous Improvement Opportunities**

The licensees are responsible for keeping informed and passing on management strategies to field staff. In addition, the forest professionals responsible for preparing Site Plans must ensure the management strategies included in the site plan are consistent with the most current the licensee-specific management strategies for Species at Risk and Sites of Biological Significance. If there are problems in implementing the Site Plan management strategies, action will be taken to improve consistency. These actions may include more intensive supervision and additional training for equipment operators. Continual improvement will also involve increasing knowledge of the interactions between harvesting and Species at Risk and Sites of Biological Significance.

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## **7.0 Appendices**

**Appendix 1:** Prince George Defined Forest Area Maps and Apportionment

**Appendix 2:** PG SFMP PAG Representatives and Alternatives

**Appendix 3:** PAG Terms of Reference

**Appendix 4:** Performance Matrix

**Appendix 5:** Species at Risk in the Prince George Defined Forest Area

**Appendix 6:** Order - Category of Species at Risk & Wildlife Habitat Areas

**Appendix 7:** Notice - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Survival of Species at Risk in the Prince George Forest District

**Appendix 8:** PG SFMP Public Advisory Group Meeting Evaluation Form

**Appendix 9:** Results of Evaluation Forms

**Appendix 10:** Acronyms

**Appendix 11:** Glossary

**Appendix 12:** SFM Indicator Forecasting for the Prince George District Width SFM Plan



## Appendix 1

### Prince George DFA Maps and PG TSA Apportionment

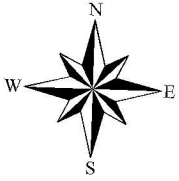
[PG SFMP Planning Area map](#)

[PG SFMP Defined Forest Area map](#)

[PG TSA Apportionment Report](#)



# Prince George Forest District Joint Licensee Sustainable Forest Management Plan Defined Forest Area



## Legend


 Defined Forest Area

### Exclusions from DFA

 Indian Reserves

 Treaty 8 Lands

 Treaty Settlement Lands

 Agricultural Leases

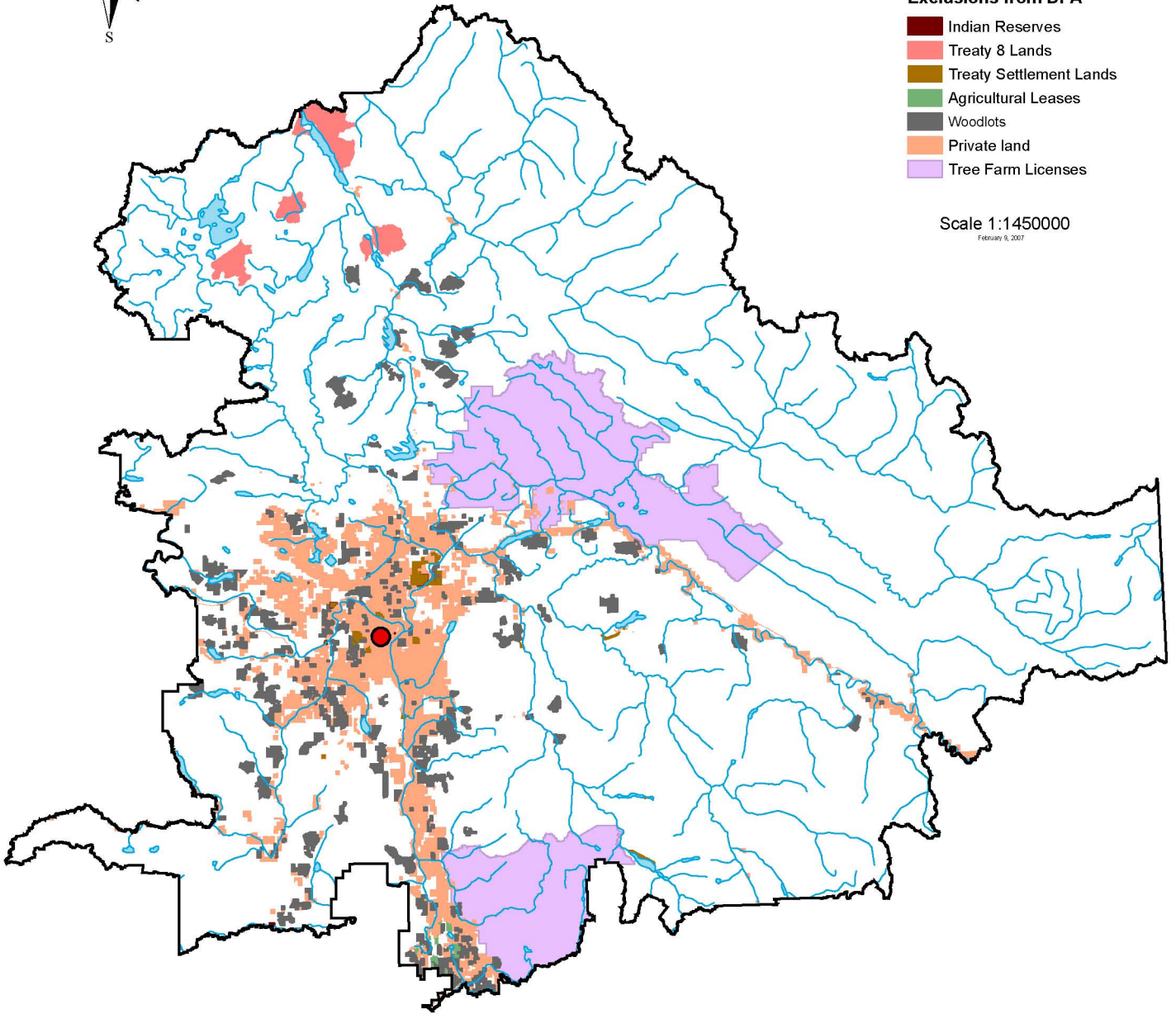
 Woodlots

 Private land

 Tree Farm Licenses

Scale 1:1450000

February 9, 2007

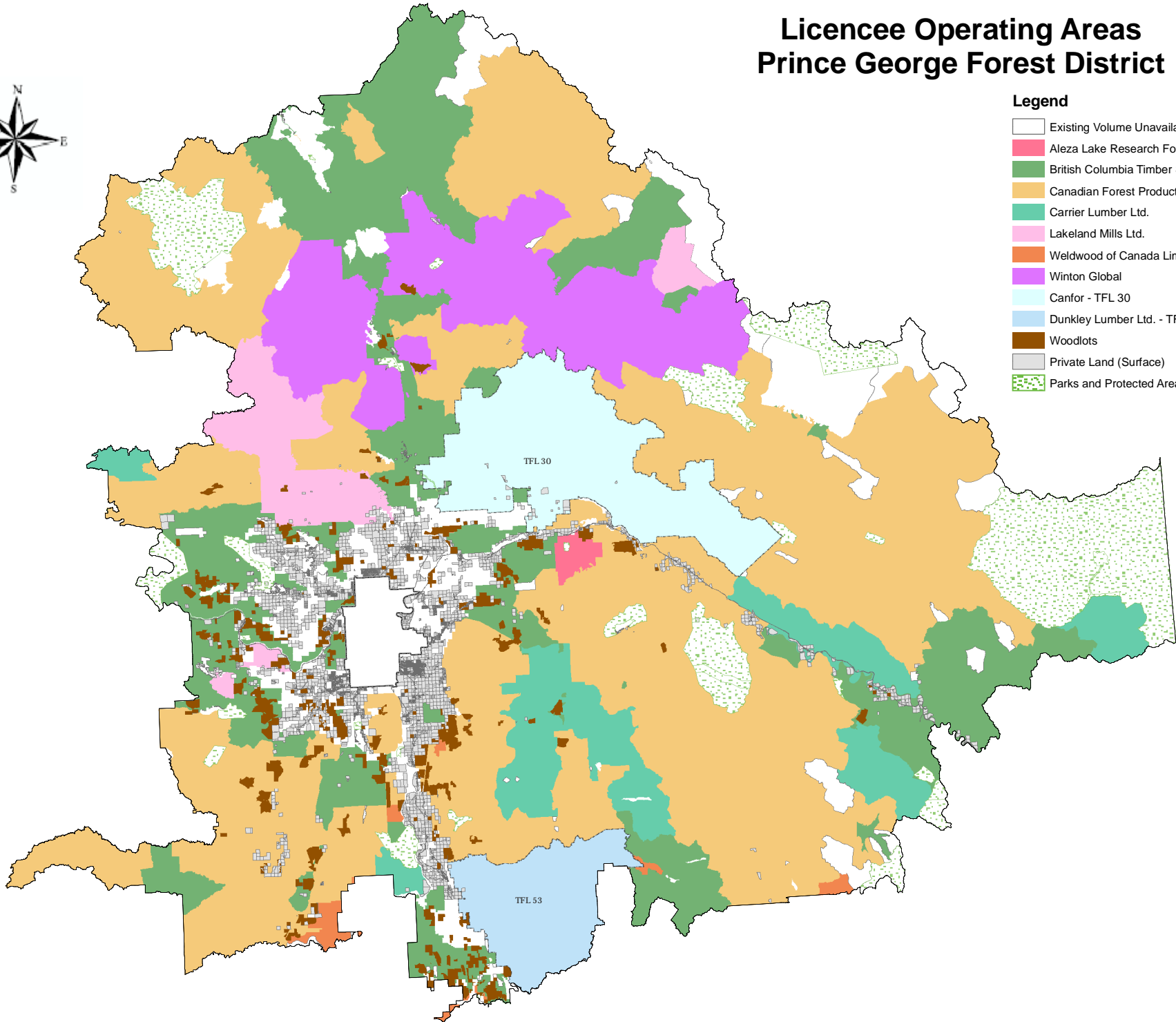


# Licencee Operating Areas Prince George Forest District



### Legend

- Existing Volume Unavailable
- Aleza Lake Research Forest
- British Columbia Timber Sales
- Canadian Forest Products Ltd.
- Carrier Lumber Ltd.
- Lakeland Mills Ltd.
- Weldwood of Canada Limited
- Winton Global
- Canfor - TFL 30
- Dunkley Lumber Ltd. - TFL 53
- Woodlots
- Private Land (Surface)
- Parks and Protected Areas



**Ministry of Forests and Range - Apportionment System  
TSA AAC, Apportionment and Commitments**

**Parameters:**                                  **TSA Name: Prince George TSA**                                  **TSA: 24**  
**Northern Interior Forest Region**  
**Report Effective Date: 2010-02-09**

**A) ALLOWABLE ANNUAL CUT (AAC)**                                  (Section 8, Forest Act)

Effective Date: 2004-10-01  
Determination Date: 2004-09-14  
AAC (cubic metres): 14,944,000

<u>Partition</u>	<u>cubic metres</u>	<u>%</u>
Conventional	8,574,000	57.37
Deciduous leading stands	160,000	1.07
Hemlock Cedar Stands	110,000	0.74
Mountain Pine Beetle	5,700,000	38.14
Supply Block A	400,000	2.68
Unapportioned Volume		
<b>Total</b>	<b>14,944,000</b>	<b>100</b>

**B) APPORTIONMENT**                                  (Section 10, Forest Act)

Effective Date: 2009-01-27  
Determination Date: 2008-11-04

**i) Cubic Meters**

	Total m3	%	Partition			
			Conventional	%	Deciduous leading	%
Forest Licences Replaceable	5,695,441	38.11	5,531,441	64.51		
Forest Licences Non-Replaceable	5,471,488	36.61	698,488	8.15	113,000	70.63
BCTS Forest Licence Non-Replaceable	180,000	1.20	180,000	2.10		
BCTS Timber Sale Licence/Licence	3,305,106	22.12	1,879,106	21.92	40,000	25.00
TSL <= 10000 m3 Replaceable	2,885	0.02	2,885	0.03		
Community Forest Agreement	75,000	0.50	68,000	0.79	7,000	4.38
Woodlot Licence	30,000	0.20	30,000	0.35		
Forest Service Reserve	184,080	1.23	184,080	2.15		
<b>Total</b>	<b>14,944,000</b>	<b>100.00</b>	<b>8,574,000</b>	<b>100.00</b>	<b>160,000</b>	<b>100.00</b>





**Ministry of Forests and Range - Apportionment System  
 TSA AAC, Apportionment and Commitments**

Parameters: TSA Name: **Prince George TSA** TSA: **24**  
**Northern Interior Forest Region**  
 Report Effective Date: **2010-02-09**

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**C) COMMITMENTS**

			Total m3	Conventional	Deciduous leading stands	Hemlock Cedar Stands
<b>Forest Licences</b>	A17842	L. & M. LUMBER LTD.	49,514	49,514		
<b>Replaceable</b>	A18156	APOLLO FOREST PRODUCTS LTD.	216,746	216,746		
	A18157	CANADIAN FOREST PRODUCTS LTD.	588,223	588,223		
	A18158	CARRIER LUMBER LTD.	253,027	253,027		
	A18160	STELLA-JONES INC.	47,048	47,048		
	A18162	WEST FRASER MILLS LTD.	240,908	240,908		
	A18163	LAKELAND MILLS LTD.	249,827	249,827		
	A18165	CANADIAN FOREST PRODUCTS LTD.	1,104,858	1,104,858		
	A18167	CANADIAN FOREST PRODUCTS LTD.	0	0		
	A18169	STUART LAKE LUMBER CO. LTD.	201,978	201,978		
	A18171	WINTON GLOBAL LUMBER LTD.	505,541	505,541		
	A40873	CANADIAN FOREST PRODUCTS LTD.	1,597,771	1,597,771		
	A77955	CONIFEX INC.	640,000	640,000		
		<b>Total</b>	<b>5,695,441</b>	<b>5,695,441</b>		
<b>Forest Licences</b>	A27823	TAKLA TRACK & TIMBER LTD.	200,000	200,000		
<b>Non-Replaceable</b>	A33801	CANADIAN FOREST PRODUCTS LTD.	200,000	200,000		
	A55578	L. & M. LUMBER LTD.	250,000	250,000		
	A57544	DUNKLEY LUMBER LTD.	0			
	A57545	WINTON GLOBAL LUMBER LTD.	0			
	A61216	LAKELAND MILLS LTD.	80,000			
	A62425	GISCOME TIMBER LTD.	30,000			30,000
	A70174	CARRIER LUMBER LTD.	300,000			
	A71015	AINSWORTH LUMBER CO. LTD.	50,000		50,000	
	A71016	T'UGUS TIMBER LTD.	55,000		55,000	
	A72189	SAIK'UZ FIRST NATION	150,000			
	A72920	STELLAKO CUSTOM WOOD LTD.	150,000			
	A75068	NADLEH WHUTEN FIRST NATION	150,000			
	A75472	B&T FOREST PRODUCTS LTD.	50,000			

**Ministry of Forests and Range - Apportionment System  
TSA AAC, Apportionment and Commitments**

**Parameters:**

**TSA Name: Prince George TSA                      TSA: 24**  
**Northern Interior Forest Region**

**Report Effective Date: 2010-02-09**

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			Total m3	Conventional	Deciduous leading stands	Hemlock Cedar Stands
<b>Forest Licences</b>						
	A75670	BRAVE HOLDINGS LTD.	25,000	25,000		
<b>Non-Replaceable</b>						
	A76218	RPP HOLDINGS INC.	250,000			
	A76219	RPP HOLDINGS INC.	250,000			
	A76400	RPP HOLDINGS INC.	250,000			
	A77813	NORTHERN INTERIOR FOREST PRODUCT	250,000			
	A78072	BRAVE HOLDINGS LTD.	25,000			
	A78073	CANYON TREE FARMS INC.	25,000			
	A81516	APOLLO FOREST PRODUCTS LTD.	50,000	50,000		
	A81863	CHUNZOOH FOREST PRODUCTS LTD.	245,000	245,000		
	A82364	APOLLO FOREST PRODUCTS LTD.	50,000	50,000		
	A84161	NORTHERN INTERIOR FOREST PRODUCT	50,000			
		<b>Total</b>	<b>3,135,000</b>	<b>1,020,000</b>	<b>105,000</b>	<b>30,000</b>
<b>BCTS Forest</b>						
	A59071	K & D LOGGING LTD.	60,000	60,000		
<b>Licence</b>						
	A64418	TA-DA-CHUN TIMBER LTD.	100,000	100,000		
<b>Non-Replacea</b>						
	A70349	XSU-WII-AX FOREST PRODUCTS LTD.	20,000	20,000		
		<b>Total</b>	<b>180,000</b>	<b>180,000</b>		
<b>TSL &lt;= 10000 m3</b>						
<b>Replaceable</b>						
	A17809	PERRY	2,070	2,070		
	A17810	POOLE	246	246		
	A17813	474483 BRITISH COLUMBIA LTD.	171	171		
		<b>Total</b>	<b>2,487</b>	<b>2,487</b>		
<b>Total Commitments</b>			<b>9,012,928</b>	<b>6,897,928</b>	<b>105,000</b>	<b>30,000</b>

**Ministry of Forests and Range - Apportionment System  
 TSA AAC, Apportionment and Commitments**

Parameters:

TSA Name: **Prince George TSA**

TSA: **24**

**Northern Interior Forest Region**

Report Effective Date: **2010-02-09**

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		Mountain Pine Beetle	NON-AAC Lump Sum Volume
<b>Forest Licences</b>	A57544	DUNKLEY LUMBER LTD.	50,000
<b>Non-Replaceable</b>	A57545	WINTON GLOBAL LUMBER LTD	20,000
	A61216	LAKELAND MILLS LTD.	80,000
	A70174	CARRIER LUMBER LTD.	300,000
	A72189	SAIK'UZ FIRST NATION	150,000
	A72920	STELLAKO CUSTOM WOOD LT	150,000
	A75068	NADLEH WHUTEN FIRST NATI	150,000
	A75472	B&T FOREST PRODUCTS LTD	50,000
	A76218	RPP HOLDINGS INC.	250,000
	A76219	RPP HOLDINGS INC.	250,000
	A76400	RPP HOLDINGS INC.	250,000
	A77813	NORTHERN INTERIOR FORES	250,000
	A78072	BRAVE HOLDINGS LTD.	25,000
	A78073	CANYON TREE FARMS INC.	25,000
	A84161	NORTHERN INTERIOR FORES	50,000
	<b>Total</b>	<b>1,980,000</b>	<b>70,000</b>
	<b>Total Commitments</b>	<b>1,980,000</b>	<b>70,000</b>

NOTE  
 NON-AAC Lump sum Volume: Lump Sum volumes that originated from a licence under-cut or from undersold volumes in the competitive program.  
 These volumes do not form an integral part of the current AAC for the TSA and therefore are excluded from the totals.

**Ministry of Forests and Range - Apportionment System  
TSA AAC, Apportionment and Commitments**

**Parameters:**                              **TSA Name: Prince George TSA**                              **TSA: 24**  
**Northern Interior Forest Region**  
**Report Effective Date: 2010-02-09**

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**Appendix 2**  
**PG SFMP PAG**  
**Representatives & Alternates**



# Prince George SFMP PAG

## Representatives & Alternates

January 2010

<b>Sector</b>	<b>Representative</b>	<b>Alternative</b>
Commercial wildlife interests (guides, trappers, outfitters)	Ken Pickering	Len Shankel
Cultural Conservation	Jo Graber	N/A
Forest workers & contractors	N/A	N/A
Hunting and Fishing	Earl Pickett	N/A
Local Government	Betty Abbs	Hillary Crowley
Metis	Gerald Bird	N/A
Natural Conservation	Virginia Karr	Jocelyn Campbell
Naturalists	Sandra Kinsey	Dave Stevenson
Private landowners	Chris Andreschefski	Norm Holt
Ranching & Farming	Esther Perry	Anne Migvar
Recreation, commercial, motorized	Kevin Taylor	N/A
Recreation, non-commercial, motorized	Lee Sexsmith	Jeff Mohr
Recreation, non-motorized	David King	
Research & Education	Melanie Karjala	Ralph Hausot
Non-renewable Resource Extraction	N/A	N/A
Small Business	Rob Murray	N/A
Small Timber Tenures	Mark Clark	Mike Torpe
Tourism	Yvonne Gaumond	Kathy Rudd
West Moberly First Nation	Teena Demeulemeester	Bruce Muir





## **Appendix 3**

### **PUBLIC ADVISORY GROUP TERMS OF REFERENCE**

**Updated January 2010**



# Prince George Forest District

## Sustainable Forest Management Plan



## Public Advisory Group

### Terms of Reference

January 12, 2010

[For maintaining the current SFMP]



**BCTS**  
BC Timber Sales  
Prince George

## 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) and 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. The primary purposes of the forest licensees and BC Timber Sales are to:

- a. Maintain the Prince George Sustainable Forest Management Plan (SFMP) covering the geographic area of the Prince George Forest District to meet the SFM standard requirements (Z809-02) developed by the Canadian Standards Association (CSA)
- b. Support a public advisory process to:
  - Refine existing and create new values, objectives, indicators and targets, based on the CSA SFM elements and any other elements of relevance to the DFA;
  - Develop alternative strategies to be assessed;
  - Assess alternative strategies and select the preferred one;
  - Review the SFMP;
  - Design monitoring programs, evaluate results and recommend improvement; and
  - Discuss and resolve any issues relevant to SFM in the DFA.
- c. 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 licensees and BC Timber Sales to prepare for eventual certification under the Canadian Standards Association's (CSA) SFM Standard (Z809-02).

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

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.

### 1.2 PG SFMP Steering Committee

The current PG SFMP Steering Committee consists of representatives from Carrier Lumber Ltd., BC Timber Sales Prince George Business Area (BCTS-PG), 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 Prince George Forest District, excluding areas such as private lands, woodlots, Indian reserves, Treaty 8 Lands, and Tree Farm Licenses 30 and 53. The DFA boundaries are shown on the map provided in Appendix A.

### 1.4 Public Advisory Group

The Public Advisory Group (PAG) for the Prince George SFMP is comprised of individuals representing the interests listed in section 6.1.1. who voluntarily participate in the PAG process.

### 1.5 Aboriginal Participation

The PG SFMP Steering Committee and the PAG recognize and agree that Aboriginal participation in the public participation process will not prejudice Aboriginal and Treaty rights.

### 1.6 Legislation

The PG SFMP Steering Committee and the PAG shall ensure that the indicators, measures and targets are consistent with current relevant government legislation, regulations and policies.

### 1.7 Progress to date

The PG SFMP Steering Committee invited the Public and Aboriginal peoples to participate in a PAG in October 2004. Between November 2004 and May 2005, a series of PAG meetings were held to develop the values, objectives, indicators and targets comprising the initial SFMP. The PAG review of the initial SFMP was completed in October 2005. By the end of February 2006, Winton Global, Lakeland Mills Ltd., Carrier Lumber Ltd., BC Timber Sales Prince George Business Area (BCTS-PG), and Canadian Forest Products Ltd. (Canfor) underwent registration audits and were recommended for certification to the CSA Z809-02 standards. Since that time, the licensees and BCTS have conducted surveillance audits and maintained their CSA Z809-02 certification. Over 2007/2008 Canfor, Carrier Lumber Ltd., Lakeland Mills Ltd., Winton Global, and BCTS underwent re-registration audits and were all-successful in being recommended for recertification for another 3 year term. Annual surveillance audits are required to maintain certification. In 2009 Lakeland Mills Ltd. and Winton Global gave notice of their resignation from the PG SFMP Steering Committee, due to switching their certification from the CSA Z809-02 standard over to the Sustainable Forestry Initiative Standard (SFIS).

## 2. Defined Goal

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

The Public Advisory Group will have the opportunity to work with the PG SFMP Steering Committee to:

- a. Refine existing and create new values, objectives, indicators, and targets, based on the CSA SFM elements and any other elements relevant to the DFA;
- b. Address items recorded in the Continuous Improvement Matrix;
- c. Review the annual SFM report and changes to the SFM plan,
- d. Design monitoring programs, evaluate results, and recommend improvements; and
- e. Discuss and resolve any issues relevant to SFM in the DFA.

### **3. Annual Schedule**

Field Meetings/Tour (as decided by the PAG)	September
Open House/Access Viewing	October
Annual Report	June

### **4. Communication**

#### **4.1 Between the PAG and PG SFMP Steering Committee**

- a. The PG SFMP Steering Committee will ensure that the minutes are distributed to the PAG one week after the meeting.
- b. The PG 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 PG SFMP Steering Committee such as financial or human resource information may be deemed sensitive or proprietary and may not be released.
- c. The PG SFMP Steering Committee will respond to all recommendations from the PAG. The PG SFMP Steering Committee will indicate how they applied the recommendations or provide reasons for not applying them.
- d. The PG SFMP Steering Committee will provide a copy of the SFMP and annual reports to the PAG.
- e. The PG SFMP Steering Committee may caucus prior to responding to the PAG.

#### **4.2 With the Public**

- a. The PG 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 PG SFMP Steering Committee will be respectful of each other.
- c. The PAG and PG SFMP Steering Committee may invite the media to attend meetings as observers with advance notification to the PAG.

### **5. Resources**

#### **5.1 Travel Expenses**

- a. Mileage to and from PAG meetings for those PAG representatives and alternates traveling more than 50 kilometers each way to the meeting site will be reimbursed at \$0.50 per kilometer. PAG representatives and alternates traveling from outside the Prince George Forest District must obtain approval for travel expenses from the PG SFMP Steering Committee before the meeting.
- b. Overnight accommodation for PAG representatives and alternates traveling to PAG meetings will be reimbursed if pre-approved by the PG SFMP Steering Committee. As a general principle, accommodation should be economical.
- c. Expense forms with copies of receipts for the above must be submitted to the facilitator within two weeks following the PAG meeting.

## 5.2 Meeting Expenses

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

## 6. Roles & 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 following sectors:

Aboriginal peoples	Recreation (commercial, motorized)
Commercial wildlife interest (guides, trappers, outfitters)	Recreation (non-motorized)
Cultural Conservation	Recreation (non-commercial, motorized)
Forestry Workers and Contractors	Research & Education
Hunters and Fishers Local	Non-Renewable Resource Extraction (mining, prospecting, & oil and gas)
Government Métis	Small Business
Naturalists	Small Timber Tenures
Natural Conservation	Tourism
Private Landowners	
Ranching & Farming	

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 following local First Nations will be encouraged to have a representative and alternate participate in the PAG:

- Lheidli T'enneh (Lheit-Lit'en) First Nation
- Lhoosk'uz Dene Nation (Kluskus First Nation)
- McLeod Lake Indian Band
- Nak'azdli Band
- Nazko First Nation
- Red Bluff First Nation
- Saik'uz First Nation
- Simpcw First Nation (North Thompson Indian Band)
- West Moberly First Nation
- Halfway River First Nation

#### 6.1.2 Selection of the PAG

- a. The PG SFMP Steering Committee will recruit potential local PAG representatives and alternates through mailed invitations to individuals, an open house, and advertisements in local newspapers.

- b. Members of the public and the PG SFMP Steering Committee will review the potential membership at the initial PAG meetings. The PG 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 the potential representatives cannot select a representative or alternate for the interest area, then the existing PAG will make a recommendation to the PG SFMP Steering Committee.
- c. Once the PAG is established, the PAG and the PG SFMP Steering Committee can recommend changes in PAG structure, list of interests, and potential members.
- d. The PG SFMP Steering Committee, in consultation with the PAG, approves appointments and replacement of PAG representatives and alternates.

### 6.1.3 Role of PAG Representatives

The role of PAG representatives is to:

- a. Provide input related to the Defined Goal and objectives (defined in Section 2);
- b. Be prepared, informed and ready for meetings;
- c. Request of the PG SFMP Steering Committee an advisor to provide information when the PAG considers this necessary;
- d. Act as a liaison between PAG and others from the interest area they are representing;
- e. Assume responsibility towards reaching consensus on recommendations to the PG SFMP Steering Committee;
- f. Attend meetings. It is recognized that PAG representatives may miss some meetings due to the nature of their work or other activities.
- g. Inform her/his 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 PG SFMP Steering Committee may, based on consultation with the PAG, replace or remove that representative; and
- h. Ensure 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.

### 6.1.4 Role of PAG Alternates

An alternate may be appointed for each PAG representative. The role of the PAG alternate is to:

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

The alternate and representative may both attend the same PAG meeting but only the representative will participate. The alternate may participate in discussions, with agreement by the group or the PG SFMP Steering Committee.

### 6.1.5 Role of PAG Subcommittee

PAG Subcommittees may be formed at certain times in the process where there is a need to conduct focused and



detailed tasks. The group will be formed with a PG SFMP Steering Committee member as the chair, and interested PAG Representatives or PAG Alternates. The role of the PAG Subcommittee will be:

- a) Attend the PAG Subcommittee meetings, review information, listen to advisors, and brainstorm ideas, strategies, indicators and targets
- b) PAG Subcommittee members will develop recommendations that will be brought forward to the general PAG meetings.
- c) All relevant information will be made available to the general PAG members.
- d) PAG Subcommittees will be temporary and will disband when the task at hand is completed.

## 6.2 PG SFMP Steering Committee

The role of the PG SFMP Steering Committee is to:

- a. Provide information to the PAG as related to the Defined Goal and objectives. Where possible, this material will be provided in advance of the meeting;
- b. Provide the PAG with necessary and reasonable human, physical, financial, information and technological resources;
- c. Where possible, inform the PAG via the agenda of any advisor attending a meeting;
- d. Avoid participating in reaching consensus on recommendations by the PAG;
- e. Consider and respond to the recommendations of the PAG;
- f. Make decisions regarding sustainable forest management and certification;
- g. Draft agendas; and
- h. Ensure the circulation of meeting minutes and agendas.

## 6.3 Advisors

The PG 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. The role of advisors is to:

- a. Provide and/or clarify technical or legal information and participate in discussions as requested; and
- b. Avoid participating in reaching consensus on recommendations by the PAG.

## 6.4 Observers

The public is welcome to observe PAG meetings. The public may not participate in:

- a. Discussions unless agreed to by the PAG, facilitator, and PG SFMP Steering Committee; and
- b. Reaching consensus on recommendations by the PAG.

## 6.5 Facilitator

The role of the PAG facilitator is to:

- a. Ensure that PAG meetings address the agreed-upon agenda items;
- b. Start and end meetings at the times stated in the agenda;

- c. Manage and implement the Terms of Reference, including the appropriate participation of the PAG, the PG SFMP Steering Committee, advisors, and observers;
- d. Enable equitable opportunity by all PAG representatives (or their alternates) to participate in the meetings;
- e. Work to clarify interests and issues, and help the PAG build recommendations;
- f. Avoid participating in reaching consensus on recommendations by the PAG;
- g. Distribute the agenda prior to each meeting; and
- h. Prepare and distribute the minutes following each 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 Goal and objectives, that representative or alternate, other PAG representatives and alternates, or a member of the PG SFMP Steering Committee must state the potential conflict. The PAG and the PG 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. Stay on topic;
- f. Not revisit past decisions unless the group agrees to do so; and
- g. Participate in an open, transparent, and accountable process.

