Fort St. John Pilot Project

Sustainable Forest Management Plan #3

Original approval: May 4, 2018
Amendment 1 approval: April 19, 2021

by

Regional Executive Director,
Ministry of Forests Lands and Natural Resource Operations,
Northeast Region

and the

Director Resource Management,
Ministry of Forests Lands and Natural Resource Operations,
Northeast Region



Updated October 15, 2021

Preface

The Sustainable Forest Management Plan #3 for the Fort St. John Pilot Area was prepared according to the Fort St. John Pilot Project Regulation and the Canadian Standards Association Sustainable Forest Management Standard CAN/CSA-Z809-16.

This SFMP is based upon SFMP# 2. Very minor revisions were made to SFMP# 2 to create SFMP# 3. The indicator revisions were discussed with the PAG on March 17, 2015. A summary of the revisions made to are described in Appendix 20 Table 51. SFMP# 3 was available for public review December 21, 2015 to March 30, 2016. The SFMP was revised December 30, 2017 to incorporate new indicators 68 and 69 and February 7, 2018 to address comments provided by the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (MFLNRORD). The SFMP was approved by MFLNRORD May 4, 2018.

Although this public document is intended to be useful to a wide variety of readers, emphasis is placed towards:

- Employees of the Participants who will use the plan to guide plans and activities,
- Government agency representatives involved in the approval process of the portions of this Sustainable Forest Management Plan that pertain to the SFMP content requirements of the Fort St. John Pilot Project Regulation.

Several authors and many reviewers contributed to developing key components of this plan. Preparation and submission of this plan was coordinated on behalf of the Pilot Project Participants (Participants): Canadian Forest Products Ltd., Chetwynd Mechanical Pulp Inc., Cameron River Logging Ltd., Louisiana-Pacific Canada Ltd., Peace Valley OSB, Dunne-Za LP and BC Timber Sales, by:



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The Sustainable Forest Management Plan #3 for the Fort St. John Pilot Area was prepared according to the *Fort St. John Pilot Project Regulation* and the Sustainable Forestry Initiative (SFI). Previously, SFMP #1 through #3 were prepared as a requirement under the *Canadian Standards Association CAN/CSA Z809-02* Sustainable Forest Management System for the Fort St. John Timber Supply Area. In 2019, the participants moved towards certification with SFI. On May 1st, 2019 and June 7, 2019, BCTS and Canfor, respectively, became registered with SFI. LP is currently in the process of transitioning to SFI.

The Plan has been revised to reflect the major (#1) and minor (#2) amendments as outlined in the below and on page v (note: indicator numbering has changed – please refer to the Table of Contents for current numbering). The revised Plan features the addition of one non-legal and two legal indicators, the revision of six legal and six non-legal existing indicators, and the removal of the following six non-legal indicators:

- First Nations Consultation & Information Sharing,
- Carbon Sequestration Rate,
- Ecosystem Carbon Storage,
- Summer and Fall Volume deliveries,
- Direct and Indirect Employment,
- Worker Training.

Monitoring of performance under the revised indicators commenced after April 1, 2020. Progress on the removed indicators will no longer be reported as of April 1, 2021. The indicator revisions were reviewed with the Fort St. John Pilot Project Public Advisory Group on October 19, 2019. SFMP# 3 Amendment was available for public review from April 20, 2020, to July 18, 2020. The Post Public Review version of SFMP#3 Amendment was submitted to the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (MFLNRORD) for approval on August 26, 2020. The SFMP was approved by MFLNRORD on April 19, 2021. On October 15, 2021, SFMP#3 was updated to include the approved amendments.

Several authors and many reviewers contributed to developing key components of this plan. Preparation and submission of this plan was coordinated on behalf of the Pilot Project Participants (Participants): Canadian Forest Products Ltd., Chetwynd Mechanical Pulp Inc., Cameron River Logistics Ltd., Louisiana-Pacific Canada Ltd., Peace Valley OSB, Dunne-Za LP and BC Timber Sales, by:



Andrew Tyrrell, RPF Planning Supervisor Canadian Forest Products Ltd	Planning Forester BC Timber Sales	Planning Superintendent Louisiana-Pacific Canada Ltd.

Date: January 17, 2022

Scope of Amendment #1:

This amendment to SFMP# 3 adds new non-legal Indicator #70 – Residual Fibre Utilization, new legal indicators #52A – AAC Partition – Conifer Harvest Performance, #51A – AAC Partition – Deciduous Harvest Performance and revises existing legal indicators #52 – Timber Profile Conifer, #51 – Timber Profile Deciduous, #2 –Seral Stages, #49 – Forest Health FOS Planning, #42 – Damage to Range Improvements, #10 – Noxious Weed and Invasive Plant Content, and non-legal indicators #48 - Summer and Fall Volume Deliveries, # 41 - Range Action Plans and # 56 – Maintenance of Wildlife and Fisheries Habitat Values.

This revision to SFMP# 3 is made to effect continuous improvement and conformance with the conditions stated in the SFMP# 3 approval dated May 4, 2018.

As per sections 35(4), 38 & 39 of the *Fort St. John Pilot Project Regulation (FSJPPR)*, the requirement for public review and government approval of SFMP regulatory performance indicators applies only to those indicators identified for the evaluation of the Participants' performance in implementing the landscape level strategies specified within the plan. Legal indicators requiring government approval are denoted by red font. The non – legal indicators are identified by black font.

Although the non-legal indicators do not require government approval or formally advertised public review, they have been included in this amendment package for transparency and were thoroughly reviewed with the Fort St. John Pilot Project public advisory group (PAG) in October 2019. Public review of the proposed amendment occurred from April 20 to July 18, 2020.

Monitoring of management performance under the revised indicators will begin after April 1, 2020.

This amendment is made on behalf of the Fort St. John Pilot Project Participants: Canadian Forest Products Ltd., Louisiana-Pacific Canada Ltd., Mackenzie Pulp mill Corp., Cameron River Logistics Ltd., Dunne-za LP, Peace Valley OSB and BC Timber Sales, by:



Date: August 26, 2020

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The Participants would like to thank the Public Advisory Group members and advisors for their continued interest and significant contributions in the development of this plan.

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1.0 INTRODUCTION

1.1 PURPOSE

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 such 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 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.

Sustainable Forest Management (SFM): 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).*

In addition to considering public objectives and forest management issues, this plan incorporates the Participants' broad business objectives. These include:

- Participants have either a significant long term capital investment in manufacturing plants or rely on timber sales to manufacturing plants to provide important revenues. Participants therefore have a vested interest in ensuring timber supplies are sustainably managed to provide relatively continuous deliveries of reasonably priced, high quality timber that meets manufacturing plants' requirements over the long term.
- Participants are interested in maintaining certification of their forest management to maintain or increase access to resources and markets. This entails ensuring management strategies that are implemented providing for the sustainability of other non-timber forest resources.
- Participants must be cost competitive provincially and globally within their business sectors. This needs to be achieved by minimizing costs and maximizing value within a sustainable forest management framework.
- In mixedwood areas the Participants' business objectives are to optimize the net value of the mixedwood stands by coordinating activities where practical to minimize timber harvesting and access costs, and by working to reduce administrative barriers to economic and environmental sustainability of this component of the timber resource.

1.2 CSA SFM CERTIFICATION PROCESS

The CSA Sustainable Forest Management (SFM) Standard initially developed in 1996 and subsequently revised and improved in 2002, 2009 and again in 2016, is Canada's national certification standard. The standard is a voluntary tool that provides independent third-party assurance that an organization is practicing sustainable forest management. Consistent with most certifications, the CSA standard expects compliance with existing forest policies, laws, and regulations.
Participants under the CSA certification system must address the following two components:

- Participants must develop and achieve performance measures for on-the-ground forest management, monitored through an annual public review with the input of the public and Aboriginals (Sec X.1.1 following).
- Participants who choose to be registered to the CSA standard must incorporate CSA defined systems components into an internal environmental management system (EMS) (Sec X.1.2 following).

For a licensee seeking certification to the CSA SFM standard, the DFA SFMP or a licensee-specific plan, complimentary to the DFA SFMP, is developed. The licensee-specific plans may contain additional information such as their defined forest area and internal means to monitor and measure the DFA SFMP components. Applicants seeking registration to the CSA standard require an accredited and independent third-party auditor to verify that these components have been adequately addressed. Following registration, annual surveillance audits are conducted to confirm that the standard is being maintained. A detailed description of these two components and a summary of the CSA registration process are as follows.

1.2.1 Public and Aboriginal involvement: Performance Requirements and Measures

The CSA standards include performance requirements for assessing sustainable forest management practices that influence on-the-ground forestry operations. The performance requirements are founded upon seven sustainable forest management criteria:

1. Biological diversity,
2. Ecosystem condition and productivity,
3. Soil and water,
4. Role in global ecological cycles,
5. Economic and social benefits,
6. Society's responsibility, and
7. Aboriginal relations

Each criterion has a number of "elements" that further define the intent. The criteria and associated elements are all defined under the CSA standards and must be addressed during development of the SFM Plan. The criteria are endorsed by the Canadian Council of Forest Ministers and are aligned with international criteria. For each set of criteria and elements, forest managers, and the advisory group must identify local values and objectives. Indicators and targets are assigned to the values and objectives to measure performance.

Discussion Items identified in the CSA Z809 Standard for each of the seven SFM criteria have been reviewed and discussed as needed by the public advisory group in conjunction with the development of this SFM Plan. Detailed information on the topics discussed can be found in the meeting summaries and reference material associated with the development of this Plan.

Values identify the key aspects of the elements.
Objectives describe the desired future condition, given an identified value.
Indicators are measures to assess progress toward an objective. Indicators are intended to provide a practical, cost-effective, scientifically sound basis for monitoring and assessing implementation of the SFM Plan. There must be at least one indicator for each element and associated value. Core indicators have been included in the CSA standard for nearly all elements. Additionally, local indicators can be added to the SFM Plan.
Targets are specific short-term (one or two year, in some cases 5 or 6 years) commitments to achieve identified objectives. Targets provide a clear, specific statement of expected results, usually stated as some level of achievement of the associated indicator.

Values, objectives, indicators, and targets apply to social, economic, and ecological criteria and may address process as well as on-the-ground forest management activities.

As part of the process of developing values, objectives, indicators, and targets, the SFM Advisory Group also assisted in the development of forecasts of predicted results for indicators and targets. This information and interrelationship are further described in Section 7. Forecasts are a prediction of the expected future condition of an indicator. These have been incorporated into the SFM Plan targets as predicted results or outcomes for each objective. Forecasting is further described in Section 6.

1.2.2 Environmental Management System Components

The CSA SFM system includes several processes or systems-related requirements called "systems components" as follows:

- **Commitment:** A demonstrated commitment to developing and implementing the SFM Plan.
- **Public and Aboriginal Group participation:** The CSA standard requires informed, inclusive, and fair consultation with Aboriginal groups and members of the public during the development and implementation of the SFMP.
- **CSA-aligned management system:** The management system is an integral part of the implementation of the SFM Plan and is designed to meet CSA standards. The management system has four basic elements: 1) Planning; 2) Implementing; 3) Checking and Monitoring; and 4) Review and Improvement. The management system includes the following base components:
    - Identify environmental commitments including those within the SFM Plan.
    - Identify standard operating procedures or develop performance measures to assess and achieve environmental commitments.
    - Develop emergency procedures in the event of an incident causing environmental impact.
    - Review all laws and regulations.
    - Establish procedures for training. (Providing updated information and training ensures that forestry staff and contractors stay current with evolving forest management information and are trained to address environmental issues during forestry activities.)
    - If an incident does occur, conduct an investigation or incident review, and develop an action plan to correct and prevent subsequent occurrences.
- **Continual improvement:** within the context of the management system, monitoring and reviewing the system and its components continually improve the effectiveness of the SFM Plan. This includes a review of ongoing planning, and public process to ensure that the management system is being

implemented as effectively as possible. SFM Plan improvements generally occur on an annual basis. Changes are generally made as a result of annual plan performance reporting and changes in science and technology. The changes can be initiated by the public (often those participating in the advisory group) or the managing Participants (for example as a result of internal discussions that occur during the Participants management review).

1.2.3 Canadian Standards Association Registration

Following completion of a SFMP and the development of an environmental management system in accordance with the CSA standard, a licensee may apply for registration of its DFA. The determination of whether all the components of a sustainable forest management system applied to a DFA are in place and functional involves an on-the-ground audit of the DFA including field inspections of forest sites. The intent of the registration audit is to provide assurance that the objectives of sustainable forest management on the DFA are being achieved. The registration of a licensee's DFA follows a successful registration audit by an eligible independent third-party auditor who has assessed and determined:

- an SFMP, that meets the CSA standard, has been developed and implemented, including confirmation that quantified targets for meeting sustainable forest management criteria have been established through a public participation process,
- an FMS has been developed and is being used to manage and direct achievement of the SFMP performance measures; and
- progress toward achieving the targets is being monitored, and monitoring results are being used for continual improvement of the Sustainable Forest Management Plan and Environmental Management System.

A typical registration audit may include:

- interviews with public advisory group members,
- a review of monitoring and reporting responsibilities related to Canadian Standards Association performance measures,
- meetings with government officials to discuss licensee performance and government involvement in development of the Sustainable Forest Management Plan,
- field reviews visiting harvest and road construction operations,
- interviews with staff and/or contractors to review their understanding of the environmental management system requirements; and
- meetings with management to assess the level of commitment to environmental performance and sustainability.

In addition to the registration audit, regular surveillance audits are conducted to examine performance against all aspects of Canfor's FMS, including the requirement that regulatory standards and policy requirements are met or exceeded.

Audits and Public Review

Each year the registrants (Participants) compile a report that summarizes results for each of the performance measures. This annual report is provided to the SFM Advisory Group for review and comment. Annual monitoring of the achievement of the Plan and comparison of the actual results to forecasts will enable the effectiveness of the SFM Plan to be continually improved, in keeping with CSA standards. Additionally, the Participants will provide summary information of the individual results, specific to their Defined Forest Area. The achievement of performance measures (indicators and targets) will be assessed annually through surveillance audits carried out by a registered third-party auditor. The audits will determine whether the registrant has successfully implemented the SFM Plan and continues to meet the CSA Standard. The Participants make audit summaries available to the public.

Management Review

Each year, management staff of the Participant's conducts a review of performance in achieving the targets. This information is used to evaluate trends in moving toward or away from the objectives and targets in the Participants Environmental Management System and the SFMP. The information is used to make recommendations for improvement to the plan to achieve the Environmental Management System and Sustainable Forest Management Plan objectives and targets.

1.3 Description Of Existing Strategic Plans

1.3.1 Fort St. John Land and Resource Management Plan

Objectives for values and resources, and acceptable uses on Crown land were outlined in the LRMP, a public land use process that was completed in 1997. The Fort St. John Land and Resource Management Plan (LRMP) was approved by Cabinet in October 1997. The plan incorporates the principles of integrated resource management into a long-term plan for resource development on Crown land within the Fort St. John Timber Supply Area (TSA). The Fort St. John pilot project area falls entirely within the LRMP area.

The Fort St. John LRMP is the outcome of the deliberations of a range of local private citizens, stakeholders, including coniferous (Canfor) and deciduous (Slocan) forest industry members, and government agency representatives. The Fort St. John LRMP process incorporated a form of consensus-based decision-making that enabled general agreement on all issues.

The Fort St. John LRMP adopts the following principles as stated in the approved document.

- Sustainable use of renewable natural resources, and
- The management of any one resource shall take into consideration other resource values, rights, tenures, and development opportunities and shall recognize the biological and physical limitations of the land and resources. In addition, land and resource management objectives and strategies will incorporate the need to maintain or enhance the local quality of life, social and economic stability, and vitality of the local communities.[1]

Forest resource planning conducted by the Participants, including the Sustainable Forest Management Plan, will be consistent with the objectives of the Fort St. John LRMP. The Fort St. John LRMP also includes

[1] Fort St. John Land and Resource Management Plan, October 1997, page 7

strategies for meeting the stated objectives. **Error! Reference source not found.** in this SFMP summarizes t he LRMP objectives that are impacted by forestry activities. Indicator descriptions in Section 6 identify each indicator's links to the LRMP objectives. Forest management activities conducted by the Participants will be consistent with the intent of the strategies of the LRMP. Insofar as several LRMP sectors and interests are similarly represented in the PAG, the Participants are confident that there will be strong consistency in interpretation and application of the objectives.

1.3.2 Muskwa-Kechika Management Area

A portion of the Fort St. John pilot project area is contained within the Muskwa-Kechika Management Area (MKMA), as defined in Bill 37-1998, the *Muskwa-Kechika Management Area Act*. The Preamble to the Act describes government's intent regarding the area and states:

> *"Whereas the Muskwa-Kechika Management Area is an area of unique wilderness in northeastern British Columbia that is endowed with a globally significant abundance and diversity of wildlife,*
> *and whereas the management intent for the Muskwa-Kechika Management Area is to maintain in perpetuity the wilderness quality, and the diversity and abundance of wildlife and the ecosystems on which it depends while allowing resource development and use in parts of the Muskwa-Kechika Management Area designated for those purposes including recreation, hunting, timber harvesting, mineral exploration and mining, oil and gas exploration and development,*
> *and whereas the long-term maintenance of wilderness characteristics, wildlife and its habitat is critical to the social and cultural well-being of first nations and other people in the area,*
> *and whereas the integration of management activities especially related to the planning, development and management of road accesses within the Muskwa-Kechika Management Area is central to achieving this intent and the long-term objective is to return lands to their natural state as development activities are completed;*
> *Therefore her majesty, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows (the Act):"*

Section 8(1) of the *Muskwa-Kechika Management Area Act* specifies that a prerequisite to the approval of a forest development plan in the Muskwa-Kechika Area is an approved landscape unit objective.

1.3.3 Graham River IRM Plan

Sustainable resource values, including timber, fishery, wildlife, recreation, and scenic values, were assessed in the Graham River valley, as part of an Integrated Resource Management Plan (IRM Plan) prepared by Canfor. The Graham River IRM Plan includes the Crying Girl Landscape Unit (LU) in the Boreal Foothills Natural Disturbance Units (NDU), and the portion of the Graham LU that falls within the Omineca NDU.

The plan brought together existing resource information and collected new information through discussions with resource user groups and government agencies, and extensive photo and field assessments of various resources. The final plan document discusses the resource values and issues in the valley and presents a general timber harvest strategy which addresses the key resource issues in the drainage. The objectives were *to "plan the use of the area without prejudice to the value, use or sustainability of any one resource at the expense of other resources within the area or dependent on it"* (Lance 1997). Following public, agency, and First Nations reviews, the plan was approved by MFRR and MELP in September of 1998. The four primary management strategies to be implemented are the application of sequential clustered development, maintenance of connectivity corridors, access management, and adaptive management.

Forestry Operations within the Crying Girl LU and the portion of the Graham LU that falls within the drainage will be consistent with the intent of the Graham River IRM Plan. Strategies are designed to implement key components of the Graham River IRM Plan in these areas within these LU's.

The Ministry of Forests District Manager and a designated official of the Ministry of Environment, Lands and Parks jointly approved the Graham River IRM Plan in September 1998. In his letter of September 16, 1998, the District Manager stated "…*the joint approval status accorded the Graham River IRM Plan represents a special situation in which special measures have been deemed appropriate so as to best achieve the spirit and intent of the Forest Practices Code of British Columbia Act, the Fort St. John LRMP and past commitments and expectations of stakeholders.*"[2]

1.4 Description Of The SFM Planning Area

The Fort St. John Timber Supply Area (TSA) is located in the northeastern interior of British Columbia. The TSA covers about 4.8 million hectares and is bounded by the Peace River and TFL 48 in the south, the Alberta border in the east, the Fort Nelson TSA in the north, and the Rocky Mountains in the west. The Fort St. John pilot project area (the "defined forest area", or DFA) covers approximately 4.1 million hectares (Figure 1) within the Fort St. John TSA. Private lands and woodlots located within the TSA are excluded from the DFA. The TSA is located in the Northern Interior Forest Region and is administered by the Peace Forest District.

The eastern portion of the TSA is dominated by a plateau (primarily the Alberta Plateau ecoregion), while the western portion consists of the Rocky Mountains and foothills. Four biogeoclimatic zones occur in the TSA: the Boreal White and Black Spruce zone in the plateau and lower elevations; the Englemann Spruce-Subalpine Fir and Spruce-Willow-Birch zones at medium to high elevation in the mountains and foothills; and the Alpine Tundra zone at higher elevations. White spruce, lodgepole pine, aspen, and black spruce are the dominant tree species in the area. Minor amounts of subalpine fir, birch, balsam poplar and larch are also present in the DFA.

In 2001, the population of the Fort St. John TSA was estimated at 28,250 people. The city of Fort St. John is the largest community in the TSA, with a population of 20,160 (2016). First Nations communities in the TSA include settlements at Halfway River, Blueberry River, Doig River and Kahntah. An additional nine First Nations have declared interests within the TSA: Fort Nelson, Kaska Dena, Tsay Keh Dene, McLeod Lake, Prophet River, Dene Tha' and Horse Lake (both from Alberta), Saulteau and West Moberly. The general TSA area falls within the provisions of Treaty 8.[3]

The Fort St. John TSA is unique in several ways. Oil and gas exploration and development has occurred throughout most of the planning area over the past few decades. The southern and southeastern portion of the planning area is predominantly used for agriculture and has a high concentration of privately held lands. Forest harvesting and management, although a major part of the current local economy, is relatively recent with some areas yet to be developed for timber harvesting. The mineral resources of the area are relatively

[2] *Proposal for selection of Graham South SMZ As A Special Management Zone Pilot*, Submitted to the Prince George Inter-Agency Management Committee, November 30, 1998, Canadian Forest Products Ltd.

[3] *Fort St. John Timber Supply Area Rationale for allowable annual cut determination, effective December 31, 1996 by BC Ministry of Forests, Chief Forester Larry Pedersen)*

unexplored and significant potential exists in the western portion of the TSA near the Rocky Mountains. Energy development is the largest economic sector in the TSA, with agriculture and forestry ranking second and third respectively, in terms of local employment.

Nationally and internationally recognized wildlife resources are an important feature in the in much of the western portion of the TSA. The TSA incorporates the southern portion of the Muskwa-Kechika Management Area. The *Muskwa-Kechika Management Area Act* was passed in June 1998 and establishes management intent for a series of protected areas and special management areas in the "Northern Rockies". Management of the Muskwa-Kechika area for its high wildlife, biodiversity and wilderness values is a key goal of several resource sectors and provincial, national, and international interest groups.[4]

As noted in the November 2016 Fort St John TSA Timber Supply Analysis Discussion Paper, about 56 percent of the Fort St. John TSA (about 2.757 million hectares) is considered productive forest land managed by the Crown. Currently about 37 percent of this area is considered available for timber harvesting under current forest management practices. The current timber harvesting land base is 1,020,817 hectares, consisting of 415,472 (40.7%) hectares dominated by deciduous species and 605,345 (59.3) hectares dominated by coniferous species. The timber harvesting land base does not contain stands of black spruce.

[4] Fort St. John Land and Resource Management Plan, October 1997

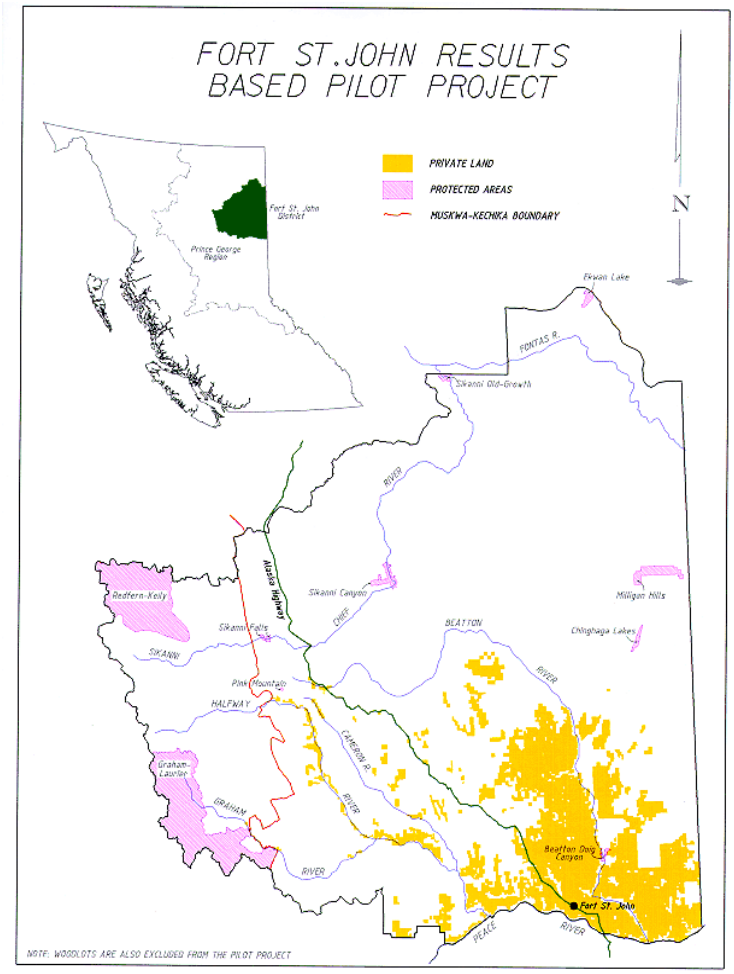


Figure 1: Project Area Map

1.4.1 Description of The Landscape Units

Landscape Units (LU) are based on updated Biogeoclimatic Ecosystem Classification (BEC) mapping, ecosection boundaries, Natural Disturbance Units, and important administrative boundaries such as the revised district boundaries and the strategic land use boundaries of the Muskwa-Kechika Management Area. In the absence of an administrative boundary, resource features such as main stem rivers (midpoint) or height of land were used wherever possible to provide logical natural boundaries for each LU. These boundaries often encompass multiple watersheds in mountainous terrain, and reflect similar BEC units, eco-sections and Natural Disturbance Units.

The current LU boundaries are consistent with strategic boundaries and their respective objectives at the LRMP Resource Management Zone (RMZ) level and allow the administrative areas to be managed without overlapping LU boundaries and fragmenting objectives during implementation.

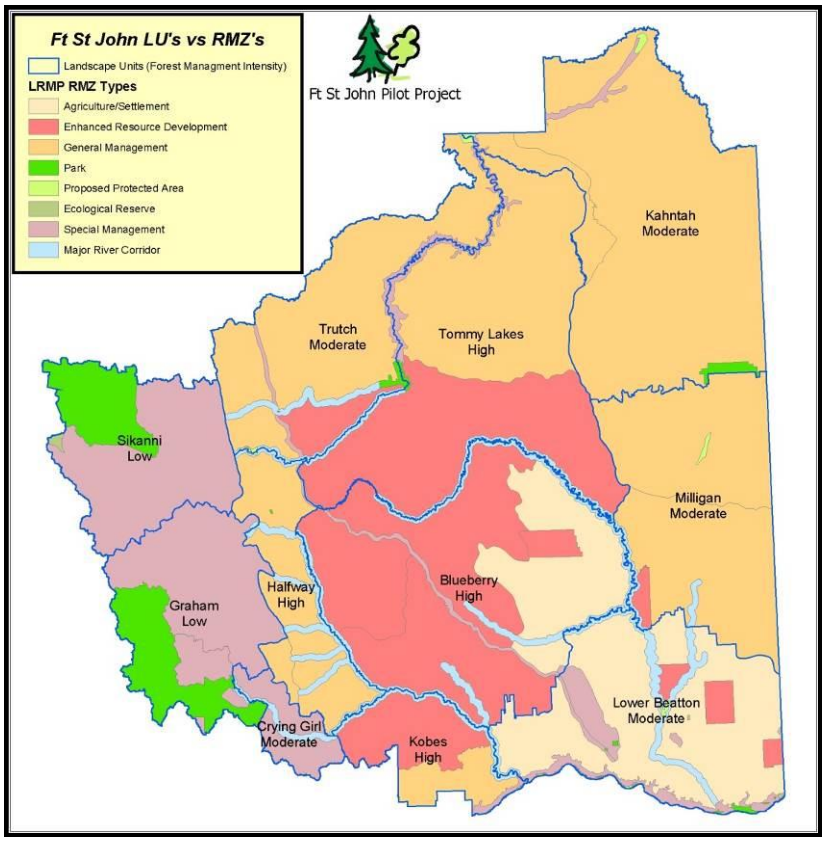


Figure 2: Fort St. Landscape Units and Resource Management Zones

The following **Error! Reference source not found.** summarizes the area breakdown of each LRMP resource m anagement zones that are contained within each Landscape Unit.

Table 1: Resource Management Zones by Landscape Units

Landscape Unit	LRMP RMZ Name	Total Area (ha)
Blueberry	Agriculture Settlement Area	183,259
	Aikman Deadhorse	166,164
	Alaska Highway Corridor	14,296
	Charlie Lake Community Watershed	596
	Grazing Reserve 1	17,210
	Jedney	183,290
	Major River Corridor	53,460
	Upper Cameron	113,159
Blueberry Total		731,433
Crying Girl	Crying Girl	27,882
	Graham-Laurier Protected Area	222
	Graham-South RMZ	30,707
	Major River Corridor	8,532
Crying Girl Total		67,343
Graham	Besa Halfway Chowade	202,824
	Graham-Laurier Protected Area	99,778
	Graham-North RMZ 1	27,041
	Graham-North RMZ 2	3,474
	Graham-South RMZ	117
	Major River Corridor	1,975
Graham Total		335,209
Halfway	Alaska Highway Corridor	1,361
	Bluegrave Horseshoe	80,258
	Crying Girl	15,298
	Grassy-Minaker	0
	Pink Mountain Protected Area A	98
	Major River Corridor	34,789
	Sikanni Falls Protected Area A	163
	Sikanni Falls Protected Area B	132
	Two-Bit	74,339
Halfway Total		206,438
Kahntah	Chinchaga	680,257
	Conroy	49,255
	Ekwan Lake Protected Area	1,741
	Milligan Hills Protected Area	7,227
	Sikanni Old-Growth Protected A	585
	Sikanni-Fontas Valley	10,181
Kahntah Total		749,247
Kobes	Farrell Creek	50,207
	Kobes	91,961
	Peace Corridor	4,670
	Peace River / Bodreau	128
	Major River Corridor	12,840
Kobes Total		159,807
Lower Beatton	Agriculture Settlement Area	374,203
	Alaska Highway Corridor	4,207
	Beatton Doig AOI	948
	Beatton Park	309

Landscape Unit	LRMP RMZ Name	Total Area (ha)
	Beatton River Site	186
	Boundary Lake Wetlands	348
Lower Beatton	Cecil Lake ER	121
	Cecil Lake Wetlands	1,156
	Charlie Lake Park	85
	Charlie Lake Community Watershed	25,036
	Clayhurst Ecological Reserve	284
	Grazing Reserve 3	7,809
	Grazing Reserve 4	14,481
	Grazing Reserve 5	6,223
	Peace Corridor	23,414
	Peace Corridor / River Sites	1,676
	Peace River / Boudreau	716
	Major River Corridor	36,997
Lower Beatton Total		498,200
Milligan	Chinchaga	227,754
	Chinchaga Lakes Protected Area	1,475
	Grazing Reserve 2	9,180
	Osborne	225,404
	Major River Corridor	10,154
Milligan Total		473,968
Sikanni	Besa Halfway Chowade	229,431
	Redfern-Keily Protected Area	80,779
	Sikanni Chief River ER	2,075
Sikanni Total		312,285
Tommy Lakes	Alaska Highway Corridor	1,157
	Conroy	342,362
	Jedney	321,857
	Major River Corridor	21,014
	Sikanni Canyon Protected Area	1,412
	Sikanni-Fontas Valley	17,875
Tommy Lakes Total		705,677
Trutch	Alaska Highway Corridor	6,291
	Buckinghorse River Way Park	36
	Grassy-Minaker	72,846
	Jedney	37,084
	Major River Corridor	21,064
	Sikanni Canyon Protected Area	3,297
	Sikanni Falls Protected Area A	302
	Sikanni Falls Protected Area B	186
	Sikanni Old-Growth Protected A	890
	Sikanni-Fontas Valley	14,324
	Trutch	280,404
Trutch Total		436,724
Grand Total		4,676,330

Error! Reference source not found. provides a general summary of the LRMP objectives as they relate to t he Landscape Units (LU's). Indicators presented in this SFMP will, where applicable, reference the respective objectives noted in **Error! Reference source not found.**. Table 3 references recommended LRMP timber strategies as they apply to the various LU's.

Table 2: LRMP Objectives by Landscape Unit

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
Y	Access 1	Coordinate access and linear development to minimize negative effects on other resource values.	X	X	X	X	X	X	X	X	X	X	X
Y	Access 2	Maintain existing access, coordinate industrial access development including linear development to minimize negative effects on other resource values.							X				
Y	Access 3	Manage access to protect alpine areas (e.g., Pink Mountain).				X							
Y	Access 4	Manage access to protect significant fish and wildlife habitats, alpine areas, and recreation values.		X	X			X					
N	Access 5	Ensure future infrastructure requirements are considered when exploring for oil and gas. (intent- for Agriculture or Settlement needs)							X				
Y	Agric1	Control the spread of noxious weeds.	X					X	X				
Y	Agric2	Maintain livestock grazing opportunities on existing tenures.	X			X			X				

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
Y	Agric3	Maintain or enhance opportunities for livestock grazing.	X			X		X	X	X	X	X	
N	Agric4	Maintain or increase land supply for agriculture including access to Crown land.	X			X		X	X	X			
N	Agric5	Minimize or mitigate wildlife impact on agricultural enterprises.	X			X	X	X	X	X			
N	Agric6	Provide opportunities for the growth and expansion of the agriculture and food production industries.	X			X		X	X	X	X		
N	Agric7	Recognize the high agricultural values within the Peace River corridor.						X	X				
Y	Consult	**Ensure that all land and resource management planning activities within the planning area provide for consultation with local municipal governments.**		X	X			X	X				
N	Ecology1	Maintain and enhance ecological integrity in areas subject to resource impacts from recreational use.				X						X	X
Y	Ecology2	**Maintain functioning and healthy ecosystems.**	X	X	X	X	X	X	X	X	X	X	X

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
Y	Ecology3	Restore and rehabilitate negatively affected ecosystems.	X	X	X	X		X					
N	Energy 1	Maintain opportunities and access for oil & gas exploration, development, and transportation.	X	X	X	X	X	X	X	X	X	X	X
Y	Fish1	**Maintain fish habitat and water quality for priority fish species.**	X	X	X	X	X	X	X	X	X	X	X
Y	Fish2	**Maintain high quality fisheries in natural settings.**											X
Y	Guide1	Maintain guide outfitting opportunities.		X	X	X		X				X	X
Y	Habitat 1	Maintain caribou habitat.		X		X	X	X				X	X
Y	Habitat 2	Maintain habitat for priority furbearing species.	X	X	X		X	X	X	X	X	X	
Y	Habitat 3	Maintain high capability ungulate winter habitat.	X	X	X	X	X	X	X	X	X	X	X
Y	Habitat 4	Maintain site specific habitats.	X			X			X	X		X	
Y	Habitat 5	Manage critical wetland habitats for waterfowl and other wildlife species.						X	X	X			

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
Y	Habitat 6	Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.		X	X	X		X				X	X
Y	Habitat 7	Protect or enhance habitats for red and blue listed species.					X		X	X	X		
N	Recreation1	Integrate recreational activities with grazing and resource extraction.							X				
Y	Recreation2	Manage backcountry recreation and tourism opportunities in a natural or natural appearing condition.											X
N	Recreation3	Manage wildlife populations to provide opportunities for non-commercial hunting.											X
Y	Recreation4	Provide a full range of recreation opportunities.				X	X	X	X	X	X	X	
Y	Recreation5	Provide a full range of wilderness recreation opportunities identified in the ROS as primitive, semi-primitive non-motorized and semi-primitive motorized.		X	X								X
Y	Recreation6	Provide quality public and commercial recreational opportunities and values.	X	X	X	X		X	X		X		X

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
N	Recreation7	Provide tourism opportunities in Peace R corridor.						X	X				
Y	Timber 1	Enhance timber harvesting and a sustainable long-term timber supply.	X	X	X	X		X		X	X		
Y	Timber 2	Maintain timber harvesting and forest management opportunities.		X	X	X	X		X			X	X
Y	Timber 3	**Manage for forest health.**							X				
Y	Timber 4	Minimize losses to the timber harvesting land base.	X			X		X	X			X	
Y	Timber 5	Ensure timber harvesting in the Graham recognizes the watershed's other important resource values e.g., trapping, guide outfitting, wilderness.			X								
Y	Timber 6	Forest Management Intensity Levels Strategies	Intensive	Moderate	Low	Intensive	Moderate	Intensive	Moderate	Moderate	Moderate	Intensive	Moderate	Low
Y	Visual 1	Manage visually sensitive areas along existing access corridors/trails and adjacent to protected areas.			X								X
Y	Visual 2	Manage visually sensitive areas as scenic areas.	X	X	X	X		X	X	X	X	X	X

Significant Forestry Influence	Resource Objective	LRMP Objectives	LANDSCAPE UNIT APPLICABILITY										
			Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
Y	Visual 3	Manage visually sensitive areas within the Peace River Valley.						X	X				
Y	Visual 4	Manage visually sensitive areas within Tommy Lakes area.									X		
Y	Visual 5	Manage visually sensitive areas within the Alaska Highway corridor.	X			X			X		X	X	
Y	Water1	Maintain groundwater quality and quantity.	X			X		X	X			X	X
Y	Water2	Maintain the headwaters of major rivers and streams as a source of water for current and future generations.			X								X
Y	Water3	Maintain water quality in the Peace River.											
Y	Water4	Promote water stewardship to manage for other resources.	X	X	X	X		X	X		X	X	X
Y	Water5	Protect water quality and quantity in Charlie Lake watershed.							X				
Y	Water6	Sustain natural stream flow regime.	X	X	X	X		X	X	X	X		

Table 3: LRMP Timber Strategies by Landscape Unit

	PROPOSED FOREST MANAGEMENT INTENSITY LEVEL BY LU and LRMP Timber Strategy	LANDSCAPE UNIT APPLICABILITY										
		Blueberry	Crying Girl	Graham	Halfway	Kahntah	Kobes	Lower Beatton	Milligan	Tommy Lakes	Trutch	Sikanni
		INTENSIVE		LOW	INTENSIVE		INTENSIVE			INTENSIVE		LOW
all	Quantify timber harvesting land base and develop policies to reduce permanent losses	X	X	X	X	X	X	X	X	X	X	X
1	Establish forest production target for LU's… consistent with high intensity forest management regimes	X			X		X			X		
2	Establish forest production target for LU's… consistent with moderate intensity forest management regimes		X	X		X		X	X		X	
3	Establish forest production target for LU's… consistent with low intensity forest management regimes							X				X
4	Reforest … all PP Br, NC deciduous, and NSR.	X			X	X	X	X	X	X		

	while providing for critical wildlife habitat											
5	Establish and maintain a permanent road infrastructure	X	X		X	X	X		X	X		
6	Minimize losses from damaging agents through aggressive fire and pest mgmt, including salvage	X	X			X	X	X	X	X	X	X
7	Promptly and aggressively reforest and manage cutovers and burnt areas within the THLB	X	X	X	X	X	X	X	X	X	X	X
8	Encourage utilization of pulp quality stands, unless it can be shown that long term viability and sustainability of wildlife species will be negatively impacted		X	X								X
8B	Encourage utilization of pulp quality stands	X			X	X	X	X	X	X	X	
9	Vary cut block adjacency requirements	X	X				X	X			X	
10	Encourage afforestation of reverted and low capability ag land	X					X	X		X		
11	Develop a long-term plan to manage access and		X	X								

	forest management activities, incorporating sequential development											
12	No harvesting South of Graham R in the North Graham until at least 2006			X								

Based on a combination of the LRMP timber objectives and timber strategies, as well as the LRMP's proposed biodiversity emphasis strategies, relative management intensity levels have been assigned to the landscape units. Management strategies for wildlife tree patch retention levels and salvage of damaged timber reflect the variable management intensity levels.

High Intensity Forest Management LU's

The Blueberry, Halfway, Kobes and Tommy Lakes LU's are included in this zone. The LRMP's predominant timber objective in the RMZ's that make up the majority of these landscape units is to enhance timber harvesting and a sustainable long term timber supply. The LRMP's predominant timber strategy in the RMZ's that make up the majority of these landscape units is to establish forest production targets consistent with high intensity forest management regimes. Similarly, the predominant biological diversity emphasis identified in the LRMP for these zones is low. To meet other non-timber objectives identified in the LRMP, some unique areas within these LU's will receive special management attention.

Moderate Intensity Forest Management LU's

This includes the Crying Girl, Kahntah, Lower Beatton, Milligan and Trutch LU's. The LRMP timber objectives in the RMZ's that make up the majority of these landscape units include maintaining timber harvesting and forest management opportunities, and in some cases enhancing timber harvesting for a sustainable long term timber supply. The predominant LRMP timber strategy in the RMZ's that make up the majority of these landscape units is to establish forest production targets consistent with moderate intensity forest management regimes. Similarly, the predominant biodiversity emphasis identified in the LRMP for these zones is intermediate. To meet other non-timber objectives identified in the LRMP, some unique areas within these LU's will receive special management attention.

Low Intensity Forest Management LU's

The Graham and Sikanni LU's make up this zone, which also coincides with the Muskwa-Kechika Management Area. The LRMP objective is to maintain timber harvesting and forest management opportunities, and the predominant timber strategy in the RMZ's that make up the majority of these landscape units is to establish forest production targets consistent with either low and/or moderate intensity forest management regimes. Similarly, the biodiversity emphasis identified in the LRMP for these zones is predominantly high. Timber harvesting operations will occur in these LU's, but an enhanced emphasis will be placed on ensuring other resource values are protected. Timber harvesting within these areas will be consistent with the Muskwa-Kechika Management Plan and any other approved plans which specifically apply to forestry operations.

Protected Areas

Protected Areas identified in the LRMP are imbedded within the LU areas noted above. Regardless of the assigned LU intensity classification, there will be no timber harvesting activities planned within those portions of the LU's identified by the LRMP as protected areas. Table 4 summarizes the LU areas by forest management intensity level.

Table 4: Landscape Unit Intensity Classes

LU by Intensity Classes	Total Hectares	% Distribution
HIGH INTENSITY		
Blueberry	731,433	15.6%
Halfway	206,438	4.4%
Kobes	159,807	3.4%
Tommy Lakes	705,677	15.1%
Total High Intensity:	1,803,355	38.6%
MODERATE INTENSITY		
Crying Girl	67,343	1.4%
Kahntah	749,247	16.0%
Lower Beatton	498,200	10.7%
Milligan	473,968	10.1%
Trutch	436,724	9.3%
Total Moderate Intensity:	2,225,482	47.6%
LOW INTENSITY		
Graham	335,209	7.2%
Sikanni	312,285	6.7%
Total Low Intensity:	647,494	13.8%
TOTAL AREA	4,676,330	100%
PROTECTED AREAS	234,439	5.0%

Unique Management Areas within High or Moderate Intensity LU's

In addition to protected areas, portions of some landscape units have unique values that require enhanced management consideration. While these areas are included in the larger landscape units to reflect the broad natural disturbance patterns, specific management strategies will be tailored to address the concerns in these areas.

- Major river corridors requiring some special management considerations transect portions of several LU's in the moderate and high intensity forest management regimes. These areas include the Blueberry River, downstream of approximately 56 degrees 46 minutes latitude, the Beatton River below its confluence with Julienne Creek, the Sikanni River, Halfway River, Graham River, Chowade River, Peace River, Cameron River below 56 degrees 35 minutes latitude, the lower reaches of the Osborn (downstream of 56 degrees, 36 minutes), the Doig River (downstream of 56 degrees 49 minutes), Bluegrave Creek, Horseshoe Creek and Cypress Creek. These major river systems are very important to the sustainability of a wide variety of resource values. Wildlife, fisheries, water, and timber values are all very high within these areas, and some modified management strategies are needed to minimize impacts on non-timber resources.
- The Charlie Lake water supply area was also identified as a special management area, which requires particular attention to water management concerns.

- The Alaska Highway, which winds through several landscape units, requires added management consideration for visual resources.

2.0 DESCRIPTION OF THE PILOT PROJECT

In June 1999 the BC government added Part 10.1 to the Forest Practices Code of BC Act to enable results-based pilot projects. The intent of the pilot projects is to test ways to improve the regulatory framework for forest practices while maintaining the same or higher levels of environmental standards.

Canadian Forest Products Ltd., Slocan Forest Products Ltd., Louisiana-Pacific Canada Ltd., and the Ministry of Forests Small Business Forest Enterprise Program prepared a detailed pilot project proposal that provided for the basis for the Fort St. John Pilot Project Regulation. Beginning in 2000, the Participants established a public advisory group (PAG) comprised of local people representing a variety of interests. The public advisory group reviewed the draft detailed project proposal and draft regulation, reviewed comments from the general public, and provided advice to government on the suitability of the project. Cabinet accepted the proposal and a draft regulation late in 2001.

The *Fort St. John Pilot Project Regulation* requires the establishment of a strategic plan for the pilot project area, to be known as a Sustainable Forest Management (SFM) Plan. The Participants have and will continue to prepare the SFMP with the guidance of a local public advisory group and a scientific/technical advisory committee. The SFMP is jointly approved by the Regional Executive Director and the Director of Resource Management, Northeast Forest Region, MFLNRORD. Upon approval, the SFMP will provide strategic stewardship direction to forest operations carried out in the pilot project area.

The Participants also intend that the Sustainable Forest Management Plan (SFMP) for the pilot project area meet the requirements of the Canadian Standards Association (CSA) Sustainable Forest Management Standard CAN/CSA-Z809-08. The Public Advisory Group (PAG) has worked with the Participants to identify and select values, objectives, indicators, and targets to be considered in the development of the SFMP for the pilot project area. The PAG will continue to have a role in monitoring and evaluating the results of the SFMP and in recommending improvements.

After a sustainable forest management plan has been approved the Participants may prepare and submit to the District Manager MFLNRORD, Peace Natural Resource District, a Forest Operations Schedule (FOS). The FOS, which replaces the Forest Development Plan (FDP), will identify the areas where timber harvesting and road construction are proposed. All forest operations carried out under a FOS must be consistent with the SFMP. The Forest Operations Schedule is subject to a public review and comment process. The District Manager does not formally approve the schedule but may withhold the authorization of specific operations if they are not consistent with the FOS or SFMP.

2.1 DESCRIPTION OF THE PARTICIPANTS

The BC Timber Sales Manager and any holder of an agreement under the Forest Act who carries out forest practices in the pilot project area may become a Participant in the Fort St. John Pilot Project. Reference to "**Participants**" throughout this SFMP refers to those forest

companies or government agencies who have agreed to participate in the Fort St. John Pilot Project. Some Participants have delegated the forest management activities in the TSA, related to their licences, to other Participants through legal Memorandums of Agreements (MOA's). Reference to "**Managing Participants**" is to those government agencies, or those companies who, through these MOA's, will be principally responsible for forestry operations conducted under this SFMP. The following agencies and forest companies are Participants in the pilot project:

2.1.1 BC Timber Sales

BC Timber Sales (BCTS) was founded in 2003 as an independent organization within the Ministry of Forests, with financial independence from regional and district operations. The mandate of BCTS is to provide credible representative price and cost benchmark data for the Market Pricing System through auctions of timber harvested from public land in British Columbia.

Through 12 Business Areas and an operational presence in 33 locations, BCTS manages some 20 percent of the provincial Crown allowable annual cut.

BCTS achieves its mandate by:

1. Sell the full BC Timber Sales' apportionment over the business cycle, consistent with safe practices and sustainable forest management.
2. Generate direct net revenue and indirect revenue for the province over the business cycle; and
3. Continuous business improvement.

BCTS Vision is to be an effective timber marketer generating wealth through sustainable resource management.

BCTS has four business goals. Guided by the overriding principles of safety and sound forest management, BCTS:

1. Is a high performing organization with skilled, motivated, and proud people.
2. Provides a credible reference point for costs and pricing of timber harvested from public land in B.C.
3. Provides a reliable supply of timber to the market, through open and competitive auctions - subject to meeting the requirements of cost and price referencing as stated in Goal 2.
4. Maximizes net revenue for the province – subject to the requirements of cost and price referencing as stated in Goal 2 and supplying timber for auction as stated in Goal 3.

The BC Timber Sales Peace-Liard Business Area geographically encompasses the Fort Nelson and Peace (formerly Dawson Creek and Fort St. John) Forest Districts. The administrative, planning and management centre for the business area is the Timber Sales Office (TSO) located in Dawson Creek. In addition to the TSO, field teams comprised of field-oriented staff reporting to the main TSO are located in Dawson Creek, Fort Nelson, and Fort St. John.

BCTS currently has a coniferous apportionment in the Fort St. John Timber Supply Area of 442,059 m^3 per year and a deciduous apportionment of 180,000 m^3 per year. However, 70,000 m^3 of the coniferous apportionment had been awarded as a Section 13.1 non-replaceable forest

license (A59959) to Cameron River Logistics, also a Participant in the pilot project. Licence A59959 expired in 2017. The remaining 372,059 m^3 of conifer and the 180,000 m^3 of deciduous are auctioned competitively.
Refer to Appendix 1 for BCTS's SFM policy. BCTS is one of the **Managing Participants** referred to in this SFMP.

2.1.2 Cameron River Logistics.

Cameron River Logistics. (CRL) operates as a custom manufacturer of softwood products in Taylor BC (approximately 15km south of Fort St. John) for distribution to various value-added manufacturers.
CRL was the holder of Forest Licence A59959 that had an allowable annual cut (AAC) of 70,000 m^3 of timber from coniferous leading stands located in the Fort St. John Timber Supply Area (TSA). This was a non-replaceable forest licence with a term of 15 years, which expired in 2017. The company has a full-time employee base of 29 people and has retained the services of Canfor to manage all aspects of its forest licence (i.e., planning, harvesting, reforestation, etc.) on their behalf.
CRL became a Participant in the FSJ Results Based Pilot Project on December 19th, 2002.
Refer to Appendix 1 for Canfor's SFM policy.

2.1.3 Canadian Forest Products Ltd.

Canfor Corporation is a leading Canadian integrated forest products company based in Vancouver, BC. The company is a major producer of lumber and bleached kraft pulp. It also produces semi-bleached and unbleached kraft paper and remanufactured lumber products. The main operating company is Canadian Forest Products Ltd., from which the name Canfor is derived.
Canfor operates two wholly owned facilities in the Fort St. John area. A random length dimension mill near Fort St. John currently produces spruce-pine-fir lumber for the North American and Asian housing markets and the British Columbia secondary manufacturing industry. By-product chips are utilized in Canfor's Taylor Pulp mill, which also utilizes chips from deciduous logs to produce pulp for its overseas pulp markets. Canfor manages the timber licenses that supply aspen fibre to the Peace Valley Oriented Strand Board (OSB) mill in Fort St. John that is owned by Louisiana Pacific Canada. This mill uses only deciduous timber. These three facilities consume approximately 2 million m^3 of coniferous and deciduous timber annually during normal operating conditions. The primary sources of this timber are deciduous and coniferous tenures in the Fort St. John Timber Supply Area (TSA) which are held by the various Participants in the Pilot Project. Tenures held by Canfor include Forest Licence A18154 and Pulpwood agreement #12. Additional volumes are purchased from other sources in the area, including the BC Timber Sales Program, woodlots, oil and gas salvage and private landowners.
Canfor's Fort St. John/Taylor operations employs approximately 350 persons directly and another 200 contractor employees in woodlands operations.
Canfor has obtained certification of all its woodlands operations under the ISO 14001 standard, and Canadian Standards Association (CSA) Sustainable Forest Management System for its

operations in the Fort St. John TSA. Refer to Appendix 1 for Canfor's SFM policy. Canfor is one of the **Managing Participants** referred to in this SFMP.

2.1.4 Louisiana-Pacific Canada Ltd.

Founded in 1973 and headquartered in Portland, Oregon, Louisiana-Pacific Corporation (LP) is a leading manufacturer of building materials in North America, with facilities throughout the United States, Canada, and in Chile. LP has more than 40 manufacturing facilities in North America.

LP's trademark is their superior ability to provide a wide variety of cost-competitive commodity and value-added specialty building products to their retail, wholesale, homebuilding, and industrial customers.

As one of the North America's largest suppliers of building products, LP is committed to providing high-quality products and ideas, and the highest level of service for their customers.

Louisiana-Pacific Canada Ltd. is the Canadian arm of Louisiana-Pacific Corporation. Canadian facilities are located in Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia.

LP holds one Forest License and a Pulpwood Agreement in the Fort St John TSA. The timber from these tenures supplies an oriented strand board plant, which is run by Peace Valley OSB which is now wholly owned by LP and formerly was a 50:50 joint venture between LP and Canfor.

The Sustainable Forestry Initiative is a strategic priority for LP. Innovation, adaptation, and continual improvement of forest management practices on all forested lands are key components to sustainable forest management. The Fort St. John Results Based Pilot Project provides unique opportunities and unique challenges in leading the forest industry in BC into a new era of forest management. Data sharing, joint planning efforts, innovative silviculture activities, innovative management of mixedwood forests and a landscape level approach to forest management will help address the sustainable management of timber and other forest resources.

LP's tenures within the Fort St John TSA are managed by Canfor Woodlands. Refer to Appendix 1 for Louisiana-Pacific Canada Ltd. SFM policies.

2.1.5 Dunne-za LP

West Moberly First Nations (WMFN) approached the expanding resource industry development within their traditional territory by devising a business strategy that supports an unwavering and exceptional commitment to their mandate: "to protect and manage the land and environment for economic and cultural uses for our future generations". They incorporate protection of treaty and aboriginal rights, and actively seek green industry solutions while working toward their long-term goal of realizing economic self-sufficiency.

West Moberly First Nations conducts business through their wholly owned, economic development management company Dunne-za Ventures. Dunne-za Ventures, in an effort to stabilize and support the community economy, works strategically with individual band member companies and community-based companies to help maintain their businesses. Through their actions WMFN verifies their dedication to the health and sustainability of their community.

Community demographics and rapidly expanding resource development within West Moberly First Nations traditional territory has required Dunne-za Ventures LP to develop a business

model built upon subcontracting, joint ventures, strategic alliances, and partnerships. Working through existing, well established and reputable companies allows Dunne-za Ventures LP access to the necessary capital and expertise to competitively fulfill contract conditions. Dunne-za Ventures LP works strategically with other First Nations business entities, including individual band member companies, as well as community-based companies.

A key success factor for WMFN's long term economic self-sufficiency will be the corporate sustainability of Dunne-za Ventures Limited Partnership and Dunne-za Economic Development Corporation. Dunne-za Ventures LP will continue to explore options to become involved in economic development / contracting opportunities that yield long-term relationships.

Dunne-za Ventures LP sees the potential to leverage short-term interests into long-term opportunities through strategic alliances and discipline. WMFN will promote sustainable business options through its various Impact-Benefit Agreements (IBA) and Memoranda of Agreement (MOA) with industry and governments at all levels.

West Moberly, through Dunne-za Ventures, jointly holds coniferous Forest License A56771 in the Fort St. John TSA, along with Canfor. This licence has an AAC of 150,000 m^3 per year. The licence is administered by Canfor through a Memorandum of Agreement, which provides economic benefits and employment opportunities to the community.

2.1.6 Chetwynd Mechanical Pulp

On March 8, 2014, Chetwynd Mechanical Pulp Inc a Paper Excellence Company acquired the Chetwynd pulp mill from Tembec Inc., making this its seventh mill in Canada and its fourth pulp mill in British Columbia. In its announcement of the acquisition of the former Tembec mill, Paper Excellence executives stated "Our intention is to reopen the mill located in northeastern B.C., which has been shut down since September 2012, reopening Chetwynd Pulp will create significant direct and indirect benefits for the local community. Paper Excellence plans to invest up to $50 million, including working capital and capital expenditure, toward the restart of the facility".

Paper Excellence is a sustainable, profitable globally integrated fiber products provider that is economically, socially, and environmentally responsible. Through innovation and adaptability, Paper Excellence provides cellulose based products at lowest possible cost. As noted by Paper Excellence executives "We will constantly strive to improve the global competitiveness of our customers, while enhancing the sustainability of our manufacturing operations and the well-being of the communities in which we operate".

Paper Excellence is a privately owned group of companies in the pulp and paper industry. With their headquarters in Richmond, BC Canada, the Company has close to 2 million tonnes of pulp production capacity, 550,000 tonnes of paper production capacity through 6 mills in Canada, 2 mills in France in cities of Saint-Gaudens and Tarascon, and 1 paper mill in Germany.

Paper Excellence employs approximately 2,600 employees in Canada. In all of their operations, Paper Excellence has always ensured that it maintains strong relationships with local and national governments, local communities, unions, non-government agencies and other stakeholders.

Chetwynd Mechanical Pulp (CMP) operates a high yield pulp mill approximately 30 km east of Chetwynd, BC. The facility produces Bleached Chemi-Thermo Mechanical pulp from Aspen, Cottonwood, and softwood fibre (primarily residual SPF chips). The manufactured pulp

products are sold mainly in Canada, the United States, Europe, and Asia. CMP's Chetwynd operations employ 160 persons directly and another 90 to 100 contract employees in log yard and woodlands operations.

CMP's Chetwynd operations consume approximately 520,000 m^3 of hardwood timber and residual softwood chips annually. The primary source of the hardwood timber is Forest Licence A70730, a non-replaceable forest licence, with an annual allowable cut of 252,000 m^3 in the Dawson Creek TSA. The other primary source of timber is Pulpwood Agreement #13, which allows up to 200,000 additional cubic metres per year from Crown land. Pulpwood Agreement #13 has an 18,000 m^3 apportionment in the Farrell Creek area of the Fort St. John TSA. This volume is not associated with the Fort St. John Code Pilot and is managed separately from the Pilot participants by LP for CMP. The remainder of the required volume is purchased from private landowners, or through the BC Timber Sales Program. Residual softwood chips are purchased from local sawmills.

As part of the purchase of the Chetwynd Pulp Mill from Louisiana-Pacific Ltd. in October 2002, Tembec, now CMP, acquired the rights to FL A60972, a non-replaceable coniferous forest licence in the Fort St. John TSA, with an annual allowable cut of 83,498 m^3 per year. On July 6th, 2017, Paper Excellence transferred licence A60972 to Mackenzie Pulp Mill Corporation (MPC).

MPC has entered into a Timber Tenure Management Agreement with one of the Pilot Project Partners (Canfor), which will enable them to manage the woodlands operations for this licence on MPC's behalf.

2.1.7 Peace Valley Oriented Strand Board

Peace Valley OSB (PVOSB) formerly a joint venture OSB mill owned by Canfor Corp. (Canfor) and Louisiana-Pacific Canada (LP) is now wholly owned by LP. In late March 2013 Canfor sold its interests in PVOSB, including the majority of timber volume associated with Pulpwood Agreement # 12 (PA 12) to Louisiana Pacific Canada (LP). The portion of timber volume from PA 12 transferred to LP has been issued to LP by the MFLNRO as PA 20.

Prior to this, in 2000, Slocan Forest Products Ltd. (Slocan) and LP determined to work collectively to respond to a call for proposals made by the BC Government in 1998 to harvest aspen and cottonwood in the Fort St. John Timber Supply Area. At the time, Slocan operated an OSB mill in Fort Nelson while LP operated an OSB plant in Dawson Creek. The two companies formed Slocan-LP OSB Corp. after deciding that one large OSB mill would have a greater chance of success versus each company operating its own smaller mill. Slocan-LP OSB Corp. was changed to Canfor-LP OSB Corp. in 2004 after Canfor completed a successful takeover of Slocan.

On December 31, 2004 the legal structure of Slocan-LP OSB Corp. was changed to a 50/50 partnership rather than a corporation. Today PVOSB is wholly and operated by LP.

LP sells PVOSB product into the North American market. Woodlands operations for Peace Valley OSB are managed by Canfor staff under a timber tenure management agreement with LP. Peace Valley OSB holds Forest Licence A85946 with an AAC of 150,000 m^3 which is managed by Canfor's' woodlands staff on behalf of PVOSB.

Refer to Appendix 1 for Canfor's SFM policy.

2.2 STRUCTURE AND RESPONSIBILITY

A Steering Committee and a Working Group govern the Fort St. John Pilot Project. The Steering Committee, comprised of senior management representing the Participants, provides broad guidance to the Working Group. The Managing Participants with local management representation have formed a Working Group to develop and implement pilot initiatives including the SFMP. **Error! Reference source not found.** identifies the governance model and the c ontinuous improvement model for the SFMP.

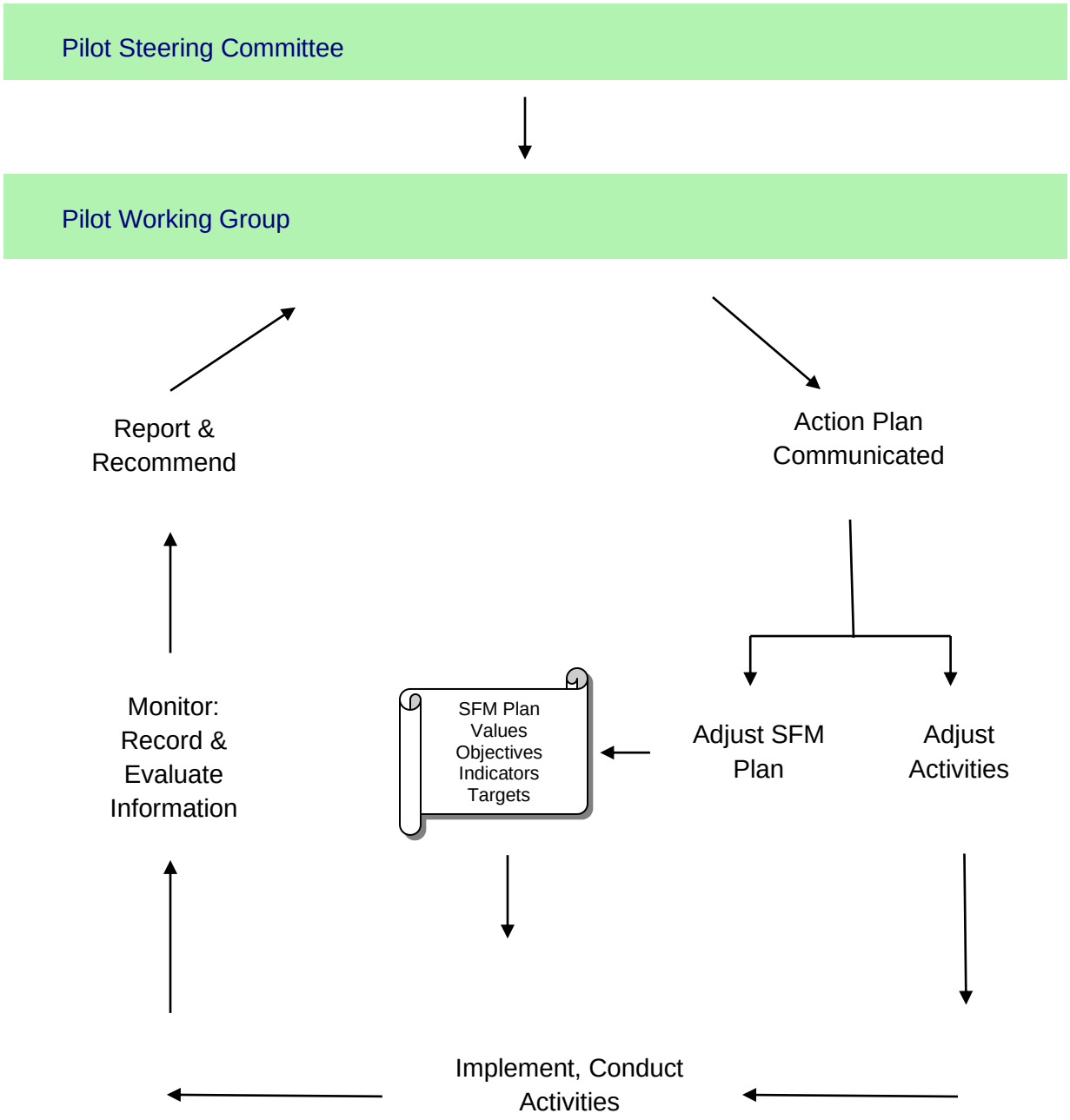


Figure 3: Pilot Governance

The Pilot Participants' specific responsibilities related to the performance indicators and targets are summarized in a Responsibility Action Matrix (RAM). The Regional Executive Director and

Resource Management Director MFLNRORD currently have the authority to approve a sustainable forest management plan under the *FSJPPR*.

2.3 DESCRIPTION AND ROLE OF PAG

The Participants are committed to provide ongoing opportunity for the public to be involved in the Fort St. John pilot project planning and monitoring activities. A key element in the public overview component is the establishment of a public advisory group (PAG).
The PAG consists of a representative for local interests, including:

i. Commercial recreation
ii. Environment/conservation
iii. Forest contractors/workers
iv. Labor
v. Oil & gas industry (contractors/producers)
vi. Non-commercial recreational – fishing/hunting
vii. Non-commercial recreation – non-consumptive
viii. Range
ix. Rural communities
x. Trapping
xi. Urban communities
xii. Energy
xiii. First Nations representatives

The role of the Fort St. John Pilot Project Public Advisory Group (PAG) is to provide input on the pilot project as described in the approved regulation and pilot proposal. In addition, the group will also meet the needs of the SFM Standard certification process, which includes providing input to help ensure that the Participant's forest management decisions *"…are made as a result of informed, inclusive, and fair consultation with local people who are directly affected by or have an interest in sustainable forest management"*[5]. The PAG will represent the diverse range of interests in the Defined Forest Area (DFA) and will:

- ensure that the Participants' forest management decisions, as contained in the sustainable forest management plan, are made as a result of informed, inclusive and fair consultation with local people who are directly affected by or have an interest in sustainable forest management (*FSJPPR* Section 47)
- review proposed sustainable forest management plans and amendments to sustainable forest management plans (FSJPPR Section 37), and
- review audits as noted in Section 50 of the Pilot Regulation, and
- review annual reports as noted under Section 51 of the Pilot Regulation

According to CAN/CSA-Z809-08, Public Advisory Groups have opportunities to work with the Participants to:

[5] Canadian Standards Association. 1996. CAN/CSA-Z808-96 A sustainable forest management system: guidance document. Canadian Standards Association, Etobicoke, ON.

- identify and select values, objectives, indicators and targets, based on the CSA SFM elements and any other elements of relevance to the DFA,
- develop one or more possible strategies,
- assess and select one or more strategies,
- review the SFMP,
- design monitoring programs,
- evaluate results and recommend improvements,
- and discuss and resolve any issues relevant to SFM on the DFA.

2.4 First Nations Participation

The SFM planning process has the potential to provide First Nations with enhanced opportunities to participate in forestry planning through participation on the Public Advisory Group, or a parallel process as a separate group from the PAG, if First Nations so requested. Currently five First Nations have representatives on the PAG as members. Invitations to each PAG meeting are sent to all First Nations who have traditional territory within the Fort St. John TSA, and representatives frequently attend meetings to observe.

Memoranda of Agreement (MOA) are currently being negotiated between Canfor LP and First Nations that will document processes for engagement in the review of strategic level plans (e.g., SFMP) and operational plans (e.g., FOS, PMP's), as well as economic opportunities. MOA negotiation participation currently includes the Halfway River, Prophet River and West Moberly First Nations. A separate MOA that addresses CMP's coniferous Forest Licence A60972 addresses economic opportunities and forestry planning engagement with the Blueberry, West Moberly, and Saulteau First Nations.

These agreements vary in content but are similar in that they have provisions for information sharing and First Nations feedback on forestry activities, as well as economic opportunities and benefits.

2.5 Description And Role Of STAC

The overall role of the Scientific Technical Advisory Committee (STAC) was to provide strategic input for consideration in the development and implementation of the Sustainable Forest Management Plan (SFMP #1). The STAC included well known and respected academics and professionals possessing a diverse set of knowledge in sustainable forest management. These scientific and/or technical experts assisted the Participants in the identification of appropriate indicators, objectives, or strategies to address values and goals derived through the public advisory process. The Committee also provided an overview and commented on the adaptive management framework that is in use by the pilot Participants.

Since the completion of SFMP # 1, the STAC has not formally met, although individual STAC members and other experts have frequently been consulted, providing timely presentations to the PAG on technical issues, and the Participants on operational methods, strategies, training, and other issues.

The Participants, who are ultimately responsible for the development and implementation of the SFMP, carefully evaluated and considered the recommendations of the Public Advisory Group, and the advice of the STAC members and other experts during the development of the SFMP.

Government advisors attend PAG meetings and provide information and advice to the Participants and the PAG.

3.0 SUSTAINABLE FOREST MANAGEMENT

Sustainable forest management is often depicted as the intersection between the sets of management options that are ecologically appropriate, socially acceptable, and economically viable.

Achievement of this best set of options is based on the application of Ecosystem Management, which is defined as a forest management system that recognizes the natural variability of an ecosystem and attempts to emulate these natural responses with man-made disturbances while managing forests for a range of environmental, social, and economic values.

Designing a forest management system that recognizes the natural variability of ecosystems and attempts to emulate patterns of natural disturbance is delivered through the application of two key concepts:

1. Sustaining biological richness and
2. Natural disturbance unit planning.



Figure 4 Pillars of Sustainable Forest Management

Both concepts are discussed in the sections below.

To demonstrate that ecosystem management is being achieved to meet a range of environmental, social, and economic values, a series of indicators (performance measures) and targets are established within the SFMP (see Section 6.0 Values, Objectives, Indicators And Targets).

3.1 SUSTAINING BIOLOGICAL RICHNESS

The concept of "sustaining biological richness" as described in this SFMP was derived from the work initially developed by Dr. Fred Bunnell and the Weyerhaeuser Adaptive Management Working Group (Bunnell et. al. 2003). This concept is further described in discussion papers completed for Canfor's TFL 48 (Bunnell 2002), and for the Prince George Timber Supply Area (Wells et. al. 2003b). The following section describes the importance of "sustaining biological richness" as it relates to "biodiversity" and three "indicators" that may be used to assess achievement. The term "indicator" used by Bunnell et. al. 2003; Bunnell 2002; and Wells et. al. 2003a, b is used in the context of providing broad qualitative tests not to be confused with the indicators in section 6.0 of this Plan, which are specific measures of performance.
Table 5 identifies biological richness and the indicators and sub-indicators defined by Wells et. al. 2003a, b. Performance indicators are contained in section 6.0 that measure and demonstrate performance with regard to the conservation of biological richness over time.

Table 5: Biological Richness and its Indicators and Sub-indicators (Wells et. al. 2003)

Biological Diversity Criterion: Biological richness and its associated values are sustained within the management unit.	
Indicator 1: Ecologically distinct ecosystem types are represented in the non-harvestable land base of the management unit to maintain lesser-known species and ecological functions.	
Indicator 2: The amount, distribution and heterogeneity of habitat and landscape structure important to sustain biological richness is maintained over time.	Coarse woody debris
	Large live trees
	Cavity trees (snags)
	Shrubs
	Broad-leaved trees
	Riparian areas
	Late seral and early seral
	Adjacent or continuous canopy
Indicator 3: Productive and well-distributed populations of forest dwelling species are maintained over time.	

Table 6**Error! Reference source not found.** identifies the critical habitat and landscape elements (sub indicators in **Error! Reference source not found.**) defined by Bunnell et. al.1999 and their importance for ecosystem management.

Table 6: Habitat and Landscape Elements Identified by Bunnell et al. (1999)

Coarse-woody debris-(downed wood)	Important habitat for a wide range of invertebrates, small vertebrates, and cryptogams (mosses, liverworts, and lichens). Large variations in persistence exist by size (diameter) and species.
Large live trees	Important contributors to snags and coarse woody debris. Important for larger sized cavities. Abundance dramatically affected by forest management.
Cavities (snags)	Snags form critical habitat for at least a portion of the life cycle for a significant portion of all animal species. Tree species preferences exist. Large variations in persistence exist by size (diameter) and species.
Shrubs	Important as food sources for many species (leaves and berries). Important as a habitat component for small mammals and birds, including nest sites. Species diversity increases in early seral, riparian, and open stands.
Broad-leaved trees	Mixtures of coniferous and deciduous trees frequently increase niche diversity. Deciduous snags are frequently preferred as habitat for cavity dwellers. Broad-leaved trees are frequently early seral colonizers, and abundance may decline in low intensity managed and unmanaged area protected from fire.
Riparian	Unique assemblages of species and stand structures. Frequently large impacts on aquatic habitat through temperature controls and biotic inputs. Potentially large impact on water quality.
Late seral and early seral	Very old and very young stands have the greatest niche diversity. Many species appear dependant on either late or early seral stands. Relative importance varies with natural disturbance type and large impact on habitat. Influences water quality and quantity through leaf area (evapotranspiration) and runoff.

Adjacent or continuous canopy	Important habitat attribute for some species through influences on species movements. When coupled with spatial considerations, has a large impact on habitat connectivity. Closely associated with patch size and seral stage distributions. Relative frequency of forest opening of different sizes. Major influence on decisions related to scale. Large impact on interior forest and thus habitat.

The term "**biodiversity**" is complex and difficult to demonstrate the conservation of the value over time. Biological richness is a much more concise term and is a credible surrogate for biological diversity (Bunnell 1998; Wells et. al. 2003). The intent of sustaining biological richness is to maintain productive, well-distributed populations of species in a defined management area over time and can be assessed through the use of the three (3) indicators identified in **Error! Reference source not found.**:

Biodiversity: The variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of

1. Ecosystem representation
2. Habitat and landscape elements
3. Species productivity and distribution

Ecosystem representation is a coarse filter approach intended to ensure a proportion of ecologically distinct ecosystem types are maintained within the non-harvestable land base (NHLB). Maintaining representative ecosystems in an unmanaged state (i.e., NHLB) is important for three (3) reasons (Wells et. al. 2003): 1) They sustain poorly understood ecological functions and species habitat requirements; 2) They act as a precautionary buffer against errors in efforts intended to sustain species in the managed forest, and 3) They provide an ecological baseline against which the effects of human activities can be compared.

Habitat and landscape elements are structural attributes that occur at a variety of temporal and spatial scales. Maintaining these elements is a medium filter approach and is important for two (2) reasons (Bunnell and Kremsater 1990; Lindenmayer and Franklin 2002; Wells et. al. 2003): 1) Studies have shown that most forest dwelling species require these elements as a habitat requirement, and 2) Forest management activities have a strong influence over the abundance, distribution, and functionality of these elements.

Species productivity and distribution is a fine filter approach intended to monitor the presence and trends of species in response to changes in habitat structure and pattern. This indicator is a long-term adaptive approach, which tests the "effectiveness" of the provisions designed to manage indicators 1 and 2 (above). This approach is often referred to as "effectiveness monitoring" and relies on the results of long-term forest monitoring and research programs such as, forest inventory monitoring plots, and wildlife research that supports species accounts (distribution and abundance). As stated above, effectiveness monitoring can be used to support adaptive management, or continuous improvement of forest practices related to indicators 1 and 2 over time. Section 3.4 Continuous Improvement discusses the SFMP process for continuous improvement.

3.2 NATURAL DISTURBANCE UNIT PLANNING

Natural disturbance unit planning refers to the work completed by S. Craig DeLong, Regional Ecologist, Northeast Forest Region, in a document entitled “Land Units and Benchmarks for Developing Natural Disturbance-based Forest Management Guidance for Northeastern British Columbia”. DeLong, (2011), provides a summary of research findings to illustrate the range of natural variability for some of elements described in **Error! Reference source not found.** a cross a set of Natural Disturbance Units (NDU). The geographical distribution of NDU’s in the DFA is presented in Figure 5. The Ministry of Environment and the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD) have indicated that the guidance provided in DeLong, (2011), is a synthesis of the most current scientific information on the natural range of variability for habitat management in the Northeast Region. The indicators and targets identified in section 6.0 therefore rely on DeLong (2011) for local-level baseline information.

The underlying assumption of NDU’s is that the biota of a forest is adapted to the conditions created by natural disturbances and thus should cope more easily with the ecological changes associated with forest management activities if the pattern and structure created resemble those of natural disturbance (Hunter 1993, Swanson et al. 1993, Bunnell 1995, DeLong and Tanner 1996, Bergeron and Harvey 1997, Angelstam 1998, DeLong and Kessler 2000). Adopting forest management practices that approximate the natural range of variability is being widely accepted as an appropriate way to manage for the needs of many organisms. The Biodiversity Guidebook (1995) was the first attempt in British Columbia to present guidance for forest management based on the natural disturbance template. Since the completion of the Biodiversity Guidebook, more information on natural disturbance dynamics has become available. Within the Northeast Region a number of studies have investigated particular aspects of natural disturbance (DeLong 1998, DeLong and Kessler 2000, Lewis, and Lindgren 2000, Rogeau 2001, DeLong 2011).

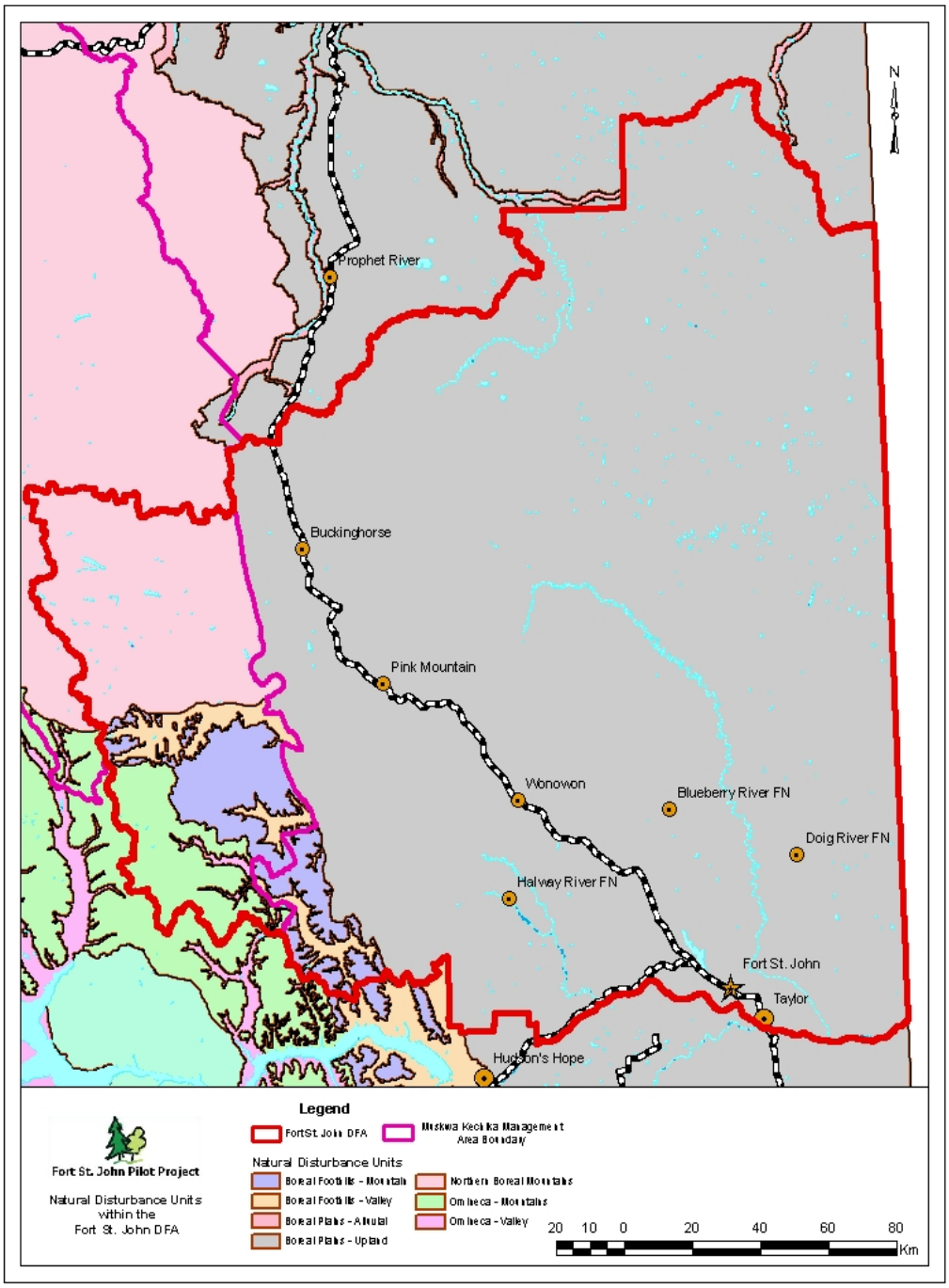


Figure 5: NDU Boundaries within the Fort St. John DFA

Instead of adopting the Natural Disturbance Types (NDT's) presented in the Biodiversity Guidebook (1995) DeLong 2011 presents information for 9 Natural Disturbance Units. These units better separate areas based on differences in disturbance processes, stand development, and temporal and spatial landscape pattern. DeLong 2011 contains guidance on management

of old forest, young natural forest, patch size distribution, and stand species composition and structure. Most of the guidance relates to approximating wildfire as it was the key stand replacement disturbance agent in most landscapes, and it is the one that we have exhibited the most control over. In other words, it is the disturbance process we are attempting to replace with harvesting.

Examples of how this Plan has adopted the principles identified in DeLong 2011 include:

1. Maintenance of some naturally disturbed areas over time, which are not salvaged.
2. Openings, which represent a more natural patch size distribution.
3. Providing for stand-level characteristics (e.g., species composition, stand structure) that emulate natural baseline information as much as possible.

To move towards a more natural range of variation and emulate patterns of natural disturbance many of the indicators and targets identified in section 6.0 are established at a landscape or DFA level, as opposed to management strategies directed at individual stands or cut blocks.

3.3 MANAGED STAND MONITORING

Under the principles of SFM, monitoring is defined as the periodic measurement and assessment of change of an indicator, where an indicator is a variable used to report progress towards achieving an objective. Objectives are broad, general statements that describe a desired state or condition related to one or more forest values (CAN/CSA-Z809-08). In this context, two broad categories of monitoring can be recognized. The first, which may be referred to as "administrative monitoring", checks that planned SFM activities are carried out (i.e., did we do what we said we were going to do?). An example is monitoring to ensure conformance with late seral targets.

The second category of monitoring may be referred to as monitoring the state of the forest, which includes activities that measure timber and non-timber variables over time. Growth and Yield (GY) monitoring, which is the process of checking GY estimates for a defined population, is in this broad category. Monitoring the state of the forest requires a long-term commitment to establishing and re-measuring plots over time.

Monitoring is a key process in adaptive management. It is a feedback loop that provides information for continuous improvement. The level of success in achieving objectives can be evaluated, and planning and management activities can be improved accordingly.

The Participants have implemented a GY monitoring program for managed stands within the DFA. This program is based upon a 3-km grid covering the whole DFA. When any one of the points is harvested a GY monitoring plot will be established 15 years post-harvest and periodically re-measured over time. The GY monitoring objectives for the Fort St. John DFA are as follows:

1. Monitor the change in volume, species composition, top height, and site index in managed stands from 15 years post-harvest onwards.
2. The intent is that this data will be compared with predicted values of the same attributes used in timber supply analysis. This is to develop a level-of-confidence in the accuracy and precision of projections used in timber supply analysis. This data

can also be used to address several SFM indicators pertaining to maintaining or improving the harvest level over time.
3. Provide data on snags, coarse woody debris, and shrubs to address SFM objectives
4. Provide data on stand growth and development that can be used as a subset of the data required for developing new GY models.
5. Use a sample design that can be modified in the future to incorporate establishment of plots in mature stands and linkages with other inventory sampling.

See Appendix 3 for a detailed description of the sample design and objectives developed for the DFA.

3.4 CONTINUOUS IMPROVEMENT

In keeping with the principles of SFM, opportunities to continuously improve the SFMP are built into the SFM process. Continuous improvement relies on the ability to recognize, plan for, and adapt to change as it occurs. As time goes by, changes will occur to both the practice of forest management and the process in which it is delivered. Ensuring that a process is in place to accept and adapt to change is a necessary part of SFM. To ensure continuous improvement occurs means that the sources of "change" are recognized, and strategies developed to accept and adapt to these changes. **Error! Reference source not found.** identifies the sources of c hange regarding forest management and the strategies that are in place to adapt.

Continual improvement includes the incorporation of new information and knowledge, the identification of other information gaps, and undertaking research to address such gaps. The incorporation of new knowledge and understanding allows for better management approaches to evolve. Continual improvement activities also include modifications to the adaptive management system as a result of what is learned from indicator monitoring. Indicator results provide a means to evaluate the achievement of objectives and to determine whether values are being maintained. This process may also reveal issues with the SFM system that requires adjustment to the SFM system in part, or as a whole.

Following the performance management evaluation and review, non-conformance issues related to organizational management and/ or practices will be addressed within an Action Plan which will be implemented by the applicable organization(s). If it is determined that non-conformances are related to issues regarding the SFM system, Action Plans will be produced and implemented by the Participants.

The SFMP is intended to be delivered and implemented through each of the Managing Participant's existing EMS organizational structure. Since the EMS is designed as a performance management loop, the SFMP will continuously improve, adjust, and adapt to changing circumstances.

Table 7: Continuous Improvement Process for the SFMP

Source of Change	Adaptation Strategy
Change in environmental circumstance i.e., natural events such as large fires.	Performance monitoring as outlined in section 6 will occur on a periodic basis. Conduct an annual performance management evaluation and review of monitoring results and compare to original targets. Adjustments to practices and/or targets are made, if required.
New information that can reveal assumptions, targets or measures are incorrect or could be improved.	Annually, plans are developed that demonstrates how resources are allocated and prioritized with regard to research, effectiveness monitoring, and adaptation of measures and targets in the SFMP. The plans will seek to collaborate wherever possible with other associations having mutual interests in SFM. Examples include, The McGregor Model Forest Association, other industry partners and Government Agencies. The results of the plans will be reviewed on an annual basis. Adjustments to practices and/or targets are made as a result of the new information.
Changing social values or SFM criteria/standards.	Periodic meetings are held with the Public Advisory Group to gather local changes in public values over time. The annual performance management evaluation and review will consider government policy and land base planning and zonation changes. Annual audits will be completed to verify conformance to the existing SFM Criteria/Standards. Adjustments to practices and/or targets are made if necessary.

4.0 LANDSCAPE LEVEL STRATEGIES

The landscape level strategies (LLS) provide the strategic direction to the Participants' plans and operations. The Fort St. John Pilot Project Regulation (*FSJPPR*) specifies the regulatory content of the SFMP. A sustainable forest management plan at a minimum must include landscape level strategies for all of the following:

- Timber Harvesting,
- Road Access Management,
- Patch Size, Seral Stage Distribution and Adjacency,
- Riparian Management,
- Visual Quality Management,
- Forest Health Management, and
- Range and Forage Management.

This SFMP also includes a Reforestation Strategy, which was included in the 2004 SFMP, and a Soil Management Strategy[6], which was new in SFMP #2 and a Climate Change Forest Health strategy new in SFMP #3.

The *FSJPPR* requires the Participants ensure that each regulatory strategy contained in the plan specifies one or more performance indicators for evaluating whether or not the strategy has been successfully implemented. The Participants will regularly review each of these indicators for appropriateness and evaluate performance and progress towards the associated targets. A summary of these reviews and any proposals for change will be reported in the SFMP annual reports. The targets will be managed within the continuous improvement process as described in section 3.4 Continuous Improvement.

This comprehensive SFMP is designed to meet not only the regulatory requirements included in the *FSJPPR*, but also CSA Forestry Certification requirements, and the business needs of the Participants. Many of the above noted Landscape Level Strategies included in this SFMP consist of several specific sub-strategies and indicators. Some of the strategies and indicators are directed more at the certification and business needs objectives, while others are specifically identified for regulatory compliance purposes as Performance Indicators for evaluation of the Landscape Level Strategies (Section 42 of the *FSJPPR*). **Specific strategies, the headings for the indicators, targets, acceptable variances, and other sections that specifically address the legal requirements of the *FSJPPR* are identified in red text throughout this plan to facilitate government review. Other sub strategies and indicators in this SFMP are included to meet CSA certification standards. These other strategies and indicators are not intended to meet the regulatory requirements, and therefore do not require regulatory approval**. They identify the Participants commitments and targets to meet objectives derived from the public group, certification bodies, or business needs. A summary of the landscape level strategies and related performance indicators being submitted to the government for approval are included in **Error! Reference source not found.**

[6] Soil Management Strategy added as per MFR comments in the 2004 SFMP Approval Letter

Table 8: **Landscape Level Strategies and Related Performance Indicators Submitted for Approval**

Landscape Level Management Strategy (& Section No.)	Legal Indicators for Evaluating LLS (S.42 of *FSJPPR*)	Indicators Affecting Part 3 Div. 5 (Sec 35(5) or 35(6))	Related Non-Legal Indicators
4.1 Timber Harvesting	18 (Graham Timing) 19 (Graham ha) 20 (Graham Connectivity) 21 (MKMA) 46 (Coordination) 47 (AAC Partition-Deciduous Planning) 47A (AAC Partition Deciduous Harvest Performance) 48 (AAC Partition-Conifer Planning) 48 (AAC Partition Conifer Harvest Performance)		27 (Silv.Systems) 44 (Deliveries) 49 (Cut Control) 64 (Residual Fibre Utilization)
4.2 Road Access	24 (Perm Access) 45 (R.O.S.)	24 (Perm Access)	37 (Coord Developments)
4.5 Patch/Seral/Adjacency	2 (Seral Stage) * 3 (Patch Size) * 6 (CWD) 9 (WTP) 7 (Reserves)	6 (CWD) 9 (WTP) 7 (Reserves)	
4.3 Riparian	22 (River Corridors) 33 (Peak Flow Index) 35 (Streambanks)	22 (River Corridors)	
4.9 Visual	41 (VQO) 1 (Forest Types) 2 (Seral Stage) *	41 (VQO)	
4.6 Forest Health	3 (Patch Size) * 13 (Seed Use) * 25 (Forest Health-Silv) 45 (Forest Health-FOS)		26 (Salvage)
4.4 Range & Forage	10 (Noxious Weeds)		38(Range Action

Landscape Level Management Strategy (& Section No.)	Legal Indicators for Evaluating LLS (S.42 of *FSJPPR*)	Indicators Affecting Part 3 Div. 5 (Sec 35(5) or 35(6))	Related Non-Legal Indicators
	39 (Damage to Range Improvements)		Plans)
4.7 Reforestation	13 (Seed Use) * 28 (Species Comp.) 29 (Reforest. Assess.) 30 (Est. Delay)	13 (Seed Use) * 29 (Reforest. Assess.)	14 (Decid. Regen)
4.8 Soil	4 (Soil Disturbance)		
*denotes indicators that are used to measure more than one strategy			

The SFMP must specify the provisions, if any, of Part 3 Division 5 of the *FSJPPR* and the schedules that are to be affected through the application of the proposed landscape level strategy and include rationales on how these will provide at least equivalent protection for forest resources, be consistent with the preamble to the Act, and provide for adequate management and conservation of forest resources. The SFMP must also include any applicable performance standards that are to be used for the purposes of Part 3 Division 5, and the associated schedules, of the *FSJPPR*. These can be found in section 8 “Changes to Requirements” of the SFMP.

4.1 TIMBER HARVESTING STRATEGY

The Participants' timber harvesting activities supply the majority of the raw material necessary to operate the forest industry's local processing facilities. The timber harvesting costs largely determine the economic viability of these processing facilities. In a sustainable forest management framework, the economic considerations of harvesting activities must be balanced with ecological and social values. The strategies included in this section are intended to address key issues within the DFA that relate to forest harvesting activities.

The timber harvesting strategies will provide strategic direction for the Participants at the DFA, landscape unit level, and site level for forest harvesting activities, with respect to the following:

- Timber harvesting objectives identified in the Fort St. John Land and Resource Management Plan (LRMP), including those related to forest management intensity levels, and areas of special concern such as the MKMA (which includes the Sikanni and Graham LU's), the Graham River IRM Plan area, and the major river corridors.
- Key assumptions within the Timber Supply Review that support the maintenance of sustainable timber production levels, particularly as they relate to the timber harvesting profile.
- Timber harvesting objectives, indicators, and targets that have been identified by the Public Advisory Group and incorporated into the CSA SFM matrix, including those related to utilizing silviculture systems consistent with the local ecology, harvesting at sustainable levels, and maintaining viable processing facilities to support the local economy.
- Business objectives relating to timber harvesting, including optimizing fibre flow and value, and the coordination of operations between Participants to minimize costs.

The Graham River Integrated Resource Management Plan (GRIMP)

Forestry operations within the Crying Girl LU and the portion of the Graham LU that falls within the Graham River drainage will be consistent with the intent of the 1998 Graham River IRM Plan. Section 1.2.3 of this SFMP summarizes the key features of the GRIMP, including clustered sequential development, connectivity corridors, access management, and adaptive management.

Since the 2004 SFMP, there have been significant developments that need to be considered in the context of adaptive management of the GRIMP area. The recent creation of substantial Wildlife Habitat Areas and Ungulate Winter Ranges for caribou in and adjacent to the GRIMP area has enhanced wildlife protection. As well rapid, unforeseen changes to forest conditions (e.g., Mountain Pine Beetle) and challenging economic conditions are compelling the forest industry to be very flexible in their harvest planning.

The following strategies are designed to implement key components of the Graham River IRM Plan that relate to timber harvesting, while addressing some of these recent developments.

4.1.1 Graham IRM Plan Sequential Development Strategy

Timber harvesting within the Crying Girl LU and the portion of the Graham LU that falls within the Graham River valley will be based on sequential clustered development. Operational harvest activities will be concentrated in one 'cluster' during a harvesting season to minimize costs, and to minimize the extent of industrial disturbance to wildlife.

The total extent of allowable harvesting area will be consistent with the GRIMP harvest schedule. Exceptions to this that may be required to address abnormal forest health and damaging events will be reviewed with the PAG and government agencies prior to conducting activities.

This strategy will limit operational harvesting (i.e., falling and/or skidding of trees, other than for predevelopment of roads) to one 'cluster' as envisioned in the GRIMP, thereby providing relatively low overall disturbance impacts to wildlife, recreation, and other non-timber activities at any one time. Predevelopment of road right of ways to facilitate timely entry into future clusters may still occur concurrently while operational harvesting is being completed. The road predevelopment strategy will employ appropriate techniques such as operating within least risk timing windows to minimize negative impacts to wildlife. Limits on the total amount of timber harvesting allowed per time period will be retained to maintain consistency with the intent of the GRIMP to maintain forested areas and other resource values. Within the total allowable harvest levels, the revised strategy does allow the flexibility for the Participants to determine which cluster will be harvested at a given point in time in order to address changing forest health, economic, or other conditions.

For the purposes of Section 42 of the *FSJPPR*, Indicator # 18 (Graham Harvest Timing) and Indicator # 19 (Graham River Merch Area Logged) will be the legal indicators that determine if forest practices are consistent with this landscape level strategy. Please refer to **Section 6.18 Graham Harvest Timing and Section 6.19 Graham Merch Area Harvested** , for the specific details for each the indicator, target, and acceptable variances, that will be used to determine if forest practices are consistent with this landscape level strategy.

4.1.2 Graham River Plan Connectivity Strategy

The Forest Connectivity Corridors that are identified in the Graham River IRM Plan area provide substantial connectivity for wildlife throughout the Plan area. Operational plans will respect the long-term primary components of these connectivity corridors. To ensure consistency with the original objectives of the GRIMP, government agencies will be consulted, and their agreement obtained prior to proposing harvesting activities in any portion of the permanent corridors.

There are two key permanent components of the connectivity corridors that are expected to remain relatively constant, and provide for the essential habitat requirements of most species in the Graham River valley (Lance, 1997):

1. *The alluvial valley floors of the Graham River and major streams which flow into the Graham River*. These riparian corridors provide a habitat complex consisting of shelter, foraging sites, and travel routes, and were identified in the Graham River IRM Plan as the most important habitats in the plan area.
2. *The non-productive, non-commercial areas, including treeless or low productivity forested alpine areas, and meadows, swamps, and other NP areas*. Other than the riparian habitats, the alpine habitats and wetlands were identified as the second most important habitats for key species such as caribou within the Graham.

This strategy will provide direction to timber harvest planning in the Graham IRM Plan area and ensure these connectivity corridors may continue to function as high value habitats though time.

For the purposes of Section 42 of the *FSJPPR*, Indicator # 20 (Graham Connectivity) will be the legal indicator used to determine if forest practices are consistent with this landscape level strategy. Please refer to **Section 6.20 Graham Connectivity** ,for the specific details on the indicator, target, and acceptable variances, that will be used to determine if forest practices are consistent with this landscape level strategy.

Muskwa-Kechika Management Area

As a result of the Fort St. John and Fort Nelson LRMP's, the Muskwa-Kechika Management Area (MKMA) was established. The MKMA was established by Order In Council in 1997 (order #1367/97) and subsequently the *MKMA Act* passed in 1998. The MKMA includes Special Management Zones (SMZ's) and Protected Areas (PA's). The Order in Council for the MKMA establishes that: *"The management intent for the Muskwa-Kechika Management Area is to ensure that wilderness characteristics, wildlife, and its habitat are maintained over time while allowing resource development and use, including recreation, hunting, timber harvesting, mineral exploration and mining, oil and gas exploration and development."*

The Muskwa-Kechika Management Plan Regulation requires the establishment of one or more landscape unit objectives prior to the approval of timber harvesting, other than 'grandparented' blocks. Blocks and roads included in approved FDP's that existed prior to the regulation are exempt from this requirement (grandparented), and may be harvested prior to landscape level objectives being established.

4.1.3 Muskwa Kechika Management Area (MKMA) Strategy

Long term harvest plans will be prepared depicting the approximate location of blocks and roads, to address key wildlife and road access issues for one or more drainages within the MKMA. These plans will be submitted to government and the public for review and comment prior to inclusion of any new proposed blocks in any FOS or similar plan.

The two main requirements of any proposed harvesting plans in the MKMA will be consistency with any legally established landscape unit objectives for the MKMA, and economic viability of the proposed developments. An evaluation of the applicability of using the clustered harvest planning concept used in the Graham River Integrated Resource Management Plan to meet these two requirements in the MKMA area should be completed once the MKMA objectives are known. Harvesting in drainages within the MKMA will not commence until the proposed plan is completed, other than in grandparented blocks (consistent with the *MKMA Act*), or unless requested by the government to address urgent forest health considerations.

For the purposes of Section 42 of the *FSJPPR*, Indicator # 21 (MKMA Harvest) will be the legal indicator used to determine if forest practices are consistent with this landscape level strategy. Please refer to **Section 6.21 MKMA Harvest** , for the specific details on the indicator, target, and acceptable variances, that will be used to determine if forest practices are consistent with this landscape level strategy.

Allowable Annual Cut Levels and Timber Profile Assumptions

Effective March 1, 2003, the Chief Forester determined that the allowable annual cut (AAC) for the Fort St. John TSA to be 2,115,000 m^3 per year. This harvest level is below the estimated Long Term Harvest Level (LTHL) of the base case scenario in the Timber Supply Analysis of 2,713,400 m^3. The approved cut is partitioned, with 1,200,000 m^3/year from coniferous leading stands, and 915,000 m^3/year from deciduous leading stands.

The Chief Forester set the approved AAC level below the theoretical LTHL after considering the risks and uncertainties inherent in the Timber Supply Review (2002). To ensure sustainable timber supplies for the manufacturing facilities, it is desirable for the Participants to consider the management assumptions used in the TSR when developing their harvest plans. The Participants believe that a management focus on harvesting coniferous timber from some height class two pine stands and commencing deciduous harvesting in Supply Block F are desirable strategies to support long term sustainable management of the timber resources.

4.1.4 AAC Rationale Assumptions Strategy

Participants will plan harvesting activities in a manner that supports the maintenance of the current Allowable Annual Cut over the term of the SFMP, balancing economic considerations with the management assumptions included in the current AAC determination (TSRII) rationale.

The Participants will plan a portion of their coniferous harvesting operations in economically viable pine stands with height class two inventory labels. If forest health concerns (e.g. Mountain Pine beetle, fire damaged timber, etc) require urgent attention, harvesting may alternatively be directed into those priority stands.

The Participants will plan a portion of their deciduous harvesting operations within economically viable deciduous leading stands within Timber Supply Block F.

For the purposes of Section 42 of the *FSJPPR*, Indicator # 47 (AAC Partition- Deciduous Planning), Indicator #47A (AAC Partition- Deciduous Harvest Performance), Indicator # 48 (AAC Partition- Conifer Planning) and Indicator #48A (AAC Partition- Conifer Harvest Performance) will be the legal indicators used to determine if forest practices are consistent with this landscape level strategy.

4.1.5 Sustainable Timber Harvest Level Strategy

Support sustainable harvest levels by managing cut control levels and timber sale volumes sold that are consistent with the approved apportioned volumes within the TSA.

In addition to supporting the retention of a sustainable long term cut in the TSA through their management practices, there is a need to demonstrate to the public that the short-term harvest levels are consistent with the allocated cut levels as determined by the Chief Forester.

Refer to **Section 6.49 Cut Control**, for details on the indicator, the target and the strategy implementation. **This performance indicator does not affect Part 3 Division 5 of the *FSJPPR* and is not intended for the evaluation of the LLS as per section 42 of the *FSJPPR***. This performance indicator is intended to address other objectives of the Participants.

Coordination of Operational Activities between Participants

Significant utilization of deciduous resources on Crown land is a recent development in the Fort St. John TSA. The interconnectivity of the deciduous and coniferous timber resources, and overlapping tenures of the various Participants presents unique environmental and economic challenges. To minimize environmental impacts, and maximize economic efficiencies, it is essential that there be a very high level of coordinated planning between the Participants. The Participants are required to have one SFMP that addresses Landscape Level strategies that apply to all Participants. In addition, the Participants have prepared a consolidated FOS and are in the process of developing another. The FOS demonstrates consistency with those SFMP indicators that can reasonably be forecasted, and provides each Participant with a fair and transparent distribution of timber resources. Joint preparation implies that the FOS will be prepared for or on behalf of all the Participants involved in forest management, and any amendments to the FOS will be reviewed for acceptability prior to completion by those same Participants.

4.1.6 Coordination of Planning Strategy

Participants will coordinate the planning of forestry operations to achieve business efficiencies, facilitate analyses of cumulative forest management impacts in relation to SFMP strategies, and provide consolidated information sharing and consultation products to interested parties in a Forest Operations Schedule.

For the purposes of Section 42 of the *FSJPPR*, Indicator # 50 (Coordination) will be the legal indicator used to determine if forest practices are consistent with this landscape level strategy. Refer to **Section 6.46 Coordination** for the specific details on the indicator, target, and acceptable variances that will be used to determine consistency with this landscape level strategy.

Fibre Flow to Processing Facilities

Maintaining viable timber processing facilities is a major business objective of the Participants and important to the sustainability of communities. The viability of local timber processing facilities is dependent on the timely delivery of sufficient volumes of high quality fibre to manufacture products at desired production levels. The primary constraint to fibre flows in the DFA is that a significant portion of annual deliveries is required during the summer and fall. This

is a major challenge in the DFA, due to the scattered distribution of suitable ground, and the shortage of acceptable surfacing material in many of these locations. To support cost competitiveness and community stability, it is highly desirable for Participants to focus efforts on identifying and developing suitable areas for summer development, while recognizing and managing the environmental factors impacted by summer harvesting.

4.1.7 Evenaged Silviculture System Strategy

Even-aged silviculture systems such as clearcuts, or clearcuts with reserves, will be the predominant silviculture systems employed, as these systems most closely parallel the even aged forests that result from natural disturbance events in the TSA. Where other resource values are particularly high, small patch or strip cuts which may result in an unevenaged silviculture system, may be proposed to maintain non-timber resource values, while allowing for some timber utilization. Modified shelterwoods will be employed in deciduous logging to protect coniferous understory on an operational trial basis, consistent with the reforestation strategy.

Refer to Indicator 27, in **Section 6.27 Silviculture Systems** for details on the indicator, the target and the strategy implementation. **This performance indicator does not affect Part 3 Division 5 of the *FSJPPR* and is not intended for the evaluation of the LLS as per section 42 of the *FSJPPR***. This performance indicator is intended to address other objectives of the Participants.

4.2 ROAD ACCESS MANAGEMENT STRATEGY

There are many industrial roads being constructed within the Fort St. John TSA on an annual basis, primarily by the forest industry and the oil and gas industry, to provide access to the resources those industries require. The Fort St. John LRMP identified that road access for industrial activity is an acceptable use of the land but needs to be managed in concert with other resource objectives. Major access management objectives identified by the LRMP included the necessity to coordinate access and linear development and manage existing access to minimize the negative effects on other resource values. Access strategies and indicators address these objectives. The Participants are cognizant of the extent of road development that is occurring on the DFA, as a result of the combined activities of both major industries. The Participants are committed to working together, as well as with the oil and gas industry and government to minimize impacts of access development.

Six years or more of planned forestry road and cutblock development are presented in the Forest Operations Schedule prepared by the Participants. This information is referred to government agencies, the public and other interested parties well in advance of actual construction. This up-front planning provides the oil and gas industry and others the opportunity to review and use to increase the coordination of access management activities. Further opportunities exist for the forest industry to more easily modify plans to utilize newly constructed oil and gas roads that were not known during the identification of road access corridors presented in the Forest Operations Schedule. Major achievements in coordinating access development between the oil and gas and forest industry, such as the jointly constructed Tommy Lakes road, and access management coordination in the Graham IRM Plan area, have already occurred, and the Participants are committed to proactively engaging other industries in coordinated developments.

Coordinated access can be encouraged by identifying minimum road construction standards that are needed by both industries to ensure that the road infrastructure meets the physical requirements of each industry, wherever practical. Critical components of a road construction standard may be maximum road grade, minimum load rating for bridges, and standard road width for mainlines. Providing forest industry standards in the SFMP is one way of providing useful information for access plans to other industries interested in coordinated developments.

The following road access management strategies for the Fort St. John Timber Supply Area (TSA) are intended to provide strategic direction to the pilot Participants at the DFA and landscape unit level with respect to the following:

- Road access management objectives as identified in the Fort St. John Land and Resource Management Plan (LRMP), including co-ordination of access and linear development to minimize negative effects on other resource values, and managing access to minimize impacts on wildlife and other resources, including sustainable long term timber production,
- Road access management objectives, indicators and targets that have been identified by the Public Advisory Group and incorporated into the CSA SFM matrix, including area occupied by permanent access structures and coordinated developments,

- Business objectives of the Participants, including improving coordination and flexibility to manage road development.

Minimizing Access Impacts on Resource Values

Limiting the amount of land taken up by permanent access structures ("PAS") on the timber harvesting landbase (THLB) reduces impacts on long term sustainable timber production, and directly or indirectly reduces impacts on soils, water, wildlife and other resource values. The Participants' objective is to target the amount of PAS in the TSA significantly below the maximum level allowed in the *FSJPPR* (i.e. 7% of the total cutblock area), but provide the flexibility in the regulatory performance standards to vary the amount of PAS in individual cutblocks. This flexibility allows the Participants to address site conditions that impact the amount of road development required, such as block size, steepness, season of harvest, and the impacts of other features (e.g. pipelines etc).

4.2.1 Permanent Access Strategy

The percentage of permanent access structures may vary significantly within cutblocks, depending on block size, terrain, season, and the need to address other resource features. The revised field performance requirement, identified in the 2004 SFMP as a maximum of 5% of the total area harvested, will continue unchanged. Permanent Access Structure % will be assessed on a DFA-wide basis, rather than block-by-block, using a three year rolling average measure expressed as a percent value. The 3 year rolling average will be defined as a population of cutblocks that have completed harvesting by the FSJ Pilot Project Participants, in the 3 years previous to the submission date of the annual report (on or prior to October 31 annually). The value will be less than the original regulatory field performance requirement.

This strategy addresses the LRMP objective *"to minimize impacts on other resources"*, and CSA objectives *"to minimize impacts on ecosystem function".*

For the purposes of Section 42 of the *FSJPPR*, Indicator # 24 (Permanent Access Structures) will be the legal indicator used to determine if forest practices are consistent with this landscape level strategy. Please refer to **Section 6.24 Permanent Access Structures** for the specific details on the indicator, target, and acceptable variances that will be used to determine if forest practices are consistent with this landscape level strategy. **For the purposes of Section 35(5) of the *FSJPPR*, the indicator statement, target statement and acceptable variance will replace section 30(1) of the *FSJPPR* as the Applicable Performance Standard. Also refer to "Section 8.0 Changes in Requirements" for a summary of changes to regulatory performance requirements.**

4.2.2 Manage Access in Low Management Intensity LU's to support ROS

Minimizing access impacts in low management intensity LU's to maintain wildlife and recreational values in near natural states, as supported by LRMP objectives, necessitates a long term access management strategy to address this issue in these areas.

Forest industry road access in the Sikanni, Graham and Crying Girl LU's will be planned to maintain over time the primitive ROS class at 1996 levels, and maintain a component of semi-primitive non motorized ROS classes.

This strategy addresses the LRMP objectives to manage access to maintain a range of wilderness values over time in low intensity management LU's in the western part of the TSA. Following the development of each Forest Operations Schedule, in which all proposed forest operations for a six year period are identified, a sensitivity analysis will be completed to quantify the impact of proposed forest management developments on the updated ROS classifications. Short-term fluctuations to the ROS classification areas due to forestry activities are expected. Where these occur, mitigating access deactivation measures will be implemented that will minimize the impacts on the current ROS factors, and ensure that the targets for the primitive and semi primitive non-motorized areas can be achieved. New non-forestry related roads, and forest industry roads taken over by other industries will not be considered in the ROS analysis. **For the purposes of Section 42 of the *FSJPPR*, Indicator # 42 (Recreation Opportunity Spectrum) will be the legal indicator used to determine if forest practices are consistent with this landscape level strategy.** Please refer to **Section 6.42 Recreation Opportunity Spectrum** for the specific details on the indicator, target, and acceptable variances, that will be used to determine if forest practices are consistent with this landscape level strategy.

4.2.3 Strategy to Coordinate Road Development with Other Industries

Participants will communicate and provide the opportunity for forest industry access management plans to be shared with the oil and gas sector through the Oil and Gas Commission. This includes providing critical forest industry road construction standards so that the forest industry road specifications can be linked with those of the oil and gas sector. Forest industry access plans encompassing all of the Participants' activities will be clearly identified within the Forest Operations Schedule (FOS). By making this information well known and easily available to the oil and gas sector, coordinated infrastructure developments within common operating areas can be implemented , thus eliminating duplicate entries and thereby reducing the amount of forest land converted to non-forest conditions and minimizing the negative impacts on other resources.

This strategy addresses LRMP access objectives as well as PAG objectives to coordinate developments "to minimize impacts on resources due to access development". The business objectives of increased access coordination and reduced access costs are also supported by this strategy.

Refer to **Indicator # 47 (Coordinated Developments)**, included in **Section 6.37 Coordinated Developments** for details on the indicator, the target, and strategy implementation. This indicator also includes a summary of key minimum road standards for third party roads that will allow the forest industry to utilize these structures. **This performance indicator does not affect Part 3 Division 5 of the *FSJPPR* and is not intended for the evaluation of the LLS as per section 42 of the *FSJPPR*. This performance indicator is intended to address other objectives of the Participants**.

4.3 Riparian Management Strategy

Riparian areas often support high timber and non-timber values concurrently. Some of the most productive timber sites in the DFA are located in riparian areas, which also are some of the most biologically diverse habitats. These areas provide important wildlife habitat, act as

natural connectivity corridors, protect adjacent aquatic ecosystems and help maintain stream bank stability and water quality.

Management issues revolve around maintaining non-timber resource values inherent in these areas while still capturing some of the high timber values. Current practices around streams include adherence to Schedule D of the FSJ Pilot Project Regulation. This regulatory requirement is specific to maintenance of minimum reserve zones on certain streams and waterbodies, and the identification riparian areas around streams and waterbodies in which constraints to forest practices may apply for the purpose of maintaining the integrity of streams, wetlands, or lakes, and associated habitats. Strategies also need to address the protection of streambanks and stream channel stability.

The following riparian management strategies will provide direction to the Participants at the landscape, watershed, and site levels, with respect to the following:

- Riparian and related objectives identified in the Fort St. John LRMP, including major river corridor considerations
- Relevant indicators and targets identified by the PAG and incorporated into the CSA SFM matrix

4.3.1 Riparian Reserve Strategy

Forestry operations adjacent to S1, S2 and S3 streams will minimize negative effects on water quality by maintaining regulatory riparian reserve zones that meet or exceed the minimum widths included in Schedule D of the *FSJPPR*.

Refer to **Indicator # 7** included in **Section 6.7 Riparian Reserves** for details on the indicator, target and implementation strategy. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy**.

For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used in replacement of Section 28(1)(b)(i)(a) of the *FSJPPR* through the application of the riparian reserve landscape level strategy .

4.3.2 Strategy to Address Riparian Management on Small Streams

Qualified personnel will conduct assessments of streams that do not have mandatory reserve zones. Site-specific management practices will be incorporated into SLP's to protect streambanks, stream channel stability, and riparian vegetation, water quality, and other riparian values.

Refer to **Indicator # 35**, included in **Section 6.35 Protection of Streambanks and Riparian Values on Small Streams**. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statements and acceptable variances in Section 6.35 will be used to determine if forest practices are consistent with the landscape level strategy**.

4.3.3 Major River Corridor Strategy

Plans developed for harvesting within the riparian corridors of major rivers will provide for a high level of forest retention for wildlife habitat, with new patch openings normally being one hectare or less in size within 100 metres of the rivers' Riparian Reserve Zone. A variety of silviculture systems can potentially be used to

achieve this, including clearcut with reserves and partial cutting systems, employing methods such as strip cuts or patch cuts.

Major river corridors requiring some special management considerations transect portions of several LU's, as noted previously in "Section 1.4.1 Description of The Landscape Units". This strategy applies only to those Major River corridors noted in Section 1.3.1

Refer to **Indicator # 22** included in **Section 6.22 River Corridors** for details on the indicator, target, acceptable variances and implementation strategy. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance included in Section 6.22 will be used to determine if forest practices are consistent with the landscape level strategies.**

4.3.4 Strategy to Manage Excessive Runoff Impacts to Riparian Habitats

Excessive runoff at the watershed level, which can disturb stream channel integrity and adjacent habitats, will be managed by limiting the extent of harvesting within watersheds, as determined through peak flow index analyses.

Refer to **Indicator # 33** included in **Section 6.33 Peak Flow Index** for details on the indicator, target, acceptable variances and implementation strategy. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance included in Section 6.33 will be used to determine if forest practices are consistent with the landscape level strategies.**

4.4 RANGE AND FORAGE MANAGEMENT STRATEGY

Grazing tenures and grazing leases for domestic livestock on Crown range are authorized under the *Range Act*, and *Land Act* respectively, while grazing practices are governed by the *Forest and Range Practices Act*. Livestock may be grazed in community pastures, in which several ranchers' livestock are grazed in common under a tenure issued to an association, or more commonly, across the DFA area under a tenure issued directly to the rancher. The vast majority of the tenured crown range use in the DFA is associated with the beef-cattle industry, although a few tenures are issued to Guide/Outfitters who graze their saddle and packhorses on Crown range as part of their activities.

Forest industry access, harvesting and reforestation activities occur throughout the DFA, and in many cases overlap numerous range tenures.

Forestry activities can impact domestic grazing in many ways, including:

- the removal of natural range barriers (heavy timber) that previously limited cattle movement
- disruption to herds due to summer logging
- the temporary damage or removal of range improvement structures (e.g. fences)
- the use of roads during summer harvesting operations while grazing is occurring, creating road dust and other issues for cattle
- an increase in the potential for the introduction of invasive noxious weeds in forest management areas
- a reduction in available forage volume following harvesting in deciduous stands, attributable to the high density of regeneration aspen affecting livestock access for up to several decades following harvesting
- restricting the movement of unmanaged cattle herds due to their reluctance to graze in dense regenerating deciduous stands
- increasing forage production for several years in regenerating coniferous forests
- increasing forage along road right of ways created by forestry
- reducing forage production for one or two years after herbicide treatments in conifer plantations, followed by several years of increased forage production due to the long term removal of much of the woody vegetation.
- changing access conditions (creation of new access, reclamation of existing access), which can either enhance or limit range use, depending on the situation

Range grazing and management can likewise affect forestry harvesting and reforestation in many ways including;

- Increasing costs resulting from mitigation measures done to address range concerns
- Reductions in tree survival, growth and fibre quality for both conifers and deciduous due to physical damage from cattle, or soil compaction in heavily grazed mature and regenerated forests
- Reduced effectiveness of siltation controls due to grazing management or cattle use damaging deactivation structures (e.g. waterbars)
- Allthough understory prescribed burning may improve forage quality, damage to existing advanced crop tree regeneration and mature deciduous and thin barked coniferous stands may result from understory burning.
- Damage to regenerating stands from escaped range burns

- Reduced timber harvesting opportunities due to range requirements (e.g. removal of areas from the THLB for range or forage burns) affecting both timber supply and delivered wood costs

The focus of this range and forage management strategy is to address these overlapping tenure issues by promoting mutual understanding between the Participants and the Crown range community within the pilot project area, and ensuring Participants fulfill their responsibilities and meet their commitments to range tenure holders.
The Range and Forage Management Strategy will provide strategic direction for Participants at the DFA and site level with respect to the following:

- Range and Forage objectives, indicators and targets identified by the Public Advisory Group and incorporated into the CSA SFM matrix, including those related to providing opportunities for a mix of timber and non timber commercial activities, and maintaining suitable habitat elements
- Range and Forage objectives in the Fort St. John Land and Resource Management Plan including those related to controlling the spread of noxious weeds. and restoring functioning and healthy ecosystems

4.4.1 Strategy to Repair Range Improvements

The Participants will ensure range improvements damaged as a result of Participants' activities are restored to the standard specified in the MFLNRORD Peace Resource District range structure guidelines in a timely manner, or as otherwise agreed to between the range tenure holder and Participant.

Refer to **Indicator # 39** located in **Section**

Indicator Statement	Target Statement
Percent consistency with mutually agreed upon action plans for range	Operations 100% consistent with resultant range action plans.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Variances are permissible only on reaching mutual agreement between the affected range tenure holder and Participant

What is this this indicator and why is it important?

The forest and range industries are active on the same crown landbase in much of the Fort St. John TSA. This extensive overlap of tenures frequently results in one industry's operations impacting the other's activities. For example, forestry activities may cause the removal of or rendering ineffective the natural range barriers. Natural range barriers may be rivers, rock

faces, dense timber stands or other naturally occurring features that stop or significantly impede livestock movement. These known or identified natural range barriers are particularly important for range tenure holders to manage livestock according to tenure boundaries, as well as preventing livestock wandering on roads with high traffic and consequently pose safety risks to the public. The Managing Participants may choose to adjust forestry activities or seek MFLNRORD approval for installation of cattle guards or fences to mitigate the effect of removing or rendering ineffective the known or identified natural range barriers. Participants may help range tenure holders with installation of these range developments.

Some other resulting issues from forestry activities may include loss of grazing opportunities through seed choice, timing of operations and herbicide use. Addressing these overlapping tenure issues successfully requires open communication of interests and expectations, a proactive process to address issues, and commitment to implement mutually agreed upon actions. This indicator is important in that it demonstrates the Participants' commitment to track and follow through to completion mutually agreed actions, which may have target completion dates months or years after the action is initiated.

Current Status:

Prior to 2013, Timber Range Action Plans (TRAPs) was the main documentation template for developing strategies to mitigate range and forestry activities' impacts on one another. However, over time, the formality and process of TRAP that originated from the Timber and Range Impact Mitigation Committee (TRIM C) project has become less formal. Since 2018, other formats of documents have been started to be used to record mutually agreed upon action plans.

Table 32 provides a summary of mutually agreed range action plans that were developed and completed, as well as a summary of comprehensive TRAP's prepared from April 1st , 2004 through March, 31st , 2019 (SFMP #1, SFMP #2 and SFMP#3):

The Participants completed all proposed mutually agreed action plans during this time period.

Table 32: Results of Mutually Agreed Range Action Plans

Annual Reporting Period	# Timber Range Action Plans (TRAPs)	# Mutually Agreed Upon Action Plans
2004-05	0	N/A
2005-06	6	N/A
2006-07	4	N/A
2007-08	5	N/A
2008-09	1	N/A
2009-10	1	N/A

2010-11	3	N/A
2011-12	0	N/A
2012-13	0	N/A
2013-14	1	N/A
2014-15	5	N/A
2015-16	1	N/A
2016-17	0	N/A
2017-18	0	N/A
2018-19	0	1
Total	**27**	**1**

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will minimize the negative impact on range resources resulting from harvest operations.

Strategy and Implementation Schedule:

At the FOS stage and the Amendment stage, forestry staff will invite range tenure holders to engage in discussions to formulate a mutually agreed action plan to address issues impacting range values and developments arising from the proposed forestry activities on their tenure area. To formulate such plans, forestry and range tenure holders should start by examining the timber harvesting proposal and its anticipated impact on features such as natural range barriers, existing range developments and existing fence lines. Mitigation strategies will be identified to alleviate the impacts of the proposed forestry activities. Cattle guard construction and fencing are commonly used tools to minimize the impacts of natural range barrier removal. District Manager approval will be sought where the Participants propose damaging or modification of existing range developments, or construction of new range developments. Managing Participants may help the range tenure holder to implement the approved modifications to existing range developments or construction of new range developments. Where natural range barriers will be removed by timber harvesting, acceptable strategies may include retention of patches of forest left intact in the field as buffers or reserves, construction of debris fences, installation of cattleguards and/or traditional post and wire fences.

Additionally, if range tenure holders identify an issue related to their tenure at other times such as field operations or block layout stage, a range tenure holder engagement meeting may be held to address the concern.

These action plans and dates will be documented and entered as range issues into the Participant's tracking systems, responsibilities will be identified and communicated to affected staff, and progress will be tracked through to the completion of the action. In the event circumstances require that changes be made to the action plan the forestry supervisor making the change will note in the action plan what change was made, indicate in the plan that he has discussed and got agreement from the range tenure holder for the change, and notify any responsible parties of the changes made.

Participants will inform MFLNRORD range staff of the range discussions, and providing the range tenure holder agrees, invite MFLNRORD to participate in discussions to develop range action plans. MFLNRORD attendance and participation is encouraged by the Participants as the MFLNRORD are the owners of all range developments on crown land

and must authorize the destruction, modification or construction of existing or new range developments.

Monitoring Procedure:

An annual review of the Participant's tracking systems will identify the number of Timber and Range Action Plans (TRAPs) planned and the number of other mutually agreed upon action plans.

Linkages to Operational Plans:

Forest Operations Schedules, Pesticide Management Plans, and other operational plans which require public review and comment will be referred to range tenure holders, and actions agreed to will be identified in the final submission of these plans.

Site Level Plans, harvesting and silviculture plans will be consistent with any relevant mutually agreed range tenure action plans.

Linkages to LRMP:

This indicator supports the continuation of range activities within the Fort St. John TSA, and therefore supports the following LRMP objectives:

- *Maintain livestock grazing opportunities on existing tenures.*
- *Maintain or enhance opportunities for livestock grazing*

6.39 Damage to Range Improvements for a detailed description of the indicator, target, acceptable variance, and strategy implementation. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategies**.

4.4.2 Noxious Weed and Invasive Plant Management Strategy

The Participants will implement measures for grass seeding activities to minimize the risk of introduction or spread of invasive plants due to forest management activities.

Refer to **Indicator # 10** located in **Section 6.10 Noxious Weed and invasive Plant Content** for a detailed description of the indicator, target, acceptable variance and strategy implementation**. For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategies.**

4.4.3 Timber and Range Action Plan Strategy

The Participants will endeavor to create and implement mutually agreed action plans (T.R.A.P.s) with range tenure holders that address forage and forest management overlap issues and other concerns, over the areas identified in the current Forest Operations Schedule.

Refer to **Indicator # 38** located in **Section 6.38 Range Action Plans** for a detailed description of the indicator, target and strategy implementation. **This performance indicator is not intended for the evaluation of the Landscape Level Strategy as per section 42 of the *FSJPPR*. This performance indicator is intended to address other objectives of the Participants.**

4.5 Patch Size, Seral Stage Distribution and Adjacency Strategy

The underlying assumption of Natural Disturbance Units (NDU's) is that the biota of a forest is adapted to the conditions created by natural disturbances and thus should cope more easily with the ecological changes associated with forest management activities if the pattern and structure created resemble those of natural disturbance (Hunter 1993, Swanson et al. 1993, Bunnell 1995, DeLong and Tanner 1996, Bergeron and Harvey 1997, Angelstam 1998, DeLong and Kessler 2000). Adopting forest management practices that approximate the natural range of variability is widely accepted as an appropriate way to manage for the needs of many organisms. The Biodiversity Guidebook (1995) was the first attempt in British Columbia to present guidance for forest management based on the natural disturbance template. Since the completion of the Biodiversity Guidebook, more information on natural disturbance dynamics has become available. Within the former Prince George Forest Region a number of studies have investigated particular aspects of natural disturbance (DeLong 1998, 2011, DeLong and Kessler 2000, Lewis and Lindgren 2000, Rogeau 2001).

Instead of adopting the Natural Disturbance Types (NDT's) presented in the Biodiversity Guidebook (1995) DeLong 2011 presents information for 9 Natural Disturbance Units. These units offer a better separation of areas based on differences in disturbance processes, stand development, and temporal and spatial landscape pattern. DeLong (2011) provides guidance on management of old forest, young natural forest, patch size distribution, and stand species composition and structure. Most of the guidance relates to approximating wildfire as it is the key stand replacement disturbance agent in most landscapes, and it is the one that we have exhibited the most control over. In other words it is the disturbance process forest management attempts to emulate with harvesting.

This strategy deals with the pattern and relative distribution of disturbance across the landscape and maintenance of structure at the stand level.

4.5.1 Seral Stage Distribution Strategy

Forests occurring in different seral and structural stages over space and time are recognized as an important part of the landscape and provide different habitat elements for a variety of species. The research publication "Natural Disturbance Units of the Prince George Forest Region: Guidance for Sustainable Forest Management" (DeLong 2002) has estimated the natural range of variation for different Natural Disturbance Units within the DFA. The Participants' strategy will be to manage activities to achieve late seral stage (old forests) targets by NDU in the DFA consistent with the natural range of variation.

Refer to **Indicator # 2** located in **Section 6.2 Seral Stages** for a detailed description of the indicator, target, acceptable variance, and strategy implementation. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance included in Section 6.2 will be used to determine if forest practices are consistent with the landscape level strategies.**

4.5.2 Patch Size Distribution Strategy

A patch is defined as a stand of similar-aged forest resulting from either a natural disturbance or created by timber harvesting. A patch may be composed of either a single disturbance event or an aggregate of events (natural, timber harvesting, or a combination of both). In forested landscapes patches represent a legacy or history of disturbances and as such may have a variety of species, stocking and ages contained within one patch. Forest patches are created naturally by disturbances such as fire, wind or pest outbreaks. In the absence of these natural disturbances forest management, through harvesting, affects the distribution and size ranges of forest patches. Over a rotation or more of the forest, harvesting can then lead to either inflating or fragmenting the landscape beyond the limits of the natural variability of the landscape, which has developed over centuries from natural disturbances. It is therefore important to establish target ranges for the size of patches that are consistent with the natural pattern of forested landscapes. The Participants' strategy will be to manage harvesting activities to move towards early seral stage (young forests less than 40 years old) patch size targets by NDU in the DFA.

Refer to **Indicator # 3** located in **Section Old Forest Retention Targets in the Fort St. John TSA**

The major forest licensee's in the Fort St. John TSA have been implementing Delong's guidance on a landscape unit level in the 2004 Sustainable Forest Management Plan (SFMP). In 2009 the technical working group for the SFMP discussed how to implement the NDU guidance in the new SFMP. The working group focused on implementing those aspects of NDU guidance related to the quality and quantity of old forest retention. A two phase approach was agreed upon with phase one establishing the amount of old forest retention required and phase two establishing spatial Old Forest Management Areas (OFMAs).

In phase one the technical working group reviewed the Delong 2002 direction and agreed to set the legal old growth retention target at the lower end of the natural range of variation. While the old growth retention targets are set at the lower end of the natural range of variation it should be noted that the end result is an equivalent or greater area under old forest management objectives than required by the Provincial Non-Spatial Old Growth Order.

The old growth targets apply to the Crown Forest Land base (CFLB) within the Fort St John TSA. The CFLB is the productive forested crown land which does not include area that is non-crown, non-forest, and non-productive forest. Area within Woodlots and First Nations Reserves do not contribute to meeting the old forest retention targets. Area within Parks and Protected Areas will contribute to maintaining old forest retention in accordance with the Landscape Unit Planning Guide.

In determining the old growth area targets, it was discovered that the Boreal Plains NDU may not achieve the old forest retention target for two reasons. The primary reason is the considerable amount of pine forest in the Boreal Plains NDU and that the pine stands in the Fort St John TSA rarely survive to the age of 140 years. The second factor is the level of natural and

anthropogenic disturbances in the area. This NDU has a high incidence of natural forest fires and an extensive history of industrial development.
In order to offset the shortfall, younger forests may be included in the spatial old forest management areas (OFMA) to act as recruitment areas. The principle behind recruitment stands is to protect the sites from disturbance to allow the natural aging process to develop mature and old forests that contain the desired old forest attributes. With respect to the non spatial late seral forest retention targets, old and near old forest will be considered as contributing to the late seral retention target.
The Participants will implement the following strategies for OFMA replacement. In the areas with natural disturbance cycle of <150 years (Boreal Plains, Boreal Foothills - Mountain, Boreal Foothills –Valley & Omineca Valley NDUs) a system of rotating reserves is recommended. These reserves would be scheduled to be cut when reserve areas of relatively equal size have been identified that can take their place. The intent would be to always have some large reserves of forest that are old but not so old as to be unnatural and highly susceptible to stand replacement forest insect or disease outbreaks.
In the remaining reporting units (Northern Boreal Mountains, Omineca Mountains NDUs) a strategy of irregularly dispersed large semi-permanent reserves is recommended. The more uneven-aged forests in these reporting units are less susceptible to stand replacement events and therefore have a higher likelihood of maintaining old forest structure over long periods of time. Replacement may be necessary but is not expected to be required on a continuous basis as in the rotating reserve strategy.
Many of the OFMAs are drawn adjacent to proposed cut blocks. The SFMP allows for some flexibility to address this type of operational issue; up to 15% in OFMAs less than 50 ha. or 10% or 40 ha., whichever is less, in OFMAs of 50 ha. or greater may be disturbed by harvesting of pre-existing FOS blocks and /or access development (to reach timber outside the OFMA that is blocked by the OFMA without invoking the requirement to replace the harvested OFMA area. The intent of the flexibility is to allow for minor adjustments to OFMA boundaries to minimize the impacts to the forest industry while maintaining the biological integrity of the OFMA.

Monitoring Procedure:

There are multiple steps that are required to be completed for reporting this indicator. The calculations are described below:
The first step in reporting the amount of non spatial old forest will be to update and project the forest cover for all disturbances to the current reporting period based on Land and Resources Manager (LRM) data (i.e. recent harvesting). Each stand is assigned to either the deciduous or coniferous group based on the leading species and a seral stage based on the age of the leading species for the rank 1 layer. The area of each stand is then summed for each NDU and expressed as a percentage of the productive forested area within the NDU.
The second step is to include all proposed harvesting, project ages to the end of the proposed development period and calculate the seral stage distribution as described above.
The first step in identifying spatial OFMAs is to determine the amount of old forest on the land base that is already constrained from harvesting. Four broad criteria of constraint are considered to directly contribute to old forest retention; old forests in parks, old forest in Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA) where timber harvesting is prohibited, riparian reserve zones and old forest in wildlife tree patches (WTP) in existing and proposed cut blocks.
Parks - While parks are not part of the crown forested land base, the area of old forest within parks is counted as contributing to the old growth target.

Ungulate Winter Range - The high elevation UWR in the Fort St John TSA has established objectives that restrict forest harvesting and road building. Therefore, any old forests within the UWR are expected to remain undisturbed and are considered as contributing to the old growth targets.
Riparian Reserves. Current forest management practices preclude harvesting of riparian forests along many streams. The current timber supply review for the Fort St John TSA produced a data coverage that removed riparian forests from the timber harvesting land base. This data may be used to determine the amount of old forest reserved along streams and these riparian reserve areas have been recognized as contributing to the old growth targets.
Wildlife Tree Patch - WTPs form part of the stand level objectives for the maintenance of biodiversity. Any WTP that meets the age criteria for old forests and is greater than 2 hectares in size is also considered to contribute to the old growth targets.
Specific OFMAs will be selected using age class themed Vegetation Resource Inventory (VRI) mapping. Areas with forest harvesting constraints such as steep slopes and visually sensitive areas will be included in OFMAs where possible to minimize the impacts on the timber harvesting land base. Habitat features, such as significant mineral licks, low elevation caribou winter habitat, wildlife travel corridors and cultural heritage values will also be considered in the selection of OFMAs. The avoidance of approved and proposed cut blocks and areas with short term forest harvesting interest is a priority to reduce the impacts to the timber supply. Where possible, OFMA polygons will be delineated using boundaries that will be readily identified in the field (roads, cut blocks, streams and heights of land). Many of the OFMA identified to date include areas of mature and immature forests that are considered to contribute to the old growth target as recruitment areas. Some OFMA polygons may also include areas of non CFLB; while this area does not contribute to the old growth targets, they may be included in the OFMA for simplification of boundary identification.
Forest Operations Schedules (FOS) will be consistent with this indicator, an analysis will be completed when FOS's are developed to assess impact of the harvesting activity proposed by the FOS on late seral retention. OFMA areas will be depicted on FOS maps and will be treated as rotating reserves. The OFMA areas developed by the Participants may form the basis of an Old Growth Management proposal to be submitted to MFLNRORD for consideration for legal designation as Old Growth Management Areas.

Linkages to Operational Plans

FOS's will be analyzed to ensure they are consistent with the targets and implementation schedule for seral stage prior to publication. Proposed development will be adjusted if necessary to ensure consistency with targets or recruitment strategies.

Linkages to LRMP:

This seral stage indicator helps to support the following LRMP objectives by maintaining late seral forested land base proportions consistent with the natural range of variation:

- *Maintain functioning and healthy ecosystems.*
- *Maintain Guide Outfitting opportunities.*
- *Maintain Caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Protect or enhance habitats for red and blue listed species.*

6.3 Patch Size for a detailed description of the indicator, target, acceptable variance, and strategy implementation.

For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance included in Section 6.3 will be used to determine if forest practices are consistent with the landscape level strategies.

4.5.3 Adjacency and Forest Structure Strategy

The previous two strategies and indicators deal with patch size, and seral stage distribution, and control both the amount and spatial distribution of the forested land base affected by forest management. The seral stage indicator regulates the amounts of old growth on the landbase, and the patch size indicator addresses the size of patches at the landscape level through time. Combined, the two strategies determine the pattern of forests that will occur on the landscape. Coarse Woody Debris and Wildlife Tree Patch retention will be managed across the landbase to ensure provision of important structural elements that support ecological processes. The four processes combined manage the structural characteristics and the temporal and spatial distribution of forest patches negates the need for specific adjacency requirements.

Refer to **Indicator # 6** (Coarse Woody Debris) located in **Section 6.6 Coarse Woody Debris Volume**

for a detailed description of the indicator, target, acceptable variance, and strategy implementation. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy. For the purposes of Section 29(2) of the *FSJPPR*, the applicable performance standard is specified by this indicator statement, target statement and acceptable variance.**

Refer to **Indicator # 9** (Wildlife Tree Patches) located in **Section 6.9 Wildlife Tree Patches** for a detailed description of the indicator, target, acceptable variance, and strategy implementation. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy. For the purposes of Section 29(1) of the *FSJPPR*, the applicable performance standard is specified by this indicator statement, target statement and acceptable variance.**

This strategy addresses the requirements of the *FSJPPR* Section 97(g) to allow harvesting adjacent to areas that are not greened-up if resultant openings are consistent with the patch size and seral stage targets.

4.6 Forest Health Management Strategy

Forest health is defined as an ecological condition of the forest ecosystem, such that its productivity and resilience are retained in the face of natural and managed disturbances. Maintaining or enhancing forest ecosystem diversity, condition and productivity at the landscape level, and to a lesser extent at the stand level, is generally the best strategy to achieve forest health. Management on this basis is thought to reduce the risk of catastrophic damage to forest productivity and maintain ecosystem resiliency.

The Participants' primary forest health objectives are to:

- Ensure forest management plans are designed to support the maintenance of healthy forest ecosystems
- Minimize losses of mature timber due to forest health factors
- Minimize risks to silviculture investment due to forest health factors

The focus of this forest health strategy is to plan forestry operations to be consistent with the principles that support the maintenance of forest ecosystem health, while addressing site specific health issues that have a direct or indirect impact on timber availability or operational costs.
The forest health strategy will provide strategic direction to the Participants at the DFA, landscape unit and site level with respect to the following:

- Forest health objectives, indicators and targets identified by the Public Advisory Group and incorporated into the SFM matrix, including those related to maintaining the diversity and pattern of ecosystems within a natural range, and maintaining a natural range of variability in ecosystem function, composition and structure to allow ecosystems to recover from disturbance and stress.
- Forest health objectives in the Fort St. John Land and Resource Management Plan.
- Business objectives related to the impacts of forest health on operations.

4.6.1 Integrated Forest Health Management Strategy

To minimize the potential of catastrophic forest health events, the Participants will apply the principles of Integrated Forest Health Management in the planning and implementation of forestry activities.

The principles of Integrated Forest Health Management (a variant of Integrated Pest Management) are:

- know the landbase and resource management objectives
- proactively manage from an ecological perspective
- do not make the situation worse, and
- practice adaptive management

Management practices consistent with the natural disturbance patterns (see Section 3.2) are appropriate from an ecological perspective, and therefore most likely to support the maintenance of healthy forest ecosystems. Forest management planning impacts this through, among other things, seral stage distribution, patch size distribution, forest types distribution, and by allowing some natural disturbance influences to occur without intervention.

Refer to **Indicator # 1** (Forest Types) located in **Section 6.1 Forest Types** for a detailed description of indicator, target, and acceptable variance and strategy implementation designed to maintain the relative distribution of pure and mixedwood types across the landscape. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variances will be used to determine if forest practices are consistent with the landscape level strategy.**
Refer to **Indicator # 2** (Seral Stages) located in **Section 6.2 Seral Stages** for a detailed description of indicator, target, and acceptable variance and strategy implementation designed to retain seral stage distributions within acceptable ranges through time. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and**

acceptable variances will be used to determine if forest practices are consistent with the landscape level strategy.

Refer to **Indicator # 3** (Patch Size) located in **Section Old Forest Retention** **Targets in the Fort St. John TSA**

The major forest licensee's in the Fort St. John TSA have been implementing Delong's guidance on a landscape unit level in the 2004 Sustainable Forest Management Plan (SFMP). In 2009 the technical working group for the SFMP discussed how to implement the NDU guidance in the new SFMP. The working group focused on implementing those aspects of NDU guidance related to the quality and quantity of old forest retention. A two phase approach was agreed upon with phase one establishing the amount of old forest retention required and phase two establishing spatial Old Forest Management Areas (OFMAs).

In phase one the technical working group reviewed the Delong 2002 direction and agreed to set the legal old growth retention target at the lower end of the natural range of variation. While the old growth retention targets are set at the lower end of the natural range of variation it should be noted that the end result is an equivalent or greater area under old forest management objectives than required by the Provincial Non-Spatial Old Growth Order.

The old growth targets apply to the Crown Forest Land base (CFLB) within the Fort St John TSA. The CFLB is the productive forested crown land which does not include area that is non-crown, non-forest, and non-productive forest. Area within Woodlots and First Nations Reserves do not contribute to meeting the old forest retention targets. Area within Parks and Protected Areas will contribute to maintaining old forest retention in accordance with the Landscape Unit Planning Guide.

In determining the old growth area targets, it was discovered that the Boreal Plains NDU may not achieve the old forest retention target for two reasons. The primary reason is the considerable amount of pine forest in the Boreal Plains NDU and that the pine stands in the Fort St John TSA rarely survive to the age of 140 years. The second factor is the level of natural and anthropogenic disturbances in the area. This NDU has a high incidence of natural forest fires and an extensive history of industrial development.

In order to offset the shortfall, younger forests may be included in the spatial old forest management areas (OFMA) to act as recruitment areas. The principle behind recruitment stands is to protect the sites from disturbance to allow the natural aging process to develop mature and old forests that contain the desired old forest attributes. With respect to the non spatial late seral forest retention targets, old and near old forest will be considered as contributing to the late seral retention target.

The Participants will implement the following strategies for OFMA replacement. In the areas with natural disturbance cycle of <150 years (Boreal Plains, Boreal Foothills - Mountain, Boreal Foothills –Valley & Omineca Valley NDUs) a system of rotating reserves is recommended. These reserves would be scheduled to be cut when reserve areas of relatively equal size have been identified that can take their place. The intent would be to always have some large reserves of forest that are old but not so old as to be unnatural and highly susceptible to stand replacement forest insect or disease outbreaks.

In the remaining reporting units (Northern Boreal Mountains, Omineca Mountains NDUs) a strategy of irregularly dispersed large semi-permanent reserves is recommended. The more uneven-aged forests in these reporting units are less susceptible to stand replacement events and therefore have a higher likelihood of maintaining old forest structure over long periods of time. Replacement may be necessary but is not expected to be required on a continuous basis as in the rotating reserve strategy.

Many of the OFMAs are drawn adjacent to proposed cut blocks. The SFMP allows for some flexibility to address this type of operational issue; up to 15% in OFMAs less than 50 ha. or 10%

or 40 ha., whichever is less, in OFMAs of 50 ha. or greater may be disturbed by harvesting of pre-existing FOS blocks and /or access development (to reach timber outside the OFMA that is blocked by the OFMA without invoking the requirement to replace the harvested OFMA area. The intent of the flexibility is to allow for minor adjustments to OFMA boundaries to minimize the impacts to the forest industry while maintaining the biological integrity of the OFMA.

Monitoring Procedure:

There are multiple steps that are required to be completed for reporting this indicator. The calculations are described below:

The first step in reporting the amount of non spatial old forest will be to update and project the forest cover for all disturbances to the current reporting period based on Land and Resources Manager (LRM) data (i.e. recent harvesting). Each stand is assigned to either the deciduous or coniferous group based on the leading species and a seral stage based on the age of the leading species for the rank 1 layer. The area of each stand is then summed for each NDU and expressed as a percentage of the productive forested area within the NDU.

The second step is to include all proposed harvesting, project ages to the end of the proposed development period and calculate the seral stage distribution as described above.

The first step in identifying spatial OFMAs is to determine the amount of old forest on the land base that is already constrained from harvesting. Four broad criteria of constraint are considered to directly contribute to old forest retention; old forests in parks, old forest in Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA) where timber harvesting is prohibited, riparian reserve zones and old forest in wildlife tree patches (WTP) in existing and proposed cut blocks.

Parks - While parks are not part of the crown forested land base, the area of old forest within parks is counted as contributing to the old growth target.

Ungulate Winter Range - The high elevation UWR in the Fort St John TSA has established objectives that restrict forest harvesting and road building. Therefore, any old forests within the UWR are expected to remain undisturbed and are considered as contributing to the old growth targets.

Riparian Reserves. Current forest management practices preclude harvesting of riparian forests along many streams. The current timber supply review for the Fort St John TSA produced a data coverage that removed riparian forests from the timber harvesting land base. This data may be used to determine the amount of old forest reserved along streams and these riparian reserve areas have been recognized as contributing to the old growth targets.

Wildlife Tree Patch - WTPs form part of the stand level objectives for the maintenance of biodiversity. Any WTP that meets the age criteria for old forests and is greater than 2 hectares in size is also considered to contribute to the old growth targets.

Specific OFMAs will be selected using age class themed Vegetation Resource Inventory (VRI) mapping. Areas with forest harvesting constraints such as steep slopes and visually sensitive areas will be included in OFMAs where possible to minimize the impacts on the timber harvesting land base. Habitat features, such as significant mineral licks, low elevation caribou winter habitat, wildlife travel corridors and cultural heritage values will also be considered in the selection of OFMAs. The avoidance of approved and proposed cut blocks and areas with short term forest harvesting interest is a priority to reduce the impacts to the timber supply. Where possible, OFMA polygons will be delineated using boundaries that will be readily identified in the field (roads, cut blocks, streams and heights of land). Many of the OFMA identified to date include areas of mature and immature forests that are considered to contribute to the old growth target as recruitment areas. Some OFMA polygons may also include areas of non CFLB; while

this area does not contribute to the old growth targets, they may be included in the OFMA for simplification of boundary identification.
Forest Operations Schedules (FOS) will be consistent with this indicator, an analysis will be completed when FOS's are developed to assess impact of the harvesting activity proposed by the FOS on late seral retention. OFMA areas will be depicted on FOS maps and will be treated as rotating reserves. The OFMA areas developed by the Participants may form the basis of an Old Growth Management proposal to be submitted to MFLNRORD for consideration for legal designation as Old Growth Management Areas.

Linkages to Operational Plans

FOS's will be analyzed to ensure they are consistent with the targets and implementation schedule for seral stage prior to publication. Proposed development will be adjusted if necessary to ensure consistency with targets or recruitment strategies.

Linkages to LRMP:

This seral stage indicator helps to support the following LRMP objectives by maintaining late seral forested land base proportions consistent with the natural range of variation:

- *Maintain functioning and healthy ecosystems.*
- *Maintain Guide Outfitting opportunities.*
- *Maintain Caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Protect or enhance habitats for red and blue listed species.*

6.3 Patch Size for a detailed description of indicator, target, and acceptable variance and strategy implementation designed to make harvest patch size more reflective of natural disturbance patterns. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variances will be used to determine if forest practices are consistent with the landscape level strategy.**
Refer to **Indicator # 26** (Fire Salvage) located in **Section 6.26 Salvage** for a detailed description of the indicator, target and strategy implementation designed to accommodate some natural disturbances on the landbase. This indicator encourages variable salvage levels of burned areas to support ecological processes, consistent with LU management intensity classifications. **This performance indicator is not intended for the evaluation of the Landscape Level Strategy as per section 42 of the *FSJPPR*.** This performance indicator is intended to address other objectives of the Participants.

4.6.2 Forest Health Strategy for Silviculture Obligation Areas

The Participants will identify potential forest health issues within their silviculture obligation areas (harvested blocks), and prioritize those that may have a significant impact on forest resources. Within their silviculture obligation areas, the Participants will detect and monitor significant forest health agents in a timely manner, and, where potential impacts are significant, implement cost effective treatment controls where practical.

The Participants will identify potentially significant forest health issues within harvested areas on which they have silviculture obligations, and develop treatment plans that address the forest health issues and support the successful reforestation of the areas.

Refer to **Indicator # 25** located in **Section 6.25 Forest Health** for a detailed description of the indicator, target and strategy implementation designed to accommodate some natural disturbances on the landbase. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy.**

4.6.3 Planning Strategy to Reduce Forest Health Impacts to Mature Timber

Where practical, prioritize harvesting of conifer blocks to those areas that are most susceptible to prevalent significant and/or catastrophic forest health damaging agents.

When major forest health concerns have the potential to become widespread, the Participants' FOS plans will accommodate a significantly higher proportion of susceptible forest types in an attempt to reduce timber losses, and limit the spread of the forest health problem.

Refer to **Indicator # 45** located in **Section 6.45 Forest Health FOS Planning** for a detailed description of the indicator, target, acceptable variance, and strategy implementation designed to accommodate some natural disturbances on the landbase. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy.**

4.6.4 Planning Strategy to Reduce Forest Health Impacts from Climate Change

Where practical, manage for climate change by implementing standards specified in the Chief Foresters Standard for Seed Use (CFSSU).

Participants can manage for climate change by following CFSSU flexibility provided to mitigate the risks identified by climate change. Climate models predict increases in temperature in NE BC. Summer and annual precipitation is also predicted to increase slightly, but because of large increases in temperature summer and annual drought index will increase. In addition, a general increase in extremes of all sorts (wind, cold, winter warm events, drought, etc.) are predicted. The impacts to existing forests that may arise from these types of events include altered tree phenology combined with increased susceptibility to damage from weather events, existing and new pests. MFLNRO provenance tests suggest that climate change could result in reduced growth, increased stem form defects and increased damage due to pests.