### 8.2 Meeting Agenda and Dates

The meeting agenda and schedule may change if agreed to by the PAG and PG 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 PG SFMP Steering Committee will agree upon meeting dates.
- b. PAG meetings will be held on Thursday evenings or Saturdays.
- c. The PAG will meet at least three times per year.

## 9. Decision Making and Methodology

The PAG agrees to work by consensus. Consensus is defined as no representative substantially disagreeing on an issue and being willing to proceed to the next step. Every effort shall be made to achieve consensus. Where an impasse is reached, the person(s) with the outstanding issue shall offer solutions or options for resolution.

## 10. Dispute Resolution Mechanism

### 10.1 Process Issues

The facilitator will resolve process issues.

### 10.2 Technical Issues

- a. The PAG will work to identify the underlying issues and work towards a solution in a positive and respectful manner.
- b. The PAG will seek to compromise, identify alternatives, and clarify information.
- c. The PAG will commit to arriving at the best solution possible.
- d. If no consensus solution can be reached, then the outstanding issues will be summarized by the PAG and provided to the PG SFMP Steering Committee for its consideration and response.

## 11. Review and Revisions

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

### Originally Approved:

Public Advisory Group

Date: December 9, 2004

PG SFMP Steering Committee

Date: December 9, 2004

### Current Approval:

Public Advisory Group

Date: January 12, 2010

PG SFMP Steering Committee

Date: January 12, 2010



## Appendix 4:

### **PERFORMANCE MATRIX**

**Criterion, Elements, Values, Objectives, Indicators and Targets**



**PRINCE GEORGE SUSTAINABLE FOREST MANAGEMENT PLAN**  
**CRITERIA, ELEMENTS and VOIT PERFORMANCE TABLE**  
Version March 2010

**REVISION TABLE**

Date	Indicator	Previous Description	Revised Description	Rational	PAG Consensus / Agreement Date
January 15, 2006	Indicator 31 (6.3.A.a.i)	Variance is -30%	Variance is -20%	To be consistent with PAG satisfaction chart	February 9, 2006
February 7, 2006	Indicator 32 (4.2.A.a.ii)	New	The total percent of forested land within the Timber Harvesting Landbase that is converted to non-forested land.	As per auditor recommendation.	February 9, 2006
June 8, 2006	Indicator 27 (3.2.A.a.iv)	Natural Drainage  Variance is -5.0%	Variance is 0.0%	This is a legal requirement. No variance is allowed.	June 8, 2006
June 8, 2006	Indicator 53 (6.3.A.a.iii) # PAG meetings	Target is $\geq 1$ Variance is 0	Target is $\geq 3$ Variance is -1	More than one PAG meet is being scheduled throughout the year	June 8, 2006
June 8, 2006	Indicator 35 (5.1.A.b.i) (5.1.A.b.ii) (5.1.A.b.iii) (5.1.A.b.iv) (5.1.A.b.v) (5.1.A.b.vi)	These are separate indicators for the following requirements: visual, cultural, range, riparian, recreation and lakeshore requirements. For example:  The percentage of forest operations consistent with visual quality requirements as identified in operational plans.	5.1.A.b.i. – Non-Timber Benefits  The percentage of forest operations consistent with visual, cultural heritage, range, riparian, recreation and lakeshore requirements as identified in operational plans.	Combining these 6 indicators into one indicator would streamline the reporting of these indicators and reduce the space they take in the annual report.	June 8, 2006
June 8, 2006	Indicator 8 (1.2.A.a.i) (1.2.A.a.ii) (1.2.A.a.iii) (1.2.A.a.iv)	These are separate indicators for the following requirements: Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders, Riparian Reserve Requirements. For example:  The percentage of forest operations consistent with approved provincial Caribou Ungulate Winter Range requirements as identified in operational plans.	1.2.A.a.i – Species Diversity and Ecosystem Productivity  The percentage of forest operations consistent with approved Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders and Riparian Reserve requirements as identified in operational plans.	Combining these 4 indicators into one indicator would streamline the reporting of these indicators and reduce the space they take in the annual report.	June 8, 2006
June 8, 2006	Indicator 8 (2.2.A.a.i) (2.2.A.a.ii) (2.2.A.a.iii) (2.2.A.a.iv)	These are separate indicators for the following requirements: Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders, Riparian Reserve Requirements. For example:  The percentage of forest operations consistent with approved provincial Caribou Ungulate Winter Range requirements as identified in operational plans.	2.2.A.a.i – Species Diversity and Ecosystem Productivity  The percentage of forest operations consistent with approved Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders and Riparian Reserve requirements as identified in operational plans.	Combining these 4 indicators into one indicator would streamline the reporting of these indicators and reduce the space they take in the annual report.	June 8, 2006
June 8, 2006	All	Alpha numeric numbering system. Eg. 1.2.A.a.i, 5.1.A.b.ii, etc.	Maintain numbering system e.g. 1,2,3,4,5,6,7,etc. and Alpha numeric numbering system. Eg. 1.2.A.a.i, 5.1.A.b.ii, etc.	To make referencing indicators much easier.	June 8, 2006
June 8, 2006	Indicator 32 (4.2.A.a.ii)	THLB Conversion	Add wording to comments – show amount of permanent access structures constructed during reporting year to the annual report.	This is intended to address mid-term THLB conversion.	June 8, 2006
Nov 2, 2006	Indicator 32 (4.2.A.a.ii)	None	Example calculation Road widths	Requested by PAG	November 2, 2006

BLACK TEXT = Consensus or general agreement

RED TEXT = Proposed new indicator

Date	Indicator	Previous Description	Revised Description	Rational	PAG Consensus / Agreement Date
			FSR=25Meters, Road permit= 15M, On block= 10 M, Non-status= 13 meters If Road lengths are FSR= 200 km, RP=300 km, On block = 400km, non status= 500 km and if THLB = 50,000 ha. Then % roads is (200,000 X 25 + 300,000 X 15 + 400,000 X 10 + 500,000 X 13) / 10,000= 2000 ha. Road % is 2,000 / 50,000 = 4.0%		
Nov 2, 2006	Indicator 32 (4.2.A.a.ii)	Target = ≤ 5.0% (variance of +0.0%)	Target = ≤ 4.0% (variance of + 0.5%)		November 2, 2006
January 18, 2007	Indicator 28 (3.2.A.a.v)	Measure the regenerated area (ha) and compare it to the previous areas (ha) harvested.	Percent of net area regenerated within 3-years after the <b>commencement</b> of harvesting  Target 100% Variance -10%	As suggest by auditors	January 18, 2007
January 18, 2007	Indicator 28 (4.1.A.a.i)	Percent of net area regenerated within 3-years after the <b>completion</b> of harvesting	Percent of net area regenerated within 3-years after the <b>commencement</b> of harvesting  Target 100% Variance -10%	As suggest by auditors	January 18, 2007
January 18, 2007	Indicator 28 (5.1.A.a.ii)	Measure the regenerated area (ha) and compare it to the previous areas (ha) harvested.	Percent of net area regenerated within 3-years after the <b>commencement</b> of harvesting  Target 100% Variance -10%	As suggest by auditors	January 18, 2007
January 18, 2007	Indicator 5 (1.1.A.a.v) (1.3.A.b.i)		<b>Add to comments section:</b>  <i>&gt;7.0 % is averaged over all blocks harvested in each reporting period. Minimum 3.5% applies to blocks ≥15.0 ha harvested in each reporting period. Licensees and BCTS to report out on retention in all blocks less than 15ha.</i>	Rationale provided at PAG Meeting	January 18, 2007
June 21, 2007	Indicator 56 (3.2.A.a.vii)	None. New Indicator.	vii. The percent of active watersheds with PFI greater than the minimum threshold that have had a watershed risk evaluation complete. Target 100% Variance -10%	To add an indicator to the plan that addresses water quantity in the DFA.	June 21, 2007
June 21, 2007	Indicator 57 (3.2.A.a.viii)	None. New Indicator.	viii. The percent of active high risk watersheds that are assessed by a qualified professional. Target 100% Variance 0%	To add an indicator to the plan that addresses water quantity in the DFA.	June 21, 2007
June 21, 2007	Indicator 58 (3.2.A.a.ix)	None. New Indicator.	ix. Percent of active operations within high risk watersheds that are consistent with recommendations of Hydrologic assessments. Target 100% Variance 0%	To add an indicator to the plan that addresses water quantity in the DFA.	June 21, 2007

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Date	Indicator	Previous Description	Revised Description	Rational	PAG Consensus / Agreement Date
	Indicators 39, 40, 41 (5.1)		New Objective: c. Maintain opportunities to access non-timber benefits by ensuring that individuals and stakeholders who have expressed an identified interest in the planning area (e.g. guides, trappers, recreationists, water licensees, mining tenure holders etc.) are specifically communicated with, during forest planning		Oct 18, 2007
Oct 18, 2007	Indicator 39 (5.1.A.b.v)	Annually provide a viewing of BCTS and Licensee current access plans of the DFA.	Annually provide a viewing of BCTS and Licensee current access plans, general forest planning and operational plans, and Sustainable Forest Management Plans in of the DFA.  Add to comments: Expanding this indicator to include not only access plans, but also operational activities and SFM plans may help to increase the general public and PAG members' awareness and understanding of the forest planning and management process that is integral to access management. This will also provide members of the public an opportunity to establish communication strategies with the companies.		Oct 18, 2007
Oct 18, 2007	Indicator 40 (5.1.A.b.vi)	none	Add to comments: Licensees will track and report out on the number of access management inquiries vs. forest planning and operational activity inquiries in order to monitor and address the level of access management concerns over time.	To monitor and report access management concerns over time.  The next version of the SFMP will be revised to incorporate these changes.	Oct 18, 2007
Oct 18, 2007	Indicator 41 (5.1.A.b.vii)	none	Add to comments: Licensees will solicit and invite non timbered tenure holders (without a current and established communication strategy) to establish communication strategies with the companies. This invitation will occur every 2 years and will provide for an increased effort to communicate and address access and other issues with resource users.	To provide for an increased effort to communicate and address access and other issues with resource users.	Oct 18, 2007
January 24, 2008	Indicator 1 (1.1.A.a.i)	None	Implement Management Strategy for Old Forest Quality A. Licensees and BCTS will implement the old forest quality model as a tool in operational planning. B. Annually monitor and report out on the area of Good to Best Old Forest Quality Rankings by NDU merged BEC in the Prince George Forest District. C. To revisit the model periodically when improved inventory data sets are available specifically to update intrinsic indicators and rankings.	Develop a strategy rather than an indicator at this time in order to implement and monitor a relatively new model and concept into the Licensee and BCTS Planning regime. Continue to monitor the Old Forest through the LOWG process and in addition report out the amount of Good to Best Old Forest quality rankings in the Prince George Forest District. In monitoring the amount of area over time, Licensees and BCTS will be able to utilize these areas in day to day planning activities, and report back to the PAG how the model is working and where it might need refinements based on some stand level information.	January 24, 2008

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Date	Indicator	Previous Description	Revised Description	Rational	PAG Consensus / Agreement Date
January 24, 2008	Indicator 29 (3.2.A.a.vi)	None	Removed and replaced by Indicators 56, 57 & 58	Peak flow calculations completed.	January 24, 2008
March 6, 2008	Indicator 9, (1.2.A.a)	Percent of appropriate personnel trained to identify Species at Risk.	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 10 (1.2.A.a)	Percent of Species at Risk that have management strategies developed by April 2006.	none	Replaced with consolidated indicator #59	March 6., 2008
March 6, 2008	Indicator 11 (1.2.A.a)	Percentage of forest operations consistent with Species at Risk management strategies as identified in operational plans.	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 12 (1.2.A.a)	Percent of site plans reviewed by a person trained in Species at Risk.	none	Replaced with consolidated indicator #59	March 6,2008
March 6, 2008	Indicator 13 (1.2.A.a)	Percent of site plans with identified Species at Risk that have appropriate management strategies	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 15 (1.4.A.a)	Percent of appropriate personnel trained to identify sites of special biological significance	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 16 (1.4.A.a)	Percent of sites of biological significance that have management strategies developed by April 2006.	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 17 (1.4.A.a)	Percentage of forest operations consistent with sites of biological significance management strategies as identified in operational plans.	none	Replaced with consolidated indicator #59	March 6, 2008
March 6, 2008	Indicator 59 (1.2.A.a, 1.4.A.a)	<ul style="list-style-type: none"> <li>None. New Indicator.</li> </ul>	Percentage of forest operations that adhere to licensee specific management strategies for: <ul style="list-style-type: none"> <li>Species at Risk (plants, plant communities, and important wildlife, fish, and bird species); and</li> <li>Sites of Biological Significance</li> </ul>	Consolidation of, and replacement for, Indicators 9,10,11,12,13,15,16, and 17.	March 6, 2008
January 12, 2010	Indicator 23	Variance: $\leq 5$ Annually	Variance: $\leq 3$ Annually	Target is still "0" but tolerance is cumulative	January 12, 2010
January 12, 2010	Indicator 34	Target: <100 ha Annually	Target: <60 ha Annually	Target is cumulative for all licensees. Variance is unchanged.	January 12, 2010

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**PERFORMANCE TABLE**

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
1.	1.0 Conservation of Biological Diversity	1.1 Ecosystem Diversity	A. Well balanced and functioning ecosystems that support natural processes	a. Maintain landscapes that support the natural diversity, variety and pattern of ecosystems	Indicator 1 The amount of old forest by NDU/ merged BEC within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	0%	<p>Landscape Biodiversity Order (LBO) for the PGTSA can be found at the following website: <a href="http://ftp.prg.env.gov.bc.ca/pub/outgoing/requests/Oct2004_PG%20TSA_Biodiversity_Order">http://ftp.prg.env.gov.bc.ca/pub/outgoing/requests/Oct2004_PG%20TSA_Biodiversity_Order</a></p> <p>Report back annually on the current status of the objective (tables and maps showing locations of old forest and old interior forest areas).</p> <p>Members of the public who want to provide input on high quality old forest should inform the respective licensee for documentation.</p> <p><b>PAG Consensus</b></p> <p>Implement Management Strategy for Old Forest Quality</p> <p>A. Licensees and BCTS will implement the old forest quality model as a tool in operational planning.</p> <p>B. Annually monitor and report out on the areas of Good to Best Old Forest Quality Rankings by NDU merged BEC in the Prince George Forest District.</p> <p>C. To revisit the model periodically when improved inventory data sets are available specifically to update intrinsic indicators and rankings.</p> <p><b>PAG Agreement with two objections</b></p>
2.					Indicator 2 The amount of interior old forest by NDU/merged BEC within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	0%	<p>Ensure that large patches are designed to ensure that patch/landscape retains values that are required by species that are dependent on that patch.</p> <p><b>PAG Consensus</b></p> <p><u>Comment Suggestion from Dave King</u> - Ensure large patches are designed to retain values required by species dependent on large patches</p>
3.					Indicator 3 The young patch size distribution by NDU within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	±15%	<p><b>PAG Recommendation:</b> In the Wet Trench and Wet Valley NDU's limit 60% of patch sizes to range of 101 to 500 ha size category. Licensees to refer to regional ecologist for further input.</p> <p><b>PAG Consensus</b></p> <p><u>Comment Suggestion from Dave King</u> ... of patch sizes 101- 500 ha.</p>

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Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
4.					Indicator 4 The amount of landscape-level biodiversity reserves within the DFA.	Area set aside to maintain natural forest conditions across the DFA as per the latest PG TSR	-1%	Refers to OGMA's, and areas not managed by MOF (parks, recreation areas, new protected areas, Herrick Old Growth Reserve). Is intended to remain constant over time. – PAG consensus to change  224,879.57 ha – Recreation, Parks, 4,480.59 ha – Herrick Old Growth Reserve 123,577.00 ha – OGMA's (Dome, Slim & Humbug) <u>44,908.56 ha – New Protected Areas</u> 397845.72 ha – Total  Show total area of DFA, PG Forest District, and Forest Harvesting Land base.  <b>PAG Consensus</b>
5.					Indicator 5 The average percentage of stand level retention in harvested areas within the DFA.	Target: > 7% Annually within the DFA (minimum of 3.5% by block, no maximum %)	0%	Process for monitoring and tracking will be identified in the SFMP.  In the SFMP, provide comments on the process for maintaining the representativeness of what was in the stand and priorities for other values.  <b>PAG Agreement with one objection</b>  <i>&gt;7.0 % is averaged over all blocks harvested in each reporting period. Minimum 3.5% applies to blocks <math>\geq</math>15.0 ha harvested in each reporting period. Licensees and BCTS to report out on retention in all blocks less than 15ha. PAG Agreement with one objection.</i>
6.					Indicator 6 Trend towards the percentage of area of patches in 101-500ha range within the Wet Trench and Wet Mountain of the young patch size distribution class 101-1000ha.	75%	-5%	Wet Trench includes Valley and Mountain.  <b>PAG Consensus</b>  <u>Comment Suggestion from Dave King</u> Refer to 1.1.A.a.iii (Young Patch size distribution)
7.					Indicator 7 Percentage of cut blocks consistent with coarse woody debris requirements in operational plans.	100% of blocks will be consistent with coarse woody debris requirements contained in operational plans	0%	Efforts should be made to ensure that operational plans are based on research by ecosystem within the DFA to accommodate fauna, flora and soil dynamics.  <b>PAG Consensus</b>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
8.		1.2 Species Diversity	A. Sustainable populations of flora and fauna native to the DFA	a. Maintain habitat to support flora and fauna native to the DFA	Indicator 8 The percentage of forest operations consistent with approved Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders and Riparian Reserve requirements as identified in operational plans.	100% Annually	0%	To be reviewed upon pending government direction regarding species at risk.  <b>PAG Consensus</b>
9.					Indicator 59 Percentage of forest operations that adhere to licensee specific management strategies for: Species at Risk (plants, plant communities, and important wildlife, fish, and bird species); and Sites of Biological Significance	100 %	-5%	Concerns with the training for SAR and SBS still being carried out - Explained that this is captured in the LSC Training Needs Matrix.  To have the process explained out in detail in the SFMP Indicator write-up. To have the training component referred to in the SFMP.  Want a movement towards a formal evaluation and effectiveness of the training. Would like to see a certificate of training reviewed by a supervisor.  Invitation made to the PAG to attend a SAR workshop in the Spring 2008.  This new indicator will be effective for the June 2008 annual report  <b>PAG Agreement with 1 objection</b>
10.		1.3 Genetic Diversity	A. Genetic Diversity	a. Maintain natural genetic diversity	Indicator 4 The amount of landscape-level biodiversity reserves within the DFA.	Area set aside to maintain natural forest conditions across the DFA as per the latest PG TSR	-1%	Refers to OGMA's, and areas not managed by MOF (parks, recreation areas, new protected areas, Herrick Old Growth Reserve). Is intended to remain constant over time. – PAG consensus to change  224,879.57 ha – Recreation, Parks, 4,480.59 ha – Herrick Old Growth Reserve 123,577.00 ha – OGMA's (Dome, Slim & Humbug) <u>44,908.56 ha – New Protected Areas</u> 397845.72 ha – Total  Show total area of DFA, PG Forest District, and Forest Harvesting Land base.  <b>PAG Consensus (repeat indicator)</b>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
11.				b. Sustain natural genetic diversity on harvested Areas	Indicator 5 The average percentage of stand-level retention in harvested areas within the DFA.	≥ 7% Annually within the DFA (minimum of 3.5% by block, no maximum %)	0%	<p>Process for monitoring and tracking will be identified in the SFMP.</p> <p>In the SFMP, provide comments on the process for maintaining the representativeness of what was in the stand and priorities for other values.</p> <p><b>PAG Agreement with one objection</b></p> <p><i>&gt;7.0 % is averaged over all blocks harvested in each reporting period. Minimum 3.5% applies to blocks ≥15.0 ha. harvested in each reporting period. Licensees and BCTS to report out on retention in all blocks less than 15ha. PAG Agreement with one objection.</i></p>
12.					Indicator 14 Percent compliance with Chief Forester's Standards for Seed Use.	100%	0%	<p>In the SFMP identify the process for assuring seed for seedlings</p> <p>Add to the CI matrix the issue of climate change and planting of the same mix of species or monocultures.</p> <p><b>PAG Consensus</b></p>
13.		1.4 Protected Areas and Sites of Special Biological Significance	A. Appropriate Management to Conserve Identified Sites of Special Biological Significance	a. Sites of special biological significance are identified and appropriately managed	Indicator 59 Percentage of forest operations that adhere to licensee specific management strategies for: <ul style="list-style-type: none"> <li>Species at Risk (plants, plant communities, and important wildlife, fish, and bird species); and</li> <li>Sites of Biological Significance</li> </ul>	100%	-5%	<p><b>Concerns with the training for SAR and SBS still being carried out - Explained that this is captured in the LSC Training Needs Matrix.</b></p> <p><b>To have the process explained out in detail in the SFMP Indicator write-up. To have the training component referred to in the SFMP.</b></p> <p><b>Want a movement towards a formal evaluation and effectiveness of the training. Would like to see a certificate of training reviewed by a supervisor.</b></p> <p><b>Invitation made to the PAG to attend a SAR workshop in the Spring 2008.</b></p> <p><b>This new indicator will be effective for the June 2008 annual report</b></p> <p><b>PAG Agreement with 1 objection</b></p>

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Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
14.			B. Protected Areas	a. Protected Areas are identified and appropriately managed	Indicator 18 Hectares of unauthorized forestry related harvesting or road construction within landscape-level biodiversity reserves.	0 ha	0 ha	Refers to OGMA's, and areas not managed by MOF (parks, recreation areas, new protected areas, Herrick Old Growth Reserve). Is intended to remain constant over time. – PAG consensus to change  224,879.57 ha – Recreation, Parks, 4,480.59 ha – Herrick Old Growth Reserve 123,577.00 ha – OGMA's (Dome, Slim & Humbug) <u>44,908.56 ha – New Protected Areas</u> 397845.72 ha – Total  Show total area of DFA, PG Forest District, and Forest Harvesting Land base.  <b>PAG Consensus</b>
15.	2.0 Maintenance and Enhancement of Forest Ecosystem Conditions and Productivity	2.1 Forest Ecosystem Resilience	A. Resilient Forest Ecosystems	a. Well-balanced ecosystems that support natural processes	Indicator 1 The amount of old forest by NDU/ merged BEC within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	0%	Landscape Biodiversity Order (LBO) for the PG TSA can be found at the following website:  <a href="ftp://ftp.prg.env.gov.bc.ca/pub/outgoing/requests/Oct2004_PG%20TSA_Biodiversity_Order">ftp://ftp.prg.env.gov.bc.ca/pub/outgoing/requests/Oct2004_PG%20TSA_Biodiversity_Order</a>  Report back annually on the current status of the objective (tables and maps showing locations of old forest and old interior forest areas).  Members of the public who want to provide input on high quality old forest should inform the respective licensee for documentation.  <b>PAG Consensus</b>
16.					Indicator 2 The amount of interior old forest by NDU/merged BEC within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	0%	Ensure that large patches are designed to ensure that patch/landscape retains values that are required by species that are dependent on that patch.  <b>PAG Consensus</b>  <u>Comment Suggestion from Dave King</u> - Ensure large patches are designed to retain values required by species dependent on large patches
17.					Indicator 3 The young patch size distribution by NDU within the DFA.	Targets set as per the "Landscape Biodiversity Objectives for the PG TSA"	±15%	<b>PAG Recommendation:</b> In the Wet Trench and Wet Valley NDU's limit 60% of patch sizes to range of 101 to 500 ha size category. Licensees to refer to regional ecologist for further input.  <b>PAG Consensus</b>  <u>Comment Suggestion from Dave King</u> <i>... of patch sizes 101- 500 ha.</i>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
18.					Indicator 19 Percent of areas planted consistent with operational plans.	100%	-5%	Operational plans identify ecologically suitable species.  <b>PAG Consensus</b>
19.					Indicator 6 Trend towards the percentage of area of patches in 101-500ha range within the Wet Trench and Wet Mountain of the young patch size distribution class 101-1000ha.	75%	-5%	Wet Trench includes Valley and Mountain.  <b>PAG Consensus</b>  <u>Comment Suggestion from Dave King</u> Refer to 1.1.A.a.iii (Young Patch size distribution)
20.		2.2 Forest Ecosystem Productivity	A. Productive Ecosystems	a. Maintain ecosystem conditions that are capable of supporting naturally occurring species.	Indicator 8 The percentage of forest operations consistent with approved Caribou UWR, Mule Deer UWR, Species at Risk Notice/Orders and Riparian Reserve requirements as identified in operational plans.	100% Annually	0%	To be reviewed upon government direction regarding species at risk  <b>PAG Consensus</b>
21.					Indicator 4 The amount of landscape-level biodiversity reserves within the DFA.	Area set aside to maintain natural forest conditions across the DFA as per the latest PG TSR	-1%	Refers to OGMA's, and areas not managed by MOF (parks, recreation areas, new protected areas, Herrick Old Growth Reserve). Is intended to remain constant over time. – PAG consensus to change  224,879.57 ha – Recreation, Parks, 4,480.59 ha – Herrick Old Growth Reserve 123,577.00 ha – OGMA's (Dome, Slim & Humbug) <u>44,908.56 ha – New Protected Areas</u> 397845.72 ha – Total  Show total area of DFA, PG Forest District, and Forest Harvesting Land base.  <b>PAG Consensus</b>
22.	3.0 Conservation of Soil and Water Resources	3.1 Soil Quality and Quantity	A. Soil Conservation	a. The productive capacity of forest soils within the Timber Harvesting Land Base (THLB) is sustained	Indicator 20 The percentage of forest operations consistent with soil conservation standards as identified in operational plans.	100% Annually	0%	Consistent with Forest Stewardship Plan (FSP).  <b>PAG Consensus</b>



Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
23.					Indicator 21 The percentage of cutblock area occupied by total permanent access structures.	≤5% Averaged Annually	+1%	Show percent of area in permanent access structures in cutblocks.  Includes Road Permit access adjacent to the cutblock.  Report out the cumulative percent of permanent access structures in the THLB annually.  <b>PAG Consensus</b>
24.					Indicator 22 The percentage of forest operations consistent with terrain management requirements as identified in operational plans.	100% Annually	0%	<b>PAG Consensus</b>
25.					Indicator 23 The number of “legally” reportable spills.	0 Annually	≤ 3 Annually	Variance reduced from 5 to 3, due to the reduction in the number of licensees in the SFMP. January 12, 2010 <b>PAG Consensus</b>
26.		3.2 Water Quality and Quantity	A. Water Conservation	a. Maintain water quality and water quantity in the Defined Forest Area (DFA)	Indicator 24 The percentage of forest operations consistent with riparian management requirements as identified in operational plans.	100% Annually	0%	Consistent with Forest Stewardship Plan (FSP).  <b>PAG Consensus</b>
27.					Indicator 25 The percentage of stream crossings that are installed or removed consistent with erosion control plans or procedures.	100% Annually	- 5%	Applies to all stream crossings. Qualified professional will assess when an erosion and sediment control plan is required. <b>PAG Consensus</b>
28.					Indicator 26 The percentage of unnatural known sediment occurrences where mitigating actions were taken.	100% Annually	- 5%	<b>PAG Consensus</b>
29.					Indicator 27 The percentage of new stream crossings that maintain natural stream flow.	100% Annually	0%	This indicator is to ensure the proper size structure does not constrict water flow.  <b>PAG Consensus</b>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
30.					Indicator 28 Percent of net area regenerated within 3-years after the commencement of harvesting	100% Annually	-10%	To address reforestation / forest continuity. This is intended to measure regeneration performance 3 years from the commencement of harvesting.  Will not include any Bark Beetle Regulation (BBR) blocks.  PAG is concerned about the Small Scale Salvage harvest impact on this indicator.  <b>PAG Consensus - January 18, 2007</b>
31.					Indicator 56 The percent of active watersheds with PFI greater than the minimum threshold that have had a watershed risk evaluation complete.	100%	-10%	In general watersheds with PFI <= 30 are considered low risk. Once above 30 then an evaluation of the watershed condition must take place to see if a hydrologist or other professional must be consulted. Evaluation can be complete by planning foresters. Some licensees have minimum thresholds established by professional hydrologists already.  PAG would like to review process in future.  <b>PAG Consensus</b>
32.					Indicator 57 The percent of active high risk watersheds that are assessed by a qualified professional.	100%	0%	Active watersheds are watersheds that have current or proposed harvesting.  <b>PAG Consensus</b>
33.					Indicator 58 Percent of active operations within high risk watersheds that are consistent with recommendations of Hydrologic assessments.	100%	0%	<b>PAG Consensus</b>
34.	4.0 Forest Ecosystem Contributions to Global Ecological Cycles	4.1 Carbon Uptake and Storage	A. Uptake and storage of carbon in forest ecosystems	a. Facilitate carbon uptake and storage within harvested areas	Indicator 28 Percent of net area regenerated within 3-years after the commencement of harvesting	100%	-10%	To address reforestation / forest continuity. This is intended to measure regeneration performance 3 years from the commencement of harvesting.  Will not include any Bark Beetle Regulation (BBR) blocks.  PAG is concerned about the Small Scale Salvage harvest impact on this indicator.  <b>PAG Consensus - January 18, 2007</b>
35.					Indicator 30 Percent of cut block area that meets Free Growing requirements as identified in site plans (SP).	100%	0%	<b>PAG Consensus</b>

BLACK TEXT = Consensus or general agreement

RED TEXT = Proposed new indicator

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
36.					Indicator 31 Areas with stand damaging agents will be prioritized for treatment.	100% Annually	-10%	Treatment may include no action.  <b>PAG Consensus</b>
37.		4.2 Forest Land Conversion	A. Forest Land	a. Minimize the conversion of forest land to non-forest land	Indicator 21 The percentage of cutblock area occupied by total permanent access structures.	≤5% Averaged Annually	+1%	Show percent of area in permanent access structures in cutblocks.  Includes Road Permit access adjacent to the cutblock.  Report out the cumulative percent of permanent access structures in the THLB annually.  <b>PAG Consensus</b>
38.					Indicator 32 The total percent of forested land within the Timber Harvesting Landbase that is converted to non-forested land.	≤ 4%	+ 0.5%	Cumulative % measured annually Number will either grow each year as more roads/landings are constructed or reduce each year as areas are rehabilitated.  Non-forested land includes unsuccessfully regenerated areas (not meeting regeneration targets). This includes roads, landings, gravel pits, pipelines and any other conversions from the timber harvesting land base (THLB) not accounted for in the THLB.  Report out in % and hectares.  Show amount of permanent access structures constructed during reporting year to the annual report.  Example calculation Road widths FSR=25Meters, Road permit= 15M, On block= 10 M, Non-status= 13 meters If Road lengths are FSR= 200 km, RP=300 km, On block = 400km, non status= 500 km and if THLB = 50,000 ha. Then % roads is (200000 X 25 + 300000 X 15 + 400000 X 10 + 500000 X 13) / 10,000= 2000 ha. Road % is 2,000 / 50,000 = 4.0%  <b>PAG Consensus</b>
39.	5.0 Multiple Benefits to Society	5.1 Timber and Non-Timber Benefits	A. Short and Long term benefits	a. Maintaining a flow of timber benefits	Indicator 33 The cut level volumes compared to the apportionment across the Timber Supply Area (TSA).	≤100% (Over each 5 year cut control period)	+10	Legal requirement.  These will be measured over a 5-year period. There is no minimum target. An upper variance of 10% is allowed (All major licensees and BCTS included).  <b>PAG Consensus</b>

BLACK TEXT = Consensus or general agreement

RED TEXT = Proposed new indicator

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
40.					Indicator 28 Percent of net area regenerated within 3-years after the commencement of harvesting	100% Annually	-10%	To address reforestation / forest continuity. This is intended to measure regeneration performance 3 years from the commencement of harvesting.  Will not include any Bark Beetle Regulation (BBR) blocks.  PAG is concerned about the Small Scale Salvage harvest impact on this indicator.  <b>PAG Consensus - January 18, 2007</b>
41.					Indicator 31 Areas with stand damaging agents will be prioritized for treatment.	100% Annually	-10%	Treatment may include no action.  <b>PAG Consensus</b>
42.					Indicator 34 Number of hectares (area) damaged by accidental forestry related industrial fires.	<60 ha Annually	5 ha	LSC will report to the PAG on the number of accidental forestry related industrial fires and size annually.  Target reduced from 100 ha to 60 ha, due to the reduction in the number of licensees in the SFMP. January 12, 2010  <b>PAG Consensus</b>
43.				b. Maintaining a flow of non-timber benefits	Indicator 35 The percentage of forest operations consistent with visual, cultural heritage, range, riparian, recreation and lakeshore requirements as identified in operational plans.	100% Annually	0%	Notify all range tenure holders of all known forest development activities. (Strategy a) in FSP include "and range tenure holders").  Notify commercial recreation tenure holders of forest development activities.  Intent to protect non-timber values in riparian areas and lakeshore management areas (i.e., wildlife habitat, wetlands, and fisheries).  <b>PAG Consensus</b>
44.					Indicator 36 The number of first order wood products produced from trees harvested from the DFA.	≥ 12 types of products (Annually)	-3	Example of first order wood products; trees to lumber, trees to veneer, trees to chips, trees to guitars, etc. Doesn't include trees to logs to lumber to houses.  First order products includes raw logs, lumber, custom cut lumber, remanufactured lumber, pulp chips, OSB chips, hog fuel, plywood veneer, house logs, poles, railways ties, wood shavings (note, this is a draft list only). Report out on unit volume of all first order products produced each year and report out on where these products are being sold in order to ensure that the indicator addresses socio-economic criterion.  <b>PAG Consensus</b>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
45.					Indicator 37 The percentage of DFA volume advertised for sale through open competitive bid.	≥20% Annually	-5%	Report out annually on actual volume sold. If possible, report out on locations of first scale of volume sold.  <b>PAG Consensus</b>
46.					Indicator 38 The number of opportunities given to the public and stakeholders to express forestry related concerns and be involved in our planning processes.	≥15 Annually	-3	Examples: FSP, FSP amendments, letters to stakeholders, Pesticide Management Plan, PAG meetings, field tours, CNRC meetings, news letters etc.  Counted by each licensee and totalled by the DFA. Intended to address all forestry related public inquiries.  <b>PAG Consensus</b>
47.				c. Maintain opportunities to access non-timber benefits by ensuring that individuals and stakeholders who have expressed an identified interest in the planning area (e.g. guides, trappers, recreationists, water licensees, mining tenure holders etc.) are specifically communicated with, during forest planning	Indicator 39 Annually provide a viewing of BCTS and Licensee current access plans, general forest planning and operational plans, and Sustainable Forest Management Plans in of the DFA.	On or before October 1	+1 month	Intent is to provide an opportunity for the public to view and provide input into Licensee and BCTS access plans.  <b>PAG Consensus</b>  <i>Expanding this indicator to include not only access plans, but also operational activities and SFM plans may help to increase the general public and PAG members' awareness and understanding of the forest planning and management process that is integral to access management.</i>  <b>PAG Consensus</b>
48.					Indicator 40 Percentage of timely responses to written public enquiries.	100% Annually	-5%	Timely response is to be made within 30 days of written inquiry.  <b>PAG Consensus</b>  <i>Licensees will track and report out on the number of access management inquiries vs. forest planning and operational activity inquiries in order to monitor and address the level of access management concerns over time.</i>  <b>PAG Consensus</b>

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
49.					Indicator 41 Percentage of communication strategy requirements met.	100% Annually	-5%	<p>Licenses and BCTS maintain list of interested parties and notify people on list when operations/developments are to occur.</p> <p>Communication strategy must be mutually agreed upon by private landowner and licensee / BCTS.</p> <p>Forest health concerns around and adjacent to private land will be discussed during communication with private landowners.</p> <p><b>PAG Agreement (three objections)</b></p> <p>Licenses will solicit and invite non timbered tenure holders (without a current and established communication strategy) to establish communication strategies with the companies. This invitation will occur every 2 years and will provide for an increased effort to communicate and address access and other issues with resource users.</p> <p><b>PAG Agreement (three objections)</b></p>
50.		5.2 Community and Sustainability	A. Community well-being	a. Support opportunities for maintaining a resilient and stable community	Indicator 42 Percent of money spent on forest operations and management on the DFA provided from North Central Interior Suppliers\Contractors	75%	-5%	<p>North Central Interior = From McBride to Smithers and 100 Mile House to Mackenzie.</p> <p>Target applies to all licenses but will be reported out by licensee</p> <p><b>PAG Consensus</b></p>
51.					Indicator 37 The percentage of DFA volume advertised for sale through open competitive bid.	≥20% Annually	-5%	<p>Report out annually on actual volume sold. If possible, report out on locations of first scale of volume sold.</p> <p><b>PAG Consensus</b></p>
52.		5.3 Fair Distribution of Benefits and Costs	A. Fair Distribution of Benefits and Costs	a. Maintain the Distribution of Benefits and Costs	Indicator 43 Taxes paid on time to Governments	100%	0%	<p>This includes all Federal, Provincial and Local Government taxes.</p> <p><b>PAG Consensus</b></p>
53.					Indicator 44 Stumpage paid on time to Government	100%	0%	<b>PAG Consensus</b>
54.					Indicator 45 Number of loss time accidents (days) in Woodland Operations.	0	0	<p>Licenses and BCTS will report out on all lost time forestry accidents in the DFA</p> <p>After data are collected for one year, modify the indicator to show improvement.</p> <p><b>PAG Consensus</b></p>

BLACK TEXT = Consensus or general agreement

RED TEXT = Proposed new indicator

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
55.	6.0 Accepting Society's Responsibility for Sustainable Development	6.1 Aboriginal and Treaty Rights	A. Aboriginal and Treaty Rights	a. Recognition and respect for Aboriginal and treaty rights	Indicator 46 No unauthorized forestry activities within legally recognized (Province and Federal) treaty areas.	100%	0%	<i>PAG Consensus</i>
56.					Indicator 47 All FSP and associated major amendments are referred to affected aboriginal bands.	100%	0%	Major amendments require government approval.  <i>PAG Consensus</i>
57.					Indicator 48 Pesticide Management Plans and associated major amendments are referred to affected aboriginal bands.	100%	0%	<i>PAG Consensus</i>
58.		6.2 Respect for Aboriginal Forest Values, Knowledge, and Uses	A. Aboriginal Forest Values, Knowledge, and Uses	a. Incorporation of Aboriginal Forest Values, Knowledge, and Uses in Forest Management	Indicator 49 Percentage of forest operations consistent with cultural heritage requirements as identified in operational plans.	100% Annually	0%	<i>PAG Consensus</i>
59.					Indicator 50 Percentage of forest operations consistent with the Heritage Conservation Act.	100%	0%	<i>PAG Consensus</i>
60.		6.3 Public Participation	A. Public participation in decision making processes	a. A clear process for a wide public participation in SFM	Indicator 51 Percentage of PAG satisfaction with public participation process.	100%	-20%	Refer to detailed survey cards from PAG Meetings.  <i>PAG Consensus</i>
61.					Indicator 52 PAG Terms of Reference reviewed per year.	≥ 1	0	Part of the review would be to ensure a diverse range of interests can participate in the process.  <i>PAG Consensus</i>
62.					Indicator 53 Number of PAG meetings per year.	≥ 3	-1	<i>PAG Consensus</i>
63.					Indicator 54 Percentage of the public sectors as defined in the ToR invited to participate in the PAG process.	100% Annually	0%	Report out on attendance of public sectors.  <i>PAG Consensus</i>

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RED TEXT = Proposed new indicator

Row No.	CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments
64.		6.4 Information for Decision Making	A. Informed, fair and inclusive decision making	a. Adaptive forest management that is responsive to research, experience and public input	Indicator 55 Percentage of PAG satisfaction with amount and timing of information presented for informed decision-making.	100%	-20%	Refer to detailed survey cards. Includes minutes, agendas, background information, and sources of additional information (amount, quality and content of the information).  <i>PAG Consensus</i>



## Appendix 5

### **SPECIES AT RISK IN THE PRINCE GEORGE DEFINED FOREST AREA (Updated February 2009)**



## Appendix 5

### SPECIES AT RISK IN THE PRINCE GEORGE DFA (as of February 2009)

Tables 7-1 through to 7-7 indicate the Species at Risk Flora, Fauna and Plant Communities in the PG DFA, as per a 2009 report by Dan Bernier of Timberline Natural Resources Group Ltd. and Gilbert Proulx of Alpha Wildlife Research & Management Ltd. This report, entitled "Identification and Management of Species & Plant Communities at Risk: Prince George Timber Supply Area", is used by the licensees to identify management strategies for these Species and Plant Communities at Risk, and is available upon request through any of the licensee representatives.

**Table 7-1. Species at Risk Invertebrates within the Prince George DFA**

Scientific Name	English Name
<i>Acroloxus coloradensis</i>	Rocky Mountain Capshell (snail)
<i>Colias meadii</i>	Mead's Sulphur (butterfly)
<i>Colias pelidne</i>	Pelidne Sulphur (butterfly)
<i>Enallagma hageni</i>	Hagen's Bluet (damselfly)
<i>Epitheca canis</i>	Beaverpond Baskettail (dragonfly)
<i>Fossaria parva</i>	Pygmy Fossaria (gastropod)
<i>Oeneis jutta chermocki</i>	Jutta Arctic (butterfly)
<i>Polites themistocles themistocles</i>	Tawny-Edged Skipper (butterfly)
<i>Somatochlora brevicincta</i>	Quebec Emerald (dragonfly)
<i>Somatochlora forcipata</i>	Forcipate Emerald (dragonfly)
<i>Speyeria mormonia eurynome</i>	Mormon Fritillary (butterfly)

**Table 7-2. Fish at Risk in the Prince George DFA**

<b>Scientific Name</b>	<b>English Name</b>
<i>Acipenser transmontanus</i>	White Sturgeon (Nechako River population)
<i>Acipenser transmontanus</i>	White Sturgeon (Upper Fraser River population)
<i>Acipenser transmontanus</i>	White Sturgeon (Middle Fraser River population)
<i>Salvelinus confluentus</i>	Bull Trout
<i>Salvelinus malma</i>	Dolly Varden
<i>Thymallus arcticus</i>	Arctic Grayling

**Table 7-3. Amphibians at Risk in the Prince George DFA**

<b>Scientific Name</b>	<b>English Name</b>
<i>Bufo boreas</i>	Western Toad

**Table 7-4. Birds at Risk within the Prince George DFA**

<b>Scientific Name</b>	<b>English Name</b>
<i>Ardea Herodias herodias</i>	Great Blue Heron
<i>Asio flammeus</i>	Short-eared Owl
<i>Botaurus lentiginosus</i>	American Bittern
<i>Buteo lagopus</i>	Rough-legged Hawk
<i>Buteo platypterus</i>	Broad-winged Hawk
<i>Chordeiles minor</i>	Common Nighthawk
<i>Contopus cooperi</i>	Olive-sided Flycatcher
<i>Dolichonyx oryzivorus</i>	Bobolink
<i>Falco peregrinus anatum</i>	Peregrine Falcon
<i>Grus canadensis</i>	Sandhill Crane
<i>Hirundo rustica</i>	Barn Swallow
<i>Numenius americanus</i>	Long-billed Curlew
<i>Tympanuchus phasianellus</i> <i>columbianus</i>	Sharp-tailed Grouse

**Table 7-5. Mammals at Risk within the Prince George DFA**

<b>Scientific Name</b>	<b>English Name</b>
<i>Gulo gulo</i>	Wolverine
<i>Martes pennanti</i>	Fisher
<i>Myotis septentrionalis</i>	Northern Myotis
<i>Ovis canadensis</i>	Bighorn Sheep
<i>Rangifer tarandus</i>	Boreal Caribou (southern populations)
<i>Rangifer tarandus</i>	Caribou (northern mountain populations)
<i>Ursus arctos</i>	Grizzly Bear

**Table 7-6. Vascular Plants at Risk in the Prince George DFA**

English Name	Scientific Name	Current CDC Rank	BGC Distribution
American sweet-flag	<i>Acorus americanus</i>	Blue S2S3	SBSdk, SBSmh, SBSwk
Arctic rush	<i>Juncus arcticus</i> spp. <i>alscanus</i>	Blue S2S3	ESSFwk, SBSun
Austrian draba	<i>Draba fladnizensis</i>	Blue S2S3	BAFA, SBSmk, SWBun
Bald sedge	<i>Carex tonsa</i> var. <i>tonsa</i>	Blue S2S3	SBSdw, SBSmk
Bog adder's-mouth orchid	<i>Malaxis paludosa</i>	Blue S2S3	SBSdw, SBSwk
Bog rush	<i>Juncus stygius</i>	Blue S2S3	SBSdw, SBSmh, SBSmk, SBSvk, SBSwk
Crested wood fern	<i>Dryopteris cristata</i>	Blue S2S3	SBSmk, ICHvk, ICHwk
Cryptic paw	<i>Nephroma occultum</i>	Blue S2S3	ICH
Davis' locoweed	<i>Oxytropis jordalii</i> spp. <i>davisii</i>	Blue S3	BAFA, SBSmh
Fernald's false manna	<i>Torreyochloa pallida</i>	Red S1	ICHwk, SBSdk
Meadow arnica	<i>Arnica chamissonis</i> spp. <i>incana</i>	Blue S2S3	ICHvk, SBSmc
Northern bog bedstraw	<i>Gallium labradoricum</i>	Blue S2S3	ICHwk, SBSmk, SBSwk
Plains butterweed	<i>Senecio plattensis</i>	Blue S2S3	SBSdk, SBSdw, SBSmh
Pointed broom sedge	<i>Carex scoparia</i>	Blue S2S3	ICHwk, SBSvk
Pygmy waterlily	<i>Numphaea tetragonal</i>	Blue S2S3	SBSmk, SBSwk
Riverbank anemone	<i>Anemone virginiana</i> spp. <i>cylindroidea</i>	Red S1	SBSmh
Small-flowered lousewort	<i>Pedicularis parviflora</i> ssp. <i>parviflora</i>	Blue S3	ICHwk, SBSmh, SBSmk, SBSwk
Sprengel's sedge	<i>Carex sprengelii</i>	Red S1	SBSmh
Swollen beaked sedge	<i>Carex rostrata</i>	Blue S2S3	SBSdw
Tender sedge	<i>carex tenera</i>	Blue S2S3	ESSFmv, ICHwk, SBSmh
Water bur-reed	<i>Sparganium fluctuans</i>	Blue S2S3	SBSdw, SBSmk
Water marigold	<i>Megalodonta beckii</i> var. <i>beckii</i>	Blue S3	SBSmk
Western dogbane	<i>Apocynum floribundum</i>	Blue S2S3	SBSwk
White adder's-	<i>Malaxis brachypoda</i>	Blue S2S3	SBSvk

English Name	Scientific Name	Current CDC Rank	BGC Distribution
mouth orchid			
White wintergreen	<i>Pyrola elliptica</i>	Blue S2S3	SBSvk
Whitebark pine	<i>Pinus albicaulis</i>	Blue S3?	ESSFmc, ESSFmv, ESSFwc, ESSFwk, ICHvk, ICHwk, SBSmc, SBSvk, SBSwk

**Table 7-7. Plant Communities at Risk in the Prince George DFA**

Common Name	Rank Global, Prov, and BC	Ecosystem Group
(balsam poplar/ black cottonwood) – spruces/ red-osier dogwood	GNR, S2, Red	Forest – Riparian
awned sedge	G3G5, S2, Red	Wetland – Herbaceous
Baltic rush - field sedge	G3G4, S3, Blue	Wetland – Herbaceous
Bebb's willow / blue joint reedgrass	G3, S3, Blue	Wetland – Shrub
black cottonwood – subalpine fir / devil's club	GNR, SNR, Blue	Forest – Riparian
black spruce - lodgepole pine / kalmias / peat-mosses	GNR, S3, Blue	Forest -- Wetland
black spruce / buckbean / peat mosses	GNR, S3, Blue	Forest -- Wetland
black spruce / creeping snowberry / peat mosses	GNR, S2S3, Blue	Forest -- Wetland
black spruce / skunk cabbage / peat mosses	GNR, S2S3, Blue	Forest -- Wetland
buckbean - seaside arrow-grass	G3, S3, Blue	Wetland – Herbaceous
buckbean - slender sedge	G3, S3, Blue	Wetland – Herbaceous
common spike-rush	GNR, S3, Blue	Wetland – Herbaceous
Douglas-fir - hybrid white spruce / electrified cat's-tail moss	GNR, S3, Blue	Forest
Douglas-fir - hybrid white spruce / falsebox	GNR, S3, Blue	Forest
Douglas-fir - hybrid white spruce / knight's plume	G3, S3, Blue	Forest
Douglas-fir - hybrid white spruce / thimbleberry	GNR, S3, Blue	Forest
Douglas-fir - lodgepole pine / clad lichens	GNR, S3, Blue	Forest
Douglas-fir - subalpine fir / black huckleberry	GNR, S3, Blue	Forest
Douglas-fir / Douglas maple / step moss	G2, S2, Red	Forest
Drummond's willow / bluejoint reedgrass	G3, S2S3, Blue	Non-forested Floodplain
few-flowered spike-rush / hook-mosses	GNR, S2, Red	Wetland – Herbaceous
glaucous bluegrass	GNR, S3, Blue	Non-forested High Elevation Community
hard-stemmed bulrush	G5, S3, Blue	Wetland – Herbaceous

<b>Common Name</b>	<b>Rank Global, Prov, and BC</b>	<b>Ecosystem Group</b>
Hudson Bay clubrush / rusty hook-moss	G2, S2, Red	Wetland – Herbaceous
hybrid white spruce - paper birch / devil's club	GNR, S3, Blue	Forest – Riparian
hybrid white spruce / foam lichens	G1, S1, Red	Forest
hybrid white spruce / hardhack	GNR, S2S3, Blue	Forest
hybrid white spruce / hardhack - prickly rose	GNR, S3, Blue	Forest
hybrid white spruce / hardhack / oak fern	GNR, S3, Blue	Forest
hybrid white spruce / horsetails - western meadowrue	GNR, S3, Blue	Forest – Riparian
hybrid white spruce / ostrich fern	GNR, S2, Red	Forest
hybrid white spruce / pinegrass / step moss	GNR, S3, Blue	Forest
lodgepole pine - black spruce / red-stemmed feathermoss	G3, S3, Blue	Forest
lodgepole pine - clad lichens - juniper haircap moss	GNR, S2S3, Blue	Forest
lodgepole pine / black huckleberry – velvet-leaved blueberry	GNR, S3, Blue	Forest
lodgepole pine / black huckleberry / reindeer lichens	G3, S3, Blue	Forest
lodgepole pine / few-flowered sedge / peat-mosses	G2G3, S2S3, Blue	Forest – Wetland
lodgepole pine / Kruckeberg's holly fern - Indian's-dream	G1, S1, Red	Forest
lodgepole pine / water sedge / peat-mosses	G3, S3, Blue	Forest – Wetland
MacCalla's willow / beaked sedge	G3, S3, Blue	Wetland – Shrub
mountain alder / common horsetail	G3, S3, Blue	Non-forested Floodplain
mountain alder / red-osier dogwood / lady fern	G3G4, S3, Blue	Non-forested Floodplain
narrow-leaved cotton-grass - shore sedge	G3, S3, Blue	Wetland – Herbaceous
northern mannagrass	G4, S3, Blue	Wetland – Herbaceous
Nuttall's alkaligrass - foxtail barley	G3?, S2, Red	Wetland – Herbaceous
Pacific willow / red-osier dogwood / horsetails	G2, S2, Red	Non-forested Floodplain
Sandberg's bluegrass – slender wheatgrass	GNR, S1, Red	Grassland - Herbaceous
saskatoon / slender wheatgrass	G2, S2, Red	Grassland - Shrub
scheuchzeria / peat-mosses	G3, S3, Blue	Wetland – Herbaceous
scrub birch / sedges / peat-mosses	GNR, S2, Red	Wetland – Shrub
seaside arrow-grass	GNR, S2, Red	Wetland – Herbaceous
shore sedge - buckbean / hook-mosses	G3, S3, Blue	Wetland – Herbaceous
shore sedge - buckbean / peat-mosses	G3, S3, Blue	Wetland – Herbaceous
Sitka willow – Pacific willow / skunk cabbage	G2, S2, Red	Wetland – Shrub
Sitka willow / Sitka sedge	G3, S3, Blue	Wetland – Shrub
slender sedge / common hook-moss	G3, S3, Blue	Wetland – Herbaceous
spruces - subalpine fir / skunk cabbage	G3, S3, Blue	Forest – Wetland
subalpine fir / alders / horsetails	GNR, S3, Blue	Forest – Wetland



<b>Common Name</b>	<b>Rank Global, Prov, and BC</b>	<b>Ecosystem Group</b>
swamp horsetail - beaked sedge	G4, S3, Blue	Wetland – Herbaceous
timber oatgrass / reindeer lichen	G1, S1, Red	Non-forested High Elevation Community
tufted clubrush / golden star-moss	G2G3, S2S3, Blue	Wetland – Herbaceous
tufted hairgrass	G4, S3, Blue	Herbaceous
western hemlock - western redcedar / clad lichens	GNR, S3, Blue	Forest
western hemlock / false azalea / clad lichens	GNR, S2, Red	Forest
western hemlock / wood horsetail / peat-mosses	GNR, S3, Blue	Forest – Wetland
western redcedar / devil's club / ostrich fern	GNR, S1S2, Red	Forest – Riparian
western redcedar / falsebox	GNR, S3, Blue	Forest
western redcedar / prince's pine / electrified cat's-tail moss	GNR, S3, Blue	Forest



**Appendix 6**

**ORDER- CATEGORY OF SPECIES AT RISK & WILDLIFE  
HABITAT AREAS**





## **ORDER – CATEGORY OF SPECIES AT RISK**

The following order applies to the province of British Columbia and takes effect on the 6<sup>th</sup> day of May, 2004.

This order is given under the authority of section 11 (1) of the *Government Actions Regulation* (B.C. Reg. 17/04).

The Minister of Water, Land and Air Protection has determined that the list of species of wildlife in schedule 1 are a category of species at risk that may be affected by forest or range management on Crown land and require protection in addition to that provided by other mechanisms.

### **Schedule 1**

#### **English Name**

#### ***Scientific Name***

##### **Fish**

Vananda Lake Limnetic Stickleback  
Vananda Lake Benthic Stickleback

*Gasterosteus sp.* 16  
*Gasterosteus sp.* 17

##### **Amphibians**

Great Basin Spadefoot  
Tiger Salamander  
Red-legged Frog  
Rocky Mountain Tailed Frog  
Northern Leopard Frog  
Coastal Giant Salamander  
Coastal Tailed Frog  
Coeur d'Alene Salamander

*Spea intermontana*  
*Ambystoma tigrinum*  
*Rana aurora*  
*Ascaphus montanus*  
*Rana pipiens*  
*Dicamptodon tenebrosus*  
*Ascaphus truei*  
*Plethodon idahoensis*

##### **Reptiles**

“Great Basin” Gopher Snake

*Pituophis catenifer deserticola*

##### **Birds**

Ancient Murrelet  
Burrowing Owl

*Synthliboramphus antiquus*  
*Athene cunicularia*

**ORDER – CATEGORY OF SPECIES AT RISK AND  
LIST OF IDENTIFIED WILDLIFE**

Flammulated Owl	<i>Otus flammeolus idahoensis</i>
Great Blue Heron	<i>Ardea herodias fannini</i>
Lewis's Woodpecker	<i>Melanerpes lewis</i>
Long-billed Curlew	<i>Numenius americanus</i>
Marbled Murrelet	<i>Brachyramphus marmoratus</i>
“Queen Charlotte” Goshawk	<i>Accipiter gentilis laingi</i>
Sage Thrasher	<i>Oreoscoptes montanus</i>
Short-eared Owl	<i>Asio flammeus</i>
Spotted Owl	<i>Strix occidentalis</i>
“Interior” Western Screech-Owl	<i>Otus kennicottii macfarlanei</i>
White-headed Woodpecker	<i>Picoides albolarvatus</i>
Yellow-breasted Chat	<i>Icteria virens</i>

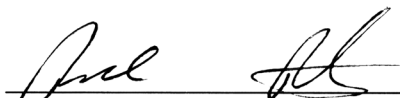
**Mammals**

Keen's Long-eared Myotis	<i>Myotis keenii</i>
Pacific Water Shrew	<i>Sorex bendirii</i>
Fringed Myotis	<i>Myotis thysanodes</i>
Badger	<i>Taxidea taxus jeffersonii</i>
Vancouver Island Marmot	<i>Marmota vancouverensis</i>
Caribou (3 populations - mountain, boreal and northern)	<i>Rangifer tarandus caribou</i>
Spotted Bat	<i>Euderma maculatum</i>
Grizzly Bear	<i>Ursus arctos</i>
Wolverine (2 subspecies)	<i>Gulo gulo luscus</i> <i>Gulo gulo vancouverensis</i>

**Plants**

Scouler's Corydalis	<i>Corydalis scouleri</i>
Tall Bugbane	<i>Cimicifuga elata</i>

Note: For a list of species distribution by Forest District please refer to Appendix 13 of the *Accounts and Measures for Managing Identified Wildlife*.

  
Signed this 3 day of May, 2004  
Bill Barisoff, Minister  
Ministry of Water, Land and Air Protection

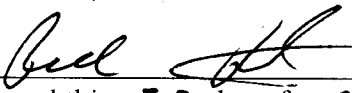


**ORDER – CATEGORY OF SPECIES AT RISK**

This order is given under the authority of section 13 (1) of the *Government Actions Regulation* (B.C. Reg. 582/04).

The Minister of Water, Land and Air Protection orders that:

1. “Queen Charlotte” Northern Saw-whet Owl (*Aegolius acadicus brooksi*) is appended to the category of species at risk established on May 3, 2004 that may be affected by forest or range management on Crown land and require protection in addition to that provided by other mechanisms.

  
Signed this 30 day of May, 2005  
Minister  
Ministry of Water, Land and Air Protection



## Order – Category of Species at Risk

This order is given under the authority of section 13 (1) of the *Government Actions Regulation* (B.C. Reg. 582/04).

The Minister of Environment orders that:

1. the species outlined in Schedule 1 are appended to the category of species at risk established on May 3, 2004 that may be affected by forest or range management on Crown land and require protection in addition to that provided by other mechanisms.