Participants will be made aware of climate change strategies that can be implemented to mitigate climate change by press releases, workshops, webinars, that are presented by MFLNRO, Association of British Columbia Forest Professionals (ABCFP) and others.

This strategy applies primarily to class B seedlots (Pine) because the required diversity is being built into class A seedlots (Spruce) via seed orchard collection.

Refer to **Indicator # 13** located in **Section 6.45 Forest Health FOS Planning** for a detailed description of the indicator, target, acceptable variance, and strategy implementation designed to adapt to future climate change impacts on the landbase. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategy.**

4.7 REFORESTATION STRATEGY

The Fort St. John TSA timber supply consists of a complex, dynamic mosaic of deciduous, coniferous and mixedwood forests, across a wide breadth of age classes. This ecologically rich mix of species and age classes presents some unique challenges to reforestation. The historical practices of predetermined, rigid block by block reforestation standards limited the adaptability of forest managers to address biodiversity objectives, as well as the changing timber production objectives brought about by the recent dramatic increased utilization of deciduous timber in the Fort St. John T.S.A. In many cases, to meet rigid standards, expensive silviculture treatments were being applied that provided little or no value to future timber production or biodiversity values.

The focus of this reforestation strategy will be to:

- Link reforestation standards to landscape level timber production objectives, and the management of vegetative patterns across the landscape over time.
- Provide flexibility at the block level to use natural variability as a tool to meet biodiversity objectives.
- Ensure timely vegetative establishment on harvested areas.
- Emphasize results-based management to provide foresters discretion to allocate silviculture resources to treatments that will have the greatest positive impacts on future timber production.

4.7.1 Reforestation Strategy

A) Discrete areas within cutblocks will be assigned an initial forest type designation (conifer, deciduous, or mixedwood). Applicable reforestation standards (coniferous, deciduous, or intimate mixedwood standard) that apply to each area will be tied to stocking standard ID's, which correspond to conifer, deciduous, or mixedwood stocking standards (i.e. declarations). These ID's will be submitted into the MFLNRO tracking system (e.g. RESULTS). Changes to stocking standard designations within cutblocks may occur prior to final assessment, and will be revised in RESULTS.

B) Timely establishment of new forests is important to support timber production objectives, and will be assessed based on the average length of time to establish trees on harvested sites.

C) Flexibility in the intensity of silviculture treatments will be used to enhance landscape level timber production, while allowing natural variability in stand development. This will be enabled by assessing reforestation success based on a cumulative 'landscape level' assessment of the area from each year's logging. Assessments will be completed separately for all deciduous and all coniferous declarations, based on a comparative measure of projected future volume production.

The strategy includes the following components which are addressed below:

1. Assigning Reforestation Standards to areas within cutblocks
2. Landscape Level Assessment of Reforestation
3. Stocking Standards and Crop Tree Requirements
4. Silviculture Performance Indicators

1. Assigning Reforestation Standards to Areas Within Cutblocks

Section 23.1 of the *FSJPPR* requires Participants to declare to reforest an area within a cutblock as a coniferous area, a deciduous area, or a mixedwood area before, or at the time, of a harvest authorization request, so that the appropriate reforestation standards may be applied to that area. The mixedwood forest type class is further defined into deciduous leading or coniferous leading mixedwood areas. These mixedwood areas will normally be declared based on proportionate area, as conifer and deciduous reforestation areas, unless intimate mixedwoods are prescribed for an area.

The "*Mixedwood Management Strategy for the Fort St. John TSA"* which was submitted to the government in December of 2005 has recently been revised. A copy of the current revised version is located in Appendix 10 ("*Mixedwood Management Guidelines for the Fort St. John TSA").* This document forms an integral part of the overall reforestation strategy. The document outlines the methodology for defining 'pure' and 'mixedwood' stands, for the purpose of determining the declaration of areas. To support business objectives, the strategy also describes an internal ledger system the Participants use to track original declaration areas and the result of any changes to area declarations from subsequent silviculture activities.

Section 6.1 Forest Types identifies the maintenance of relatively consistent forest type composition over time as being important for ecosystem diversity. As that indicator ultimately relies on the species composition from reforested harvested areas, it is necessary to maintain a relatively consistent methodology for defining pure and mixedwood stands in young and old stands. Consistent with Section 6.1, a revised process will be implemented to define 'mixedwoods' as blocks in which the coniferous and deciduous components constitute between 25% and 75% of the gross cruise volumes[7]. 'Pure' coniferous or deciduous stands will be defined as blocks where greater than 75% of the gross volume is contained in one type or the other.

The process for tracking the areas of forest type declarations needs to be flexible enough to allow foresters to exercise their professional judgment at the cutblock level to vary regimes and/or make corrective actions as required to achieve the landscape level targets. A declaration may, therefore, be revised prior to the end of the reforestation period, although compensating revisions elsewhere on the landscape may be needed to maintain a balance of forest types consistent with Section 6.1 **Forest Types**.

The 2004 SFMP included a commitment to apply "*mixedwood regimes for intimate mixtures of conifer and deciduous*" on an area greater than or equal to 10% of the mixedwood area harvested, as "*operational trials*". Several trials were established during the term of the last SFMP, but conclusive results from those trials are not likely to be available for several years. The Participants recognize the importance of having some intimate mixtures present in managed stands, and shall continue to manage a portion of the area under reforestation obligation this way. This management may take the form of continued or newly established operational trials, or a reclassification of some area previously classed as 'pure' types. The

[7] Gross cruise volume is a readily available, simple measure with a high correlation to basal area % which is used in the Forest Types indicator.

intention is to ensure the persistence of some intimate mixtures within the THLB, without undue impacts to timber supply, and without increasing silviculture costs.

The following guidelines will be used in establishing or designating areas as intimate mixtures.

- 'Intimate mixtures' will comprise at least 10% of the total of mixedwood area harvested, by managing participant, with a harvest start date of November 15th, 2001 or later. Areas subsequently removed from the THLB for other uses (e.g. Oil and gas facilities) shall not be included in the participants' tracking of this target.
- "Mixedwood area" is determined using the limits described earlier in this section (gross volume, 75%/25%).
- Areas designated and managed as intimate mixtures will be tracked annually by Managing Participants. Results shall be reported in the 2015-2016 Annual Report.
- The participants will consider impacts, positive and negative, to other resource values when classifying areas to be 'intimate mixtures' (e.g. Potential avoidance of herbicide application, species at risk objectives, range, visual quality, etc.)
- The "*Fort St. John Pilot Project Mixedwood Management Guidelines*" document in Appendix 10 provides additional detail on these guidelines.

2. Landscape Level Assessment of Reforestation Success

The landscape level reforestation assessment system measures reforestation performance and determines if reforestation obligations are complete. Block level reforestation requirements are replaced with landscape level (multi-block) reforestation requirements. The system was initially developed for conifer reforestation in the first SFMP, and has been extended to deciduous reforestation in SFMP #3. The participants completed the development of a deciduous compiler, which utilizse MFLNRORD deciduous yield curves, and the MFLNRORD's "Draft Stocking Guidelines for Hardwoods in the BWBS" for 15 year old stands. The interim block level standards for deciduous regeneration identified in SFMP#2 no longer apply (see part 3 below "*Stocking Standards and Crop Tree Requirements*").

The key components of the landscape level assessment system are:

- The assessment will measure success with a comparative estimate of predicted yield (volume) to actual yield (volume).
- The system will be based on data from individual cutblocks, but the data will be assessed over many blocks across the landscape.
- Areas are evaluated at a predetermined age following harvest.
- The results are tracked at the landscape and cutblock levels.
- Foresters will have flexibility at the cutblock level to vary regimes and provide for other values as they progress to a landscape level target for yield.
- The system will provide data to improve silviculture regimes and targets over time.

Details of the landscape level assessment system itself, the research background and development for Fort St. John, Survey Procedures, and the Applicable Performance Standards are detailed separately as follows:

a) **A detailed write-up of this assessment system is found in the "Strategy and Implementation" description in Section 6.29 Reforestation Assessment**.

This includes definitions of the variables involved in the assessment, the objectives of the assessment survey, identification of the target population of areas to be assessed, the

sample design and data collection, and actions to address populations less than the allowable minimums.

b) **Research background, and model development to support the landscape level assessment process in the Fort St. John TSA is documented in Appendix 4 and Appendix 7.**

The document *"Stocking Estimators and Future Volume"*, located in Appendix 4, statistically assesses and compares the reliability of the MSQ system to predict future volumes, relative to other surveying systems.

The J.S. Thrower report *"Stand Survey and Growth Modeling for the Fort St. John TSA"* is located in Appendix 6. This document outlines the model development using TASS simulations to predict future volumes using species, MSQ, site index, effective stand age, and general stand survey requirements in Fort St. John. It also identifies the steps needed to summarize the survey data and determine predicted merchantable volumes for a population. Processes for surveys and summarizing data may change over time. Current procedures can be found in Participants' contract standards, manuals and standard work procedures.

c) **The detailed assessment survey procedures for Fort St. John are documented in Appendix 5**

"*The Survey Design and Field Procedures"* in Appendix 5 describes the detailed survey methods to be used in the Fort St. John DFA to meet the requirements of yield assessment and inventory labels. It outlines where count plots and full measure plots should be established, the information to be collected at each, specific areas that need to be mapped out in the field, and the information that must be captured, and acceptable data formats.

d) **Applicable Performance Standard**

The minimum legal requirements required to be met by a population of cutblocks for these assessments are defined by the acceptable variance to the target in Section 6.29 Reforestation Assessment.

3. Stocking Standards and Crop Tree Requirements

Appendix 6 includes additional information and requirements for use at the well growing and/or the establishment assessment phases. The Appendix includes:

- descriptions of crop tree requirements relative to vegetative competition
- minimum inter tree distances, for coniferous areas within blocks(only for use during the establishment assessment if using a well spaced assessment),and assessments of deciduous areas within blocks (for assessments completed prior to the full implementation of the landscape level assessment)
- stocking requirements for coniferous areas within blocks at the establishment assessment,
- stocking requirements for areas within blocks declared as intimate mixedwoods, both at the time of establishment and well growing assessments.
- stocking requirements for areas within a block declared as deciduous, for assessments completed prior to the full implementation of the landscape level assessment

4. Reforestation Performance Indicators

a) Legal Indicators

There are four legal indicators that will be used to assess conformance to this strategy.

i) The reforestation landscape level assessment strategy will be measured based on the predicted merchantable volume at a predetermined post harvest stand age in a population of reforested block areas, compared to a theoretical maximum predicted merchantable volume that those block areas were capable of producing . Refer to **Indicator #29** located in **Section 6.29 Reforestation Assessment** for a detailed description of the indicator, target, acceptable variance, and strategy and implementation. **For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level reforestation strategy.**

For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used in replacement of the portions of affected Section 32 of the *FSJPPR* through the application of the landscape level strategy for coniferous and deciduous areas logged after November 15, 2001.

This will also apply to coniferous and deciduous areas in cutblocks with commencement dates before November 15, 2001 if the Participant currently carries reforestation liability and has submitted a statement to the District Manager that the cutblock(s) will be subject to the SFMP under Section 42 of the *FSJPPR*.

ii) Establishment delay assesses the overall timeliness of prompt reforestation in the TSA at the landscape level by determining the average age of those harvested areas which do not yet have regeneration established. Refer to **Indicator #30** located in **Section 6.30 Establishment Delay** for a detailed description of the indicator, target, acceptable variance, and the strategy and implementation.

For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level reforestation strategy.

iii) Maintaining a balance of spruce and pine on the landbase following reforestation efforts supports natural species diversity within coniferous forests. This will be assessed based on a comparison of spruce and pine cruise volumes to the relative numbers of spruce and pine seedlings planted. Refer to **Indicator #28** located in **Section 6.28 Species Composition** for a detailed description of the indicator, target, acceptable variance, and the strategy and implementation.

For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level reforestation strategy.

iv) Use of seed and planting according to certification seed use standards helps ensure the identity, adaptability, diversity and productivity of the Province's tree genetic resources is used in the DFA. Recent awareness concerning the potential impacts of climate change on future forests has prompted increased flexibility, and the recognition that additional changes may be forthcoming to transfer rules, as outlined in the Chief Forester's Standards for Seed Use (Nov.20, 2004), as amended from time to time. In order to address these changes

efficiently without requiring regulatory revisions, the Participants are including conformance to this Standard as a legal indicator for the Reforestation Strategy. Refer to **Indicator # 13**, located in **Section 6.13 Seed Use**, for a detailed description of the indicator, target, acceptable variance, and the strategy and implementation.

For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used in replacement of Section 99 of the *FSJPPR* (Use of Seed) through the application of the reforestation landscape level strategy for all areas.

For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level reforestation strategy.

b) Additional Silviculture Related Indicator (non legal)

There is one other silviculture indicator included in this plan that supports successful reforestation, but, while indirectly tied to the reforestation strategy, is included primarily to meet genetic diversity objectives and CSA requirements.

Using predominately natural regeneration for deciduous reforestation ensures genetically appropriate stock will be re-established on deciduous areas. Refer to **Indicator # 14**, located in **Section 6.14 Deciduous Regeneration** for a detailed description of the indicator, target, acceptable variance, and the strategy and implementation. **This performance indicator is not intended for evaluation of the landscape level strategy as per Section 42 of the *FSJPPR*.**

4.8 Soil Management Strategy

The sustainability of long term timber supply depends to a great extent on the quality and quantity of soil resources available to support commercial forestry activities. Soil disturbance can be classified into two types, namely the areas impacted by dispersed soil disturbance across harvested areas that will be reforested (the net area to be reforested, or NAR), and the areas occupied by permanent access structures such as roads, which has been addressed already in Section 4.2.

The most significant management issue in the DFA related to soil that the Participants believe needs to be addressed in a management strategy is:

- The extent of soil disturbance in the net area to be reforested (NAR) that may negatively affect the physical, chemical, and biological properties of the soil

The soil management strategy will provide strategic and operational direction for the Participants at the DFA and site level for managing impacts to soil productivity, with respect to the following:

- Soil management and productivity objectives identified in the Fort St. John Land and Resource Management Plan
- Soil quality and quantity objectives, indicators and targets that have been identified by the Public Advisory Group and incorporated into the CSA SFM matrix, including those related to soil productivity.

4.8.1 Soil Disturbance Strategy

Managing soil resources to maintain productivity will focus on minimizing detrimental soil disturbance during forestry operations. This will be done by implementing effective systems to identify risks, to determine suitable equipment depending on site sensitivity, and to monitor operations to promptly address changing ground conditions when necessary.

The Participants will implement measures that ensure operations are conducted in a manner that addresses the inherent sensitivity of a site to soil degrading processes.

This strategy identifies the processes used to manage activities to minimize detrimental soil disturbance, how changing site conditions will be monitored to ensure activities can be modified to avoid unacceptable soil disturbance, and how soil disturbance will be determined and reported.

Refer to **Indicator # 4** (Soil Disturbance) located in **Section 6.4 Soil Disturbance** for a detailed description of indicators, targets, acceptable variance and strategy implementation designed to manage soil disturbance on harvested cutblocks. **For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variances will be used to determine if forest practices are consistent with this landscape level strategy**.

4.9 Visual Quality Management Strategy

Visual quality management in the TSA is focused on achieving preset visual quality objectives in sensitive areas. Visual quality objectives (VQO's) are the extent to which the visual or scenic resources of a landscape may be altered compared to the pre-existing or natural condition. VQO's are resource management objectives established by the District Manager or contained in a higher-level plan that reflect the desired level of visual quality based on the physical characteristics and social concern for the area.

4.9.1 Visual Quality Objectives

All forest operations carried out in scenic areas covered by an established visual quality objective (VQO) will be consistent with the objective, and in scenic areas without established VQO's all forest operations will be designed using appropriate visual design techniques to minimize visual impacts.

Refer to **Indicator # 41**, located in **Section** 6.41 **Visual Quality Objectives** for a detailed description of the indicator, target, acceptable variance and strategy implementation to achieve visual quality objectives in the DFA. **For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used in replacement of Section 28(1)(c) of the *FSJPPR* through the application of the visual quality landscape level strategy.**

For the purposes of Section 42 of the *FSJPPR* the indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the landscape level strategies.

5.0 CSA SFM REQUIREMENTS

The Participants used the 6 Canadian Council of Forest Ministers SFM Criteria and 17 CSA SFM Elements from the Canadian Standards Association Sustainable Forest Management Standard CAN/CSA-Z809-16 and input from a Public Advisory Group to set values, objectives, indicators, and targets in the development of the SFMP. The criteria and elements are:

Criteria	***Critical Element***
❑ Conservation of biological diversity	❑ Ecosystem diversity ❑ Species diversity ❑ Genetic diversity ❑ Protected areas and sites of special biological, geological, heritage or cultural significance
❑ Maintenance of forest ecosystem condition and productivity	❑ Forest ecosystem condition and productivity
❑ Conservation of soil and water resources	❑ Soil quality and quantity ❑ Water quality and quantity
❑ Forest ecosystem contributions to global ecological cycles	❑ Carbon uptake and storage ❑ Forest land conversion
❑ Economic and social benefits	❑ Timber and Non-Timber Benefits ❑ Communities and Sustainability
❑ Society's responsibility for sustainable development	❑ Fair and effective decision-making ❑ Safety
❑ Aboriginal Relations	❑ Aboriginal and Treaty Rights ❑ Respect for Aboriginal Forest Values, Knowledge, and Uses

These criteria, their SFM elements and the values, objectives, indicators, and targets developed by the Public Advisory Group form the basis of the following sections, and are summarized in the Sustainable Forest Management Matrix (Appendix 2).

The SFM Matrix also identifies how the CSA Z809-16 core indicators link up with the values, objectives, indicators, and targets developed by the Public Advisory Group.

A requirement of the CSA SFM Standard and Fort St John Pilot Project Regulation is to produce an annual report, which reports on progress, performance and appropriateness of each of the indicators and objectives developed for the DFA. The annual report will update the current condition of the indicators.

6.0 VALUES, OBJECTIVES, INDICATORS AND TARGETS

Values & Objectives: What is locally important and what is desirable?

The first step in developing the SFMP is to identify what is locally important and describe what is desirable. This involves reviewing SFM standards and comparing them to the local area so that *values* that are considered locally important are identified. Once values are identified, one or more *objectives* are then developed to describe the future state or condition of each of the values. Objectives are usually broad, general statements that are qualitative as opposed to quantitative. To develop this SFMP, local values and objectives were derived from reviewing SFM Standards, LRMPs and input from the PAG and STAC.

Objective: a broad statement describing a desired future state or condition for a value.

Indicator: a variable that measures the state or condition of an objective for which one or more targets is set.

Target: a specific statement describing a desired future state or condition of an indicator. Targets are succinct, measurable, achievable, realistic, and time bound.

Indicators & Targets: How do we know we have been successful?

A method of knowing when we are successful has often been a missing link within past and contemporary forest management plans. Strategic objectives are well defined throughout BC, but forest managers are often challenged with implementing on-the-ground practices and knowing whether or not the overall strategic objectives have been met. To overcome this uncertainty, SFMP's establish one or more performance measures *(indicators)* for each objective. One or more *targets* are then identified for each indicator. This is a fundamental difference between SFMP's and other strategic plans that exist throughout the Province. Indicators and targets are also a core part of the Performance Management system as a whole. A detailed description of each indicator and target are provided as demonstrated in the example below.

X INDICATOR

Indicator Statement	Target Statement
A reiteration of the indicator as identified in the landscape level strategy or the SFM matrix.	A specific statement describing a desired future state or condition of an indicator. Targets are succinct, measurable, achievable, realistic, and time bound.
SFM Objective: A description the SFM objectives that this indicator and target relate to.	
Linkage to *FSJPPR*: If applicable, a brief statement regarding whether this indicator affects performance requirements of the *FSJPPR*, or if it will be used to evaluate success of the implementation of the landscape level strategy.	

Acceptable Variance:

This provides the acceptable variance from the desired level of the Indicator.

What is this indicator and why is it important?

This provides a description of the indicator.

Current Status:

The information provided under this heading summarizes the current state (if known) and objective levels of the quantifiable indicator. This information will usually be summarized in table format by Landscape Unit and BEC variant, or whatever scale at which the objective is to be met. Where current and quantitative information is available for the indicator, that information will be presented here.

Forecasting Assumptions and Analytical Methods:

CSA specifies that: a) quantitative and long-term projections of expected future indicator levels have been prepared; b) that the assumptions and analytic methods used in forecasting have been specified; and c) the public participation process was used to select the preferred forecast.
Where possible and when they exist, this section provides a summary of the forecasting assumptions and analytical methods used to project a variety of possible future forest conditions that could result from present forest management activities.

Strategy and Implementation Schedule:

This is a description of the chosen strategy, including all significant actions to be undertaken and their associated implementation schedule.

Monitoring Procedure:

The information provided under this heading summarizes the sources of monitoring information, timing and frequency of monitoring to ensure that the Participants meet the targets.

Linkages to Operational Plans:

This identifies the links between short-term operational plans and the SFMP.

Linkages to LRMP:

A description of the LRMP objectives included in **Error! Reference source not found.** that relate to this i ndicator and target.

Classifying indicators is important because it helps us understand the variable we are attempting to measure and the data that is produced. Indicators can be divided into three groups: *context*, *process*, and *response indicators* (Duinker 2000):

1. **Context Indicators** – These indicators measure the output of a system where the outcome cannot be controlled at the local level. An example is measuring climate variables such as temperature or precipitation. These indicators provide useful data to help us understand the context in which we operate, but provide little value within our SFMP because the outcome is not directly linked to our actions.
2. **Process Indicators** – These indicators measure the output of an agreed upon practice or process. An example is measuring the number of seedlings planted in a given year or season. These indicators are usually very effective because it is relatively easy to establish targets and measure and record data. However, they are based on an assumption that the practice or process is correct in the first place. Further investigation and validation of the assumptions used can help mitigate these uncertainties and facilitate continuous improvement.
3. **Response Indicators** – These indicators measure the output of a system as a direct response to actions applied. An example is the change in site index of a managed stand as various silviculture or harvesting practices are applied. These indicators are very useful but are often difficult to measure, or the results are difficult to interpret. The lack of knowledge of biological systems and / or the expense of providing meaningful results can be preventative in the short term. Gathering more knowledge about biological systems, coupled with technological improvements will aid in the development of these types of indicators.
4. **Mix of Indicators** - To be effective, an SFMP should contain both process and response indicators. Once all SFM objectives are covered by one or more of these types of indicators, the addition of context indicators will provide enhanced value.

All indicators do not "weigh-in" equally. Some will be stronger in some areas while others are weaker. Therefore, any one indicator by itself is "weak", however, it is the package, or suite of indicators that provides the strength to measure performance towards sustainable forest management.

6.1 FOREST TYPES

Indicator Statement	Target Statement
Percent distribution of forest type (deciduous, deciduous mixedwood, conifer mixedwood, conifer) >20 years old by landscape unit	All forest type groups by landscape unit will meet or exceed the minimum area percentage in **Error! Reference source n ot found.**
SFM Objective: Maintain the diversity and pattern of communities and ecosystems within a natural range Ecosystem functions capable of supporting naturally occurring species exist within the range of natural variability	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Forest Health Landscape Level Strategy.	

Acceptable Variance:

A Forest Type's area within a LU may be allowed to decline to 50% of the minimum targeted area of a forest type, provided a plan can demonstrate that projected ingrowth will allow the minimum targeted area to be achieved within ten years.
Targets may be adjusted in the event of large natural disturbances impacting a forest type's area within a landscape unit.
The Minimum Target Area in hectares noted in the last column of **Error! Reference source not f ound.** for each Forest Type and LU must be achieved if the actual percentage falls below the target percentage (e.g. due to changes in the total area of all Forest Types in the LU),

What is this indicator and why is it important?

Forest Type groups are the designation of stand types into one of four ecologically significant groups – pure deciduous, deciduous leading mixedwood, conifer leading mixedwood, and pure conifer. The classification is based on the British Columbia Land Classification System (BCLCS). For the purposes of this indicator the BCLCS code 'Treed-Broadleaf' (TB) is deciduous, 'Treed-Mixed' (TM) is mixedwood and 'Treed-Conifer' (TC) is conifer. Treed-Mixed is further delineated into either deciduous mixedwood or conifer mixedwood based on the leading species.
This indicator monitors the change in the proportion of forest type groups (> 20 years old) within each group over time. Stands less than 20 years of age are not included because it is assumed that 0 - 20 year-old stands could exhibit significant fluctuations in tree species composition within that time span as a result of silviculture practices and natural ingress of species in regenerating stands. Considering only stands over 20 years of age will focus the target on the end result of reforestation regimes.
This indicator is important because forest operations can, through harvesting and reforestation practices have a significant influence over the composition of forest types across forested landscapes. This influence increases with the duration and intensity of management of regenerating stands. Since forest operations have a significant influence over the distribution of stand composition groups, it is important to monitor changes over time as harvest and reforestation activities are applied.
Stands with black spruce (*Picea mariana*) and larch (*Larix* spp.) as the leading species are not included in the conifer Forest Type class. Black spruce and larch stands are not typically targeted for timber harvesting in the DFA. There are over 1,145,000 ha of these stands within the DFA. To include them in

the conifer Forest Type would overly weight the conifer forest type away from the other species such as white spruce (*Picea glauca*) and pine (*Pinus contorta*), which are targeted by the forest industry, and make this indicator less sensitive to the effects of forest management activities.
Other than harvesting and silviculture practices, this indicator may be affected by large natural disturbances, as well as the addition of young stands ("ingress") to the populations as they reach twenty years. Acceptable variances attempt to mitigate these non harvesting impacts. Changes in proportions may also result from new inventories reclassifying areas as different forest types.
Error! Reference source not found. summarizes the target minimums for this indicator. Minimum t argets are proposed as ingress over time due to maturation and natural succession can distort maximum percentage targets. Targets are established initially at no less than 20% of the 2010 Current Status area, and then adjusted to provide a realistic range for groups that have a very low occurrence, down to a minimum of 1%. Current status to August 2015 is noted in Table 10, 44 of the 44 forest type LU combinations achieved the minimum area targets noted in Table 9.

Table 9: 2010 Baseline Targets for Forest Types

Landscape Unit	Forest Type	2010 Current Status		2010 Target Minimum Area	2010 Target Minimum Area
		Area (ha)	% of L.U.	Percentage	(ha)
Blueberry	Deciduous	126,729	**34.6%**	**28%**	**102,495**
	Deciduous Mixedwood	48,777	**13.3%**	**11%**	**40,266**
	Conifer Mixedwood	37,973	**10.4%**	**8%**	**29,284**
	Conifer	152,573	**41.7%**	**33%**	**120,797**
Blueberry Total		366,052	**100%**		
Crying Girl	Deciduous	556	**1.0%**	**1%**	**546**
	Deciduous Mixedwood	928	**1.7%**	**1%**	**546**
	Conifer Mixedwood	915	**1.7%**	**1%**	**546**
	Conifer	52,206	**95.6%**	**76%**	**41,499**
Crying Girl Total		54,604	**100%**		
Graham	Deciduous	2,764	**1.4%**	**1%**	**1,963**
	Deciduous Mixedwood	2,142	**1.1%**	**1%**	**1,963**
	Conifer Mixedwood	3,540	**1.8%**	**1%**	**1,963**

Landscape Unit	Forest Type	2010 Current Status		2010 Target Minimum Area	2010 Target Minimum Area
		Area (ha)	% of L.U.	Percentage	(ha)
	Conifer	187,878	**95.7%**	**77%**	**151,170**
Graham Total		196,325	**100%**		
Halfway	Deciduous	13,730	**11.6%**	**9%**	**10,676**
	Deciduous Mixedwood	7,765	**6.5%**	**4%**	**4,745**
	Conifer Mixedwood	5,782	**4.9%**	**3%**	**3,559**
	Conifer	91,345	**77.0%**	**62%**	**73,546**
Halfway Total		118,622	**100%**		
Kahntah	Deciduous	63,979	**37.8%**	**30%**	**50,826**
	Deciduous Mixedwood	21,232	**12.5%**	**10%**	**16,942**
	Conifer Mixedwood	22,217	**13.1%**	**10%**	**16,942**
	Conifer	61,990	**36.6%**	**29%**	**49,132**
Kahntah Total		169,419	**100%**		
Kobes	Deciduous	31,736	**34.7%**	**28%**	**25,575**
	Deciduous Mixedwood	10,107	**11.1%**	**9%**	**8,221**
	Conifer Mixedwood	9,334	**10.2%**	**8%**	**7,307**
	Conifer	40,164	**44.0%**	**35%**	**31,969**
Kobes Total		91,341	**100%**		
Lower Beatton	Deciduous	69,470	**70.6%**	**56%**	**55,128**
	Deciduous Mixedwood	8,575	**8.7%**	**7%**	**6,891**
	Conifer Mixedwood	6,494	**6.6%**	**5%**	**4,922**
	Conifer	13,904	**14.1%**	**11%**	**10,829**
Lower Beatton Total		98,442	**100%**		
Milligan	Deciduous	38,499	**29.5%**	**24%**	**31,282**
	Deciduous Mixedwood	8,739	**6.7%**	**5%**	**6,517**
	Conifer Mixedwood	9,223	**7.1%**	**6%**	**7,821**

Landscape Unit	Forest Type	2010 Current Status		2010 Target Minimum Area	2010 Target Minimum Area
		Area (ha)	% of L.U.	Percentage	(ha)
	Conifer	73,882	**56.7%**	**45%**	**58,654**
Milligan Total		130,343	**100%**	**N/A**	
Sikanni	Deciduous	2,422	**2.2%**	**1%**	**1,118**
	Deciduous Mixedwood	2,144	**1.9%**	**1%**	**2,144**
	Conifer Mixedwood	3,104	**2.8%**	**1%**	**1,118**
	Conifer	104,128	**93.1%**	**75%**	**83,848**
Sikanni Total		111,797	**100%**	**N/A**	
Tommy Lakes	Deciduous	62,243	**22.9%**	**18%**	**48,974**
	Deciduous Mixedwood	30,505	**11.2%**	**9%**	**24,487**
	Conifer Mixedwood	26,783	**9.8%**	**8%**	**21,766**
	Conifer	152,546	**56.1%**	**45%**	**122,435**
Tommy Lakes Total		272,078	**100%**	**N/A**	
Trutch	Deciduous	43,229	**21.3%**	**17%**	**34,422**
	Deciduous Mixedwood	22,193	**11.0%**	**9%**	**18,223**
	Conifer Mixedwood	16,552	**8.2%**	**7%**	**14,174**
	Conifer	120,509	**59.5%**	**48%**	**97,192**
Trutch Total		202,483	**100%**	**N/A**	
All L.U.'s	Deciduous	455,357	**25.1%**	**N/A**	**362,301**
	Deciduous Mixedwood	163,107	**9.0%**	**N/A**	**126,805**
	Conifer Mixedwood	141,917	**7.8%**	**N/A**	**108,690**
	Conifer	1,051,125	**58.0%**	**N/A**	**833,293**
Total All		1,811,506		**N/A**	

Current Status:

Error! Reference source not found. indicates the 2015 current status[8] by forest type and landscape u nit, and the target ranges included in the 2004 SFMP #1. Twelve of the forty four forest type resultant areas are outside the targeted ranges. Nine of these are in deciduous mixedwood or conifer mixedwood forest types, while two pure conifer forest types showed increases that exceeded the upper threshold of the target range. Four deciduous leading mixedwood forest type areas exceeded the upper threshold of the target range, while three conifer mixedwoods and one deciduous mixedwood were less than the lower threshold of the target range.

SFMP # 1 targets were based on inventory information that was, in many cases, more than thirty years old. The 'current state' areas in **Error! Reference source not found.** are based on analysis of f orest cover data from the recent re-inventory of the TSA. The natural successional pathway of spruce understory growing up through deciduous canopies tends to convert some deciduous stands to deciduous mixedwoods. Similarly, the natural reduction of shorter lived deciduous in conifer leading mixedwoods would tend to convert conifer mixedwoods to purer conifer types. These trends are apparent from the recent re-inventory, some thirty years later than the previous inventory.

Note the one exception to these trends was a decrease in deciduous mixedwoods in the Milligan LU from 20.4% to 6.2%, at the same time there was a large increase in the pure conifer landbase from 30.5% to 60.3%. As noted in Table 20, there has only been 202 hectares logged in the Milligan LU since the commencement of the pilot project, consequently this anomaly is not related to harvesting patterns, but rather entirely a reflection of the reinventory of the LU.

Table 10: Current Status and 2004 Baseline Target for Forest Types > 20 years old

Landscape Unit	Forest Type	2015 Current Status		2004 Status		2004 SFMP Target Ranges	
		Area (ha)	% of L.U.	Area (ha)	% of L.U.	Min	Max
Blueberry	Deciduous	126,488	32.1%	140,289	37.1%	30%	45%
	Deciduous Mixedwood	50,578	12.9%	32,500	8.6%	7%	10%
	Conifer Mixedwood	44,844	11.4%	50,669	13.4%	11%	16%
	Conifer	171,532	43.6%	154,320	40.8%	33%	49%
Blueberry Total		393,442	100.0%	377,778	100.0%		
Crying Girl	Deciduous	737	1.3%	646	1.1%	0.50%	2%
	Deciduous Mixedwood	1,027	1.8%	706	1.2%	0.50%	2%
	Conifer Mixedwood	926	1.6%	1,205	2.0%	1%	3%
	Conifer	55,967	95.4%	58,390	95.8%	93%	98%
Crying Girl Total		58,656	100.0%	60,947	100.0%		

[8] Current status as of August 19, 2015.

Landscape Unit	Forest Type	2015 Current Status		2004 Status		2004 SFMP Target Ranges	
		Area (ha)	% of L.U.	Area (ha)	% of L.U.	Min	Max
Graham	Deciduous	3,539	1.5%	3,061	1.4%	0.50%	2%
	Deciduous Mixedwood	2,833	1.2%	1,724	0.8%	0.50%	2%
	Conifer Mixedwood	4,115	1.8%	3,866	1.8%	1%	3%
	Conifer	220,003	95.4%	205,996	96.0%	93%	98%
Graham Total		230,490	100.0%	214,647	100.0%		
Halfway	Deciduous	14,448	10.9%	14,845	11.5%	9%	14%
	Deciduous Mixedwood	8,432	6.4%	5,399	4.2%	3%	5%
	Conifer Mixedwood	6,871	5.2%	8,936	6.9%	6%	8%
	Conifer	102,874	77.6%	100,239	77.5%	73%	82%
Halfway Total		132,625	100.0%	129,419	100.0%		
Kahntah	Deciduous	84,735	36.3%	64,727	40.1%	32%	48%
	Deciduous Mixedwood	33,258	14.3%	21,274	13.2%	11%	16%
	Conifer Mixedwood	21,487	9.2%	25,395	15.7%	13%	19%
	Conifer	93,636	40.2%	49,940	31.0%	25%	37%
Kahntah Total		233,116	100.0%	161,335	100.0%		
Kobes	Deciduous	30,510	32.6%	34,392	37.0%	30%	44%
	Deciduous Mixedwood	9,644	10.3%	8,578	9.2%	7%	11%
	Conifer Mixedwood	9,454	10.1%	13,560	14.6%	12%	18%
	Conifer	43,935	47.0%	36,442	39.2%	31%	47%
Kobes Total		93,543	100.0%	92,971	100.0%		
Lower Beatton	Deciduous	68,544	69.1%	58,825	68.6%	55%	82%
	Deciduous Mixedwood	8,733	8.8%	5,372	6.3%	5%	8%
	Conifer Mixedwood	7,126	7.2%	7,624	8.9%	7%	11%
	Conifer	14,777	14.9%	13,976	16.3%	13%	20%
Lower Beatton Total		99,181	100.0%	85,797	100.0%		
Milligan	Deciduous	39,445	27.1%	28,677	26.1%	21%	31%

Landscape Unit	Forest Type	2015 Current Status		2004 Status		2004 SFMP Target Ranges	
		Area (ha)	% of L.U.	Area (ha)	% of L.U.	Min	Max
	Deciduous	9,050	6.2%				
	Mixedwood			22,493	20.4%	16%	25%
	Conifer	9,371	6.4%				
	Mixedwood			25,259	23.0%	18%	28%
	Conifer	87,836	60.3%	33,570	30.5%	24%	37%
Milligan Total		145,702	100.0%	109,999	100.0%		
Sikanni	Deciduous	2,577	2.0%	4,608	3.3%	2%	4%
	Deciduous	1,774	1.4%				
	Mixedwood			2,662	1.9%	1%	3%
	Conifer	2,478	1.9%				
	Mixedwood			4,746	3.4%	2%	4%
	Conifer	124,270	94.8%	129,392	91.5%	89%	95%
Sikanni Total		131,099	100.0%	141,408	100.0%		
Tommy Lakes	Deciduous	70,452	22.6%	64,676	24.0%	19%	29%
	Deciduous	40,617	13.0%				
	Mixedwood			19,517	7.2%	6%	9%
	Conifer	27,502	8.8%				
	Mixedwood			31,864	11.8%	9%	14%
	Conifer	173,554	55.6%	153,325	56.9%	46%	68%
Tommy Lakes Total		312,125	100.0%	269,383	100.0%		
Trutch	Deciduous	45,119	20.8%	45,003	23.0%	18%	28%
	Deciduous	24,313	11.2%				
	Mixedwood			10,628	5.4%	4%	7%
	Conifer	17,254	8.0%				
	Mixedwood			18,072	9.2%	7%	11%
	Conifer	130,300	60.0%	122,373	62.4%	50%	75%
Trutch Total		216,985	100.0%	196,076			
All L.U.'s	Deciduous	486,594	23.8%	459,749	28.0%		
	Deciduous	190,259	9.3%				
	Mixedwood			130,853	8.0%		
	Conifer	151,428	7.4%				
	Mixedwood			191,196	11.6%		
	Conifer	1,218,684	59.5%	1,057,963	64.4%		
Total All		2,046,964	100.0%	1,839,761			

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

An analysis of the impacts of harvesting proposed in the Forest Operations Schedule (FOS) will be conducted, and presented in FOS #3. The effect of stand maturation will also be considered in this analysis (projected date set to March 31st, 2022).

Strategy and Implementation Schedule:

Prior to harvest starting each Participant must declare to the District Manager if the Participant proposes to reforest a cutblock as a coniferous area, a deciduous area or a mixedwood area (sec. 23.1(1) of the *Fort St. John Pilot Project Regulation*).

It is not necessarily the intention to match regeneration of specific areas with the same species composition as was harvested. Across the landscape and over time the Forest Type groups will be maintained above the minimum target percentage of area for each Forest Type group, by LU.

Long-term monitoring of species composition change within managed stands will occur through Change Monitoring Inventory (CMI) plots established over the DFA. These plots are systematically established across the DFA based on a 3-km grid in managed stands 15 years after harvesting. These plots will provide a representative sample of all managed stands over time. The first set of 30 plots was established in 2003.To date a total of 78 sample plots have been established in managed stands in the DFA.

Monitoring Procedure:

Data sources include Vegetation Resource inventory (VRI), Landscape Unit boundaries, and RESOURCES Forest Resources ("RESOURCES") block data.

VRI information is updated either by the Provincial Government or by Forest Licensees under contract with the Government. These data sources are usually updated and replaced in five to ten year intervals. The RESOURCES system is a "real-time" or "live" database that is maintained and updated by the Participants' staff as they carry out their daily activities.

Reports will be generated at two scales. The first report is a tabular report of the percent of stand composition groups within each landscape unit. The second report is a single number that identifies the consistency between the actual status in any given year compared to the 44 baseline targets, expressed as a percent. The calculation is described below:

Report 1 calculation: Forest inventory data is projected to the current date, and recent harvesting is taken into account by overlaying RESOURCES block information. Each inventory polygon is assigned to a Forest Type group then summed for each LU and expressed as a percent of the productive forested area of the LU. Only stands above 20 years of age will be monitored and reported in this calculation.

Report 2 calculation: Number of stand composition groups meeting the baseline targets / the total number of baselines (44), expressed as a percent. To monitor this indicator, the above reports will be generated at the start of each SFMP or FOS, and when each SFMP expires (Presented in Annual Reports). The results will be compared to the overall target. The CMI plots are expected to be re-measured on a cycle of approximately 10 years and will allow comparisons of species composition, among other things, over time.

Linkages to Operational Plans:

The data will be used by the Participants to guide future harvest planning (i.e. FOS development), to review long term trends in reforestation policies, and to adjust silviculture practices where necessary.

Linkages to LRMP:

This indicator helps to support the following LRMP objectives by ensuring that the forest type groups are maintained over time across the DFA.

- *Maintain functioning and healthy ecosystems,*
- *Enhance timber harvesting and a sustainable long-term supply,*
- *Maintain timber harvesting and forest management opportunities,*
- *Manage for forest health.*

6.2 SERAL STAGES

Indicator Statement	Target Statement
The minimum proportion (%) of late seral stage forest retention by NDU.	A) All Periods: The minimum proportion (%) of late seral stage forest retention by NDU as identified in Table 11[9] will be met. B) By the close of Period 1 (April 1, 2019 – March 31, 2020): a minimum of 30% of the late seral stage forest retention target will be achieved by contribution from spatially identified OFMAs, in all NDUs. By the close of Period 2 (April 1, 2020 – March 31, 2021): a minimum of 60% of the late seral stage forest retention target will be achieved by contribution from spatially identified OFMAs, in all NDUs. By the close of Period 3 (April 1, 2021 – March 31, 2022): A minimum of 100% of the late seral stage forest retention target will be achieved by contribution from spatially identified OFMAs, in all NDUs.
SFM Objective: Maintain the diversity and pattern of communities and ecosystems within a natural range Ecosystem functions capable of supporting naturally occurring species that exist within the range of natural variability Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Patch Size, Seral Stage and Adjacency and Forest Health Management Landscape Level Strategies.	

Acceptable Variance:

A 1% variance below the target is permissible provided projections indicate the target can be met within 20 years. (e.g. Boreal Foothills minimum allowable would be 22%)

[9] Refers to Table 11 in the *Fort St. John Pilot Project Sustainable Forest Management Plan #2*

What is this indicator and why is it important:

In the 1990's retention of old forests within all forested landscapes was recognized as important for maintaining biodiversity. The basic principle being that all landscapes (ecosystems) have some level of old forests and the more a managed forest resembles the forests that were established as a result of natural processes the more likely that all native species and ecological processes will be maintained.

The Craig DeLong paper entitled *"Land Units and Benchmarks for Developing Natural-disturbance Based Forest Management Guidance for Northeastern British Columbia, Technical Report 059; 2011"* is a synthesis of the most current scientific information and regional professional judgement available. The Natural Disturbance Unit (NDU) guidance uses the updated local research and separates areas based on differences in disturbance processes, stand development, and temporal and spatial landscape patterns. Unlike the Biodiversity Guidebook, this document presents goals based on the "natural range of variability" and does not present any numbers that represent a compromise between biodiversity and timber management. The guidance in this document would result in the least possible differences between harvesting and natural disturbance.

There are four NDUs within the Fort St. John TSA; Boreal Plains Uplands in the east, Northern Boreal Mountains in the northwest, the Omineca in the central and eastern mountains and the Boreal Foothills south of the Halfway River.

In the Boreal Plains Uplands NDU, upland climax forests are dominated by hybrid white spruce and/or black spruce depending on topographic position and the time since the last stand replacement event. Trembling aspen and to a lesser extent lodgepole pine and paper birch dominate younger stands. Wetlands are very common; there are 7 forested and 9 non-forested wetland types recognized in this NDU. (Delong 2002)

In the Northern Boreal Mountains NDU, upland climax forests have sparse crown closure and are dominated by hybrid white spruce and/or subalpine fir. Subalpine fir dominance increases with elevation. Lodgepole pine and to a lesser extent trembling aspen dominate younger stands. Black spruce occurs along with white spruce or lodgepole pine on upland sites especially on north aspects. Wetlands are common along the broader valleys and in flatter terrain in the mountains. (Delong 2002).

Forests occurring in different seral and structural stages over space and time are recognized as an important part of the landscape, providing distinct habitat elements for a variety of species. The publication *Land Units and Benchmarks for Developing Natural-disturbance Based Forest Management Guidance for Northeastern British Columbia, Technical Report 059; 2011,* has estimated the natural range of variation for different Natural Disturbance Units within the DFA.

Late seral "old" forest is defined as stands greater than 140 years old for coniferous leading stands and as greater than 100 years old for deciduous leading stands. Late seral "near old" forest is defined as stands between 120 to 140 years old for coniferous and between 80-100 years old for deciduous leading stands. Deciduous stands are typically made up of short lived early seral species, and if left undisturbed for long periods of time (>150 years) will eventually convert to coniferous stands, or die and cycle back to a similar species composition. Therefore it would be inappropriate to manage for the same distribution of ages for deciduous as for conifer species. Late seral deciduous stands are structurally distinct from young and mature stands. These stands provide lower tree densities and hence produce larger diameter trees and higher level of coarse woody debris and, it is therefore important to maintain some occurrence of these stands on the landscape over time.

As deciduous stands make up approximately 28% of the Boreal Plains land base, targets are applied to both deciduous and coniferous in the Boreal Plains NDU. In the Boreal Foothills, Omineca and Northern Boreal Mountains NDU's however, deciduous stands comprise an insignificant amount of the remainder

of the TSA (approximately 3%, 1.5% of which is THLB) and therefore only conifer late seral stage targets are applied to the forested land base in these NDU's.

There have been no separate targets set for mixedwood stands in the DFA. Approximately one third (33%) of the productive forested land base of mixedwood stands is within the non-harvesting land base (NHLB) which is not actively managed by the Participants. This provides some assurance that there will be a significant amount of unmanaged mixedwood stands to meet seral stage targets. The remainder of the mixedwood stands will be managed to the targets for the deciduous and conifer leading stands, based on leading species, for the appropriate NDU.

The late seral stage forest retention targets identified in Table 11 are planned to be achieved through an evolving combination of spatially identified Old Forest Management Areas (OFMAs), land designations in the Crown Forest Landbase (CFLB) that prohibit timber harvesting such as Wildlife Habitat Areas (WHAs), Ungulate Winter Ranges (UWRs) and Parks and protected areas, and non-spatially identified old forest. Over time, the contribution from non-spatially identified old forest will be reduced as the target for spatially identified OFMAs is achieved. The target for spatially identified OFMAs will be derived by subtracting the late seral stage contribution made by the land designations in the CFLB that prohibit timber harvesting and which are not legally designated as OGMAs, from the late seral stage forest retention targets specified by NDU in Table 11 of the SFMP.

Table 11: Natural Disturbance Unit Late Seral Stage Targets

Natural Disturbance Unit	Minimum Age of Late Seral (yrs)	Targets for Late Seral Forest Retention (%)
Boreal Plains Uplands (BPU)	**Conifer- 140** **Decid.- 100**	**16** **16**
Boreal Foothills Valley (BV)	**All- 140**	**23**
Boreal Foothills Mountain (BM)	**All- 140**	**33**
Northern Boreal Mountains (NBM)	**All- 140**	**37**
Omineca Mountains (OM)	**All- 140**	**41**
Omineca Valley (OV)	**All- 140**	**16**

Current Status

The following Table 13, 15 and 16 show the 2010 status of seral stage distribution for the NDU's in the DFA, and a projection to 2016 of seral stage distribution that accounts for stand maturation, and any known planned harvesting remaining from the 2010 FOS. Since 2010, the majority of timber harvesting conducted in the DFA has been concentrated in the Boreal Plains NDU. The Boreal Plains NDU current seral condition as of August18, 2015 is shown in Tables 12 and 14.

The current existing late seral stage areas exceed the targets in each NDU.

Table 12: Boreal Plains Conifer Current and 2025 Seral Stage and Target

LU_NAME	< 40 years				41 - 100 years				101 - 140 years				> 140 years				
	2017		2025		2017		2025		2017		2025		2017			20	
	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	Surplus (ha)	area (ha)	%
Blueberry	59410	17%	61911	18%	148573	43%	141809	41%	92814	27%	84738	24%	45741	13%		58080	1
Crying Girl	0	0%	0	0%	0	0%	0	0%	3	32%	0	0%	7	68%		10	10
Halfway	11944	8%	16182	11%	29040	20%	23512	16%	49798	34%	41485	28%	55489	38%		65093	4
Kahntah	6831	1%	6767	1%	395913	67%	337770	58%	144102	25%	182690	31%	40406	7%		60026	1
Kobes	14037	17%	15077	18%	10722	13%	10762	13%	37992	46%	31967	39%	19035	23%		23982	2
Lower Beatton	19202	42%	19398	42%	16023	35%	13656	30%	9049	20%	10621	23%	1953	4%		2554	
Milligan	29617	8%	28901	8%	244595	65%	241125	64%	45332	12%	37986	10%	59481	16%		71012	1
Tommy Lakes	22563	4%	37445	7%	215421	39%	183368	33%	217759	39%	218253	39%	103357	18%		120034	2
Trutch	2258	1%	6018	2%	126169	36%	107972	31%	131570	38%	131558	38%	87138	25%		101586	2
Grand Total	165862	7%	191698	8%	1186456	48%	1059972	43%	728419	29%	739297	30%	412607	17%	25187	502376	2

Oil and gas area included:	16%	2

Target = 16%

2017 - uses FOS blocks with harvest start date <Mar 31, 2017

2025 - uses FOS blocks with harvest start date >Mar 31, 2017

Table 12 identifies the current and expected 2025 conifer seral condition upon the completion of all harvest activities proposed by FOS #3 for the Boreal Plains Natural Disturbance Unit (NDU). Upon completion of all conifer harvest activities proposed in FOS #3 the conifer seral targets are achieved for the Boreal Plains NDU and the analysis indicates a surplus of 100,747 ha of old forest (amount of old forest above the target).

The old seral analysis also considered the cumulative effect of timber harvesting and oil and gas disturbance on the landbase. The existing calculated area occupied by wellsites and pipelines is 25,333ha, by adding this area (25,333ha) to the CFLB and harvested area, the Boreal Plains Conifer late seral current condition is 16% and future is 20%.

Table 13: Boreal Plains Deciduous Current and 2025 Seral Stage and Target

	< 40 years				41 - 100 years				> 100 years						Total LU area
	2017		2025		2017		2025		2017			2025			
LU_NAME	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	area (ha)	%	surplus (ha)	area (ha)	%	surplus (ha)	
Blueberry	17320	9%	26845	14%	101907	55%	93261	50%	67578	36%		66699	36%		186805
Crying Girl	0	0%	0	0%	5	100%	3	62%	0	0%		2	38%		5
Halfway	1599	6%	3692	14%	10475	41%	8415	33%	13531	53%		13497	53%		25604
Kahntah	2737	2%	3084	2%	98870	79%	86639	69%	24111	19%		35996	29%		125718
Kobes	3013	8%	7700	19%	10911	27%	7696	19%	26222	65%		24750	62%		40146
Lower Beatton	10618	13%	9990	12%	59051	70%	54504	64%	15189	18%		20364	24%		84858
Milligan	6059	12	5534	11	42256	81%	42553	81%	4130	8%		4358	8%		52445

		%		%											
Tommy Lakes	4859	4%	17272	14 %	58998	49%	49532	41%	56354	47%		53407	44 %		120211
Trutch	612	1%	2186	3%	39857	53%	34940	47%	34045	46%		37388	50 %		74514
Grand Total	46817	7%	76303	11 %	42232 9	59%	37754 3	53%	24116 0	34%	12928 7	25646 0	36 %	14365 2	710306
							Oil and gas area included			34%			36 %		718260

Target = 16%

2017 - uses FOS blocks with harvest start date <Mar 31, 2017

2025 - uses FOS blocks with harvest start date >Mar 31, 2017

Table 13 identifies the current and expected 2025 deciduous seral condition upon the completion of all harvest activities proposed by FOS #3 for the Boreal Plains NDU. Upon completion of all deciduous harvest activities proposed in FOS #3 the deciduous seral targets are achieved for the Boreal Plains NDU and the analysis indicates a surplus of 143,652 ha of old forest (amount of old forest above the target).

The old seral analysis also considered the cumulative effect of timber harvesting and oil & gas disturbance on the landbase. By including existing oil and gas area in the calculation (7,954ha) the Boreal Plains Deciduous late seral current condition is 34% and future is 36%.

Table 14: Boreal Foothills Valley and Mtn, Northern Boreal Mountains, Omineca Mtns and Valley: Current and 2025 Seral Stage and Targets

NDU Sub-Unit	Landscape Unit	< 40 years				40 - 100 years				101 - 140 years				> 140 years					Target
		2017		2025															
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Grand Total	
Boreal Foothills - Mountain	Crying Girl	931	2%	792	2%	4020	10%	3087	7%	19132	46%	16118	38%	17845	43%	21930	52%	41927	
	Graham	1870	2%	1817	2%	10561	13%	6597	8%	41091	49%	35436	42%	30960	37%	40632	48%	84482	
	Halfway	15	0%	15	0%	2069	16%	1764	13%	4471	34%	3335	25%	6636	50%	8077	61%	13192	
	Kobes									8	54%	8	54%	7	46%	7	46%	15	
	NDU Total	2815	2%	2624	2%	16650	12%	11448	8%	64702	46%	54897	39%	55448	40%	70646	51%	139616	33

NDU Sub-Unit	Landscape Unit	< 40 years				40 - 100 years				101 - 140 years				> 140 years					
		2017		2025															
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Grand Total	
Boreal Foothills - Valley	Crying Girl	1386	7%	977	5%	2747	13%	2561	12%	9308	45%	8560	41%	7347	35%	8689	42%	20787	
	Graham	218	0%	47	0%	6741	13%	4502	8%	22847	43%	19927	38%	23298	44%	28628	54%	53104	
	Halfway	7	0%	7	0%	211	13%	138	9%	435	28%	349	22%	916	58%	1076	69%	1570	
	Kobes									86	49%	82	47%	89	51%	93	53%	175	
	Grand Total	1611	2%	1032	1%	9699	13%	7201	10%	32675	43%	28918	38%	31650	42%	38486	51%	75636	23

NDU Sub-Unit	Landscape Unit	< 40 years				40 - 100 years				101 - 140 years				> 140 years					
		2017		2025															
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%		
Northern Boreal Mountains	LU_NAME	Young		Young		Mid		Mid		Mature		Mature		Old		Old		Grand Total	
	Graham	245	1%	4	0%	5732	18%	3918	12%	7997	25%	8367	26%	18025	56%	19708	62%	31998	
	Sikanni	822	0%	86	0%	23262	13%	14790	8%	57350	32%	58108	33%	96379	54%	104829	59%	177813	
	Trutch									4	100%	4	100%					4	
	Grand Total	1067	1%	90	0%	28994	14%	18708	9%	65350	31%	66479	32%	114404	55%	124537	59%	209815	37

NDU Sub-Unit	Landscape Unit	< 40 years				40 - 100 years				101 - 140 years				> 140 years					
		2017		2025															
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%		
Omenica Mountains	LU_NAME	Young		Young		Mid		Mid		Mature		Mature		Old		Old		Grand Total	
	Crying Girl					33	18%	33	18%	115	64%	91	51%	32	18%	56	31%	180	
	Graham	290	0%	288	0%	5026	5%	4699	5%	26616	27%	20915	21%	68227	68%	74257	74%	100159	
	Grand Total	290	0%	288	0%	5059	5%	4732	5%	26731	27%	21006	21%	68259	68%	74313	74%	100338	41

NDU Sub-Unit	Landscape Unit	< 40 years				40 - 100 years				101 - 140 years				> 140 years					
		2017		2025															
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%		
Omineca Valley	LU_NAME	Young		Young		Mid		Mid		Mature		Mature		Old		Old		Grand Total	
	Crying Girl					0		0		3.9	57%	3.9	57%	2.9	43%	2.9	43%	6.8	
	Graham	141.8	2%	138.3	2%	1146.4	13%	926.2	11%	4392.6	51%	3561.4	42%	2887.8	34%	3942.7	46%	8568.6	
	Grand Total	141.8	2%	138.3	2%	1146.4	13%	926.2	11%	4396.5	51%	3565.3	42%	2890.7	34%	3945.6	46%	8575.4	16

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Y

The existing FOS was incorporated into the forest inventory. Stands that are proposed to be harvested were removed, and existing inventory polygons were aged to the end of the SFMP. The seral stage distribution levels were based on productive forest area contributing to meeting the seral stage targets. Non- productive or Non-Commercial forested areas ('Projected Type Identity' = 5 or 6 in VRI files) do not contribute to meeting seral stage targets.

Long term projections of seral stage distribution were completed, and presented as part of SFMP # 1. The Forest Estate model used in that analysis (Forest Service Simulator FSSIM ver.3.0) employed a one decade look ahead function, which allowed some harvesting in the late seral provided the late seral target could be achieved in the next decade.

Current harvest levels and seral targets were forecasted and achieved for 400 years into the future.

Some level of natural disturbance continues to occur over time across the land base. Disturbance was therefore modeled in the NHLB as well. The rate of disturbance was determined by analyzing the amount of fire disturbance since the advent of fire suppression for each NDU. The rate used was 0.1% of the area per year for the Boreal Plains, Boreal Foothills and Omineca Valley NDU's, 0.08% of the area per year for the Northern Boreal Mountains NDU and 0.03% for the Omineca Mountains NDU.

Strategy and Implementation Schedule:

The graduated indicator target is reflective of the time required to conduct the many iterative analyses required to move from the current system of managing late seral forest retention utilizing a non spatial approach to identification of spatially explicit OFMAs. Seral targets, as described earlier, are based on ranges appropriate to a very large natural disturbance unit (NDU). The Fort St. John DFA only includes a portion of these large NDU's that span areas outside the DFA. As a result of this, some flexibility in reaching the targets is appropriate. During development of the FOS Participants will consider the 'current' seral stage state versus 'target' when developing the plans. Plans will normally be developed that maintain consistency with the target. Circumstances may warrant short term deviations from the target (e.g. forest health, large disturbances, poor economic conditions etc) and are acceptable. Harvesting in older stands can still occur provided an analysis is completed to demonstrate there is a high likelihood of achieving the target within a 20 year time frame.

MFLNRO has endorsed the concept of managing by seral stage at an NDU level. Participants will work with government to identify spatially explicit old forest reserves termed as Old Forest Management areas (OFMAs) within priority NDUs during the term of SFMP# 3. A higher proportion of Old Forest Management Areas may be identified in the alluvial portion of the Boreal Plains NDU (i.e. the Boreal Plains Alluvial NDU sub unit – Sikanni-Fontas RMZ).

Old Forest Retention Targets in the Fort St. John TSA

The major forest licensee's in the Fort St. John TSA have been implementing Delong's guidance on a landscape unit level in the 2004 Sustainable Forest Management Plan (SFMP). In 2009 the technical working group for the SFMP discussed how to implement the NDU guidance in the new SFMP. The working group focused on implementing those aspects of NDU guidance related to the quality and quantity of old forest retention. A two phase approach was agreed upon with phase one establishing the amount of old forest retention required and phase two establishing spatial Old Forest Management Areas (OFMAs).

In phase one the technical working group reviewed the Delong 2002 direction and agreed to set the legal old growth retention target at the lower end of the natural range of variation. While the old growth retention targets are set at the lower end of the natural range of variation it should be noted that the end result is an equivalent or greater area under old forest management objectives than required by the Provincial Non-Spatial Old Growth Order.

The old growth targets apply to the Crown Forest Land base (CFLB) within the Fort St John TSA. The CFLB is the productive forested crown land which does not include area that is non-crown, non-forest, and non-productive forest. Area within Woodlots and First Nations Reserves do not contribute to meeting the old forest retention targets. Area within Parks and Protected Areas will contribute to maintaining old forest retention in accordance with the Landscape Unit Planning Guide.

In determining the old growth area targets, it was discovered that the Boreal Plains NDU may not achieve the old forest retention target for two reasons. The primary reason is the considerable amount of pine forest in the Boreal Plains NDU and that the pine stands in the Fort St John TSA rarely survive to the age of 140 years. The second factor is the level of natural and anthropogenic disturbances in the area. This NDU has a high incidence of natural forest fires and an extensive history of industrial development.

In order to offset the shortfall, younger forests may be included in the spatial old forest management areas (OFMA) to act as recruitment areas. The principle behind recruitment stands is to protect the sites from disturbance to allow the natural aging process to develop mature and old forests that contain the desired old forest attributes. With respect to the non spatial late seral forest retention targets, old and near old forest will be considered as contributing to the late seral retention target.

The Participants will implement the following strategies for OFMA replacement. In the areas with natural disturbance cycle of <150 years (Boreal Plains, Boreal Foothills - Mountain, Boreal Foothills –Valley & Omineca Valley NDUs) a system of rotating reserves is recommended. These reserves would be scheduled to be cut when reserve areas of relatively equal size have been identified that can take their place. The intent would be to always have some large reserves of forest that are old but not so old as to be unnatural and highly susceptible to stand replacement forest insect or disease outbreaks.

In the remaining reporting units (Northern Boreal Mountains, Omineca Mountains NDUs) a strategy of irregularly dispersed large semi-permanent reserves is recommended. The more uneven-aged forests in these reporting units are less susceptible to stand replacement events and therefore have a higher likelihood of maintaining old forest structure over long periods of time. Replacement may be necessary but is not expected to be required on a continuous basis as in the rotating reserve strategy.

Many of the OFMAs are drawn adjacent to proposed cut blocks. The SFMP allows for some flexibility to address this type of operational issue; up to 15% in OFMAs less than 50 ha. or 10% or 40 ha., whichever is less, in OFMAs of 50 ha. or greater may be disturbed by harvesting of pre-existing FOS blocks and /or access development (to reach timber outside the OFMA that is blocked by the OFMA without invoking the requirement to replace the harvested OFMA area. The intent of the flexibility is to allow for minor adjustments to OFMA boundaries to minimize the impacts to the forest industry while maintaining the biological integrity of the OFMA.

Monitoring Procedure:

There are multiple steps that are required to be completed for reporting this indicator. The calculations are described below:

The first step in reporting the amount of non spatial old forest will be to update and project the forest cover for all disturbances to the current reporting period based on Land and Resources Manager (LRM) data (i.e. recent harvesting). Each stand is assigned to either the deciduous or coniferous group based on the leading species and a seral stage based on the age of the leading species for the rank 1 layer. The area of each stand is then summed for each NDU and expressed as a percentage of the productive forested area within the NDU.

The second step is to include all proposed harvesting, project ages to the end of the proposed development period and calculate the seral stage distribution as described above.

The first step in identifying spatial OFMAs is to determine the amount of old forest on the land base that is already constrained from harvesting. Four broad criteria of constraint are considered to directly contribute to old forest retention; old forests in parks, old forest in Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA) where timber harvesting is prohibited, riparian reserve zones and old forest in wildlife tree patches (WTP) in existing and proposed cut blocks.

Parks - While parks are not part of the crown forested land base, the area of old forest within parks is counted as contributing to the old growth target.

Ungulate Winter Range - The high elevation UWR in the Fort St John TSA has established objectives that restrict forest harvesting and road building. Therefore, any old forests within the UWR are expected to remain undisturbed and are considered as contributing to the old growth targets.

Riparian Reserves. Current forest management practices preclude harvesting of riparian forests along many streams. The current timber supply review for the Fort St John TSA produced a data coverage that removed riparian forests from the timber harvesting land base. This data may be used to determine the amount of old forest reserved along streams and these riparian reserve areas have been recognized as contributing to the old growth targets.

Wildlife Tree Patch - WTPs form part of the stand level objectives for the maintenance of biodiversity. Any WTP that meets the age criteria for old forests and is greater than 2 hectares in size is also considered to contribute to the old growth targets.

Specific OFMAs will be selected using age class themed Vegetation Resource Inventory (VRI) mapping. Areas with forest harvesting constraints such as steep slopes and visually sensitive areas will be included in OFMAs where possible to minimize the impacts on the timber harvesting land base. Habitat features, such as significant mineral licks, low elevation caribou winter habitat, wildlife travel corridors and cultural heritage values will also be considered in the selection of OFMAs. The avoidance of approved and proposed cut blocks and areas with short term forest harvesting interest is a priority to reduce the impacts to the timber supply. Where possible, OFMA polygons will be delineated using boundaries that will be readily identified in the field (roads, cut blocks, streams and heights of land). Many of the OFMA identified to date include areas of mature and immature forests that are considered to contribute to the old growth target as recruitment areas. Some OFMA polygons may also include areas of non CFLB; while this area does not contribute to the old growth targets, they may be included in the OFMA for simplification of boundary identification.

Forest Operations Schedules (FOS) will be consistent with this indicator, an analysis will be completed when FOS's are developed to assess impact of the harvesting activity proposed by the FOS on late seral retention. OFMA areas will be depicted on FOS maps and will be treated as rotating reserves. The OFMA areas developed by the Participants may form the basis of an Old Growth Management proposal to be submitted to MFLNRORD for consideration for legal designation as Old Growth Management Areas.

Linkages to Operational Plans

FOS's will be analyzed to ensure they are consistent with the targets and implementation schedule for seral stage prior to publication. Proposed development will be adjusted if necessary to ensure consistency with targets or recruitment strategies.

Linkages to LRMP:

This seral stage indicator helps to support the following LRMP objectives by maintaining late seral forested land base proportions consistent with the natural range of variation:

- *Maintain functioning and healthy ecosystems.*
- *Maintain Guide Outfitting opportunities.*
- *Maintain Caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Protect or enhance habitats for red and blue listed species.*

6.3 PATCH SIZE

Indicator Statement	Target Statement
Percent area by Patch Size Class (0-50, 51-100, and >100 ha) by NDU	A minimum of 9 of 18 of the baseline targets for early patches will be achieved during the term of this SFMP (**Error! Reference source not f ound.**)
SFM Objective: Maintain the diversity and pattern of communities and ecosystems within a natural range Ecosystem functions capable of supporting naturally occurring species that exist within the range of natural variability	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Patch Size, Seral Stage and Adjacency Strategy.	

Acceptable Variances:

Natural disturbance events that shift the patch size distribution to such a level that it cannot be accommodated in a short (decade) time frame
Seral spatial distribution does not permit patch size targets in the short term.
Patch size distributions will need to be recalculated as new forest inventory is completed and targets and thresholds assessed to determine if they are still appropriate.

What is this indicator and why is it important?

A patch is defined as a stand of similar-aged forest resulting from either a natural disturbance or created by timber harvesting. A patch may be composed of either a single disturbance event or an aggregate of events (natural, timber harvesting, or a combination of both). In forested landscapes patches represent a legacy or history of disturbances and as such may have a variety of species, stocking and ages contained within one patch. Forest patches are created naturally by disturbances such as fire, wind or pest outbreaks. In the absence of these natural disturbances forest management, through harvesting, affects the distribution and size ranges of forest patches. Over a rotation or more of the forest, harvesting can then lead to either inflating or fragmenting the landscape beyond the limits of the natural variability of the landscape, which has developed over time from natural disturbances. It is therefore important to establish target ranges for the size of patches that are consistent with the natural pattern of forested landscapes.
This indicator will monitor the consistency of our harvesting patterns compared to the natural pattern of our landscapes.
The distribution of early patches is monitored based on Natural Disturbance Units (NDU's). Natural Disturbance Units are the stratification level as they represent areas with similar disturbance patterns, and they are expected to have similar landscape level size distributions of early and mature patch sizes. The NDU's are based on natural disturbance regime research by Craig Delong, Regional Ecologist, BC Ministry of Forests & Range, Prince George Forest Region (DeLong 2002). NDU's encompass large areas that in many cases exceed the size of the DFA (see Figure 6).
Target ranges are applied for early patches (less than 40 years old) in each NDU. The targets are established in this way as the distribution of early patches predetermines the

future distribution of old patches as the forests age. There are 6 Natural Disturbance Units with 3 patch size classes in each NDU.

The 18 patch size target ranges are summarized in **Error! Reference source not found.** " Natural Disturbance Unit Early Patch Distribution Targets" The target to meet 9 of 18 targets will mean that harvesting activities have maintained or improved on the current natural patch size distribution over the term of this SFMP.

At this time targets are not applied to the proportion in interior forest condition, as baseline data is not available to determine an appropriate target.

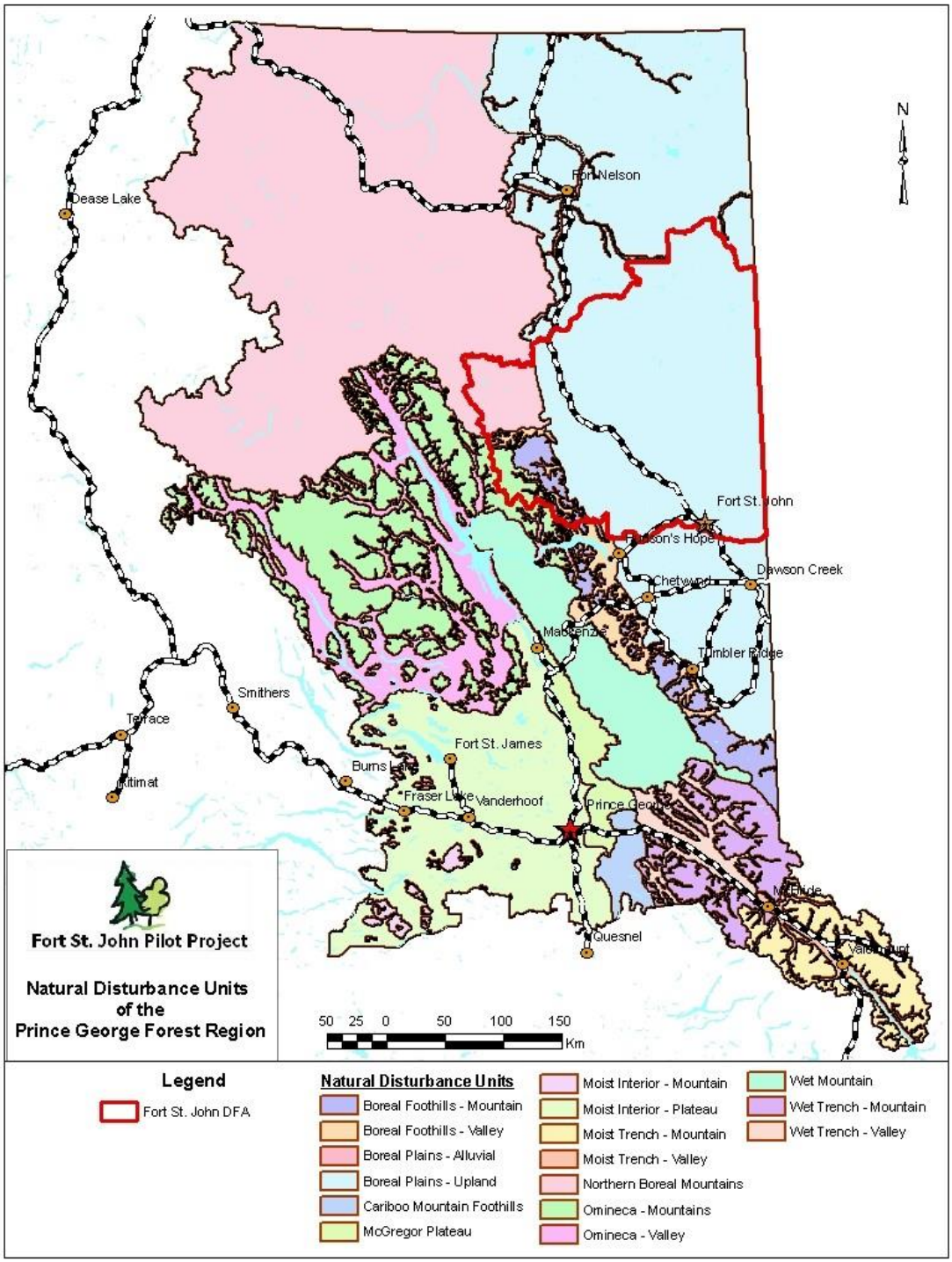


Figure 6: NDU's of the Prince George Forest Region

Table 15: Natural Disturbance Unit Early Patch Distribution Targets

Natural Disturbance Unit	Early (<40 yrs) Patch Size Target (%) (acceptable range)		
	100+ ha	51-100 ha	<50 ha
Boreal Plains Uplands (BPU)	90 (65-90)	5 (5-15)	5 (5-15)
Boreal Foothills Valley (BV)	70 (55-85)	10 (5-15)	20 (15-25)
Boreal Foothills Mountain (BM)	70 (55-85)	10 (5-15)	20 (15-25)
Northern Boreal Mountains (NBM)	90 (65-90)	5 (5-15)	5 (5-15)
Omineca Mountains (OM)	70 (55-85)	10 (5-15)	20 (15-25)
Omineca Valley (OV)	90 (65-90)	5 (5-15)	5 (5-15)

Current Status:

Table 18 summarizes the current status of early patch size distribution by NDU. The vast majority of harvesting completed over the course of SFMP# 2 occurred in the Boreal Plains Upland NDU, in which all targets are currently being met. The 2015 current status indicates that 11 of 18 patch size NDU targets have been achieved. This shows an improving trend over the 2010 current status when 7 patch NDU targets were achieved. The significant increase in the proportion of young large patch sizes in the Omineca Mountains and Omineca Valley NDUs is attributed to natural disturbances, primarily wildfire.