### Schedule 1

<b>English Name</b>	<b>Scientific Name</b>
<b>Birds</b>	
American White Pelican	<i>Pelecanus erythrorhynchos</i>
Bay-breasted Warbler	<i>Dendroica castanea</i>
Black-throated Green Warbler	<i>Dendroica virens</i>
Brewer's Sparrow, <i>breweri</i> subspecies	<i>Spizella breweri breweri</i>
Cape May Warbler	<i>Dendroica tigrina</i>
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>
Connecticut Warbler	<i>Oporornis agilis</i>
Great Blue Heron, <i>herodias</i> subspecies	<i>Ardea herodias herodias</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Hairy Woodpecker, <i>picoideus</i> subspecies	<i>Picoides villosus picoideus</i>
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>
Northern Pygmy-owl, <i>swarthi</i> subspecies	<i>Glaucidium gnoma swarthi</i>
Prairie Falcon	<i>Falco mexicanus</i>
Sandhill Crane	<i>Grus canadensis</i>



## Order – Category of Species at Risk

Sharp-tailed Grouse, <i>columbianus</i> subspecies	<i>Tympanuchus phasianellus columbianus</i>
White-tailed Ptarmigan, <i>saxatilis</i> subspecies	<i>Lagopus leucurus saxatilis</i>
Williamson's Sapsucker, <i>nataliae</i> subspecies	<i>Sphyrapicus thyroideus nataliae</i>
Williamson's Sapsucker, <i>thyroideus</i> subspecies	<i>Sphyrapicus thyroideus thyroideus</i>
<b>Fish</b>	
Bull Trout	<i>Salvelinus confluentus</i>
Cutthroat Trout, <i>lewisi</i> subspecies	<i>Oncorhynchus clarki lewisi</i>
<b>Invertebrates</b>	
Gillett's Checkerspot	<i>Euphydryas gillettii</i>
Johnson's Haristreak	<i>Loranthomitoura johnsoni</i>
Quatsino Cave Amphipod	<i>Stygobromus quatsinensis</i>
Sonora Skipper	<i>Polites sonora</i>
Sooty Hairstreak	<i>Satyrium fuliginosum</i>
<b>Mammals</b>	
Bighorn Sheep	<i>Ovis canadensis</i>
Common Water Shrew	<i>Sorex palustris brooksi</i>
Fisher	<i>Martes pennanti</i>
<b>Plant Communities</b>	
Alkali Saltgrass Herbaceous Vegetation	<i>Distichlis spicata</i> var. <i>stricta</i> herbaceous vegetation
Antelope Brush / Bluebunch Wheatgrass	<i>Purshia tridentata</i> / <i>Pseudoroegneria spicata</i>
Antelope Brush / Needle-and-Thread Grass	<i>Purshia tridentata</i> / <i>Hesperostipa comata</i>
Douglas-Fir/Alaska Oniongrass	<i>Pseudotsuga menziesii</i> / <i>Melica subulata</i>
Douglas-Fir / Common Juniper / Cladonia	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> / <i>Cladonia</i>
Douglas-Fir / Dull Oregon Grape	<i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i>
Douglas-fir / Snowberry / Balsamroot	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> / <i>Balsamorhiza sagittata</i>

## Order – Category of Species at Risk

Hybrid White Spruce / Ostrich Fern	<i>Picea engelmannii x glauca / Matteuccia struthiopteris</i>
Ponderosa Pine / Bluebunch Wheatgrass - Silky Lupine	<i>Pinus ponderosa / Pseudoroegneria spicata – Lupinus sericeus</i>
Vasey's Big Sage / Pinegrass	<i>Artemisia tridentata ssp. vaseyana / Calamagrostis rubescens</i>
Water Birch - Red-Osier Dogwood	<i>Betula occidentalis - Cornus stolonifera</i>
Western Hemlock - Douglas-Fir / Electrified Cat's-Tail Moss	<i>Tsuga heterophylla - Pseudotsuga menziesii / Rhytidiadelphus triquetrus</i>
Western Redcedar - Douglas-fir / Vine maple	<i>Thuja plicata - Pseudotsuga menziesii / Acer circinatum</i>
Western Redcedar - Douglas-fir / Devil's Club	<i>Thuja plicata - Pseudotsuga menziesii / Oplopanax horridus</i>
Western Redcedar / Devil's Club / Ostrich Fern	<i>Thuja plicata / Oplopanax horridus / Matteuccia struthiopteris</i>
<b>Reptiles</b>	
Racer	<i>Coluber constrictor</i>
Western Rattlesnake	<i>Crotalus oreganus</i>



Signed this 5<sup>th</sup> day of JUNE, 2006  
Barry Penner, Minister  
Ministry of Environment



### **ORDER – Wildlife Habitat Area # 7-003**

This order is given under the authority of sections 9(2) and 10(1) of the *Government Actions Regulation* (B.C. Reg. 582/04).

The Deputy Minister of Environment orders that:

1. the wildlife habitat area shown in the map set out in the attached Schedule A (#7-003) and boundaries contained in the GIS file *twha\_bc* are established;
2. the wildlife habitat area in the attached Schedule A and boundaries contained in the GIS file *twha\_bc* are established for Mountain Caribou (*Rangifer tarandus*);
3. the general wildlife measures outlined in Schedule 1 are established for the wildlife habitat area in the attached Schedule A and boundaries contained in the GIS file *twha\_bc*;
4. where there is any discrepancy between the Wildlife Habitat Area boundary as shown in the attached Schedule A and the GIS file *twha\_bc*, the boundary as detailed in the GIS file will take precedent. The centre point of the line on the map denoting the wildlife habitat area is what establishes the boundary; and
5. pursuant to section 7(3) of the Forest Planning and Practices Regulation the person(s) required to prepare a forest stewardship plan are hereby exempted from the obligation to prepare results or strategies in relation to the objective set out in section 7(1) of the Forest Planning and Practices Regulation to the extent that wildlife habitat area 7-003 addresses the amount included for Mountain Caribou in the Notice for the Prince George Forest District.

#### Schedule 1 – General Wildlife Measures

##### *Access*

- Do not construct roads or trails within the WHA unless an exemption is approved by the Minister of Environment or delegate.

##### *Harvesting and Silviculture*

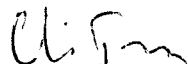
- Do not harvest within the WHA unless an exemption is approved by the Minister of Environment or delegate.

##### *Pesticides*

- Do not use pesticides unless an exemption is approved by the Minister of Environment or delegate.

##### *Recreation*

- Do not develop recreation sites or trails.

  
Signed this 1<sup>st</sup> day of Dec, 2005  
Chris Trumpy, Deputy Minister  
Ministry of Environment



## **Appendix 7**

### **NOTICE - SPECIES AT RISK**





**NOTICE – INDICATORS OF THE AMOUNT, DISTRIBUTION AND ATTRIBUTES OF  
WILDLIFE HABITAT REQUIRED FOR THE SURVIVAL OF SPECIES AT RISK IN  
THE PRINCE GEORGE FOREST DISTRICT**

This Notice is given under the authority of section 7(2) of the *Forest Planning and Practices Regulation* (B.C. Reg. 14/04) and 9(3) of the *Woodlot Licence Planning and Practices Regulation* (B.C. Reg. 21/04).

The following Notice includes indicators of the amount, distribution and attributes of wildlife habitat required for the survival of the species at risk outlined in Schedule 1.

Approved Wildlife Habitat Areas are not included in the indicators of amount, distribution and attributes for each of the species outlined in Schedule 1. As per section 7(3) of the *Forest Planning and Practices Regulation*, forest tenure holders are exempt from the obligation to specify a result or strategy in relation to the objective set out in section 7(1) of the *Forest Planning and Practices Regulation*, for approved Wildlife Habitat Areas.

This Notice applies to the Prince George Forest District.

Schedule 1

**1) Mountain Caribou Ecotype (*Rangifer tarandus caribou*)**

The following information is provided under consideration of direction for caribou management provided by the Prince George LRMP (January 1999). According to the LRMP, there is to be no commercial timber harvesting in areas of high suitability caribou habitat until proven management strategies are developed in areas of medium suitability caribou habitat.

***Amount:***

1. Must not exceed an impact to the mature timber harvesting landbase of 6,980 ha.

***Distribution:***

1. The amount of habitat referenced above must be distributed to provide areas of suitable habitat of the size, spatial distribution and connectivity identified in the species account for Mountain Caribou in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).
2. SAR habitat elements for mountain caribou are generally distributed in locations as described below:

<i>SAR Elements</i>	<i>BEC Unit</i>	<i>Size</i>	<i>Comments</i>
Calving Range	AT, ESSF	50-300ha	May be overlap spatially between calving and rutting ranges and late winter range
Rutting Range	At, ESSF	50-300ha	
Connectivity	All		Heights-of-land Ridgelines Cross valley movements
Mineral Lick	Any	50ha	None identified.

**Habitat Attributes:**

1. Use the species account for Mountain Caribou in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004) to identify suitable habitat structural stages, security, breeding and foraging habitats, and goals for the management of wildlife habitat areas.
2. SAR habitat for mountain caribou includes:
  - **Calving and Rutting Range** – high elevation alpine and open subalpine forest on gentle to moderate slopes.
  - **Mineral Licks** – Any dry or wet mineral lick used by caribou (Note: none have been made known in the Prince George FD).
  - **Connectivity** – heights-of-land, large contiguous patches of mature/old forest for cross valley movements, and open to densely forested ridgelines for elevation movements.

<i>SAR Habitat</i>	<i>Slope</i>	<i>Forest Cover</i>	<i>Stand Age</i>	<i>Elev</i>	<i>Other</i>
Calving Range	generally <35%	Subalpine forest	Na	>1100	Convex rather than concave topography Alpine, open subalpine forest
Rutting Range		Subalpine forest	>120	>1100	
Connectivity	0-80%	Mature/old forest	>120	all	Large contiguous patches of mature/old forest

**2) Northern Caribou Ecotype (*Rangifer tarandus caribou*)**

**Amount**

- Must not exceed an impact to the mature timber harvesting landbase of 1,000 ha.

**Distribution**

- Northern caribou herds distributed within the Southern Mountain National Ecological Area - map-based depiction in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).
- SAR Elements for northern caribou are generally distributed in locations as described below:

<i>SAR Elements</i>	<i>BEC Unit</i>	<i>Size</i>	<i>Comments</i>
Calving Range	At, ESSF	50-300ha	May overlap spatially with calving range, rutting range, connectivity



Rutting Range	At, ESSF	50-300ha	matrix, or ungulate winter range.
Connectivity Matrix	SBS	Matrix should be 2km wide and at least 5km long (1,000ha)	
Mineral Lick	Any	50ha	None identified.

**Habitat Attributes:**

- **Calving and Rutting Range** - Flat or convex shaped, vegetated alpine (i.e., not rock) sites with south or westerly aspects. Alternatively, arboreal lichen associated sites in mature to old, sub-alpine fir stands with moderate slopes.
- **Mineral Lick** – Any dry or wet mineral lick used by caribou (note: none have been made known in the Prince George FD).
- **Connectivity Matrix** – Low elevation, intermediate/mature forest cover following major rivers.
- **Anti-predation Matrix** – Areas adjacent winter ranges managed to discourage: 1) intensive activity by humans (100 m buffer) and 2) an abundance of moose and wolves (5 km buffer).

<i>SAR Element</i>	<i>Slope</i>	<i>Forest Cover</i>	<i>Stand Age</i>	<i>Elev m asl</i>	<i>Other</i>
Calving Range Rutting Range	<40%	At, Not rock	Na	Na	Convex rather than concave topography
		Ba overstory	>120	>1300	
Connectivity Matrix	<30%	Forested	>40 (if shrub dominated)	<1000	Buffer major rivers 1km each side
Anti-predation Matrix	Na	Forested	>40 (if shrub dominated)	Na	No linear corridors within 100 m of habitat Stand age conditions to be met within 5 km of habitat



**Appendix 8**

**PG SFMP PUBLIC ADVISORY GROUP**  
**MEETING EVALUATION FORM**



**PG SFMP Public Advisory Group  
January 12, 2010 Meeting Evaluation**

Please evaluate the PG SFMP Public Advisory Group process using the following scale of 1-5:

1=very poor, 2=poor, 3=average, 4=good, 5=very good

**Meetings and PAG process**

1. Was an agenda pre-published? \_\_\_\_\_
2. Were most members involved? \_\_\_\_\_
3. Were advisors prepared? \_\_\_\_\_
4. Were PAG Terms of Reference followed? \_\_\_\_\_
5. Were actions updated? \_\_\_\_\_
6. Was time allocated wisely? \_\_\_\_\_
7. Were decisions summarized? \_\_\_\_\_
8. Was focus on consensus decision making? \_\_\_\_\_
9. Was there a positive atmosphere? \_\_\_\_\_
10. Were you satisfied with the meeting? \_\_\_\_\_
11. Are you satisfied with the PAG process? \_\_\_\_\_
12. How timely was the information? \_\_\_\_\_
13. How satisfied are you with the Information provided? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Facilitator**

The facilitator:

1. strived for consensus decision-making? \_\_\_\_\_
2. kept the meeting focused? \_\_\_\_\_
3. kept the meeting moving? \_\_\_\_\_
4. remained neutral on content issues? \_\_\_\_\_
5. encouraged open communication? \_\_\_\_\_
6. tolerated and smoothed conflict? \_\_\_\_\_
7. obtained technical expertise (when needed)? \_\_\_\_\_
8. captured documentation? \_\_\_\_\_
9. actively listened? \_\_\_\_\_
10. came prepared and organized? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Meetings Logistics**

1. Was the Civic Centre location convenient? \_\_\_\_\_
2. Was the timing of the meeting convenient? \_\_\_\_\_
3. Was the meeting room adequate? \_\_\_\_\_
4. Was the food and beverage good? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Your Suggestions**

Please list three ways the PG SFMP Advisory Committee can improve subsequent PAG meetings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**General Comments**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Please indicate who you are:

- PAG member       Observer       Other  
 Advisor       First Nation

**PG SFMP Public Advisory Group  
January 12, 2010 Meeting Evaluation**

Please evaluate the PG SFMP Public Advisory Group process using the following scale of 1-5:

1=very poor, 2=poor, 3=average, 4=good, 5=very good

**Meetings and PAG process**

1. Was an agenda pre-published? \_\_\_\_\_
2. Were most members involved? \_\_\_\_\_
3. Were advisors prepared? \_\_\_\_\_
4. Were PAG Terms of Reference followed? \_\_\_\_\_
5. Were actions updated? \_\_\_\_\_
6. Was time allocated wisely? \_\_\_\_\_
7. Were decisions summarized? \_\_\_\_\_
8. Was focus on consensus decision making? \_\_\_\_\_
9. Was there a positive atmosphere? \_\_\_\_\_
10. Were you satisfied with the meeting? \_\_\_\_\_
11. Are you satisfied with the PAG process? \_\_\_\_\_
12. How timely was the information? \_\_\_\_\_
14. How satisfied are you with the Information provided? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Facilitator**

The facilitator:

1. strived for consensus decision-making? \_\_\_\_\_
2. kept the meeting focused? \_\_\_\_\_
3. kept the meeting moving? \_\_\_\_\_
4. remained neutral on content issues? \_\_\_\_\_
5. encouraged open communication? \_\_\_\_\_
6. tolerated and smoothed conflict? \_\_\_\_\_
7. obtained technical expertise (when needed)? \_\_\_\_\_
8. captured documentation? \_\_\_\_\_
9. actively listened? \_\_\_\_\_
10. came prepared and organized? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Meetings Logistics**

1. Was the Civic Centre location convenient? \_\_\_\_\_
2. Was the timing of the meeting convenient? \_\_\_\_\_
3. Was the meeting room adequate? \_\_\_\_\_
4. Was the food and beverage good? \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Your Suggestions**

Please list three ways the PG SFMP Advisory Committee can improve subsequent PAG meetings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**General Comments**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Please indicate who you are:

- PAG member       Observer       Other  
 Advisor       First Nation



**Appendix 9**

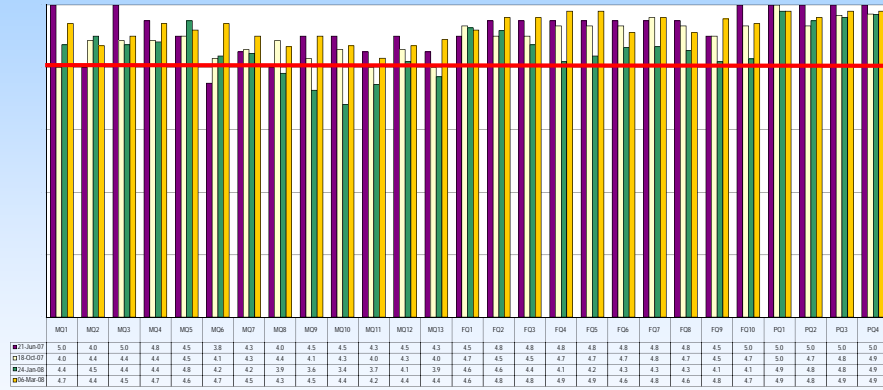
**RESULTS OF PAG MEETING EVALUATION FORMS as of  
January 12, 2010  
(for subsequent results see PG SFMP Annual Reports)**





## PG SFMP 2007-08 PAG Meeting Evaluation

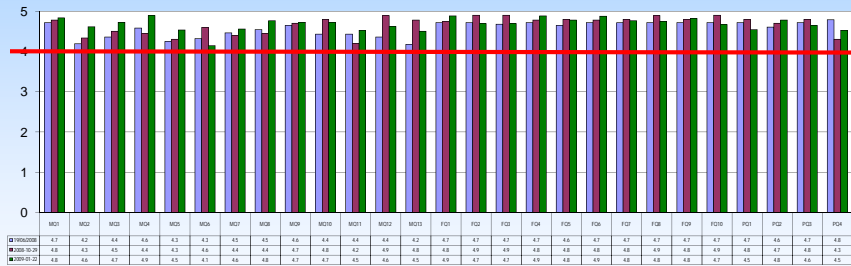
Score (out of 5)



Question

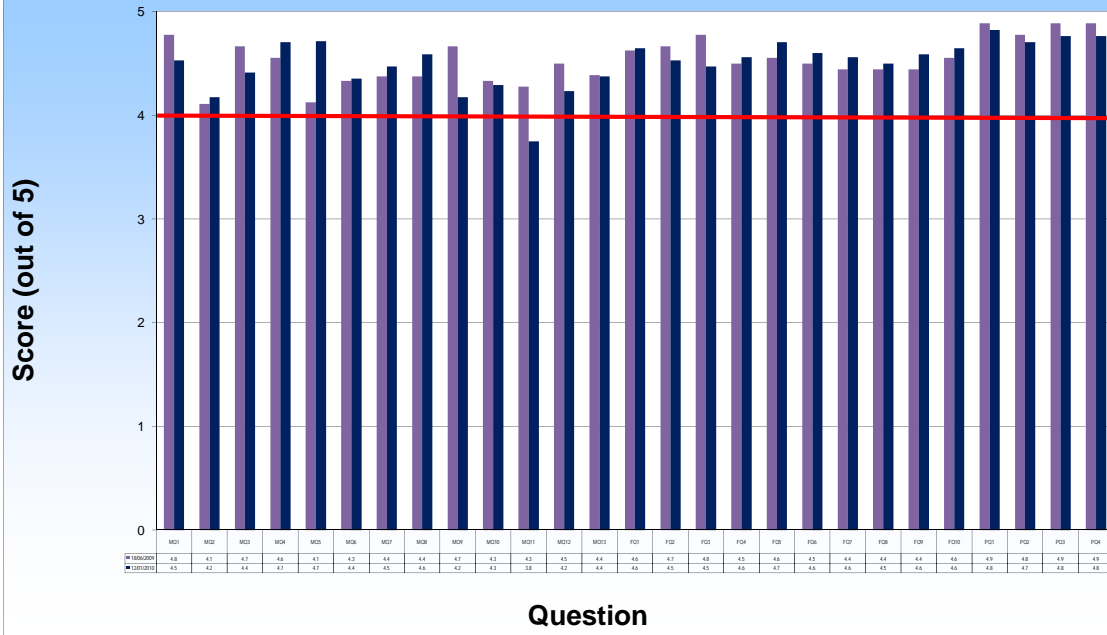
## PG SFMP 2008-09 PAG Meeting Evaluation

Score (out of 5)



Question

## PG SFMP 2009-10 PAG Meeting Evaluation



**Appendix 10**

**PRINCE GEORGE FOREST DISTRICT SUSTAINABLE FOREST  
MANAGEMENT PLAN  
PUBLIC ADVISORY GROUP LIST OF ACRONYMS**



# Prince George Forest District Sustainable Forest Management Plan

## Public Advisory Group List of Acronyms

Updated to August 16, 2005

As presented by the BC Ministry of Forests from their webpage

### A

AAC	Allowable Annual Cut
AAP	Assessment Action Plan
ABCPF	Association of BC Professional Foresters
ADM	Assistant Deputy Minister
AE	Acid Equivalent
AFIRM	Analysis Framework for Integrated Resource Management
AFIS	Automatic Filing Index System
AG	Attorney General
AGM	Annual General Meeting
AIA	Archaeological Impact Assessment
AIF	Area Inclusion Factor
AIFM	ASEAN Institute of Forest Management
AIT	Agreement on Internal Trade
ALEP	Active Living Environment Program
ALIC	Assistant t Deputy Minister's Land Information Council
ALR	Agricultural Land Reserve
AMV	Average Market Value
AOA	Archaeological Overview Assessment
AOI	Area of Interest
APSC	Aboriginal Policy Steering Committee
AR	Annual report
ARCS	Administrative Records Classification System
ARS	Automatic Repeater Station
ARWG	Armillaria Research Working Group
ASFIT	Allied Science Forester in Training
ASP	Average Selling Price
ASSCS	Automated Silviculture Survey Compilation System
ASTTBC	Association of Applied Science Technicians and Technologists of BC
AT	Alpine Tundra (Biogeoclimatic Zone)
ATLAS	A Tactical Landscape Analysis System
ATT	Attribute
ATU	Activity Treatment Unit
ATV	All Terrain Vehicle
AU	Analysis Unit
AUM	Animal Unit Month

### B

B&W	Brushing & Weeding
B/L	Backlog
BA	Basal Area
BAF	Basal Area Factor
BBGIS	Bulletin Board, Geographic Information System
BBTS	Building Better Training S kills
BC	British Columbia
BCAL	British Columbia Assets and Land Corporation

BCARS	BC Archive and Records Services
BCBC	British Columbia Building Corporation
BCEIN BC	Environmental Information Network
BCFA	British Columbia Forestry Alliance
BCFCSN	BC Forestry Continuing Studies Network
BCFS	British Columbia Forest Service
BCGEU	BC Government Employees Union also BC Government Employees Union
BCGMA	BC Government Managers Association
BCGS	British Columbia Geographic System (of mapping)
BCLI	BC Land Inventory
BCLRB	BC Labour Relations Board
BCNU	BC Nurses Union
BCTS	British Columbia Timber Sales Program (previous SBFEF)
BCTMP	Bleached Chemi-Thermal Mechanical Pulp
BCTSDA	BC Tree Seed Dealers Association
BCUC	British Columbia Utilities Commission
BCWF	BC Wildlife Federation
BCWSAC	British Columbia Weed Science Advisory Committee
BCYBTU	BC & Yukon Building Trades Union
BEC	Biogeoclimatic Ecosystem Classification
BEO	Biodiversity Emphasis Options
BEP	Break Even Point
BG	Bunch Grass (Biogeoclimatic Zone)
BGC	Biogeoclimatic
BLF	Branch Landscape Forester
BN	Briefing Note
BR	Brushing
BR	Base Rate
BRIFM	Backlog Restoration Intensive Forest Management
Btk	Bacillus thuringiensis Berliner var. kurstaki
BUI	Build Up Index
BWBS	Boreal White & Black Spruce (Biogeoclimatic Zone)
BZ	Buffer Zone

## C

C/C	Crown Closure
CADD	Computer Aided Drafting and Design
CAI	Current Annual Increment
CAM	Computer Assisted Mapping
CAMP	Coordinate Access Management Plan
CAS	Coast Appraisals
CASI	Compact Aerial Spectrographic Imagery
CATI	Computer Assisted Telephone Interview
CBT	Computer Based Training
CC	Clearcut
CCF	Crown Competition Factor
CCFM	Canadian Council of Forest Ministers
CCLCRMP	Central Coast Land and Coastal Resource Management Plan
CCLUP	Cariboo-Chilcotin Land Use Plan
CCLUPIR	Cariboo-Chilcotin Land Use Plan Integration Report
CCMAR	Client, Credit Management, Accounts Receivable
CCREM	Canadian Council of Resource and Environment Ministers
CCSD	Cabinet Committee on Sustainable Development
CDF	Coastal Douglas fir (Biogeoclimatic) Zone
CDI	Cost Driver Initiative
C&E	Compliance and Enforcement
CEAC	Chip Export Advisory Committee

CEO	Chief Executive Officer
CEP	Communications, Energy and Paper Workers Union
CF	Chief Forester
CFA	Canadian Forestry Association
CFBC	Consulting Foresters of BC
CFD	Cancellation and Forfeiture of Deposit
CFFG	Coastal Fish Forestry Guidelines
CFS	Canadian Forest Service
CHIPS	Corporate and Human Resource Information and Payroll System
CHRIS	Cultural Heritage Resources Inventory System
CHRS	Cultural Heritage Resources
CIF	Canadian Institute of Forestry
CIS	Central Invoicing - MOF, Revenue
CISMP	Critical Incident Stress Management Program
CLC	Canadian Labour Congress
CLI	Client Management - MOF, Revenue
CLI	Canada Land Inventory
CLIB	Common Land Information Base
CLIFF	Ministers Referral Letters
CLISP	Corporate Land Information Strategic Plan
CLMA	Coast Lumber Manufacturers Association
CLMS or CMS	Client Management System
CLR	Crown Land Registry
CLRIS	Crown Land Registry Information System
CLS	Canadian Lumber Standards
CMT	Culturally Modified Trees
CO	Communications Officer
Code	Forest Practices Code
COFI	Council of Forest Industries of BC
CONSEP	Cone & Seed Processing
C.O.R.E.	Commission on Resources and the Environment
CORE	Conservation, Outdoor Recreation Education Program
CP	Cutting Permit
CPPA	Canadian Pulp & Paper Association
CPS	Cabinet Planning Secretariat
CPU	Central Processing Unit
CRB	Community Resource Board
CRII	Corporate Resources Inventory Initiative
CRIS	Contractor Reference Information System
CRLUPS	Cariboo Region Landscape Unit Planning Strategy
CRMP	Coordinated Resource Management Plan
CSAC	Coast Scaling Advisory Committee
CSS	Correspondence Services Section
CSSP	Clayoquot Sound Scientific Panel
CT	Commercial Thinning
CTCSS	Central Tone Control Squelch System
CTO	Cumulative Time Off
CU	Close Utilization
CVDF	Cowichan Valley Demonstration Forest
CVP	Comparative Value Pricing
CVTP	Comparative Value Timber Pricing
CWAP	Coastal Watershed Assessment Procedure
CWD	Coarse Woody Debris
CWG	Community Watershed Guidelines
CWH	Coastal Western Hemlock (Biogeoclimatic) Zone

# D

DAC	Diameter over Age Curve
DBC	Bulkley/Cassiar Forest District
DBH	Diameter Breast Height
DBMS	Data Base Management System
DBO	Boundary Forest District
DCB	Cranbrook Forest District
DCE	Distributing Computing Environment
DCH	Chilcotin Forest District
DCK	Chilliwack Forest District
DCL	Clearwater Forest District
DCO	Columbia Forest District
DCR	Campbell River Forest District
DDC	Data Distribution Centre
DDC	Dawson Creek Forest District
DDS	Data Delivery System
DEM	Digital Elevation Map
DFN	Fort Nelson Forest District
DFO	Department of Fisheries and Oceans
DFZ	Disturbance-Free Zone
DHO	Horsefly Forest District
DI	Disturbance
DI	Diversity index
dib	Diameter Inside Bark
DIN	Invermere Forest District
DJA	Fort St. James Forest District
DJO	Fort St. John Forest District
DKI	Kispiox Forest District
DKL	Kootenay Lake Forest District
DKM	Kalum Forest District
DKO	Kamloops Forest District
DLA	Lakes Forest District
DLI	Lillooet Forest District
DM	Deputy Minister
DM	District Manager
DMC	Mid-Coast Forest District
DME	Merritt Forest District
DMH	100 Mile House Forest District
DMK	Mackenzie Forest District
DMO	Morice Forest District
DMRL	Deputy Minister's Referral Letters
DNC	North Coast Forest District
dob	Diameter Outside Bark
DOS	Disk Operating System
DP	Development Plan
DPA	Deferred Planning Area
DPE	Penticton Forest District
DPG	Prince George Forest District
DPM	Port McNeill Forest District
DQC	Queen Charlotte Forest District
DQL	Quesnel Forest District
DRA	Armillaria Root Disease
DRC	Diameter at Root Collar
DRV	Robson Valley Forest District
DSA	Salmon Arm Forest District
DSB	Disease Stem Blister Rust



DSC	Sunshine Coast Forest District
DSD	Disturbed Stocking Doubtful
DSH	Diameter at Stump Height
DSI	South Island Forest District
DSQ	Squamish Forest District
DSS	Decision Support Systems
DTM	Digital Terrain Map, Digital Terrain Modeling
DVA	Vanderhoof Forest District
DVE	Vernon Forest District
DW2B DWB	Decay, (unavoidable) Waste & Breakage
DWC	Delivered Wood Cost
DWL	Demonstration Woodlot
DWL	Williams Lake Forest District

## E

E&T	Economics & Trade Branch
EARP	Environmental Assessment Review Process (federal)
ECA	Equivalent Clearcut Area
ECW	Expert Committee on Weeds
EDD	Extended Data Dictionary - MOF, Information Systems
EDI	Electronic Data Interchange
EFMPP	Enhanced Forest Management Pilot Project
EFP	Enhanced Forestry Program
EGAF	Extended Grid Area File
EKIDC	East Kootenay Insect and Disease Committee
EKWUS	East Kootenay Wildland Use Strategy
ELF	Eliminate Legal-size Folders (government-wide cost-cutting measure)
ELUC	Environment and Land Use Committee
E.M.B.E.R.	Ecosystem Maintenance Burning Evaluation and Research
EMS	Export Management System - MOF, Economics + Trade
ENFOR	Energy from the Forest
EPA	Environmental Protection Area
EPF	Environmental Protection Forest
EPS	Essential Planning systems
ERA	Enforcement, Administrative Review & Appeal Tracking System
ERDZ	Enhanced Resource Development Zone
ESA	Employment Systems Review
ESR	Environmentally Sensitive Area
ESSF	Englemann Spruce Subalpine Fir (Biogeoclimatic Zone)
ETO	Earned Time Off
ETV	Emergency Transport Vehicle (Biogeoclimatic Zone)
EVC	Existing Visual Condition
EWN	Early Warning Note

## F

FABC	Forest Alliance of BC
FAC	Forest Appeals Commission
FAMAP	Forest Atlas Mapping Automation Project
FAMS	Forest Asset Management System
FAO	Food and Agriculture Organization (United Nations)
FAOP	Financial Administration Operating Policy
FAR	Forest Archives Manager
FBM	Foot Board Measure

FBM/HA	Foot Board Measure per Hectare
FBP	Fires Behaviour Prediction
FC	Forest Cover
FCAP	Forest Cover Attribute Processing System
FCB	Forests Communications Branch
FCI	Forest Cover Inventory
FCS	Friends of Clayoquot Sound - also FOCS
FCSBC	Forestry Continuing Studies Network of BC
FDP	Forest Development Plan
FDP	Federal Development Plan
FE	Fertilization
FEN	Forest Ecosystem Network
FEP	Forestry Enhancement Program
FERIC	Forest Engineering Research Institute of Canada
FG	Free Growing
FHC	Forest Health Committee
FIDS	Forest Insect and Disease Survey
FINSIL	Stand Level Financial Silviculture
FIP	Forest Inventory Planning
FIPDBF	Forest Inventory Planning Data Base File
FIR	Forest Inventory Reporting System
FIT	Forester-In-Training
FIZ	Forest Inventory Zone
FL	Forest Licence
FLM	Forest Landscape Management
FLMP	Forest Land Management Plan
FMA	Forest Management Agreement
FMIS	Financial Management Information System
FN	First Nation
FNFC	First Nations Forestry Council
FNS	First Nations Summit
FOI	Freedom of Information
FORCAN	Forestry Canada (federal government department)
FORGIS	Forest Resource Geographic Information system
FPB	Forest Practices Board
FPC	Forest Practices Code
FPO	Forest Pre-Organization
FR	Forest Renewal
FRAS	Forest Resource Analysis System
FRBC	Forest Renewal BC
FRC	Forest Resources Commission
FRDA	Forest Resources Development Agreement
FRGIS	Forest Resource GIS Section
FRIC	Forest Resources Inventory Committee
FRIP	Forest Renewal Initiatives Program
FRIT	Forest Revenue Inspection Team
FRM	Forest Resource Management
FRP	Forest Renewal Plan
FRPA	Forest Range and Practices Act
FRRR	Forest and Range Resource Analysis
FRRRA	Forest, Range and Recreation Resource Analysis
FSAC	Forest Sector Advisory Committee
FSIS	Forest Sector Initiatives Section
FSR	Forest Service Road
FSRRI	Forest Service Recreation Resources Inventory
FSP	Forest Stewardship Plan
FSS	Forest Sector Strategy
FSSC	Forest Sector Strategy Committee
FSSIM	Forest Service Simulator (TSR) Modelling
FTA	Forests Tenure Administration
FTAS	Forest Tenure Administration System
FTP	File Transfer Protocol

FTE	Full-Time Equivalent
FTG	Free To Grow
FUP	Free Use Perm it
FWDP	Forest Worker Development Program
FWI	Fire Weather Index
FYDP	Five Year Development Plan

## G

G&Y	Growth & Yield
GAP	Gully Assessment Procedure
GAS	General Appraisal System
GATT	General Agreement on Tariffs and Trades
GAUS	Grid Area Unit System
GBPU	Grizzly Bear Population Unit
GDP	Gross Domestic Product
GEF	Grazing Enhancement Fund
GEMS	Government Electronic Mail System
GIS	Geographic Information System
GISCST	Geographic Information System Client Support Team
GISSC	Geographic Information System Steering Committee
GISWG	Geographic Information System Working Group
GLIDE	Government Land Information Data Exchange
GMA	Government Managers Association
GMOP	General Management Operating Policy
GPS	Global Positioning System
GPSD	Government Personnel Services Division (now PSERC-Public Service Employee Relations Commission)
GRNSD	Global Research Network on Sustainable Development
GRT	General Range Types
GST	Goods and Services Tax (federal)
GST	Government Support Team
GTG	Growth Type Group
GUI	Graphic User Interface

## H

ha	Hectare
HAA	MOF Aboriginal Affairs Branch
HAS	MOF Audit Services Branch
HBD	MOF Business Design
HBR	Harvest Billing Reporting
HBS	Harvest Billing System
HCO	MOF Communications Branch
HCP	MOF Corporate Policy and Planning Branch
HCTF	Habitat Conservation Trust Fund
HDBS	Harvest Database System
HEN	MOF Enforcement
HET	MOF Economics and Trade Branch
HFC	MOF Forest Community Transition Secretariat
HFD	MOF Forestry Division Services Branch
HFP	MOF Forest Practices Branch
HFS	MOF Financial Services
HHR	MOF Human Resources Branch
HIA	High Intensity Area

HIS	MOF Information Systems
HNS	Nursery and Seed Operations Branch
HPR	MOF Protection Branch
HRE	MOF Research Branch
HRI	MOF Resources Inventory Branch
HRMS	Human Resources Management System
HRS	Harvest Revenue System
HTC	MOF Tree Seed Centre
HTH	MOF Resource Tenures and Engineering Branch
HTML	Hyper Text Mark-up Language
HTS	MOF Timber Supply Branch
HVA	MOF Revenue Branch – Valuation



IAAC	Interior Advisory Appraisal Committee
IAC	Information Access
IALE	International Association of Landscape Ecologists
IAM	Interior Appraisal Manual
IAMC	Inter Agency Management Committee
IAR	Income Assistance Recipient (formerly Social Assistance Recipient)
IAS	Interior Appraisal System
IATA	International Air Transport Association
IBM	Mountain Pine Beetle
ICH	Interior Cedar Hemlock (Biogeoclimatic) Zone
IDD	Integrated Data Dictionary
IDF	Interior Douglas fir (Biogeoclimatic) Zone
IEF	Information Engineering Facility
IFFWG	Interior Fish, Forestry, Wildlife Guidelines
IFHC	Interior Forest Harvesting Council
IFHSC	Interior Forest Harvesting Subcommittee
IFMIS	Integrated Fire Management Information System
IFPA	Innovative Forest Practices Agreement
IGDS	Intergraph Graphic Digital System
ILMA	Interior Lumber Manufacturer's Association
ILWU	International Longshoremen's & Warehousemen's Union
IM	Interim Measures
IMA	Interim Measures Agreement
IMG	Information Management Group
IMG	Interim Management Guidelines
INCOSADA	Integrated Corporate Spatial and Attribute Database
IO	Industry Outstanding
IPC	International Poplar Commission
IPM	Integrated Pest Management
IPM	Inventory Project Management
IPT	Interagency Planning Teams
IR	Indicated Rate
IRM	Integrated Resource Management
IRMP	Integrated Resource Management Plan
IRMZ	Integrated Resource Management Zone
IRPC	Integrated Resource Planning Committee
IRT	Interface Response Teams
IRWA	International Right of Way Association
ISAC	Interior Scaling Advisory Committee
ISB	Information Systems Branch
ISDD	Integrated Spatial Data Dictionary
ISIS	Integrated Silviculture Information System
ITG	Inventory Type Group
ITIC	Interior Tree Improvement Council

ITP	Inventory Training Plan
I.U.	Intermediate Utilization
IVMA	Integrated Vegetation Management Association of BC
IWA	International Woodworkers of America
I.W.A.	Canada Industrial, Wood & Allied Workers of Canada
IWAP	Interior Watershed Assessment Procedure
IWIFR	Integrated Wildlife-Intensive Forestry Research
IWMP	Integrated Watershed Management Plan
IWWR	Institute for Wetland and Waterfowl Research

## J

JAD	Joint Application Design
JS	Juvenile Spacing
JUMAC	Joint Union Management Advisory Committee
JV	Journal Voucher

## K

KBLUP	Kootenay/Boundary Land Use Plan
KBLUPHLP	Kootenay/Boundary Land Use Plan Higher Level Plan
KCTA	Kootenay Christmas Tree Association
KDEDC	Kaslo and District Economic Development Committee
KSA	Knowledge, Skills and Ability
KSF	Key Success Factors
KWCC	Kootenay Weed Control Committee

## L

L/C	License to Cut
LAC	Limits of Acceptable Change
lai/ha	Litres of Active Ingredient per Hectare
LAN	Local Area Network
LCCFCO	Lake Cowichan Combined Fire Control Organization
LBOM	LAN-Based Object Management
LHAL	Learning how adults learn
LHO	Lost Harvesting Opportunity
LIA	Low Intensity Area
LICC	Land Information coordinating Committee
LII Land	Information Infrastructure
LIICC	Land Information and Inventory coordinating Committee
LIM	Land Information Management
LIMF	Land Information Management Framework
LIS	Land Inventory System
LISC	Land Information Strategic Council
LLSP	Log and Lumber Selling Price
LMS	Leave Management System
LMU	Land Management Unit
LOD	Large Organic Debris
LOS	Local Office System
LP	Linear Programming
LPI	Logging Productivity Index

LRC	Land Reserve Commission (replaces FLC)
LRF	Lumber Recovery Factor
LRIICC	Land and Resource Inventory and Information coordinating Committee
LRMP	Land and Resource Management Plan
LRSY	Long Run Sustained Yield
LRUP	Local Resource Use Plan
LSO	Licensed Science Officer
LSR	Landscape Sensitivity Rating
LU	Landscape Unit
LUCO	Land-Use Coordination Office
LUS	Local Use Study

## M

MAC	Minister's Advisory Committee
MAI	Mean Annual Increment
MASD	Maximum Allowed Site Degradation
mb	Megabyte
mbf	Thousand Board Feet
MCDM	Multi-Criterion Decision Maker
MDF	Medium Density Fibreboard
MDI	Multiple Document Interface Application
MDM	Maps Distribution Management
MDWR	Mule Deer Winter Ranges
MEA	Monitoring Enforcement Auditing
MELP	Ministry of Environment, Lands and Parks (also MOELP)
MET	Monitoring & Enforcement Teams
MFBM	Thousand Board Feet
MFU	Managed Forest Unit
MH	Mountain Hemlock (Biogeoclimatic) Zone
MILAP	Modified Industry and Labour Adjustment Program
ML	Holder of a Major Licence
MLA	Member of the Legislative Assembly
MLSIS	Major License Silviculture Information System
MM	Maximum Modification
MMFBM	Million Board Feet
MO	Minister's Office
MO	Ministry Outstanding
MOELP	Ministry of Environment, Lands and Parks (also MELP)
MOF	Ministry of Forests
MORT	Ministry of Roads and Trees
MOU	Memorandum of Understanding
MP	Management Plan
MPC	Ministry Partnership Committee
MPRP	Major Project Review Process
MR	Modified Road
MRC	Modified River Compatible Alteration
MRI	Modified River Incompatible Alteration
MRL	Ministers Referral Letters (also CLIFF)
MS	Montane Spruce (Biogeoclimatic) Zone
MSP	Mechanical Site Preparation
MSS	Manager, Systems Services
MSY	Maximum Sustained Yield
MSYT	Managed Stand Yield Tables
MU	Management Unit
MUSYC	Multiple Use Sustained Yield Calculator
MVI	Mean Value Index
MWP	Management and Working Plan
MZ	Management Zone

# N

NA	Not Applicable
NAD	North American Datum (number refers to year)
NAD83	North American Datum 1983
NAPP	National Aerial Photography Program
NC	Non-Commercial
NCBr	Non-Commercial Brush
NCC	Non-Commercial Cover
NDT	Natural Disturbance Type
NEC	Nechako Environmental Coalition
NEED	New Employment Expansion & Development
NGO	Non-Governmental Organization
NICC	Northern Interior Cruising Committee
NILS	Northern Interior Lumber Manufacturer s Society
NIVMA	Northern Interior Vegetation Management Association
NoFC	Northern Forest Centre
NP	Non-Productive
NPBr	Non-Productive Brush
NPV	Net Present Value
NR	Natural Roaded
NR	Not Recommended
NRL	Non-Recoverable Losses
NSC	Northern Silviculture Committee
NSR	Not Satisfactorily Restocked
NT	Not Tested
NTDB	National Topographic Data Base
NTS	National Topographic System of mapping
NTZ	No Treatment Zones

# O

OAF	Operational Adjustment Factors
OC	Operating Cost
OCC	Organization, Classification & Compensation
OCG	Office of the Comptroller General
ODMT	Object Distribution Management
ODMT	Operations Division Management Team
OG	Old Growth
OGMA	Old Growth Management Area
OGSI	Old Growth Site Index
OGSP	Old Growth Strategy Project
OHSC	Occupational Health and Safety Committee
OIC	Order-in -Council
ONP	Old Newspaper
OPRG	Operational Planning Review Group
ORC	Outdoor Recreation Council of BC
ORCS	Operational Records Classification System
OSB	Oriented Strand Board
OSP	Official Settlement Plan
OTT	Old Temporary Tenure
OV	Office Vision

# P

P	Primitive
PA	Protected Areas
PA	Pulpwood Agreement
PABAT	Protected Areas Boundary Advisory Team
PAC	Pesticide Advisory Committee
PACT	Protected Areas Coordinating Team
PAFS	Print and File system
PAS	Protected Areas Strategy
PAYCERT	Payment Certification
PC	Personal Computer
PCAMS	Personal Computer Acquisition Management System
PCT	Pre-Commercial Thinning
PEA	Professional Employees Association
P.Eng	Professional Engineer
PFG	Post Free-Growing
PFT	Problem Forest Types
PFZ	Pesticide-Free Zone
PHA	Pulpwood Harvesting Area
PHSP	Pre-Harvest Silviculture Prescription
PIA	Pre-Inventory Assessment
PIM	Pacific International Mapping
PL	Planting, Lodgepole Pine
PLANTS	Planning Timber Supply
PLIC	Provincial Land and Information Council
P.L.U.M.	Present Land Use Map
PMAC	Pest Management Advisory Committee
PMP	Pest Management Plan
PMP	Program Management Plan
PMR	Private Mark Registry
PMS	Personal Management System
POC	Point Of Commencement
POI	Point Of Intersection
POT	Point Of Termination
POYS	Pests of Young Stands
PP	Ponderosa Pine (Biogeoclimatic) Zone
PPMS	Personal Performance Management System
PPP(3P)	Probability Proportionate to Prediction
PPR	Program Planning Review
PPS	Probability Proportionate to Size
PPWP	Planning Phases Working Group
PR	Pruning
PR	Partial Retention
PRIC	Public Relations in Charge
PROFS	Professional Office Systems
PRTSM	Price Responsive Timber Supply Model
PSA	Public Service Act
PSAB	Public Service Appeal Board
PSEC	Public Sector Employee's Council
PSERC	Public Service Employee Relations Commission
PSP	Permanent Sample Plot
PSR	Provincial Summary Reporting
PSYU	Public Sustained Yield Unit
PUP	Pesticide Use Permit



# Q

QRMS      Quartech Records Management System

# R

R      Rural  
R&D      Research and Development  
RAD      Recreation Activity-Day  
RAM      Random Access Memory  
RAN      Rainforest Action Network  
RBS      Range Billing System  
RCEST      Road Cost Estimating  
RCMA      Recreation and Conservation Management Areas  
RCT      Regional Command Team  
RCO      Regional Communications Officer  
RD      Regeneration Delay  
REA      Resource Emphasis Areas  
REFAC      Regional Employees Forest Awareness Committee  
REGEN      Regeneration  
RESGEN      Results Generation, Resultants Generator  
RFP      Request for Proposal  
RHRO      Regional Human Resource Officers  
RIB      Reforestation Information Bank  
RIB      Resources Inventory Branch  
RIC      Resources Inventory Committee  
RIS      Range Inventory Strata  
RIS      Range Improvement System  
RISI      Resource Information Systems Inc.  
RIWG      Recreation Inventory Working Group  
RWG      Regional Implementation Working Group (as in WRP)  
RKA      Kamloops Forest Region  
RMA      Riparian Management Assessment  
RMA      Resource Management Agreement  
RMIS      Records Management Information System  
RMP      Resource Management Plan  
RMT      Resource Management Team  
RMU      Recreation Management Unit  
RMZ      Riparian Management Zone  
RMZ      Resource Management Zone  
RN      Roded Natural  
RNE      Nelson Forest Region  
ROM      Read-Only Memory  
ROS      Recreation Opportunity Spectrum  
RPA      Regeneration Performance Assessment  
RPAC      Regional Public Affairs Committee  
RPAT      Regional Protected Area Team  
RPF      Registered Professional Forester  
RPG      Prince George Forest Region  
RPR      Prince Rupert Forest Region  
RRA      Range Reference Area  
RRAC      Regional Research Advisory Committee  
RRB      Regional Resource Board  
RRL      Roded Resource Land  
RRMP      Revenue Risk Management Plans

RRZ	Riparian Reserve Zone
RTL	Roads, Trails and Landings
RUD	Recreation User-Day
RUP	Range Use Permit
RVA	Vancouver Forest Region
RVQC	Recommended Visual Quality Class
RVQO	Recommended Visual Quality Objective

## S

S & R	Scale & Royalty (account)
SAR	Scale Administration Revenue
SAR	Scenic Attractiveness Rating
SAS	Statistical Analysis System
SAT	Spatial Analysis Team
SAWSIM	Sawmill Simulator (model)
SB/ST	Small Business/Special Tenures
SBB	Spruce Bark Beetle
SBE	Small Business Eligibility
SBFEP	Small Business Forest Enterprise Program
SBPS	Sub-Boreal Pine Spruce (Biogeoclimatic) Zone
SBR	Small Business Reporting
SBS	Sub-Boreal Spruce (Biogeoclimatic) Zone
SB/ST	Small Business/Special Tenures
SCS	Scale Administration Revenue
SCS	Scaling Control System
SDI	Stand Density Index
SDM	Statutory Decision Makers
SEA	Slope, Elevation and Aspect
SEA	Socio-Economic Impact Assessment
SEF	Sustainable Environment Fund
SEIDAMS	System of Experts for Intelligent Data Management (Canadian Forest Service)
SEMS	Silviculture Electronic Mapping System
SEPT	Spatially Explicit Planning Tool
SI	Site Index
SIA	Silviculture Information Access
SIBC	Silviculture Institute of BC
SIBEC	Site Index Biogeoclimatic Ecosystem Classification
SIC	Standard Identification Codes
SIFMC	Southern Interior Fire Management Committee
SIL	Survey Intensity Level
SilvRx	Silviculture Prescription
SIMFOR	Simulates Forest Management & Stand Development
SISCO	Southern Interior Silviculture Committee
SITCA	Southern Interior Timber and Cruising Association
SIWG	Silviculture Interpretations Working Group
SLBC	Stand Level Biodiversity Management
SMECC	Smoke Management and Expenditure Control Committee
SMOOP	Statement of Management Objectives, Options and Procedures
SMP	Stand Management Prescription
SMR	Soil Moisture Regime
SMTP	Senior Managers Training Program
SNR	Soil Nutrient Regime
SOA	Special Operating Agency
SOCA	Spotted Owl Conservation Area
SOFA	Shuswap-Okanagan Forestry Association
SOI	Statement of Interest Area
SOI	Statement of Intent
SOP	Standard Operating Procedures

SP	Silviculture Prescription
SP	Site Preparation
SP	Site Plan
SPAR	Seed Planning and Registry Information System
SPH	Stems Per Hectare
SPM	Semi-Primitive Motorized
SPNM	Semi-Primitive Non-Motorized
SPR	Seedling Planning and Registry
SPS	Stand Prognosis System/Stand Projection System
SPWG	Site Productivity Working Group
SPWG	Strategic Planning Working Group
SR	Satisfactorily Restocked
SRMZ	Special Resource Management Zone
SRTS	Scale Return Tracking System
SSS	Seedling Survival System
ST	Stand Tending
STG	Seed Transfer Guidelines
STIP	Spatial Tools Implementation Plan
STOB	Standard Object (of expenditure)
SU	Standards Unit (in silviculture)
SU	Survey
SUP	Special Use Permit
SVIFWTI	South Vancouver Island Forest Workers Training Initiative
SVWA	Slocan Valley Watershed Alliance
SYLVER	Silviculture on Yield, Lumber Value and Economic Return

## T

TAMS	Technology Asset Management System
TAS	Tenure Administration System
TASS	Tree and Stand Simulator
TBA	To Be Announced
TCC	Technical Coordinating Committee
TCH	Trans-Canada Highway
TDC	Takla Development Corporation
TEAC	Timber Export Advisory Committee
TFL	Tree Farm Licence
TG	Type Group
THG	Timber Harvesting Guidelines
THLB	Timber Harvesting Land Base
TIA	Timber Information Access
TIPS	Topical Information Program System
TIPSY	Table Interpolation Program for Stand Yield Information
TIRRMP	Trench Integrated Renewable Resource Management Plan
TL	Timber Licence
TLUA	Traditional Land Use Area
TMR	Timber Mark Registry
TNAC	Treaty Negotiation Advisory Committee
TR	Target Rate
TREES	the Recognition for Employee Efforts and Suggestions
TREWG	Technical Review and Evaluation Working Group
TRIM	Terrain Resources Information Mapping
TRIM	Terrain Resource Information Management Program
TRIM	Timber Resource Inventory Model
TRP	Total Resource Plan
TSA	Timber Supply Area
TSAS	Timber Supply Analysis System
TSB	Timber Supply Block
TSB	Timber Supply Branch

TSHL	Timber Sale Harvesting Licence
TSL	Timber Sale Licence
TSM	Terrain Stability Mapping
TSP	Temporary Sample Plot
TSR	Timber Supply Review
TTA	Timber Tenure Access
TTT	Takla Track and Timber
TU	Treatment Unit
TUS	Traditional Use Study

## U

U	Urban
UBCIC	Union of BC Indian Chiefs
UBCM	Union of BC Municipalities
ULC	Underwriters Laboratories of Canada
UNCED	United Nations Conference on Environmental Development
UNEVEN	Uneven-aged Whole Stand Model
UREP	Use, Recreation and Enjoyment of the Public
USFS	United States Forest Service
USSCS	Uneven-aged Silviculture Survey Compilation System
UTM	Universal Transverse Mercator, used for location references.
UWR	Ungulate Winter Range

## V

VAC	Visual Absorption Capability
VAC	Volume Over-Age Curves
VDYP	Variable Density Yield Projection
VEG	Visually Effective Green-up
VEGINV	Vegetation Inventory Working Group
VG	Vegetation Management
VI	Value Index
VILUP	Vancouver Island Land Use Plan
VIWG	Vegetation Inventory Working Group
VLM	Visual Landscape Management
VLMU	Visual Landscape Management Unit
VLU	Visual Landscape Unit
VPT	Viewpoint Number
VQO	Visual Quality Objective
VRI	Vegetation Resources Inventory
VSA	Visually Sensitive Area
VSR	Visual Sensitivity Rating
VYDP	Variable Yield Depletion Plan

## W

WADF	West Arm Demonstration Forest
WAP	Watershed Assessment Procedure
WAWA	West Arm Watershed Alliance
WCB	Workers Compensation Board
WCWC	Western Canada Wilderness Committee

WG	Working Group
WGS	World Geodetic System (number refers to year)
WHA	Wildlife Habitat Area
WHL	Western Hemlock Looper
WHMIS	Workplace Hazard Management Information System
WinTIPSY	Windows version of the Table Interpolation Program for Stand Yields
WKFA	West Kootenay Forest Alliance
WL	Woodlot Licence
WLK	Walker
WOSFOP	Wood Supply and Forest Productivity Model
WP	Working Plan
WRP	Watershed Restoration Plan
WSA	Wood Supply Agreement
WSCA	Western Silviculture Contractors Association
WSSPA	Well-Spaced Stems per Hectare
WT	Wildlife Trees
WTC	Wildlife Tree Committee
WTP	Wildlife Tree Patches

# X

None to-date

# Y

None to-date

# Z

None to-date



## Appendix 11

### GLOSSARY





# Prince George Forest District Sustainable Forest Management Plan

## Public Advisory Group Glossary of Terms

Updated to August 16, 2005

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# 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*).

**Access management plan**: an operational plan identifying the requirements for all road construction, reconstruction, maintenance, and deactivation.

**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 127-129 of the Forest Practices Code of British Columbia 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.

**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).

## 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 per hectare:** the area of the cross-section of tree stems near their base, generally at breast height and including bark, measured over 1 ha of land.

**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, pre-harvest silviculture prescription or silviculture prescription.

**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):** the diversity of plants, animals, and other living organisms in all their forms and levels of organization, including genes, species, ecosystems, and the evolutionary and functional processes that link them.

**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:** a hierarchical classification system of ecosystems that integrates regional, local and chronological factors and combines climatic, vegetation and site factors.

**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.

**Biogeoclimatic zone:** a geographic area having similar patterns of energy flow, vegetation and soils as a result of a broadly homogenous macroclimate.

**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.

**Bird dog 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.

**Burning permit:** a permit required under Section 110 of the Forest Act, municipal bylaw, or letter-patent for authorizing open burning within 1 km of a forest during the fire season, for purposes other than cooking or obtaining warmth.

## 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 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 favored 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.

**Coast:** that geographic area west of the Cascade Mountains, as officially delineated by the Cascade Mountains Administrative Line through British Columbia from Washington state to Alaska, including 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, but excluding the portions of the Kalum Forest District and Cariboo Forest Region lying west of the line.

**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 km<sup>2</sup>, 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.

**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.

**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.

**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 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).

**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 runoff 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.

**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 to 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 Practices Code of British Columbia 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 Practices Code of British Columbia 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.

**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 unfavorable 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).

**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 Ecosections, 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 (see Figure 1).

**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.

**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*

**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 vigor of crop trees following juvenile spacing or commercial thinning.

**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 behavior 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 smoldering 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 order stream:** stream originating in a seepage zone or spring, with no entering tributaries; the most headward channels in the drainage network.

**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.

**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:** as defined by the Forest Practices Code of British Columbia Act includes all of the following - forest land, whether Crown land or private land; Crown range; Crown land or private land that is predominantly maintained in one or more successive stands of trees, successive crops of forage, or wilderness.

**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 Practices Code of British Columbia 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.

**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.

**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. (2) A term defined in the Forest Practices Code of British Columbia Act. Activities include timber harvesting, road construction, road maintenance, road deactivation, silviculture treatments, grazing, fire use, control and suppression, and other similar activities, provided these activities are carried out on Crown forest land, range land, or private land subject to a tree farm licence or woodlot licence by government, a tenure holder or a person engaged in a commercial enterprise (e.g., mining). Further explanation is contained in the definitions section of the act.

**Forest Practices Advisory Council (FPAC):** Cabinet may by regulation establish a Forest Practices Advisory Council to periodically review the Forest Practices Code and recommend changes.

**Forest Practices Board (FPB):** the Forest Practices Board is the "public watchdog" agency established under the Forest Practices Code of British Columbia 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 resources: a defined term in the Forest Practices Code of British Columbia Act meaning resources and values associated with forests and range including, without limitation, timber, water, wildlife, fisheries, recreation, botanical forest products, forage, and biological diversity.

**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.

**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 8 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.

**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. 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.

**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.

**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.

**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 (Source CSA):** a variable that measures or describes the state or condition of a value (see Figure 5).

**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.

**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 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, Lands and Parks 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, Lands and Parks 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.

**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 vigor 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.

**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 Practises 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 and Silviculture Planning Regulations 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 m<sup>3</sup>/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.

**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.

**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.

**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 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.

**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.

**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 (see Figure 5).

**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 plans:** within the context of area-specific management guidelines, operational plans detail the logistics for development. Methods, schedules, and responsibilities for accessing, harvesting, renewing, and protecting the resources are set out to enable site-specific operations to proceed. Operational plans include a forest development plan, logging plan, access management plan, range use plan, silviculture prescription, stand management prescription and 5 year silviculture 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 favored 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.

**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.

**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 reparation.

**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.

**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 4 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.

**Public Sustained Yield Unit (PSYU):** a portion of a TSA, and area of Crown land, usually a natural topographic unit determined by drainage areas, managed for sustained yield by the Crown through the Ministry of Forests. It includes all Crown lands within the currently established boundaries of the unit and excludes federal lands, provincial parks, experimental forest reserves, gazetted watersheds and tree farm licences. Crown land designated as a public sustained yield unit under Section 6 of the Forest Act.

**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

**Rain-on-snow events:** rainstorms that result in large amounts of surface runoff due to the combined effects of heavy rainfall and snow melt. Rapid snow melt is caused by heat supplied from the warm air that is characteristic of intense rainstorms and by heat released during condensation of moisture from the air onto the snow surface.

**Range development:** any practice, treatment or structure designed to achieve plant community, production and integrated resource management goals.

**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 readiness:** the stage of plant growth at which grazing may begin under a specific management plan without permanent damage to vegetation or soil.

**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.

**Rapattack:** a method of initial attack whereby firefighters are transported to the fire in a specially-equipped helicopter, from which they descend during a hover by means of rappelling down a rope fitted with a mechanical device to control the rate of descent. In this way fire crews can be transported to fires which would otherwise pose difficult access problems.

**Rappel crew:** an initial attack crew which rappels from a helicopter to access fires.

**Rate-of-cut:** the proportion of the watershed area allowed to be cut each year.

**Rate of Spread (ROS):** the speed at which a fire extends its horizontal dimensions, expressed in terms of distance per unit area of time. Generally thought of in terms of a fire's forward movement or head fire rate of spread, but also applicable to backfire and flank fire rate of spread.

**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.

**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 Performance Assessment (RPA):** a sampling survey carried out to collect field data on the height growth, competition, and stocking of young stands (5-10 years).

**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).

**Regulated unit:** a Special Sale Area (SSA) describes a Crown area not under sustained yield management on which timber may be sold at the discretion of the Minister of Forests. It is not planned that the allowable annual cut on these units will be maintained in perpetuity.

**Reinventory:** the complete re-stratification 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*

**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, Lands and Parks, 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.

**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 sidescast 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.

**Scalping:** site preparation method which exposes favorable 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

**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 vigor, 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.

**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, Lands, and Parks or the Ministry of Energy, Mines and Petroleum Resources, who is designated by name or title to be a senior official for the purposes of 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, Lands and Parks, 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 (see Figure 2).

**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.

**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 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 preparation:** the treatment of the soil and ground vegetation to prepare the soil surface as a favorable 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 feature such as bald eagle or osprey nests, mineral licks, species at risk habitats and others provided by government. *From March 16 2005 Glossary Amendment.*

**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.

**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.

**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:** as defined under Section 1 of the Forest Act and B.C. Regulation 355/87, these are: poles; posts; pilings; shakes; shingle bolts; Christmas trees; building logs; mining timbers, props, and caps; cribbing; firewood and fuel logs; hop poles; orchard props; car stakes; round stakes, sticks, and pickets; split stakes, pickets, palings, and lagging; and shake bolts, blocks, and blanks.

**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, Lands and Parks, 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.

**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.

**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 behavior 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 management prescription:** a site-specific plan describing the nature and extent of the silviculture activities that will occur on a free-growing stand to facilitate the achievement of, among others, social, economic, and environmental 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.

**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 m<sup>3</sup>) is determined and applied to the volume of timber that is cut (m<sup>3</sup>). 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.

**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.

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**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 (see Figure 5).

**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 agreement 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.

**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, Lands and Parks; 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:** the portion of the total area of a management unit considered to contribute to, and be available for, long-term timber supply. The harvesting land base is defined by reducing the total land base according to specified management assumptions.

**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.

**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.

## U

**Underplanting:** planting young trees under the canopy of an existing stand.

**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.

# V

**Value (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 (see Figure 5).

**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 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 maneuvering 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.

# 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 bomber:** see Airtanker.

**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.

**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 5 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

# 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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## **Appendix 12**

### **SFM INDICATOR FORECASTING FOR THE PRINCE GEORGE DISTRICT-WIDE SFM PLAN**



SFM Indicator Forecasting for the  
Prince George District-wide SFM Plan

Data Package and Draft SFM Base case

**DRAFT**

September 24, 2005

Prepared for:  
**Prince George Licensee Group**

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*Data Package and Preliminary Basecase  
Results*

## **Introduction**

This report contains the overview of data inputs, assumptions, baseline values, results and interpretations from the scenario and forecasting project in support of the development of the sustainable forest management plan and the application for certification under the Canadian Standards Association.



## Data Preparation

The following information provides a description of the key data and assumptions that were used in the forecasting of scenarios presented in this report. There are numerous other detailed assumptions that apply to these analyses and if readers are interested they could refer to the documents listed below.