Table 16: Early Patch Size Class Current Status

	2010 Current Early (< 40 years) Patch Size Distribution							
	Large(> 100 ha)		Med. (50-100 ha)		Small (< 50 ha)		Total All Patches	
Natural Disturbance Unit (NDU)	**%**	ha	**%**	ha	**%**	ha	%	ha
Boreal Plain Upland (BPU)	**72.5%**	137865	**14.4%**	27460	**13.1%**	24922	100.0%	190247
Boreal Foothills Valley (BV)	**84.3%**	2276	**2.4%**	66	**13.3%**	359	100.0%	2701
Boreal Foothills Mountain (BM)	**77.4%**	3443	**9.7%**	431	**12.9%**	575	100.0%	4449
Northern Boreal Mountains (NBM)	**1.2%**	4	**54.3%**	178	**44.5%**	146	100.0%	328
Omineca Mountains (NBM)	**0.0%**	0	**6.2%**	4	**93.8%**	61	100.0%	65
Omineca Valley (OV)	**0.0%**	0	**65.7%**	92	**34.3%**	48	100.0%	140
Total DFA (All NDU's)	**72.5%**	143588	**14.3%**	28231	**13.2%**	26111	100.0%	197930
Yellow = Below Target Range			Red=Above Target Range					
	2016 Projected Early (< 40 years) Patch Size Distribution							
	Large (> 100 ha)		**Med. (50-100 ha)**		**Small (< 50 ha)**		**Total All Patches**	
Natural Disturbance Unit (NDU)	%	ha	%	ha	%	ha	%	ha
Boreal Plain Upland (BPU)	76.6%	148076	12.4%	24025	11.0%	21268	100.0%	193369
Boreal Foothills Valley (BV)	75.9%	2426	4.9%	156	19.3%	616	100.0%	3198
Boreal Foothills Mountain (BM)	73.8%	3656	12.9%	641	13.3%	660	100.0%	4957
Northern Boreal Mountains (NBM)	0.0%	0	66.0%	62	34.0%	32	100.0%	94
Omineca Mountains (OM)	0.0%	0	6.2%	4	93.8%	61	100.0%	65
Omineca Valley (OV)	0.0%	0	65.7%	92	34.3%	48	100.0%	140
Total DFA (All NDU's)	76.4%	154158	12.4%	24980	11.2%	22685	100.0%	201823
	* Assumes current FOS blocks logged and maturation of some stands							

	to 40+ years

	2015 Current Early (< 40 years) Patch Size Distribution							
	Large(> 100 ha)		Med. (50-100 ha)		Small (< 50 ha)		Total All Patches	
Natural Disturbance Unit (NDU)	%	ha	%	ha	%	ha	%	ha
Boreal Plain Upland (BPU)	75.0%	164,781	12.3%	27,129	12.7%	27,924	100.0	219,834
Boreal Foothills Valley (BV)	78.5	1,847	4.7	110	16.8	394	100.0	2,351
Boreal Foothills Mountain (BM)	77.2	2,523	7.9	258	15.0	489	100.0	3,270
Northern Boreal Mountains (NBM)	72.1	648	7	62	21	188	100.0	898
Omineca Mountains (NBM)	90.6	427	0.0	0	9.4	44	100.0	471
Omineca Valley (OV)	85.7	177	0.0	0	14.3	30	100	207
Total DFA (All NDU's)	74.8	169,755	12.1	27,497	12.7	28,881	100.0	226,133
Yellow = Below Target Range			Red=Above Target Range					

Forecasting Assumptions and Analytical Methods:

Forecasting of this indicator was completed to determine the effect of all known planned harvesting included in the 2016 FOS, as well as the effects of existing stand maturation through to 2016.

Forest cover information was projected to the end of the timeframe (2016) and known proposed disturbances from the 2004 FOS were incorporated. Seral stages were then calculated and patch size distributions determined and summarized by NDU. Actual harvest area will be less once stand level reserves (WTP's) have been designated.

Early patches are defined as those patches of forest that are less than 40 years old. Recognizing that there could be great variability within the defined patch and that the patch may change over time and to ensure that a reasonable functional estimate of the size of young patches is reported, a 100m buffer is applied to young patches. Young patches that fall within the 100m buffer, or are within 200m of each other have their area's summed and are reported as one patch.

Additional projections of the patch size distribution will be done with the 2016 FOS to demonstrate consistency with the indicators target.

Strategy and Implementation Schedule:

The targets are recognized as being a desired future condition and will not necessarily be initially achievable; in fact it may take more than one forest rotation to fully achieve the desired distributions. Additionally throughout parts of the Fort St John TSA achievement of the patch size targets will be limited due to the large extent of non-commercial and non-

forest areas which will not be harvestable. As well, large natural disturbance events may occur which suddenly change the distribution of patch size classes. This will require an adjustment of planning strategies to reflect the new distribution, however it may take several decades or more to adjust to a large natural disturbance within some NDU's.

In general, requirements for smaller patches will be achieved in more sensitive areas such as visually sensitive areas and in the major river corridors, consistent with other indicators included in this SFMP. Otherwise harvesting will be planned to be consistent with the targeted patch size distribution presented in Table 17, to the extent the distribution and size of merchantable patches allows. If in the FOS harvesting is proposed in an NDU that has patch size deficiencies, efforts will be made to develop blocks that address the deficient patch size classes, to the extent practical.

Monitoring Procedure:

Data sources for this include VRI, RESOURCES block data, Natural Disturbance Unit boundaries and DFA boundaries.

All Participants are using RESOURCES to track their operational data, which includes harvesting and silviculture information. Forest inventory cover (VRI) will be supplemented with harvesting data from RESOURCES as required to complete patch size analysis. Disturbances due to fires and other industrial users are generally updated less frequently (approximately 5 year intervals) and are the responsibility of the Provincial Government. There are two steps that are required to be completed for reporting this indicator. The calculations are described below:

The first step will be to update and project ages of the forest cover for all disturbances to the current reporting period based on RESOURCES block data. Contiguous areas are 'dissolved' into each other based on age of the leading species for the rank 1 layer. Early patches within 200m of each other are considered to be part of the same patch. The area of a early patch is then summed and treated as one patch. The area of early patches is then summed by NDU and expressed as a percentage of early area within the LU. All stands less than 40 years old are included in the early patch classes.

The second step is to include all proposed harvesting, project ages to the end of the proposed development period and calculate the post FOS condition patch size distribution as described above.

The monitoring of this indicator will occur coincident with the development of a new Forest Operations Schedule (FOS).

Linkages to Operational Plans:

FOS's will be analyzed and adjusted if necessary to ensure they are consistent with the targets and implementation schedule for patch size prior to final publication.

Linkages to LRMP:

Implementation of this indicator provides a range of patches for both early and mature stands over time and space, and supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Protect or enhance habitats for red and blue listed species.*

6.4 SOIL DISTURBANCE[10]

Indicator Statement	Target Statement
Number of blocks with non-conformances to soil disturbance limits reported annually by Managing Participant	Zero blocks will have non-conformances to soil disturbance limits.
SFM Objective: Protect soil resources to maintain productive forests.	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Soil Management Strategy.	

Acceptable Variance:

None

What is this indicator and why is it important?

This indicator measures the effectiveness of the Participants' management strategies to limit detrimental soil disturbance on harvested cutblocks. Detrimental soil disturbance is defined as disturbance that negatively impacts the physical, chemical or biological properties of the soil. It applies to blocks on which harvesting commenced on or after the approval date of SFMP #2 (April 2010).

The default targets for maximum detrimental soil disturbance will be 5% dispersed disturbance in the Boreal Plains NDU, 10% dispersed disturbance in the other NDU's located in the foothills and mountains, and 25% detrimental soil disturbance for all roadside work areas. The lower target for the Boreal Plains NDU reflects the preponderance of fine textured soils in these areas, whereas the other NDU's typically have medium to coarse textured soils which are less sensitive to disturbance.

Current Status:

Management systems are currently in place to manage and monitor soil disturbance, and the Participants' inspections note whether unacceptable soil disturbance has taken place.

There are no incidents of detrimental soil disturbance reported in the 2014-2015 Annual Report. The MFLNRO completed an inspection on Block 09104 in summer 2013, the inspection noted that the limits on soil disturbance prescribed for the block may have been exceeded. Canfor and the MFLNRO completed separate soil disturbance surveys on the block. The survey completed by an independent contractor hired by Canfor indicated that the soil disturbance limits were not exceeded. To the date of preparation of this report, the MFLNRO has not shared the results of the soil disturbance survey that they completed on block 09104.

[10] New indicator in 2010 SFMP. Previous SFMP #1 indicator 6.4 was Shape Index, which has been deleted.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

By following the indicator strategy it is anticipated that productive forest soils with minimized losses from forest operations will be maintained. Maintenance of site productivity is a core prerequisite for achieving sustainability. Minimizing the area of detrimental soil disturbance will help to retain the productive capacity of the land base.

Strategy and Implementation Schedule:

Management practices are followed by the Participants to minimize disturbance on cutblocks. The majority of the Participants' harvesting operations occur during the winter months. Winter harvesting during frozen ground conditions typically results in little or no disturbance to soils. When summer operations are required measures are implemented from the planning stage through to block completion to ensure site productivity is not compromised.

Planning

Proposed blocks in the FOS will be initially assessed to indicate if a block has potential for summer logging or hauling based on tree species, slope position, and access conditions. Identified candidate blocks will be assessed during field data collection processes to determine if moisture regime, soil conditions, and access opportunities are potentially conducive to operations during frost-free periods.

Forest profesionals may incorporate more or less restrictive soil disturbance limits in SLP's if they determine soil conditions warrant these changes.

Operational Practices and Field Monitoring

In potential summer or fall harvest areas, the following measures will be implemented to minimize detrimental soil disturbance.

- Streams and wet areas will be identified, and measures will be prescribed in SLP's to protect these areas during summer harvest conditions.
- Low ground pressure equipment will be used on fine textured soils during frost free conditions to reduce compaction risks.
- Areas proposed as summer harvesting areas will be risk ranked higher than similar areas proposed for winter logging. Higher risk-ranked areas will receive increased monitoring attention by supervisory staff. Careful monitoring of ongoing operations will determine when ground conditions become unfavorable due to excessive moisture, at which time operations will cease until conditions dry out.
- "Boot survey" or ocular site degradation assessments will be implemented by qualified/experienced personnel where and when needed to monitor site degradation, and provide guidance on when to cease operations.
- If the access conditions are favourable (e.g. roads can be placed in drier areas that can support summer activity) , but cutblock site conditions preclude summer harvesting activities on the block, timber may be harvested in the winter and decked in the block on landings or at roadside for summer loading and hauling.
- Inspections will note any potential concerns regarding detrimental soil disturbance, and indicate actions necessary to address these concerns. Where visual inspections indicate that operations may be in non compliance, the incident will be entered in ITS (or similar incident tracking system), and the MFLNRO notified.

Soil disturbance surveys are not mandatory. However, if visual inspections indicate that the Participants' operations may be in non-compliance, a formal survey may be completed to assess the detrimental soil disturbance percentage in the NAR or at roadside. Appendix 9 (Soil Disturbance Information) includes Site Disturbance Cards, which specify the criteria to use to determine soil disturbance, and information on soil disturbance classification and transect methodology.

Monitoring Procedure:

An annual review will be completed of incidents related to detrimental soil disturbance that occurred as a result of the Participants' activities between April 1st of one year and March 31st of the following year. The results of the will be presented in the Annual Report.

Linkages to Operational Plans:

The FOS will identify potential areas for further consideration of summer harvest potential. SLP's collate site information and may indicate areas that could potentially support frost free operations, as well as identify any site specific measures that may be needed to limit detrimental soil disturbance. Harvest plans use this information to schedule logging and/or hauling activities.

Linkages to the LRMP:

Planning and conducting operations that minimize soil disturbance levels helps sustain the productivity of the land, and reduces the potential for stream sedimentation which can impact water resources. This strategy therefore supports the following LRMP objectives:

- *Minimize losses to the timber harvesting land base*
- *Maintain functioning and healthy ecosystems*
- *Maintain fish habitat and water quality*

6.5 SNAGS/CAVITY SITES

Indicator Statement	Target Statement
Number of snags and/or live trees (>23 cm dbh) per ha on prescribed areas[11]	Retain annually an average of at least 6 snags and/or live trees (>23 cm dbh) per hectare on prescribed areas
SFM Objective: Suitable habitat elements for indicator species Maintain a natural range of variability in ecosystem function, composition, and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Prescribed areas within blocks on which the SLP's were completed prior to April 1st 2010 will have a target of 6 snags and/or live trees greater than 17.5 cm dbh, consistent with the SFMP in effect at that time.

What is this indicator and why is it important?

This indicator measures the average retention of snags and/or live trees (23 cm dbh minimum) per hectare over the cumulative area that had retention prescribed. For the purposes of this indicator, "the prescribed area" is the area identified in Site Level Plans where the retention of snags or live trees is to occur. The total amount of prescribed area will vary annually depending on the site conditions where harvesting operations occur.

The target will be assessed as an average retention level achieved on the cumulative prescribed area, as there are logistical, safety and economic considerations which preclude the retention of snags or live trees in many areas.

"Snags" are dead standing trees, and include 'stub trees', which are the lower portions of trees that are naturally occurring or have been created by feller bunchers. Stub trees are greater than 3 metres in height. Snags or live trees greater than 23 cm diameter can provide cavity and foraging sites for vertebrate species found within the DFA, now or at some future point in the development of a stand.

These stand structural elements can provide important habitats for at least portions of life cycles of a wide variety of animals. Snags or live trees retained within the perimeter of a block can provide cavity sites and other habitat values for several decades following disturbance, provided they remain standing. Hoyt and Hannon (2002), for example, note that trees averaging 16 cm and 23 cm dbh provide feeding and nesting habitat respectively for black backed and three toed woodpeckers in recent burns.

Snags and/or residual live trees are a common component of young stands following natural disturbance. Fires (the predominant natural disturbance in the DFA) burn at variable intensities, depending on site and climatic conditions. This results in the natural retention of live trees and snags at variable densities across the landscape. Retaining some dispersed snags or live trees

[11] The indicator minimum diameter is increased to 23 cm from 17.5 cm based on a synthesis of literature review completed by Dr. Fred Bunnell

in suitable portions of managed stands supplements sources of this habitat element occurring in wildlife tree patches, unsalvaged natural disturbances, and in the non timber harvesting landbase. All of these sources of this habitat element support reestablishment of the many species dependent on this element.

While the retention of standing material in managed stands may be at relatively low levels, the duration of retention of the vertical structure is likely longer than average, due to the lack of fire damage. This indicator thereby contributes to maintaining ecosystem function, composition and structure that assists the ecosystem in recovering quicker from logging disturbance.

Harvested stands on the DFA tend to be relatively uniform, with smaller tree sizes, and fewer dead trees than similar stands in other parts of the province. This is apparently due to the frequency of fires on the landscape, and the relatively young age of the forest stands. Delong (2002) reports densities of snags greater than 15 cm averaging 12, 59, 73, and 126 per ha in young, mature, remnant and old stands, within the SBS mk1. While direct comparisons are difficult, analysis of cruise results on 234 mature and older coniferous blocks planned for harvest in the DFA indicates an average of 27.9 merchantable sized snags/ha, with a range from 0.5 snags/ha to 172/ha, with 9.4% of the blocks having 6 snags/ha or less.

Relatively little research exists on desired levels of retention, particularly in the boreal forest. Bunnell (“Vertebrates and stand structure within the Arrow TSA”) reports that in conifer types little use is gained by sustained provision of more than about 3 snags/ha greater than 30 cm. Hiebert reports (personal communication) that bird species presence in managed stands did not increase significantly above 6 snags/ha, attributing it to territoriality. Six snags per hectare is proposed as a reasonable retention level in other jurisdictions (Forest management Guide for Natural Disturbance Pattern Emulation-Ontario Nov. 28,2001), consequently this level has been adopted as the target average for this indicator.

Current Status:

A review of Annual Reports shows the Participants have been consistent with the target or acceptable variances each year since the first SFMP was approved. The following chart shows the ten-year results for this indicator through to March 31, 2015:

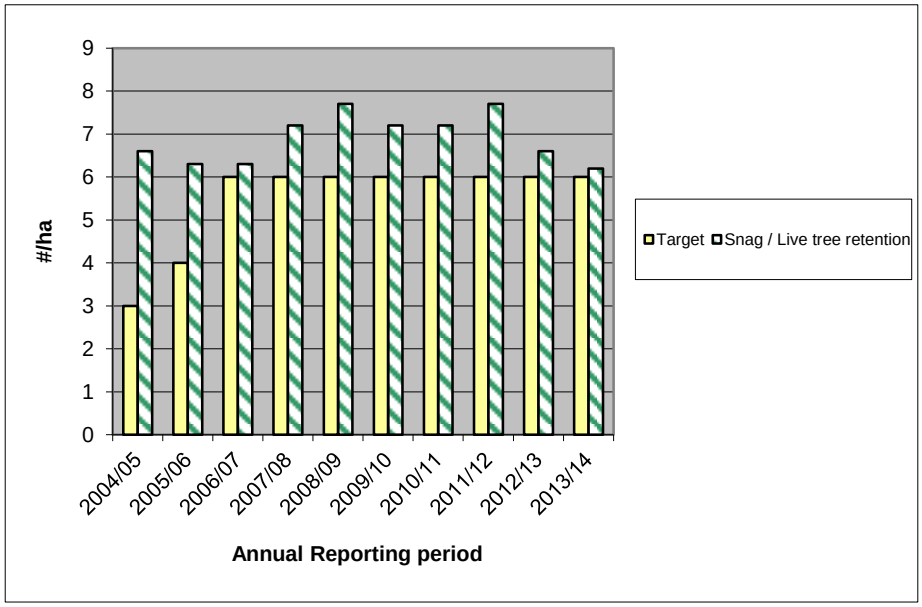


Figure 7: Ten years results for Snag/Cavity Site Indicator[12]

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

By following the indicator strategy, it is anticipated that upon completion of harvesting, piling and site preparation activities, areas will contain a range of standing snags of various sizes in a range of decay classes that will deliver a supply of coarse woody debris (CWD) in the short through to the long-term. Retention of standing and downed CWD will provide habitat benefits to fur bearers, birds and insects, which contributes to biodiversity conservation.

Strategy and Implementation Schedule:

After harvesting, with consideration for safety and economic limitations, dispersed snags or live trees will be retained in some suitable areas within managed stands to provide potential cavity sites through time.

This strategy is designed to encourage the retention of some snags or live trees capable of providing cavity sites, within the harvested portion of the timber harvesting landbase. The strategy is intended to supplement the retention of this habitat element found in wildlife tree patches, un-salvaged burns, and the approximately 50% of the DFA (*2002 Timber Supply Review*) that is not in the timber harvesting landbase.

Snags or trees may be stubbed at 3-5 metres height to meet safety requirements and ensure windfirmness. It is not required that retention be evenly distributed across prescribed areas. Rather retention should be distributed in areas where the risk of damage to the retained snags or trees is minimal.

[12] Based on SFMP # 1 indicator which used 17.5 cm dbh or greater

Prescribing Foresters will identify in SLP's to which blocks, or specific portions of blocks, this indicator will be applied (i.e., the prescribed area). They should consider the guidelines below when determining which areas to prescribe.

- For blocks that have at least 10% of the gross area in WTP's containing mature forest types, this indicator need not be applied, as the habitat element will be well represented within the WTP's.
- If forest health is a potential concern, this indicator need not apply. One example of this is blocks where sanitation logging is being applied to address a bark beetle outbreak. If, in the opinion of the prescribing forester, leaving stubs or standing live trees would lessen the treatment effectiveness, or worsen the outbreak, then the indicator need not apply.
- If worker safety is a potential concern, this indicator need not apply. An example is areas in blocks that have recently burned. Leaving standing live trees that have their root systems damaged could present a risk to worker safety, and the indicator need not apply in these cases.
- In stands where the average tree diameter is less than 23 cm DBH, this indicator need not apply (at the forester's discretion), since depending on stand variability, there may be a lack of suitable candidate trees.
- This indicator need not apply in blocks with a total area (i.e., gross area, less external WTP area), less than 50 hectares. Smaller blocks in the boreal are often very irregularly shaped, which restricts equipment maneuverability. These blocks typically have forestland in proximity that can contribute to the retention of this habitat element on the landscape.
- This indicator need not apply to areas of blocks where factors may limit the capability to stub snags or live trees safely and economically, or limit the ability of skidding or site preparation equipment to avoid significantly damaging stubbed trees (e.g., steep slopes (>30%), narrow fingers of timber less than 40 metres wide, cable systems or partial harvesting systems, etc.).

Prior to the commencement of operations, implementing staff will review SLP's to determine if this indicator is applicable to a block, and if so, specifically to which sections of the block it applies. The intent is to end up with an average of six or more snags or live trees per hectare over the cumulative 'prescribed areas', but not to necessarily require a minimum of six/ha on every hectare. Operational and logistical considerations make it impractical to have an even distribution of snags across all prescribed areas. Some variability in retention levels across the landbase is natural and more appropriate from an ecological point of view.
Supervisors review the requirements pertaining to this indicator in preworks with harvesting and silviculture workers and discuss methods and procedures to create and/or retain these habitat elements to the target levels.
Prior to the commencement of operations, Operational Supervisors will review SLP's to determine if this indicator is applicable to a block, and if so, specifically to which sections of the block it applies.
Supervisors will review the requirements pertaining to this indicator in preworks with harvesting and silviculture workers and discuss methods and procedures to create and/or retain these habitat elements.

Where SLP's identify this indicator applies to all or part of a block (i.e., the prescribed area), operations supervisors note in harvesting inspections whether or not operational activities are in

general compliance with the SLP, which includes snag or live tree retention where applicable. This need not be reported in annual reports.

Monitoring Procedure:

The actual average retention level of snag or live tree retention on prescribed areas will be determined during silviculture monitoring, or alternatively at post harvest inspections.
Data from a sample of blocks with area prescribed for snag/live tree retention will be collected. For deciduous blocks, the total number of snags and live residual trees will be tallied on a minimum of 20% of the prescribed (deciduous) area surveyed in a year. Snag /live tree data will typically be collected within three years of harvesting completion on deciduous blocks. For coniferous blocks the total number of snags and live residual trees will be tallied on a minimum of 20% of the prescribed area planted in a year. In blocks with large numbers of residual trees, where it is readily apparent that the retention exceeds 6 stems per hectare it will be acceptable to estimate the number of residual trees left instead of counting each individual stem. Estimated retention levels will be summarized in annual reports.

Linkages to Operational Plans:

SLP's will identify whether cutblocks or portions thereof are candidate areas for dispersed snag or live tree retention.

Linkages to the LRMP:

Cavity sites provide important niche habitats for a variety of species. Residual snags, live trees and stub trees provide cavity and foraging sites for birds and animals such as furbearers, and functional habitats that support fungi, lichens, and other organisms that contribute to maintaining ecosystem function (Bunnell 1999).
This indicator therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain habitat for furbearer species.*
- *Maintain site-specific habitats.*

6.6 COARSE WOODY DEBRIS VOLUME

Indicator Statement	Target Statement
Average retention level of Coarse Woody Debris volume/ (m^3/ha) on blocks logged in the DFA between December 1, 2016 and November 30, 2022	Average retention level over the DFA will be at least 46 m^3/ha (50% of average pre-harvest volume) on harvested blocks assessed between December 1, 2016 and November 30, 2022
SFM Objective: Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress Suitable habitat elements for indicator species	
Linkage to *FSJPPR*: For the purposes of Section 29(2) of the *FSJPPR* the applicable performance standard is specified by this indicator statement, target statement and acceptable variance. For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Patch Size, Seral Stage and Adjacency Landscape Level Strategy	

Acceptable Variance:

CWD plots will not be assessed for the purposes of this indicator if they fall in blocks where management of non-timber resource values was identified as an overriding priority that was not compatible with CWD retention (e.g. community pastures, etc).

What is this indicator and why is it important?

Coarse Woody Debris (CWD) refers to sound and rotting logs or stumps, which can provide important habitats for a wide variety of organisms, including invertebrates, vertebrates, fungi and cryptograms (mosses, liverworts and lichens). CWD refers to material greater than 7.5 cm in diameter, which is consistent with VRI and NIVMA measurement criteria. Maintenance of CWD across the DFA within natural ranges of variability provide for the specific habitat needs of numerous organisms. Management of CWD retention within managed stands is necessary, as there is often an economic incentive to minimize debris which could, over time, have significant habitat and nutrient cycling implications on some sites.

CWD is a common component of natural stand replacement, and plays important roles in nutrient recycling, and assisting in the reestablishment of organisms after disturbance. The occurrence of CWD following harvesting, therefore, is also an indicator of the ability of the ecosystem to recover from disturbance.

Based on the most current preharvest CWD information which is from the NIVMA plots used in the 2004 SFMP, the target is set at a minimum average of 46 m^3/ha (50% of the estimated average pre-harvest volume) for this SFMP. It is recognized that a range of CWD levels is desirable, and it is expected that this will be achieved with the measures proposed in Site Level Plans (SLP's), as is demonstrated in existing NIVMA plots. Using the average volume/ha of CWD in the DFA is intended to provide a reasonable indication if, overall, operational measures

to protect CWD within the DFA are effective. To achieve a range of CWD across the landbase, it is important to note that the target does not apply separately to each block.
CWD within cutovers is complemented by CWD retained within Wildlife Tree Patches, unsalvaged burns, and the substantial component of non-timber harvesting landbase within the DFA. Assessing post-harvest CWD levels compared to pre-harvest CWD levels provides an assessment of the relative effectiveness of SLP measures to retain CWD on the site. While there appears to be limited scientific information on CWD volumes pre or post disturbance in the boreal forests, Delong (2002) does quote data from Lee et al (1995) that reports boreal mixedwood average CWD volumes in young stands (20-30 years) of 108.8 m^3/ha, versus old stand CWD average volumes of 124.3 m^3/ha (120+) years. Delong also reports CWD ranges in young coniferous stands of 5.6-590.3 m^3/ha compared to 23.4-283.3 m^3/ha in mature stands. Based on this data, the target level is a minimum average that is significantly greater than the lower CWD range limit for either young or mature stands. The target therefore should provide CWD levels that fall within the natural range of variation.

Current Status:

This indicator is unchanged from the 2004 SFMP, the targets for which effectively replaced the coarse woody debris field performance requirements of the FSJPPRs (Section 29(2)).
Post-harvest CWD levels from previous samples ranged from 53 m^3/ha to 94 m^3/ha with an average of 71 m^3/ha. There were 23 coarse woody debris plots measured in the 2014-15 reporting period. Post harvest CWD levels from these samples ranged from 19 m^3/ha to 215m^3/ha with an average of 95m^3/ha. The average residual CWD volume exceeds the target. Figure 8 shows the distribution of CWD volumes along a group of ranges. Data includes the aforementioned post harvest CWD levels, and the preharvest CWD baseline data in the 2004 SFMP for comparison purposes. The preharvest and post harvest date are from different sample points (i.e. no preharvest points were sampled post harvest). Both data sets show a wide range of variation.

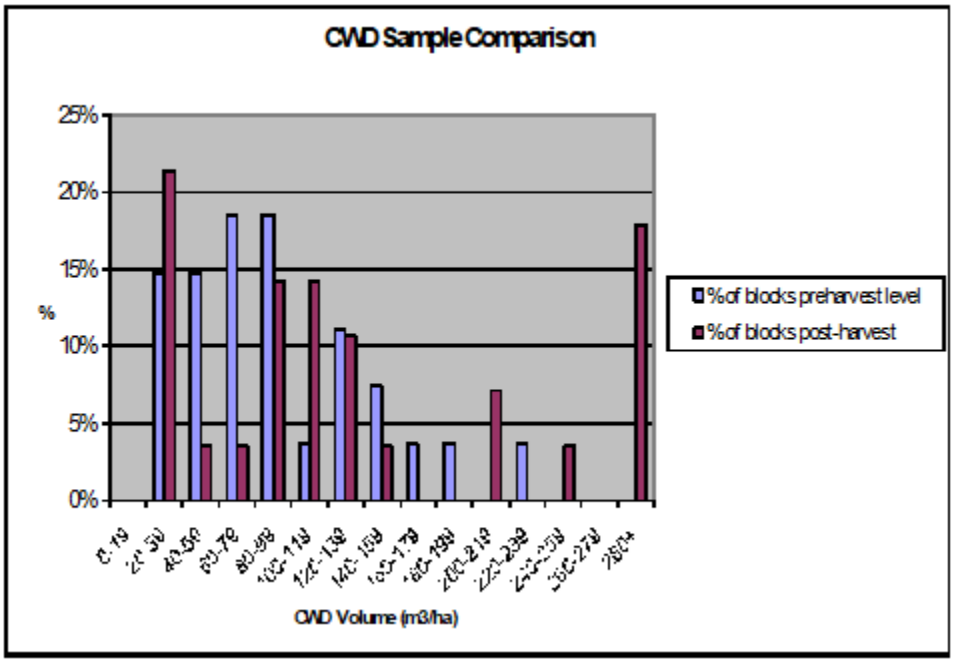


Figure 8: CWD Distribution

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Yes

By following the indicator strategy, it is anticipated that upon completion of harvesting, piling and site preparation activities, areas will contain a range of standing snags of various sizes in a range of decay classes that will deliver a supply of coarse woody debris (CWD) in the short through to the long-term. Retention of standing and downed CWD will provide habitat benefits to fur bearers, birds and insects, which contributes to biodiversity conservation.

Strategy and Implementation Schedule:

In SLP's management practices will be identified to promote the retention of variable levels of CWD within harvested cutblocks, with a target to retain cumulatively 50% or more of the total estimated average pre-harvest levels of CWD ha on harvested blocks assessed between December 1st, 2008 and November 30th, 2016. SLP's will identify site-specific management strategies to contribute to the maintenance of CWD levels at the DFA level which fall within the natural range of variation. These strategies will complement the retention or recruitment of CWD from WTP's, riparian areas, unsalvaged burns, and the non-timber harvesting landbase.

The objective of CWD management strategies will be to maximize the ecological value of the CWD left on site without increasing operating costs, within the constraints of current utilization standards and avoidable waste bench marks.

The following principles will be considered when developing site-specific SLP strategies:

- Minimize CWD accumulations at roadside or landings to the extent practical. Small CWD piles dispersed in blocks may be appropriate in some cases to provide habitat for some mammals.
- Consider if coarse woody debris management should be accentuated to address guidelines included in Indicator # 11 (Species at Risk Guidelines) for identified cutblocks where species at risk are of concern
- Larger pieces of CWD are more valuable than smaller pieces.
- Maintaining a wide range of decay and diameter classes is ecologically desirable.
- Retention of a variety of tree species is advantageous.
- Standing live and dead trees and/or stubs retained on cutblocks can provide important sources of CWD recruitment.
- CWD within riparian areas can be particularly beneficial ecologically.
- The retention of CWD must be harmonized with silvicultural objectives.
- Maintain variability in the levels of CWD at the landscape level.
- Measures should include retention of CWD in both concentrations and dispersed patterns, as different organisms favour each of these strategies. Concentrating solely on one method could disadvantage some groups of species (Bunnell).

In the rare event management priorities for other resource values require the active minimization of CWD from the site (e.g. community pastures etc) this should be noted in the SLP, and "the post harvest CWD sampling activity" or similar tracking method should indicate that a plot is not to be located in the block for that reason.

In future SFMP's, the most current cumulative pre-harvest information should be summarized to determine a projected average CWD volume from forest cover types that may be targeted from harvest. This may include information from NIVMA, Phase II VRI, or other monitoring systems. The minimum target for the duration of the SFMP will be 50% of this average CWD.

Monitoring Procedure:

Average post harvest CWD will be estimated from measurements taken at the 3 km long-term monitoring points after completion of harvesting and primary silviculture operations. Sampling methodology will follow the Resource Inventory Committee standard described in the Vegetation Resource Inventory ground sampling procedures. The average CWD volume determined from these samples will be monitored annually, and depending on the results of this monitoring, revisions to the prescribed management practices within the SLP's may need to be implemented to achieve the SFM targets.

The average CWD volume attained at all 3 km sample points in blocks logged between December 1, 2008 and November 30, 2016 will be used to assess conformance to the target.

Linkages to Operational Plans:

SLP's will identify site-specific management strategies to retain CWD. Annual reviews of CWD plot information will provide feedback on the appropriateness of SLP CWD management measures, and changes to procedures can be made accordingly.

Linkages to the LRMP:

Coarse Woody Debris is an important habitat element for a variety of plants, insects, cryptograms, invertebrates, and vertebrates, particularly furbearers. CWD is known to play an integral role in nutrient cycling, and therefore contributes significantly to ecosystem function. Therefore this indicator therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain habitat for furbearer species.*
- *Maintain site-specific habitats.*

6.7 RIPARIAN RESERVES

Indicator Statement	Target Statement
The number of non-compliances to riparian reserve zone standards	No non-compliances to riparian reserve zone standards
SFM Objective: Suitable habitat elements for indicator species Maintenance of water quality	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Riparian Management Landscape Level Strategy. For the purposes of Section 35(5), Section 28(1) (b)(i)(A) of the *FSJPPR* may be effected by the application of this Riparian Management Landscape Level Strategy, specifically the acceptable variance for this indicator.	

Acceptable Variance:

A variance to the riparian reserve zone requirements, where approved by the District Manager, will be permitted for site-specific issues as identified in a SLP. A rationale prepared by a Qualified Registered Professional must be completed indicating the reasons, and what measures will be implemented to ensure disturbance to the riparian reserve will be limited to the minimum necessary to address the site-specific issue. The rationale must be documented and retained by the Participant. The situations where this variance will be applied include felling trees that are a safety hazard, constructing a stream crossing, creating a corridor for full suspension yarding and carrying out a forest health sanitation treatment.

What is this indicator and why is it important?

Riparian areas occur adjacent to wetlands or bodies of water such as rivers, streams, or lakes, and include stream bank and flood plain areas. On larger streams particularly, riparian areas often provide productive, structurally diverse habitats. In addition to providing ready access to water, these areas also support important habitat features such as coarse woody debris, cavity sites, shrubs and broadleaf trees, which have been identified as key habitat elements necessary to support species richness.

Riparian reserve zones (RRZ's) are specific areas on larger fish bearing streams, and some wetlands (W1) and lakes (L1) in which harvesting is not normally permitted, in order to protect significant riparian and aquatic habitats. Maintaining RRZ's provides many of the habitat elements needed to support a diverse species mix across the landscape.

Minimum RRZ's widths are identified in Schedule 'D' of the *FSJPPR*, and relate to activities carried out under the pilot regulation by the Participants, excluding road rights of way necessary to cross streams. An indication of the success in protecting riparian areas and the associated habitat elements is the number of non-compliances to the Schedule 'D' requirements.

The variance provides that prescribing foresters may vary the reserve requirements under certain circumstances, and includes the requirement to get District Manager approval of the site specific variance in those circumstances.

Current Status:

A review of conformance to this indicator from Annual Reports completed to date during the term of the 2004 SFMP (Annual Reports submitted for operations from April 1, 2004- March 31 2009) found two compliance issues noted, both in the 2004-2005 Annual Reporting period. The issues occurred in blocks that had been laid out between 2000 and 2003 prior to the SFMP preparation. One issue involved intentional authorized harvesting in a riparian reserve zone to enhance wildlife browse, as agreed to in consultation with MOE staff (block 11037). The non conformance occurred because the specific formal variance requirement was not issued prior to harvesting. The second issue resulted in seven trees being harvested inadvertently (block 11038) due to incorrect boundary placement, which was subsequently reported to the MFLNRO.
A review of BCTS Compliance issues from April 1, 2013 to March 31, 2014 indicated that BCTS had no non-compliances to riparian reserve zone standards. BCTS achieved the target for this indicator.
A review of licensee participants' compliance issues occurring between April 1, 2013 and March 31, 2014 indicated no non-compliances to riparian reserve zone standards.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
By following the indicator strategy, it is anticipated that healthy ecosystems with a diversity and abundance of native species and habitats will be maintained. Implementing the strategy will result in properly functioning riparian systems leading to the conservation of fish habitat and maintenance of water quality. It is anticipated that the amount of in-block retention will trend towards the target levels over time. This will result in harvested areas with riparian habitat attributes that will help to sustain biological and ecological processes.

Strategy and Implementation Schedule:

All streams, wetlands, and lakes in or immediately adjacent to a planned harvest area will be classified and mapped in the field prior to the commencement of operations. Riparian Reserve Zones (RRZ) that meet or exceed the RRZ widths noted in Schedule D of the *FSJPPR* will be located and clearly marked in the field. Information on Riparian Classification will be documented as per the Participant's EMS or FMS (e.g. SLPs, checklists, etc.)
Locations of riparian reserve zones, and any site specific protection measures relating to the RRZs, will be identified during preworks completed prior to harvesting, road construction, or silviculture activities.
Current practice when establishing reserve boundaries in the field on S1, S2, and S3 streams is to utilize natural topographic breaks and timber type boundaries that result in irregular shaped edges. In practice reserve widths are normally wider than the minimum, but vary significantly in distance from the stream along their length, based on the natural breaks that are typically used for the boundary. These natural boundaries are usually inherently more windfirm than fixed width RRZ's, and easier to implement, so this practice is the preferred strategy for delineating

RRZ's in the field. Other measures such as feathering edges may also be considered, depending on their potential to be effective for the given site conditions, as well as their economic feasibility.

Monitoring Procedure:

Inspections completed on field layout activities will include some review of boundary adherence to riparian reserve zones. Operations supervisors completing inspections of harvesting, road construction and silviculture activities will identify and record any transgressions into the RRZ, which will be documented in tracking systems (e.g. Incident Tracking System), with clear wording identifying it as a compliance issue regarding riparian reserves. Non-compliances will be reported promptly to the appropriate government officials. Annual reports will summarize the number of compliance issues identified, specifically identifying any incidents involving RRZ's.

Linkages to Operational Plans:

The location, classification and, where applicable, RRZ requirements of waterbodies will be included in SLP's and/or operational maps used for timber harvesting, road construction and silviculture activities.
Field foresters will identify site-specific requirements for the protection of reserve zones, and management practices will be included in SLP's.
Preworks completed prior to harvesting, road construction, or silviculture activities will review the size and location of RRZs, and any site-specific protection measures prescribed.

Linkages to the LRMP:

Riparian Reserve Zones are an important potential source of habitat elements that support ecological function. They also serve to protect aquatic habitats and water quality from forestry activities, and provide forested habitats adjacent to water that are important to furbearers and other species.
Therefore this indicator supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain fish habitat and water quality for priority fish species.*
- *Maintain habitat for priority furbearing species.*
- *Maintain site- specific habitats.*
- *Manage critical wetland habitats for waterfowl and other wildlife species.*
- *Sustain natural stream flow regime.*

6.8 SHRUBS

Indicator Statement	Target Statement
The proportion of shrub habitat (%) by Landscape Unit	Each landscape unit will meet or exceed the baseline target (%) proportion of shrub habitat
SFM Objective: Suitable habitat elements for indicator species	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Acceptable variance is no more than 20% below the baseline target (e.g. Crying Girl target is 5%, minimum acceptable is 4 %).

What is this indicator and why is it important?

Shrubs are defined in the Vegetation Resource Inventory (VRI) BCLCS Level 4 as either shrub low (SL) or shrub tall (ST). Forest or harvested sites less than 20 years old are also considered to contribute to shrub habitat in the DFA.

Shrubs are common in riparian areas, and readily enter larger forest openings, especially on moist sites. As stands close shrubs are suppressed by the taller trees, and remain uncommon until stands naturally open. Many wildlife species respond positively to shrub abundance, and shrub abundance is influenced by forest practices (Bunnell 1999).

In a review of the vertebrates in the Sub-boreal Spruce (SBS) zone of BC, Bunnell (1999) found that 42% of birds and 59% of mammals depended on a shrub structural stage for their breeding habitats. In the Fort St. John DFA Manning and Cooper (2003) indicates that 6 out of 20 birds and 1 out of 7 mammals considered to be species at risk or of regional significance are dependent on shrub habitats for some part of their life requisites.

Current Status:

The following table (**Error! Reference source not found.**) indicates the 2010 condition of shrub h abitat within the DFA. The proportions of shrubs changed significantly as a result of the reclassification of areas in the recent re-inventory of the Fort St. John T.S.A. Targets were established for this indicator by reviewing the amount of naturally occurring shrub areas by landscape unit, as well as forested areas less than 20 years old. Landscape units with low levels of naturally occurring shrubs generally have lower targets than areas with higher levels of shrubs. The Boreal Plains natural disturbance unit generally has higher levels of shrubs than the other units within the DFA. The targets reflect the same proportionate change as in the 2004 SFMP.

Table 17: Shrub Habitat Current, FOS Condition and Targets

Landscape Unit	LU Gross Area (ha)	LU Net Area (ha)	2010 Shrub Area (ha)*	2010 Shrub % of LU	Baseline Target (%)
Blueberry	730,966	593,281	69,408	11.7%	8.0%
Crying Girl	67,291	67,142	7,098	10.6%	8.0%
Graham	334,945	334,646	54,215	16.2%	15.0%
Halfway	206,274	196,280	20,992	10.7%	6.0%
Kahntah	749,011	748,963	180,151	24.1%	21.0%
Kobes	159,746	140,217	16,067	11.5%	8.0%
Lower Beatton	498,312	165,539	15,006	9.1%	7.0%
Milligan	473,876	455,017	69,866	15.4%	13.0%
Sikanni	312,049	311,913	24,402	7.8%	6.0%
Tommy Lakes	705,234	705,054	67,318	9.5%	8.0%
Trutch	436,391	436,261	29,875	6.8%	6.0%
Total All LU's	4,674,095	4,154,313	554,398		

*Areas based on recent reinventory of the Fort St. John TSA

As the recent reinventory of the TSA has significantly impacted the estimates of shrub habitat, the shrub percentages will be recalculated to assess the 2004 SFMP's targets using the inventory in effect at that time. The results will be reported in the 2009-2010 Annual Report.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n): Yes.

Quantitative forecasting was completed for this indicator by tracking the proportion of forest stands that are less than 20 years old over the full 250-year planning horizon. There was no site conversion or brush rehabilitation to forest forecasted in the analysis.

Strategy and Implementation Schedule:

Early forest less than 20 years old can provide important shrub habitat and this can be created through harvesting. Harvesting and silviculture practices can influence the abundance and distribution of shrubs over time.

Long-term monitoring of shrub abundance change within managed stands will occur through Change Monitoring Inventory (CMI) plots established over the DFA. These plots are systematically established across the DFA based on a 3-km grid in stands 15 years after harvesting. The plots will provide a representative sample of all managed stands over time. 78 CMI plots have been established through 2009. An estimated 4-8 new sample plots on average are expected to be established each year.

Monitoring Procedure:

Data sources include vegetation resource inventory (VRI), landscape unit maps, and RESOURCES data.

VRI information is updated either by the Provincial Government or by Forest Licensees under contract with the Government. These data sources are usually only updated or replaced in five to ten year intervals. The RESOURCES system is a "real-time or live" database that is maintained and updated by the Participants' staff as they carry out their daily activities.

Reports will be generated at two scales. The first report is a tabular report of the percent of stand composition groups within each landscape unit. The second report is a single number that identifies the consistency between the actual status in any given year compared to the 11 baseline targets, expressed as a percent. The calculation is described below:

Report 1 calculation: Forest cover is projected to the current date by overlaying RESOURCES information. Stands less than 20 years old plus stands identified as SL or ST in the VRI are summed for each LU and expressed as a percent of the total area of the LU.

Report 2 calculation: Number LU's meeting the baseline targets / the total number of LU's (11), expressed as a percent.

To monitor this indicator, the reports will be run at each SFMP and compared to the overall target. The CMI plots will be re-measured on an approximately 10 year cycle and will allow comparisons of shrub composition and abundance among other things over time.

This information will feed back to operational practices overtime to determine which practices are adversely impacting the habitat element and corrective action will be taken if necessary.

Linkages to Operational Plans:

The data will be used at the Forest Operation Schedule level to guide future harvest planning and will be used by the silviculture staff to review long term trends in reforestation policies and to adjust practices where necessary.

Linkages to LRMP:

This indicator provides for the maintenance of a key habitat element, which numerous species including species at risk are dependent on and therefore supports the following LRMP objectives.

- *Maintain functioning and healthy ecosystems.*
- *Maintain site-specific habitats.*
- *Protect or enhance habitats for red and blue listed species.*

6.9 WILDLIFE TREE PATCHES

Indicator Statement	Target Statement
Cumulative Wildlife Tree Patch percentage in blocks harvested under the *FSJPPR* in each Landscape Unit	Cumulative Wildlife Tree Patch % will meet or exceed the minimum target in each LU **Landscape Unit** — **WTP %** Blueberry — 9% Halfway — 6% Kahntah — 5% Kobes — 8% Lower Beatton — 3% Milligan — 4% Tommy Lakes — 8% Trutch — 5% Sikanni — 4% Graham — 4% Crying Girl — 3%
SFM Objectives: Suitable habitat elements for indicator species. Maintain a natural range of variability in ecosystem function, composition, and structure which allows ecosystems to recover from disturbance and stress.	
Linkage to *FSJPPR*: For the purposes of 29(1) of the *FSJPPR* the applicable performance standard is specified by this indicator statement, target statement and acceptable variance. For the purposes of Section 42 of the *FSJPPR* this indicator statement, target and acceptable variance will be one of the indicators used to determine if forest practices are consistent with the Patch Size, Seral Stage and Adjacency Landscape Level Strategy	

Acceptable Variance:

Aggregate WTP percentages will only apply if 200 hectares or more has been harvested under the *FSJPPR* in a landscape unit. Because the targets are cumulative, and because there is a backlog of Site Level plans in place that will be harvested in 2017-18 to the existing targets, the participants will implement a stepped approach to achieving the revised targets. The targets identified in SFMP# 2 will be implemented for the 2017-18 reporting year. With the exception of the Blueberry, Kobes and Tommy Lakes LUs the Participant's will implement monitoring of the revised targets with 2018-19 reporting year. This is especially important where existing performance lags behind that of the proposed targets such as in the Blueberry, Kobes and Tommy Lakes LUs. In the Blueberry, Kobes and Tommy Lakes LUs, the Participants will implement monitoring to 89% of the revised targets in the 2018-19 reporting year and to 100% of the targets for these LUs in the 2019-20 reporting year.

What is this indicator and why is it important?

Wildlife Tree Patches (WTP's) are forested areas of timber within or immediately adjacent to a cutblock that are retained primarily for their value in providing a source of habitat elements, or for the protection of important habitat features.

WTP's provide sources of shrubs, large live trees, broadleaf trees, coarse woody debris (CWD), and snag/cavity sites. These elements can provide key habitat components that support the residual populations, the reintroduction of populations expatriated by the disturbance, and overall ecosystem function (Bunnell et al 1999).

Wildlife Tree Patches (WTP's) within managed stands have been shown to be important in the reestablishment or maintenance of a variety of species, including moose (Gasaway and Dubois 1985), and birds (Seip 1997). Residual patches include both islands within the block (internal WTP's) and patches immediately adjacent to logged areas that are also adjoined to unharvested areas (external WTP's). Both internal and external residual patches may be suitable for WTP's provided they can function as sources of habitat elements, which will depend on their site specific attributes. External WTP's connected to adjacent unharvested areas are typically more windfirm within the DFA, and may receive higher initial use by some wildlife species due to the proximity of adjacent unharvested habitats.

Maintaining habitat elements in Wildlife Tree Patches contributes to enhancing species richness by providing the critical features needed to support a variety of species. Designating areas that have composition and structure similar to natural remnants as WTPs will contribute to maintaining a natural range of variability in ecosystem function. Providing diverse habitat structures, including WTP's, within managed stands is consistent with the pattern of natural disturbances. Fire is the most prevalent natural disturbance in the DFA. Maintaining a component of Wildlife Tree Patches in managed stands over the landscape is analogous to fire 'skips'. Skips occur where areas are burnt, but undamaged or lightly burnt patches persist within the perimeter, or on the edge of the fire within a similar forest type. These residual patches in otherwise disturbed areas typically vary substantially in size, shape and composition, so variability in these characteristics of WTP's is desirable.

WTP's can also be used to protect site-specific habitats, such as mineral licks and raptor nesting sites and provide a source of local genetic material.

The establishment of WTP targets by L.U. was based on the following factors:

1. The relative importance of WTP's as sources of habitat elements in a landscape unit is somewhat related to the amount of unharvested areas that function as sources of habitat elements. This is particularly significant in this DFA, where a very high percentage of the DFA is in the Non Timber Harvesting Landbase (NHLB). The NHLB areas will not be affected significantly by harvesting and will still provide some habitat elements that contribute to ecological function. Only the productive forest that contributes to seral stage targets within the non-THLB was considered in determining the contribution from the NHLB. In LU's with relatively low levels of harvesting, the larger undisturbed forest acts as a source of habitat elements, therefore the retention of WTP's can play a smaller role in providing these habitat elements. In areas with relatively high levels of logging, the importance of retention patches such as WTP's to contribute to these elements becomes more significant, so it is generally desirable to maintain relatively higher levels of WTP's in these areas. Utilizing information from the Biodiversity Guidebook (1995) provides one methodology for addressing this factor. This methodology provides for 2 separate determinations. A lower WTP retention level results in those LU's with defined objectives, which provides a higher potential risk to biodiversity. A higher WTP retention level is required in areas without LU's objectives, which is intended to provide a lower potential risk to biodiversity.

2. The forest management intensity levels will be used as a modifier of WTP target levels, with a greater relative emphasis placed on biodiversity in low and medium management intensity zones. In these LU's, WTP retention levels will account for this by using targets consistent with lower biodiversity risk (i.e. utilize retention level targets assuming LU objectives are not in place). Conversely, in high management intensity LU's, retention levels will be consistent with a higher biodiversity risk (i.e. utilize the WTP retention level targets consistent with LU objectives being in place).

3. While there is limited information specific to the western boreal forest on retention levels in natural disturbances, Delong quotes Eberhart and Woodward (1987) findings that 3% - 15% of the total area of a fire can be composed of unburned mature forest. Targets were increased where necessary to fall within this range of variation.
The WTP levels are intended to be a source of habitat elements. In those LU's with less than 200 hectares cumulative logging under the pilot project, there is unlikely to be a significant concern with habitat, so the WTP levels will not be applied until after harvesting exceeds 200 hectares.

Current Status:

The following table indicates the amount of harvest area and proportion of Wildlife Tree Patches by each Landscape Unit where the harvest start date is between November 15, 2001 and March 31, 2016. The targets noted are those specified in SFMP# 2.

Table 18: Cumulative WTP % by LU (2001 - March 31, 2016)

LU	Gross Block Area (ha)	WTP Area (ha)	WTP %	Target %
Blueberry	46,350.6	3,082.4	6.7	**6**
Halfway	3,537.9	310.9	8.8	**3**
Kahntah	1,280.4	118.0	9.2	**7**
Kobes	9,095.4	643.8	7.1	**5**
Lower Beatton	5,219.2	439.5	8.4	**8**
Milligan	258.5	39.2	15.2	**6**
Tommy Lakes	8,607.3	668.5	7.8	**3**
Trutch	887.2	61.6	6.9	**5**
Sikanni	0	0	N/A	**4**
Graham	234.2	31.9	13.6	**4**
Crying Girl	1,718.4	143.3	8.3	**6**
Grand Total:	77,189.1	5,539.1	7.2	

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that achievement of the indicator will promote maintenance of healthy ecosystems with a diversity and abundance of native species and habitats. Implementing the indicator strategy will result in retention of patches of forest representative of the pre-harvest condition within cutblocks. It is anticipated that the amount of in-block retention will trend

towards the target levels over time. This will result in harvested areas with interior forest habitat attributes that will help to sustain biological and ecological processes.

Strategy and Implementation Schedule:

Wildlife tree patches will be established across landscape units to act as sources of key habitat elements, provide stand level structural characteristics, and protect site-specific habitats. WTP retention levels will be assessed at the landscape level to reflect the natural variability in residual retention levels in natural disturbance patches. Retention targets will consider the relative potential importance of WTP's to contribute to habitat element supply, the intended forest management intensity consistent with the LRMP timber strategies, and the range of forested cover retained following natural disturbances**.**

In order to manage the entire landscape in a coordinated manner, consistent WTP retention levels have been developed which are intended to replace the Applicable Performance Standard in the *FSJPPR* Regulation (Section 29 (1)), and therefore apply to the cumulative harvesting of all the Participants.

New WTP's will be designed consistent with the following:

1) Wildlife Tree Patch minimum size will be 0.25 hectares. Reserves less than this size will not be included in the calculation. WTP's should be of various sizes, including some areas larger than 1 hectare in larger blocks particularly (i.e. greater than 100 ha), if possible.

2) It is ecologically prudent when designing larger openings (i.e. greater than 500 ha) to increase the proportional amount of wildlife tree patch area (Delong 1999). Delong and Tanner (1996) reported average remnant area of about 6% for 500-1000 ha fires, and about 9% for fires greater than 1000 ha. Blocks greater than 500 hectares in size therefore, will have at least 7% WTP retention unless requirements are waived due to forest health concerns, as determined by a professional forester. WTP's should contain proportional representation of the vegetation contained in the general cutblock area, both merchantable and non merchantable.

WTP retention prescriptions are the responsibility of the prescribing forester. The forester should consider the following guidelines when determining the amount and placement of WTP's:

- Including areas of key site specific habitat importance, such as eagle, osprey, or blue heron nests, mineral licks, and riparian areas ,
- In areas with species of concern, locate WTP's consistent with stand level management guidelines (see Section 11 Species at Risk- Stand Level Management Guidelines) where practical,
- Areas of operational concern which can contribute significantly to the provision of key habitat elements (riparian habitats, large live trees, snags or declining trees, large trees, broadleaf trees, CWD, or shrubs).
- Tree species that are uncommon in the LU may provide some unique niche habitats (e.g. cottonwood or birch in the Graham River LU-see Section 17 Representative Examples of Ecosystems)
- Other windfirm forested stands that can provide these habitat elements.
- WTP's should be retained for the full rotation, unless there are overriding forest health concerns, or as otherwise approved by the MFLNRO.
- WTP's may be more windfirm if located adjacent to cutblock boundaries.

A business objective of the Participants is to integrate the management of all their planning and harvesting activities as much as possible. The revised wildlife tree patch applicable performance standards therefore will apply to all harvesting by the Participants within an LU.
WTP targets and current status must be considered in the delineation of WTP's in new SLP's, using the current status results and projections for previously prepared SLP's planned for harvesting.

Monitoring Procedure:

Participants will track the WTP areas and SU areas to calculate prorated, cumulative WTP percentages by LU in a common database.
If a Participant's blocks planned in an LU for the year have less than the LU target WTP%, and the current state reported in the previous annual report for that LU is less than 1% over the targeted WTP %, that Participant will notify the other Participants and:

a) Demonstrate to the other Participants' satisfaction that this will not result in a non-conformance to the overall target, or

b) Obtain their formal consent to proceed, if WTP's from other Participants will assist in avoiding a non-conformance, or

c) Revise the proposed blocks as needed to ensure a non-conformance is avoided.

Monitoring results will be reported in each Annual Report. The Report will include the Cumulative Actual WTP% by LU for all Pilot Project blocks on which harvesting commenced from April 1, 2018 to March 31 of the reporting year.

Linkages to Operational Plans:

Prior to completion of SLP's, field foresters will refer to the current status of WTP retention within the LU, and the SFMP target for the LU to which the SLPs apply. Using the guidance provided in the SFMP, WTP's will be designated on a block-by-block basis and identified in SLP's to meet the objectives, and achieve the WTP targets.
Annual reports will utilize areas from SLP's for those blocks in which harvesting started during the year, to update the cumulative actual WTP areas by LU.

Linkages to LRMP:

Specific areas such as dens, raptor nests, and mineral licks will be focal points in many areas for Wildlife Tree Patch location. WTP's will also provide sources of key habitat elements, including shrubs, large live trees, snags, broadleaf trees, and coarse woody debris that are integral to maintaining ecosystem function.
Therefore, this indicator supports the following LRMP objectives:

- *Maintain site specific habitats.*
- *Maintain functioning and healthy ecosystems.*

6.10 Noxious Weed and Invasive Plant Content

Indicator Statement	Target Statement
The percent of noxious weeds, and known invasive plan species of concern in the seed mix analyses.	Seed lots utilized by the Participants will meet standards established by the Canadian Seed Growers Association regarding allowable content of seeds of noxious weeds and invasive plants as identified in the most current Provincial and Federal Regulations, and Regional District guidelines.
SFM Objective: Suitable habitat elements for indicator species	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Range Management Landscape Level Strategy.	

Acceptable Variance:

The primary objective of seeding is to control erosion to protect water resources, with a secondary objective to discourage the establishment of invasive weeds and in some cases provide forage opportunities for cattle and/or wildlife. All seed lots sold in Canada go through a certification process where the seed lot is tested to rate the weed content. Typically it is rated with an allowable maximum amount of weeds per 25g of seed. All weed and germination testing information is identified on the Certificates for that particular lot of seed. So for the purposes of this indicator, if the amount of weeds in the seed lot sample is below the allowable amount, the seed lot is considered to be “weed free”.

What is this indicator and why is it important?

There are 10 categories of seed certification according to the Canada Seeds Regulations and referenced in the British Columbia Rangeland Seeding Manual. All of them list a specific amount of allowable "weed" content, weed meaning any seed that is not the designated seed (so not necessarily invasive). It should be noted that both "Canada Certified" seed categories also permit inclusion of a small amount of identified primary and secondary noxious weeds. A seed lot’s certification is not based on the number of weeds it has, but on it’s vigour and purity. Therefore, a "common" seed certification could have a lower percentage of weeds and noxious species than a "pedigreed" or "certified" seed certification. The intent here is to use seedlots appropriate to the site conditions and management intent with as little weed seed content possible.

Natural species diversity can be negatively impacted by the aggressive germination and growth of noxious or invasive weeds. These weeds may occupy sites that might normally be occupied by naturally occurring vegetation such as herbs or shrubs, and may negatively impact natural or seeded domestic range and wildlife forage resources.

Following road construction, right-of-ways are grass seeded to minimize erosion and provide forage. This is the most significant manageable potential source of weed introduction to forested landscapes. By using site appropriate seed mixes certified to be free of specified weed

species, complete with Canada Certified seed analyses, the Participants forestry operations can minimize the likelihood of accidentally introducing invasive plants and noxious weeds.

Current Status:

All reclamation seed broadcast by the licensee participants during the reporting period is certified as having 0% content of prohibited and primary noxious weeds, and known invasive weed species of concern, as identified in the Sustainable Forest Management Plan.
For all broadcast seeding completed by BCTS licensees during the reporting period the review of seed tags and seed analysis certificates verified 0% content of prohibited and primary noxious weeds, and known invasive weed species of concern, as identified in the Sustainable Forest Management Plan
The Participants are not aware of any occurrence of noxious weeds occurring on forestry rights-of-way to date as a result of grass seeding activities.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementing the indicator strategy will reduce the potential for the introduction of invasive weed species through the road reclamation activities of the Participants. This will contribute to the maintenance of healthy ecosystems.

Strategy and Implementation Schedule:

For the purposes of this indicator, the Participants will refer to the most current versions of the following documents:

1) The Canada Weed Seed Order
2) The List of Regulated Invasive Plants in BC
3) The Peace River Regional District's Invasive Plant Program Strategic Plan and Profile

Within those documents the following categories are applicable to the implementation of this indicator:

- Prohibited noxious and primary noxious weeds as identified in the Canada Weed Seed Order
- Provincially noxious and regionally noxious species on the List of Regulated Invasive Plants in BC
- Regional Early Detection and Rapid Response as indicated in the Regional District Strategic Plan
- Category A and Category B species as indicated in the Regional District Strategic Plan

The Licensee Participants will review Canadian seed analysis certificates prior to purchasing seed lots to ensure there are no species in any of the above categories present. The licensee Participants will retain the Canadian seed analysis certificates after purchasing seed, to verify that species in the above categories are not present.
BCTS will request and retain seed tags from TSL holders, and review the associated seed analysis certificates to determine conformance to the indicator target.
Staff responsible for grass seeding will refer to the federal, provincial and regional noxious weed and invasive plant lists in the above noted documents to determine if changes to the lists have occurred in the last year. The staff will then confirm from the certificate that the seed is free of species in the above categories, and file the seed analysis certificate for future reference. In the rare event that urgent circumstances require the use of seed that does not meet the target, the

supervisor will report the variance to the person responsible for the SFMP annual report. For these variance areas the supervisor will schedule action items in the incident tracking system to inspect the seeded areas within one year. In the event any weeds of concern are noted during the inspection, the supervisor will consult with government agencies on a site-specific basis on how to address the weed occurrence.

In situations where certified "weed free" seed is not available, the Participants will consider implementing alternative erosion control measures where practicable and appropriate.

In addition to ensuring the seed mix to be used is "free" of prohibited and primary noxious weeds and known regional invasive weed species of concern, the Participants will implement the following three additional measures to prevent the introduction and spread of noxious weeds and invasive plants:

1) Complete employee training and improve contractor awareness about noxious weeds and invasive plants.
2) Report any invasive plants or noxious weeds found during forest operations.
3) Compare the location of FOS blocks to the Provincial data set of known locations of noxious weeds and invasive plants to determine if there is any overlap. Where existing sites are found within cutblocks, one or more of the following activities may be implemented on that block:
    i. Enter the site into the block tracking application (LRM etc.)
    ii. Avoid disturbing the infested site where feasible.
    iii. Complete operations when there is decent snowpack where feasible.
    iv. Where known sites couldn't be avoided during forestry activities, visually inspect workers and equipment and remove any plant parts and mud prior to leaving the block.
    v. Treating invasive plants appropriately prior to commencement of activities.
        1. Appropriate treatment options for each species can be found in PRRD document: Profile of Invasive Plant Species within the Peace River Regional District or the Provincial document: Best Practices for Preventing the Spread of Invasive Plants during Forest Management Activities.
    vi. Minimize unnecessary soil disturbance and revegetate road surfaces as quickly as possible.

Monitoring Procedure:

This indicator will be monitored by an annual review of the seed analysis certificates and a review of the incident tracking system. Inspection and actions to address variances will be recorded and clearly identified and tracked in the Participants' incident tracking system by the responsible supervisor. Variances and follow-up inspections and actions will be noted in the Annual Report.

Linkages to Operational Plans:

None

Linkages to LRMP:

This indicator will assist in minimizing the spread of noxious weeds, which will enhance the establishment of plant species that meet other objectives, such as erosion control and foraging

opportunities. Controlling noxious weeds has positive impacts on other non-timber resource values (e.g. Range). Therefore, this indicator supports the following LRMP objectives:

- *Control the spread of noxious weeds*
- *Restore functioning and healthy ecosystems*

6.11 SPECIES AT RISK STAND LEVEL MANAGEMENT GUIDELINES

Indicator Statement	Target Statement
The percentage of SLP's prepared annually for 'effected' cutblocks that incorporate one or more stand level species at risk management guidelines	100% of SLP's prepared annually for effected cutblocks will incorporate one or more stand level species at risk management guidelines
SFM Objective: Maintain habitats for species at risk	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

A 15% variance below the target will be acceptable. (i.e. 85% or more of SLP's in effected cutblocks must have one or more SLMG applied). The variance from 100% to 85% of effected SLPs would only be invoked in situations where forest health, worker or public safety, or operational concerns make implementation of the stand level management guidelines impracticable. In these situations a rationale detailing the reasons for not implementing stand level management guidelines will be included in the effected SLPs.

What is this indicator and why is it important?

This indicator measures the proportion of Site Level Plans in effected blocks that include one or more of the stand level management guidelines to manage for species at risk, whose habitat needs may not be met by landscape level ("coarse filter") biodiversity measures.

"Effected blocks" refers to a cutblock being identified as having the geographical, geophysical and vegetative characteristics that suggest it could provide the suitable niche habitats needed for one or more of the species identified.

Managing Participants will continue to implement similar stand level management practices as employed during the previous SFMP and will continue to refer to those guidelines included in the November 2004 document entitled "Stand-level Management Guidelines for Selected Forest-Dwelling Species in the Fort St. John Timber Supply Area" prepared by Manning, Cooper and Associates for direction. That document summarizes forest dwelling species of interest that may be impacted by forestry operations, the estimated likely geographical extent of the local habitat of these species, the specific niche habitat characteristics applicable to those species, and some stand level management guidelines that may help retain habitat or otherwise support these species. Guidelines from other sources may also be used, as appropriate.

Application of landscape level biodiversity management measures contribute to the maintenance of most of the biodiversity needs in the planning area. These management approaches are "coarse filter", i.e., they represent general measures to conserve a variety of wildlife species.

However, coarse filter approaches may not be sufficient to ensure the conservation of special status species. Fine filter management guidelines are therefore required to ensure that species "at risk" are maintained within the DFA. This indicator measures whether guidelines that may help conserve and manage specific habitat needs for species at risk where they are likely to occur are being applied.

Species at risk included in the Stand Level Management Guidelines (SLMG) are derived from reviewing available information and authoritative sources:

1) Federal Species at Risk Act Schedule 1, 2 or 3,
2) Provincially red and blue listed forest dwelling species (MSRM 2004) that are directly and negatively impacted by forestry operations,
3) Regionally rare species that are sensitive to forestry operations (Sandhill Crane). and
4) Information on forest dwelling species from local MOE staff: Local government staff provided input on which local forest dwelling species might benefit significantly by inclusion in the Stand Level Management Guidelines.

Current Status:

The list of species managed for under SFMP #3 includes eleven birds (Canada Warbler, Olive Sided Flycatcher, Rusty Blackbird, Common Nighthawk, Yellow Rail,Cape May Warbler, Bay-breasted Warbler, Black-throated Green Warbler, Connecticut Warbler, Sandhill Crane, and Great Blue Heron), five mammals (Wood Bison, Fisher, Wolverine, Grizzly Bear, Woodland Caribou-Northern and Boreal Ecotypes) one amphibian (Western Toad) and one fish (Bull Trout). Since the SLMG indicator and target became fully effective (i.e.2006) the status of the conformance to the indicators target has been as follows:

Table 19: Conformance to SLMG Indicator (2001- March 31, 2009)

SLP Year	# Effected Blocks in DFA	# SLP's Identifying 1+ Guidelines	% Conformance
2006-2007	53	52	98%
2007-2008	49	49	100%
2008-2009	45	45	100%
2009-2010	20	20	100%
2010-2011	11	10	91%
2011-2012	45	45	100%
2012-2013	31	31	100%
2013-2014	47	47	100%
Total	**301**	**299**	**99%**

Between April 1, 2013 and March 31, 2014, 39 Site Level Plans (SLP's) were prepared by licensee participants in cutblocks where Stand Level Management Guidelines for species and sites of management concern were required to be specified. One or more guidelines were applied in all 39 of these plans.

Between April 1, 2013 and March 31, 2014, 8 Site Level Plans (SLP's) were prepared by BCTS in cutblocks where Stand Level Management Guidelines for species at risk were required. One or more guidelines were applied in 8 of these plans.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Yes.

It is anticipated that implementing the indicator strategy will result in the maintenance of habitat elements important to the survival of species at risk.

Strategy and Implementation Schedule:

Training on the implementation of the stand level management guidelines will be done for staff involved with preparing plans or implementing the guidelines during field layout.

Following the preparation of each Forest Operations Schedule or major amendment, a population of applicable “effected cutblocks” that require management guidelines for a particular species will be developed. This block selection will use the guidance provided in the SLMG, and use the best digital information available (e.g., based on the location, stand type, block size and structural characteristics of the block) to develop a GIS generated block list. For most species, this list will be the main determinant on whether blocks qualify for management.

Once the block list is developed, each identified block will have an activity scheduled and progress tracked (in RESOURCES, or a similar activity tracking system) to address Stand Level Management Guidelines. For example, in RESOURCES, where required, the *SLM Guidelines Activity* status would show as *planned* initially, and information on which species in the SLMG needs to be managed would be detailed in the *activity comments* section.

The forester in charge of SLP development will review the SLMG for the species noted, and identify at least one guideline to incorporate into the SLP or layout plan. The *SLM Guidelines Activity* status would be changed to *done* after a SLMG is actually incorporated into the SLP, and the specific guideline(s) would be noted in the activity comments section to facilitate future reporting requirements.

For any species that have habitat attributes discussed in the SLMG, but that are not identified in the GIS analysis, (e.g. Fisher) or for those species that can be readily identified from field work (e.g. Sandhill Crane, or Great Blue Heron), the RESOURCES entry of a planned SLMG would be done by field staff if key habitat attributes noted in the SLMG, or the physical presence of a species is confirmed within a block.

A supplementary source of information field staff can use to assist in identifying species of risk is the document "*Identification and Management of Species and Plant Communities at Risk in Northeastern British Columbia*" prepared by Timberline Natural Resource Group Ltd. and Alpha Wildlife Research & Management Ltd .

In the spring of each year (prior to the field layout season), the Participants will review the current list of species at risk that are likely to be impacted by their activities, and discuss with biologists and/or local government officials knowledgeable with species at risk whether any changes to species at risk lists relevant to forestry activities are recommended. If any new information is available which would require changes to the list, or to the management guidelines, revisions to the SLMG will be made, and the changes will be noted in the Annual Report.

Monitoring Procedure:

Annually, a report will be completed for blocks with SLP's completed that year (April 1- March 31), which shows (by managing Participant), how many SLP's should have had SLMG applied, and how many actually had SLMG applied. The report is currently pulled from the SLMG activity record in RESOURCES. The results, as well as any change requirements to the SLMG will be presented in Annual Reports.

Linkages to Operational Plans:

The FOS block locations, size, and timber profile information will be used to develop initial effected block lists. SLP's and operational plan maps will include information necessary to implement any Stand Level Management Guideline.

Linkages to LRMP:

This indicator addresses niche habitat requirements for species at risk that require site specific habitat management. This indicator therefore supports the following LRMP objectives:

- *Protect or enhance habitats for red and blue listed species.*
- *Maintain caribou habitat.*

6.12 FOREST WORKERS' SAFETY[13]

Indicator Statement	Target Statement
Implementation and maintenance of certified safety program	Each managing Participant will implement and maintain a certified safety program
SFM Objectives: Provide a safe work environment for DFA forestry workers and the public	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None

What is this indicator and why is it important?

This indicator identifies whether or not a certified safety program is in place for the Managing Participants' forestry staff.

A certified safety program to forest industry wide standards provides some assurance that the policies, procedures, and practices occurring in the DFA provide a safe work environment for forestry workers.

Current Status

Currently the Managing Participants (B.C.T.S and Canfor) are certified to the B.C. Forest Safety Council S.A.F.E. Companies Standard. Surveillance audits are completed at regular intervals to ensure safety programs meet the S.A.F.E. Companies safety criteria, and to identify where there may be opportunities for improving the safety programs. The Managing Participants each maintained their individual certifications to the B.C. Forest Safety Council S.A.F.E. Companies Standard during the 2013-14 reporting year.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Yes.

It is anticipated that implementation of the indicator strategy will result in forest planning and operations being conducted with a genuine focus on worker safety. Forest contractors and employees will have adequate knowledge and tools to conduct their jobs safely. It is anticipated that implementation of certified safety programs will result in increased awareness of safety issues and should result in fewer safety incidents.

Monitoring Procedure:

Annually, a review of the status of the Managing Participants certification will be completed, and any change to the status will be presented in Annual Reports.

Linkages to Operational Plans:

None

Linkages to LRMP:

None

[13] New indicator in SFMP #2. Indicator # 12 (Caribou) in previous SFMP #1 deleted.



6.13 SEED USE[14]

Indicator Statement	Target Statement
The percentage of seedlings & vegetative material used and planted in accordance with the Chief Forester's Standards for Seed Use (Nov.20, 2004), as amended from time to time.[15]	100% of seedlings and vegetative material will be used and planted in accordance with the Chief Forester's Standards for Seed Use (Nov.20, 2004), as amended from time to time.
SFM Objectives: Conserve genetic diversity of tree stock Suitable habitat elements for indicator species	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Reforestation Landscape Level Strategy. For the purposes of Section 35(5) the indicator this indicator statement, target statement and acceptable variance will replace the requirements of Schedule F Section 99 (Seed Use).	

Acceptable Variance:

As per Section 8 Transfer Limits in the Chief Forester's Standards for Seed Use, no less than 95% of the combined total of the number of seedlings and vegetative material planted during each fiscal year within the DFA will comply with the transfer requirements of section 8.2 through 8.7, of those standards. As the standards are amended from time to time, the allowable variance will change consistent with any amendments.

What is this indicator and why is it important?

This indicator measures the Participants' adherence to the standard designed to ensure reforestation efforts in the DFA use genetically appropriate material.

Genetic diversity of seedlings used for reforestation is ensured through the Ministry's seedlot registration policies and standards. Cones and seed obtained from wild forest stands must be collected from a minimum of ten trees. The Ministry licenses tree seed orchards to ensure that their design and management practices maintain genetic diversity.

Seed derived from licensed orchards must also contain a minimum level of genetic diversity - or effective population size (Ne) – as measured by the quantity of pollen and cones from each contributing tree in the orchard. Orchard seedlots must have a minimum Ne of 10. Similar registration requirements also apply to vegetatively propagated reforestation materials. These rules ensure that planted forests contain sufficient genetic diversity so they are able to withstand any biotic (e.g. insect or disease) or abiotic (e.g. wind, snow, frost, or climate change) event as well as a naturally regenerated forest.

"Transfer guidelines minimize the risks of maladaptation or growth loss associated with moving seed or vegetative material from its source to another location. Exceeding the transfer limits may decrease productivity or increase susceptibility to frost, insects or disease. Poor survival or

[14] Previously named "Conifer Seed". Changed due to wider applicability of Standard to deciduous as well.

[15] Revisions to this indicator initially made in 2005/2006 Annual Report

outright mortality may occur when seed is transferred past its ecological tolerance; however, losses in productivity can be substantial even over relatively short distances, particularly where elevation is concerned." (Ministry of Forests Tree Improvement Branch publication).
Recent concern about climate change and the impact it may have on forests' ability to adapt has illustrated the need for increased flexibility in seed transfer rules, as outlined in the Chief Forester's Standards for Seed Use (Nov 20, 2004, and amendments) which can be accessed on line at (http://www.for.gov.bc.ca/code/cfstandards/). Seed transfer rules are based on provenance and progeny testing conducted by government genetic research scientists. Increases in upper elevation limits by 100-200 metres were made in a recent amendment to seed transfer standard to anticipate climate change over the next 15-20 years. As improved information may result to changes to this standard, the Participants will modify their future activities to be consistent with any amendments to the CFSSU standard.

Current Status:

BCTS

One pine seedlot (#53833) totaling 65,275 grams was collected between April 1, 2013 and March 31, 2014. Collection was in compliance with the Chief Forester's Standards for Seed Use.
No seedlings were planted outside the transfer limits.

Licensee Participants (Canfor, Chetwynd Mechanical Pulp, CRL, Dunne-za, Louisiana-Pacific, PVOSB)

3,615,130 seedlings were planted within the reporting period. All seedlings were planted in accordance with the standard.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
By following the Chief Forester's Standards for seed use, it is anticipated that healthy, productive and genetically diverse forests that are ecologically suited to the site will be maintained.

Strategy and Implementation Schedule:

Seeds will be collected and planted in accordance with the Chief Forester's Standards for Seed Use (Nov.20, 2004) as amended from time to time. Participants preparing seedling orders and planting programs will use the seedlot registration information to determine the allowable geographical and elevational range in which a seedlot may be planted. SLP's will be referenced to determine the location and elevation of cutblocks planned for reforestation, to match with suitable seedlots.
Where exceptions to these guidelines are contemplated because of unanticipated changes to plans, or other logistical considerations, the number of seedlings or vegetative material that fall outside the guidelines will be tracked and reported.

Monitoring Procedure:

All reforestation activities are documented and tracked in RESOURCES. Seedlots are tracked and recorded for every area planted.

A report will be generated from RESOURCES identifying the amount of area (ha) planted by seedlot that falls outside of the seedlots' acceptable geographic or elevational range. The total number of seedlings that fall outside the range will be determined by multiplying the area (ha) times the average density of seedlings planted per hectare. The total of all seedlings that fall outside of the range, divided by the total number of seedlings planted will provide the percent conformance for comparison to the indicator.

Linkages to Operational Plans:

SLP's prescribe the areas to be reforested, and includes GIS information on a block's location and elevational range. This information is used by silviculture staff to determine appropriate seedlots to use that conform to the Chief Forester's Standards for Seed Use (Nov.20, 2004) as amended from time to time.

Linkages to LRMP:

This indicator helps ensure that genetic material used in reforestation is suitable for the site, and able to grow vigorously through time, therefore it supports the following LRMP objective:

- *Maintain functioning and healthy ecosystems.*

6.14 Deciduous Regeneration

Indicator Statement	Target Statement
% natural regeneration of deciduous	100% natural regeneration for deciduous.
SFM Objectives: Conserve genetic diversity of tree stock	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

A maximum of 10% of the area prescribed for deciduous regeneration may be restocked with deciduous vegetative propagules or seedlings (e.g. 90% minimum natural regeneration of deciduous) in accordance with the Chief Foresters Standards for Seed Use, as amended from time to time. In such cases, records must be kept of vegetative lots used and locations where vegetative lots are planted..

What is this indicator and why is it important?

This indicator identifies the percentage of reforested deciduous areas that will be from natural sources, and therefore genetically appropriate for the site.
Natural regeneration maintains the genetic diversity of harvested deciduous species. Maintenance of genetic diversity is important for adaptive processes of deciduous species, and for the maintaining the health, productivity and resiliency of the tree species and ecosystems in the face of changing environmental conditions. Some allowance for introducing stock that is not natural to address underperforming natural regeneration concerns, as trials to assess the impacts of climate change, or to increase timber production volumes are considered acceptable, as at low levels of introduction they are very unlikely to have any measurable impact on the local naturally occurring genetic stock.

Current Status:

To date, all deciduous reforestation in the DFA has been from natural regeneration, either by coppice (i.e. root and stump suckering) or natural seed in. Some deciduous leading areas that had low initial restocking, or were otherwise expected to not meet deciduous reforestation standards have been planted to coniferous species. To date there have been no plantings of deciduous seedlings or vegetative material in the DFA.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that by implementing the indicator strategy and by following “The Chief Forester’s Standards for Seed Use, that healthy, productive and genetically diverse forests that are ecologically suited to the site will be maintained.

Strategy and Implementation Schedule:

Natural reforestation will be the default prescription where areas are expected to be reforested to deciduous species. Reforestation failures will normally be reforested to coniferous species. In the event artificial reforestation of deciduous is planned, the Participants will determine the

amount of deciduous area that is to be declared ‘established’ in that year, and ensure that any planned plantings of deciduous is consistent with the acceptable variance for this indicator.

Monitoring Procedure:

All reforestation activities are documented and tracked in RESOURCES or a similar database. Planted deciduous areas will be spatially identified in RESOURCES or similar database, as will the total deciduous area designated as ‘established’ (i.e. combined natural and planted deciduous areas). Annual Reports will include the percent natural deciduous regeneration achieved (i.e. unplanted established deciduous area divided by the total established deciduous area).

Linkages to Operational Plans:

SLP’s include standards, and reforestation declarations or RESULTS submissions identify the reforestation standards to be used on areas within a cutblock.

Linkages to LRMP:

This indicator ensures the maintenance and conservation of local deciduous and genetic material, and thereby supports biological diversity at the genetic level. This indicator therefore supports the following LRMP objective:

- *Maintain functioning and healthy ecosystems.*

6.15 CLASS A PARKS, ECOLOGICAL RESERVES AND LRMP DESIGNATED PROTECTED AREAS

Indicator Statement	Target Statement
Hectares of forestry related harvesting or road construction within Class A parks, protected areas, ecological reserves, or LRMP designated protected areas	Zero hectares of forestry related harvesting or road construction within Class A parks, protected areas, ecological reserves, or LRMP designated protected areas
SFM Objective: To have representative areas of naturally occurring and important ecosystems, and rare physical environments protected at both the broad and site specific levels across or adjacent to the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No variance, other than government direction requiring the forest industry to conduct operations in these areas.

What is this indicator and why is it important?

This indicator identifies whether the values protected within Class A parks, protected areas, ecological reserves and LRMP designated protected areas are going to be impacted by forestry related harvesting and road construction. Targeting for no forestry related harvesting or road construction will contribute to the protection of these ecosystems.

Current Status:

In order to avoid operating in these areas, forestry activities need to clearly identify the status and location of Class A parks, protected areas, ecological reserves and LRMP designated protected areas.

Protected areas and sites of special biological significance within or adjacent to the DFA have been identified through a variety of processes.

No forestry related harvesting or road construction has occurred, nor was any harvesting planned in FOS#2, in Class A Parks, Ecological Reserves and LRMP Designated Protected Areas. The participants have achieved the target for this indicator.

Digital boundaries of all known protected areas were used in the development of the Forest Operations Schedule #2 and to ensure proposed blocks or roads did not fall within any of the protected areas.

The participants continue to be in conformance with the indicator target.

LRMP Protected Areas and Parks

Goal 1 protected areas are established primarily for ecological representation to protect viable examples of natural diversity such as major terrestrial, marine, and freshwater systems,

characteristic habitats, hydrology and landforms and/or characteristic backcountry recreational or cultural and heritage features.

Goal 2 protected areas represent special features such as cultural, heritage and recreation sites, rare and endangered species and critical habitats, outstanding or unique botanical, zoological, geological and paleontological features, outstanding or fragile culture and heritage features, and outstanding outdoor recreational features such as trails.

Potential protected areas were initially identified through a technical team formed from government agencies (RPAT). This group delineated Areas of Interest which met the above criteria. The Fort St. John LRMP then used this information to finalize proposed Protected Area (PA) boundaries.

Following is a summary of the classified protected areas in or adjacent to the DFA, and their major characteristics.

Milligan Hills Provincial Park (7226 ha) is located in the Alberta Plateau, Milligan Hills Park and provides representation of the Clear Hills ecosection and the BWBS wk2 biogeoclimatic subzone. The area is characterized by level to rolling plateaus with mixed boreal white and black spruce and deciduous forests. The park provides woodland caribou habitat for endangered Alberta populations.

Graham-Laurier Park (99,904 ha) is located in the southwest part of the DFA, and provides representation of ESSF mv2 and 4, BWBS mw 1 and wk2 and Alpine Tundra biogeoclimatic zones. These zones illustrate the transition from river bottom, old-growth forests to sub-alpine and alpine areas. The Boreal Black and White Spruce zone is found in the southeast corner of the park along the Graham River and contains extensive stands of old-growth habitat. The Engelmann Spruce Sub-alpine Fir occurs along the lower elevations of each drainage. This is a sub-alpine zone characterized by severe climatic conditions; heavy growth of Engelmann spruce and sub-alpine fir thins rapidly to scrubby sub-alpine fir. This vegetation is replaced by the Alpine Tundra zone at higher elevations.

The Graham-Laurier Park provides landscape transition from the foothills to the Rocky Mountains through representation of the Misinchinka Ranges and Peace Foothills ecosections. The Misinchinka Ranges, found in the western portion of the park, are unlike the rest of the Rocky Mountains due to their lower elevation and relief and reduced alpine and valley glaciations.

The park contains medium or high capability habitat for caribou, grizzly bear, moose and furbearers, high fisheries values in the Graham River system, First Nations traditional use values, and several undeveloped intact watersheds. Christina Falls is a significant physical feature which a popular destination for backcountry recreationalists. Virtually all of the primitive ROS areas in the DFA are located in this protected area. The area has significance to First Nations as well.

Redfern-Keily Park (80,771 ha) provides representation of the Eastern Muskwa Range eco-section and the SBS and BWBS Biogeoclimatic zones. The park provides high capability habitat for moose, caribou, Stone's sheep and Rocky Mountain elk, as well as old growth furbearer habitat as well as First Nations values, major lake systems, and a full range of backcountry recreation opportunities.

Butler Ridge Provincial Park (6,134 ha) is located in the Peace Foothill ecosection just east of the Rocky Mountains, adjacent to the DFA. The area provides important winter range for caribou and stone sheep habitat in the higher elevations as well as moose and elk winter range in the lower elevations. A blue-listed species, the Arkansas rose, has been recorded in the park.

Peace-Boudreau Protected Area (19,741 ha) is an undesignated protected area located in the Peace Lowlands ecosection adjacent to the south boundary of the DFA, and provides representation of the BWBS mw1 Biogeoclimatic zones.

The Northern Rocky Mountains Park (665,709 ha) is located adjacent to the northwestern boundary of the DFA, provides representation of the Eastern Muskwa Ranges, Muskwa Foothills and Muskwa Plateau ecosections. The park landscape consists of a series of northwest-southeast trending valley and ridges. Glaciation has resulted in broad U-shaped river valley bottoms, mountain cirques and moraine ridges. One of the notable features of the Northern Rocky Mountains Park is the diversity of water features. The area is accentuated by major rivers, clear, cold streams, waterfalls, rapids, small glaciers and lakes, and includes a number of undeveloped watersheds.
The Boreal White and Black Spruce, Spruce Willow Birch and the Alpine Tundra biogeoclimatic zones are found in the Northern Rocky Mountains Park. Forests in the valley bottoms are dominated by white spruce and aspen, and are replaced by sub-alpine fir and white spruce at higher elevations. Alpine plant communities consist of dwarf willows, grasses, sedges, forbs and lichens. The park also has numerous wetlands and native grasslands. Old growth white spruce forests can be found along the major river valley bottoms.

Pink Mountain Provincial Park (92 ha) is located in the Muskwa Foothills eco-section. This area represents a part of the eastern foothills of the Rocky Mountains. The subalpine zone, located at 1100 to 1550 m elevation consists primarily of black and white spruce, lodgepole pine, willow and birch. Above 1550 m, the area consists of alpine tundra vegetation. The vegetation consists of shrubs, herbs, mosses and lichens which all contribute to support the significant diversity of wildlife species. The park also features paleontological sites.

Sikanni Old Growth Provincial Park (1,439 ha) is located within the Fort Nelson Lowlands eco-section and Boreal White and Black Spruce biogeoclimatic zone. It protects locally significant alluvial old growth white spruce forests of the Muskwa Plateau and the associated wildlife species typical of old growth forests.
Sikanni Chief Canyon Protected Area (4,641 ha) encompasses a distinct section of two river canyons within the Sikanni Chief - Buckinghorse drainage of the Muskwa Plateau eco-section. Boreal white and black spruce forests dominate the landscape above the canyon. The park features alluvial stands of white spruce along the Sikanni Chief River and locally significant mountain goat populations.

Ekwan Lake Protected Area (1892 ha) is situated in the Fort Nelson Lowlands which includes the Clear Hills. Boreal white and black spruce forests surrounds Ekwan Lake. The lake features First Nations and fish and wildlife values.

Beatton-Doig Canyon Protected Area (948 ha) is an undesignated protected area that features unique cutbank and grassland areas in the Peace Lowlands eco-section.

Sikanni Chief Falls Protected Area (606 ha) features recreational and paleontological values.

Chinchaga Lakes Protected Area (1,475 ha) is an undesignated protected area that provides representation of the Clear Hills ecosection and wet cool Boreal White and Black Spruce biogeoclimatic zone typical of the boreal plains. The primary role is to protect the ecological values of the local lakes and critical habitat for an endangered Alberta population of woodland caribou, and First Nations values.

Peace River Corridor Provincial Park (2,014 ha) is located in the Boreal White and Black Spruce (BWBS) biogeoclimatic zone within the Peace Lowlands ecosection. This park is straddles the DFA's south boundary. The open aspen and south facing grassland hillsides provide important wintering habitat for ungulates such as mule and white-tailed deer and the islands provide important moose calving sites in the spring. The area is a prime migratory waterfowl staging area. Old growth cottonwood with mixed stands of spruce and aspen dominate the area. Bald eagles and other raptors nest within the large cottonwoods located alongside the Peace River.
Various red and blue-listed species have been identified within the corridor. These species include fennel-leaved desert parsley (*Lomatium foeniculaceum var foeniculaceum*) and slender penstemon (*Penstemon gracelis*). Although not a red or blue-listed plant species, prickly pear cactus is abundant throughout the area.

Beatton River Provincial Park (185 ha) is located at the Beatton River and Peace River junctions in the BWBS mw1 and Peace Lowlands ecosection; the park is typical riparian habitat for the area.

Beatton Provincial Park (312 ha) and Charlie Lake (92 ha) are recreational campgrounds located on Charlie Lake, in typical upland aspen and spruce forests within the BWBS mw1.

Taylor Landing Provincial Park (2 ha) is located in the Peace Lowland ecosection and is covered by the boreal white and black biogeoclimatic subzone. Forest cover is comprised of balsam poplar, trembling aspen, willows, alders and white spruce. The park is immediately adjacent to the DFA's south boundary.

Peace River/Boudreau Protected Area (6,750 ha) is located adjacent to the south boundary of the DFA, and provides representation for the BWBS mw1 biogeoclimatic subzone provides habitat for a number of wildlife species including trumpeter swan nesting sites around Boudreau

Lake. The area also contains a number of cultural heritage sites, including the first site of European settlement on mainland BC at Rocky Mountain Fort, and a historic travel corridor for First Nations, early European explorers and fur traders.
Only very minor amounts of logging occurred in any of the protected areas prior to their establishment. Since establishment, no industrial timber harvesting operations have occurred within the reserves.

Ecological Reserves

Ecological reserves are areas selected to preserve representative and special natural ecosystems, plant and animal species, features and phenomena. The key role of ecological reserves is to contribute to the maintenance of biological diversity and the protection of genetic materials. Scientific research and educational purposes are the principle uses of ecological reserves. The benefits of these areas are that they provide for the maintenance of biological diversity, they provide outdoor laboratories and classrooms for studies, and they can act as benchmarks against which environmental changes can be measured.
Three ecological reserves are identified in the DFA.
The Cecil Lake Reserve (129 ha) is located in the BWBS mw1 in an important waterfowl area. Its stated goal is preservation of aspen, fen, and bog ecosystems representative of the Peace River area of the Alberta Plateau.
The Clayhurst Reserve (316 ha) was established to conserve grassland and aspen grove communities on the slopes along the Peace River.
The Sikanni Chief River Reserve (2401 ha) was established for conservation of alpine and subalpine ecosystems representative of the Northern Rocky Mountains, and overlaps some of the protected areas noted above.
No previous or current harvesting activities have occurred within these Ecological Reserves.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementing the indicator strategy will result in forest management operations that respect and reflect the interests of non-timber resource users, local public and First Nations, resulting in the maintenance of existing recreation opportunities offered by the established recreational sites, trails, ecological reserves and protected areas in the Fort St John DFA.

Strategy and Implementation Schedule:

As new areas are identified and declared for protection and made known to the Participants, within one month detailed location and management information will be requested from the government by the planning staff.
Map information will be digitally stored within 1 month of this information being made available by the government, and planning maps will display this information, provided the data is not considered sensitive (e.g. Some WHA's will not be shown on public maps).
Applicable management information will be circulated to effected staff by planning staff for consideration in all planning activities within 1 month of receipt of this information from government.

Monitoring Procedure:

Changes to protected areas will be reported in future Annual Reports, and conformance to this target will be included in the Annual Report. FOS will report on the consistency of the proposed harvesting to this indicator.

Linkages to Operational Plans:

Staff members will refer to base maps or digital coverage's to locate protected areas when preparing operational plans. When planned activities are in the general vicinity of the identified areas, staff members will ensure operational plans are consistent with any management guidelines for these protected areas.

Linkages to LRMP:

This indicator supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain fish habitat and water quality for priority fish species.*
- *Maintain high quality fisheries in natural settings.*
- *Maintain site-specific habitats.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Protect or enhance habitats for red and blue listed species.*
- *Provide a full range of wilderness recreation opportunities identified in the ROS as primitive, semi-primitive non-motorized, and semi-primitive motorized.*
- *Maintain the headwaters of major rivers and streams as a source of water for current and future generations.*
- *Manage backcountry recreation and tourism opportunities in a natural or natural appearing condition.*

6.16 UNGULATE WINTER RANGES, WILDLIFE HABITAT AREAS AND MKMA

Indicator Statement	Target Statement
Proportion of activities consistent with objectives of the Muskwa-Kechika Management Area (MKMA) and general wildlife measures for Ungulate Winter Ranges (UWR) and Wildlife Habitat Areas (WHA)[16]	All pilot Participant activities will be consistent with the objectives of the MKMA and the general wildlife measures for Ungulate Winter Ranges and Wildlife Habitat Areas
SFM Objective: To have representative areas of naturally occurring and important ecosystems, and rare physical environments protected at both the broad and site specific levels across or adjacent to the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No variances unless authorized by the MOE.

What is this indicator and why is it important?

Consistency with the objectives of WHA's and UWR's ensures the protection of specific features and critical habitat. The objectives designed for these areas generally allow activities provided that protection of the special features of these areas is maintained.

Wildlife Habitat Areas are spatially defined areas of habitat that are biologically limiting to a species. They are established by MOE to protect critical habitat elements for one or more species of Identified Wildlife. Identified Wildlife are considered to be sensitive to habitat alteration associated with forest and range practices and are considered to be at risk (i.e. endangered, threatened, vulnerable, or regionally important). All Identified Wildlife are Species at Risk (provincially red or blue listed species).

Ungulate Winter Range refers to an area that is identified as being necessary for the winter survival of ungulate species.

MKMA related objectives as specified in the LRMP are the objectives noted in **Error! R eference source not found.** that apply to the Sikanni LU

Current Status:

There are currently over 15 approved Wildlife Habitat Area's (WHA's) totaling roughly 159,700 ha and over 16 Ungulate Winter Range (UWR) areas totaling approximately 622,462 ha wholly or partially within the Fort St John TSA. General Wildlife Measures –the legal management regimes that will be required in these areas – have been developed, with input from the Participants and other stakeholders. The Participants will follow the General Wildlife Measures for each specific area when harvesting is proposed within these areas. For the reporting period, there were no activities conducted within approved WHAs or UWRs.

[16] 2006-2007 Annual Report made minor wording amendments to be consistent with UWR and WHA terminology

Discussion regarding WHA's and UWR areas for Caribou and Stone's Sheep in the North portions of the Timber Supply Area was ongoing at the time this SFMP was being prepared. The following table summarizes harvest activities within grand parented blocks within the Muskwa-Kechika Management Area (MKMA) up to March 31, 2014.

Table 20: Harvest Activities in the MKMA

Licencee	Licence	Timber Mark	Block ID	Gross Area (ha)	Merch Area (ha)	Harvest Start Date	Harvest Completion Date	System
CANFOR	A18154	EK8335	20007	57.6	52.0	1/19/2005	2/14/2006	CCRES
CANFOR	A18154	EK8335	20008	101.4	88.7	1/19/2005	3/31/2006	CCRES
CANFOR	A18154	EK8335	20060	75.1	68.5	1/5/2005	3/4/2005	CCRES
Total				**234.1**	**209.2**			

The total cumulative area logged to date within blocks in the MKMA is 209.2 ha. All harvesting operations within the MKMA have been consistent with previously approved Forest Development Plans, as well as provisions within the MKMA Act that 'grandparent' previously approved blocks.
Harvesting within the MKMA that is proposed within the Forest Operations Schedule (i.e., to 2016) is currently limited to previously 'grandparented' blocks within the MKMA, and is therefore consistent with the objectives of the MKMA.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementation of the indicator strategy will result in the short and long-term maintenance of a supply of desirable habitat for species of management concern on the DFA.

Strategy and Implementation Schedule:

The spatial datasets identifying the locations of WHA's and UWR's are maintained within the Participants' GIS systems. The Participants will identify any activities proposed near or within WHA's and UWR's. All SLP's within Ungulate Winter Ranges and Wildlife Habitat Areas will ensure consistency with the objectives or general wildlife measures.
Implementation to ensure consistency with the objectives of the MKMA will be through plans developed through indicator #21 in **Section 6.21 (MKMA Harvest).**

Monitoring Procedure:

When activities are proposed and/or implemented within Ungulate Winter Ranges and Wildlife Habitat Areas a summary of these activities will be presented in the annual report. FOS's will

specifically note if proposed activities occur in these areas, and if as proposed these activities are consistent with the indicator's targets.

Linkages to Operational Plans:

FOS's and SLP's will be developed in accordance to the general wildlife measures and objectives

Linkages to LRMP:

This indicator supports the following LRMP objectives:

- *Maintain fish habitat and water quality for priority fish species.*
- *Protect or enhance habitats for red and blue listed species.*

6.17 REPRESENTATIVE EXAMPLES OF ECOSYSTEMS

Indicator Statement	Target Statement
Percentage of area of forest stands in an unmanaged condition, by leading species, by NDU	100% of baseline targets for forested stands in an unmanaged condition, by leading species, by NDU will be met
SFM Objective: To have representative areas of naturally occurring and important ecosystems, and rare physical environments protected at both the broad and site-specific levels across or adjacent to the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

10 ha or 10% of area, whichever is greater for Leading Species by NDU that have an uncommon distribution (as noted in Table 23) if required for access purposes.
No acceptable variance for Leading Species by NDU that are not identified as uncommon in Table 23.

What is this indicator and why is it important?

The following is adapted from Bunnell 2002 and Wells et.al. 2003 a, b.
Habitat structures and patterns that are monitored by the indicators of, forest type, seral stage, patch size, snags/cavity sites, coarse woody debris, riparian, shrubs, and wildlife tree patches are considered as medium filters. These are designed to capture the habitat requirements of many species. There are, however, many more species about which we know little, but that may be restricted to particular ecosystem types or geographic localities. Most species, but especially those for which knowledge is sparse or absent, are best sustained by ensuring that some portion of each distinct ecosystem type is represented in a relatively unmanaged state.
Unmanaged stands also play an important role as a precautionary buffer against errors in efforts intended to sustain species in the managed forest. While we can develop management practices intended to keep many forest-dwelling species in managed forests, we also recognize that we have insufficient knowledge to ensure that proposed practices will meet all species' requirements in managed stands. That is particularly true of the many poorly known, or completely unknown, organisms. Unmanaged stands are an ecological safeguard against the inevitable errors that occur during management.
Poorly understood functions also will be sustained in unmanaged areas. For example, natural disturbances can occur that would otherwise be suppressed or reduced. While some aspects of natural disturbance can be mimicked in managed stands, other aspects cannot be (e.g., large patches of burned snags, or large areas attacked by spruce or balsam bark beetles). Some species benefit from or rely on these features of natural disturbance, so may not be productive in managed landscapes.
A final function of unmanaged areas in the landscape is to provide an ecological baseline against which the effects of human activities can be compared (Arcese and Sinclair 1997). This role as a benchmark is especially critical in the long-term monitoring required to assess effectiveness of forest practices.
It is preferable to conduct this type of representative management based on site series or clusters of site series or plant associations. Until such time as this type of information is

available leading tree species shall be the coarse filter for representativeness. An unmanaged condition for the purposes of this indicator is considered as areas not contributing to the long-term harvest level within the DFA, or non-timber harvesting land base (NHLB)

Current Status:

An assessment of the future condition of this indicator was completed to confirm consistency of FOS# 2 with SFMP #2. The targets specified in SFMP# 1 for proportion of area in forest stands by leading species in an unmanaged condition were carried over to SFMP# 3 without any revision. The assessment of future condition for this indicator is presented in the table below (table 23) and indicates the future status of forest stands by leading species and NDU for the Non-Timber Harvesting Land Base (NHLB). This reflects the stand types that will exist in an unmanaged state. FOS blocks have been identified within the portion of the land base that is considered as the timber harvesting land base.

Where harvesting is proposed, the SFMP requires an assessment of those NDU species combinations considered unique, highlighted in yellow in the following table, to ensure that targets are not compromised. The above would likely not be necessary for the Boreal Plains NDU due to the amount of area already in the NHLB.

Data collection for the next TSR for the DFA commenced in the summer of 2013. It is estimated that the Fort St. John TSR will not be completed until mid 2016. If a significant amount of block area is added to the Forest Operations Schedule, through an amendment prior to the completion of the TSR, the analysis for this indicator will be redone to ensure ongoing conformance. Analysis of the future condition of this indicator will be completed to assess the consistency of the 2016 FOS with SFMP# 3.

Table 21: **Current (2015) Proportion of Leading Species by NDU Unmanaged (from FOS#2)**

Natural Disturbance Unit	Sub NDU	Leading Species	Total Forested Area	Unmanaged Forests			2010 FOS Harvest Area
				Non-THLB	%Non-THLB	Baseline Target %	
Boreal Plains		AC	25,514.30	16,134.10	63%	12%	1,081
		AT	564,583.80	291,952.30	52%	12%	53,986
		BL	2,004.40	1,681.30	84%	12%	108
		Ep	62,206.80	51,479.80	83%	12%	1,265
		Lt	42,022.20	41,031.70	98%	12%	6
		PL	538,665.30	286,990.30	53%	12%	31,583
		SB	1,297,980.50	1,188,607.60	92%	12%	5,730
		SW	238,097.40	142,671.00	60%	12%	27,776
		SX	134,436.20	54,614.20	41%	12%	0
Boreal Plains Total			2,905,511	2,075,162	71%		121,535
Boreal Foothills	Valley	AC	161.40	111.80	69%	80%	0
		AT	2,554.00	1,973.60	77%	12%	1

Natural Disturbance Unit	Sub NDU	Leading Species	Total Forested Area	Unmanaged Forests			2010 FOS Harvest Area
				Non-THLB	%Non-THLB	Baseline Target %	
		BL	1.60	1.40	88%	0%	0
		Ep**	2.40	0.00	0%	100%	0
		PL	14,551.50	5,814.50	40%	12%	377
		SB	1,448.80	1,088.40	75%	12%	0
		SW	16,316.30	8,307.80	51%	12%	222
		SX	4.40	2.80	64%	12%	0
	Valley Total		35,040	17,300	49%		600
	Mountain	AC	103.60	92.90	90%	100%	0
		AT	2,619.80	2,236.60	85%	12%	0
		BL	13,729.20	13,192.90	96%	12%	0
		Ep**	30.00	25.80	86%	100%	0
		PL	33,974.80	15,347.00	45%	12%	98
		SB	835.50	538.50	64%	12%	0
		SW	98,210.00	68,422.00	70%	12%	155
		SX	66.30	33.00	50%	12%	0
	Mountain Total		149,569	99,889	67%		253
Boreal Foothills Total			184,610	117,189	63%		
Northern Boreal Mountains		AC	182.90	157.70	86%	70%	0
		AT	6,567.00	5,734.00	87%	12%	0
		BL	8,353.60	7,267.80	87%	12%	0
		PL	29,606.10	18,330.00	62%	12%	0
		SB	2,626.00	2,276.00	87%	12%	0
		SW	17,753.60	14,465.30	81%	12%	0
		SX	110,506.90	95,071.30	86%	12%	0
Northern Boreal Mountains Total			175,596	143,302	82%		0
Omineca	Valley	AC	33.30	31.90	96%	100%	0
		AT	372.70	344.00	92%	50%	0
		BL*	18.10	18.10	100%	100%	0
		PL	4,355.30	2,851.50	65%	12%	0
		SB	312.70	275.70	88%	12%	0
		SW	5,578.00	4,367.90	78%	12%	0
	Valley Total		10,670	7,889	74%		0
	Mountain	AC*	1.70	1.70	100%	100%	0
		AT	500.70	457.40	91%	50%	0
		BL	17,857.10	17,473.60	98%	12%	0
		PL	9,369.90	6,696.50	71%	12%	0
		SB	270.10	235.90	87%	100%	0
		SW	57,318.50	51,098.00	89%	12%	0

Natural Disturbance Unit	Sub NDU	Leading Species	Total Forested Area	Unmanaged Forests			2010 FOS Harvest Area
				Non-THLB	%Non-THLB	Baseline Target %	
	Mountain Total		85,318	75,963	89%		0
Omineca Total			95,988	83,852	87%		0
Grand Total			**3,361,705**	**2,419,506**	72%		

* 100% contained within a Park
** Polygon is a portion of polygon split by the NDU Line between Boreal Foothills Valley and Mountain.

Harvesting proposed in FOS# 2 is represented in the 'FOS Harvest Area' in the above table. The majority of proposed harvesting is to occur in the Boreal Plains NDU. The analysis reports on the condition expected as of March 31, 2017 and assumes that all blocks presented in the FOS# 2 will be harvested by that date. The results show that the majority of the baseline targets for retention of a representative sample of forest stands in an unmanaged condition are achieved in the NHLB. Several of the species / NDU combinations considered un-common and highlighted in yellow, do not have sufficient area within the NHLB to meet the target. However in none of the cases was any area harvested under FOS# 1, nor is there any area identified for harvesting under FOS# 2 in these unique combinations, and therefore an 'un-managed' designation is assigned thesestand types.
Table 23 indicates that 100% of the baseline targets for retention of a representative sample of forest stands in an unmanaged condition was achieved for all NDUs, including the 'uncommon' associations (highlighted in yellow), either through the identified NHLB area or through avoidance of harvest planning. The participants' activities are in conformance with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

This indicator is forecasted at each TSR. Forested areas and types undergo an extensive review to see whether they contribute to potential timber supply. The current status table was derived from the base case analysis definition of the timber harvesting land base conducted in support of TSR 3. New inventory information and assumptions on which forest types contribute to timber supply will require a new forecast following completion of TSR 4.

Strategy and Implementation Schedule:

Setting aside a large percentage of the land base as unmanaged forest to ensure that biological richness is sustained is not compatible with economic and social objectives of managed forests. Fortunately, forest tenures in BC typically have 20% to 50% or more of the forest in an unmanaged state. This unmanaged area is of two types: 1) areas that are not harvested or are harvested only lightly because of concerns other than conserving biological diversity (e.g., operability, visual quality, watershed protection, favoured-species management[17]); and 2) areas intentionally set aside to protect biological diversity (e.g., wildlife tree patches, riparian buffers).

[17] Even though favoured species, such as caribou, are a component of biological richness, such species-specific approaches can work against sustaining all of biological diversity. It is important to assess how areas set aside for a single species contribute to the broader goals of representation.

This unmanaged proportion of the land base exceeds the objective for protected areas of most jurisdictions (typically 12%, following the Brundtland commission), and is comparable to many recommendations derived from principles of conservation biology (e.g., 33 to 50%; Noss 1993; Sætersdal and Birks 1993; Stokland 1997; Soulé and Sanjayen 1998) (Bunnell 2002).
On the Fort St. John DFA, wholly constrained areas represent 64.5% of the forest. Partially constrained areas, having 50 to 90% of the volume constrained, represent only 1% of the forest area.[18]
When inventories such as VRI and ecosystem (site series) inventories are completed the intention is to conduct a representative analysis to ensure that ecologically distinct habitats are maintained in an unmanaged status. Until this is completed forest stands by leading species will be used as a surrogate.

Monitoring Procedure:

Data sources for this include forest cover, RESOURCES data, Natural Disturbance Unit boundaries and DFA boundaries. All Participants are using RESOURCES to track their operational data. Forest cover will be updated with harvesting data from RESOURCES as required to complete leading species analysis. Disturbances due to fires and other industrial users are generally updated less frequently (approximately 5 year intervals) and are the responsibility of the Provincial Government. As new inventory information is collected and incorporated into timber supply analysis this indicator will be reviewed and confirmed that it is still being met.
During each TSR process this indicator will be analyzed to ensure that the required representation of forest types by leading species is met.

Each FOS will have the leading species NDU combinations highlighted in Table 21 reviewed and plans adjusted if necessary to ensure that the targets for these species are achieved. The FOS rationale will identify if any of these stands are proposed for harvest, and confirm that the target is still being achieved.

Linkages to Operational Plans:

FOS's will be reviewed to ensure that those NDU species combinations identified as important and at low levels are not affected by operations.

Linkages to LRMP:

This indicator helps to support the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain site-specific habitats.*
- *Protect or enhance habitats for red and blue listed species.*

[18] A "net-down" of 50 to 90% in the Timber Harvest Analysis should ensure that there will be unharvested portions of each leading species in the area.

6.18 GRAHAM HARVEST TIMING

Indicator Statement	Target Statement
The number of clusters in the Graham IRM Plan area where active operational harvesting is concurrently occurring.	Operational harvesting within the Graham IRM Plan area will be constrained to no more than one 'cluster' of cutblocks at any one time.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities and non-timber commercial activities Management strategies address important values in SMZ areas.	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Timber Harvesting Landscape Level Strategy.	

Acceptable Variance:

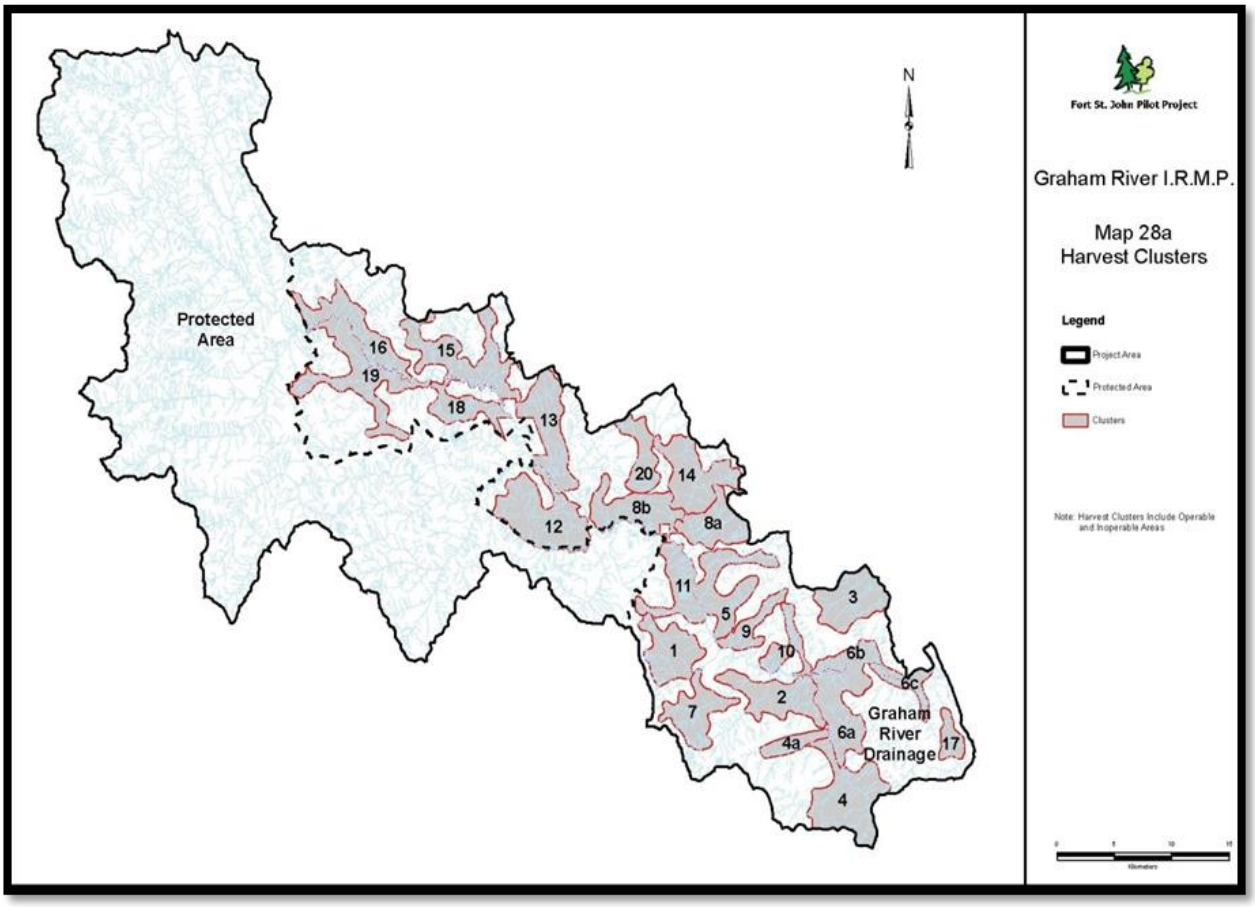
Operational harvesting (i.e. falling and/or skidding of timber, *excluding predevelopment of road right of ways*) in more than one cluster at a time may occur concurrently, if required to address significant forest health concerns (e.g. Mountain Pine Beetle infestations, wildfire), with the authorization of the MFLNRO.

What is this indicator and why is it important?

The intent of the GRIMP harvest scheduling is to concentrate harvesting in one area or subdrainage (i.e. cluster) at a time. This is designed to limit the extent of disturbance to wildlife, recreational, and other non-timber values over the entire Graham drainage at any one time, and supports the objective of providing opportunities for a mix of activities within the Graham drainage area.

The approximate locations of the clusters are shown in Figure 9. Note that cluster 4 has been partitioned into two clusters in this plan, so that a new cluster (#4A, which includes block 11058) is identified west of the main body of cluster 4. This area requires a separate access route, and can be developed separately from the cluster 4 blocks.

Figure 9: Graham Harvest Clusters (updated December 2009)



Current Status:

Harvesting has been completed in clusters 1, 2, 3 and 17. Cluster 17 was advanced in the schedule in to coordinate with a proposed oil and gas development. Harvesting in cluster 4, which started in 2004, is not yet completed. No harvesting occurred in any part of the Graham IRM plan area during the 2013-14 reporting period.

The Forest Operations Schedule Section 3.1, submitted to MFLNRO in January 2011, identifies the approximate proposed harvest dates for clusters 4, 4a, 5, 6 and 6a. The Graham IRM Area harvest sequencing is also noted in Table 17 of the FOS. The harvest sequencing presented in the FOS is consistent with achieving the target for this indicator.

The participants' activities to date are in conformance with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementation of the indicator strategy will result in concentration of harvesting in one area or subdrainage (i.e. cluster) at a time. This is anticipated to limit the extent of disturbance to wildlife, recreational, and other non-timber values over the entire Graham drainage at any one time.

Strategy and Implementation Schedule:

Harvest planning will ensure that the commencement of operational harvesting will not occur in a second cluster of blocks in the Graham IRM Plan area while operational harvesting is active in any other cluster in the GRIMP area. It is recognized that predevelopment of access routes in a future cluster may be necessary to allow orderly development, and this is acceptable while operational harvesting is being completed in another cluster.

In the event that other industries propose development in a separate cluster, the Participants will review the feasibility of modifying harvest schedules to accommodate a joint entry into the cluster.

Monitoring Procedure:

Scale records and inspections reports will be used to determine and report the timing of operational harvesting applied to a cluster of cutblocks within the Graham River IRM Plan area. This will be presented in Annual Reports, which will indicate whether or not the target is being achieved.

Linkages to Operational Plans:

Planners will identify in the Forest Operations Schedule which blocks within the Graham IRM area are proposed for harvesting during the term of the plan, and will note which cluster each block is in. Harvest schedulers will be responsible for ensuring operational plans do not schedule the timing of operational harvesting activities in separate clusters such that they overlap.

Linkages to the LRMP:

The sequential development strategy assists in access control, provides some flexibility to coordinate access with other industries, and restricts the amount of harvesting disturbance at

any point in time. This provides for greater proportions of the Graham River drainage to be available for wilderness recreation, guide outfitting, and other non-timber uses, by providing larger areas of forested wildlife habitat availability than provided by conventional harvesting patterns. The strategy also minimizes development costs, thereby enhancing the efficiency of timber harvesting operations.

Therefore this indicator supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Manage access to protect significant wildlife and recreation values.*
- *Maintain guide outfitting opportunities.*
- *Maintain caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Maintain high capability ungulate winter habitat.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Provide a full range of wilderness recreation opportunities.*
- *Enhance timber harvesting and a sustainable long term timber supply.*
- *Maintain the headwaters of major rivers and streams as a source of water for current and future generations.*
- *Ensure that timber harvesting in the Graham River watershed recognizes the other important resource values.*

6.19 GRAHAM MERCH AREA HARVESTED

Indicator Statement	Target Statement
Cumulative merchantable area (hectares) within blocks harvested within the Graham River IRM Plan area since 1997	The cumulative merchantable area (hectares) within harvested blocks will not exceed the planned maximum cumulative harvest areas as measured at the end of each time period. Period # 3 (ending April 2017): 9355 ha Period # 4 (ending April 2022): 10,858 ha
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities and non-timber commercial activities Management strategies address important values in SMZ areas	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Timber Harvesting Landscape Level Strategy.	

Acceptable Variance:

Operations may only exceed the target in the event of urgent forest health concerns that necessitate increased harvest rates, and after reviewing with the Public Advisory Group, and with the approval of the government.

What is this indicator and why is it important?

This indicator measures the relative level of conformance to the planned maximum harvest levels in the Graham River IRM Plan area. The estimated area planned for harvest in each time period is shown in the column entitled “Estimated IRM net area”, and the permissible maximum cumulative harvest, as measured at the end of each of the 9 time periods, is in the column “Maximum Cumulative Merch ha within blocks to be Harvested” in Table 22.

The Graham River IRM Plan area covers 198,140 hectares. As a result of the LRMP discussions approximately 50% (99,904 ha) of the plan area was incorporated into protected areas, which is intended to meet the vast majority of biodiversity needs in the drainage. The plan identifies an estimated 15,748 ha of area for logging based on broad operability mapping, over the rotation (1997-2042). This is 7.9% of the total landbase in the GRIM Plan area.

The GRIM Plan noted that that the delineation of actual harvest areas would need more detailed work. As better information becomes available, including inventory and operability information, changes to the timber harvesting plan should be made (Lance 1997 p. 43). To account for potential changes, 25% additional area was incorporated into the 2004 SFMP maximum harvest area , which brings the GRIMP’s total maximum harvest level to 19,685 ha (9.9% of the plan area). This leaves a minimum of approximately 90% of the landbase within the plan area available for the maintenance of other forest values and not available for inclusion into cutblocks.

General consistency with the intent of the harvest schedule to restrict the total area logged still allows for timber harvesting activities to occur, while maintaining other values in the large areas not planned for harvest, and supports many of the objectives associated with this special management zone.

The indicator targets in this SFMP are specific to the maximum amount of harvesting permissible, as measured at the end of the two time periods noted in which overlap the term of this SFMP, as noted in Table 22.

Current Status:

Period 3 began April 2, 2012 and runs to April 1 2017, with a maximum cumulative harvest area target of 9,355 ha. No harvesting has taken place within the Graham during the first 2 years of Period #3. The Participants performance to date is in conformance with this indicator.
March 31st, 2007 marked the completion of Harvest Period #1 for this indicator, which covered all logging in cutblocks in the GRIM Plan area from June of 1998 to April 2007. The area harvested to the end of Harvest Period #1 was 3,515.6 ha, which is less than the Period 1 maximum allowable cumulative merchantable area of 3,638 ha.
April 1st 2007 to March 31st 2012 marks the duration of time period 2, which has a cumulative merchantable harvest target (i.e. including areas logged in period 1) of 6,569 ha. No harvesting has occurred in the Graham plan area since April 1st 2007 through March 31st, 2009 (time period # 2 to date).

Table 22: Graham River IRM Plan- Cluster Area and Timing Schedule

Definitions:	
Total Area:	**The total size of a Cluster including inoperable areas**
Gross Contributing Area:	**The Contributing Area (base area) for FPC Biodiversity calculations**
IRM Net Harvest Area:	**Estimated amount of Gross Operable area considered harvestable after IRM factors are taken into account**
Proposed Schedule:	**General timing of harvest sequence over the course of the Plan**
Maximum Cumulative Merch Area (ha)	**The maximum cumulative merch area (hectares) (all previous periods) allowed in cutblocks to period end (indicator)**

Cluster #	R.M.Z.	Total Area (ha)	Gross Contrib. Area (ha)	Est. IRM Net Harvest Area (1) (ha)	Est. Proportion of Cluster Proposed for Harvest	Initial Proposed Harvest Schedule Start-End	Harvest Period	# of Years	Maximum Cumulative Merch Area (ha) within blocks to be harvested
1	Graham-South	1,946	1,922	706.0	36.3%	June 1998 July 1999			
17	Graham-South	627	620	294.0	46.0%	Nov. 1999 April 2000			
2	Graham-South	2,208	2,085	312.9	14.2%	July 2000 April 2002			
3	Crying Girl	2,439	2,115	620.5	25.4%	Nov 2002 April 2003			
4	Graham-South	3,975	3,705	976.6	29.2%	July 2003 April 2007			
Sub-total		11,195	10,447	2910		1998 2007	Period 1	9	3638
5	Crying Girl	2,228	2,181	748.6	33.0%	April 2007 Nov. 2008			
6a&4B	Graham-South	2,508	2,369	1078.8	35.0%	Nov. 2008 Nov. 2009			
6b	Graham-South	884	775	257.5	29.0%	Nov. 2009 April 2010			
6c	Graham-South	726	541	260.0	35.0%	April 2010 April 2012			
Sub-total		6,346	5,866	2344.9		2007 2012	Period 2	5	6569

7	Crying Girl	1,848	1,812	577.2	31.0%	April 2012 April 2013			
8a	Crying Girl	1,904	1,638	840.0	44.0%	April 2013 April 2014			
8b	Crying Girl	2,184	1,877	812.3	37.0%	April 2013 April 2017			
Sub-total		5,936	5,327	2229.5		2012 2017	Period 3	5	9355
9	Crying Girl	952	840	291.0	30.0%	April 2017 Nov. 2017			
10	Crying Girl	966	788	317.0	32.0%	Nov. 2017 April 2018			
11	Graham-South	1,768	1,717	594.0	33.0%	April 2018-April 2022			
Sub-total		3,686	3,345	1202.0		2017 2022	Period 4	5	10858
12	Graham-North	3,439	3,249	1289.0	37.0%	April 2022 April 2024			
13	Crying Girl	2,493	2,359	745.0	29.0%	April 2024 April 2027			
Sub-total		5,932	5,608	2034.0		2022 2027	Period 5	5	13400
14	Crying Girl	2,643	2,583	1034.0	39.0%	April 2027 April 2028			
15	Graham-North	3,258	2,666	1072.0	32.0%	April 2028 April 2032			
Sub-total		5,901	5,249	2106.0		2027 2032	Period 6	5	16033
16	Graham-North	2,108	1,917	903.0	42.0%	Apr. 2032 April 2035			
Sub-total		2,108	1,917	903.0		2032 2035	Period 7	3	17162
18	Graham-North	1,341	1,217	468.0	34.0%	Nov. 2035 Nov. 2037			
19	Graham-North	3,121	2,782	1022.0	32.0%	Nov. 2037 April 2040			
Sub-total		4,462	3,999	1490.0		2036 2040	Period 8	5	19024.
20	Crying Girl	1,317	1,188	527.0	40.0%	Nov. 2041 April 2045			
Sub-total		1,317	1,188	527.0		2042 2045	Period 9	5	19683

Totals (Cluster only)	**46883**	**42946**	**15746.4**			**Period 1-9**	**47.0**	**19683**
D. Total Plan Area	**198,140**	**145,053**	**15,746**	**8%**				**10%**

Notes on Table 24:
IRM Plan areas were based on available operability data in 1997 and subject to change. Proposed Blocks are estimates at time of the GRIM Plan (1997) and will be refined as a portion of the "Operable Area" as they become included in successive FOSs.
Yellow highlighted text notes approved revisions made in October 2006, and blue highlighting updates renaming of block 11058 as cluster 4B (was part of cluster 4, but area moved to cluster 4B because separate access route required).
The 2004 SFMP set the 'Maximum Cumulative Merch Area at 25% above the estimate net IRM harvest area.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementing the indicator strategy will result in minimizing the total area logged, while maintaining other values in the large areas not planned for harvest, and will support many of the non timber objectives associated with this special management zone.

Strategy and Implementation Schedule:

Harvest areas from the approval date of the GRIM Plan onwards will be included in assessing this indicator.
Table 22 identifies the original harvest plan. Scheduling of clusters and blocks for harvesting may be modified from the original plan to address forest health, economic or logistical concerns, provided that the total area logged is consistent with the target for this indicator, and that the temporal extent of logging is consistent with indicator # 18 (i.e. No operational harvesting in more than one cluster at any one time).
Detailed aerial photo inventory, and reconnaissance work will refine proposed cutblock boundaries and road locations within the clusters, consistent with the target for this indicator. These refined boundaries will be included in FOS's. SLP fieldwork may further refine boundary locations in the field based on detailed reviews of site conditions, however all proposed changes must still fall within the indicators target range.

Monitoring Procedure:

The total updated harvested area logged since 1997 in cutblocks within the Graham River IRM area will be reported in each Annual Report. Compliance to the indicator cumulative target will be assessed at the end of time periods 2 and 3.

Linkages to Operational Plans:

FOS's will schedule harvesting areas and note the maximum area that can be harvested during the term of the FOS that will demonstrate consistency with the targets. SLP's must be

consistent with the FOS's. Harvest schedules must ensure operational timber harvesting does not occur in more than one cluster at a time.

Linkages to the LRMP:

Harvesting clusters at levels that are generally consistent with the schedule in Table 26 provides increased certainty on the maintenance of large, forested areas in the Graham River IRM Plan area. It ensures large proportions of the drainage are available for wilderness recreation, guide outfitting, interior forest habitat, and other non-timber uses. This strategy therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Manage access to protect significant wildlife and recreation values.*
- *Maintain caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Maintain high capability ungulate winter habitat.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Provide a full range of wilderness recreation opportunities.*
- *Enhance timber harvesting and a sustainable long term timber supply.*
- *Ensure that timber harvesting in the Graham River watershed recognizes the other important resource values.*

6.20 GRAHAM CONNECTIVITY

Indicator Statement	Target Statement
Area (hectares) harvested in cutblocks in the Graham IRM area, within the permanent alluvial and non-productive/non-commercial components of the connectivity corridors	Zero hectares harvested within cutblocks in the permanent alluvial and non-productive/non-commercial components of the connectivity corridors
SFM Objective: Ecosystem functions capable of supporting naturally occurring species exist within the range of natural variability Management strategies address important values in SMZ areas	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Timber Harvesting Landscape Level Strategy.	

Acceptable Variance:

Variances may be allowed on a site-specific basis where government approval is attained. The indicator target excludes road rights-of-way needed to cross streams.

What is this indicator and why is it important?

This indicator measures the level of harvesting in cutblocks within the two important designated long term connectivity corridors

There are two key permanent components of the connectivity corridors that are expected to remain relatively constant, and provide for the essential habitat requirements of most species in the Graham River valley (Lance, 1997):

1. **The alluvial valley floors of the Graham River and major streams which flow into the Graham River.**

The riparian corridors provide a habitat complex consisting of shelter, foraging sites and travel routes, and were identified in the Graham River IRM Plan as the most important habitats in the plan area.

The Graham River IRM Plan specifically notes that within these alluvial areas, provided that a suitable silviculture regime can be applied, some timber harvesting could potentially be beneficial in places where forest cover has been encroaching onto open ground, as open grown forage has decreased significantly over the past few decades in the plan area. Such places were also identified as priority candidates for monitoring and adaptive management (Lance, 1997).

In the event harvesting is proposed in a riparian corridor, government staff responsible for wildlife habitat will be consulted, and operations will only proceed where mutually agreed plans can be developed for these areas. Such agreements have been made previously for strip cuts in some of the blocks within the Meadow Creek drainage.

2. **The non-productive, non-commercial areas, including treeless or low productivity forested alpine areas, and meadows, swamps, and other NP areas.**

Other than the riparian habitats, the alpine habitats and non productive wetlands have been identified as the next most important habitats to key species such as caribou within the Graham. The approximate location of these corridors is shown in **Error! Reference s ource not found.**.

The large area of inoperable timber within the Graham drainage provides additional extensive connectivity. These areas are generally of less habitat significance than the alpine and riparian areas (Lance 1997), and the location and extent may vary somewhat as inventory information is improved.

Providing for connectivity in the key habitat areas of the Graham supports ecosystem functions, and the habitat needs of a variety of local species.

Current Status:

A review of Annual Reports since April 1, 2004 indicates no unapproved harvesting has occurred in these corridors.

Following consultation and agreement with MOE staff, some strip cuts were harvested within cluster 4, on the west side of the connectivity corridor in Meadow Creek, to increase forage potential while maintaining a component of forest cover. BCTS has requested a variance for proposed harvesting on the east side of Meadow Creek, and is waiting for a response from MOE.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementing the indicator strategy will result in the maintenance of connectivity corridors for wildlife which will promote / maintain the movement of wildlife in the DFA supporting ecosystem function and the habitat needs of various wildlife species.

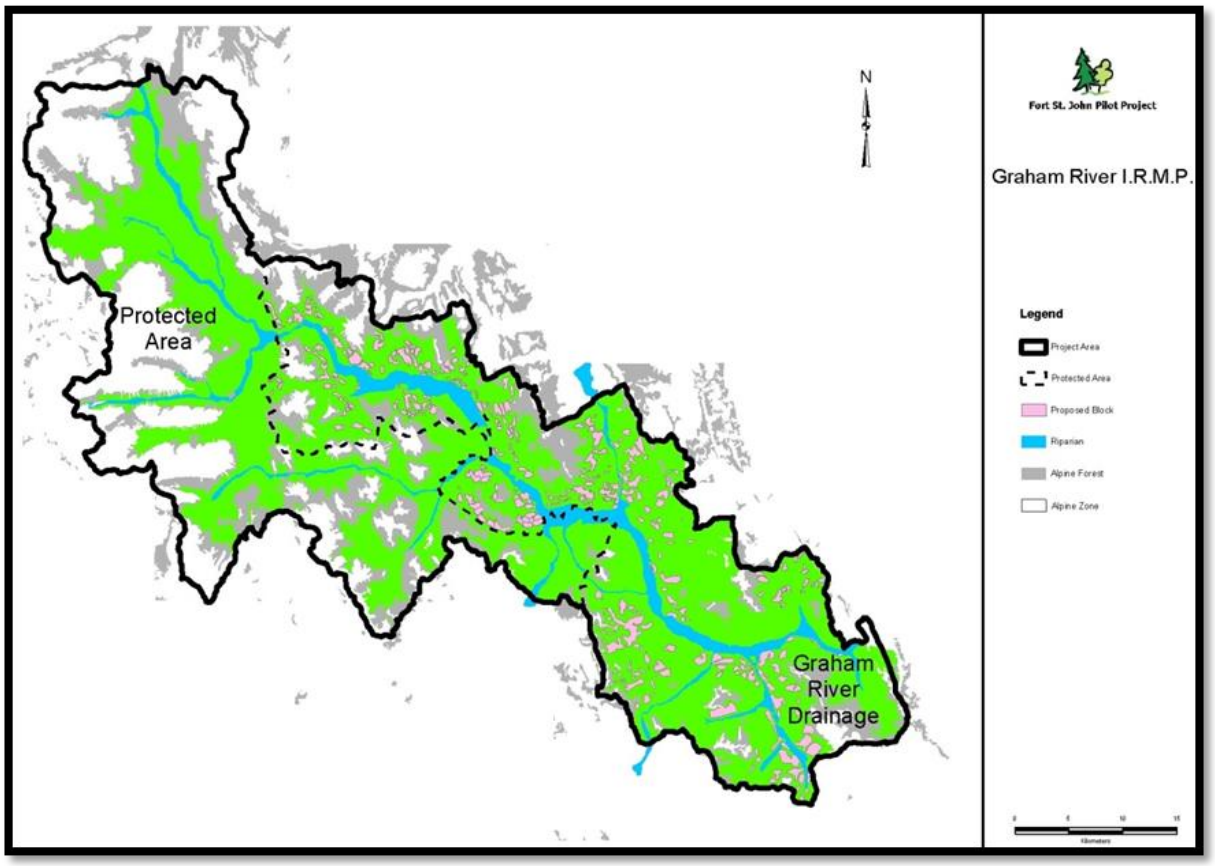


Figure 10: Corridors within the Graham River Area

Strategy and Implementation Schedule:

During preparation of FOS's these two connectivity corridors will be identified using the digital coverage or maps. FOS block boundaries will be drawn consistent with avoiding harvesting these areas, and block specific comments will be included in RESOURCES or other tracking systems to advise forestry supervisors of the rationale for the block boundary location.
During field layout in blocks adjacent to these corridors, the mapped extent of the corridor will be established by GPS or other means, and harvesting will be excluded from this area. Forestry staff may, however, elect to include corridor areas adjacent to cutblocks as WTP's.
In the event harvesting within the corridors is proposed for habitat enhancement, and agreed to by government, SLP's will identify the specific measures to be implemented to accommodate habitat values.

Monitoring Procedure:

GIS overlays of the digital coverage of the corridors and timber harvesting planned and completed blocks will be used to report compliance to this indicator in Annual Reports.

Linkages to Operational Plans:

FOS's will demonstrate that the block design is consistent with maintaining the identified corridors. SLP's will identify the corridors and specifically exclude the areas from operational

harvesting. If harvesting for habitat enhancement within the corridor was approved by the government, the SLP will identify what specific measures are to be implemented.

Linkages to the LRMP:

The retention of significant areas for connectivity can also contribute to interior forest habitat, and protects areas that generally have the highest habitat values. Enhanced riparian protection within these corridors maintains water quality and fisheries values. This strategy therefore supports the following LRMP objectives:

- *Maintain habitat for priority furbearing species.*
- *Maintain high capability ungulate winter habitat.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Maintain functioning and healthy ecosystems.*
- *Promote water stewardship to manage for other resources.*

6.21 MKMA HARVEST

Indicator Statement	Target Statement
The number of long-term harvest plans within the MKMA completed and submitted to government	A minimum of one long-term harvest plan submitted no later than one year following government approval of a landscape unit objective under the MKMA Act, that applies to the Fort St. John TSA portion of the MKMA
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities and non-timber commercial activities Management strategies address important values in SMZ areas	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Timber Harvesting Landscape Level Strategy.	

Acceptable Variance:

Timing of submission may be delayed no more than one additional year.

What is this indicator and why is it important?

This indicator measures progress towards planning long term harvesting in the MKMA that will be consistent with the *MKMA Act* requirements.

Developing a long term plan provides a useful tool for optimizing the mix of timber, recreational activities, non timber commercial activities, and the protection of wildlife habitat.

Prior to proposing harvesting in a drainage in the MKMA a long term harvest plan for that drainage will be developed consistent with applicable legal objectives and any other relevant local strategic plans (eg. MKMA Wildlife Management Plan). The harvest plan will be submitted for review and comment to the government. Harvesting in drainages within the MKMA will not commence until this plan is completed, other than in grandparented blocks, as allowed for in the *MKMA Act*.

Current Status:

No new harvesting is proposed in the MKMA, other than that previously approved under grand parenting provisions of the Muskwa-Kechika Management Act and Regulation, for the duration of FOS# 2. No harvesting of grand parented blocks occurred within the MKMA in the 2013-14 reporting period.

Initial planning for development of an MKMA harvest plan commenced in 2006, and continued in 2007. An area has been selected for plan development. However, Landscape Unit Objectives must be developed for the area by the government, with input from the participants. Progress towards the completion of this plan has been made, however the participants must wait for Landscape Unit Objectives to be approved by government before a plan can be finalized, submitted to government for review and endorsed. As a result of the lack of approval of Landscape Unit Objectives no new clustered harvest plans have been prepared for the MKMA to date.

To date harvesting has only occurred in the MKMA on a few previously approved grand parented blocks. Blocks 20015, 20016 and 20027 are grand parented blocks not yet harvested that are carried forward from these previously approved plans. These blocks are located along the eastern boundary of the MKMA in the Cypress Creek drainage, and can be harvested without any additional plan approvals (see Section 6.16, **Error! Reference source not found.**). A long term "clustered harvest plan" was prepared in 1997 in the upper Graham River drainage (west of Crying Girl Prairie) within the MKMA, as part of the Graham River IRM Plan, prior to the requirements of the *MKMA Act*. No harvesting has occurred in these proposed blocks, and this area of the Graham IRM plan will be revisited and modified as needed, once government objectives for this portion of the MKMA are determined.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementing the indicator strategy will result in the development of a long term harvest that will optimize the mix of timber, recreational activities, non timber commercial activities, and the protection of wildlife habitat within the MKMA.

Strategy and Implementation Schedule:

Following the formal approval by government of landscape unit objectives related to timber harvesting, the Participants will identify one or more drainages to commence harvest planning. The Participants will, in consultation with government, review the applicability of using a sequential clustered harvesting pattern, similar to that employed in the Graham River drainage, to concentrate effects of harvesting in relatively small areas at any one time in the MKMA.

A long term harvesting plan for a specific drainage will be developed that will include the approximate location of cutblocks and roads, and identify how the approved landscape unit objective(s) will be achieved.

The plan will be completed and submitted to government, consistent with the target or acceptable variance of this indicator. The harvesting plan will be consistent with approved MKMA plans prepared by Government.

Monitoring Procedure:

Progress on the identification of landscape unit objectives by the government, and the subsequent development of harvest plans within the MKMA will be reported in Annual Reports in the year they occur.

Linkages to Operational Plans:

Blocks not previously grand parented may not be proposed in a FOS or other operational plan until the drainage plan(s) in the MKMA have been submitted to government. Subsequent FOS's will be consistent with the LU objectives and drainage plan.

Linkages to the LRMP:

Development of a drainage plan will assist in access control, provides some flexibility to coordinate access with other industries, and restrict the amount of harvesting disturbance at any point in time. This provides for greater proportions of the drainage to be available for wilderness

recreation, guide outfitting, and other non timber uses, by providing larger areas of forested wildlife habitat availability than provided by conventional harvesting patterns. The strategy also minimizes development costs, thereby enhancing the efficiency of timber harvesting operations. Therefore this indicator supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Manage access to protect significant wildlife and recreation values.*
- *Maintain guide outfitting opportunities.*
- *Maintain caribou habitat.*
- *Maintain habitat for priority furbearing species.*
- *Maintain high capability ungulate winter habitat.*
- *Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.*
- *Provide a full range of wilderness recreation opportunities.*
- *Maintain timber harvesting and forest management opportunities.*

6.22 River Corridors

Indicator Statement	Target Statement
The percentage of harvested areas that create openings greater than 1 hectare within 100 metres of RRZ's in identified major river corridors	No openings exceeding 1 hectare in blocks within the major river corridors harvested under the *FSJPPR* (i.e. after November 15th, 2001)
SFM Objective: Management strategies address important values in SMZ areas	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Riparian Management Landscape Level Strategy	

Acceptable Variance:

10% of openings may exceed 1 hectare, but no openings greater than 2 hectares, except where required otherwise by a forest health treatment plan.

What is this indicator and why is it important?

This indicator measures significant, continuous interruption in riparian connectivity caused by recent harvesting in identified Major River Corridors (see Section 1.4.1 Description of The Landscape Units). It applies separately to the harvesting plans of each Managing Participant. In addition to providing high timber values, these areas are important sources of habitat elements such as CWD, snags for cavity sites, broadleaf trees, and shrubs. They also play a role as travel corridors for wildlife. This indicator will provide one measure of the implementation of the strategies designed to protect habitat elements and provide some connectivity within these corridors while allowing some timber harvesting. Openings are defined as areas cleared of timber and without sufficient vegetation to act as wildlife cover (e.g. typical clearcut type openings that are not old enough to have been declared as having met silviculture obligations). Roads or trails linking patches are not included in the harvested area determination for the purposes of this indicator.

The variance is intended to address those instances where it may occasionally be logical to increase block sizes to allow boundaries to follow natural features (e.g. slope breaks or timber type changes) or where more extensive harvesting is identified as being required to address forest health issues.

Current Status:

As part of the preparation of the Forest Operations Schedule #2, a digital spatial layer was used for those portions of streams identified in the Fort St. John LRMP in the Major River Corridor Resource Management Zone. The coverage assigned a 100-metre buffer to the riparian reserve zone stream classification, which was based on inventory information if known, or defaulted to S1 classifications if unknown. This coverage is displayed on all 1: 50,000 maps where the Major River Corridor RMZ occurs. Blocks not previously authorized and occurring within this major river corridor were either deleted from the FOS, or were designated for partial cutting systems (e.g. Blocks 20015 and 20016) that will be consistent with the target statement.

The target for this indicator is unchanged from the 2004 and 2010 SFMPs. A review of this indicator in Annual Reports from April 1st 2004 to March 31st 2013 identified the Participants were consistent with this indicator's target in all but one of the Annual Reporting periods. The participants were consistent with the acceptable variance in the fifth reporting period (2008-2009).

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementing the indicator strategy will result in the maintenance of connectivity corridors for wildlife which will promote / maintain the movement of wildlife in the DFA, supporting ecosystem function and providing the habitat elements such as CWD, snags for cavity sites, broadleaf trees, and shrubs important for various wildlife species.

Strategy and Implementation Schedule:

The Major River Corridor digital coverage and FOS maps will be used by operations staff to identify where planned harvest blocks may be proposed within the corridor. Where blocks are proposed in these areas, operations staff will incorporate silviculture systems in SLP's or other operational plans that provide for the retention of forested habitat (i.e. capable of providing cover for wildlife) through time outside of the RRZ, to minimize impact on the connectivity of forested stands.

Selection of a suitable silviculture system will be based on relative habitat values, windfirmness, timber values, and site characteristics such as slope, topography and moisture conditions.

Where clearcut openings are proposed, they will generally not exceed one hectare in size, other than allowed for in the acceptable variance.

Implementation of the silviculture system will be assessed during inspections of field layout, harvesting, and silviculture operations.

In the event harvesting in a Major River Corridor is required to salvage damaged timber, or otherwise required to address forest health concerns the Participants will note the rationale for implementing the acceptable variance in the SLP or other plan.

Monitoring Procedure:

Field inspections of operational activities will ensure silviculture systems prescribed in SLP's are implemented to achieve the indicator's targets.

Conformance to this indicator will be determined by overlaying the digital corridor coverage over areas harvested during an annual reporting period. The associated silviculture system employed on those harvested areas within the coverage area will be identified. Where clearcut type openings occur, the number of openings one hectare or less, and the number greater than one hectare in size (excluding areas identified for forest health or salvage harvesting) will be recorded and used to calculate conformance to the indicator target.

Linkages to Operational Plans:

FOS's will identify those areas that are proposed for harvesting within the Major River Corridor, and propose silviculture systems within these areas consistent with this indicator and strategy.

SLP's will include specific protection measures based on field assessments of site conditions, or rationales for larger openings due to forest health or salvage reasons.

Linkages to LRMP:

Maintaining significant amounts of forest cover within these areas provides for connectivity, ensures a high level of retention of forested habitat, and provides additional protection of riparian and aquatic values, while still permitting harvesting. Therefore this indicator supports the following LRMP objectives within the major riparian corridors:

- *Maintain high capability ungulate winter habitat.*
- *Maintain site-specific habitats.*
- *Maintain functioning and healthy ecosystems.*
- *Maintain timber harvesting and forest management opportunities.*

6.23 VALUE AND TOTAL NUMBER OF CONTRACTS AWARDED TO FIRST NATIONS[19]

Indicator Statement	Target Statement
Value and total number of Contracts awarded annually to First Nations.	Report the annual total value and number of contracts awarded to companies or groups owned or operated by First Nations.
SFM Objective: Provide opportunities for First Nations to participate in forest economy.	
Linkage to *FSJPPR*: None	

Acceptable Variance:

This is a reporting indicator so no variance is required.

What is this indicator and why is it important?

This indicator measures the value and total number of contracts awarded annually to First Nations, either to companies or groups owned, operated, or sponsored by First Nations. Value may be expressed in monetary terms, or, alternatively, in terms of cubic metres logged, number of people employed etc. This indicator provides evidence of efforts to promote the meaningful participation by First Nations in the forest industry within the DFA.

Current Status:

During the 2013-2014 reporting period, the licensee Participants provided eight contracts to companies or groups owned, operated, or sponsored by First Nations. These contracts provided First Nations with the opportunity to be involved in the local forest industry and economy by harvesting and hauling approximately 401,516 m^3 of timber, selling 121 m^3 of timber and by operating the Peace Valley OSB log yard. The contract to manage the PVOSB logyard was worth approximately $ 1.78 million in 2013.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementing the indicator strategy will result in a strengthening of local First Nations participation in the forest economy of the DFA.

Strategy and Implementation Schedule:

Memoranda of Agreement between First Nations and Canfor, L.P., and Tembec provide opportunities for timber harvesting and other forestry related work to the Blueberry, Halfway, Doig, West Moberly, Prophet River and Saulteau First Nations who have traditional territory in the Fort St. John T.S.A. Some contracts may be direct awarded, while others are available for First Nations to submit competitive bids. First Nations companies or groups may also bid on BCTS contracts or timber sales. For the purposes of this indicator, BCTS Timber Sales licenses are considered as the equivalent of a contract.

[19] New indicator in 2010 SFMP. Replaces old indicator # 23 'Visual Screening' which has been deleted

Monitoring Procedure:

An annual review will determine the number of contracts and values (actual or estimated value expressed either in terms of monetary worth or in terms of goods or services provided or produced) of forestry work directly awarded to, or competitively won, by known companies or groups owned, operated or sponsored by First Nations.

Linkages to Operational Plans:

None.

Linkages to LRMP:

Not applicable.

6.24 PERMANENT ACCESS STRUCTURES

Indicator Statement	Target Statement
Percentage of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed.	A maximum of 5% of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average.
SFM Objective: Sustain forest lands within our control within the Defined Forest Area Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: For the purposes of Section 35(5) of the *FSJPPR*, this indicator statement, target statement and acceptable variance will replace Section 30(1) of the *FSJPPR*. For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Access Management Landscape Level Strategy.	

Acceptable Variance:

None.

What is this indicator and why is it important?

Permanent access structures (PAS) include roads, landings, trails, borrow pits, quarry or other similar structure in a cutblock that are developed or used for timber harvesting or other forest management activities, and whose use and/or construction material precludes the production of a commercial crop of trees. This indicator measures the proportion of area that is removed for long periods of time from the productive forest landbase within a harvested cutblock's boundary for forest industry purposes. Limiting the extent of permanent access structures supports the maintenance of a natural range of variability in ecosystem function, composition, and structure on the DFA as a whole.

The percentage of a block's productive area that is occupied by PAS should be dependent on the block size, shape, geography, logging method, season of logging and location of other resources or structures. Small, steep, gullied, irregular shaped blocks, or blocks with pipelines or well sites, require relatively more roading to safely and efficiently harvest timber than large, flat blocks with no streams. Managing PAS at a broader DFA level, and using a three year rolling average allows the flexibility to address variable cutblock conditions and variations in annual harvesting levels that might distort short term results.

Current Status:

The current 3-year average area in permanent access structures ending March 31, 2014 is presented in the following Table 23. The target for this period is a maximum of 5% of total area in permanent access structures. All participants' permanent access structure values were consistent with the targets during the reporting period – Canfor 4.47%, and BCTS 2.15%

Table 23: Current 3-year Average in Permanent Access Structures (PAS)

Managing Participant	Annual Reporting Period (Ending Mar. 31st of Year Indicated)	PAS Area (ha)	Total Area (ha)	% PAS of Total Area
Canfor	2013	204.00	3952.2	4.5%
Canfor	2014	224.90	4563.6	4.4%
Canfor	2015	150.1	5125.2	4.2%
Canfor Total:[20]		579.0	13,236.7	4.4%
BCTS	2013	11.8	527.8	2.2%
BCTS	2014	40.0	1893.2	2.2%
BCTS	2015	70.8	2,772.9	2.5
BCTS Total:[21]		122.6	5,200.9	2.40%
Combined Participants Totals:		701.6	18,437.6	3.80%

The following graph (Figure 11) shows the participants' performance relative to the Permanent Access Structure indicator over the last ten reporting periods. BCTS values have trended consistently downward. Area occupied by Permanent Access Structures on Canfor operations has remained relatively consistent. Although this indicator is tracked separately for each managing participant, the combined total values are presented in the graph in the interest of displaying a cumulative view.

[20] based on 10 metre wide road widths

[21] based on 6 metre wide road widths

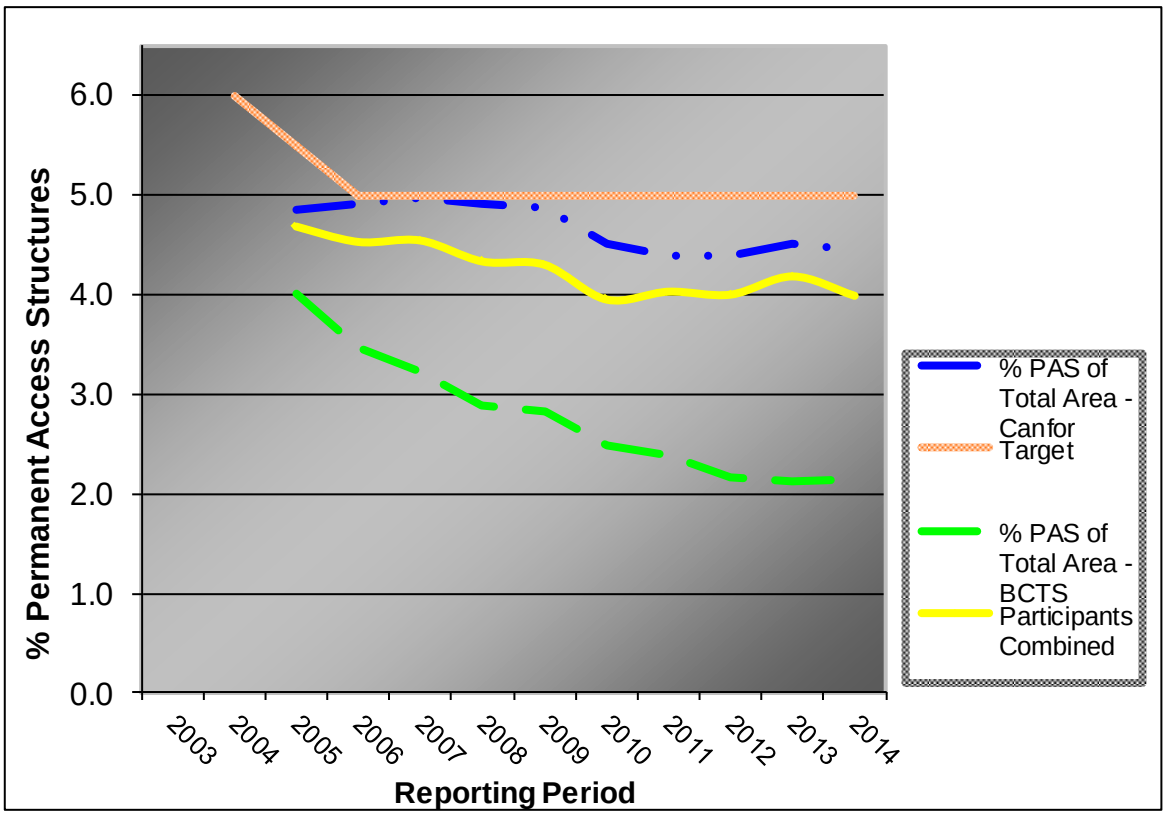


Figure 11: Permanent Access Structures

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementing the indicator strategy will result in the maintenance of productive forest soils with minimized losses in forest productivity and the forest productive area resulting from the construction and maintenance of permanent access structures.