The base data used for this analysis was compiled during the 2004 Natural Disturbance Unit analysis conducted for the Prince George TSA. This data was supplied in the form of 42 individual landscape unit Arc overages. These datasets were developed from the TSR II analysis, and also used in the 2004 Expedited Timber Supply Review. Input data was updated to reflect the most current available information for the following elements;

- Caribou Habitat
- Mule Deer Habitat
- Recent Depletions (up to March 31<sup>st</sup>, 2005)
- Sustut LRUP Preservation Zone
- Visual Preservation Areas

Previous analysis projects that used these datasets were conducted using an aspatial model. For the Prince George SFM Indicator Forecasting project, FESL's proprietary spatial model Forest Simulation and Optimization System (FSOS) was used. A significant amount processing was required to adapt the datasets for use with FSOS.

### ***Number of Polygons / Polygon Size***

Initially the resultant dataset had over 1 million polygons, of which approximately ½ were less than .5 ha in size. In order to provide meaningful spatial results the total number of polygons had to be reduced. GIS processes were used to initially eliminate and remove many of the small sliver polygons.

### ***Aspatial Riparian Reserves and Management Zones***

To further reduce the number of polygons, the riparian buffers and reserve zones were removed from the dataset. Through a process referred to as 'rating', the area of the resulting polygons contained within the riparian areas was then calculated, and the timber harvesting landbase in those polygons was reduced accordingly.

The result of this spatial processing was a resultant with slightly over 340,000 polygons, reduced from over 1,000,000 polygons.

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## Definition of the timber harvesting landbase

A new timber harvesting landbase area was calculated based on the area netdown reductions from TSRII and the 2004 PG TSA NDU analysis being run on the updated dataset. The following describes the types of land that do not contribute to the timber harvesting land base. Table 1 summarizes the areas in each category, and shows the area of the timber harvesting land base.

- non-forest areas — areas not occupied by productive forest cover (e.g., rock, swamp, alpine areas and water bodies).
- woodlots — Crown managed productive forest excludes woodlots, which are not administered as part of the TSA for AAC determination.
- land not managed by the B.C. Forest Service — non-Crown areas such as private land, Indian reserves, federal and municipal lands.
- parks and eco-reserves — areas not administered by the B.C. Forest Service, but explicitly identified since they contribute to landscape-level biodiversity\* objectives.
- non-commercial areas — areas occupied by non-commercial brush species.
- lake and riparian area\* — areas unavailable for harvesting to provide protection for riparian habitat, stream ecosystems, and lakeshores.
- physically inoperable areas\* — forested areas that are considered inoperable based on slope, and surficial geology information.
- problem forest types\* (PFT) — stands which are physically operable and exceed low site criteria yet are not currently utilized or have marginal merchantability, such as leading-black spruce stands.
- economically inoperable — geographically- identified areas with projected high operating costs.
- high value recreation areas.
- non-merchantable forest types\* — conventionally accessible stands that generally have less than 120 cubic metres per hectare at maturity, or cable or aerial accessible stands that have less than 200 cubic metres per hectare at maturity, are excluded.
- immature stands on low sites — areas occupied by younger forests with low timber growing potential.
- Caribou Habitat – areas identified as High value Caribou habitat, or caribou corridors.
- Ungulate Winter Range – area identified as u-5-001 removed from THLB.

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**Table 1 Netdown Table**

	<b>Area (hectares)</b>
<b>Total TSA Area</b>	<b>3,128,386</b>
Non-Crown Forest	715,221
Reserves (Federal)	20,679
Small Leases, Woodlots	1,227
Private Land Grant	187,956
<i>Total Non-CFLB Reductions</i>	<i>925,083</i>
<b>Crown Forested Landbase</b>	<b>2,203,303</b>
Caribou - High	141,455
Crown Eco. Reserves	1,308
Herrick Old Growth Reserve	633
Isolated High Cost Planning Cells	2,915
Non Merchantable -Mature	62,887
Physically Inoperable	7,324
Provincial Park	129,539
RMZ	5,219
Other Reductions	195,136
UREP	3,825
<i>Total Full Reductions</i>	<i>550,242</i>
Partial Reductions	
ESA	158,325
Riparian, WTP, RTL	243,617
<i>Total Reductions to CFLB</i>	<i>401,942</i>
<b>Current Timber Harvesting Landbase</b>	<b>1,251,119</b>
<i>Future Road Reductions</i>	<i>43,789.17</i>
<b>Long Term THLB</b>	<b>1,207,330.04</b>

Table 2 compares the timber harvesting and non-timber harvesting landbase used in previous analysis projects, with the areas used in this project. The THLB area calculated for this analysis is less than .5 percent greater than that used in the NDU Analysis. This variation is considered to be well within acceptable limits. Areas vary from the TSR II figures by a greater percentage. This is largely due to updates in the data, and assumptions.

Difference between the assumptions include changes to deciduous stand inclusion, Wildlife tree patch percentages, road reductions, Identified wildlife management areas, the McLeod Lake Treaty area.

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**Table 2 Area comparison**

	<b>TSR II</b>	<b>NDU Analysis</b>	<b>2005 SFM Indicator Analysis</b>
Timber Harvesting Landbase (ha)	1,326,163	1,250,569	1,251,119
Non-Contributing Landbase (ha)	889,359	927,510	952,184
Crown Forested Landbase (ha)	2,215,522	2,178,080	2,203,303

## Management Assumptions

With the exception of Mountain pine beetle, the management assumptions used in TSR II, and the 2004 NDU Analysis will be carried through to this analysis. Below is a brief description of the key assumptions;

1. WTPs – 3.5% of the THLB (TSR II Addendum run)
2. Roads, Trails, Landings – PG Current 5.7%, Future 5.7, FSJ Current 5.6%, Future 5.7% (2004 NDU)
3. Old Forest Constraints – Natural Disturbance Unit based old seral targets (2004 NDU).
4. Deciduous partition - deciduous leading and  $\geq 17.7$ m site index included in THLB (2004 NDU).
5. Natural Disturbance in the inoperable landbase – use Disturbance rates based on professional knowledge and analysis from Craig DeLong, Regional Ecologist, Ministry of Forests, Prince George, 2003
6. Supply Block A Partition – 400,000 m<sup>3</sup> /yr

Other assumptions will be as per TSR II / Beetle II analysis.

### *Natural Disturbance Unit (Old Forest Targets)*

Unit Label	Natural Disturbance Unit	Merged Biogeoclimatic Unit (mBECs)	Minimum Percent of the CFLB retained as old forest
A1	Boreal Foothills - Mountain	ESSF wcp3, ESSF wc3, ESSF mvp2, ESSF mv2	33%
A2	McGregor Plateau	EESF wc3, ESSF wk2, ESSF wk1	26%
A3	McGregor Plateau (combined with A13)	SBS mk1, SBS mh	12%
A4	McGregor Plateau	SBS wk 1, SBS vk	26%
A5	Moist Interior - Mountain, Omineca - Mountain	ESSF wk2, ESSF mv3, ESSF mv1, ESSF mv3	29%
A6	Moist Interior - Mountain	ESSF wk1	29%
A7	Moist Interior - Plateau	SBS mh	17%
A8	Moist Interior - Plateau	SBS mc3, SBS mc2	12%
A9	Moist Interior - Plateau	SBS mw	12%
A10	Moist Interior - Plateau	SBS wk1	17%
A11	Moist Interior - Plateau	SBS dw2, SBS dw1	12%
A12	Moist Interior - Plateau	SBS dw3	12%
A13	Moist Interior - Plateau, Omineca - Mountain	SBS mk1	12%

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A14	Wet Mountain	ESSF mvp2, ESSF wcp3, ESSF mv2, ESSF wk2	50%
A15	Wet Mountain	ESSF wc3	84%
A16	Wet Mountain	SBS wk1	26%
A17	Wet Mountain	SBS vk	50%
A18	Wet Trench – Mtn.	ESSF wcp3	80%
A19	Wet Trench - Mountain	ESSF wcp3, ESSF mm1, ESSF mmp1, ESSF mvp2, ESSF mv2, ESSF wk2	48%
A20	Wet Trench – Mtn.	ESSF wc3	80%
A21	Wet Trench – Mtn.	ESSF wk1	48%
A22	Wet Trench - Valley	ICH wk3	53%
A23	Wet Trench - Valley	ICH vk2	53%
A24	Wet Trench - Valley	SBS wk1, SBS mw, SBS mk1	30%
A25	Wet Trench - Valley	SBS vk	46%

Zone or Group	Max Allowable Disturbance Area	Green-up Height (meters)	Minimum Retained Area (%)	Minimum age for retention (years)
VQO – retention	4	5	N/A	
VQO – partial retention	11	5	N/A	
VQO – modification	21	5	N/A	
VQO – max modification	33	5	N/A	
Caribou – Medium		N/A	30	80
Caribou – Corridor		N/A	20	100
Aleza Lake Research Forest	25	3		
Herrick FENs	25	3		
Other IMA	20	3		

## **Mountain Pine Beetle**

The mountain pine beetle epidemic was modeled using the provincial spread projections. Each resultant polygons was assigned a percent killed / percent pine volume lost for each year. The percent pine volume lost was then multiplied by the projected shelf-life (using conservative assumptions by dry, medium and moist sub-zones). The result was a percent of usable pine volume by polygon for year of the first 30 years of the model.

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## Analysis Units

The analysis units used in this project as based on the broad species groupings used in previous analyses. In order to facilitate the FORECAST indicator modeling and the more detailed approach to modeling the mountain pine beetle epidemic, further refinement of the analysis units was required. Analysis units for this project are made up of five characters, as indicated below. The criteria to define each analysis unit is shown in

1	2	3	4	5
<b>Natural or Managed</b>	<b>Inventory Type Group</b>	<b>Site Index</b>	<b>Pine Percent</b>	<b>Age Class</b>

Origin		Inventory Type Grp.		Site Index		Percent Pine		Age Class	
No.	Description	No.	Description	No.	Description	No.	Description	No.	Description
1	Natural	1	ITG (1 - 8)	1	All SI	1	< 10%	1	<= 40
2	Managed					2	<= 10%	2	40-80
								3	80 - 140
								4	140 +
		2	ITG (9 - 11)	1	All SI	1	All	1	All
		3	ITG (12 - 17)	1	All SI	1	All	1	All
		4	ITG (18 - 24)	1	All SI	1	All	1	All
		5	ITG (21 - 26)	1	SI <= 11.9	1	< 10%	1	<= 40
				2	SI > 11.9	2	<= 10%	2	40-80
								3	80 - 140
								4	140 +
		6	ITG (27 - 34)	1	All SI	1	<= 50 %	1	<= 40
						2	50 - 80 %	2	40-80
						3	>= 80 %	3	80 - 140
								4	140 +
		7	ITG (35 - 42)	1	All SI	1	< 10%	1	<= 40
						2	<= 10%	2	> 40

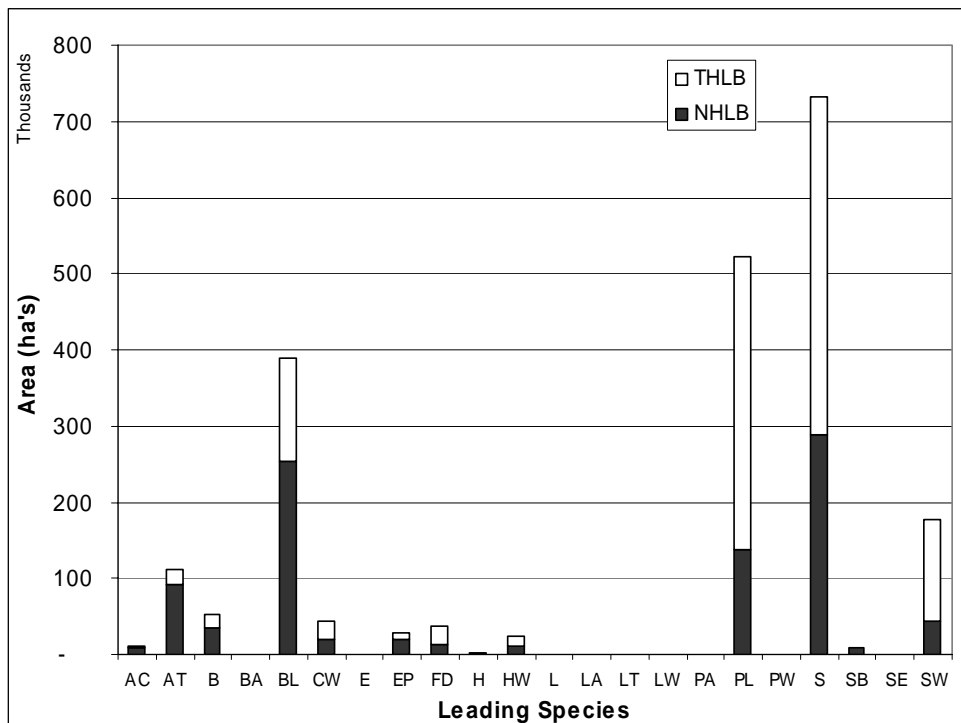
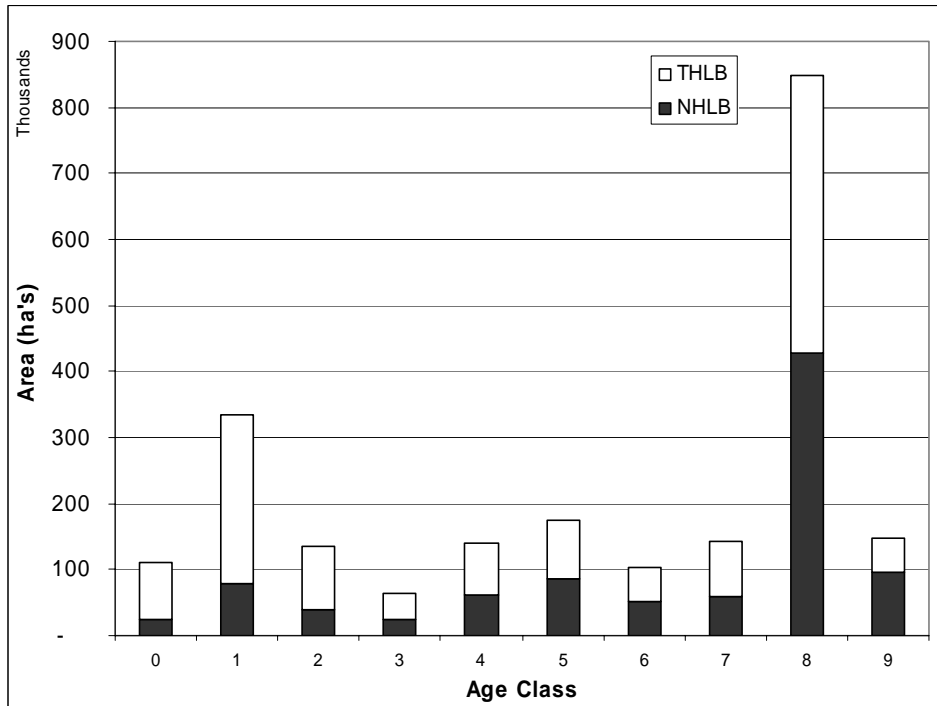
## Growth and Yield

All growth and yield assumptions were taken directly from TSR II. "Two growth and yield models were used to estimate timber volumes for the Prince George District. The variable density yield prediction (VDYP) model\* supported by the Ministry of Sustainable Resource Management, Terrestrial Information Branch, was used for estimating volumes in unmanaged coniferous stands and both unmanaged and regenerating deciduous stands. The table interpolation program for stand yields (TIPSY)\*, developed by the B.C. Forest Service, Research Branch, was used to estimate yields for coniferous managed stands. In the analysis, managed stands were defined as coniferous stands aged 12 years or younger. Where regenerating stands included a mix of coniferous and deciduous species, yield curves were developed by combining values from TIPSY and VDYP."

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### Current Conditions





## Results

Forecasted harvest levels of the Draft SFM Base Case are shown in Figure 1. The harvest levels of the expedited timber supply review for the Prince George district are provided for comparison. The first step in forecasting the SFM base case was to attempt the expedited TSR harvest levels. There was insufficient volume available in the forest district to fulfill these harvest levels, resulting in a large timber supply shortage (“crash”) between 40 and 100 years into the future. This crash is shown in red in Figure 1. Expedited TSR harvest levels were achievable beyond 100 years.

There are many possible ways to distribute the timber supply impact over a longer period to dampen the acute timber supply shortage at year 40. The approach taken for the SFM base case was to maintain the uplift harvest levels for the first ten years of the planning horizon, then step down by 10% per decade to a minimum harvest level of 2.42 million m<sup>3</sup>/year. This harvest level is maintained between 40 to 60 years before stepping up at 10% per decade until the expedited TSR harvest level of 3.64 million m<sup>3</sup>/year is resumed in year 100. The long-term harvest level of 3.71 million m<sup>3</sup>/year is reached in year 125. The average annual harvest over the first 100 years is 3.09 million m<sup>3</sup>/yr.

An alternative harvest forecast is provided to illustrate the flexibility of setting harvest levels in the medium term. The alternative approach is to maintain the uplift harvest levels for the first ten years of the planning horizon, then immediately reduce the harvest level to 2.71 million m<sup>3</sup>/year. This harvest level is maintained until year 65. A harvest level of 3.19 million m<sup>3</sup>/year is achievable between year 65 and 100. Similar to the SFM Base Case, expedited TSR harvest levels are resumed beyond 100 years. The average annual harvest over the first 100 years is 3.09 million m<sup>3</sup>/yr in the alternative harvest forecast, which is exactly the same as the Base Case.

The growing stock of the SFM Base Case and the alternative harvest forecast are shown in Figure 2. Despite small differences in growing stock development over the medium term, the total growing stock of both forecasts are the same beyond 170 years, indicating that the two harvest forecasts are equally sustainable in terms of timber supply. Total growing stock at the end of the planning horizon appears to be adequately stable. However, there are still some fluctuations at 200 years. A longer planning horizon of up to 500 years would provide more security that the Base Case long term harvest level is sustainable.

Total harvest area and average harvest volume are reliable indicators of sustainable harvest levels (Figure 3 and Figure 4). The long term harvest level is likely non-sustainable if harvest area is increasing or average harvest volume is decreasing at the end of the planning horizon. The SFM Base Case indicates stable levels of harvest area and volume.

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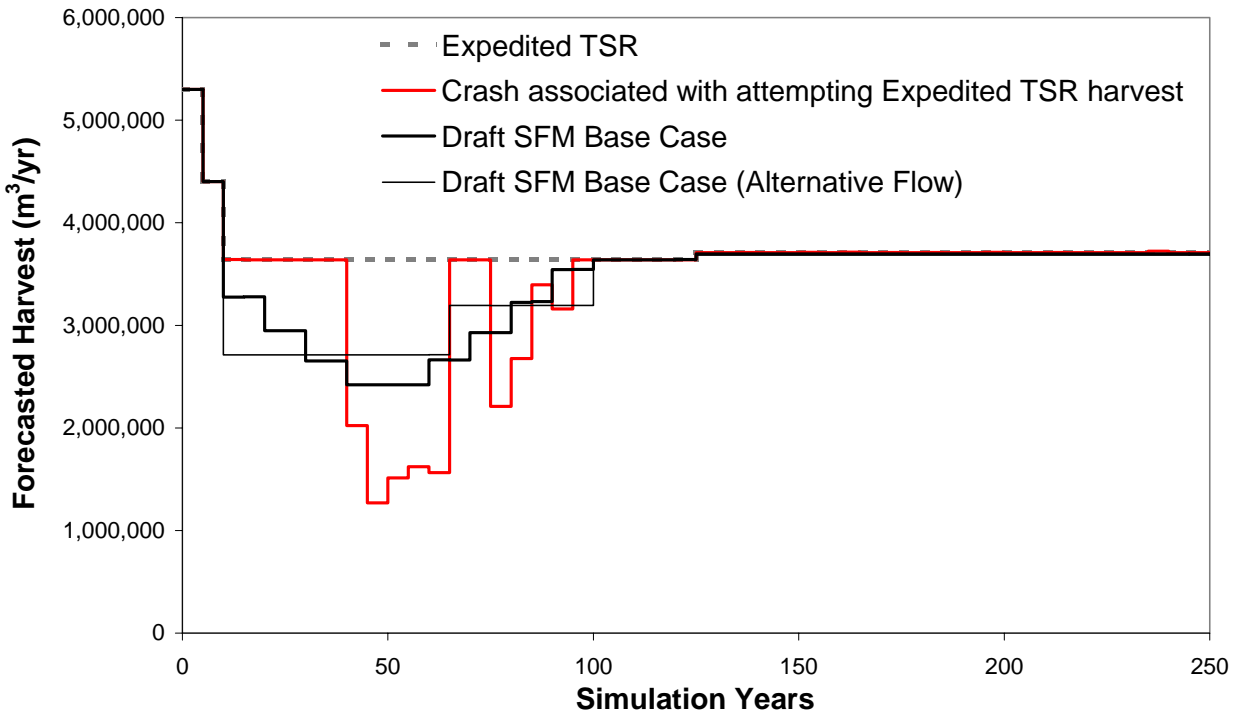


Figure 1: Forecasted Harvest levels of the Draft SFM Base Case and alternative flows

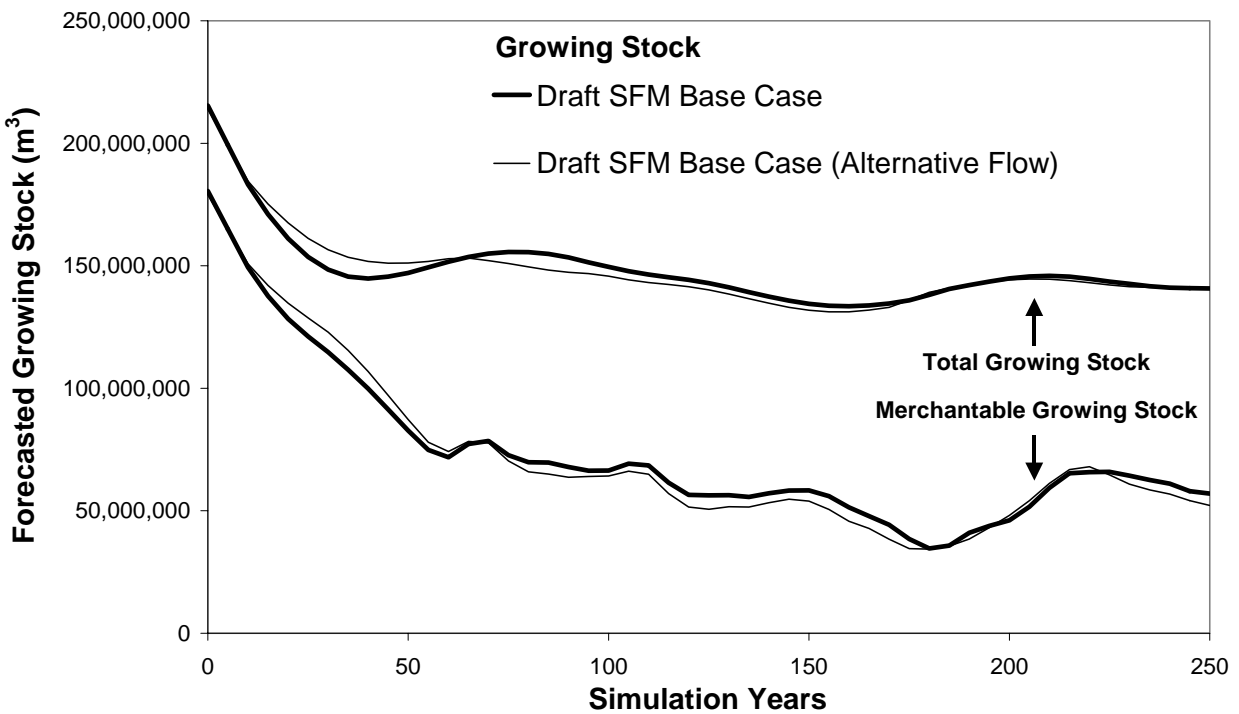


Figure 2: Forecasted growing stock of the Draft SFM Base Case and an alternative harvest flow

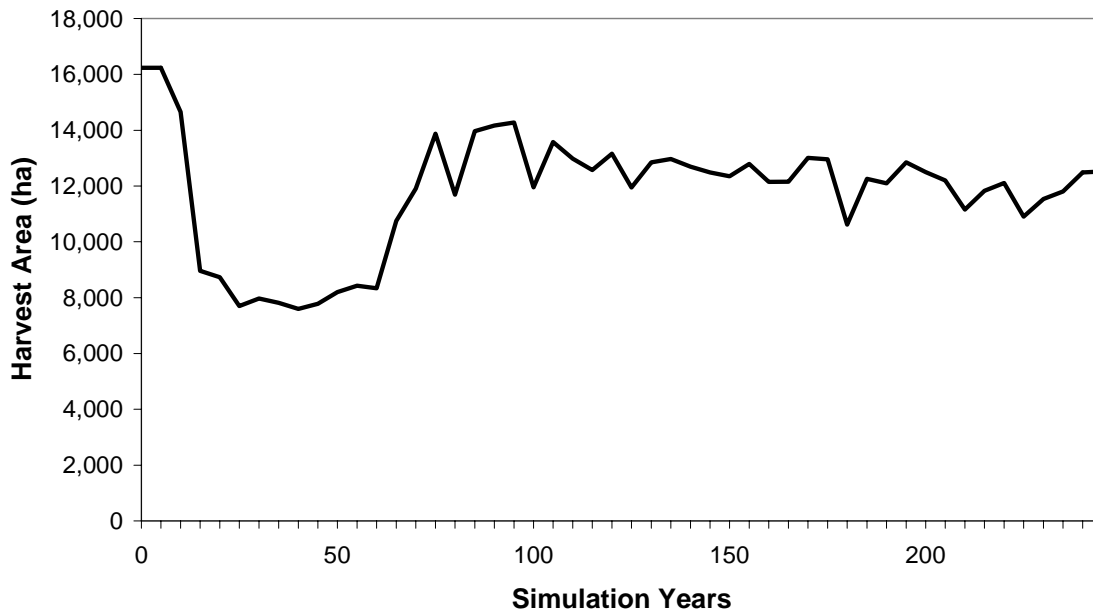


Figure 3: Total harvest area over the planning horizon in the Draft SFM Base Case

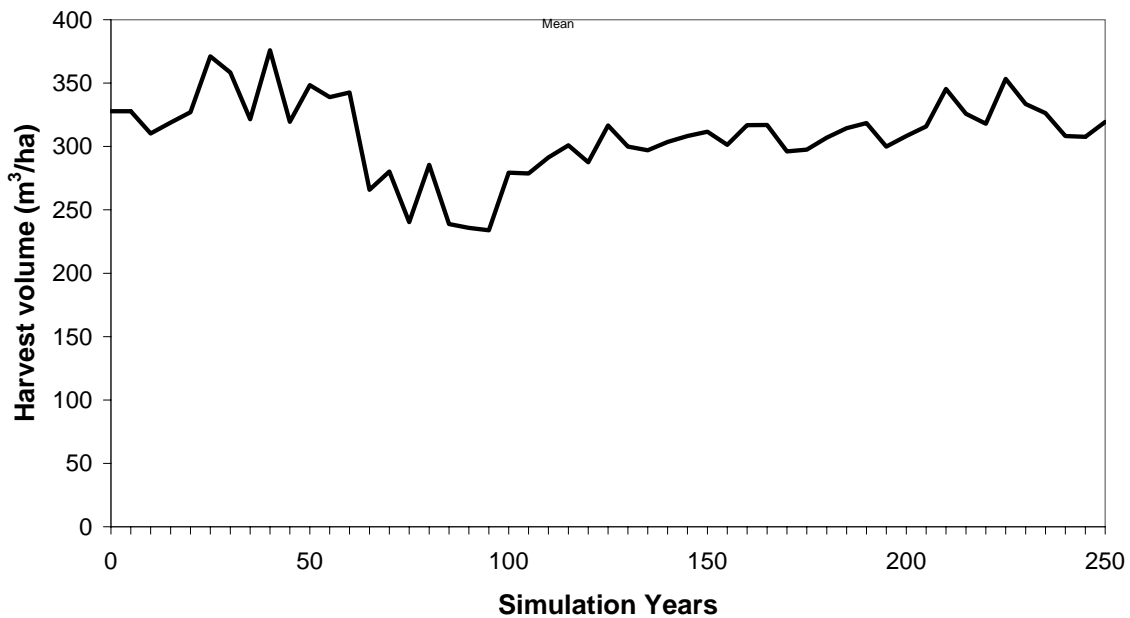


Figure 4: Average harvest volume of the Draft SFM Base Case

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### Sensitivity Analyses

Simple sensitivity analyses were performed to investigate the role of beetle attack and old growth assumptions in the timber supply analysis. The purpose of the sensitivity analyses is to determine the relative impacts of these assumptions. Simply documenting the size of the timber supply crash, rather than the associated sustainable harvest levels, is sufficient for this purpose.

Removing old growth targets substantially reduces the medium term timber supply impact of the SFM Base Case assumptions from 17.7% to 5.9%. In contrast, removing beetle attack assumptions creates a relatively minor reduction in the timber supply impact (from 17.7% to 14.1%). These results indicate that old growth targets are the key assumption responsible for the large reduction in harvest levels compared to the expedited TSR.