Strategy and Implementation Schedule:

The approval of this indicator in the 2004 SFMP effectively replaced the *FSJPPR* regulatory Performance Requirement of 7% per cutblock maximum PAS, with the target: *A maximum of 5% of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average.* Foresters preparing SLP's will clearly differentiate in map and GIS labeling PAS that will be used for forestry operations from those structures which cannot be used (e.g. pipelines, wellsites, etc). Prescribing foresters who are proposing road developments within cutblocks in excess of 5% need to be cognizant of the relative status of the rolling average percentage for the Managing Participant's cutblocks, and modify plans accordingly if needed to meet the indicator target.

Monitoring Procedure:

Assessment of the compliance to the indicator's target is determined on a three-year rolling average basis. Developments created by other industries (e.g. Oil and gas) are not included in the PAS summary if they are not used for forestry harvesting operations within cutblocks. Areas designated as Permanent Access Structures within each Managing Participants' cutblocks that had harvesting completed during the three most recent Annual Reporting periods will be summarized from the Participants' database information The 'Total' cutblock area for the same population of blocks will be determined from GIS information as the 'Gross' block area, minus external WTP area. The total amount of applicable PAS within blocks harvested divided by the Total cutblock area provides the annual Permanent Access Structure percentage.

For each Managing Participant:

$(\sum$ 3-yr PAS area $\div \sum$ 3-yr Total Area) $\times$ 100 = 3-yr average PAS %

Where:

- 'Total Area' is Gross Area less external WTP area and,
- 'PAS area' is the area designated as Permanent Access Structures within cutblock areas

Linkages to Operational Plans:

Operational plans prepared by Participant staff will continue to prescribe the most appropriate methods to minimize losses to the forest landbase. Staff will be responsible for ensuring that area occupied by PAS not be disproportionate to the planned harvest area.

Linkages to LRMP:

Restricting the permanent losses due to PAS helps maintain the productive land available for timber and other resources. This indicator therefore supports the following LRMP objectives:

- *Coordinate access and linear development to minimize negative impacts on other resource values.*
- *Minimize losses to the timber harvesting land base.*

6.25 FOREST HEALTH

Indicator Statement	Target Statement
Percentage of silviculture obligation areas with significant detected forest health damaging agents which have treatment plans developed for them.[22]	100% of silviculture obligation areas with significant forest health damaging agents will have treatment plans developed for them, and initiated within 1 year of detection.
SFM Objective: Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress Ecosystem functions capable of supporting naturally occurring species continue to exist within the DFA Maintain or enhance landscape level productivity	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Forest Health Landscape Level Strategy.	

Acceptable Variance:

A variance of 1 additional year for completing the treatment plan is permissible to provide time for additional information collection and consultation with forest health specialists.

What is this indicator and why is it important?

This indicator describes the effectiveness of the forest health management strategy in addressing identified forest health problems within plantations.

Forest health issues that have been identified to date as impacting reforested areas in the DFA are numerous. Most significant have been several abiotic factors (frost damage, winter desiccation, fire, snow press, and flooding). Numerous insects including spruce gall aphids, spruce leader weevil, Northern pitch twig moth, root collar weevil, and eastern budworm are known to occur, but have had relatively minor isolated impacts on conifer plantations, while defoliating (tent caterpillar and others) and other insects (Eriophyid mites) may similarly impact deciduous plantations. Foliar diseases have been noted in deciduous (Venturia sp.) and coniferous areas, but impacts on local plantations to date are thought to be relatively low. Gall rusts in pine plantations have the potential to have significant impacts on plantation success on some sites.

Identifying and addressing forest health problems in plantations ensures forest health issues which can affect the forest throughout its life are addressed and if practicable, corrected at an early stage. This ensures reforestation objectives, and ultimately, timber production objectives can be achieved.

[22] Indicator changed in 2010 SFMP to apply to silviculture obligation areas

Current Status:

Currently free-growing damage (health) standards are used to assess stand health in plantations.

Surveyors are required to be competent in identifying significant forest health damaging agents. Surveys identify when and where these pose a threat to the plantation. If plantation success is believed to be at issue, treatment prescriptions are prepared for the area. The most common forest health concerns to date have been abiotic, particularly frost damage, winter desiccation, and leader or lateral browsing damage by animals. The most common prescriptions have typically been increased frequency of plantation monitoring to assess recovery levels of damaged trees, and fill planting.

BCTS

From the surveys conducted during the reporting period on BCTS obligation areas, there were minor incidences of some forest health damage, primarily from damaging agents such as western gall rust, northern pitch moth and stalactiform blister rust. Reports of defoliation on some of the deciduous plantations due to Venturia spp were also indicated. None of the forest damages identified were considered at levels significant enough to warrant development of a treatment plan however. Heavy browse on pine was noted on one block located in the Kobes Creek Operating area.

The efficacy of the BCTS aerial herbicide spray program is still not at acceptable levels. We will continue to monitor blocks that have been treated. We expected better results last year than the previous two years since there was not a drought condition in 2013.

BCTS silviculture surveys have indicated that grass has been inhibiting the reestablishment of aspen in isolated pockets in some of our deciduous stands. This may result in more conversions from deciduous to coniferous strategy.

Licensee Participants (Canfor, CMP, CRL, Dunne-za, Louisiana-Pacific, PVOSB)

Licensee participants fill planted 234.8ha of obligation area in 9 different openings during the reporting period of April 1, 2013 through March 31, 2014. The need for fill planting on these sites was identified during plotted surveys, and the cause was attributed to competition from grass, brush, and/or deciduous species in all cases.

Surveys conducted on obligation areas during the reporting period identified minor incidences of forest health damaging agents, primarily ungulate browse and *Venturia* blight. A survey on two adjacent blocks noted that heavy competition from grass had resulted in widespread deciduous mortality, and as a result an action plan for these areas was developed. These areas will be mechanically site prepared, planted with conifer seedlings, and subsequently managed as coniferous areas.

The participants performance since the indicator was revised in 2010 to apply to silviculture obligation areas has been consistent with the targets for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply? Yes

It is anticipated that implementing the indicator strategy will result in the implementation of action plans designed to limit losses to damaging forest health agents thereby improving the

likelihood of ahieving of regen delay or free growing requirements within target time frames. This will in turn reduce timber losses and downward pressure on the timber supply.

Strategy and Implementation Schedule:

Site Level Plans will identify significant preexisting forest health concerns which may persist and impact future reforestation success (e.g. gall rusts spruce budworm etc). Reforestation plans will consider issues identified in SLP's in selecting reforestation stocking standards and site preparation treatments to apply to a cutblock.

Within their silviculture obligation areas, the Participants will detect and monitor significant forest health agents in a timely manner, and where potential impacts are significant, implement cost effective treatment controls where practicable.

Silviculture surveyors will be required to be competent in the identification of forest health agents that impact plantations. Surveys will be the primary source for identifying new forest health issues. Treatment prescriptions will be developed when surveys indicate there may be a risk to the success of the plantation. The most common treatment plans are likely to include replanting areas, planting resistant tree species, physically removing infected materials, herbicide treatment to remove cover for browsing animals, or no treatment, although other treatment options may be considered depending on circumstances.

Forest health experts within the provincial or federal government, or elsewhere, will be consulted in the event the Participants lack the expertise to evaluate either the impact of the forest health agent, or the potential effectiveness of a proposed treatment plan.

Monitoring Procedure:

The Participants' silviculture staff will review surveys, and retain a record of all significant forest health damaging agents detected in the survey or otherwise, as well as the date they were detected in the silviculture obligation areas.

Treatment plans will be developed by silviculture staff within one year of identification. The treatment plan will be documented, and the implementation of the treatment plan will be tracked. Information on the identification of forest health damaging agents in silviculture obligation areas, and the development and implementation of treatment plans will be reported out in each Annual Report.

Linkages to Operational Plans:

Site Level Plans will identify significant pre-harvest forest health concerns that may affect reforested areas, and potential treatment options.

Linkages to LRMP:

The forest health indicator addresses forest health issues in new forests, which, if not addressed may negatively impact their development through time. The indicator therefore supports the following specific LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Manage for forest health.*
- *Minimize losses to the timber harvesting land base.*
- *Enhance timber harvesting and a sustainable long-term supply.*



6.26 SALVAGE

Indicator Statement	Target Statement
The relative proportion of area of merchantable fire-damaged stands salvaged within a management intensity class[23]	The relative proportions of salvage hectares will be highest in the high intensity zones[24], and lowest in the low intensity zones over an SFMP period (April 1, 2016 - March 31, 2022)
SFM Objective: A natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None.

What is this indicator and why is it important?

This indicator measures the success of a timber fire salvage strategy designed to promote lower relative salvage rates in merchantable damaged stands as forest management intensity emphasis decreases. Merchantability will be defined based on forest cover and TSR assumptions on what constitutes a merchantable stand. Damaged stands are defined as burnt merchantable stands where enough of the stand is damaged that, if not salvage harvested, the remaining live stems would not likely meet the merchantability criteria (e.g. volume/hectare) included in the most recent TSR.

Studies have suggested that some species may be heavily dependent on fire killed forests, and occur at much reduced numbers after forest salvage operations (Delong, 2002). Black-backed and three toed woodpeckers may decrease in abundance due to a lack of fire killed stands (Huuto 1995), and some fungi and insects are fire obligates, or heavily reliant on fire (Stepnisky, unpublished data). In order to provide unique habitats not available in young managed stands (e.g. burnt snags), and maintain a proportion of forests that follow natural successional pathways, it is ecologically desirable to have some proportion of natural disturbances, including those in otherwise merchantable stands, left unsalvaged on the landscape. Providing for some unsalvaged damaged areas contributes to maintaining a natural range of variability in ecosystem function, composition and structure.

It is still necessary, however, to protect timber resources from various abiotic (e.g. fire, wind and flooding) and biotic (e.g. pests and diseases) damaging agents. Salvaging some timber values following damaging events, including fire, supports the basic assumptions of the TSR, and addresses forest health concerns. Implementing a strategy that places a low emphasis on salvaging fire damaged merchantable stands in low forest management intensity areas, and greater emphasis in high forest management intensity areas, will help balance the ecological values with economic and social values.

[23] Modified in 2010 from SFMP # 1 to include only fire damaged stands

[24] See section 1.3.1 for description of LU's in high and low management intensities

The DFA's forest composition includes large areas of non-merchantable stands, due to low productivity. Natural disturbances, particularly fires, are largely random events which may or may not occur in merchantable stands, so the degree to which areas follow natural disturbance pathways will be influenced significantly by the types of stands that burn, therefore absolute measures of salvage levels is not a reliable indicator.

Current Status:

Analysis of forest cover data in 2004 indicated that since 1980, 47,182 hectares burnt, and approximately 2711 hectares or 5.8% was salvage logged. It is assumed that the other 94.2% of unsalvaged area is following natural successional pathways. Much of the burnt area, however, would fall in stands not targeted for harvesting during that period of time (e.g. non timber harvesting landbase, deciduous stands, and immature conifer in the timber harvesting landbase (THLB). Assuming merchantable coniferous stands were equally likely to be burnt as other stands, it is estimated that approximately 36.6% of the burnt area in merchantable stands was salvage logged.

Following is a summary of fire damage, the estimated amount of merchantable wood that was damaged, and the level of salvage that has occurred through to December of 2010.

Table 24: Salvage Harvesting of Fire Damage Timber

Management Intensity Emphasis	**Low**		**Moderate**		**High**	
Year	total ha merch burnt	ha salvaged	total ha merch burnt	ha salvaged	total ha merch burnt	ha salvaged
2004	0.0	0.0	227.3	58.1	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0
2006	2.5	0.0	761.5	0.0	5147.1	643.2
2007	0.0	0.0	0.0	0.0	3.5	0.0
2008	0.0	0.0	5.5	0.0	14.1	0.0
2009	6.5	0.0	3.7	0.0	74.9	0.0
2010	0.9	0.0	35.0	0.0	80.0	0.0
Totals	**9.9.**	**0.0**	**1033**	**58.1**	**5319.6**	**643.2**
% Salvage of Merch		**0.0 %**		**5.6 %**		**12.1 %**

A total merchantable area of approximately 6,362.5 ha burnt from April 1, 2004 to March 31, 2010. The Participants salvage harvested 12.1% of the merchantable timber that burnt in high management intensity LU's, 5.6% in medium management intensity LU's, and none in low management intensity LU's.

During the period of 2011 to 2014 there were numerous forest fires identified within the DFA with a combined area of 3,313 ha. These fires occurred in the Low, Moderate and High Management Intensity Zones. None of these fires were of sufficient size or timber value for the Participants to initiate salvage harvesting activities within them.

MANAGEMENT INTENSITY EMPHASIS	HIGH		MODERATE		LOW		ALL	
Year	Merch* Timber Damaged (ha)	Merch Timber Salvaged (ha)	Merch* Timber Damaged (ha)	Merch Timber Salvaged (ha)	Merch* Timber Damaged (ha)	Merch Timber Salvaged (ha)	Total Merch* Timber Damaged (ha)	Total Area Salvaged
2011	6.1	0	4.0	0	0	0	10.1	0
2012	9.7	0	1,591.0	0	0	0	1,600.7	0
2013	7.5	0	0.8	0	0.2	0	8.6	0
2014	109.2	0	783.2	0	288.5	0	1,598.8	0
SFMP Totals	**132.5**	**0**	**2,379**	**0**	**288.7**	**0**	**3,218.2**	**0**

Table 25: Area Damaged / Salvaged in Merchantable Timber 2011-2014

*Based on VRI from LRDW on stands with a total estimated volume of >= 140m^3/ha and occurring on the Crown Forest Landbase (CFLB).

The majority of the fire area was within low value timber areas not considered to be merchantable. As such salvage harvesting was not completed on any stands damaged by fire during the reporting period. As no salvage harvesting of fire damaged stands has occurred to date under SFMP #2, the participants are consistent with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementing the indicator strategy will result in lower emphasis on salvaging fire damaged merchantable stands in low forest management intensity areas, and greater emphasis in high forest management intensity areas, thereby helping to balance the ecological values with economic and social values. This will result in some burnt areas with merchantable sized timber being allowed to follow natural successional pathways by remaining unsalvaged, while allowing for the salvage of some timber values. This will support species that rely heavily on such features as burnt snags, and is expected to provides significant sources for snag and CWD habitat elements important to ecosystem function.

Strategy and Implementation Schedule:

The Participants' strategy is to augment the component of young natural forests in the DFA by implementing variable levels of salvage effort in merchantable burnt timber, based primarily on management intensity level. The greatest salvage efforts will be directed towards the LU's

designated as high forest management intensity zones, and the least effort in the low intensity zones where non timber values (e.g. biodiversity) have a higher management emphasis. The Participants' general objective for naturally disturbed areas, therefore, will be to salvage some of the higher value damaged timber, while permitting a proportion of otherwise merchantable damaged stands to go unsalvaged and follow natural successional patterns. Zonal guidelines which should be considered by planners when contemplating any fire salvage programs are noted below:

High Intensity LU's:
In stands damaged by fire, all reasonable efforts will be made to salvage merchantable stands of timber where it can be done economically, except in Protected Areas. Economic viability of harvesting will vary depending on factors such as the degree of damage, age, and size of timber when damaged, extent of new access required, the extent of the damaged area and the value of the fibre to the manufacturing plants. Wildlife tree patches may not be established in these areas if WTP LU targets are being met, to meet safety and forest health concerns.

Moderate Intensity LU's:
Some merchantable stands within five kilometres of existing winter access and outside protected areas or riparian buffers may be harvested, provided harvesting is economically viable. A proportion of the damaged area may be retained as wildlife tree patches provided safety and forest health concerns can be addressed satisfactorily. To provide for small natural disturbance events, patches less than 1 hectare could be left unsalvaged unless they are within 1 km of existing access, or present a potential health risk to adjacent forests.

Low Intensity LU's:
Salvage operations should be limited to burnt merchantable stands identified in proposed blocks or clusters in any existing plan, or other merchantable areas within two kilometres of existing winter access, provided the harvesting is economically viable. A proportion of the damaged area may be retained as wildlife tree patches provided safety and forest health concerns can be addressed satisfactorily.
This strategy will be implemented with some flexibility, as the intent is to find a balance between maintaining habitat niches created by fires and salvaging some valuable timber resources to maintain forest health and meet economic and social objectives. In the event that fires are rare for extended periods of time (e.g. less than 100 ha/SFM period), it may be desirable to leave some burnt areas unsalvaged that would normally be salvaged. Conversely, in the event of exceptionally large areas being impacted by fire over a short period of time, additional salvage efforts may be necessary to support timber management and social objectives.

Monitoring Procedure:

The total area burnt, the burnt area of merchantable stands (based on the TSR definition), and the area salvage logged by management intensity level, will be determined from MFLNRO digital information, forest cover data, and Participants' records. The cumulative relative rate of salvage of merchantable stands by management intensity will be reported in subsequent SFMP's. This time frame provides the opportunity for winter salvage operations of a previous year's fire in order to allow accurate comparisons of relative salvage rates compared to burn rates, and provide sufficient time to report in subsequent SFMP's. Annual reports may provide

interim updates on the amount of area burnt and the level of salvage, provided digital data has been updated and is available.

Linkages to Operational Plans:

Guidelines will be used as a tool to assist foresters in determining if FOS's will be amended to propose salvage of merchantable burnt areas, and in the development of SLP's.

Linkages to LRMP:

This strategy provides for some burnt areas with merchantable sized timber to follow natural successional pathways by remaining unsalvaged, while allowing for the salvage of some timber values. This supports species that rely heavily on such features as burnt snags, and provides significant sources for snag and CWD habitat elements important to ecosystem function. This strategy supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain site-specific habitats.*
- *Maintain timber harvesting opportunities.*
- *Maintain forest health.*

6.27 SILVICULTURE SYSTEMS

Indicator Statement	Target Statement
Percentage of area harvested annually using even aged silviculture systems	Even aged silviculture systems will be employed on at least 80% of the total area harvested annually in the DFA
SFM Objective: Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No acceptable variance.

What is this indicator and why is it important?

Evenaged silviculture systems are any silviculture system that results in new forests with one or two treed layers of relatively uniform ages (+/-20 years). The most common evenaged silviculture system is clearcutting, with or without reserves, where most trees are harvested, and new forests are established in which trees are approximately the same age. DeLong (2002) notes that large fires are the dominant type in the Boreal and Boreal Foothills NDU's (i.e. the NDU's where harvesting will occur during the term of this plan), which has resulted in large patches of relatively even aged forests. Initial estimates for the proportion of stand replacement natural disturbances (e.g. that result in significant sized even aged natural stands) in these NDU's range from 80-98%, while small gap replacement events vary from 2-20% (Delong 2002).

Even aged silviculture systems are most similar to stand replacement events and are therefore consistent with the natural disturbance pattern. The target minimum for evenaged silviculture systems is at least 80% of the area harvested annually, which is consistent with the low range of stand replacement events in these NDU's.

Current Status:

From April 1 2004 through to March 31, 2013, an average of 99.7% of the area harvested by the Participants was completed using even aged silviculture systems, with all years between 97% and 100%25.

The Table 28 summarizes the silviculture system (merchantable ha) on blocks harvested between April 1, 2013 and March 31, 2014.

Table 26: Sivliculture System (Merchantable ha) on Blocks Harvested, 2013-2014

Managing Participant	Even-aged (ha)	Uneven-aged (ha)	Total (ha)
Licensee Participants	4692.1	0	4692.1

[25] Information was derived from the 9 Annual Reports covering the SFMP # 1 and # 2 period, up to March 31, 2014.

BCTS	484.7	0	484.7
Total	**5176.8**	**0**	**5176.8**

The participant's performance has been consistent with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementing the indicator strategy will result in a harvesting pattern that is consistent with wildfire, which is the dominant natural disturbance regime in the DFA.

Strategy and Implementation Schedule:

Evenaged silviculture systems, primarily clearcutting with reserves, will be implemented on most sites to reproduce even aged forests consistent with natural stand replacement events. In deciduous leading stands where a coniferous understory exists, shelterwood systems may be employed to protect some of the understory. In unevenaged stands, foresters will assess site factors and the quality of the immature timber in determining the most appropriate system to employ.

In some identified areas where other non-timber resources have high value, other alternative or modified silviculture systems (e.g. group or individual tree selection, small patch or strip cuts etc) that can be implemented successfully and cost effectively may be employed.

Monitoring Procedure:

The area harvested by evenaged silviculture systems will be determined from Participants' records, and presented in annual reports.

Linkages to Operational Plans:

Prior to preparing SLP's, foresters will consider the site factors and stand structures of proposed blocks, and any objectives or strategies in the SFMP which may impact selection of a silviculture system. SLP's will identify if blocks are planned for unevenaged silviculture systems based on these factors.

Linkages to the LRMP:

Evenaged silviculture systems are consistent with the predominant natural stand replacement events. They're also amenable to highly efficient harvesting methods, and effective silviculture treatments which allow for the replacement of forests stands to maintain or enhance sustainable long term timber supplies. This indicator therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain timber harvesting and forest management opportunities.*
- *Enhance timber harvesting and a sustainable long term timber supply.*

6.28 SPECIES COMPOSITION

Indicator Statement	Target Statement
Relative change in plantation composition versus harvest composition for spruce and pine	The relative proportion of spruce and pine planted annually will equal the proportions harvested annually (excluding fill planting)
SFM Objectives: Maintain the diversity and pattern of communities and ecosystems within a natural range Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Reforestation Landscape Level Strategy.	

Acceptable Variance:

An annual variance of plus or minus 20% absolute difference between the planted Pine/Spruce percentages and cruise Pine/Spruce percentage estimates is allowed to reflect potential annual harvest composition fluctuations, site treatment impacts, annual seedling delivery fluctuations (i.e. nursery production shortfalls/overruns), and to allow site level decisions to be signed off by Professional Foresters for variances (e.g. to address potential forest health concerns such as areas highly susceptible to rusts, insects, etc.)[26]

What is this indicator and why is it important?

This indicator illustrates the relative proportion of spruce and pine being planted annually, compared to the relative cruise volumes of spruce and pine from the same areas. It provides an approximation of the extent of change of species composition as a result of forest management activities on coniferous licenses. Spruce and pine make up in excess of 95% of the coniferous species harvested in the DFA, and 99% of the species planted.

Maintaining relatively consistent proportions of spruce and pine between pre-harvest and post-harvest stands helps to maintain a natural range of diversity and pattern of plant communities and ecosystems. Comparing the percentage planted to the cruise volume percentage of each species on the same areas will provide an indication of whether or not similar proportions of spruce and pine are being maintained on the landbase.

This indicator applies to coniferous licensees and BCTS only, and does not apply to the replanting or fill planting of areas previously planted.

Current Status:

The following table illustrates the proportions of pine and spruce planted compared to the proportions cruised in the same blocks, as reported in the 2011-2013 Annual Reports.

[26] The original variance was amended in the 2006-2007 Annual Report- clarified that the assessment is based on cruised volumes vs seedlings planted

Table 27: Species Composition Last 3 Years

Participant	Data	2011-12	2012-13	2013-14	3 Yr. Totals	3 Yr. Percentage
BCTS Participants	Cruise Sw (m^3)	39,484	32,736	78,973	151,193	46.60%
	Cruise Pl (m^3)	31,684	36,681	104,856	173,221	53.40%
	Planted Sw Seedlings	204,650	354,012	414,075	972,737	56.78%
	Planted Pl Seedlings	122,185	260,895	357,420	740,500	43.22%
Licencee Participants	Cruise Sw (m^3)	250,872	441,286	580,080	1,272,238	58.89%
	Cruise Pl (m^3)	303,283	251,988	332,928	888,199	41.11%
	Planted Sw Seedlings	1,274,630	1,237,993	2,397,938	4,910,561	63.13%
	Planted Pl Seedlings	695,200	1,187,040	985,247	2,867,487	36.87%
All Participants Total Cruise Spruce volume (m^3)	**Cruise Sw (m^3)**	**290,335**	**474,022**	**659,053**	1,423,410	57.28%
All Participants Total Cruise Pine volume (m^3)	**Cruise Pl (m^3)**	**334,967**	**288,669**	**437,784**	1,061,420	42.72%
All Participants Total Planted Spruce seedlings	**Planted Sw Seedlings**	**1,479,280**	**1,592,005**	**2,812,013**	5,883,298	61.99%
All	**Planted**	**817,385**	**1,447,93**	**1,342,66**	3,607,987	38.01%

Participants Total Planted Pine seedlings	**Pl Seedlings**		**5**	**7**		

As noted in the table over the previous three year period during which the indicator target was assessed comparing trees planted to cruise volumes, the blocks planted during this period contained 57.3% spruce cruise volume, while 62.0% of the planted trees were spruce. The blocks contained 42.7% pine cruise volume compared to 38.0% of the planted trees were pine seedlings. The planted species percentages over the three years were different by 4.7% absolute difference from cruise volume percentages, demonstrating minimal changes to coniferous species composition as a result of forest management activities

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Yes. Projections for seedling orders are done one or two years prior to planting, based on information in the SLP's if available, and/or best estimates of which blocks will be harvested and available for planting. It is anticipated that iplementing the indicator strategy will help to maintain a natural range of diversity and pattern of plant communities and ecosystems across the DFA.

Strategy and Implementation Schedule:

Currently Participants plant nearly 100% of coniferous blocks in the DFA with spruce or pine seedlings, with planting occurring as soon as practical following harvesting.
SLP's identify proposed silvicultural treatment regimes prior to harvesting, based on stand and site characteristics, including species selection options. Silviculture supervisors place seedling orders by species using information provided in the SLP's, cruise data, and projected harvest plans. Preharvest species composition, as well as species site suitability, are two of the major factors used to determine what species will be planted on a harvested block.
Plans for planting programs are reviewed and updated periodically, based on any changes that may have occurred to harvest plans, site preparation plans, or in inventory updates from nurseries on the number of projected deliverable seedlings from seedling orders.
Block cruise compilation information is stored digitally in RESOURCES or similar databases to provide the baseline for spruce and pine volumes on planted areas.
Detailed records of planting activity, including the number of trees planted by species, are completed following each summer field season. Cruise compilations provide information on the net volume by species for each of the planted coniferous blocks. Records will be reviewed and results summarized for the April 1- March 31 fiscal year.

Monitoring Procedure:

A report from silviculture information systems (e.g. RESOURCES) will be produced annually for all blocks planted in the last year. The report will compare the percentage of spruce planted (total spruce planted divided by the total spruce and pine planted) to the percentage of spruce cruise volume (total spruce volume divided by the total pine and spruce cruise volume) in the blocks planted. Similarly, the percentage of the total pine planted will be compared to the

overall percentage of pine cruise volume. The target is met where the absolute difference between the planted pine/spruce percentages and cruise pine/spruce percentage estimates is less than 20%.[27]

Linkages to Operational Plans:

The FOS provides general information on the species composition of future cutblocks. Site Level Plans identify silviculture regimes, and in conjunction with harvesting plans, are used to develop seedling requests and silviculture planting programs.

Linkages to the LRMP:

This indicator provides information on whether silviculture practices are resulting in significant species conversions, which may negatively impact vegetative patterns across the landscape over time. It therefore supports the following LRMP objective:

- *Maintain functioning and healthy ecosystems.*

[27] Monitoring process changed from harvest volumes to cruise volumes in 2006-2007 Annual Report

6.29 REFORESTATION ASSESSMENT

Indicator Statement	Target Statement
Predicted Merchantable Volume (PMV) (cubic meters) coniferous and separate deciduous surveyed areas.	Predicted Merchantable Volume will meet or exceed the Target Merchantable Volume (TMV). The TMV is set at 95% of the Maximum Predicted Merchantable Volume attainable on coniferous areas. The TMV is set at 90% of the Maximum Predicted Merchantable Volume attainable on deciduous areas.
SFM Objectives: A natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress Maintenance of the processes for carbon uptake and storage	
Linkage to *FSJPPR*: For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used in replacement of the portions of affected Section 32 of the *FSJPPR* through the application of the landscape level strategy for coniferous and deciduous areas logged after November 15, 2001. This will also apply to coniferous and deciduous area in cutblocks with commencement dates before November 15, 2001, if the Participant currently carries reforestation liability and has submitted a statement to the District Manager that the cutblock(s) will be subject to the SFMP under Section 42 of the *FSJPPR* (see section 8.1.3) For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Reforestation Landscape Level Strategy.	

Acceptable Variance:

A variance of 5% below the Target Merchantable Volume will be acceptable (i.e. 90.25% of the Maximum Predicted Merchantable Volume for coniferous areas, and 85.5% of the Maximum Predicted Merchantable Volume for deciduous areas). The variance accounts for the complexity of ecosystems and silviculture regimes combined with the long time frames and variety of influences on reforestation outcomes.

If the conifer target population's Predicted Merchantable Volume is less than the Target Merchantable Volume, individual cutblocks will be required to meet a minimum cutblock Mean Stocked Quadrant (MSQ) value of 2.0 well growing crop trees, for a target stocking of 1200 stems/ha or greater. For a target stocking of 1000 stems/ha and 800 stems/ha the minimum cutblock MSQ values will be 1.7 and 1.3 respectively. If the cutblock has areas of different target stocking the MSQ will be prorated by area.

If the deciduous target population's Predicted Merchantable Volume is less than the Target Merchantable Volume, individual cutblocks will be required to meet a minimum cutblock Mean Stocked Quadrant (MSQ) value of 3.0 well growing crop trees, for a minimum cutblock value of 1200 stems/ha or greater.

Damage events beyond the control or influence of the Participants (e.g. wildfire) will result in the block being deleted from the assessment population, and assessed as noted in the Strategy and Implementation section.
Situations may arise in which despite due diligence in prescribing and implementing the silviculture regimes the Participant has not met the target. Where further treatment options are limited the District Manager may waive a requirement for further treatment.

What is this indicator and why is it important?

This indicator measures the ultimate success fifteen years after harvest of reforestation regimes in establishing well growing forests that meet long term TSA level timber supply objectives, while providing cutblock level flexibility to address other considerations. The indicator assesses two separate populations - one for pure coniferous strata, and the other for pure deciduous strata. These deciduous and conifer strata may be in separate blocks, or may be separate strata in the same block (e.g. unmixing a mixedwood).
MPMV is the **Maximum Predicted Merchantable Volume** from models that a population of harvested sites can produce under ideal conditions. The **Target Merchantable Volume (TMV)** percentages are a relative volume that the silviculture regime on those sites might be reasonably expected to achieve, given normal constraints. The **Predicted Merchantable Volume (PMV)** is the area weighted average projected volume that survey results indicate will be achieved as a result of the actual silviculture activities on those blocks. A detailed description of the landscape level assessment system that will be implemented is included in the 'Strategy and Implementation Section' below. Ensuring that harvested stands are replaced with a well growing plantation is an indication that the harvested area has recovered from a disturbance and maintained its resiliency and productive capacity. Reforesting harvested areas also contributes to carbon uptake and storage objectives.
The assessment on a landscape level allows reforestation regimes to be varied at the cutblock level to accommodate other resource values, and to allocate reforestation funds to achieve maximum effectiveness.

Current Status:

Canfor

A total of 56 blocks were surveyed from the 1998/1999 harvest year, accounting for a sample size of 2207.2 ha. The field data collected in August and September of 2012 was compiled over the winter using a compiler developed by J.S. Thrower & Associates. The 2207.2 ha were grouped into 28 different strata based on species composition, site index, stocking class, and target stocking standard. For each stratum a target merchantable volume (TMV) was determined based on TASS models. Using the inputs of mean stocked quadrant (MSQ), mean effective age and site index, a predicted merchantable volume (PMV) was then calculated for each stratum. The PMV for the 1998/1999 harvest year was 1,529,829 m^3 and the TMV was 1,451,307 m^3. **This put the PMV at 105.4% of the TMV, which means the target was met.** .
One stratum was determined to be Satisfactorily Restocked (SR) but not Well Growing (WG) due to competition from deciduous species on site, meaning that the stratum had adequate conifer density but that deciduous trees were overtopping the conifers. This SR stratum had a PMV calculated at 59.5% of target, reflecting the impact of the deciduous competition on the predicted future conifer volumes. The SR stratum accounted for 4.7 ha of the total 2207.2 ha

population size, so the effect of the low PMV stratum is minimal over the landscape and reflects the variability expected by employing a landscape-level reforestation assessment.

BCTS

A total of 14 BCTS blocks were surveyed from the 1998/1999 -harvest year. This accounted for a sample size of 255.3 ha. The field data collected in August through October was compiled over the winter using a compiler developed by J.S. Thrower & Associates. The 255.3 ha were broken down into 5 different stratums based on species composition, site index, stocking class and target stocking standard. For each stratum a target merchantable volume (TMV) was determined based on TASS models. Using the inputs of mean stocked quadrant (MSQ), mean effective age and site index, a predicted merchantable volume (PMV) was then calculated for each stratum. The PMV for the 1998/1999 harvest year was 178,615m^3 and the TMV was 180,828m^3. **This put the PMV at 98.8 % of the TMV, which means that the target has been achieved.**

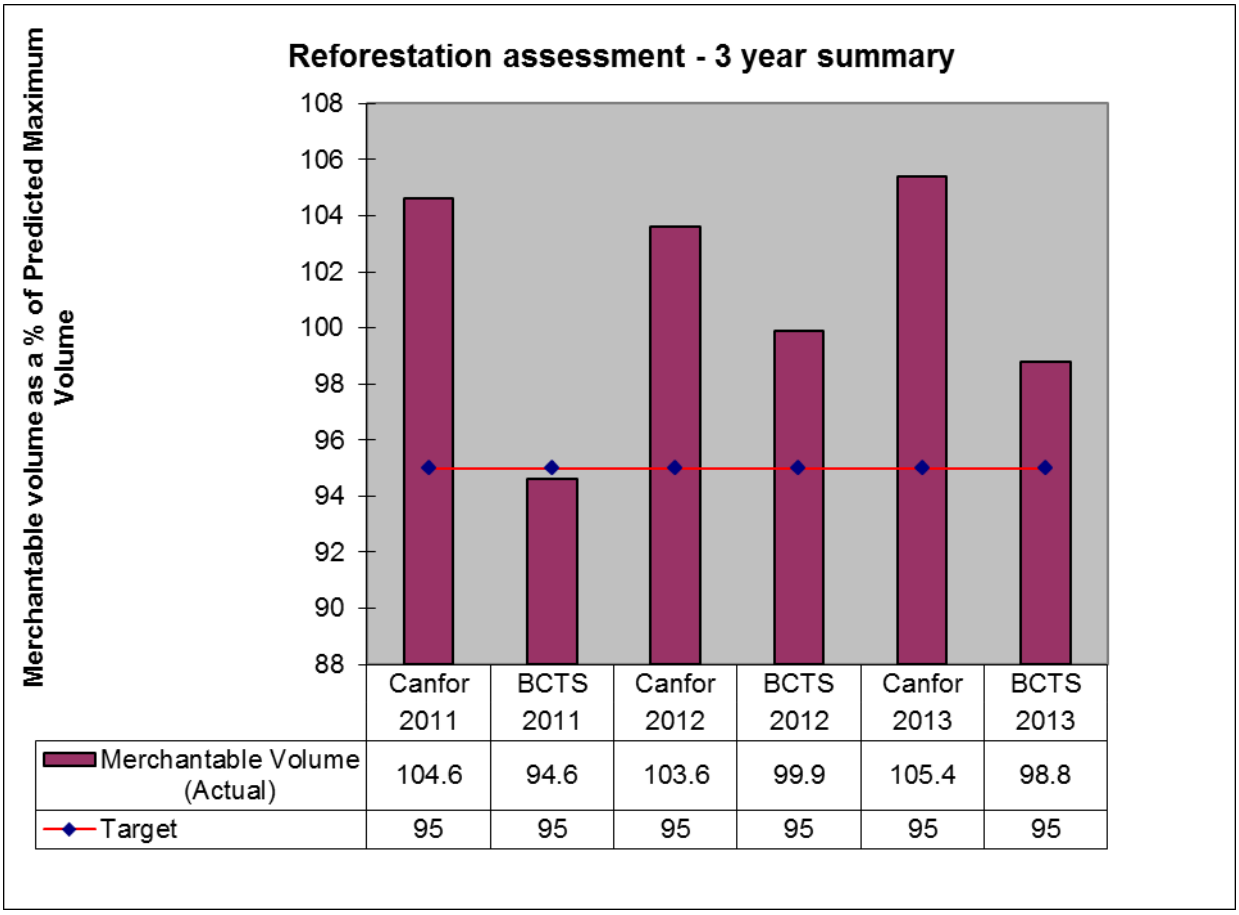


Figure 12: Reforestation assessment merchantable volume prediction

The participants' activities in 2012 and 2013 were consistent with the target for this indicator. The participants' activities in 2011 were not consistent with the indicator target. An action plan was implemented by BCTS and the revised reforestation assessment calculation now meets the merchantable volume target that was in place for the 2011 reporting year. This however is not expressed in Figure 12, as this figure depicts the results achieved in the actual reporting year.

A deciduous volume compiler has been developed and approved for use in assessing reforestation performance on areas to be managed to produce deciduous forests. The MSQ values for deciduous were developed in conjunction with development of a deciduous volume compiler. The TMV target for deciduous blocks was reviewed with MFLNRO staff in conjunction with development of the deciduous compiler and MSQ values. The deciduous compiler will be used to assess reforestation performance on deciduous stands harvested under this SFMP.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Yes.

Future yields are calculated based on a TASS model. Inputs of stocking, species group, effective age, harvest age, and site index are used to calculate a theoretical yield. The target (**TMV**) is set at 95 % (conifer) or 90% (deciduous) of the theoretical maximum predicted merchantable volume (**MPMV**) and the actual predicted merchantable volume (**PMV**) is calculated using field data. This predicts the theoretical timber volume yield expected given the actual silviculture activities implanted on a given cutblock.

Strategy and Implementation Schedule:

The conifer strategy is currently implemented, while the deciduous strategy will be implemented on similar principles to the conifer strategy. The deciduous compiler has been developed and is utilizing government TASS (TASS) outputs derived from deciduous yield curves. The Participants are planning on evaluating the applicability of extending this survey methodology to mixedwoods during the term of this SFMP. The development of a landscape level mixedwood survey methodology will be based on the research document " A Silviculture Survey Methodology for Boreal Mixedwoods" developed by Craig Farnden, which is included in Appendix 18.

Following is a description of the Assessment System which will be used for both conifer and deciduous. The key components of the assessment system are:

- The assessment will measure success with a comparative estimate of theoretical predicted potential yield (volume) to actual expected yield (volume).
- The system will be based on data from individual cutblocks, but the data will be assessed over many blocks across the landscape.
- Areas are evaluated at a predetermined age following harvest.
- The results are tracked at the landscape and cutblock levels.
- Foresters will have flexibility at the cutblock level to vary regimes and provide for other values as they progress to a landscape level target for yield.
- The system will provide data to improve silviculture regimes and targets over time.

The **Maximum Predicted Merchantable Volume (MPMV)** is a theoretical maximum volume that could be attained at a defined post harvest time for a population of cutblocks, assuming a very aggressive reforestation regime.[28]MPMV = function (Species, Site Index, Effective Age_p, Harvest Rotation Age, MSQ_p)

[28] See Section 3.4 of Appendix 7

The **Target Merchantable Volume (TMV)** is determined by multiplying the MPMV for the population of cutblocks by a factor to provide flexibility in the application of silviculture treatments to recognize operational constraints, damaging agents and other resource values.[29]
TMV = *a* * MPMV
Predicted Merchantable Volume (PMV) is the predicted volume that will be attained at a defined post harvest rotation age for a population of cutblocks[30].
Conifer PMV = function (Species, Site Index, Effective Age_m, Harvest Rotation Age, MSQ_m)
Deciduous PMV = function (Species, Site Index, Harvest Rotation Age, MSQ_m)
Conifer
Reforestation obligations will be met when PMV for a population of cutblocks at a defined post harvest time meets or exceeds TMV (i.e. ≥ *a**MPMV), or is consistent with the acceptable variance.

Where:

MPMV	=	Maximum Predicted Merchantable Volume
PMV	=	Predicted Merchantable Volume
TMV	=	Target Merchantable Volume
Species	=	Species group (measured)
Site Index	=	Site Index (measured)
Effective Age_p	=	Effective Age (Prescribed). Set at 14 years.
Effective Age_m	=	Effective Age (Measured).
Harvest Rotation Age	=	Estimated Harvest Rotation Age. (100 years)
MSQ_p	=	stocking (prescribed)
MSQ_m	=	stocking (measured)
a	=	coefficient to estimate the effects of damaging agents, operational constraints and other values

Future volume is predicted using methods developed by J.S. Thrower & Associates, Riverside Forest Products and the Ministry of Forests. The modeling system has been adapted for the Fort St. John Pilot Project area. A full report can be found in Appendix 6. The modeling system is designed to predict future stand merchantable volumes at 80, 90, and 100 years after harvest using only key inputs. The following inputs are used in the model:
Deciduous
Reforestation obligations will be met when PMV for a population of cutblocks at a defined post harvest time meets or exceeds TMV (i.e. ≥ *a**MPMV), or is consistent with the acceptable variance.
Where:

MPMV	=	Maximum Predicted Merchantable Volume
PMV	=	Predicted Merchantable Volume
TMV	=	Target Merchantable Volume
Species	=	Species group (measured)

[29] Section 3.4 of Appendix 7 discusses setting the current TMV at 90% of the theoretical Maximum PMV attainable

[30] See Section 3.3.3 of Appendix 7 "Stand Survey and Growth Modelling for the Fort St. John TSA"

Site Index	=	Site Index (measured)
Harvest Rotation Age	=	Estimated Harvest Rotation Age. (80 years)
MSQ_p	=	stocking (prescribed)
MSQ_m	=	stocking (measured)
a	=	coefficient to estimate the effects of damaging agents, operational constraints and other values

Development of Models to Predict PMV from MSQ Statistics for Deciduous Stands (Farnden 2013), *section 1.0 Introduction*, describes the creation and application of set of models intended to support development of Mean Stocked Quadrant (MSQ) surveys and related stocking standards for deciduous stands in the Peace River region of northeastern British Columbia. It should be considered as an addendum to *Stand Survey and Growth Modeling for the Fort St. John TSA* (J.S. Thrower and Assoc. 2003), and it is assumed here that readers are familiar with the contents of that document. The basic theory and field methods described in the antecedent report continue largely unchanged, with the exception of a few minor alterations at noted in Section 2.0. A full report can be found in Appendix 7A The modeling system is designed to predict future stand merchantable volumes at 80 years after harvest using key inputs. The following inputs are used in the model:

Site Index:

Conifer:

A site index of 20 was used in the TASS simulations. Adjustment factors were developed for other site index values and are applied when estimating both the target and predicted maximum volumes. Adjustment factors are found in Table 3 of Appendix 6. Site index will be calculated using the growth intercept method if possible, otherwise the site index may be obtained from SIBEC or pre-harvest cruise data. Field site index data is used in the MPMV and PMV calculation.

Deciduous:

Development of Models to Predict PMV from MSQ Statistics for Deciduous Stands (Farnden 2013), *Section 3.0 Model Fitting, Page 5*. In order to utilize site index within the PMV/MSQ assessment procedure, a reasonably reliable estimate of age is required. There are at least two options for achieving this including:

1. Assuming that total age is equal to years since harvest (10 years) and that SI is then simply a function of height, and
2. Counting age using bud scale scars on branch whose origin on the stem is immediately below breast height, or

The first of these options is the most likely to be easily applied in the field and is recommended. Based on values derived from the computer program Site Tools, a function to derive site index from total height assuming a total age of 10 years was developed as

$$SI = 2.54 + 4.15 \times HT - 0.0845 \times HT2$$

Where HT is the stand top height (in metres) based on a sample of the fattest tree in each of a set of 0.01 ha plots. The validity of this model is restricted to a SI 50 range from 14 to 28 metres. Given that total age is fixed in this method at 10 years, care will be needed to avoid sampling trees that were already established prior to harvest. Such trees will typically be recognized as emergents, or trees that are obviously taller than the main canopy. In some

cases, it may be possible to confirm that a tree is too old by counting bud scale scars on branches.

Effective Age: Conifer only

The impacts of variables, such as brush, delayed or more intensive silviculture treatments, disease, etc. are accounted for by assigning an effective age to the plantation. An effective age is calculated by comparing the actual site tree height to a height-age curve for the appropriate site index. For trees that have diminished height growth the effective age is less than the actual age while those with better than average height growth have effective ages greater than their actual age. The effective age is used for the calculation of actual Predicted Merchantable Volume (PMV). In the calculation of the theoretical Maximum Predicted Merchantable Volume (MPMV) the effective age is assumed to be fourteen years based on a two-year establishment delay and planting with a one year old tree. Blocks logged over more than one year will be entered into the appropriate assessment year based on the harvest year with the most volume removed from the block. Effective age will be adjusted for area with volume removed from earlier or later years.

Development of Models to Predict PMV from MSQ Statistics for Deciduous Stands (Farnden 2013), *Section 2.0 Model Fitting, Page 1.* There are two primary differences between conifer and deciduous MSQ surveys and proposed stocking standards:

1. Where conifer stands are assessed at year 15, deciduous stands are assessed at year 10.
2. For conifer stands, management-induced acceleration in growth of newly planted trees is reflected in a reduced number of years to breast height and is recognized through application of the *effective age* concept. Uncertainties in age determination for trembling aspen make this impractical. Corresponding changes have been necessitated in the deciduous compilation procedure, where impacts of *effective age* have been eliminated.

Species Group:

The model was developed for pure Pl (>80%), Pl/Sx (21-79%) and pure Sx (>80%) based on stand density at the time of survey. Survey data provides the basis for MPMV and PMV calculations.

The deciduous model was developed for pure deciduous and all species are entered as Aspen. Survey data provides the basis for MPMV and PMV calculations.

Stocking:

The model assesses stocking based on a Mean Stocked Quadrant (MSQ). The theoretical MPMV is calculated based on the target stocking initially prescribed in the SLP. The target well spaced stocking standards (TSS) for each stratum set the MSQ value to be used. The PMV is calculated using field MSQ data.

The above inputs are used to calculate the following predicted and actual yields:

Maximum Predicted Merchantable Volume (MPMV):

The Maximum Predicted Merchantable Volume (MPMV) is calculated for all blocks 15 years post harvest for conifer, and 10 years for deciduous stands (i.e. 15 or 10 complete growing

seasons following logging start date) based on target stocking and an aggressive and timely implementation of current silviculture regimes.
The collected survey data is summarized by stratum. Maximum Predicted Merchantable volume (MPMV) is calculated based on actual data for site index and species composition and theoretical data for stocking and effective age.

Predicted Merchantable Volume (PMV):

Predicted Merchantable volume is calculated using actual field data for site index, species composition, effective age and stocking.

Target Merchantable Volume:

The Target Merchantable Volume (TMV) is set at 95% of the Maximum Predicted Merchantable Volume for conifer areas and 90% for deciduous areas, to account for the effects of damaging agents, operational constraints, and consideration of other values. At the time of assessment the calculated volume based on actual field data (i.e. the Predicted Merchantable Volume) is compared to the TMV.
A number of important differences exist between this strategy and the assumptions used in the TSR. This assessment of reforestation provides a relative measure of success, however, as the system is employed and data collected it will provide feedback to the silviculture regimes and guidelines and may eventually be able to provide feedback to the TSR to improve assumptions and yield calculations. The predicted merchantable volume under this system should not be used for analysis under the Timber Supply Review.

Assessment Survey:

The assessment survey has the following objectives:

- Identify areas not meeting well growing requirements.
- Provide basic data required to predict future volume.
- Provide inventory labels.

Defining the Target Population:

The conifer target population to sample is the total NAR based on all blocks fifteen growing seasons following log start date. Fifteen years or growing seasons has been selected, based on current field experience in the Peace, to provide sufficient time for the silviculture regimes to be implemented and for the plantations to reach a stable well growing state.
The deciduous target population to sample is the total NAR based on all blocks ten growing seasons following log start date. Ten years or growing seasons has been selected, based on current field experience in the Region, which provides sufficient time for natural reforestation to establish on a site.
Conifer SU's in a block will be surveyed separately at year 15 and the data will be used to contribute towards the appropriate volume calculation.

Deciduous SU's in a block will be surveyed separately at year 10 and the data will be used to contribute towards the appropriate volume calculation.

As previously noted, the indicator may apply to coniferous and deciduous area in cutblocks with commencement dates before November 15, 2001, if the Participant submits a statement to that effect. This population may include blocks previously declared as "well growing" by the Participant, as the intent is to measure the cumulative effectiveness of silviculture treatments to meet predicted volume targets.

The target population requires further stratification to define sample populations. Stratification occurs both pre- and post-survey.

Pre-survey stratification is based on the initial stocking requirements, inventory polygons (species composition, site productivity, stand density) and actual stocking levels. Stocking levels below minimum stocking are stratified separately. Post-survey grouping is done based on inventory labels and initial stocking requirements to group strata across the landscape for future yield calculation. Field stratification procedures can be found in **Error! R eference source not found.**.

Sample Design and Data Collection

The sample method follows a systematic sampling design. Plot centers are established on a one hundred metre grid based on UTM coordinates. Two types of plots are established: Full Measure Plots at every fourth plot location to record site quality measurements and Count Plots at every plot to record stocking. Details can be found in **Error! Reference source not found.**.

The above method follows current accepted survey procedures under MFLNRO guidelines except for the assessment of stocking using quadrants. The method is referred to as Mean Stocked Quadrant (MSQ). The method is simple and cost effective to implement. MSQ compares favourably with other methods in estimating stocking and predicting future volume. A detailed comparative review of stocking estimators can be found in Appendix 4: Reforestation Strategy: Stocking Estimators and Future Volume. For deciduous refer to Appendix 7A, *Development of Models to Predict PMV from MSQ Statistics for Deciduous Stands* (Farnden 2013).

Actions to Address Populations Less than the Allowable Variances

When the populations' Predicted Merchantable Volume is less than the acceptable variance to the Target Merchantable Volume (TMV) corrective action will be as follows:

Survey data is required to be maintained at the cutblock level and include areas of low stocking or areas requiring treatment. The data will be reviewed to locate the best candidates for further treatment.

An action plan will be prepared detailing the areas selected for treatment, treatment types, expected results relative to the target, and timelines for completion. Areas selected for treatment will be considered in view of the expected success and the diligence of the Participant in implementing the original plan (see below).The action plan will be included in the Annual Report that documents the survey results and that acts as the notification to the MFLNRO of a non compliance to the landscape level reforestation strategy.

For conifer areas requiring brushing treatment a mandatory period of three years for manual methods and one year for chemical treatments will be required before areas can be reassessed unless otherwise agreed to by the District Manager.

Options for deciduous stands with low stocking are limited to fill plant (mixedwood) or conversion to a conifer stand.

Only those areas selected for treatment will remain under Licensee obligation with the remaining areas released from further obligation.

Once the timelines for the treatments have been met MSQ data will be collected from the treated areas, combined with the original survey data and merged with the original population

data to demonstrate achievement of the target. The results will be documented in the Annual Report.

Situations may arise in which despite due diligence in prescribing and carrying out the silviculture regimes the Participant has not met the target. Where further treatment options are limited the District Manager may waive a requirement for further treatment. When damage to the plantation (fire, etc.) requires replanting, the reduction in effective age will lower the future yield. Timely and aggressive silviculture regimes can help to moderate this effect but it is largely out of the control of the Participant. The Participant is not required to direct extraordinary effort into area under management to try to correct this problem.

In cutblocks that have had an event causing significant damage (e.g. falls under Section 108 of FRPA) to a plantation or site the participants may:

a) Elect to drop the block from its original population group (e.g. Based on the harvest start year) and use the year of the damaging event as the new commencement date to reset the late well growing date from that point in time or,

b) Maintain the block in the current population group if they believe the overall performance of the population will still meet the target

c) Request relief from all obligations, consistent with legislated provisions.

In these situations the Participants may seek funding and/or relief from obligations by government. Where the obligation no longer remains with the Participants, the block will be dropped, and not assessed as part of this indicator.

Monitoring Procedure:

The progress of reforestation monitoring through the establishment phase is addressed in the Establishment Indicator (#30). Stands will normally be monitored at key points in time to ensure reforestation outcomes are unfolding as expected.

Progress Review:

Planting will typically be carried out over the entire conifer area to be reforested as prescribed in SLPs, although in some instances treatment plans may prescribe natural regeneration in conifer stands. Deciduous stands are typically prescribed for natural regeneration.

Following planting, or subsequent to determining that natural regeneration is likely, blocks will be reviewed to assess progress towards achieving SLP requirements where necessary. Progress reviews will normally occur within the first eight growing seasons following harvest commencement. The forester managing each block will summarize the progress to date; and the likelihood of maintained success. Assessment methods are at the discretion of the forester and may vary from an aerial assessment, to a walk through, or even a detailed plotted survey. Deciduous stands will be surveyed at year six or seven to assess if stand is predicted to continue forward on its current successional pathway. Survey methods are at the discretion of the forester and may vary from an aerial assessment, to a walk through, or plotted MSQ survey if stocking appears low.

If stocking is low options available are to fill plant conifer for full conversion to a conifer plantation or partially to a mixedwood stand.

This review is intended to be an internal monitoring activity to provide the Participants with an approximate measure of success. At this time the forester can also decide whether areas below the minimum standards in the SFMP/SLP require further treatments, or can be carried forward in their existing condition if the areas will not impact the success of landscape level targets set out in the SFMP.

Final Assessment

Assessment of achievement of the indicator's target will be calculated using the standards noted above in the 'Strategy and Implementation' section. Assessments will be completed separately for the two Managing Participants' blocks under management (i.e. including all licenses managed by the Participant on behalf of other licenses). Assessments will provide detail on individual cutblock MSQ's, as well as separate rolled up Predicted Merchantable Volume (PMV) totals for coniferous areas and deciduous areas, and the percentage achievement of the target (TMV). This information will be presented in Annual Reports.

Linkages to Operational Plans:

Target stocking requirements are included in Site Level Plans.

Linkages to LRMP:

The indicator statement and target help to support the following LRMP objective:

- *Maintain functioning and healthy ecosystems.*

6.30 ESTABLISHMENT DELAY

Indicator Statement	Target Statement
Establishment Delay (years)	The area weighted average establishment delay for coniferous regeneration will not exceed two years The area weighted average establishment delay for deciduous regeneration will not exceed three years The area weighted average establishment delay for mixedwood stands regeneration will not exceed three years.
SFM Objectives: Maintain the diversity and pattern of communities and ecosystems within a natural range Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance and stress Maintenance of the processes for carbon uptake and storage	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Reforestation Landscape Level Strategy.	

Acceptable Variance:

To allow for variations in site preparation requirements, access, and delays in harvest the acceptable variance for establishment delay is an additional one half year (e.g. 2.5 years for conifer, 3.5 years for deciduous and mixedwood).

What is this indicator and why is it important?

Establishment delay is the period from the start of harvest on the area to be reforested to the completion of initial establishment of a future crop of commercially acceptable species. This indicator is important because delays in the replacement of harvested species can negatively impact future harvest levels. Assessing the delay in establishment on an area weighted basis provides a comprehensive assessment of overall establishment success, encourages prompt reforestation, and provides some flexibility to Participants to employ efficiencies in silviculture plans. Ensuring that harvested stands meet the prescribed establishment delay is an indication that the harvested areas have maintained the ability to recover from a disturbance and thereby maintaining their resiliency and productive capacity.

Current Status:

The Figure below shows a 3-year summary for the coniferous and deciduous regeneration for this indicator:

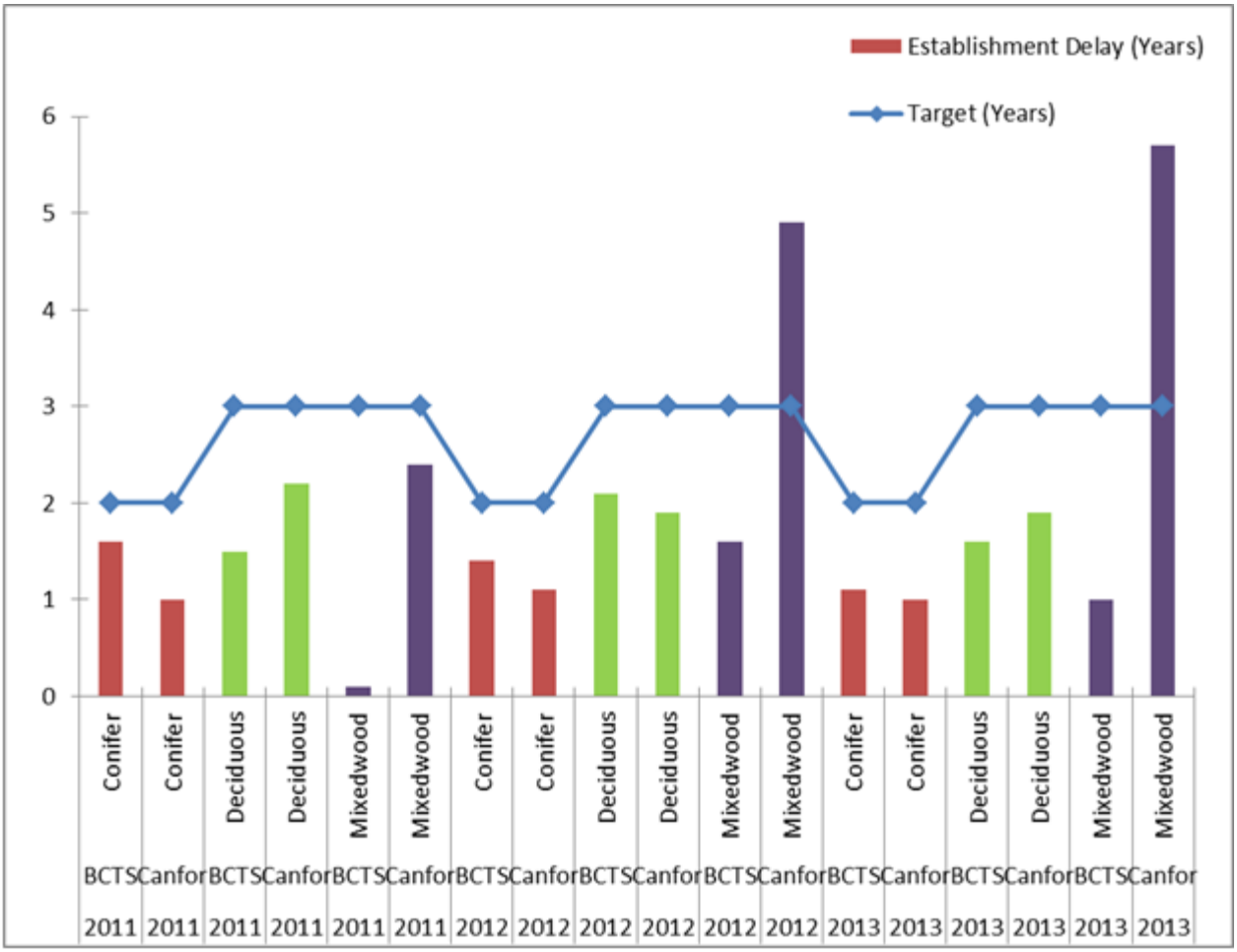


Figure 13 Establishment delay 3-year summary

Coniferous Regeneration:
The coniferous establishment delay target was achieved in all instances.
Deciduous Regeneration:
The deciduous establishment delay target was achieved in all instances.
Mixedwood Regeneration
The mixedwood establishment delay target was not met in 2 instances.
There are currently 4 mixedwood strata totaling 81.1ha which have not met establishment delay, because the blocks have complicated stratification with multiple reforestation obligations on them, with some blocks being regenerated under trial techniques to see which reforestation techniques work best. All of the blocks are scheduled to be surveyed in 2014 or 2015 to declare regeneration.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementation of the indicator strategy will result in prompt reforestation that will reduce delays in developing free growing stands, thereby maximizing use of the

productive capacity of the forest land base to grow trees. Early establishment of a viable crop of trees reduces the need for subsequent interventions (i.e. planting, brushing) and positively contributes to carbon sequestration and reducing harvest rotation periods.

Strategy and Implementation Schedule:

The Landscape Level Reforestation Strategy identifies targets and timelines for reforestation success. Site level plans (SLP's) provide information to develop silviculture regimes on a cutblock level. Information systems (e.g. RESOURCES) are used to track harvesting activity, as well as planned future treatments based on SLP's and post harvest block reviews. Within the first or second growing season after harvesting, coniferous blocks are normally planted, unless natural regeneration is prescribed.

Deciduous blocks typically rely on natural regeneration. Initial assessments may be completed shortly after logging to assess the likelihood of achieving natural regeneration. Obvious areas requiring supplemental conifer planting will be prescribed at that time, but typically a visual or plotted assessment will be done two to four years after harvesting to confirm the establishment of naturals.

The establishment delay is usually within two years where planting is prescribed and two to four years where the stand is expected to reforest naturally.

Survey Procedures:

For artificial regeneration a survey of well spaced trees will normally be carried out during the same growing season as establishment to confirm stocking levels are consistent with the requirements of the SLP. A further survey (well spaced or MSQ) may be carried out within three growing seasons if deemed necessary to confirm stocking is being maintained above minimum levels. The surveys will consider current standards at the time of the survey for measuring well-spaced and total trees. Inclusion of any other parameters, such as brush, health, inventory labeling, etc. will be at the discretion of the implementing forester. Surveys will be completed at an intensity level sufficient to assess regeneration survival and performance. The minimum strata size is 2 hectares.

For natural regeneration a survey of well spaced trees or MSQ may be carried out during the three growing seasons post harvest to confirm stocking levels meet the requirements of the SLP. A minimum of five plots will be placed in each stratum on 100 meter UTM coordinates in a random fashion and meet required confidence limits. A minimum stratum size of 2 ha will be applied.

For areas designated as intimate mixtures a preliminary survey based on the mixedwood stocking standards (Appendix 6) will be completed to determine if establishment delay has been achieved

Monitoring Procedure:

Records of silviculture treatments are entered and tracked in information systems (e.g. RESOURCES). On an annual basis these records are reviewed and all harvested areas that are not completely re-established are identified. The area weighted average age from harvesting start date of all blocks is calculated.

Establishment delay is reviewed annually by summarizing data from RESOURCES on all unstocked cutblocks and calculating the area weighted average age of unstocked area. The establishment delay calculation is as follows:
1) A report will be run from RESOURCES[31] that identifies all blocks that had operational harvesting commence and areas not having met initial establishment according to SLP requirements.
2) The total NAR of these harvested blocks with unestablished areas constitutes the data population.
3) The number of days from harvest start date to March 31 of the reporting year will be determined for each block. The number of days is then multiplied by the NAR in each block, and the product is summed is summed for all blocks.
4) This summation of all blocks (i.e. # days x NAR) is then divided by the total area of NAR to create an area weighted establishment delay in days, and converted to establishment delay in years by dividing by 365.
5) In the rare instance where harvesting is started in a block but not completed within 36 months of the harvest start date (e.g. as might occur to address major sanitation or salvage issues) the NAR will apply only to the harvested portion of the block, and only that portion of the harvested NAR that does not have a crop established will be used in the calculation of establishment delay.

Linkages to Operational Plans:

The Site Level Plans identifies the stocking requirements for each block.

Linkages to LRMP:

The indicator statement and target help to support the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain timber harvesting and forest management opportunities*

[31] RESOURCES refers to 'RESOURCES Forest Resources' which is the common data platform for the Participants (previously known as GENUS)

6.31 LONG TERM HARVEST LEVEL

Indicator Statement	Target Statement
Long-term harvest level (LTHL) as measured in cubic metres per year (m^3/yr)	We will propose an Allowable Annual Cut (AAC) that sustains the LTHL of the Defined Forest Area (DFA)
SFM Objective: Maintain or enhance landscape level productivity No decrease in the LTHL in the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

At the time of SFMP #1 government policy direction was to have TSR's prepared by industry for the Chief Forester's consideration, and determination of the AAC. It is unclear at this time whether industry will be involved in future TSR development. Therefore, this indicator will only apply if the Participants are involved in the preparation of the TSR.
The Participants may propose an AAC however, the Chief Forester (Ministry of Forests) determines the AAC for the management unit.

What is this indicator and why is it important?

The LTHL is the harvest level that can be maintained indefinitely given a specified timber harvesting land base and associated management regime within the DFA. The analysis that accompanies the TSR is based on the best available information and provides a timber supply forecast for the next 250 years. Timber Supply Reviews are generally conducted every five years during which the assessment of the long term sustainable harvest level can be reviewed in the context of current socio-economic condition, ecological consideration and also with updated inventory and forest management information. AAC's are determined by the Chief Forester of BC and are generally within the long-term harvest level forecasts in order to ensure sustainable forest productivity.
Since the impacts of forest utilization that occur today will affect future generations, it is necessary to be able to plan for sustainable forest management over centuries. The short- and medium-term harvest projections are directly linked to the long-term sustainable harvest levels. Incorporating new (best available) information and changing social values into the periodic timber supply analysis, provides an opportunity to fine tune short-term and long-term harvest levels throughout time and be responsive to changing conditions while still considering the long-term sustainability of the forest ecosystem.

Current Status:

The next AAC determination by the provincial Chief Forester was deferred in 2008 and was to occur no later than January 2013. Work on the Timber Supply Review was scheduled to commence in the fall of 2011 but was delayed and commenced in the summer of 2013. Government staff have indicated that they will be doing the majority of the work for the TSR, with the Participants being involved from a review and comment perspective. TSR release is

expected to occur summer 2016. Currently the AAC remains at the levels set in 2003. The participants are in conformance with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

Forecasting of this indicator is completed as part of the TSR process and completed every 5 years. Participants update the status of their individual AAC's annually and information that goes into the TSR is updated as it becomes available. The next timber supply determination was originally scheduled for 2009 but has since been deferred to 2013.

Timber supply is usually considered within the context of three relative timeframes — short, medium, and long term. The short term is typically represented by the first two decades of the harvest forecast and reflects the period in which the scheduled harvest level is defined by immediate concerns of achieving socio-economic objectives and maintaining non-timber values. The medium term corresponds to the transition from harvesting mostly old growth to harvesting managed stands. The long term is the period that begins approximately when the harvest reaches the LTHL. It is anticipated that TSR3 will identify a sustainable harvest base case and that the MFLNRO will establish an AAC that sustains the LTHL of the DFA, thereby sustaining the flow of economic and ecological values derived from the DFA well into the future.

Strategy and Implementation Schedule:

Guidance in developing harvest flow objectives is taken from the current economic and social objectives of the Crown expressed by the Minister of Forests in a letter to the Chief Forester in 1994. In the letter, the Minister emphasized the importance of the continued availability of good forest jobs and the long-term stability of communities that rely on forests. The letter also states that any decreases in allowable cut at that time should be no larger than necessary to avoid compromising long-run sustainability.

In general, a reasonable flow pattern provides for a managed and gradual transition from short-term to medium and long-term harvest levels and avoids large and abrupt disruptions in timber supply. A reasonable flow has a medium-term level that drops below the long-term level to the minimum extent and only if justified. The long-term level should provide an even level of growing stock over the long term.

Monitoring Procedure:

The data needed to monitor and forecast this indicator includes, but is not limited to:

- VRI (Vegetation Resources Inventory) forest cover
- Timber supply information package; current management assumptions
- Growth and yield curves/tables
- Social-economic parameters (employment, taxes, government revenues, etc.)

Long-term monitoring of managed stands will occur through Change Monitoring Inventory (CMI) plots established over the DFA. These plots are systematically established across the DFA based on a 3-km grid in stands 15 years after harvesting. These plots will provide a representative sample of all managed stands over time. The first 78 plots have been established from 2003 though to 2009 in blocks greater than 15 years old. There will be

additional samples established each year in conifer and deciduous stands as the new plantations reach 15 years of age.
The CMI plots are planned to be re-measured on an approximately 10-year cycle providing growth and yield data for managed stands that can be used to check the accuracy of yield curves used to project growing stock in managed stands within the THLB.

Linkages to Operational Plans:

The TSR forecasts short, medium, and long-term harvest levels for the DFA. The Chief Forester determines an AAC for both deciduous and coniferous timber harvesting land bases, and the Minister of Forests sets an apportionment to each forest tenure. Forest tenure holders (licensees) develop operational harvest plans (Forest Development Plans, or Forest Operations Schedules) using AAC as a key driver for development.

Linkages to LRMP:

The indicator statement and target help to support the following LRMP objectives:

- *Maintain timber harvesting and a long-term timber supply.*
- *Maintain timber harvesting and forest management opportunities.*

6.32 SITE INDEX

Indicator Statement	Target Statement
Site index	Average post harvest site index will not be less than average pre-harvest site index on blocks harvested under the Pilot Project regulation
SFM Objective: Maintain or enhance landscape level productivity Protect soil resources to sustain productive forests	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

A maximum negative variance of 15% post harvest site index versus pre harvest site index, for statistical variability.

What is this indicator and why is it important?

Site index is a relative measure of forest site quality. It is a measure of the height growth that can be expected 50 years after trees reach 1.3 metres in height for a tree species on a given site. Site index is highly sensitive to changes in ecological site conditions including soil nutrients, moisture and other variables, and is generally considered one of the most reliable indicators of site quality. Conducting activities in a manner that decreases a site's potential capability to produce timber will be reflected in reduced post harvest site index.

Soil productivity is one of the main factors impacting site productivity. Site index will be negatively affected if soil productivity were significantly reduced due to harvesting activities. A relative comparison of a plantation's average site index when well growing compared to the pre-harvest site index is therefore an appropriate method for evaluating if the resiliency and productive capacity of forest stands and forest soils has been maintained.

Current Status:

Testing the practicality of using cruise information for assessing site index (SI) was done in 2002. Cruise information for 25 blocks was analyzed and compared to forest cover map site index. Due to the age of the inventory in some parts of the TSA, six of the blocks had site classes rather than site indices identified, so they were assigned SI based on averages for the site class. Three (12%) of the average site indices determined by cruise information were lower than the forest cover SI, the rest were the same or higher. In one sample, forest cover site index overestimated the SI by 11.1% compared to the cruise data. These minor discrepancies appear to be related to the accuracy of the inventory, and statistical variability. Accounting for natural variability within blocks, and normal statistical sampling error of the measurements, a maximum variance of 15% to the target minimum should be permissible.

Silviculture surveys to date generally have not calculated site index by the growth intercept method. Site index for previous silviculture surveys was estimated from either preexisting forest cover information, or from ecotype averages.

Since the completion of the last SFMP preharvest site index has been collected from either cruise data, or from inventory labels, and is recorded by cutblock and/or SU in CENGEA, or in RESULTS submissions.
The majority of SPs/SLPs for blocks harvested since Nov. 15, 2001 have been updated to include pre-harvest site index, so that the data will be readily available when well-growing assessments are made to them in the future. All SLP's completed by the participants between April 1, 2013 and March 31, 2014 include site index. Blocks for which licensees developed SLP's during the reporting period have Site Index identified for each Standard Unit.
There has been no change in the status of this indicator since the development of SFMP # 1.
This indicator applies to blocks harvested since Nov. 15, 2001 that have undergone completion of a well growing assessment as per the required well growing assessment schedule. To date no well growing assessments were required to be completed during the previous reporting periods.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementing the indicator strategy will maintain the productive capacity of the landbase yielding healthy ecosystems and long term timber supply.

Strategy and Implementation Schedule:

The vast majority of the forests in the DFA are even aged, thrifty to mature stands, which make them amenable to collecting accurate pre-harvest site indices during operational cruising activities, utilizing existing site index compilation programs. In some instances where cruising information is not available pre-harvest, site index estimates will be derived from forest inventory maps, or alternatively from SIBEC information, although this source is considered less reliable at present.
This indicator will initially only apply to blocks harvested under the *FSJPPR* (i.e. harvesting commenced Nov. 15, 2001 or later). Silviculture blocks harvested prior to this date are currently subject to existing SLP provisions for detrimental site disturbance.

Monitoring Procedure:

The site index information will be compiled for each SU in each well growing block surveyed. Silviculture staff will compare the prorated averages of pre-harvest SI in each block to the recorded post harvest SI, and report this information in Annual Reports.
Future Annual Reports should report out on any declared blocks harvested under the *FSJPPR* (November 15th, 2001 or later start dates) the preharvest and post harvest SI.

Linkages to Operational Plans:

Managing Participants will ensure that cruising project tenders include SI requirements within the contract documents. Site level plans (SLP's) will identify the pre-harvest site index for each SU from the cruising information, or where not available, from the forest cover inventory information. Well growing surveys will collect and report site index by SU.

Linkages to LRMP:

Site index provides a measure of the capability of the sites' future productivity, and an indication of the impact of forest operations on this capability. This indicator therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Enhance timber harvesting and a sustainable long term timber supply.*
- *Maintain timber harvesting and forest management opportunities.*

6.33 PEAK FLOW INDEX

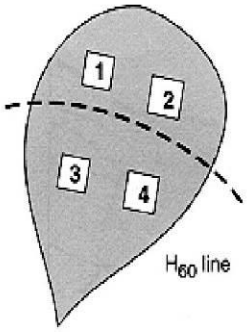
Indicator Statement	Target Statement
The percentage of watersheds achieving baseline targets for the peak flow index and the percent of watershed reviews completed where the baseline target is exceeded	95% or more of the watersheds will be below the baseline target All watersheds that exceed the baseline target will have a watershed review completed wherever new harvesting is planned
SFM Objective: Maintenance of water quantity	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Riparian Management Landscape Level Strategy.	

Acceptable Variance:

A variance to a minimum of 90% of the watersheds below the baseline targets will be acceptable.

A zero variance for conducting a watershed review wherever new harvesting is planned in a watershed where the baseline target is exceeded.

What is this indicator and why is it important?



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 = **72.5**

Peak Flow Index = $\frac{72.5}{1000}$ = **0.0725**

Figure 14 Peak Flow Index - Example Calculation

Most changes to stream channel stability and fish habitat occur during large runoff events, or peak flows (Beaudry and Gottesfeld 2001). In the interior of British Columbia most peak flows occur during spring snowmelt. Large disturbances in a forested watershed, such as extensive forest harvesting or wildfires, can have a negative impact on peak flows by increasing the flows above stability thresholds. This can accelerate streambed and stream bank erosion, damage fish habitat and result in an unstable fluvial system. After forest harvesting or wildfires have disturbed an area, both winter snow accumulation and spring snow melt rates increase (Winkler 2001). However, the impact of disturbances on peak flows is not equal throughout a watershed. Disturbances that are located at higher elevations in a watershed have a greater impact on peak flows than do those located at lower elevations (Gluns 2001). Consequently, it is important that a good water quantity indicator take this fact into consideration. The Peak Flow Index (PFI) considers this by providing a greater weight factor to the disturbances that occur at higher elevations. The "higher elevation" is defined as the upper 60% of the watershed. This "upper watershed area" is defined individually for each watershed or sub-basin by using the concept of the "H60 line".

The Peak Flow Index (PFI) also considers that the forest will re-grow over time within a disturbed area. As re-growth occurs, the negative impact of accelerated snow accumulation and melt is reduced and consequently so are the impacts to increased peak flows. The PFI considers stand height as the indicator of re-growth. The PFI value decreases as the stand height increases. The PFI provides an objective method to forecast and evaluate the potential effects of past disturbances and future plans. By providing conservative target values, it ensures that rates of forest harvesting do not contribute to the degradation of the water resource. **Error! Reference source not found.** provides an example of how PFI is calculated f or a 1000 ha watershed.

The Peak Flow Index is not intended to be a detailed quantitative modeling of increased volumes of flows. The Peak Flow Index will be used as a "coarse-filter" to identify where a more detailed review of the watershed is required when new harvesting is planned i.e. if the PFI for the watershed is below the baseline target when new harvesting is planned then no further review is required. However, if the current PFI is above the baseline target when new harvesting is planned then a more detailed review of the watershed is required.

Current Status:

There are 105 watersheds delineated for monitoring PFI. As part of the preparation of Forest Operations Schedule #2, a DFA-wide analysis of watersheds was conducted. The analysis determined the impact of FOS #2 to each watershed's peak flow index, by modelling the impact of the participants' total proposed harvest and the projected growth of forest stands. The analysis showed that all watersheds (105 of 105, 100%) are within the target threshold for peak flow upon completion of all harvest activities proposed in FOS# 2 through 2016. Table 29 identifies the peak flow index expected upon completion of all harvest activities proposed in FOS# 2 in 2016. Table 29 also indicates the PFI current status in 2015. The 2015 analysis indicates that all watersheds (105 of 105) are within the target thresholds for peak flow.

Table 28: PFI FOS Condition and Targets

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
Fontas	Bedji Creek		230.42	460 – 600	508	50	2.6	2.07
Fontas	Chasm Creek		168.21	539 – 680	599	50	0.2	0.41
Fontas	Dazo Creek		260.27	360 – 494	460	50	1.9	1.31
Fontas	FONT Unnamed 1		117.73	361 – 481	461	50	1.2	2.43
Fontas	Fontas River		320.35	536 - 800	660	50	1.1	5.98
Fontas	Kataleen Creek		162.95	380 – 451	413	50	0.7	1.31
Fontas	Teklo Creek		212.81	380 – 474	426	50	0.6	5.57
Fontas	Upper Etthithun River		404.45	620 – 842	680	50	6.2	2.94
Fontas	Ekwan Creek	LB	850.5	360 – 481	420	50	1.2	3.68
Fontas	Etthithun River	LB	1161.6	440 – 842	535	50	3.6	0.64
Fontas	Fontas River - LB	LB	714.32	440 – 800	580	50	0.6	14.53
Kahntah	Dahl Creek		412.84	535 – 943	700	50	0.9	7.34
Kahntah	Helicopter Creek		147.32	505 - 742	613	62	1.2	1.28
Kahntah	KAHN Unnamed 4		226.87	640 – 944	720	50	6.7	1.36
Kahntah	KAHN Unnamed 5		126.05	538 – 721	624	62	1.0	2.47
Kahntah	Upper Cautley Creek		478.27	660 – 1022	740	62	5.5	0.95
Kahntah	Cautley Creek	LB	865.02	518 – 1022	680	62	4.3	1.77
Kahntah	Kahntah	LB	1096.5	518 - 944	700	50	2.5	11.

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
	Creek		9					87
Lower Beatton	Aitken Creek		828.45	654-985	815	43	31.2	16.99
Lower Beatton	Charlie Lake		292.66	690-889	773	62	53.3	9.45
Lower Beatton	Doig River		983.34	623-852	731	43	7.6	2.04
Lower Beatton	Osborn River		735.95	623-987	745	43	17.3	13.30
Lower Beatton	Umbach Creek		430.91	611-866	741	43	27.3	7.69
Lower Beatton	Upper Blueberry		857.77	655-1048	820	50	27.6	16.93
Lower Halfway	Aikman Creek		118.74	640 - 1120	815	43	31.0	9.47
Lower Halfway	Blair Creek		230.44	698 – 1142	902	43	25.3	24.87
Lower Halfway	Cameron Creek		495.18	699 – 1203	944	43	22.3	8.34
Lower Halfway	Colt Creek		158.53	719 – 1701	913	43	16.7	15.23
Lower Halfway	Deadhorse Creek		208.99	560 – 959	820	43	33.6	7.85
Lower Halfway	Ground Birch Creek		338.39	558 – 1062	735	43	24.6	21.01
Lower Halfway	Horn Creek		426.61	1079 – 2347	1474	37	0.01	2.53
Lower Halfway	Kobes Creek		299.88	620 – 1648	828	50	21.9	15.88
Lower Halfway	LHAF Unnamed 1		216.47	699 – 1022	860	43	31.4	0.07
Lower Halfway	Needham Creek		328.94	938 – 2269	1430	43	0.04	12.11
Lower Halfway	Poutang Creek		179.97	1098 – 2393	1453	43	0.0	12.82
Lower Halfway	Townsend Creek		295.8	698 – 1081	880	43	37.7	0.14
Lower	Cameron	LB	2029.3	538 - 1205	837	37	30.8	0.1

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
Halfway	River - Residual		2					3
Lower Halfway	Graham River	LB	2309.94	530 – 2404	1279	43	4.7	18.78
Lower Sikanni	Bull Creek		351.34	639 – 981	752	50	19.5	3.13
Lower Sikanni	Dechacho Creek		172.51	378 – 762	516	50	2.4	4.27
Lower Sikanni	Katah Creek		594.82	419 – 915	660	50	13.6	2.08
Lower Sikanni	Kenai Creek		78.86	400 – 621	1000	50	2.9	2.50
Lower Sikanni	LSIK Unnamed 2		162.43	536 – 858	720	43	12.6	1.60
Lower Sikanni	LSIK Unnamed 4		59.29	519 – 721	641	50	2.2	3.86
Lower Sikanni	Niteal Creek		516.6	359 – 520	475	50	0.2	7.29
Lower Sikanni	Upper Gutah Creek		806.45	559 – 901	728	62	7.3	1.82
Lower Sikanni	West Conroy		248.28	638 – 1020	782	50	22.7	0.30
Lower Sikanni	Conroy Creek	LB	1096.67	417 – 1020	720	50	16.4	2.44
Lower Sikanni	Gutah Creek	LB	1450.99	380 – 901	645	50	5.6	6.25
Milligan	Dede Creek		128.35	680 – 740	720	62	22.4	2.60
Milligan	Flick Creek		203.24	700 – 859	780	62	5.0	2.26
Milligan	Little Beaverdam Creek		334.14	690 – 854	732	62	2.7	1.46
Milligan	MILL Unnamed 3		325.52	780 – 962	880	62	0.7	5.40
Milligan	Milligan Creek		432.38	680 – 941	780	50	4.6	2.26
Milligan	Upper Milligan		382.2	719 – 941	832	50	2.1	2.22

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
	Creek							
Milligan	Milligan Creek - LB	LB	1836.56	619 – 941	758	50	6.7	2.04
Upper Beatton	Arrow Creek		507.02	661 – 902	783	50	2.2	3.25
Upper Beatton	Beatton River		1071.09	777 – 1780	984	43	15.0	7.84
Upper Beatton	Black Creek		666.11	700 – 1022	807	50	6.7	8.51
Upper Beatton	Grewatsch Creek		269.73	736 – 1103	927	50	19.2	6.85
Upper Beatton	Holman Creek		150.18	719 – 1080	896	50	27.9	10.66
Upper Beatton	Jedney Creek		128.76	779 – 1101	952	43	19.7	8.56
Upper Beatton	La Prise Creek		338.99	717 – 1021	860	50	18.3	15.68
Upper Beatton	Martin Creek		120.24	700 – 980	830	50	17.3	43.23
Upper Beatton	McMillan Creek		103.34	659 – 770	736	43	1.9	1.55
Upper Beatton	Nig Creek		476.81	680 – 920	782	50	21.0	23.55
Upper Beatton	UBTN Unnamed 9		156.26	677 – 880	757	50	2.5	2.23
Upper Beatton	Upper Beatton Lrg	LB	2345.63	719 - 1782	924	50	18.9	9.10
Upper Halfway	Blue Grave Creek		158.63	720 – 1722	960	37	12.0	5.46
Upper Halfway	Horseshoe Creek		197.41	739 - 1762	1060	37	8.5	6.98
Upper Halfway	Two Bit Creek		160.23	980 – 1888	1235	37	0.6	2.96
Upper Halfway	UHAF Unnamed 3		127.86	922 – 1862	1221	37	0.0	2.31
Upper Halfway	UHAF Unnamed 6		211.34	778 – 1981	976	37	14.5	1.00
Upper	Upper		426.75	925 – 2336	1395	37	0.0	0.0

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
Halfway	Chowade							5
Upper Halfway	Upper Cypress		334.89	1099 – 2316	1493	37	0.0	17.87
Upper Halfway	Upper Halfway River		629.22	1103 – 2590	1235	37	0.0	5.48
Upper Halfway	Chowade River	LB	988.88	779 - 2331	1475	43	3.9	0.00
Upper Halfway	Cypress Creek	LB	620.07	840 – 2229	1200	37	5.6	0.12
Upper Halfway	Upper Halfway River - LB	LB	1096.06	914 – 3057	1241	37	0.2	0.36
Upper Peace	Coplin Creek		350.04	582-942	773	43	36.5	23.76
Upper Peace	Farrel Creek		646.01	447-1686	713	43	27.6	12.68
Upper Peace	North Cache Creek		187.89	548-909	759	43	29.7	16.07
Upper Peace	Red Creek		239.85	446-919	753	43	32.5	13.39
Upper Prophet	Besa Creek		515.61	1136 – 2993	1568	43	0.01	0.16
Upper Prophet	Minaker River		170.31	859 – 1742	1060	43	0.8	2.57
Upper Prophet	Nevis Creek		182.43	1019 – 2102	1422	37	0.01	1.79
Upper Prophet	Pocketknife Creek		235.85	860 – 1884	1110	43	0.2	0.30
Upper Prophet	Upper Keily Creek		269.62	1137 – 2920	1683	37	0.0	1.19
Upper Prophet	Minaker River - Residual	LB	555.08	819 – 1820	1070	43	0.8	0.01
Upper Prophet	Upper Prophet	LB	1177.85	1020 - 2993	1569	37	0.00	0.12
Upper Sikanni	Boat Creek		391.83	455 – 1081	719	50	0.0	0.69

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS # 2	PFI 2015
Upper Sikanni	Buckinghorse River		389.18	840 – 1936	1119	43	1.6	2.37
Upper Sikanni	Coal Creek		214.49	637 – 1079	900	43	9.7	2.67
Upper Sikanni	Daniels Creek		223.39	758 – 1263	1041	43	2.6	4.83
Upper Sikanni	Donnie Creek		122.16	520 – 1043	822	50	13.2	4.33
Upper Sikanni	Loranger Creek		132.18	1025 – 2018	1390	43	0.0	8.35
Upper Sikanni	Medana Creek		138.68	702 – 1183	1000	43	2.5	0.18
Upper Sikanni	Middle Fork Creek		207.97	857 – 1269	1060	43	0.3	1.37
Upper Sikanni	Sidenius Creek		460.87	1119 – 2619	1489	43	0.04	3.68
Upper Sikanni	Sikanni Chief		470.52	1119 – 2739	1488	43	0.53	2.57
Upper Sikanni	Temple Creek		216.19	458 – 901	760	43	10.6	0.22
Upper Sikanni	Trimble Creek		160.27	1082 – 2122	1439	43	0.0	1.84
Upper Sikanni	Trutch Creek		858.44	491 – 1262	781	43	6.3	6.94
Upper Sikanni	Buckinghorse River - Residual	LB	1239.18	618 - 1936	1029	43	2.1	0.22
Upper Sikanni	Sikanni Chief - Residual	LB	2902	618 – 2739	1143	43	4.1	5.76

Forecasting Assumptions and Analytical Methods:

The watersheds and baseline target PFI's were developed by Pierre Beaudry, MSc, RPF, Professional Hydrologist (P. Beaudry & Associates Ltd. Watershed Management Services). The watersheds are based on the BC Provincial Watershed Atlas. The following principles were applied when delineating watersheds:

- The watershed boundaries are based on the concept of hydrologic watersheds (water draining through a single point) as opposed to political watersheds. Modifying the true hydrological watershed to fit within the political landscape was avoided wherever possible. Also, small watersheds, known as "residual areas" were not "lumped" or aggregated into a single unit. The PFI concept is most relevant if it monitors a single hydrologic watershed.
- The size of sub basins in this plan range from approximately 60 to 2,900 square kilometres. Very small watersheds and very large watersheds are not included because the PFI concept is most applicable at the sub basin level.
- Watersheds were delineated where the DFA covered at least 50% of the watershed area. Therefore one watershed extends beyond the DFA. Alternatively, the DFA is not completely covered by watersheds. Despite these physical limitations the majority of the planning area is covered by watersheds.

Watersheds were named according to the local name of the water body, where applicable. A basin name was also added to provide a geographic reference.

Once all watersheds were delineated, a baseline target was determined for each of the watersheds. The setting of an absolute PFI target is very difficult and can lead to significant controversy. Although there is no single widely accepted threshold value, conservative targets are suggested. Although the physical and biological impacts from increased peak flows are not known, there will be temporary increased flows caused by the removal of a large percentage of the forest canopy. Consequently, a maximum target is set with the overall goal of maintaining the sustainability of the aquatic resource without being overly conservative. The targets must consider the type of watershed and type and stability of the fluvial system. The idea behind setting a baseline target is not to prevent changes in peak flows to occur, but to maintain flows within levels that will not unduly accelerate rates of streambed and stream bank erosion and degrade fish habitat. The suggested target PFI values are partly subjective and are based on a combination of professional opinion, scientific literature and 20 years of personal involvement in research projects investigating peak flows by Pierre Beaudry. Further details on the development of peak flow indices can be found in the report provided to the Participants by Pierre Beaudry, *"Peak Flow Index Calculations for 96 Watersheds in the Fort St. John Defined Forest Area, March 2003".*

Long term forecasting was completed over the full 250 year planning horizon for this indicator. Due to complexities in modeling the direct PFI index because of difficulties in tracking the area above and below the H60 line and applying the constraints, a simplified forecasting was done using Equivalent Clearcut Area (ECA) targets. ECA targets were developed by Pierre Beaudry as well as PFI targets. The ECA targets are set lower to reflect the lack of consideration for increased flows coming from above the H60 line within a watershed. Forecasting results showed that all targets were met over the 250-year planning horizon.

Strategy and Implementation Schedule:

There are two levels of implementation for this indicator: PFI calculation (coarse filter), and watershed review (fine filter).

The first indicator target is established to provide the number of watersheds with PFI's that may exist above the baseline PFI at any point in time. The target percentage was determined from a review of the number of watersheds currently above the baseline target and the number that are

expected to be above the baseline target after the 2004 Forest Operations Schedules (FOS) was implemented. The second indicator target was established to ensure that where new harvesting is planned within watersheds that exceed the baseline PFI a watershed review is completed. Watershed reviews will be performed by a professional hydrologist and will make specific recommendations for further development in the watershed. These recommendations will then be implemented with operational plans.

The impacts of future harvesting on PFI will next be projected and reported in the 2016 FOS which is scheduled to be completed in the summer of 2016. Information will be updated on recent fires, past and future harvesting, and tree growth to identify the projected impacts on PFI target achievement for the term of the FOS.

Monitoring Procedure:

Data sources include forest cover inventory, watershed boundaries, adjacent licensee planning and harvest history information, and RESOURCES data. All Participants are using RESOURCES to track planning and harvest history information.

Forest cover information and biogeoclimatic maps are updated either by the Provincial Government or by Forest Licensees under contract with the Government. These data sources are usually only updated / replaced in five to 10 year intervals. Adjacent licensee information is obtained from other licensees that share the same biological land base. This information is obtained periodically as new information becomes available. The Participants utilize a "real-time" or "live" database (RESOURCES Forest-Resources) that is maintained and updated by the Participants' staff. There are 105 watersheds with PFI baseline targets identified in the DFA. Three reports will be generated. The first report is a tabular report of the PFI within each of the 105 watersheds. The second report is a single number that identifies the percent of watersheds that are below the PFI for any given year. The third report shows the number of watersheds exceeding the baseline target PFI that have had a watershed review completed if new harvesting is planned.

Report 1 calculations: Forest cover is projected to the current date by overlaying the Participants' block data and adjacent licensee information. Each harvest area is weighted based on its elevation and stand height to determine the actual PFI.

Report 2 calculations: The number of watersheds below the baseline target PFI / the total number of watersheds (105), expressed as a percent.

Report 3 calculations: The number of watersheds exceeding the baseline target PFI where new harvesting is planned and a watershed review is complete / the total number of watersheds reviews expressed as a percent.

To monitor this indicator, the reports will be run when new harvesting is reported in FOS's and compared to the overall target. The results of watershed reviews will be compared to the initial targets to determine the effectiveness of the target. If the reviews indicate that the targets were not appropriate, a review of all assumptions used to determine the targets will be done. The review may result in the targets being adjusted.

Linkages to Operational Plans:

The data will be used at the FOS level to guide future harvest planning. Results of watershed reviews will be used to adjust practices where necessary.

Linkages to LRMP:

The PFI indicator supports the following LRMP objectives:

- *Sustain natural stream flow regime.*
- *Maintain fish habitat and water quality for priority fish species.*
- *Maintain the headwaters of major rivers and streams as a source of water for current and future generations.*
- *Promote water stewardship to manage for other resources.*
- *Protect water quality and quantity in Charlie Lake watershed.*

6.34 WATER QUALITY EFFECTIVENESS EVALUATION

Indicator Statement	Target Statement
The percentage of surveyed stream crossings annually identified with a high WQEE (formerly WQCR) rating on forestry roads within the DFA for which Participants have stewardship WQCR – Water Quality Concern Rating WQEE – Water Quality Effectiveness Evaluation	On an annual basis fewer than 30% of the total number of surveyed stream crossings on roads for which the Participants have stewardship will have 'High' WQEE* [32] *formerly WQCR
SFM Objective: Maintenance of water quality	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Maximum allowable 'high' WQEE will be 35%.

What is this indicator and why is it important?

Sediment from forestry practices is generated mainly from the following three sources: roads, landslides and stream bank instability. Significant increases in sediment concentration in streams over natural levels can have a negative effect on fish and fish habitat (Slaney et al. 1977; Government of BC 1995; Hall et al. 1987; Hartman and Scrivener 1990; Phillips 1971; Scrivener and Tripp 1998.). Sediment can also reduce the value of water for domestic and agricultural use (Government of BC 1995). In areas where rainfall precipitation is dominant and harvesting occurs on steep slopes, landslide processes can be a major contributor of sediment to streams. In areas such as the Fort St. John DFA, where the landscape is dominated primarily by rolling hills and low precipitation, landslides are a less significant landscape process than in many other areas of the province.

Sediment yields from logging roads can show a 2-to-50-fold increase over historical levels (Reid 1993). The main point of road sediment delivery to streams is at crossings such as culverts and bridges (Brownlee et al. 1988; Government of BC 1995). While it is recognized that roads are not the only source of sediment related to forestry practices, they are considered to be the most significant causes of increased sedimentation (Beschta 1978; Brownlee et al. 1988; Government of BC 1995; Reid and Dunne 1984). Through the proper layout, construction, deactivation and use of erosion and sediment control (ESC) measures, the impact that roads have on water quality can be significantly reduced (Beaudry 1998; Government of BC 1995). In an effort to assess the impact that stream crossings are having on the water quality within the

[32] 2010 SFMP target revised to annual measurement from three year rolling average of 2004 SFMP

Fort St. John TSA, a field-based assessment, known as the Stream Crossing Quality Index (SCQI) was developed.

The SCQI method is a subjective type of assessment, yet it is systematic in its approach. There are no detailed quantitative measures that must be made (e.g., length and depth of erosion rills). The SCQI method was designed with the assumption that it is better to assess a much larger number of crossings in a qualitative way (i.e., a significant proportion of the crossings within a watershed), than it is to assess only a few crossings in a very detailed, quantitative way. A balance between effectiveness and efficiency has been developed when performing the SCQI field assessments. The SCQI method was designed to be conducted relatively quickly (10 to 15 minutes per crossing) so that a maximum number of crossings can be assessed within an area of interest.

The result of conducting the SCQI field surveys is an individual score for each crossing surveyed. This is calculated based on the erosion and sediment delivery potential of the crossing and results in a numerical score. The individual crossing score is used to assign a Water Quality Concern Rating (WQCR) of None, Low, Medium, or High to each individual crossing. The WQCR can then be used to identify individual or groups of crossings that may be having a negative impact on local water quality.

Starting in the 2021 reporting season, the Participants propose switching to the FREP's (Forest and Range Evaluation Program) methodology of calculating the WQEE. The WQCR method is outdated, but very similar in approach and data collected. One of the authors of both methods, Pierre Beaudry, suggested this would be a logical change. The WQCR method was being converted to the WQEE variable regardless.

Current Status:

Water Quality Effectiveness Evaluation (formerly WQCR) field surveys were conducted on forty-five crossings along fish bearing streams in 2013. Results of the field surveys are presented below.

The participants achieved the indicator target for the 2013/14 reporting period.

Table 29: Summary of WQCR data collected during 2013

Status	*WQCR 'High'or 'Very High' (# crossings)*	*WQCR 'Medium' (# crossings)*	*WQCR 'Low' or 'Very Low' (# crossings)*	*WQCR 'None' (# crossings)*	*Total (#)*	*%crossings rated 'High'*
All combined	5	12	22	6	45	**11.1**

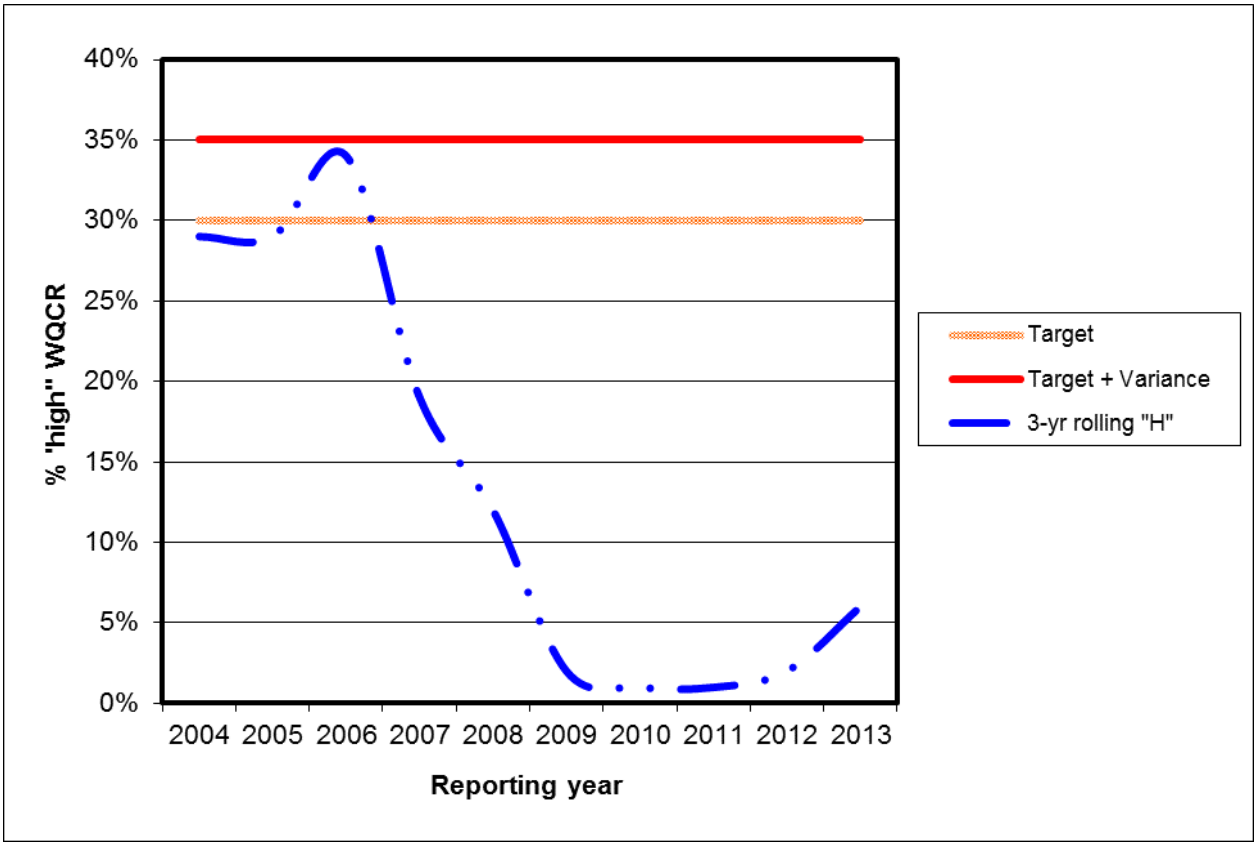


Figure 15 Three Year Rolling Average of WQCR

Error! Reference source not found. summarizes the results of three-year rolling averages with ' high' WQCR for data collected between 2002 -2013. The participants continue to be encouraged by the downward trend in crossings rated as "high", following the 2006 reporting year and reflected in the graph. The participants feel that the downward trend is a result of a combination of factors including increased awareness among supervisory staff and contractors, remediation works conducted on selected crossings, and geographic variation in soils and road use. Specific examples of the participants' actions to address, what had been an increasing trend in crossings rated "high", include:

- Canfor Contractor / staff training and awareness workshop (2007),
- Canfor staff fieldtrip featuring a site inspection and discussion of WQCR (2008),
- Follow-up sampling of several crossings where remediation works were performed, and caused the WQCR rating to be decreased significantly (2007, 2008),

In addition to the above, Canfor hosted another contractor/staff training and awareness session in early 2010.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementation of the indicator strategy will result in construction and maintenance of stream crossings that minimize the sedimentation of streams, thereby protecting water quality and fish habitat.

Strategy and Implementation Schedule:

Management practices for stream crossings and seasonal bridge installation and removal will be consistent with the procedures in Appendix 11.

Assessment strategies are as follows:

Selection of Locations

Crossings surveyed shall be restricted to those on roads under the control of the Participants. The number of crossings surveyed in a year depends on funding availability, spatial distribution of the selected samples, and other logistical constraints (e.g. weather, access, staff availability, etc.).

Selection of survey locations is guided in part by the following criteria:

- Areas that have not received previous sampling,
- Areas that provide a representative sample of practices among Participants,
- Areas where concentrations of recent road construction and deactivation projects (< 5 years) have occurred,
- Areas where terrain features and soil type pose a relatively high potential for sediment delivery into streams.
- Areas where previous surveys, or remediation works, require follow up assessments, and
- Limitations based on funding issues to conduct surveys

Field Assessments

Crossing assessments are typically done between May and November annually. Assessments will be guided by the procedures outlined in the "*Stream Crossing Quality Index (using the WQEE Computation Procedure) Field Manual*" (Beaudry 2007).

Implementation

The SCQI method was initially implemented on the DFA in 2002.

In the winter of 2006/07, there was a new standard developed for use throughout the province for evaluating the effectiveness of measures to protect water quality. It is called the Water Quality Effectiveness Evaluation (WQEE). Previously, the Participants have used exclusively the Stream Crossing Quality Index (SCQI) method to gather field data in support of this indicator. Results from the SCQI work were used to determine the WQCR for each crossing. The developer of the SCQI system, Pierre Beaudry, was also involved in some aspects of the WQEE development. Mr. Beaudry developed translation tables that allow field values collected using the WQEE method to be used to derive Water Quality Concern Ratings for the purposes of tracking this indicator. One notable change relative to the previous SCQI method is that the WQCR determination is impacted by stream class, fish-bearing status, and community watershed status. This was done to better account for the concept of stream size, sediment

dilution, and potential downstream impacts (Beaudry, 2007). In general, the WQCR goes up (none→high) as the size of the stream goes down. Streams with a 'fish-bearing' status generally have one class higher WQCR than non-fish-bearing streams, size and WQEE score being equal. Streams in a designated community watershed generally will receive a much higher WQCR than non-fish-bearing streams, size and WQEE score being equal, up to three classes higher.

Stream crossing surveys will be conducted annually, using the following WQEE procedure:

Task I: Determining the sampling area. Sample areas are determined as per 'Selection of Location' section, above.

Task II: All reasonably accessible stream crossings in the sample population are to be visited and assessed. No range assessments are required.
Task III: For all sites in the selected sample areas, a site field card is completed. Only the data required to obtain an estimate of Surface Erosion Contribution are required (erosion potential and delivery potential). No estimates of Turbidity or Mass Wasting Contribution are required for the purposes of monitoring this indicator.
Task IV: Evaluate management practices associated with stream crossings in relation to soil erosion and sediment delivery potential.
Task V: Compile all results from field data forms and summarize. Include summary information in Annual Reports.

If assessment and evaluation of survey data identifies levels of "High" WQCR in excess of targets, recommendations will be developed for changes to management practices related to road construction, maintenance, and deactivation.

Monitoring Procedure:

Results from the surveys will be summarized in spreadsheet reports. Survey locations are tracked spatially to assist in identifying potential candidate areas for future surveys. Survey reports will be evaluated, and results summarized by the Participants for inclusion in Annual Reports.

Linkages to Operational Plans:

None.

Linkages to the LRMP:

This indicator identifies where construction and deactivation procedures can be improved to reduce the potential impacts to stream crossings, which will protect water quality in areas downstream of crossings. It therefore supports the following LRMP objectives:

- *Manage access to protect significant fish and wildlife habitats, alpine areas and recreation values.*

- *Promote water stewardship to manage for other resources.*
- *Maintain water quality in the Peace River.*
- *Protect water quality and quantity in the Charlie Lake watershed.*

6.35 PROTECTION OF STREAMBANKS AND RIPARIAN VALUES ON SMALL STREAMS

Indicator Statement	Target Statement
The number of annual non-conformances to SLP measures related to protecting stream bank, stream channel stability and riparian vegetation from harvesting or silviculture activities.	No non-conformances to SLP measures related to protecting stream bank, stream channel stability and riparian vegetation from to harvesting or silviculture activities.
SFM Objective: Maintenance of water quality	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Riparian Management Landscape Level Strategy	

***Acceptable Variance*:**

The maximum allowable variance is one non-conformance per Managing Participant annually.

What is this indicator and why is it important?

This indicator measures if Participants harvesting and silviculture activities are being conducted in accordance with measures outlined in SLP's to protect streambanks, channel stability and riparian values on waterbodies that do not have a mandatory riparian reserve zone (i.e. S4, S5, and S6 classifications).

The majority of riparian classifications completed by Participants within or adjacent to their operations will be on S4, S5 or S6 streams, so management measures on these small streams can have a meaningful impact on riparian and water resources. A review in 2004 identified 136 classified streams in 77 Site Level Plans on proposed cutblocks. S6 streams accounted for approximately 81% of the streams, S4's accounted for 2%, and there were no S5 streams, while S1, S2, and S3 streams accounted for 17% of the classifications.

SLP's contain site-specific measures designed to protect streambanks, stream channel stability, and in many cases adjacent riparian vegetation. This indicator provides an indication of the effectiveness of SLP measures, and the implementation of these measures during forestry operations to protect riparian vegetation and water resources. Protecting the streambanks and stream channels reduces the risk of sedimentation entering the watercourse and contributes to the maintenance of water quality.

Current Status:

The target for this indicator is unchanged from the 2004 and 2010 SFMPs. A review of conformance issues for this indicator in Annual Reports from April 1st, 2004 to March 31st, 2013 identified that the Participants were consistent with this indicator's target in four of nine years, and within the acceptable variance in the other 5 years.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementation of the indicator strategy will result in construction and maintenance of stream crossings that minimize the sedimentation of streams, thereby protecting

water quality and fish habitat and logging practices that maintain the integrity of plant communities in riparian areas thereby contributing to healthy ecosystems.

Strategy and Implementation Schedule:

Management practices will be included in SLP's to protect stream banks and stream channel integrity, and maintain some riparian vegetation in order to maintain water quality, aquatic habitats and riparian values on streams without mandatory riparian reserve zones.
All streams, wetlands, and lakes in or immediately adjacent to a planned harvest area will be classified prior to the commencement of operations.
Management strategies for the protection of these values on streams without mandatory riparian reserve zones, as well as for the protection of other non-fishbearing waterbodies, are based on site-specific assessments during fieldwork. Foresters consider factors such as riparian classification, topography and slopes, edaphic characteristics, season of harvest, snow loads, vegetation and habitat characteristics. Measures that may be implemented are designation of Wildlife Tree Patch or other reserve area, restricting harvesting operations to frozen ground conditions, compressible snow pack criteria, establishment of machine free or machine sensitive zones, use of low ground pressure equipment, and prescribing retention of non-merchantable stems within riparian areas.
The location of these streams and waterbodies, and SLP protection measures are reviewed with workers prior to the commencement of harvesting and silviculture activities.

Monitoring Procedure:

Inspections will be completed on harvesting and silviculture activities by Participants' field staff. Non- conformances to SLP measures related to this indicator will be noted and tracked by the Participants.
Incident records will be reviewed during the preparation of the Annual Report, and the number of non-conformance issues to SLP measures to protect stream bank, stream channel stability and riparian vegetation from harvesting and silviculture activities will be reported for each managing Participant.

Linkages to Operational Plans:

The location, classification and, where applicable, protection measures for classified waterbodies will be included in SLP's and/or operational maps used for timber harvesting or silviculture activities.

Linkages to the LRMP:

Protecting streambanks and related aquatic ecosystems through careful forestry practices assists in maintaining water quality in the downstream watersheds, and helps sustain fish and wildlife species which rely on stream side vegetation, or the maintenance of water quality.
This indicator therefore supports the following LRMP objectives:

- *Maintain functioning and healthy ecosystems.*
- *Maintain fish habitat and water quality for priority fish species.*
- *Promote water stewardship to manage for other resources.*
- *Manage critical wetland habitats for waterfowl and other wildlife species.*

- *Maintain the headwaters of major rivers and streams as a source of water for current and future generations.*
- *Protect water quality and quantity in Charlie Lake watershed.*
- *Maintain water quality in the Peace River.*

6.36 SPILLS ENTERING WATERBODIES

Indicator Statement	Target Statement
Number of spills of a reportable substance (i.e. antifreeze, diesel fuel, gasoline, greases, hydraulic oil, lubricating oil, methyl hydrate, paints and paint thinners, solvents, pesticides, and explosives) entering water bodies.	Zero spills entering water bodies.
SFM Objective: Maintenance of water quality	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None.

What is this indicator and why is it important?

Any volumes of spills of the substances included in the indicator statement are reportable.

Current Status:

The Participants had no reportable spills entering water bodies noted in Annual Reports during the term of SFMP # 1 (2004-2009) and SFMP # 2 (2010-2015).
The Participants are in conformance with the target for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
It is anticipated that implementation of the indicator strategy will result in the maintenance of water quality and fish habitat.

Strategy and Implementation Schedule:

Applicable operational controls are within the Participants' Environmental Management Systems including: Work Instructions, Emergency Preparedness and Response Plan, and spill response training. Preworks are conducted prior to commencement of operations which identify the location of classified waterbodies.
Any reportable spills will be investigated and recommendations will be made to minimize the risk of future occurrences.

Monitoring Procedure:

Regular audits and inspections of activities will be conducted. All reportable spills will be entered into the Issue Tracking System, and reported to the appropriate agency.
Annual reviews of ITS entries will be completed, and conformance performance for this indicator will be reported in Annual Reports.

Linkages to Operational Plans:

None.

Linkages to LRMP:

This indicator directly addresses maintaining the quality of water in the DFA. The indicator therefore supports the following LRMP objectives:

- *Maintain fish habitat and water quality for priority fish species.*
- *Maintain water quality in the Peace River.*
- *Protect water quality and quantity in Charlie Lake watershed.*

6.37 COORDINATED DEVELOPMENTS

Indicator Statement	Target Statement
Number of coordinated developments.	Report annually the number of proposed coordinated developments that occurred.
SFM Objective: Foster inter-industry cooperation to minimize conversion of forested lands to non-forest conditions	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

The opportunities for coordinated development will fluctuate annually based on the overall activity of the oil and gas industry as well as the proximity of operations to one another. Any amount of coordinated development on the basis of making participants' plans readily available will be viewed as a positive step in reducing the conversion of forested lands to non-forest conditions. No variance is necessary as the target is to report out on coordinated activities that occurred between the industries.

What is this indicator and why is it important?

This indicator is a measure of the level of coordinated inter-industry developments that occurs annually. Coordination of access between the oil and gas and forest industries helps minimize the creation of new roads and leads to reduced impacts on the landbase. In addition to known opportunities for coordination, the referral of proposed activities between the two industries can help identify new opportunities to share access roads.

The Participants will report the following information on coordinated activities:

- The total number of referrals from the oil and gas industry that indicate they plan on using existing forestry roads for access, or they are proposing to construct a road in the same general location as a future proposed FOS road.
- The number of new licensee road use agreements with the oil and gas or other industries signed annually, and the length of the roads under one or more agreements.

The most recent timber supply review by the Chief Forester identified that projected future roads, trails and landings attributed to the forest industry are in excess of 48,000 hectares on the timber harvesting landbase (THLB). Additional projected losses to the THLB for oil and gas activities were estimated to increase this figure by another 26,000 hectares. Coordinating access development can reduce the impacts on the THLB, as well as other non timber resources.

Current Status:

Existing and planned forest industry roads are made available by the Managing Participants to the Oil and Gas Commission, and upon request, to oil and gas companies, to facilitate the oil and gas referral process.

Some major coordinated developments, such as the jointly constructed and managed Tommy Lakes Road, and the oil and gas road access routes in the Graham IRM Plan area utilizing proposed forestry access corridors, have been very successful to date.

Following is a summary of proposed changes to activities related to coordinating development between licensee participants and the oil and gas industry between April 1, 2013 and March 31, 2014.

Licensee participants received 251 referrals of Oil and Gas activities. While many of the referrals already had measures proposed to minimize impacts on forestland, forest licensees did make recommendations on multiple projects.

- Nine pipeline crossings to be built to minimize future incurred costs
- Eighty-five referrals were received that resulted in spatial impacts to one or more Canfor blocks that will now require a mapping update and corresponding SLP amendment. Nine separate requests to alter plans to prevent impacts to WTP's, riparian areas, specific wildlife features, streams and NCD's were made by Canfor.
- Two requests to move ancillary to minimize impacts to Canfor's existing plantations and/or roads, preventing the need to construct alternate routes.
- Two cases where companies were asked to utilize existing access as opposed to building new roads for proposed projects.
- Thirty-one requests for oil companies to salvage merchantable timber harvested during construction of proposed projects.

Canfor provided oil and gas companies with a total of 347 road use agreements for use of Canfor roads by oil and gas companies. Oil and gas companies consequently provided a number of road use agreements for use of oil and gas roads to Canfor. In most of the referrals received, planned access to the oil and gas development had considered information from the Forest Operations Schedule.

Canfor had some opportunities during the reporting period to share resources with oil and gas companies. The following are incidences where Canfor partnered with various companies to develop new access or maintain or improve existing access.

- Canfor has entered into an agreement with an oil and gas company to manage sections of the Kobes Creek FSR.
- Canfor has engaged in talks with 2 major oil and gas companies to develop an access coordination plan in order to minimize impacts to the landbase.

Following is a summary of proposed changes to activities related to coordinating development between BCTS and the oil and gas industry between April 1, 2013 and March 31, 2014.

BCTS received 62 oil and gas referrals between April 1, 2013 and March 31, 2014 of the 62 referrals BCTS received, there were 14 proposed changes. The changes consisted of the following:

- The recommended moving of borrow pits, decking sites and workspaces to a location outside of the BCTS block. - 10 referral replies.
- The recommendation that the particular Timber Sale affected will be remapped and the cruise recompiled due to planned oil/gas activity within the sale. – 4 referral replies.

The other 48 referrals had very little or no impact to BCTS blocks and required minor or no changes to the proposed oil and gas activity.

Most of the referrals from the oil/gas industry appeared to have utilized the FOS maps provided to the industry. In doing so our BCTS planned and/or developed infrastructure was considered.

Another opportunity that demonstrated coordinated development involved the planning of a Forest Service Road. BCTS asked a company with similar road access interest, to assist in the planning stage by providing a legal survey in proximity to private holdings. The firm cooperated and supplied the required survey.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

It is anticipated that implementation of the indicator strategy will result in minimization of duplicate access constructed on the DFA, thereby minimizing the industrial footprint on the DFA. Sharing forest development plans with the oil and gas industry will lead to minimal duplication of road access structures, which will minimize overall area deleted from forest production.

Strategy and Implementation Schedule:

All existing, and the next six years or more of proposed cutblocks and roads will be included in a shared digital database and displayed on operational maps included on the consolidated Forest Operations Schedule (FOS).

This information will be provided digitally to government agencies including the Oil and Gas Commission, to be made available to their clients for referral purposes. Additionally, specific block or road information may be made available to individual oil and gas interests by the Participants to expedite referrals.

The Participants will respond to oil and gas referrals in a timely manner. The Participants will determine the potential impacts on those roads and blocks impacted by the proposed development where they bear some legal liability. Where opportunities are identified to reasonably minimize disturbances to the THLB (e.g., using an existing road instead of building a new one), or otherwise minimize impacts to the forest operations or resources (e.g., avoiding effectively isolating patches of merchantable timber by the location of pipelines etc.), the Participants will note these opportunities in their responses to the referrals, for the proponents' consideration. The Participants will also advise the oil and gas company if road use agreements may be required.

In the event new oil and gas roads are proposed or constructed which may also be used by the forest industry, in lieu of a proposed FOS road location, the Participants may advise the oil and gas proponent of this potential and may modify forestry operational plans to allow for use of this road system.

The Participants have identified the following minimum critical road construction standards that will permit the forest industry to utilize oil and gas road locations:

Minimum width: 5 metres with inter-visible turnouts; or 7 metres with no turnouts

Maximum grade: 10% sustained; 12% short pitches; 5% on switchbacks

Minimum bridge requirements: L60T (i.e., legal highway loading)

The Participants will endeavor to work closely with the oil and gas sector through the referral and planning process in proposed development areas where both sectors operate, and to identify opportunities to locate and coordinate access in the most optimal location which will meet the needs of both industries.

Monitoring Procedure:

The following information will be tracked, and reported for each Annual Reporting period (i.e. April 1st – March 31st annually):

- Licensees will track **new road use agreements** signed with the oil and gas or other industries, and **annually report the number of new agreements**, and the **length of the roads covered under one or more agreements** (e.g., agreements on the same road with different companies will count as more than 1 agreement, but the road length would not be double counted).
- The Participants will **track the number of proposed roads included in the FOS that are revised or eliminated** due to the forest industry revising access routes to utilize new oil and gas access, and **the length of roads eliminated**.
- The Participants will track **the number of referrals** from the oil and gas industry that indicate coordinating activities is occurring by the proponent **proposing to use existing forestry roads or construct a new road in the same general location** as a future proposed FOS road.

Linkages to Operational Plans:

The FOS and SLP's or operational harvesting or silviculture maps will be reviewed at the time oil and gas referrals are received to identify potential issues or possible synergies. FOS access routes and SLP's or harvest plans may be changed as the result of new oil and gas developments being constructed in or adjacent to planned forestry developments.

Linkages to LRMP:

This indicator encourages the co-ordination of industrial access, and the reduction of losses of productive land to roads and other permanent access structures. The indicator therefore supports the following LRMP objectives:

- *Coordinate access and linear development to minimize negative effects on other resource values*
- *Minimize losses to the timber harvesting landbase*

6.38 RANGE ACTION PLANS

Indicator Statement	Target Statement
Percent consistency with mutually agreed upon action plans for range	Operations 100% consistent with resultant range action plans.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Variances are permissible only on reaching mutual agreement between the affected range tenure holder and Participant

What is this this indicator and why is it important?

The forest and range industries are active on the same crown landbase in much of the Fort St. John TSA. This extensive overlap of tenures frequently results in one industry's operations impacting the other's activities. For example, forestry activities may cause the removal of or rendering ineffective the natural range barriers. Natural range barriers may be rivers, rock faces, dense timber stands or other naturally occurring features that stop or significantly impede livestock movement. These known or identified natural range barriers are particularly important for range tenure holders to manage livestock according to tenure boundaries, as well as preventing livestock wandering on roads with high traffic and consequently pose safety risks to the public. The Managing Participants may choose to adjust forestry activities or seek MFLNRORD approval for installation of cattle guards or fences to mitigate the effect of removing or rendering ineffective the known or identified natural range barriers. Participants may help range tenure holders with installation of these range developments.

Some other resulting issues from forestry activities may include loss of grazing opportunities through seed choice, timing of operations and herbicide use. Addressing these overlapping tenure issues successfully requires open communication of interests and expectations, a proactive process to address issues, and commitment to implement mutually agreed upon actions. This indicator is important in that it demonstrates the Participants' commitment to track and follow through to completion mutually agreed actions, which may have target completion dates months or years after the action is initiated.

Current Status:

Prior to 2013, Timber Range Action Plans (TRAPs) was the main documentation template for developing strategies to mitigate range and forestry activities' impacts on one another. However, over time, the formality and process of TRAP that originated from the Timber and Range Impact Mitigation Committee (TRIM C) project has become less formal. Since 2018,

other formats of documents have been started to be used to record mutually agreed upon action plans.

Table 32 provides a summary of mutually agreed range action plans that were developed and completed, as well as a summary of comprehensive TRAP's prepared from April 1st , 2004 through March, 31st , 2019 (SFMP #1, SFMP #2 and SFMP#3):

The Participants completed all proposed mutually agreed action plans during this time period.

Table 32: Results of Mutually Agreed Range Action Plans

Annual Reporting Period	# Timber Range Action Plans (TRAPs)	# Mutually Agreed Upon Action Plans
2004-05	0	N/A
2005-06	6	N/A
2006-07	4	N/A
2007-08	5	N/A
2008-09	1	N/A
2009-10	1	N/A
2010-11	3	N/A
2011-12	0	N/A
2012-13	0	N/A
2013-14	1	N/A
2014-15	5	N/A
2015-16	1	N/A
2016-17	0	N/A
2017-18	0	N/A
2018-19	0	1
Total	**27**	**1**

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will minimize the negative impact on range resources resulting from harvest operations.

Strategy and Implementation Schedule:

At the FOS stage and the Amendment stage, forestry staff will invite range tenure holders to engage in discussions to formulate a mutually agreed action plan to address issues impacting range values and developments arising from the proposed forestry activities on their tenure area. To formulate such plans, forestry and range tenure holders should start by examining the timber harvesting proposal and its anticipated impact on features such as natural range barriers, existing range developments and existing fence lines. Mitigation

strategies will be identified to alleviate the impacts of the proposed forestry activities. Cattle guard construction and fencing are commonly used tools to minimize the impacts of natural range barrier removal. District Manager approval will be sought where the Participants propose damaging or modification of existing range developments, or construction of new range developments. Managing Participants may help the range tenure holder to implement the approved modifications to existing range developments or construction of new range developments. Where natural range barriers will be removed by timber harvesting, acceptable strategies may include retention of patches of forest left intact in the field as buffers or reserves, construction of debris fences, installation of cattleguards and/or traditional post and wire fences.

Additionally, if range tenure holders identify an issue related to their tenure at other times such as field operations or block layout stage, a range tenure holder engagement meeting may be held to address the concern.

These action plans and dates will be documented and entered as range issues into the Participant's tracking systems, responsibilities will be identified and communicated to affected staff, and progress will be tracked through to the completion of the action. In the event circumstances require that changes be made to the action plan the forestry supervisor making the change will note in the action plan what change was made, indicate in the plan that he has discussed and got agreement from the range tenure holder for the change, and notify any responsible parties of the changes made.

Participants will inform MFLNRORD range staff of the range discussions, and providing the range tenure holder agrees, invite MFLNRORD to participate in discussions to develop range action plans. MFLNRORD attendance and participation is encouraged by the Participants as the MFLNRORD are the owners of all range developments on crown land and must authorize the destruction, modification or construction of existing or new range developments.

Monitoring Procedure:

An annual review of the Participant's tracking systems will identify the number of Timber and Range Action Plans (TRAPs) planned and the number of other mutually agreed upon action plans.

Linkages to Operational Plans:

Forest Operations Schedules, Pesticide Management Plans, and other operational plans which require public review and comment will be referred to range tenure holders, and actions agreed to will be identified in the final submission of these plans.

Site Level Plans, harvesting and silviculture plans will be consistent with any relevant mutually agreed range tenure action plans.

Linkages to LRMP:

This indicator supports the continuation of range activities within the Fort St. John TSA, and therefore supports the following LRMP objectives:

- *Maintain livestock grazing opportunities on existing tenures.*
- *Maintain or enhance opportunities for livestock grazing*

6.39 DAMAGE TO RANGE IMPROVEMENTS

Indicator Statement	Target Statement
Number of natural range barriers or range improvements rendered ineffective by Participants' activities.	Natural range barriers or range improvements rendered ineffective by Participants' activities will be repaired within 2 years of harvest completion.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Range and Forage Management Landscape Level Strategy.	

Acceptable Variance:

The indicator target would not apply if a Participant can implement alternative mitigation strategies to the satisfaction of the range tenure holder and if required, approval from MFLNRORD. In the event that a natural range barrier is not identified prior to harvesting, Managing Participants have to develop and implement mitigation strategies to alleviate the impact of lost or ineffective natural range barrier in less than two years from the completion of harvesting, provided that the range tenure holders raise concerns regarding the natural range barrier to the Managing Participants within 180 days of completion of primary harvesting activities.

Temporary removal or alteration of a range development to enable short-term forestry activities to proceed is permissible. However, repairs to or replacement of improvements must be completed in less than two years from harvest completion. For the purposes of this indicator, the terms range improvement and range development have the same meaning.

What is this indicator and why is it important?

The overlapping nature of forest and range tenures may result in natural range barriers and range developments being present in cutblocks planned for harvest by the forest industry. A natural range barrier can be 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. Range developments include fences, cattle guards, dugouts, or trails constructed by range-tenure holders for specific range management purposes. Range developments are considered the property of the provincial government. Natural range barriers and range developments may intentionally be lost or rendered ineffective in order to conduct forestry activities. In cases where natural range barriers or range developments are not made known to the forest tenure holder, they may be inadvertently damaged by the forest industry.

Alteration or removal of natural range barriers and range developments may occur, on the understanding that the developments or range barrier will be reconstructed or replaced in a timely manner, preferably prior to the next scheduled turnout of cattle for summer grazing, to the standard specified in the MFLNRORD Peace Natural Resource District range structure guidelines. Variances to the range development standards may be requested where

appropriate e.g. use of non-treated posts, smooth wire. MFLNRORD District Manager approval is required to build, modify or temporarily destroy a range development such as a fence, cattleguard, etc.

All concerns raised by the range tenure holders will be dealt with by the Participants in a timely manner. The two year period identified in the target statement is meant to accommodate situations where concerns were raised regarding damage to natural range barriers or developments long after completion of the timber harvest activities. This allows the Participants time for discussion with the range tenure holder and MFLNRORD to develop mitigation plans and seek authorisation of those plans. It also considers time required to address logistical concerns such as the availability of fence materials and adverse weather conditions.

This indicator demonstrates the Participants' commitment to address direct impacts to natural range barriers and range tenure developments resulting from forestry activities, and to minimize disruption to range tenure holders.

Current Status:

In the 2018-2019 reporting year, three cases of range developments being damaged by licensee Participants' activities were recorded. In two instances, Managing Participants had to temporarily remove fence lines to allow road entry, as well as making sure harvesting operations could be conducted safely. Managing Participants repaired both fence lines within one year of the occurrence of the instance. In the other instance, the Managing Participant received a complaint that a cattle guard was filled in with mud from grading and not functioning properly. The Managing Participant developed mitigation strategies to the satisfaction of the range tenure holder within one year of the occurrence of the instance.

There was a total of 16 instances of damaged range developments between April 1, 2009 and March 31, 2019 resulting from the Participants' activities. All 16 had mitigation strategies developed, tracked and successfully implemented to repair the damage in a timely manner, consistent with the indicator's target.

Damages to natural range barriers will begin to be reported in the 2019-2020 annual report.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will minimize the negative impact on range resources resulting from harvest operations.

Strategy and Implementation Schedule:

As of 2019, there are no natural range barriers or range developments mapped on the publicly available government mapping layers.

Information on the location and pre-harvest condition of natural range barriers and range developments are provided by range tenure holders through responses to referral requests on Forest Operations Schedules, and other operational plans (e.g. PMP's), or range-related mutually agreed action plans. In addition, natural range barriers and range developments may be identified and mapped during Site Level Plan (SLP) field data collection.

With the acknowledgement of range tenure holders, Managing Participants may contact the MFLNRORD for guidance and administrative support during discussions with range tenure holders to develop mitigation strategies. A copy of mutually agreed upon action plans will be provided to the MFLNRORD. Participants will seek District Manager approval of plans to construct, modify, remove, damage or destroy a range development.

Actions that the Managing Participants may implement when planning harvesting activities which may negatively impact natural range barriers and/or range developments are:

- Proactively contact range tenure holders and affected First Nations in situations where proposed timber harvest cutblocks may overlap natural range barriers or range developments, to determine if mitigation plans are necessary.
- Confirm with the MFLNRORD Range Officer and range tenure holder whether harvesting and road construction will remove or render ineffective a natural range barrier or range improvement.
- Where it is confirmed that timber harvesting or road construction will damage a range improvement, develop mitigation plans and seek authorization from MFLNRORD if the mitigation plan requires the Participant to construct, modify, remove, damage or destroy a range development on crown range.
- Make adjustments to road and/or cut block locations to reduce or eliminate impact to the natural range barrier or range development.

When developing strategies to restrict cattle movement in situations where it is anticipated that timber harvesting will remove or render ineffective natural range barriers, the Managing Participants may consider implementing the following strategies:

- Retain a reserve of trees wide enough to significantly impede the movement of cattle. Consult with the range tenure holder and the MFLNRORD Range Officer to identify the appropriate reserve size.
- Construct range developments such as post and wire fence lines, debris fences and / or cattle guards upon receipt of appropriate approvals.
- Make adjustments to road and/or cut block locations to reduce or eliminate impact to the natural range barrier.

Proposed actions related to mitigating damage to range developments, are tracked by the Participants in the Participants' forest management data tracking systems (e.g. COPI, LRM). The location of natural range barriers and range developments are shown on operational maps, and pre-works with the Participants staff and contractors to identify what measures are needed, if any, to avoid, modify, temporarily remove and/or repair such structures.

Damage to natural range barriers and range developments is recorded by Participant staff through field inspections. Staff develop action plans to ensure mitigation, repair, or restoration measures are authorised by MFLNRORD and conducted in a timely manner.

Monitoring Procedure:

The Participant's tracking systems identify all action plans and target dates, including those derived from range-related mutually agreed action plans. An annual review of the tracking system will identify all range damage issues, and note whether the target and completion dates are consistent with this indicator.

Linkages to Operational Plans:

Range-related actions and target deadlines arising out of operational plan referrals of FOS's and PMP's etc. will be tracked in the incident tracking systems.

Provided the features are known and their locations shared with the Participants, Site Level Plans will identify natural range barrier and range development locations, if their location causes them to be at risk of damage from the Participants' operations, and what measures are

necessary to protect or otherwise mitigate negative impact to natural range barriers and range developments resulting from timber harvesting and road construction operations.

Linkages to LRMP:

This indicator supports range management activities within the Fort St. John TSA, and therefore supports the following LRMP objectives:

- *Maintain livestock grazing opportunities on existing tenures.*
- *Maintain or enhance opportunities for livestock grazing.*

6.40 RECREATION SITES

Indicator Statement	Target Statement
The number of recreation sites maintained by Participants	Participants will maintain a minimum of one recreational site within the DFA
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No less than the target.

What is this indicator and why is it important?

The DFA has a number of campsites operated by the government or commercial interests, however most are concentrated in the high traffic corridors near the Alaska Highway and charge fees to users.

Providing maintained campsites in more remote but locally popular locations helps meets local demand for recreational pursuits in a natural setting.

Current Status:

Canfor currently maintains the Crying Girl Prairie Recreation Site on the Graham River at 101 km on the Halfway Graham Forest Service Road. The area features hunting, fishing, boating, and hiking opportunities. The campsite was originally constructed by Canfor in 1991 on a 58 ha government recreational reserve. Additional campsites and a 2.5 km hiking trail were added in 1996 with FRBC funding. In July of 1999 Canfor assumed sole responsibility for the campsite and its maintenance. The site currently provides a total of 15 campsites for free public use.

In 2009, following discussions with government agencies, responsibility for the campsite has been transferred back to the government, however Canfor continues to maintain the campsite on behalf of the government.

During the reporting periods of SFMP # 1 and # 2 Canfor continued maintenance of the Crying Girl Prairie campsite, utilizing a local contractor to provide firewood, site cleanup, outhouse cleaning, and garbage disposal.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes, it is anticipated that forest operations will respect and reflect the interests of non-timber forest resource users, local public and Aboriginals, resulting in the maintenance of existing recreation opportunities offered by the established recreational sites and trails in the Fort St John DFA.

Strategy and Implementation Schedule:

Annual maintenance contracts are locally awarded to complete garbage disposal, site cleanup, outhouse cleaning, firewood cutting and distribution, and general cleanup.

Monitoring Procedure:

Canfor inspects and maintains this remote campsite from June 1 until October 31 annually. Status of this indicator will be updated in annual reports.

Linkages to Operational Plans:

An existing visual inventory utilized this campsite as a viewpoint. SLP's for harvesting within the Graham operating area will address any visual impacts from the Crying Girl campsite viewpoint. Maintenance of the recreational values present at the campsite will be considered in proposing any future development proposals in the FOS.

Linkages to the LRMP:

This indicator supports the following LRMP objectives:

- *Provide quality public and commercial recreation opportunities and values,*
- *Provide a full range of wilderness recreation opportunities identified in the ROS as primitive, semi primitive non-motorized, and semi primitive motorized.*

6.41 VISUAL QUALITY OBJECTIVES

Indicator Statement	Target Statement
Consistency with Visual Quality Objectives (VQO's).	Pilot Participants' forest operations will be consistent with the established VQO's.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Visual Quality Management Landscape Level Strategy. For the purposes of Section 35(5), Section 28(1) (c) of the *FSJPPR* may be effected by the application of this Visual Quality Strategy, specifically the acceptable variance for this indicator	

Acceptable Variance:

A variance to the requirement for consistency with established VQO's, where approved by the District Manager, is permitted on a site-specific basis, where required to address risks to resource values or safety issues (e.g. fire salvage, sanitation harvesting for forest pest control), as identified in a SLP. A rationale will be prepared by a qualified professional and must specify the reasons for the variance and the measures that will be implemented to address the resource value at risk and mitigate impacts on the visual resource.

What is this indicator and why is it important?

This indicator is a results-based measure of how successful the Participants are in meeting the post harvest visual quality objective rating. It applies to cutblocks that occur in known scenic areas established by government.

Visual quality objectives are the extent to which the visual or scenic resources of a landscape may be altered compared to the pre-existing or natural condition. VQO's are resource management objectives established by government that reflect the desired level of visual quality based on the physical characteristics and social concern for the area.

(a) *preservation*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is

(i) very small in scale, and

(ii) not easily distinguishable from the pre-harvest landscape;

(b) *retention*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is

(i) difficult to see,

(ii) small in scale, and

(iii) natural in appearance;

(c) *partial retention*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is

(i) easy to see,

(ii) small to medium in scale, and

(iii) natural and not rectilinear or geometric in shape;

(d) *modification*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint,

(i) is very easy to see, and

(ii) is

(A) large in scale and natural in its appearance, or

(B) small to medium in scale but with some angular characteristics;

(e) *maximum modification*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint,

(i) is very easy to see, and

(ii) is

(A) very large in scale,

(B) rectilinear and geometric in shape, or

(C) both.

Current Status:

Figure 18 shows the current VQO polygon distribution in the Fort St. John TSA.

Table 33 summarizes the total number of assessments completed, and the number of assessments that were consistent with VQO's of post harvest visual assessments during the term of the previous SFMP (April 1 2004- March 31 2009). All thirty-three assessments demonstrated consistency with the VQO's.

Variances to VQO requirements (*FSJPPR* Section 28(1) (c)) were received from the District Manager prior to activities occurring in 12 cutblocks. These variances were granted in order to address Mountain Pine Beetle sanitation logging in visually sensitive areas, and were reported in the 2007-08, 2008-09 and 2012-13 Annual Reports.

Table 30: Summary of Post harvest Visual Quality Assessments 2004-2013

Year	# Licensee Assessments	# BCTS Assessments	Total # Assessment	Total # Consistent with VQO

2013-14	9	0	9	9
2012-13	13	0	13	10
2011-12	4	0	4	2
2010-11	4	0	4	4
2009-10	2	1	3	3
2008-09	13	3	16	16
2007-08	2	0	2	2
2006-07	4	2	6	6
2005-06	1	0	1	1
2004-05	8	0	8	8
Total	**60**	**6**	**66**	**61**

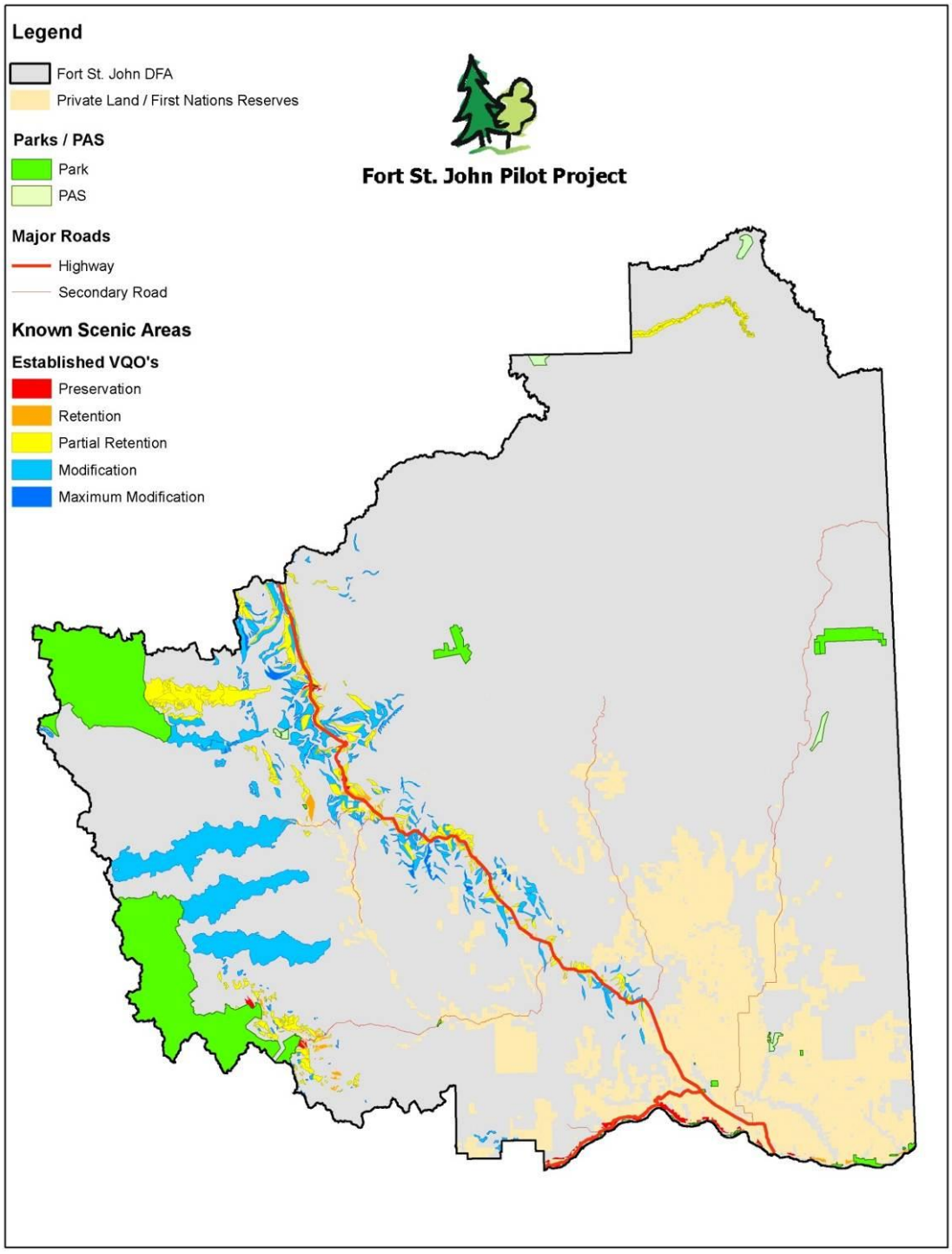


Figure 16: Fort St. John VQO's (updated December 2009)

Forecasting Assumptions and Analytical Methods:

The 2002 Fort St. John Timber Supply Review (TSR) and the current Allowable Annual Cut (AAC) for the Fort St. John TSA reflect the forecasted effect on the timber supply base case of the established VQO's as well as recommended visual quality classes that were considered current practice. Sensitivity analysis was also completed to analyze the lower end of the forest cover requirements allowed under each of the visual quality classes.

Strategy and Implementation Schedule:

The visual landscape inventory contains known scenic areas and associated Visual Quality Objectives and is located on the BC Government's Land and Resource Data Warehouse. The inventory current at the time of submission of this SFMP for approval, will be referred to during the development of the FOS, and blocks that may impact the achievement of VQO's will be noted in the FOS, and tracked by the Participants.

If deemed necessary by the Participants, pre-harvest visual impact assessments and landscape design processes may be done to assist in block design to achieve VQO's.

Where variances are required to allow harvesting to meet other resource management objectives (e.g. forest health), the Participants will document and retain a rationale for the variance, the measures that will be implemented to address the resource value at risk, and the measures to be used to mitigate impacts on the visual resource to the extent practicable. The Participants will seek approval from the District Manager for these site specific variances to be consistent with VQO objectives. The Participants will notify the Ministry of Forests and Range regarding proposed variances at the time of harvest authorization request.

Post-harvest reviews of harvested areas that fall within visually sensitive landscapes will be completed no later than the end of the following year after harvesting is completed (e.g. if logging is finished in November of 2009, the post harvest assessment would be done by December 31, 2010).

Monitoring Procedure:

Participants will maintain records of the results of post harvest reviews and will report annually on the relative conformance to the target in the Annual Report.

Variances to VQO's and the rationales will be documented and tracked by the Participants, and reported in each Annual Report.

Linkages to Operational Plans:

Forest Operations Schedules will identify where proposed blocks occur in visually sensitive polygons, and Site Level Plans and harvest plans will be consistent with the VQO's or variances.

Linkages to LRMP:

The indicator statement and target support the following objectives set out in the Fort St. John LRMP:

- *Manage visually sensitive areas along existing access corridors/trails and adjacent to protected areas.*
- *Manage visually sensitive areas as scenic areas.*

- *Manage visually sensitive areas within the Peace River Valley.*
- *Manage visually sensitive areas within the Alaska Highway corridor.*

6.42 Recreation Opportunity Spectrum

Indicator Statement	Target Statement
Area in primitive and semi-primitive non-motorized classifications of the Recreation Opportunity Spectrum (ROS) for the Graham, Sikanni, and Crying Girl LU's.	A minimum of 65,839 ha in primitive ROS area (100% of 1996 primitive ROS area) and 180,726 ha in semi primitive non-motorized ROS area (50% of the 1996 total semi primitive NM ROS area) in the combined Graham, Crying Girl and Sikanni LU's (excluding the Graham Laurier and Redfern-Keily PA's).
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities and non-timber commercial activities	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Access Management Landscape Level Strategy.	

Acceptable Variance:

The Primitive ROS percentage may fluctuate over time as roads are constructed and permanently deactivated to retain the percentage at 1996 levels. At any given time the Primitive ROS percentage may decrease down to 10% on a temporary basis until such time as the constructed forest roads are permanently deactivated and the Primitive classification is restored. There is no allowable variance for the Semi-Primitive non-motorized target.

What is this indicator and why is it important?

This indicator is a measure of the amount of Primitive and Semi-Primitive forest land that has been classified under the Ministry of Forests Recreation Opportunity Spectrum within the Landscape Units that will provide a full range of wilderness recreational opportunities for the general public.

The Fort St. John LRMP identifies the importance of maintaining and providing a wide range of public and commercial outdoor recreational opportunities. The three specifically identified low management intensity LU's provide a unique recreational opportunity due to the retention of the "wilderness recreation experience" that can be found in these areas. This can be described as a moderate to high probability of experiencing solitude, closeness to nature, high degree of self reliance, natural appearing environment, low interaction with people and little to no on-the-ground evidence of other people.

Access management and deactivation can be used as tools to achieve the desired ROS classification (see Appendix 12 for definition of ROS classes).

The Participants may use roads developed and maintained by other non-forest industry industrial users (e.g. oil/gas, mining). If a Participant assumes responsibility for the road due to

no other industrial user having long term interests in the road then it will be assessed as a change in ROS attributable to forest management activities.
New non-forestry related roads, and forest industry roads taken over by other industries (e.g. not deactivated due to other industries' needs) will not be considered in the ROS analysis.

Current Status:

During development of the 2010 – 2016 FOS, the FOS was analyzed to project the potential impact on the ROS targeted percentages; all of proposed development was consistent with the SFMP ROS targets. Many of the blocks proposed by FOS# 1 for harvest in the Crying Girl and Graham RMZs have not been harvested and no new activities were proposed in FOS #2. The following table identifies the condition of the recreation opportunity spectrum expected upon the completion of all harvest operations in FOS# 2.

Table 31: Projection of Changes to ROS Class from 1996 to 2016

Crying Girl Graham & Sikanni LU	ROS Class Projection to 2016 - After Modeling Impact of Proposed Development in 2010 FOS											
	Primitive		Semi Primitive Non-Motorized		Semi Primitive Motorized		Roaded		Urban/ Agriculture		Total Area (ha)	Total %
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%		
Total 1996 ha	65,839	12.1 %	361,451	66.2 %	116,090	21.3 %	269	0.0 %	2287	0.4 %	545,936	100.0 %
Total 2010 Projected ha (from 2004 FOS)	65,839	12.1 %	344,488	63.1 %	133,056	24.4 %	269	0.0 %	2,287	0.4 %	545,939	100.0 %
2010 SMFP Target	**65,839**		**180,726**		**NA**		**NA**		**NA**		**NA**	

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes see Table 34. Yes, it is anticipated that forest operations will respect and reflect the interests of non-timber forest resource users, local public and Aboriginals, resulting in the maintenance of wilderness recreation experience opportunities and

existing recreation opportunities offered by the established recreational sites and trails in the Fort St John DFA.

Strategy and Implementation Schedule:

All forest management activities within each of the specified Landscape Units will be evaluated in the development of the 2016 Forest Operations Schedule. The potential impact of the proposed developments will be evaluated by recalculating the recreation opportunity spectrum classification for these LU's as per the Ministry of Forests and Range standards (Appendix 13 "ROS Polygon Delineation Standards") and presented in the FOS to demonstrate consistency. Amendments to proposed forest operations may be implemented to mitigate impacts, or other deactivation measures may be implemented following harvest operations to ensure the targeted areas for SPNM are retained.

Forest operations will be planned so that they do not cause the

Primitive classification to dip below 10% and so that appropriate deactivation measures will be implemented as soon as possible following harvesting and primary silviculture activities to restore the primitive classification to the original level. These evaluations will be undertaken by the Participants upon the preparation of each Forest Operations Schedule. This periodic evaluation prior to the finalization of each FOS will endeavor to capture the most current ROS condition.

Access will be managed to be consistent with the access related LRMP objectives and other SFMP indicators included in this document (e.g. Indicators 11, 15, 16, 21, 24, and 40). Access management options available to assist in meeting these objectives include access controls, road deactivation, accelerated harvesting or alternative silviculture techniques to meet these objectives. Access control and or deactivation may be completed for existing roads adjacent to or within the LU areas to remove areas from the roaded classification and move to the Semi-Primitive. These works and strategies are subject to agency approvals and do not include oil/gas or mining activities. All deactivation measures and other mitigating measures will be implemented as soon as practical following harvesting and primary silviculture activities.

New road construction will be open for the duration of the season in which the forest management activity occurs (e.g. road construction, harvesting, and primary silviculture). Seasonal deactivation and access restrictions will normally be completed by the end of the active season.