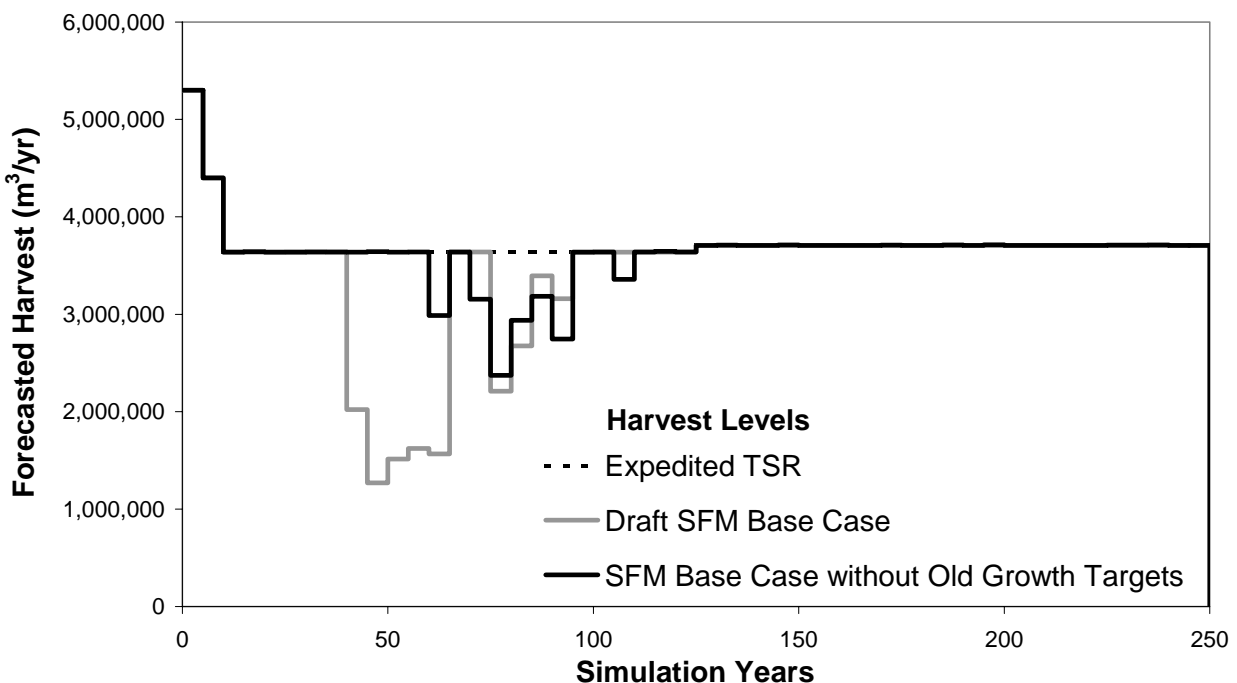


Figure 5: Timber supply crash associated with removing old growth targets from the SFM Base Case Assumptions

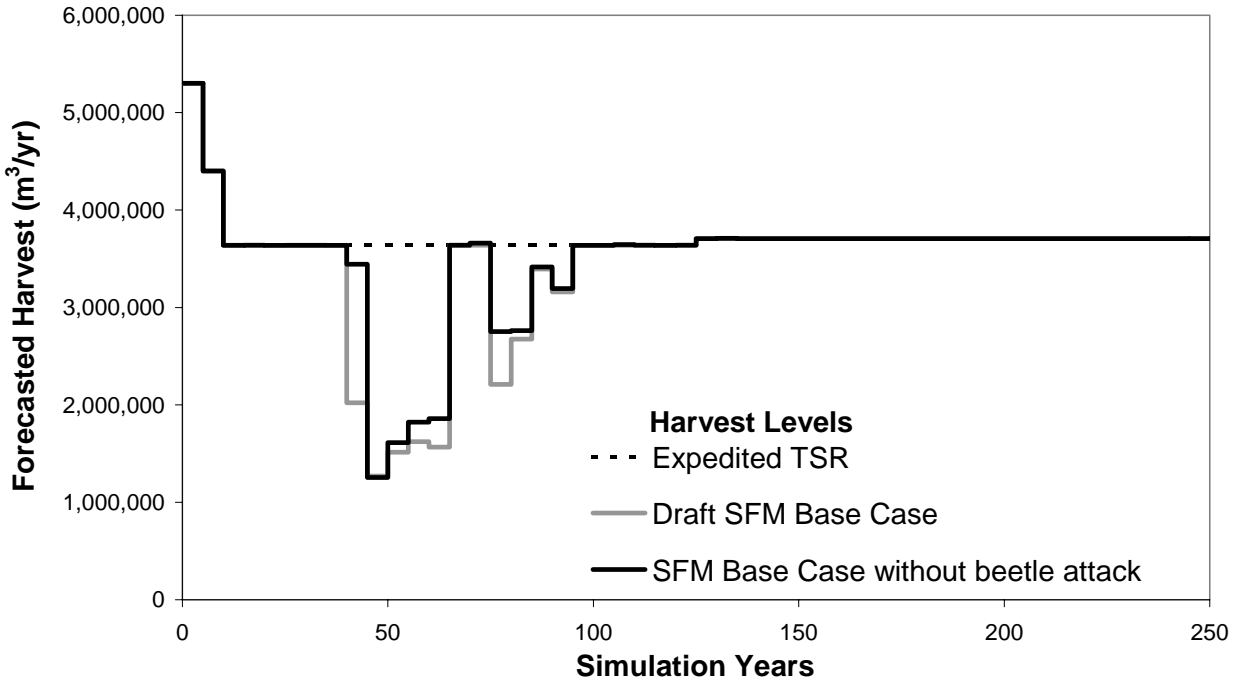


Figure 6: Timber supply crash associated with removing mountain pine beetle attack from the SFM Base Case Assumptions.

## **Discussion**

Harvest flow projections in the preliminary SFM Basecase show a 66.5 million m<sup>3</sup>/yr (17.7%) reduction in the total volume harvested over the first 100 years of the planning horizon, compared with the 2004 Expedited TSR Basecase. An initial review of the results has identified 3 major factors that may be contributing to this shortfall.

### **Mountain Pine Beetle Future Attack**

The SFM Basecase incorporates the provincial projections for future spread of the MPB epidemic. The 2004 Expedited TSR did not model future spread of the MPB. The approach taken in the SFM Basecase will have a significant downward pressure on the medium term timber supply.

### **Scale of Analysis**

Previous analysis projects have focused on the Prince George TSA as a whole, while the SFM Basecase is concerned with only the Prince George district. Whenever the size of an analysis area is reduced, the model is more constrained in finding stands for harvest. In the Prince George TSA, there is a wide variety of forest types, and subsequently forest dynamics, that result in the harvest shifting around between the Prince George District and the Ft. St. James district (particularly in the medium term, following the reduction in available volume resulting from the MPB epidemic). The smaller scope of this project will have a downward pressure on the medium term timber supply.

### **Natural Disturbance Unit Old Seral Targets**

The 2004 Expedited TSR dealt with landscape level biodiversity using Landscape Unit / BEC based old seral targets. In the SFM Basecase, natural disturbance unit / merged biogeoclimatic variant based old seral targets were used (based on the 2004 NDU Analysis). The variation between the two set of old forest targets is another possible source of downward pressure on the mid-term harvest level. The 2004 NDU Analysis showed a minimal impact on the timber supply using the NDU/mBEC targets. That analysis was based on the entire TSA, while the SFM Basecase only applies to the Prince George district. The effects of different analysis scale is discussed above.

These three factors, may explain the reduction in available volume in the short term. Further exploration of the model results will confirm or exclude them as factors.

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## APPEDIX I

We have obtained the spatial year 2 results for the provincial level projection of the mountain pine beetle attack (BCMPB2). We are proposing to use this data to model volume losses to mountain pine beetle in the Prince George and Fort St. James CSA forecasting projects.

The BCMPB2 data is advantageous for CSA forecasting because:

- It is the best available projection of how the beetle attack will proceed;
- It is spatial, allowing meaningful projections of other indicators that are spatially variable;
- Most of the assumptions about beetle are built into the projection, which reduces the research involved in creating and seeking approval for new assumptions.

This memo briefly describes the BCMPB2 data and how it will be incorporated into the CSA forecasting project. It also poses a list of questions that need to be answered before proceeding with this method.

### ***Year 2 BCMPB data***

All data was provided on a 16-ha grid and is complete for the province. Marvin Eng provided the “no harvest” scenario, which gives cumulative percent pine killed in each grid cell *assuming that there is no harvesting after 2004*. This is good because it means we can do our own harvesting and do not have to incorporate their management assumptions. The projection is annual and proceeds until 2024, by which time most of the susceptible pine volume is killed. Marvin also provided some of the input data in grid form (age, ITG, total volume, pine volume, susceptibility).

### ***Application in CSA Forecasting***

There are two challenges in converting the BCMPB data into a form that we can use in the CSA forecasting projects:

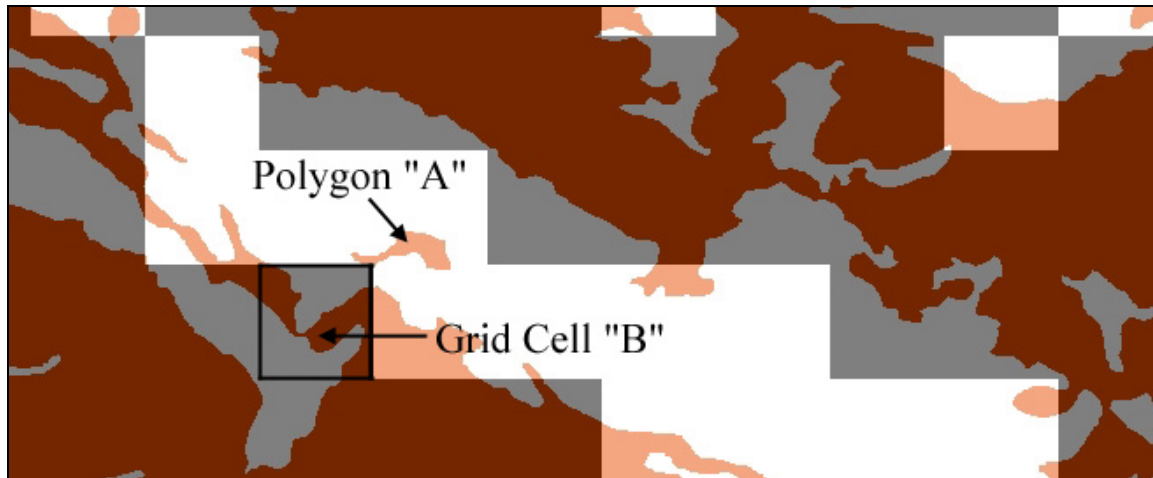
1. Getting the grid data into the resultant polygons
2. Converting “% killed” to “% volume lost” using shelf life curves.

### ***Getting the grid data into the resultant polygons***

Beetle attack in the BCMPB projection only occurs in susceptible grid cells. Simply rating the grid data onto the resultant is not sufficient for our purposes because it will “orphan” susceptible resultant polygons that occur in non-susceptible grid cells. There is also the inverse problem that pine could be killed in non-susceptible stands.

We will classify resultant polygons into susceptible and non-susceptible using the same criteria used to classify the grid. Then, susceptible polygons will be assigned the attack sequence of the nearest susceptible grid cell (within some tolerance: e.g. 1km). This process is illustrated in Figure 7.

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**Figure 7:** susceptible grid cells are shown in dark gray, susceptible resultant polygons are shown in red. Polygon "A" is in a non-susceptible grid cell. Our method will assign this polygon the attack sequence of grid cell "B."

### Converting "% killed" to "% volume lost" using shelf life curves

Once the BCMPB grid attributes have been assigned to susceptible resultant polygons, each polygon will have:

- An attack chronosequence of % pine volume killed (from BCMPB)
- A shelf life curve that varies depending on general climate categories ("Dry", "Moist", and "Wet" BGC subzones; also from BCMPB).

The chronosequence and shelf life curve can be combined to produce a curve of percent pine removed from timber supply availability ("loss curve"). The loss curves will be unique to each grid cell, and so will need to be simplified to produce a dozen or so general loss curves. The general loss curves are the inputs to FSOS.

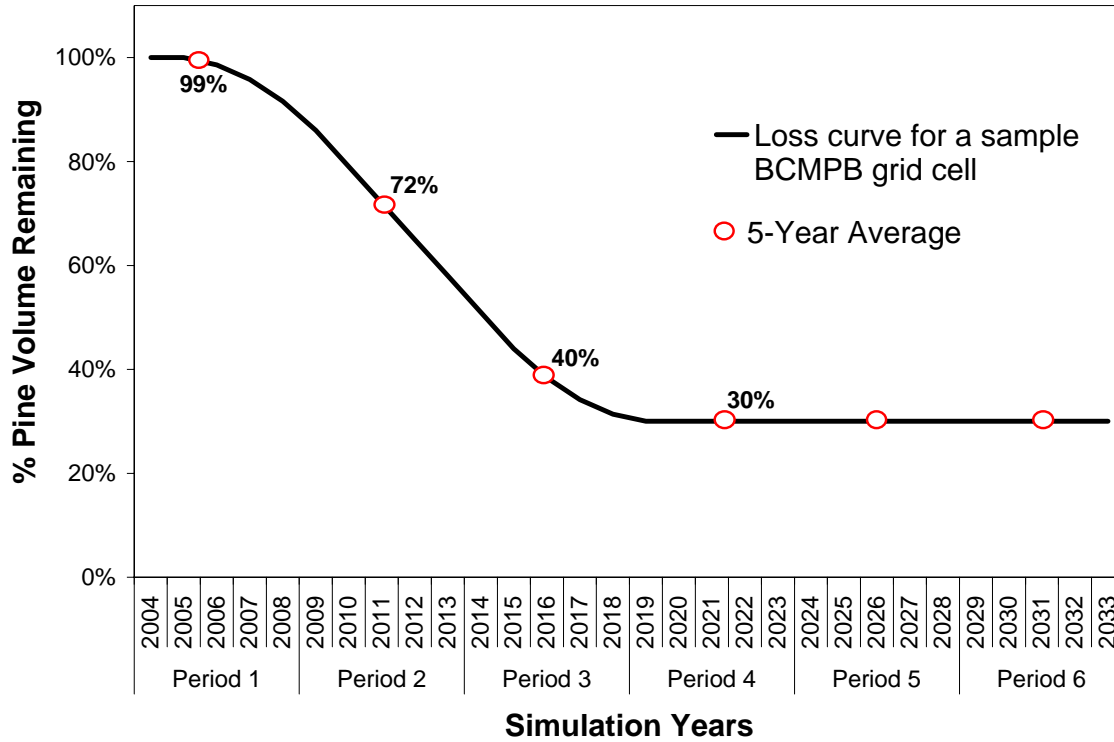
### ***Modeling beetle attack in FSOS***

A hypothetical loss curve is shown in Figure 8. This loss curve would be applied to the pine volume of all susceptible resultant polygons covered by the associated BCMPB grid cell.

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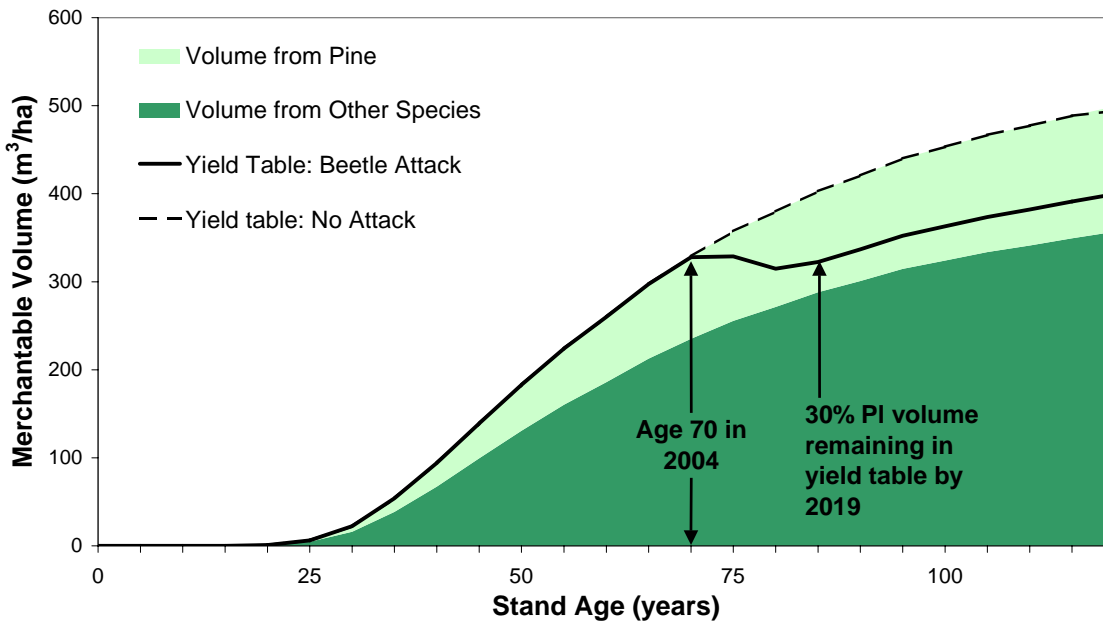
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**Figure 8: Volume loss curve for a hypothetical BCMPB grid cell.**

Figure 9 gives an example of how the loss curve would be applied in a single resultant polygon. The hypothetical stand in this example contains a minority component of pine. It is 70 years old in 2004 (the start of the analysis). The yield adjustment for mountain pine beetle attack is 99% in 2004, meaning that the pine component of the stand is reduced by 1%. At age 75, the merchantability of some of the pine volume in the stand has begun to decrease, and the yield adjustment has dropped to 72% of the original merchantable pine volume. By 2019, at age 85, the shelf life of the attacked wood in the stand has passed, and the 30% pine component that is assumed to be unattacked continues to grow normally from this point on. The adjusted yield table would look different for a stand that is 100 years old in 2004, because the successive reductions to the yield table would begin at 100 years rather than at 70 years stand age.



**Figure 9: example of how the yield adjustment curves are applied to the yield tables of susceptible stands in the timber supply analysis.**

### ***Outstanding Issues***

Many issues are resolved by using the BCMPB2 data. Nevertheless, some questions remain:

- What is an appropriate regeneration delay for high-pine-component stands that remain unsalvaged?
- What is an economically feasible shelf life for beetle-killed wood from stands in the study area?

### ***Shelf Life***

The merchantability of beetle-killed wood remains an important uncertainty for projecting the timber supply impact of the MPB epidemic. The status quo shelf life assumption in most timber supply analyses to date have assumed 100% retention of merchantability for 10 years, after which the volume is no longer usable (BC MoF 2004; Foresite 2004). However, the year 2 BCMPB assumptions indicate that 10 years is probably an optimistic shelf life assumption for the Prince George TSA. They provided “pessimistic”, “conservative”, and “optimistic” shelf life assumptions for “Dry”, “Moist”, and “Wet” groups of BGC subzones (Figure 10). All climate categories occur in the Prince George and Fort St. James Forest Districts.

An important distinction was made between shelf life for sawlogs and “alternative” volume (pulp, OSB, fuel, etc.). The conservative assumption is that all volume is available for sawlogs and alternative uses for 3-5 years after attack. No volume is

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available for sawlogs after 5-7 years, but decreasing volumes for alternative uses are available for 10-15 years after attack. Determining the average economically feasible shelf life for stands in the study area is an issue. FESL proposes to use a shelf life curve between the curves for sawlogs and alternative products.

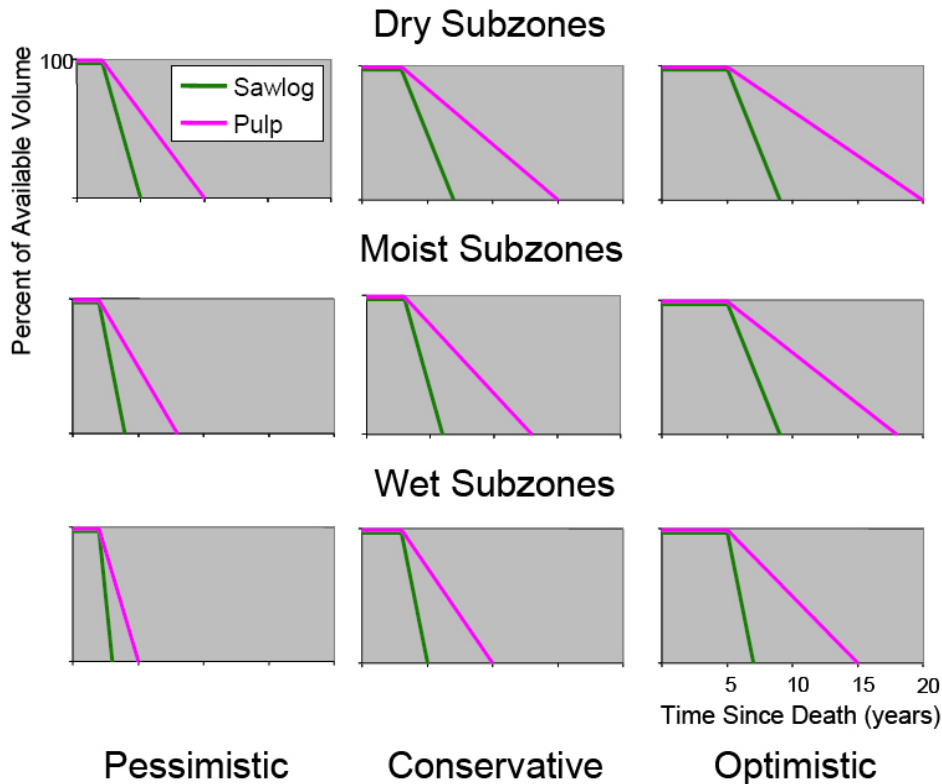


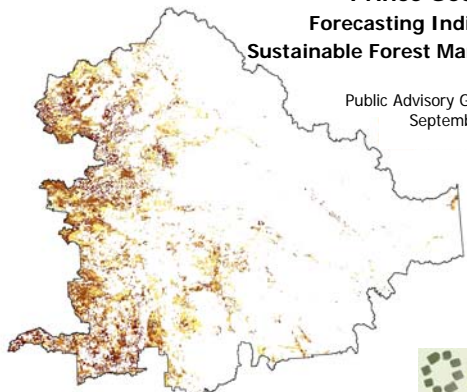
Figure 10: BCMPB shelf life assumptions for moist climates. Shelf life is differentiated between sawlogs (green) and alternative products (red).


**Regeneration Delay**

Unsalvaged stands with a low to moderate percentage of pine will be assumed to continue to grow as mature stands. However, stands with a high component of pine will be assumed to break up and regenerate naturally after beetle attack. The recent Expedited TSR used a regeneration delay of 15 years from the time off attack, while the 2004 NDU analysis used a regen delay of 10 years following the stand being declared dead. FESL proposes to use regen delay of 10 years after the stand is dead. This approach provides modeling results that can be interpreted in a more straight forward way.

**Prince George DFA**  
**Forecasting Indicators for**  
**Sustainable Forest Management**

Public Advisory Group Meeting  
September 24<sup>th</sup>, 2005



 forest ecosystem solutions ltd.

Outline

- **Background on forest level modeling**
- **Scenarios and indicators**
- **Assumptions of the analysis**
- **Scenario comparison**
- **Discussion/questions?**

Forest Level Modeling for CSA Forecasting

“Man plans, God laughs.”

Forest Level Modelling for CSA Forecasting

- ◆ Some forecast without modelling.
- ◆ Prince George licensees had data set readily available for modelling;
  - ◆ Allowed for more thorough investigation.
  - ◆ Deadlines reduced flexibility in terms of using any additional data sources.
- ◆ Not an AAC determination;
- ◆ Means to learn how different management approaches may impact indicators.
- ◆ Nothing carved in stone; adaptive management, continuous improvement.
- ◆ This the beginning, not the end.

Forest Level Modelling for CSA Forecasting

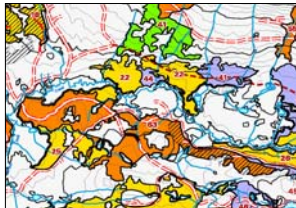
- ◆ Establish baseline.
- ◆ Develop scenarios.
- ◆ Compare scenarios (indicators) with base line.
- ◆ Develop SFM scenario for certification.

Forest Level Modelling Background  
Basic Concepts

- ◆ Models grow and harvest trees in an area (Prince George Forest District = forest estate).
- ◆ Attempt to simulate real life.
- ◆ Harvesting in models is governed by combination of many objectives (old growth retention rules, visual quality rules, timber targets etc.)
- ◆ Inventory: how much volume in the forest now.
- ◆ Growth and yield: how fast trees grow and how much volume they produce in the course of time.

### Forest Level Modelling Background Basic Concepts

- Inventory an input into forest estate models.
- Growth and yield models are inputs into forest estate models.
- Not possible to model/predict tree/forest growth as easily as some other parameters; animal science.
- Polygon



### Forest Level Modelling Background Basic Concepts

- Traditionally modeling has focused on tree and stand volume in both stand level and forest estate modeling.
- Outputs were traditionally volumes (harvest level over 250 years etc.)
- Focus has changed and other outputs - often habitat related - are desired.
- Little habitat data available - expectations from modern analyses often in conflict with this.

### Forest Level Modelling Background Sources of Uncertainty

- predicting future (very far) is difficult. Ways to mitigate.
- variation in the source data; which set of yield curves? Inventory adjustments etc.
- how well the management problem is interpreted;
- how well the modeler translates that interpretation into model terms; and
- how well the modeler interprets and presents the results.

### Forest Level Modelling Background Reality of Analysis Projects

- data gathering and integration problems;
- changing rules and concepts;
- "scope creep";
- uncertainty;
- need to interpret solutions; and
- lack of funding and time.

### Forest Level Modelling Background Uses for Modelling

- strategic/tactical forest management planning
- sustainable forest management assessment and scenario testing
- policy and land use regulation testing
- land use objective assessment
- habitat and ecological analysis

### Scenario Description

- **Scenario 1: Base Case**  
Best guess at current reality, includes MPB
- **Scenario 2: Enhanced Biodiversity**  
Increase old growth targets by 20%
- **Scenario 3: Increased Conservation**  
Increase stand-level retention by 10%
- **Scenario 4: Incremental Silviculture**  
Increase volume and height growth by 20%
- **Scenario 5: No Harvest**  
No harvest (natural disturbance only)
- **Scenario 6: Worst Case Beetle Epidemic**  
Beetle attack more widespread and shelf life shorter

Indicators

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Monitoring Indicators

**Indicator 5.ix:**

"The number of opportunities given to the public and stakeholders to express forestry related concerns and be involved in our planning processes."

Indicators

---

Some indicators are input assumptions

**Indicator 1.2.A.a.1:**

"The percentage of forest operations consistent with approved provincial Caribou Ungulate Winter Range requirements as identified in operational plans."

Indicators

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Peripheral Forecasting Indicators

**Indicator 5.iii:**

"Areas with stand damaging agents will be prioritized for treatment."

Indicators

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Core Forecasting Indicators

**Indicator 1.i:**

"The amount of old forest by NDU/merged BEC within the DFA."

Indicators

---

Timber Harvest  
Old Forest  
Beetle Salvage  
Visual Quality  
UWR - Caribou  
UWR - Mule deer  
Ecosystem Carbon  
Coarse Woody Debris  
Forestry-related employment  
Old Interior Forest  
Early Seral Patches  
Wildlife Tree Retention  
Riparian Management  
Seed Use  
Watershed Hydrology  
Landscape Level Reserves

Base Case Assumptions

---

Assumptions of CSA Forecasting build on previous projects:

- Expedited timber supply analysis for the Prince George Timber Supply Area (MoF 2004)
- Natural Disturbance Unit Analysis for the Prince George Timber Supply Area (Forsite 2004)

**What's new in this analysis:**

- Old Forest Objectives – Natural Disturbance Unit (NDU) based old seral targets
- New mountain pine beetle assumptions
- Modeling for the Prince George District only

Base Case Assumptions  
Comparison of the Forested Land Area

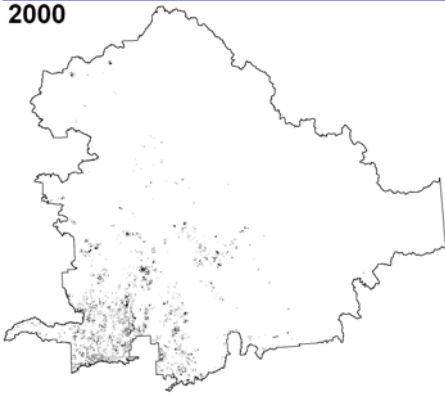
	TSR II	2005 SFM Indicator	
		NDU Analysis	Analysis
Timber Harvesting Landbase (ha)	1,326,163	1,250,569	1,261,584
Non-Contributing Landbase (ha)	889,359	927,510	927,887
Crown Forested Landbase (ha)	2,215,522	2,178,080	2,189,471

Base Case Assumptions  
Mountain Pine Beetle

- What has it attacked?
- What will it attack?
- What happens to stands after attack?
- For how long is the wood usable?

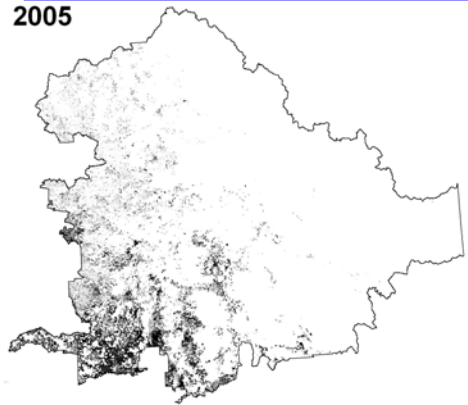
Provincial-Level MPB Projection (BCMPB2)

**2000**



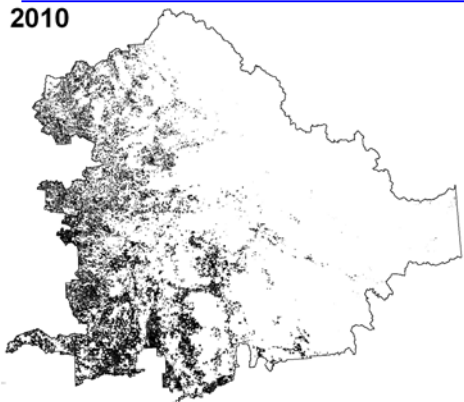
Provincial-Level MPB Projection (BCMPB2)

**2005**



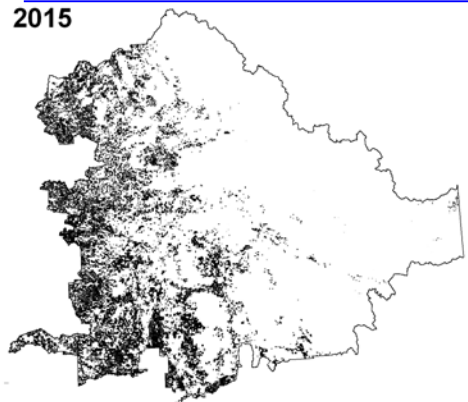
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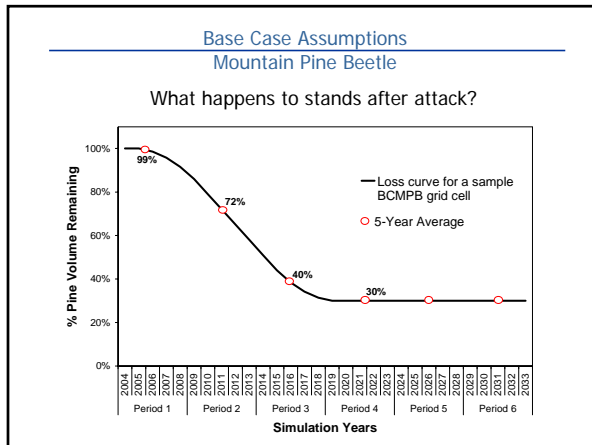
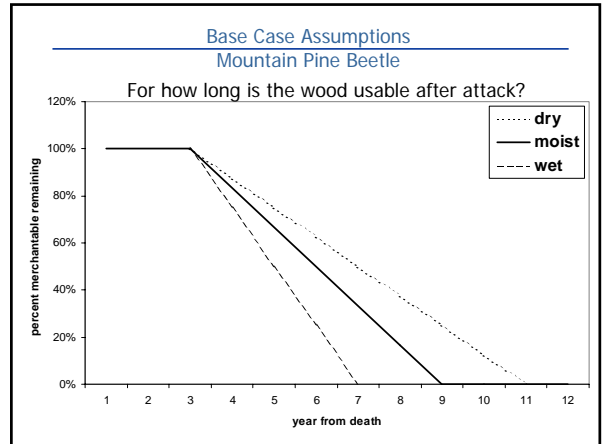
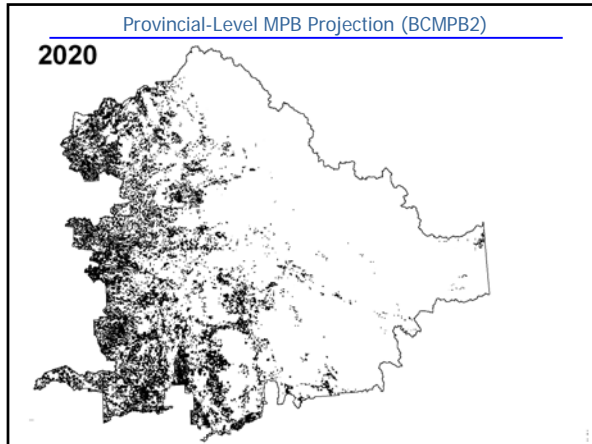
**2010**



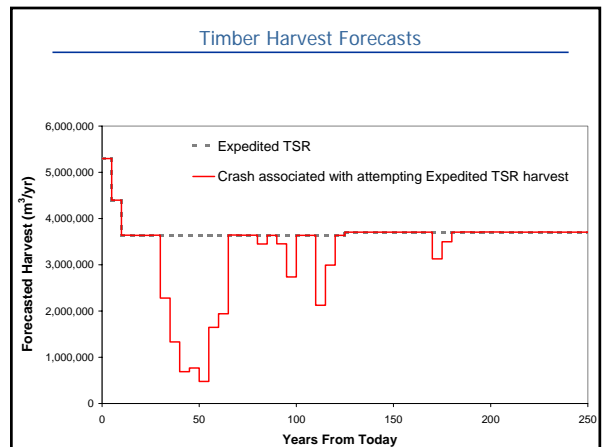
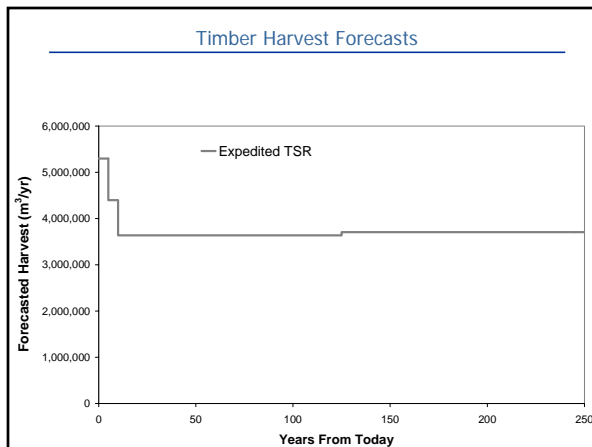
Provincial-Level MPB Projection (BCMPB2)

**2015**

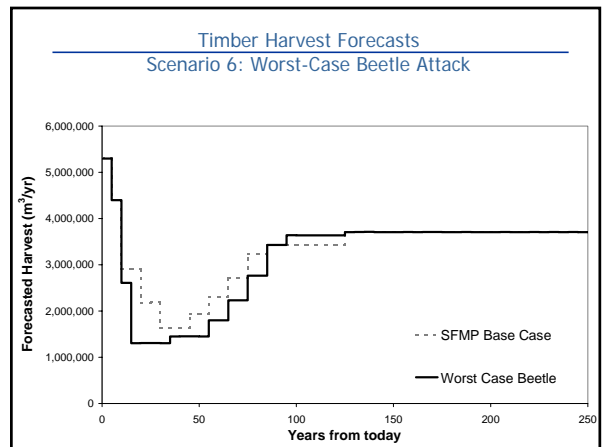
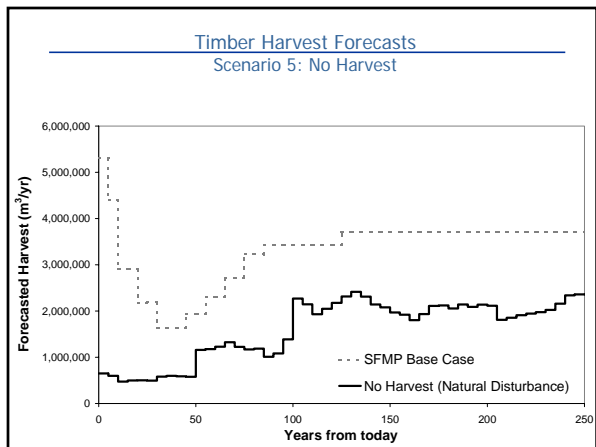
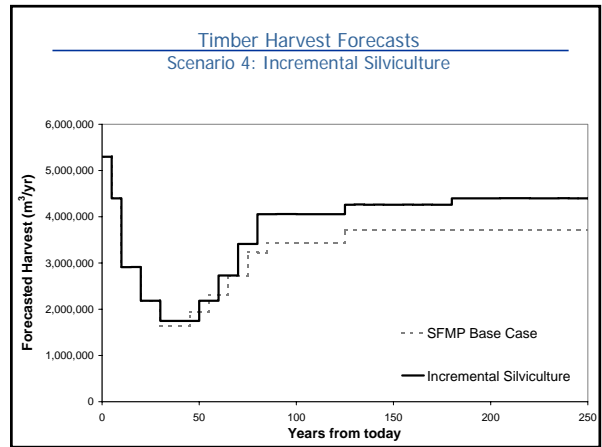
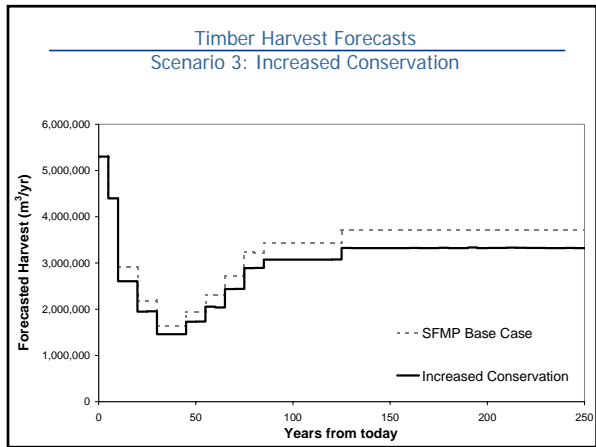
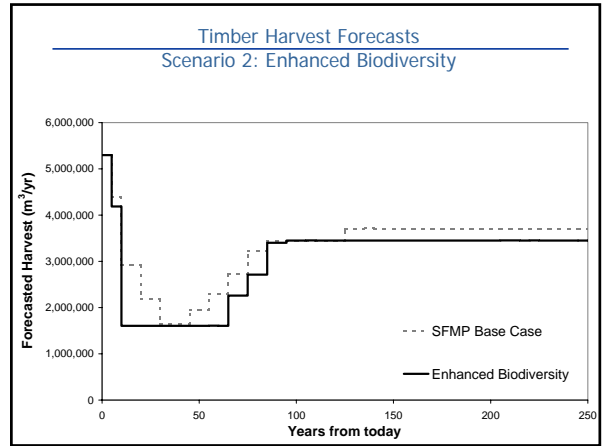
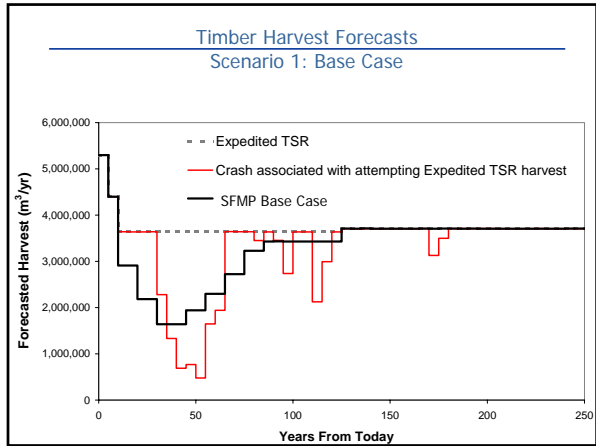


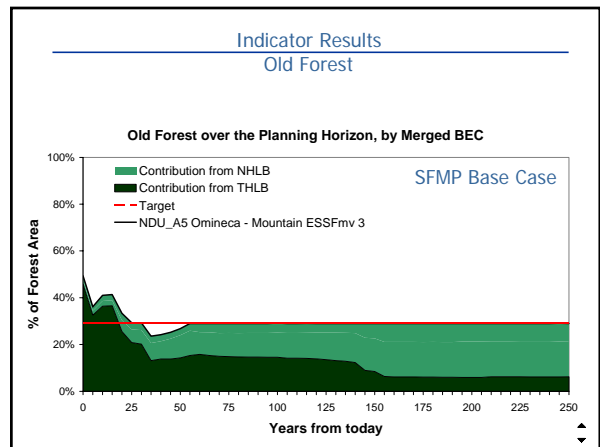
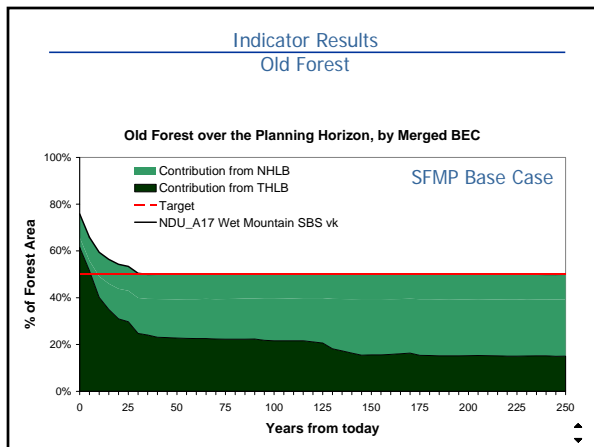
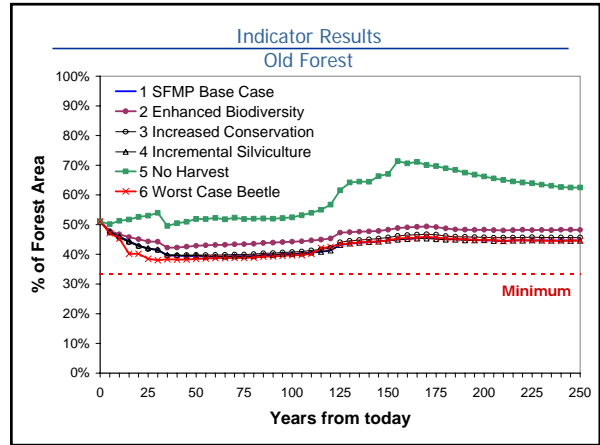
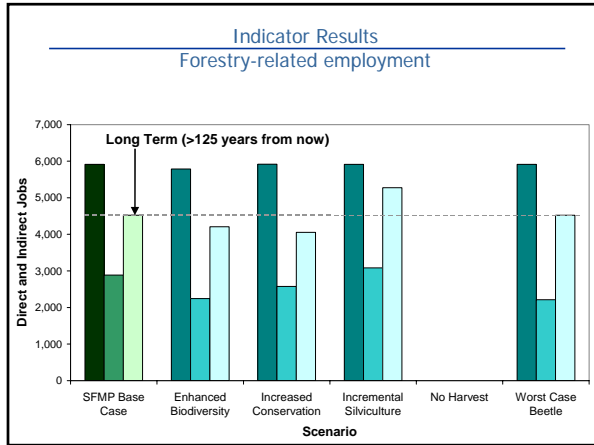
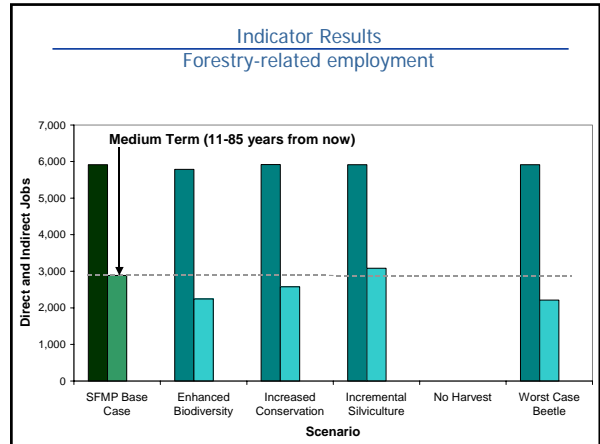
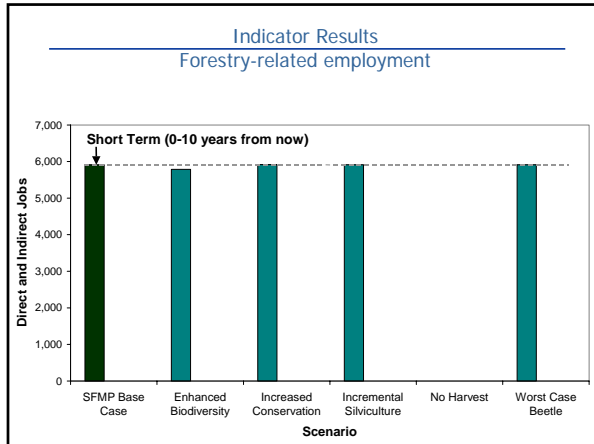


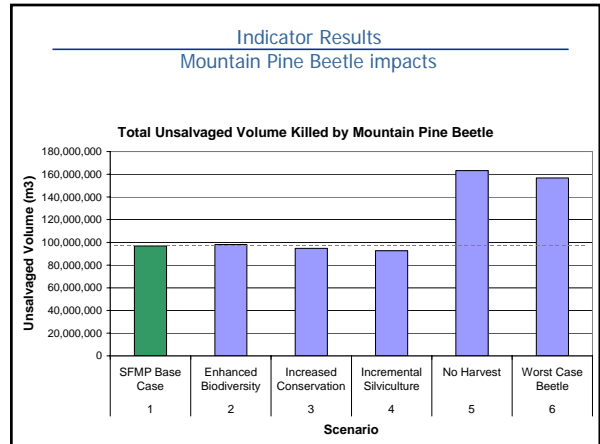
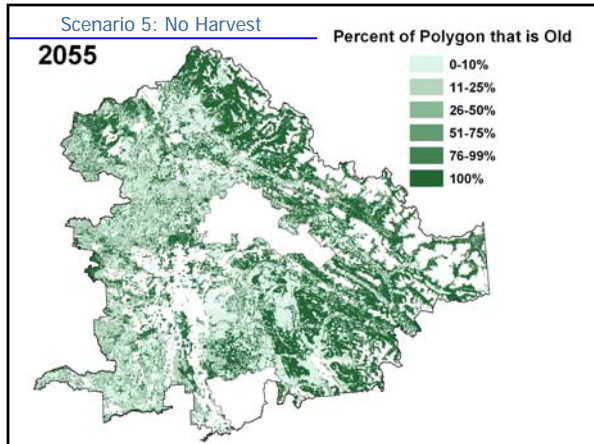
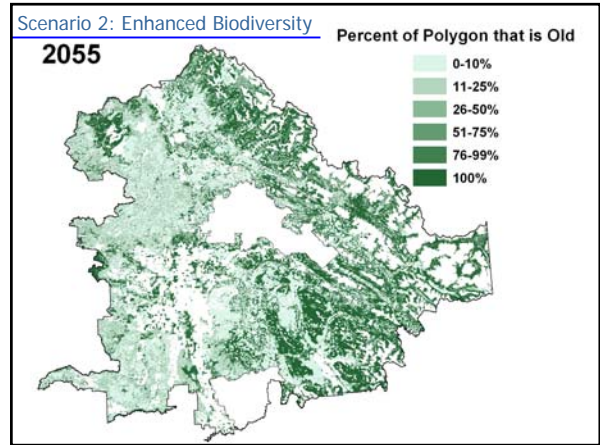
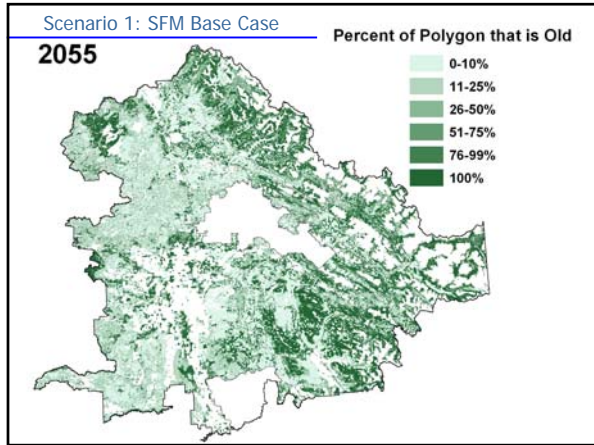
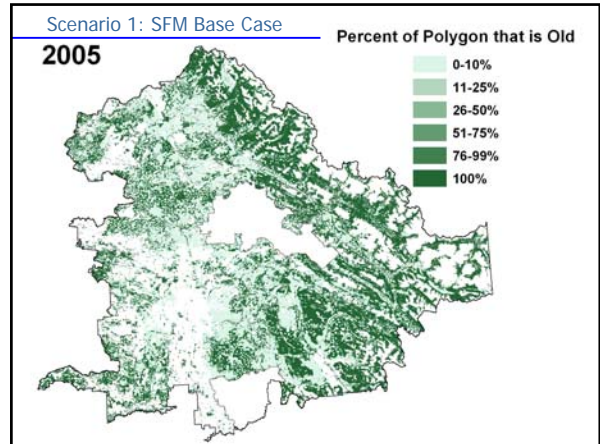
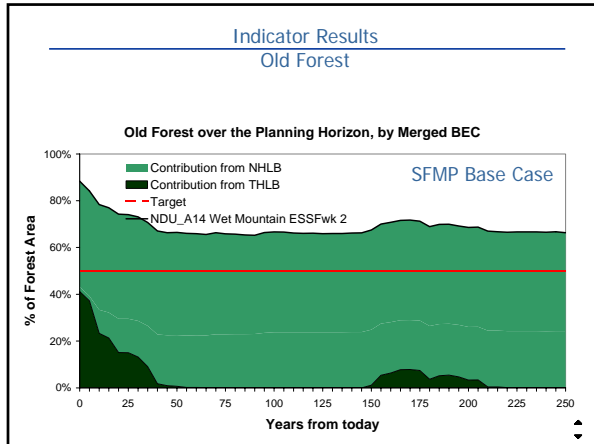
- ### Results
- Timber Harvest Forecasts
  - Scenario Comparisons
    - Employment
    - Old Forest
    - Beetle Salvage
    - Visually sensitive areas
    - Ungulate winter range
    - Carbon
    - Coarse Woody Debris & Snags
  - Indicator Overview

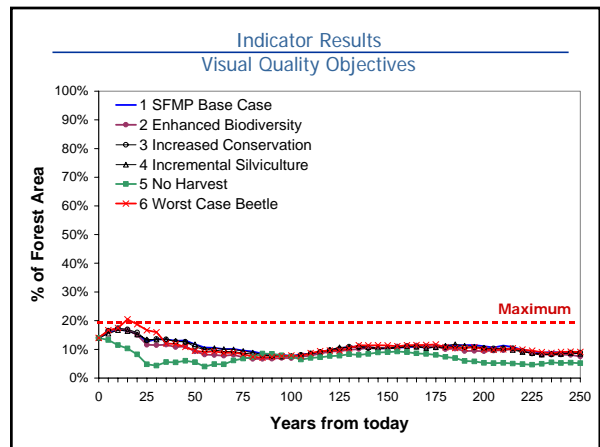
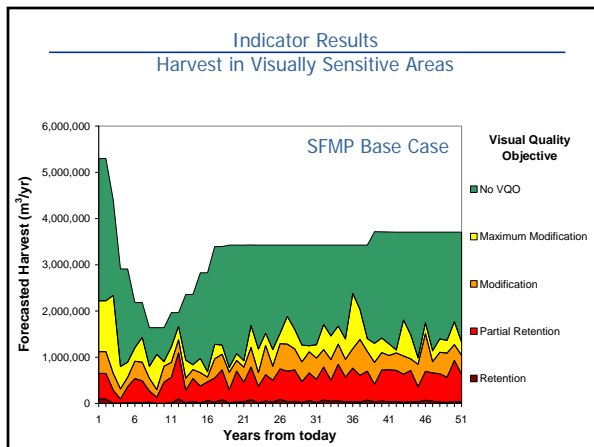
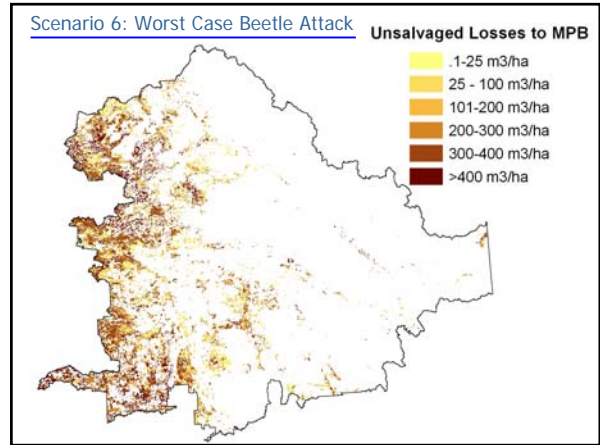
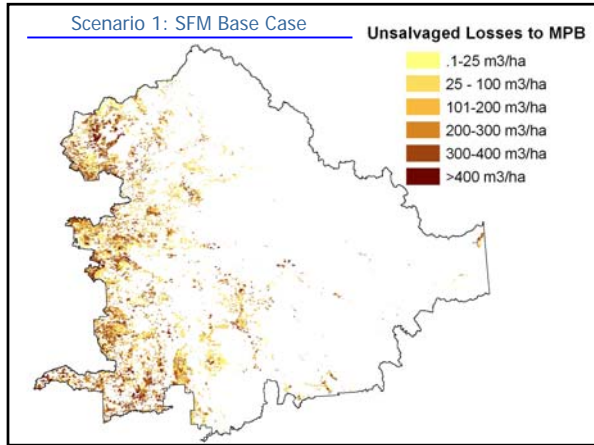
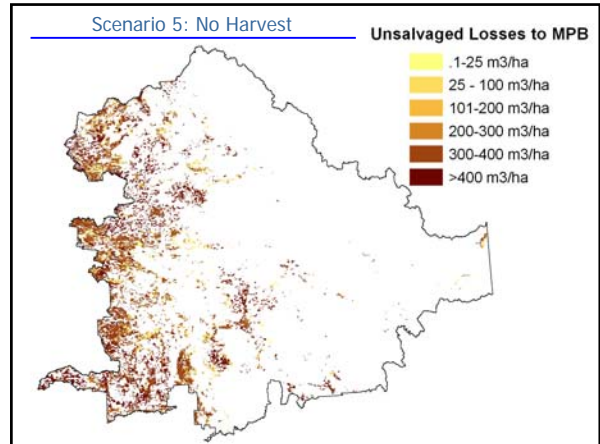
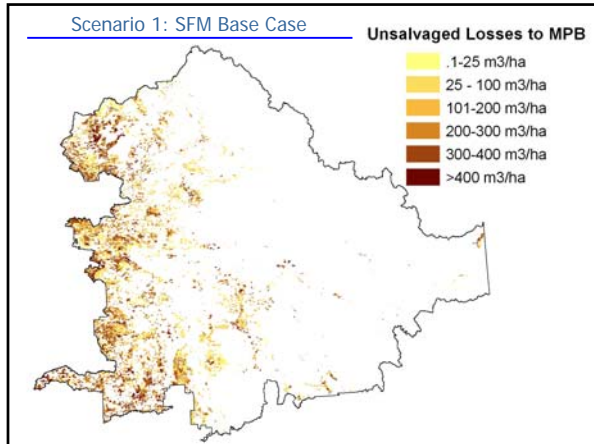


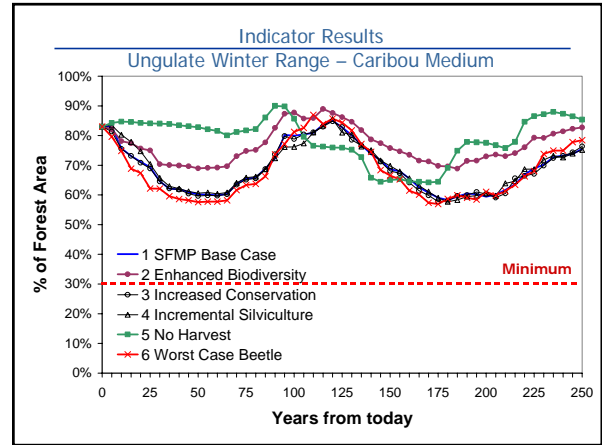
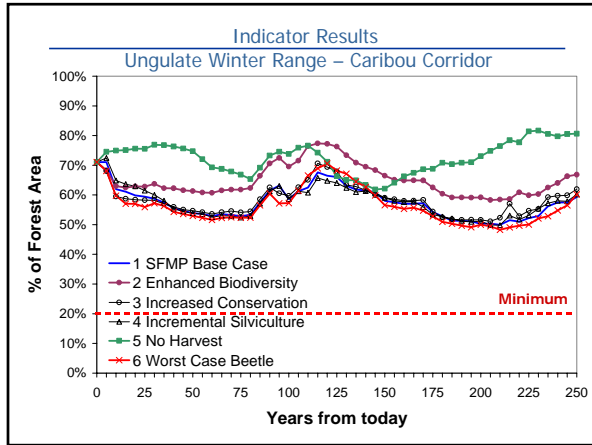
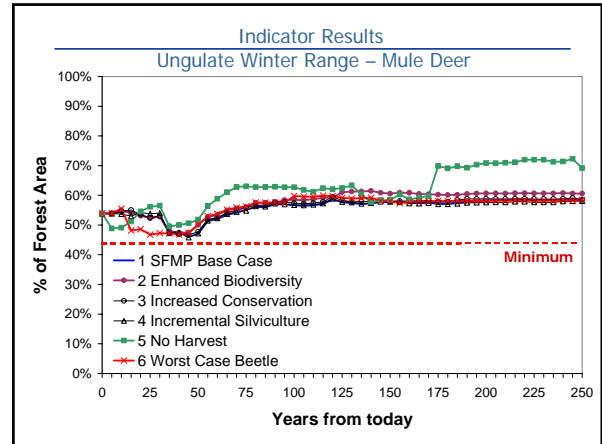
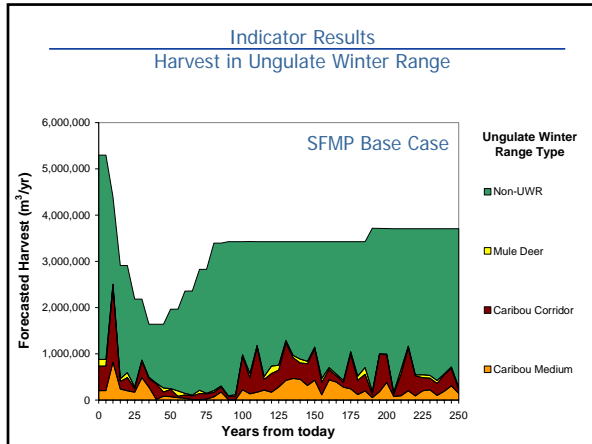












### Indicator Results Summary of Trends

Indicator	Scenario 1 SFMP Base Case	Scenario 2 Enhanced Biodiversity	Scenario 3 Increased Conservation	Scenario 4 Incremental Silviculture	Scenario 5 No Harvest	Scenario 6 Worst Case Beetle
Timber Harvest	o	-	-	+	---	--
Old Forest	o	+	o	o	+++	-
Beetle Salvage	o	o	-	+	---	--
Visual Quality	o	+	o	o	++	-
UWR - Caribou	o	++	o	o	+++	-
UWR - Mule deer	o	o	o	o	+	-
Ecosystem Carbon	o	+	TBA (+)	o	+	-
Coarse Woody Debris	o	+	TBA	+	+	o
Forestry-related employment	o	-	-	+	---	--
Old Interior Forest	o	TBA (+)	TBA (o)	TBA (o)	TBA (++)	TBA (-)
Early Seral Patches	o	TBA	TBA	TBA	TBA	TBA
Wildlife Tree Retention	o	o	++	o	+++	o
Riparian Management	o	o	+	o	?	o
Seed Use	o	o	o	++	n/a	o
Watershed Hydrology	o	TBA (+)	TBA (+)	TBA (+)	TBA (+/-)	TBA (-)
Landscape Level Reserves	o	++	o	o	++	o

### Indicator Results Summary of Trends

Indicator	Scenario 1 SFMP Base Case	Scenario 2 Enhanced Biodiversity	Scenario 3 Increased Conservation	Scenario 4 Incremental Silviculture	Scenario 5 No Harvest	Scenario 6 Worst Case Beetle
Timber Harvest	o	-	-	+	---	--
Old Forest	o	+	o	o	+++	-
Beetle Salvage	o	o	-	+	---	--
Visual Quality	o	+	o	o	++	-
UWR - Caribou	o	++	o	o	+++	-
UWR - Mule deer	o	o	o	o	+	-
Ecosystem Carbon	o	+	TBA (+)	o	+	-
Coarse Woody Debris	o	+	TBA	+	+	o
Forestry-related employment	o	-	-	+	---	--
Old Interior Forest	o	TBA (+)	TBA (o)	TBA (o)	TBA (++)	TBA (-)
Early Seral Patches	o	TBA	TBA	TBA	TBA	TBA
Wildlife Tree Retention	o	o	++	o	+++	o
Riparian Management	o	o	+	o	?	o
Seed Use	o	o	o	++	n/a	o
Watershed Hydrology	o	TBA (+)	TBA (+)	TBA (+)	TBA (+/-)	TBA (-)
Landscape Level Reserves	o	++	o	o	++	o