The Graham River Integrated Resource Management Plan incorporates restricted access provisions that limit public access. These provisions are intended to protect wildlife and wilderness values, and are consistent with direction provided by the LRMP. The construction of a remote control gate on the forestry bridge crossing the Graham River fulfills the LRMP strategic direction to restrict access for non-industrial users (as defined in the LRMP) south of the Graham River. Access permissions are managed through Canfor's Fort St. Johns office. Once industrial activities are completed on the south side of the Graham River, the bridge deck may be removed to further restrict access.

Monitoring Procedure:

Forest Operations Schedule's (FOS) that are developed will identify proposed forest operations for at least six years. FOSs include an analysis of the forest management activities proposed

within these Landscape Units relevant to this indicator, and the projected impact, if any, on the most current ROS Primitive and Semi Primitive classification areas.

Linkages to Operational Plans:

FOS's include projection of the impact planned developments may have on the areas of Primitive and Semi Primitive ROS classifications. Participant staff will evaluate the impact of any planned access in the preparation of a Forest Operations Schedule to ensure that the overall percentages of each classification are not impacted negatively by road development or are within the stated variance. It is expected that this level may fluctuate slightly over time and that deactivation strategies will be developed to mitigate any short term impacts.

Linkages to LRMP:

This indicator supports the maintenance of remote and natural recreational opportunities and therefore supports the following LRMP objectives:

- *Manage backcountry recreation and tourism opportunities in a natural or natural appearing condition.*
- *Provide a full range of wilderness recreation opportunities identified in the ROS as primitive, semi-primitive non-motorized and semi primitive motorized.*
- *Provide quality public and commercial recreational opportunities and values.*

6.43 Actions Addressing Guides, Trappers and Other Interests

Indicator Statement	Target Statement
Percentage of operations consistent with mutually agreed upon action plans for guides, trappers and other known non-timber commercial interests.	100% of operations will be consistent with action plans for guides, trappers and other non-timber commercial interests.
SFM Objective: Provide opportunities for a feasible mix of timber, recreational activities and non-timber commercial activities	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Variances are permissible only on reaching mutual agreement between the affected tenure holders and Participant.

What is this indicator and why is it important?

Diversity in commercial resource activities within a limited landbase is important to the sustainability of communities. Extensive overlap of forest tenures with guide, trapping, and other non-timber commercial interests may necessitate mutually agreed upon action plans to address site-specific issues. This indicator measures the Participants' implementation success in addressing these actions.

Current Status:

The Participants currently notify trappers, guides and others that may be affected by proposed activities during the preparation of the FOS, as part of the regulatory public review and comment period. Prior to the commencement of approved forest activities, further notification is provided to those stakeholders that will be affected by the activity. In the event site specific comments are received, Participants attempt to come to agreement with the stakeholder on reasonable actions that may mitigate the impacts.

The Participants track comments, responses, and actions arising from this information sharing with stakeholders. Following is a summary of the current status from 2013-2014 Annual Report: During the reporting period of April 1, 2013 to March 31, 2014 there were three mutually agreed upon actions developed between Canfor and guides, trappers, or other non-timber commercial interests. The first was a request made by a trapper to maintain the access along his trapline during harvesting operations, retain visual cues along the seismic lines he uses for trapping, move a proposed access route to avoid his trapper cabin and outhouse and refrain from harvesting between November 15 - December 31st in several blocks proposed in the Alces operating area. Two requests were made by private landowners to grade and repair the access roads into their property during and after completion of harvesting activities. These actions were all agreed to within the annual report period and apply to blocks that are at various stages of development. All the actions have been entered into our Resources tracking system to ensure completion.

During the reporting period of April 1, 2013 to March 31, 2014 there was one mutually agreed upon action plan between BCTS and a guide outfitter. A request was made by the guide outfitter that at the time the blocks around Chunamun Lake are to be harvested, that the guide would be notified. These blocks are not yet scheduled for harvesting.

Forecasting Assumptions and Analytical Methods:

It is anticipated that forest operations will respect and reflect the interests of non-timber resource tenure holders, local public and Aboriginals, resulting in the maintenance of non timber resource commercial opportunites in the Fort St. John TSA.

Strategy and Implementation Schedule:

During the referral period for each SFMP, FOS, PMP, and/or Site Level Plan (if available) the Participants will provide opportunities to meet with affected guide, trapper and known non-timber commercial interest stakeholders to:

- Provide a review of the current SFMP, Forest Operations Schedule, PMP's, and/or Site Level Plans (if available) as applicable,
- Seek site specific information from tenure holders and known non-timber commercial interests regarding tenure improvements, tenure use timing, and other issues pertinent to the overlap of forest and guide, trapping tenures and non-timber commercial interest activities, and
- Where possible, develop, review and implement a mutually agreed action plan to address site-specific issues.

Outside of the review and comment periods, if concerns regarding forestry operations are raised by guides, trappers or other commercial interests, the Participants will endeavor to reach an amicable agreement to address the concerns by developing and implementing mutually agreed actions plans.

When an action plan is developed, the issue needs to be clearly identified to facilitate reporting. The Participants will enter the action plan in a database for tracking purposes (e.g. Cngea Incident Tracking System - I.T.S.), identifying the action, that the issue deals with a guide, trapper or other commercial interests concerns, what the due date to complete the action is, and the Participant's staff member responsible for completing or following up on the action.

Monitoring Procedure:

An annual review of action plans will be completed, and a summary of conformance to action plans will be prepared and reported in annual reports.

Linkages to Operational Plans:

Plans subject to review and comment will be a primary venue for identifying issues that may require action plans to address. Forest Operations Schedules, Site Level Plans and all other short-term operational plans will be consistent with any agreements between Participants and guides, trappers and other known non-timber commercial interests.

Linkages to LRMP:

This indicator ensures the commercial interests of other stakeholders are considered and addressed by the Participants in a proactive manner. The indicator statement and target therefore support the following LRMP objectives:

- *Maintain guide outfitting opportunities.*
- *Provide quality public and commercial recreational opportunities and values.*
- *Manage backcountry recreation and tourism opportunities in a natural or natural appearing condition.*
- *Ensure future infrastructure requirements are considered when exploring for oil and gas (intent – for agriculture or settlement needs).*

6.44 TIMBER PROCESSED IN THE DFA

Indicator Statement	Target Statement
Volume of timber processed in the DFA in proportion to volume harvested in the DFA	The annual equivalent of 70% of the DFA's harvest is primary processed in the DFA
SFM Objective: Maintain viable timber processing facilities in the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

An acceptable negative variance of 5% (i.e. a minimum of 65% of the harvest processed in the DFA) is permissible. This target level and variance is necessary to account for timber harvested within the DFA that is not directly harvested by the Participants thus having less control as to its final processing destination.

What is this indicator and why is it important?

This indicator is a measure of the volume of timber harvested within the DFA which goes directly to the timber processing facilities located within the DFA as compared to the total volume of wood harvested within the DFA. The volumes harvested in the DFA include all quota, BCTS purchase, private, and woodlot volumes. The volumes exclude oil and gas salvage wood, as MFLNRO reporting does not provide a clear distinction to delineate by TSA the source of this wood. The proportion of the volume of timber processed locally, in comparison to the total volume harvested should provide a reasonable assessment of the SFM objective of continued viability for local timber processing facilities.

Current Status:

The following table outlines the volume of timber processed in the DFA in proportion to the entire volume of timber harvested in the DFA from April 1 2013 through March 31, 2014.

Table 32: Proportion of Total Volume Locally Processed[33]

	Total Scaled Volume of Timber Delivered to Local Processing Plants (m^3)	(a) Total Scaled Volume of Timber Originating Within the DFA (m^3)	(b) Total Volume of Timber Originating Within the DFA Processed within the DFA (m^3)	(b/a) % of Total DFA Volume Processed Locally
Conifer	1,059,259	940,006	937,508	99.7%
Deciduous	820,005	775,591	775,591	100%
All	**1,879,264**	**1,715,597**	**1,713,100**	**99.9%**

Note: The above quoted volumes include woodlot and private wood, but exclude oil and gas salvage since there is no way to determine from which Timber Supply Area salvage wood originates.

The majority of the timber harvested in the DFA was processed at facilities within the DFA.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? Forest organizations that harvest in relation to their allocation of the allowable annual cut provide employment and taxation revenue to local communities. Forest organizations that process timber within the DFA will provide employment and taxation revenue to local communities in the DFA.

Strategy and Implementation Schedule:

All timber to be harvested within the DFA is assigned a unique timber mark identifier, and requires that a scale site designation (SSD) be approved by the Ministry of Forests and Range. Each truckload of timber is then marked appropriately and delivered to the approved scale site designation and recorded into the Ministry's scaling information system. A query of the scale information system based on the population of tenures originating within the DFA will identify specifically where the timber was hauled to, how many cubic metres of timber was hauled and subsequently milled.

It is expected that most of the timber harvested by the major licensee Participants will be processed in their local facilities. Timber that is sold through auction by BCTS can be delivered to any approved milling facility however, as there is no requirement that it be processed locally. This also applies to timber originating from private lands, woodlots, and oil and gas salvage activities. For the purposes of monitoring this indicator all timber harvested within the DFA and delivered to a processing facility within BC will be included with the exception of timber originating from oil and gas salvage.

[33] The volumes in the table include quota, BCTS, woodlot and private wood but do not include oil and gas salvage since there is no practical way to determine from which TSA the salvage wood originated

Monitoring Procedure:

The SSD will be queried and results will be summarized in the Annual Report. All timber harvested from the DFA can be determined from records, except for oil and gas salvage which will be excluded from the calculation.

Linkages to Operational Plans:

None.

Linkages to LRMP:

There are no LRMP objectives linked to this indicator.

6.45 FOREST HEALTH FOS PLANNING [34]

Indicator Statement	Target Statement
Percentage of significant detected forest health damaging agents which have treatment plans prepared and implemented.	100% of significant detected forest health damaging agents will have treatment plans repared and implemented within 1 year of initial detection.
SFM Objective: Maintain or enhance landscape level productivity Maintain a natural range of variability in ecosystem function, composition and structure which allows ecosystems to recover from disturbance	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Forest Health Management Landscape Level Strategy.	

Acceptable Variance:

A 20% variance (i.e. minimum of 80% of significant detected forest health damaging agents) is required in the event some FOS blocks are dropped due to other First Nation, stakeholder or public interests. A variance of 1 year is permissible to provide for data collection and engagement with forest health specialists, First Nations, stakeholders and the public.

What is this indicator and why is it important?

This indicator describes the effectiveness of the forest health management strategy in addressing identified forest health issues. The current process of detection has to date been successful in identifying significant forest health issues, as broad based pest incidence surveys have not identified any substantial catastrophic losses to damaging agents which have gone undetected. This indicator will identify that treatment plans are developed and implemented in a timely manner to address significant forest health issues that are detected.

Significant detected forest health damaging events are defined as those identified as:

- medium or high risk from the severity classification system (see Table 18, below), or
- forest health events identified as significant by the MFLNRORD, or
- damage which threatens the achievement of silviculture stocking standards within a plantation, or
- damage which threatens the survival of 10% or more of the trees in a merchantable stand greater than 50 hectares in size.

Current Status:

Participants and the MFLNRORD have conducted detection programs across most of the Fort St John TSA, focusing primarily on existing or proposed development areas. Some overview flights in other parts of the DFA have been undertaken where forest health issues in adjacent TSA's posed a potential threat to stands within the DFA. Fire and windthrow damage has been routinely identified from field information and overview flights, and salvage programs developed

[34] New indicator in 2010- previous # 49 in SFMP # 1 was Harvest Systems which has been deleted

as required. Other forest health issues in the DFA have been sporadic and localized since significant forest utilization commenced, as most of the forest stands are relatively young.

Historically, the MFLNRORD has on one occasion, requested a pest inventory assessment for a spruce beetle outbreak near Wonowon. Surveys showed the pest was limited in extent, and salvage logging was conducted to address the concern. Of late, forest health management focused on the mountain pine beetle outbreak which began locally in the later part of the term of SFMP# 2. The mountain pine beetle infestation has significantly declined to the point where it is no longer of sufficient significance to be considered the primary forest health agent requiring management in the Fort St John TSA.

Free-growing damage (health) standards are used to assess stand health in plantations. Harvesting is currently the most commonly applied treatment and control for protecting mature timber inventories for fire, wind damage, and spruce beetle. Fill-planting is the most commonly applied treatment for damage to plantations from frost and winter desiccation, which are the most prevalent abiotic factors.

Participants utilize the forest health management expertise in the Canadian Forestry Service and MFLNRORD as needed. The Canadian Forestry Service holds extensive historical information (old Forest Insect and Disease Survey), and it also houses expert diagnostic services, and conducts research relevant to forest health management. The MFLNRORD also has leading experts in diagnostics, management and training.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply.

Strategy and Implementation Schedule:

1. The participants will establish, and maintain a summary of damaging agents and their estimated incidence, current status and their potential impacts. **Table** 18 is the initial estimate of incidence and severity of damaging agents in the DFA.

Table 18: Estimated Incidence, Severity, Current Conditions and Potential Impact of Damage Agents in the Fort St. John DFA

Pest Damage Agent	Estimated Incidence (area affected of DFA) by Severity Class (low, mid & high)			Severity Class Risk Breakpoints (Low, Mid & High Risk)	Current conditions	Potential Impact
	Low	Mid	High	e.g., prefixes denote classification is under development	Estimated extent of pest damage in the DFA, and type of damage	Type of damage, and seral stage affected
Spruce beetle	98.5 %	1.5 %	0	E.g., <2%, 2-10%, >10%	Uncommon, stem mortality; central, western and northern areas of DFA	Stand destroying (mature)
Eastern spruce budworm	99%	1%	0%	E.g.,<5%, 5-25%, >25%	Common, annual conditions dependant, northern areas of DFA	Stand destroying (mature & early seral understorey)
Foliar diseases of deciduous (*Venturia sp.*)	70%	25 %	5%	E.g.,<10%, 10-30%, >30%	Ubiquitous/common, annual moist-weather condition dependant, often severe growth impact	Severe growth reduction, reduces stand density (early seral)
Pine stem rusts	70%	25 %	5%	<10%, 10-20%, >20% (Pers comm., R.W. Reich)	Ubiquitous/common, localized mid-high severity	Stem mortality, reduces stand density (early seral)
Insect defoliators of deciduous	80%	10 %	10 %	E.g.,<10%, 10-30%, >30%	Periodical, wide range of severity; growth reduction	Limited stem mortality, growth reduction (early to mature seral)
Wood decay fungi	30%	40 %	30 %	E.g.,<10%, 10-30%, >30%	Ubiquitous, variable by stand	None to severe wood quality effects (mature)
Wildlife browse (hares, elk etc) Livestock	90%	10 %	0%	E.g.,<10%, 10-30%, >30%	Ubiquitous but localized both conifer & deciduous	Low to severe growth reduction (early seral)

Pest Damage Agent	Estimated Incidence (area affected of DFA) by Severity Class (low, mid & high)			Severity Class Risk Breakpoints (Low, Mid & High Risk)	Current conditions	Potential Impact
	Low	Mid	High	e.g., prefixes denote classification is under development	Estimated extent of pest damage in the DFA, and type of damage	Type of damage, and seral stage affected
Livestock	90%	10 %	0%	E.g.,<10%, 10-30%, >30%	Localized to range tenures on both conifer & deciduous	Low to severe growth reduction & mortality (early seral)
Mountain pine beetle	99.5 %	0.5 %	0	E.g., <2%, 2-10%, >10%	Uncommon	Stand destroying (mid-to-late-mature)
Warren's root collar weevil	99%	1%	0	E.g., <2%, 2-10%, >10%	Ubiquitous but localized stem mortality	Scattered stem mortality (early seral, <10yrs)
Tomentosus root rot	95%	4%	1%	<6, 6-15, 15+ (Pers 300omm.., R.W. Reich)	Common below 700m a.s.l. (I.e., ~ 5000 ha in DFA)	Low to severe growth reduction, limited mortality & windthrow (early to mature)
Spruce weevil	97%	2%	1%	E.g., <2%, 2-10%, >10%	Uncommon, localized attack; stem deformity and growth reduction	Stem deformity and growth reduction (early seral)
Western balsam bark beetle	95%	5%	0%	E.g., <2%, 2-10%, >10%	Common but variable attack intensity	Stand destroying (mature)
Conifer foliar diseases	80%	10 %	10 %	E.g.,<10% ,10-20%, >10%	Uncommon, localized attack; growth reduction	Growth reduction (early to mature seral)
Eriophyid mites	99%	0%	1%	E.g.,<1% 1-10%, >10%	Very uncommon, localized attack; little growth reduction	Growth reduction (early seral, predominantly on deciduous)

Pest Damage Agent	Estimated Incidence (area affected of DFA) by Severity Class (low, mid & high)			Severity Class Risk Breakpoints (Low, Mid & High Risk)	Current conditions	Potential Impact
	Low	Mid	High	e.g., prefixes denote classification is under development	Estimated extent of pest damage in the DFA, and type of damage	Type of damage, and seral stage affected
Abiotic: Frost	85%	10 %	5%	E.g.,<1% 1-10%, >10%	Common, localized to widespread damage	Growth reduction, sometimes stem deformity or stem mortality (early seral is most severely affected)
Abiotic: Snow-press	97%	3%	0%	E.g.,<1% 1-10%, >10%	Common, localized to widespread damage	Stem deformity to breakage (early to mid seral)
Abiotic: Hail	99%	0%	1%	E.g.,<1% 1-10%, >10%	Common, localized damage; most affects deciduous species	Stem damage or forking (early)
Abiotic: Winter Desiccation (Red belt)	97%	1%	2%	E.g.,<1% 1-10%, >10%	Common, localized mid – high elevation bands or plantations at any elevation; on conifer species	Foliage mortality on mature, or seedling mortality in plantations
Abiotic: Sunscald	99%	1%	0%	E.g.,<1% 1-10%, >10%	Uncommon, localized to widespread damage	Stem mortality (early to mid seral)
Abiotic: Windthrow	85%	10 %	5%	E.g.,<1% 1-10%, >10%	Uncommon, localized to widespread damage	Stem breakage (mature)
Abiotic: Fire	99%	<1 %	<1 %	<5% mortality-5-30% mortality; >30% mortality	Uncommon to common, localized to widespread damage, highly variable occurrence annually	Stem quality to stem and stand mortality

Pest Damage Agent	Estimated Incidence (area affected of DFA) by Severity Class (low, mid & high)			Severity Class Risk Breakpoints (Low, Mid & High Risk)	Current conditions	Potential Impact
	Low	Mid	High	e.g., prefixes denote classification is under development	Estimated extent of pest damage in the DFA, and type of damage	Type of damage, and seral stage affected
Abiotic: Flooding	95%	4%	1%	E.g.,<1% 1-10%, >10%	Uncommon, localized to widespread damage	Stem mortality (early to mature)
Abiotic: H2S etc gas	99%	<1 %	<1 %	E.g.,<1% 1-10%, >10%	Uncommon, localized near energy operations	Growth reduction to mortality (early to mature)

This table will be updated as new information becomes available.

2. The participants will maintain and refine a detection and monitoring program for damaging agents over the landbase by:
   a) continuing to conduct aerial and ground surveys in management zones in which forest operations will be proposed during the term of this plan if there is an identified forest health issue .
   b) continuing to conduct aerial surveys in other parts of the DFA if there is reason to suspect potential forest health issues may exist in these areas.
   c) ensuring appropriate forest workers, consultants and industry staff, are competent at identifying specific forest health concerns within the Fort St John TSA.
   d) maintaining a record of agent incidence and intensity.

3. Active Participants will address fire management issues in fire preparedness plans that outline objectives, duties and responsibilities related to minimizing fire risk, and responding to fire occurrence.
4. The Participants will develop treatment plans for significant forest health issues. Treatment plans will identify the location of the significant concern, and an implementation schedule for the proposed treatments. Treatment plans will be developed using forest health specialists as needed. Plans will consider the risk presented by the damaging agent, and the cost: benefits of a range of available options. Some of the more common options which may be employed are:
   - relocating harvesting activities to meet forest health management requirements,
   - pheromone baiting and lethal trap programs (trap trees in forested conditions, and lethal traps in mill yard conditions),

- incorporating forest health requirements into cutblock designs where necessary to prevent the development of forest health problems (e.g., cold air drainage for frost potential, or understorey management for eastern spruce budworm),
- fill-planting or species conversion for plantation related problems
- doing nothing, if so warranted by the level of risk and cost : benefit analysis.

5. General measures to be implemented for potential significant problems, depending on site conditions, are summarized in Table 33.

Table 33: Detection & Monitoring, and Treatment Groupings for Damage Agents

	Damage Agents			
Forest Health Management Groupings	Spruce beetle Eastern spruce budworm Mountain pine beetle Fire	Defoliators of deciduous species Western balsam bark beetle Red-belt desiccation	Tomentosus root rot Wildlife browse Pine stem rusts Wood decay fungi Windthrow	Foliar diseases of deciduous & coniferous species Spruce weevil Warren's root collar weevil Eriophyid mites **Frost, snow-press, hail, sunscald, flooding
Detection and Monitoring	*Detect and Monitor via aerial surveys, and pre-harvest operations surveys and assessments*	*Detect and Monitor via aerial surveys (for areas classified as high risk, or anecdotal observations)*	*Detect and Monitor during pre-harvest, and reforestation success survey operations.*	*Detect and Monitor during silviculture surveys*
Treatment or Control	*Implement containment sanitation and salvage harvesting strategies*	*Fill planting of plantations.*	*Prescribe pest control or salvage strategies at pre-harvest phase; for pine stem rusts; genetically resistant stock types and/or fill-planting*	*Fill-planting of plantations.*

Monitoring Procedure:

The Participants retain records of all significant forest health damaging agents detected. Forest health information on areas or damage agents of broad concern affecting or potentially affecting more than one participant (e.g., mountain pine beetle, spruce bark beetle) will be forwarded to the MFLNRORD. Participants will notify the MFLNRORD following treatment action on high-risk

damage agents. A summary of significant pest conditions and treatment plans will be presented in each annual report.

Linkages to Operational Plans:

Site Level Plans will identify significant forest health concerns and proposed treatment options. Forest Operations Schedule's (FOS's) will be modified as needed to relocate harvesting to address forest health issues.

Linkages to LRMP:

The forest health management strategy links to the LRMP indirectly and supports the biodiversity strategy through its direction to manage for seral stages, and, it links directly to the General Management Direction (Forest Management) by "encouraging forest harvesting patterns and block sizes which emulate natural disturbance patterns found within the planning area." The forest health management strategy further links to other specific LRMP objectives:

- *Maintain functioning and healthy ecosystems*
- *Manage for forest health*
- *Minimize losses to the timber harvesting land base*
- *Enhance timber harvesting and a sustainable long-term supply*

6.46 COORDINATION[35]

Indicator Statement	Target Statement
Percentages of SFMPs and FOSs jointly prepared by the Participants	100% of all SFMPs and FOSs will be jointly prepared by the Participants
SFM Objective: Maintain viable timber processing facilities in the DFA	
Linkage to *FSJPPR*: For the purposes of Section 42 of the *FSJPPR* this indicator statement, target statement and acceptable variance will be used to determine if forest practices are consistent with the Timber Harvesting Landscape Level Strategy	

Acceptable Variance:

May exclude new Participants that join the Pilot Project and can be assigned blocks from an existing plan, or Participants that are not required to complete a plan (e.g. TSL holders).

What is this indicator and why is it important?

The coniferous and deciduous timber resources are highly intermingled, yet widely dispersed within the TSA. Most Participants' tenure interests lie primarily in either deciduous or coniferous stands, depending on what the needs are of their primary manufacturing customer. Independent development of adjacent and intermixed resources would result in serious overlapping tenure conflicts, an inability to meet broader landscape level objectives, and economic inefficiencies in planning effort and access development. Coordinated planning allows comprehensive analysis of all harvesting plans concurrently to determine forecasted impacts on landscape level strategies and SFMP indicators, and provides a clearer document for members of the public and First Nations to understand cumulative impacts of all forestry operations.

Fully coordinated SFM and FOS Plans provide opportunities for cost efficiencies in planning, harvesting and road construction, and can ensure fair and equitable distribution of harvesting opportunities. Increased cost efficiencies promote the viability of the timber processing facilities, a key LRMP objective.

"Jointly prepared" refers to the plan applying to all effected Participants, and that the Participants, or their designated representatives, are aware of the plan, and agree with its content. The actual workload may vary between Participants, depending on the content of the plan, and the relevance to their operations.

Current Status:

In 2004 and again in 2010 a coordinated six-year FOS was developed by the Managing Participants. Blocks were assigned to each Participant based on agreed-to criteria. Analyses were completed to demonstrate that the plan was consistent with the 22 relevant SFMP indicators. This coordinated plan facilitated common consultation presentations to interested stakeholders and First Nations, which demonstrated the cumulative impacts of all planned forestry activities. Subsequent FOS and SFMP amendments have either been prepared jointly

[35] The indicator was made a legal indicator in SFMP#2 to emphasize the commitment to coordinated planning by the Participants

by effected Participants, or prepared by one Participant and reviewed prior to submission for any concerns by the other Participants.
There was one amendment to the SFMP (amendment #3) during the annual reporting period 2013-2014 but the amendment did not involve a regulatory performance indicator and therefore did not require public review or government approval. The amendment content was discussed at the February 2014 Public Advisory Group meeting.
There were twenty-three amendments to the FOS during the reporting year, three requiring public review and comment (amendment #154, 156, 157), and the balance not requiring public review. FOS amendments continue to be coordinated through a mutual notification protocol. The participants were consistent in following the established amendment procedures, pertaining to ensuring that all participants are aware of, or are involved in, amendments to the FOS.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Implementation of the indicator strategy will result in coordination of the planning of forest management activities which will result in minimization of duplication of forest access infrastructure. This will reduce the amount of area removed from forest production.

Strategy and Implementation Schedule:

The preparation of FOS# 3 is expected to be completed in the fall of 2016, following approval of this SFMP. Opportunities to streamline the information included in the FOS, and the FOS development and consultation process, including changes to Schedule requirements, will be done in consultation with government agencies.

Monitoring Procedure:

Progress on this objective will be reported in annual reports.

Linkages to Operational Plans:

FOS's will be consistent with an approved SFMP.

Linkages to the LRMP:

Coordinating forestry activities is expected to optimize main road locations and reduce the amount of road construction needed. This indicator therefore supports the following LRMP objective:

- *Coordinate access and linear development to minimize effects on other resources.*

6.47 AAC Partition – Deciduous Planning

Indicator Statement	Target Statement
The volume of deciduous species that has been identified in planned cutblocks in the FOS within the Core partition area.	The Core area will have a maximum of 56% of the total planned deciduous harvest volume identified in the Fort St John TSA area.
SFM Objective:	
Linkage to *FSJPPR*:	

6.47A AAC Partition – Deciduous Harvest Performance

Indicator Statement	Target Statement
The volume of deciduous species (measured using planning stage block volume data), that has been harvested by the Participants within the Core partition area since May 10, 2018.	On a 3-year rolling basis, deciduous harvest in the Core area will not exceed an average of 512,000 m^3 annually.
SFM Objective:	
Linkage to *FSJPPR*:	

Acceptable Variance:

- Acceptable variance to the annual partition target is 20% in any reporting year, with an acceptable variance of 10% to the 3-year rolling target. Variances account for: reduction in block volume from WTP's, revisions to Old Seral Retention, other retention, VRI inaccuracies, harvest deferrals necessary to address public, First Nation or stakeholder concerns. – This variance gives us flexibility to meet the target with planned blocks in light of the uncertainties inherent in the VRI and harvest scheduling.
- If FSJ sawmill mill is down for greater than six months, conifer blocks contributing deciduous volume will not be tallied. (Incidental deciduous volume within planned conifer blocks will not be tallied because the conifer blocks will not be harvested.)
- If the harvest planning indicator is not achieved, the Participants have one year to amend the FOS to get it back into compliance.
- BCTS volume is considered harvested once the volume has been sold.

What is this indicator and why is it important

The Fort St John TSA TSR #3 AAC Determination, dated May 10, 2018, established the AAC for the Fort St John TSA at 2,115,000 m^3. The AAC determination also identified a non legal partition to the AAC as follows:

1. Coniferous species: a maximum of 1,200,000 m^3 for coniferous species of which no more than 672,000 m^3 may be harvested from the 'core area'. Within the core area spruce should comprise no more than 50% of the conifer volume; and

2. Deciduous species: a maximum of 915,000 m^3 for deciduous species of which, no more than 512,000 m^3 may be harvested from the 'core' area.

The core area consists of the Blueberry, Kobes, Halfway, Lower Beatton and the southern portion of the Tommy Lakes landscape units. This AAC determination will remain in effect until a new AAC is determined. The partition is intended to result in a more balanced distribution of timber harvesting throughout the Fort St John TSA. Harvesting similar timber profiles to those assumed in the TSR process can help support the maintenance of sustainable long-term timber supplies. Harvest performance in smaller diameter pine stands was identified as a priority in TSR 2, but due to the damage inflicted on the pine resource from the mountain pine beetle, is no longer considered a priority in the current AAC determination.
This indicator is intended to track the Participants conformance with the AAC partition identified in the current AAC determination.

Current Status

The AAC partition was identified May 10, 2018. Harvesting conducted after that date is expected to conform to the non legal partition. Following is a summary of the Participants' planned harvest opportunities by geographic area and harvest performance in the 2018-19 reporting year.

Table 34: FOS Proposed Deciduous Harvest Geographic Distribution

Geographic Area	Total Deciduous Volume (m^3)	Mgmt. Unit Proportion of Total TSA Deciduous Volume	AAC Partition Total Harvest Proportion Target
Core	2,515,406	**57%**	<56.1%
Periphery	1,925,613	43%	>43.9%
FSJ TSA	4,441,019	100%	

As of the date of preparation of this amendment the total deciduous AAC managed by the Participants is 843,000 m^3. As of the SFMP amendment date, the FOS contains roughly 5.2 years worth of unharvested deciduous volume. This volume was planned prior to the announcement of the TSR AAC partition.

Table 35: FOS Completed Deciduous Harvest Geographic Distribution

	Reporting Period					
	2018 - 2019		**2019 - 2020**		**2020 - 2021**	
Managing Participant	**Periphery Total Deciduous**	**Core Deciduous Harvest**	**Periphery Total Deciduous**	**Core Deciduous Harvest**	**Periphery Total Deciduous**	**Core Deciduous Harvest**

	Harvest Volume (m^3)	Volume (m^3) & Proportion of Total TSA Deciduous Harvest (%)	Harvest Volume (m^3)	Volume (m3) & Proportion of Total Core Deciduous Harvest (%)	Harvest Volume (m^3)	Volume (m3) & Proportion of Total Core Deciduous Harvest (%)
Canfor	17,893	340,656 (95%)				
BCTS	0	237,567 (100%)				
BCTS Surrendered Volume*	0	-186,163				
LP	0	0				
Total	**17,893**	**392,060 (95.6% in Core)**				

The harvest completed in the 2018-19 reporting year was planned (blocks developed, cutting permits acquired) 1 to 2years prior to the announcement of the Fort St John TSA AAC partition. In August 2019 Louisiana Pacific Canada indefinitely shut down the Peace Valley OSB plant.

Going forward, future deciduous harvest scheduling will be planned individually by Canfor, LP and BCTS for their respective deciduous tenures (Canfor will no longer conduct deciduous planning, harvest and reforestation activities on behalf of LP).

* A total of 10 BCTS TSLs sold during the period of April 1, 2018, to March 31, 2019 were surrendered unharvested to BCTS. This volume will be resold at a later date.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply? (y/n) No

Strategy and Implementation Schedule:

As mentioned, harvest scheduling is typically planned 1-3 years in advance of the desired harvest date. Because of the lead time required to develop cutblock harvest plans and acquire necessary cutting and road permits, the Participants will require up to 3 years to revise their harvest plans in order to bring their harvest performance into conformance with the AAC partition. FOS amendments will be generated by the Participants, adding blocks where geographically necessary, to bring the FOS harvest opportunities in line with the deciduous AAC partition.

The AAC determination rationale does not specify how performance to the partition is to be measured (units) or monitored (periodicity). The reporting proposed by the Particpant's will include annual performance and average performance over the 3-year rolling period. The 3-

year rolling period for harvest performance monitoring provides flexibility to ramp up revision of harvest scheduling plans over a few years to conform with the non legal partition. It also provides flexibility to overcut in an individual year, followed by undercutting to ensure that over the reporting period, the intent of the partition is achieved – this is similar flexibility to that provided by cut control requirements which are monitored over a 5-year period.

Monitoring Procedure:

The Participants will annually report the amount of:

- The proportion of total TSA deciduous harvest within the Core area.

Both indicators will use the block volume data generated at the FOS planning stage. Cruise and or scale volume data may be used where available for reporting harvest performance.

Linkages to Operational Plans

FOSs and harvest performance will be analyzed to ensure they are consistent with the TSA AAC partition. Proposed development will be adjusted, if necessary, to ensure consistency with targets identified in the SFMP which are designed to generate conformance with the AAC partition.

Linkages to LRMP:

The deciduous planning and harvest performance indicator helps to support the following LRMP objectives by maximizing use of on block residual fibre:

- *Maintain timber harvesting and forest management opportunities.*
- *Enhance timber harvesting and a sustainable long term timber supply.*

6.48 AAC PARTITION - CONIFER PLANNING

Indicator Statement	Target Statement
The volume of conifer species that has been identified in planned cutblocks in the FOS within the Core partition area.	A) In the Core area non spruce conifer species will comprise, a minimum of 50% of the total planned conifer harvest volume. B) The Core area will have a maximum of 56% of the total planned conifer harvest volume identified in the Fort St John TSA area.
SFM Objective:	
Linkage to *FSJPPR*:	

6.48A AAC Partition - Conifer Harvest Performance

Indicator Statement	Target Statement
The volume of conifer species (measured using planning stage block volume data), that has been harvested by the Participants within the Core partition area since May 10, 2018.	On a three-year rolling average: A) Conifer harvest in the Core area will not exceed an average of 672,000 m^3 annually. B) In the Core area non spruce conifer species will comprise, a minimum of 50% of the total conifer volume harvested by the Participants.
SFM Objective:	
Linkage to *FSJPPR*:	

Acceptable Variance:

- Acceptable variance to the annual partition target is 20% in any reporting year, with an acceptable variance of 10% to the 3-year rolling target. Variances account for: reduction in block volume from WTP's, revisions to Old Seral Retention, other retention, VRI inaccuracies, harvest deferrals necessary to address public, First Nation or stakeholder concerns. – This variance gives us flexibility to meet the target with planned blocks in light of the uncertainties inherent in the VRI and harvest scheduling.
- If PVOSB mill is down for greater than six months, deciduous blocks contributing conifer volume will not be tallied. (Incidental coniferous volume within planned deciduous blocks will not be tallied because the deciduous blocks will not be harvested.)
- If the harvest planning indicator is not met, the Participants have one year to amend the FOS to get it back into compliance.
- BCTS monitoring, volume is considered harvested once the volume has been sold.

- This indicator is to be reviewed after the next Timber Supply Review (TSR) to ensure continued relevance to the new TSR.

What is this indicator and why is it important

The Fort St John TSA TSR #3 AAC Determination, dated May 10, 2018, established the AAC for the Fort St John TSA at 2,115,000 m^3. The AAC determination also identified a non legal partition to the AAC as follows:

1. Coniferous species: a maximum of 1,200,000 m^3 for coniferous species of which no more than 672,000 m^3 may be harvested from the 'core area'. Within the core area spruce should comprise no more than 50% of the conifer volume; and
2. Deciduous species: a maximum of 915,000 m^3 for deciduous species of which, no more than 512,000 m^3may be harvested from the 'core' area.

The core area consists of the Blueberry, Kobes, Halfway, Lower Beatton and the southern portion of the Tommy Lakes landscape units. This AAC determination will remain in effect until a new AAC is determined. The partition is intended to result in a more balanced distribution of timber harvesting throughout the Fort St John TSA. Harvesting similar timber profiles to those assumed in the TSR process can help support the maintenance of sustainable long-term timber supplies. Harvest performance in smaller diameter pine stands was identified as a priority in TSR 2, but due to the damage inflicted on the pine resource from the mountain pine beetle, is no longer considered a priority in the current AAC determination.
This indicator is intended to track the Participants' conformance with the AAC partition identified in the current AAC determination.

Current Status

The AAC partition was identified May 10, 2018. Harvesting conducted after that date is expected to conform to the non legal partition. Following is a summary of the Participants' planned harvest opportunities by geographic area and harvest performance in the 2018-19 reporting year.

Table 36: FOS Proposed Conifer Harvest Geographic Distribution

	Conifer Volume in Unharvested FOS Blocks						
Geographic Area	**Spruce Volum**	**Non Sx Conifer**	**Total Conifer**	**Spruce Proportio**	**Partition Area**	**Core Target**	**TSA Total**

	e (m^3)	Volume (m^3)	volume (m^3)	n of Total Mgmt. Unit Conifer Volume	Proportion of Total TSA Conifer Volume	Spruce Proportion	Harvest Target Proportion
Core	2,976,646	1,376,603	4,353,249	**68%**	**58%**	<50.1%	<56.1%
Periphery	2,467,228	726,139	3,193,367	77%	42%	N/A	>43.9%
FSJ TSA	5,536,532	2,010,084	7,546,616	73%	100%	N/A	

As of the date of preparation of this amendment the total AAC managed by the Participants is 1,106, 096 m^3. Considering the AAC managed by the Participants of 1,106, 096 m^3, as of the SFMP amendment date, the FOS contains roughly 6.8 years' worth of unharvested conifer volume. This volume was planned prior to the announcement of the TSR AAC partition.

Table 37: FOS Completed Conifer Harvest Geographic Distribution

	Reporting Period					
	2018 - 2019		2019 - 2020		2020 - 2021	
Managing Participant	**Core Total Conifer Harvest Volume (m^3)**	**Core Spruce Harvest Volume (m3) & Proportion of Total Core Conifer Harvest (%)**	**Core Total Conifer Harvest Volume (m^3)**	**Core Spruce Harvest Volume (m^3) & Proportion of Total Core Conifer Harvest (%)**	**Core Total Conifer Harvest Volume (m^3)**	**Core Spruce Harvest Volume (m^3) & Proportion of Total Core Conifer Harvest (%)**
Canfor	455,069	382,640 (84%)				
BCTS	470,390	253,128 (54%)				
BCTS Surrendered Volume*	-111,401	-80,443 (72%)				
LP	0	0				
Total	**814,058**	**555,325 (68%)**				

The harvest completed in the 2018-19 reporting year was planned (blocks developed, cutting authorities acquired) 1 to 2years prior to the announcement of the Fort St John TSA AAC partition.

* A total of 10 BCTS TSLs sold during the period of April 1, 2018, to March 31, 2019 were surrendered unharvested to BCTS. This volume will be resold at a later date.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply? (y/n) No

Strategy and Implementation Schedule:

As mentioned, harvest scheduling is typically planned 1-3 years in advance of the desired harvest date. Because of the lead time required to develop cutblock harvest plans and acquire necessary cutting and road permits, the Participants will require up to 3 years to revise their harvest plans in order to bring their harvest performance into conformance with the AAC partition. FOS amendments will be generated by the Participants, adding blocks where geographically necessary, to bring the FOS harvest opportunities in line with the coniferous AAC partition.

The AAC determination rationale does not specify how performance to the partition is to be measured (units) or monitored (periodicity). The reporting proposed by the Particpants will include annual performance and average performance over the 3-year rolling period. The 3-year rolling period for harvest performance monitoring provides flexibility to ramp up revision of harvest scheduling plans over a few years to conform with the non legal partition. It also provides flexibility to overcut in an individual year, followed by undercutting to ensure that over the reporting period, the intent of the partition is achieved – this is similar flexibility to that provided by cut control requirements which are monitored over a 5-year period.

Monitoring Procedure:

The Participants will annually report the amount of:

- The proportion of spruce conifer harvest in the Core area, and
- The proportion of total TSA conifer harvest within the Core area.

Both indicators will use the block volume data generated at the FOS planning stage. Cruise and or scale volume data may be used where available for reporting harvest performance.

Linkages to Operational Plans

FOS's and harvest performance will be analyzed to ensure they are consistent with the TSA AAC partition. Proposed development will be adjusted, if necessary, to ensure consistency with targets identified in the SFMP which are designed to generate conformance with the AAC partition.

Linkages to LRMP:

The coniferous planning and harvest performance indicator helps to support the following LRMP objectives by maximizing use of on block residual fibre:

- *Maintain timber harvesting and forest management opportunities.*
- *Enhance timber harvesting and a sustainable long term timber supply.*

6.49 CUT CONTROL

Indicator Statement	Target Statement
Percentage of total Allowable Annual Cut (AAC) charged to licensee tenure holders or BCTS Participants during the term of the SFMP.	Jan 1 2016 - Dec 31 2021: Industry Participants: -Not to exceed 110% of the combined cumulative coniferous AAC for the 6-year period -Not to exceed 110% of the combined cumulative deciduous AAC for the 6-year period BCTS Participant: -Not to exceed 110% of the combined cumulative coniferous commitment offered for sale for the 6-year period -Not to exceed 110% of the combined cumulative deciduous commitment offered for sale for the 6-year period
SFM Objective: No decrease in the LTHL in the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None, however the actual volume permissible to be harvested may be adjusted through time if additional licenses are awarded to Participants to address past undercuts, or changes made by the Chief Forester to the approved AAC for the TSA .

What is this indicator and why is it important?

Harvesting at levels that do not significantly exceed the cumulative coniferous and deciduous volumes allocated under various licenses, agreements and apportionments provides assurances that the industry and BCTS are harvesting at levels consistent with the established AAC for the Fort St. John Timber Supply Area. The targets may need to be revised in the event of catastrophic natural disturbances, or related regulatory changes.

Current Status:

The following tables identify the volume harvested by the Participants during the January 1, 2010- December 31, 2015 monitoring period established for this indicator under SFMP# 2.

Table 38: Licensee Conifer License AAC

License	AAC (m^3)	Planning Period 6 year cumulative volume AAC (m^3)	Volume Harvested by Calendar Year (m3)						Total Volume Harvested (m^3)
			2010	2011	2012	2013	2014	2015	
Canfor	394,95	2,369,712	403,54	495,46	516,17	(49,91	530,74		1,896,00

A18154	2		1	4	4	4)	4		9
DZ A56771	150,000	900,000	0	0	33,774	716,226	164,845		914,845
CRL A59959	70,000	420,000	26,286	54,783	133,031	20,582	50,227		284,909
Tembec A60972	83,494	500,964	71,267	68,879	21,292	49,958	143,334		354,730
Total	**698,446**	**4,190,676**	503,104	619,126	704,271	735,582	889,150		3,450,493
Maximum Cumulative AAC (m^3)			**4,609,744**						
Maximum cumulative AAC = 110% of cumulative AAC									

Table 39: Licensee Deciduous License AAC

License	AAC (m^3)	Planning Period 6 year cumulative volume AAC (m^3)	Volume Harvested by Calendar Year (m^3)						Total Volume Harvested (m^3)
			2010	2011	2012	2013	2014	2015	
LP A60049	193,000	1,158,000	79,325	103,496	173,997	144,958	118,676		620,452
LP A60050*	119,300	238,600	52,168	86,407	n/a	n/a	n/a	n/a	138,575
PVOS B A85946	150,000	900,000	0	0	0	273,217	81,056		354,273
Canfor / LP PA 12 & 20**	500,000	3,000,000	246,635	196,926	342,648	244,194	90,994		1,121,397
Total	**962,300**	**5,296,600**	378,128	386,829	516,645	662,369	290,726		2,234,697
Maximum Cumulative AAC (m^3)			**5,826,260**						
**A60050 expired Dec 31, 2011* ***In 2013 PA 12 was subdivided creating PA 20. Combined AAC of the 2 PAs remains unchanged at 500,000 m^3.* Maximum cumulative AAC = 110% of cumulative AAC									

Table 40: BCTS Volume Allotment

Species	AAC (m^3)	Planning Period 6 year cumulative volume commitment offered for sale (m^3)	Volume Harvested by Calendar Year (m^3)						Total Volume Harvested (m^3)
			2010	2011	2012	2013	2014	2015	
Conifer	372,059	2,232,354	341,222	233,819	233,872	349,479	341,607		1,499,999
Deciduous	180,000	1,080,000	73,783	109,335	32,327	0	238,197		453,642
Maximum cumulative coniferous AAC			**2,455,589**						
Maximum cumulative deciduous AAC			**1,188,000**						
Maximum cumulative AAC = 110% of cumulative AAC									

The annual BCTS coniferous allotment in 2013/14 was 372,059 m^3. Between April 1, 2013 and March 31, 2014, BC Timber Sales' offered 349,479 m^3 (93.5%) of the annual allocation. Of the 349,479 m^3 offered, nine TSL's with a volume of 261,983 m^3 sold.
The annual BCTS deciduous allotment in 2013/14 was 220,000 m^3. Between April 1, 2013 and March 31, 2014, BC Timber Sales did not offer any of the annual deciduous fibre allocation.
2010 represents the first year of this 6-year cumulative cut review period, which will conclude December 31, 2015.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)?
Forest organizations that harvest in relation to their allocation of the allowable annual cut provide employment and taxation revenue to local communities.

Strategy and Implementation Schedule:

The Participant's strategy is to develop harvest or timber sale plans consistent with allocated coniferous and deciduous harvest levels over the term of the SFMP.
The Forest Operations Schedule uses the approved allowable harvest levels for all Participants' tenures to assign cutblocks to their license or apportionment.
BCTS uses FOS volumes to develop timber-selling programs consistent with coniferous and deciduous apportionments. Plans are modified, as needed once more accurate volumes are determined from operational timber cruises. BCTS conformance to cut apportionment levels is determined from coniferous and deciduous cruise data from individual advertised timber sales, whether or not the volume is sold.
Industry Participants' cut control positions are based on actual scaled deliveries plus bush waste assessment volumes. Cuts attributable to the coniferous and deciduous licenses will be assigned to the two targets consistent with the TSA AAC methodology. On deciduous licenses,

all deciduous and coniferous volumes charged to cut control will apply to the deciduous component of this indicator. On coniferous licenses, all coniferous and deciduous volumes charged to cut control will apply to the coniferous component of this indicator.
The industry Participants' will periodically compare planned estimated harvest volumes to actual cut control volumes, and modify future harvest plans as needed to compensate for over or underestimates of actual versus estimated volumes.

Monitoring Procedure:

The final assessment of achievement of the target for this indicator will be provided in the Annual Report following December 31, 2015. Interim monitoring will be presented in each year's annual report to demonstrate whether the Participants are trending towards achievement of this target.
Industry Participants: The annual cut control levels will be monitored using the MFLNRO's harvest billing system, which provides the cut control volumes for each tenure. Coniferous licenses and deciduous licenses volumes will be summed, and the total coniferous and deciduous industry annual and cumulative to date cut control volume will be reported in each Annual Report.
BCTS Participant: The annual commitment for volume offered will be determined separately for coniferous and deciduous volumes based on timber sales offered for sale during the government fiscal year (April 1st – March 31st). The annual and cumulative BCTS coniferous and deciduous volumes offered for sale will be reported in each Annual Report.

Linkages to Operational Plans:

The FOS uses periodic cut control volumes to determine the approximate areas and volumes that need to be included in these plans to meet cut control targets. Volume in the FOS will be assigned to Participants by license or by apportionment, based on these estimates. Blocks must be included in a FOS prior to being authorized for harvest, consequently the total six year FOS volume will provide an indication of the Participants' potential to conform to this indicator over the term of this SFMP.
SLP's and cruise compilations will be used for licensees' annual harvest plans, or BCTS TSL sale plans, to more accurately project the volumes to be delivered or auctioned in the next year.

Linkages to LRMP:

Managing and controlling cut levels helps ensure the sustainability of timber production. This indicator therefore supports the following LRMP objective:

- *Maintain timber harvesting and forest management opportunities.*

6.50 DOLLARS SPENT LOCALLY ON EACH WOODLANDS PHASE

Indicator Statement	Target Statement
Percentage of dollars spent locally on each woodlands phase in proportion to total expenditures	Woodlands Phases to be monitored: Logging/hauling: minimum of 80% Road construction and maintenance: minimum of 80% Silviculture: minimum of 5% Planning and administration: minimum of 50%
SFM Objective: Diverse local forest employment opportunities exist in the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

A 10% variance to the minimum target (e.g. logging/hauling 10% lower than 80%= 72% of costs) is required for each identified woodlands phase, as the dollars to be spent fluctuate annually, depending on the amount of harvesting completed that year.

What is this indicator and why is it important?

Woodlands operations and B.C. Timber Sales purchase a wide variety of products and services to produce timber and to manage their forestry activities. This indicator is a measure of total amount of dollars attributed to forestry activities (woodlands phase*) that are spent locally, which is an indication of the diversity of the local forest employment opportunities associated with forest industry activities (the SFM objective for this element). For the purposes of this objective, “local” has been defined as those residences or businesses which have mailing addresses or known established businesses located in the Peace Natural Resource District. The indicator includes staff costs as local administrative costs and refers to the cumulative expenditures of all Participants.

Current Status:

The indicator is unchanged from SFMP # 1. The results of the most recent assessment of this indicator from the 2013-14 Annual Report are summarized by woodlands phase in the table below.

Table 41: Dollars Spent Locally on Each Woodlands Phase

Woodlands Phase	Total dollars expended	Total dollars spent locally	Local %	Indicator target
Logging and Hauling	$62,895,448.83	$54,584,944.08	86.8	80%
Reforestation	$2,972,051.47	$210,105.40	7.1	5%
Road construction and Maintenance	$5,045,888	$4,280,097.98	84.8	80%
Planning and Administration	$7,170,706.57	$6,370,533.27	80.0	50%
Total	**$78,084,094.86**	**$65,445,680.73**	**83.8**	

The percentage of dollars spent locally met targets for the four phases.
It should be noted that BCTS costs for this indicator refer to April 1, 2012-March 31, 2013, while other Participants' costs are based on calendar year reports due to reporting limitations. This is consistent with previous annual reports for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Forest organizations that harvest in relation to their allocation of the allowable annual cut provide employment and taxation revenue to local communities. Hiring local contractors and suppliers will result in a more stable and resilient local economy.

Strategy and Implementation Schedule:

Costs for all woodlands phases will be tracked annually and a query will be done identifying the amount of these dollars that are expended in contracts to local contractors, (as determined by the contractor mailing address, or otherwise known to have local operations) and dollars paid to employees, all of whom are considered local. The data includes the cumulative values of all Participants' woodlands costs.

Monitoring Procedure:

The following activities have been combined in order to define a woodlands phase.

- Logging and hauling costs,
- Road construction and road maintenance, including deactivation,
- Reforestation, including external costs for seedlings, site preparation, planting, brushing and all silviculture surveys,
- Planning and administration, including all wages, all office overhead, all forest development and layout, taxes, leases and rentals.

Stumpage and forest rent costs are excluded from the cost basis, as these are paid to the provincial government.
Each Participant will be responsible for ensuring that all costs are tracked by each phase as identified above and further tracked by the invoice addresses to determine whether this is local or not. A summary will be provided in the annual report.

Linkages to Operational Plans:

This indicator provides no links between short-term operational plans and the SFMP.

Linkages to LRMP:

There are no linkages between this indicator and the LRMP objectives.

6.51 MAINTENANCE OF WILDLIFE AND FISHERIES HABITAT VALUES

Indicator Statement	Target Statement
Conformance to the SFMP indicators and targets pertinent to the maintenance of wildlife and fisheries habitat.	Participants will conform to the identified SFMP indicators and targets pertinent to the maintenance of wildlife and fisheries habitat.
SFM Objective: Recognition of Treaty 8 rights and respect of aboriginal rights through maintenance of landscape level biodiversity	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Variances provided in the specific indicators will apply.

What is this indicator and why is it important?

This indicator ties the indicators associated with ecosystem diversity, species diversity, and water quality and quantity management to practices that are important to maintaining habitat for species that are the focus of hunting, fishing and trapping activities. The ability to practice these activities are rights held by First Nations under Treaty 8. These indicators incite implementation of management practices which result in the maintenance of wildlife and fisheries habitat, thereby supporting the hunting, fishing, and trapping rights embodied in Treaty 8.

The Fort St John TSA is within the larger geographic area of Treaty 8 of 1899, which established hunting, fishing and trapping as treaty rights for the local aboriginal First Nations communities. The rights as such are available across the treaty area and have no site specificity or quantum. The following First Nations have known traditional territory in the DFA: Prophet River, Doig River, Blueberry River, Halfway River, West Moberly, Saulteau, Fort Nelson, Horse Lake and Dene-Tha' (Assumption).

Maintenance of hunting, trapping and fishing opportunities are provided through the suite of SFMP ecological indicators noted below, which prompt actions that maintain habitat for fish and wildlife species across the Fort St John TSA.

Hunting and trapping opportunities are provided by effective habitat management practices designed to create a range of seral stages and forest types across the landscape. Moose, elk and caribou are iconic ungulate species found in the Fort St John TSA. Moose are of particular importance to First Nations as a food source. Some of the common commercial furbearer species in the DFA are fisher, marten, lynx, wolf and wolverine. Maintenance of connectivity corridors across the landscape is also an important consideration for maintaining ungulate and furbearer habitat.

This indicator reports on the participant's performance addressing the ecological indicators that are important to the maintenance of wildlife and fisheries habitat, with the intent being to maintain hunting, fishing and trapping opportunities, which will allow Treaty 8 First Nations to practice their treaty rights.

Hunting and trapping rights are generally upheld by meeting Criterion 1 – Conservation of Biological Diversity, Element 1.1 Ecosystem Diversity – specifically #2 Seral Stage and #3 Patch Size, and Element 1.2 Species Diversity, more specifically by meeting the objective of

suitable habitat elements and its relevant indicators: #5-Snags/Cavity sites, #6-Coarse Woody Debris, #7-Riparian Reserves, #8- Shrubs and #9-Wildlife Tree Patches.

Fishing rights are generally upheld by meeting Criterion 3 – Conservation of Soil and Water Resources, Element 3.2 Water Quality and Quantity, and more specifically by meeting the indicators of maintaining water quality (#35- WCQR, # 36-Protection of Streambanks, # 37-Spills Entering Waterbodies), and water quantity (#34- Peak Flow Index) within the natural ranges of variation.

The following indicators are pertinent to the maintenance of wildlife and fisheries habitat and used to measure the effectiveness of the Participants habitat management practices:

Ecosystem and Species Diversity Indicators supporting hunting and trapping opportunities:

- 6.1 Forest Types
- 6.2 Seral Stages
- 6.3 Patch Sizes
- 6.5 Snags/Cavity Sites
- 6.6 Coarse Woody Debris Volume
- 6.7 Riparian Reserves
- 6.8 Shrubs
- 6.9 Wildlife Tree Patches
- 6.11 Species at Risk Stand Level Management Guidelines
- 6.22 Riparian Corridors

Water Quality and Quantity Indicators supporting fishing opportunities:

- 6.33 Peak Flow Index
- 6.34 Water Quality Effectivenss Evaluation
- 6.35 Protection of Streambanks and Riparian Values on Small Streams
- 6.36 Spills Entering Waterbodies

In addition, Indicator 6.5 Snags/Cavity Sites, Indicator 6.6 Coarse Woody Debris Volume and Indicator 6.22 River Corridors contribute to furbearer management, ensuring furbearer habitat and travel corridors are protected at the stand and landscape levels.

The indicator identifies and measures the Participants' effectiveness in recognizing and respecting existing treaty rights and in managing wildlife and fisheries habitat. In doing so the Participants demonstrate their role of recognizing and respecting society's commitment to sustain core traditional values and ways of life for First Nations in the DFA.

Current Status:

Participants refer SFMP's, FOS's and PMP's to affected First Nations for review and comment on how the plans may impact the First Nations' ability to practice the Treaty rights to hunt, fish and trap. In many cases First Nations are not able to provide site-specific comment regarding the impact of these plans on their ability to practice their treaty rights.

Where site-specific comments are provided, Participants may be able to mitigate the impact of planned activities on treaty rights by modification of planned activities. In situations where no site specific comments are provided, it is felt that the positive management of the indicators pertinent to the practice of treaty rights will result in continued opportunities for First Nations to practice treaty rights to hunt, fish, and trap.

Currently, the Participants are working on identifying additional connectivity corridors to better protect the connectivity of habitats for big game species, furbearers, fish and other wildlife species. Once identified, the connectivity corridors will be spatially defined on FOS maps. During the period of April 1, 2018 to March 31, 2019 the Participants conformed to 14 of the 14 related indicators. Participants did not achieve the target of Indicator 6.9 Widlife Tree Patches.

Forecasting Assumptions and Analytical Methods:

Implementation of the indicator strategy will result in the maintenance of stand and landscape level habitat attributes, such as coarse woody debris and wildlife trees, that will benefit forest dwelling species.

Strategy and Implementation Schedule:

The Participants will:

- Continue to manage the indicators pertinent to the practice of treaty rights.
- Continue to engage with First Nations in the development of strategic and operational plans.
- Report annually on the performance of the indicators as noted above.

Monitoring Procedure:

The Participants will annually review conformance to the 14 related indicators and based on that review determine the level of conformity to this indicator's target, which will be documented in annual reports.

Linkages to LRMP:

- *Maintain fish habitat and water quality for priority fish species.*
- *Maintain habitat for priority furbearing species.*
- *Maintain high capability ungulate winter habitat.*
- *Manage critical wetland habitats for waterfowl and other wildlife species.*
- *Protect or enhance habitats for red and blue listed species.*

6.52 Number of Known Values and Uses Addressed in Operational Planning

Indicator Statement	Target Statement
Percentage of known traditional site-specific aboriginal values and uses identified that are addressed in operational plans	100% of known traditional site-specific aboriginal values and uses identified that have been addressed in operational plans through specific management practices will successfully be implemented in the block.
SFM Objective: Respect known traditional aboriginal forest values and uses	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None.

What is this indicator and why is it important?

The indicator is a measure of the Participants' recognition and response to the traditional aboriginal values and uses that are made known in a timely manner during referral processes. The requirement for site-specificity enables both the Participant and First Nations to best qualify and/or quantify the effects of forest development and the strategies required to manage for the development.

This indicator contributes to respecting the social, cultural, heritage and spiritual needs of aboriginal people who traditionally and currently use the DFA for the maintenance of traditional aspects of their lifestyle. Working with aboriginal peoples to identify, define and develop management strategies that recognize and respect traditional values and uses is an important component of the forest industry's sustainable forest management framework.

This indicator applies to any block where the Participant has agreed to implement special measures in an operational plan to address site specific concerns identified by a Firt Nation. This indicator also applies to archeological sites or areas of potential (AOPs) identified during and Archaeological Overview Assessment (AOA) or and Archaeological Impact Assessment (AIA) and the applicable recommendations from the Archaeologist.

Current Status:

Between April 1, 2013 and March 31, 2014 opportunity to provide information on site-specific values from First Nations to Canfor & BCTS was available through the formal processes of NIT (notice of intent to treat) communications, the FOS amendment info-sharing process, the deciduous *Memorandum of Agreement* Joint Management Advisory Committee (Canfor, LP and the First Nations), as well as other formal or informal communication. Assessments by professional archaeologists are another method used by the participants to gather information on site-specific First Nations' values.

BCTS received a site-specific comment in response to the Notification of Intent to Treat (NIT) referrals. This response was received from the Doig River First Nations (DRFN) regarding a proposed block to be sprayed in the area DRFN identifies as the K'ih tsaa?dze Tribal Park. The DRFN requested that this block be removed from the spray program. Following further discussions and a site visit, BCTS made the decision to take this block out of the spray program. Given the impact this decision would ultimately have on the future ability of this block

to successfully achieve well growing status, BCTS made an application to the District Manager to convert portions of the stand to a deciduous stocking type with applicable stocking standards.
Halfway River First Nations provided some input to BCTS that they were concerned with the potential impact possible future harvest of some blocks would have on the viewscape surrounding a site that they consider important to them. BCTS has subsequently decided to delay the harvest of these blocks until such time as a detailed visual simulation and sensitivity analysis is conducted. The results of that simulation and recommendations will ultimately form the basis for how this viewscape will have forest management activities conducted within it in the future.
BCTS commissioned the completion of archaeological assessments (AIA) on three blocks during the reporting period. A total of two artifacts, one each in two of the blocks were identified during the assessments. The AIA report recommendations were to protect these sites through harvest avoidance. The areas were subsequently ribboned out and removed from the planned harvest boundary.
Canfor received notification from Ron Apsassin of the BRFN of some site-specific aboriginal value features –wildlife habitat, in the vicinity of blocks 03099, 03095, 24017, and 03043 (BCTS). These blocks were not scheduled for development in the near future therefore, the values identified were addressed by way of documenting the information in Resources to ensure the information is communicated when the time comes to develop these blocks.
Through the FOS amendment 154 info-sharing process, Canfor received notification from DRFN that there was an old trail that transected the Southern portion of block 25037. Canfor placed a 100m buffer on the general location of the trail and DRFN was satisfied that this would protect the integrity of the trail. After harvest completion Canfor visited the block with members of the DRFN to ensure implementation of the plan was successful. The members expressed no concerns with the block and were happy about the width of the buffer and the level of protection applied to the feature.
Through the FOS amendment 154 info-sharing process Canfor received notification from BRFN of some site-specific aboriginal uses – trapping in the vicinity of blocks 24359, 02298, 02299, 02300, 03127, 03128, 18064. Canfor committed to constructing small debris piles in these blocks to create habitat for small fur-bearing animals commonly trapped by local trappers. These blocks were not scheduled for development in the near future therefore; the uses and related operational requirements were addressed by way of documenting the information in Resources to ensure the information is communicated when the time comes to develop these blocks.
During the development of block 18054, Canfor noticed that there were 2 sites of concern that had been previously identified by BRFN which fell within the block shape. Canfor contacted the BRFN for help in identifying the specific value that was present. After much effort, Canfor was able to get in touch with the owner of the trapline in this area who identified that the Northern-most site within the block was one of his old trapping cabins (floor only) and a dugout. The trapper, a member of the BRFN, indicated that he didn't mind Canfor harvesting around this site, especially if the timber type was dead pine, in order to decrease the fire hazard here. If the timber type was aspen, he would prefer a buffer be left. The timber type was a mixed type, so Canfor took the feature out of the block and ensured a 80-100m of retention between the cabin site and the block boundary. Despite much effort Canfor was not able to determine the nature of the other feature. Several visits to this location did not help to identify what this specific location might be. BRFN was not forthcoming about the nature of this site despite repeated attempts to engage. The trapline owner was not aware of any special feature at this location. Canfor removed this feature from the block and ensured 50-80m of retention between the location and the block boundary. The final layout was presented to BRFN and no objections were received.

Canfor commissioned 8 archeological assessments (AIA's) during the reporting period. As a result of these AIA's 30 areas of arch potential and 4 verified arch sites were identified. These recommendations for protection of these sites were to alter access routes, avoid sub-surface disturbance (implement machine free zones) to prevent impact to any potential archaeological material.
Canfor did not receive any site specific values or use comments in response to the 2013 NIT referral distributed under the IVMP to local First Nations.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in open and meaningful relationships with local Aboriginals leading to a trust in sharing sensitive information.
Meaningful relationships and open communication with local Aboriginal communities will provide insight to help ensure that areas of cultural importance are managed in a way that provides opportunity to retain aboriginal traditions and values.

Strategy and Implementation Schedule:

Participants will continue with ongoing relationship building processes with First Nations, to encourage meaningful engagement and input during the development of the SFMP, the FOS, and PMP's.
The Participants will encourage First Nations to provide site-specific information about traditional values and uses (subject to confidentiality agreements) at the SFMP, FOS, and PMP stages.
Detailed operational planning will occur following the review and comment periods. Strategies will be implemented in operational plans to address all site specific known values and uses included in the scope of this indicator.
Information provided subsequent to the formal referral review and comment periods will be considered and addressed to the extent Participants are able to do so without unduly disrupting ongoing operations. Ongoing communication with First Nations will also occur through Joint Management Advisory Committees (JMAC's), and during other meetings that provide additional opportunities for First Nations to identify new site-specific information.
The Managing Participants' field staffs are trained in the recognition of wildlife habitat and cultural heritage resources features. Standard Work Procedures provide guidance to field staff regarding the requirement to identify and protect various resources features encountered during fieldwork activities. This guidance provides for management of resource features not specifically identified by First Nations via discussion of the Participants plans.

Monitoring Procedure:

Participants will track the number of opportunities for communication, meetings and input provided during review and comment opportunities for operational plans. Where site-specific information on traditional uses and values is provided, the Participants will record the information, track the issue (e.g. in an ITS or similar tracking system), and any resulting action plans and/or strategies to address the values, and identify staff responsibilities to complete or close off the action. Information from Archeological Impact Assessments (AIA) will be likewise be tracked through Participants' information management systems.

A review of the information management systems will be completed for the April 1st to March 31st time period each year, and the results for this indicator will be reported in Annual Reports.

Linkages to Operational Plans:

Operational plans will be consistent with jointly agreed upon strategies between Participants and First Nations.
Information from AIA's will be used during the development of SLP's and other operational plans.

Linkages to LRMP:

There are no direct links to the LRMP objectives

6.53 Regulatory Public Review and Comment Processes

Indicator Statement	Target Statement
Compliance with the public review and comment process identified in the FSJ Pilot Project Regulation	100% compliance with the public review and comment processes identified in the FSJ Pilot Project Regulation
SFM Objective: To facilitate a satisfactory public participation process	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No variances, unless authorized by the Regional Executive Director (MFLNRO) or his designate.

What is this indicator and why is it important?

This indicator reports the Participants' adherence to the regulatory public review and comment process for the Public Advisory Group (PAG), as well as the SFMP and FOS process.
The FSJPP regulatory requirements related to public review and comments include the following:
1) The public advisory group must review:

- Proposed SFMP's and amendments to SFMP's (S. 47(2)(a))
- Audits carried out under Section 50 (S. 47(2)(b))
- Annual reports prepared under section 51

The Participants must include PAG comments in these documents, and respond to their concerns in writing if necessary.
2) The SFMP and major amendments must be made available for general public review and comment for a specified period of time. Comments received and Participants' responses are to be included with the final documents.
3) The FOS and major amendments must be made available for general public review and comment for a specified period of time. Comments received and Participants' responses are to be included with the final documents

Current Status:

During the 2013-14 reporting period there were three cases where the participants were required to follow formal Public Review and Comment Process identified in the *Fort St. John Pilot Project Regulation*. The licensee participants initiated three separate public reviews regarding amendments to the Forest Operations Schedule for the Fort St. John Pilot Project area.
The review and comment period for FOS amendment #154 was between May 30 and July 31, 2013. The review and comment period for FOS amendments #156 and #157 occurred concurrently and were between May 17th and July 16th. The amendment proposals were advertised in the Alaska Highway News, in a form acceptable the District Manager of the Ministry of Forests, Lands, and Natural Resource Operations.
The participants followed the review and comment procedure set out in the *Fort St. John Pilot Project Regulation* for these amendments.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of opportunities for the public, First Nations and others to gain a better understanding of the Participants planned activities.

Strategy and Implementation Schedule:

The SFMP # 2 was developed following a series of six meetings with the PAG during 2009 to discuss and get input on the proposed legal strategies and indicators. Government advisors were also engaged in meetings in 2009 and 2010 to discuss the SFMP's proposed content. One PAG meeting was held on February 1st 2010 to review the completed "SFMP for Public Review and Comment" prior to the advertisement of the Plan. The landscape level strategy and indicator revisions proposed for SFMP# 3 were discussed with the PAG on March 17, 2015. SFMP# 3 will be available for public review and comment according to the regulatory requirements, or as otherwise agreed to by the Regional Executive Director (MFLNRO) or his designate.

This indicator will also apply to the FOS, which is scheduled to be redone following approval of the SFMP, in 2016.

Monitoring Procedure:

An annual review of conformance too this indicator's targets will be completed as it relates to the applicable plans and reports that require public review and comment as outlined in the *FSJPPR*. The results will be reported in Annual Reports.

Linkages to Operational Plans:

Each SFMP or FOS will undergo a public review and comment period, and comments and the Participants responses will be included in the final submission of these plans to government.

Linkages to LRMP:

This process provides an opportunity for local municipal governments to review and comment on plans. It therefore supports the following objective:

- *Ensure that all land and resource management planning activities within the planning area provide for consultation with local municipal governments.*

6.54 TERMS OF REFERENCE (TOR) FOR PUBLIC PARTICIPATION PROCESSES

Indicator Statement	Target Statement
Current Terms of Reference (TOR) for the *FSJPPR* public participation process	Biennial review of the TOR for the *FSJPPR* public participation process (PAG)
SFM Objective: To facilitate a satisfactory public participation process	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

The TOR will be reviewed at some point every second year (in even years). Due to the timing of meetings, the TOR review may not be in the same month each year.

What is this indicator and why is it important?

The Participants are committed to provide ongoing opportunity for the public to be involved in the Fort St. John Pilot Project planning and monitoring activities. A key element in the public oversight component is the establishment of a Public Advisory Group (PAG) and TOR for the PAG. This indicator states that every second year a review of the TOR will be completed by the PAG to ensure the TOR remain relevant through time.

This is a demonstration that the public participation process is designed and functioning to the satisfaction of the PAG.

Current Status:

The PAG approved an updated TOR on March 8th, 2016. The complete Terms of Reference is located on the pilot project website (http://fsjpilotproject.com). The next review is scheduled for the spring meeting of 2018.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of a TOR that is reflective of the needs of the Participants and interests represented on the PAG.

Strategy and Implementation Schedule:

The Participants will review the TOR timing requirements included in Section J of the TOR when preparing the draft agenda prior to each PAG meeting, and if two years have passed since the last TOR approval, they will add it as a topic to be addressed in the agenda.

Monitoring Procedure:

The status of the Terms of Reference review will be reported in annual reports.

Linkages to Operational Plans:

Not applicable.

Linkages to LRMP:

Not applicable.

6.55 PUBLIC INQUIRIES

Indicator Statement	Target Statement
The percentage of timely responses to public inquiries	Respond to 100% of public inquiries regarding Participants' forestry practices, that are additional to the Pilot Public Review and Comment processes, within one month of receipt.
SFM Objective: To facilitate a satisfactory public participation process Relevant information used in the decision making process is provided to PAG, general public, and affected parties	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Responses will be provided to all inquiries, provided contact information is provided so that the Participants can reach the person making the inquiry.

What is this indicator and why is it important?

This indicator measures the percentage of timely responses provided to public inquiries or concerns regarding our woodlands activities that effect the environment or other forest resource users. The indicator includes responses to public comments on operational plans (e.g. SFMP's, FOS's, PMP's) as well as unsolicited public comments on operational activities. Relevant information used in decision making is made available to the PAG, general public and affected parties upon request.

Providing timelines for responses that provide information on the Participants' operational practices, or indicate how a particular issue will be addressed, encourages the Participants to actively consider and address public input. The responses also provide an indication that comments are being considered within the planning and communication processes.

Current Status:

The Participants currently solicit feedback from interested stakeholders and the public when preparing public plans. As well, ongoing feedback is often received regarding the practices and management of the forest from interested parties. Following is a summary of public comments and responses from the last Annual Reporting period (2013-14).

The participants received three public inquiries during the reporting period. The nature of the inquiries, and a general summary of response for each, follows below.

1. February 10, 2014 a guide outfitter came into the Canfor office to inquire about the timing of harvesting of a block near Chunamun Lake. We reviewed the FOS maps together and determined the location and block numbers of the blocks of concern. The blocks turned out to be BCTS blocks. The guide was provided a contact number for BCTS. In addition, Canfor contacted BCTS to communicate the guide's name, contact information and nature of his concerns. (COPI contact: 4197)

2. March 10, 2014 a private landowner called the Canfor office with concerns over a block being developed on the Gundy road, 06037. A meeting was planned at the office for March 13, 2014 to review maps and plans. During the meeting the landowner communicated that their concern was not the logging but retaining a visual and sound buffer between their property and a oil and gas facility across the valley from their residence. Canfor contacted the oil and gas company to determine the long-term plans in the area so they could be considered in any block revisions we make. It was identified that there was plans to expand the oil and gas facility significantly and construct associated pipelines. Canfor acquired the preliminary plans and adjusted the layout to provide as good a buffer as possible. On April 9, 2014, (outside this annual report period), the landowners and Canfor representatives visited the field to better understand the concerns of the landowners, the scope of the facility plans and finalize block layout boundaries. Due to the site and stand factors of the block and the scope of the facility expansion, the buffer may not be as effective as the landowner hoped, but we tried to maximize the retention in appropriate areas to create a suitable sound and visual buffer. The plan was communicated to the landowners and they acknowledged we were doing the best we could under the circumstances. (COPI contact 3651).

3. On March 24, 2014 a private landowner called the Canfor office to express concern about the proposed block adjacent to his private land. A meeting was scheduled for March 27, 2014 at the Canfor office. The landowner communicated his concerns about the block: windthrow impacts to his property, risks to his organic grain and bee certification, visual impacts, increased public access. Canfor explained how we typically mitigate these types of concerns and that a specific plan would be developed for this cutblock. The concerns have been documented in COPI and in Resources to ensure the operational plans incorporate the mitigation measures. (COPI contact 6638). COPI actions have been created to ensure communication and follow-up is maintained with this landowner (COPI actions: 3991, 3971).

All inquiries received by the participants during the reporting period were responded to within 30 days.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of opportunities for the public, First Nations and others to gain a better understanding of the Participants planned activities.

Strategy and Implementation Schedule

All staff who receive inquiries will be responsible for forwarding them to the appropriate person within the organization in a timely manner that will allow for a response within one month. Supervisors responsible for applicable plans or operational activities will ensure that responses are provided to public inquiries concerning the environment, or inquiries from other forest resource users. They will also ensure records are kept of the inquiries and responses.

Monitoring Procedure:

Public inquiries regarding forestry operations or plans will be tracked as such in the Participants databases (e.g. RESOURCES ITS), with information clearly identifying it as a public inquiry, what the issue is, who is responsible to respond to the inquiry, and by when (i.e. within one

month of original receipt of the inquiry). Once the response is provided, the response and date provided will be noted in the database, and the action plan closed.
A review of the database will be completed for the April 1-March 31 time period to identify and report out on all the public inquiries received, and to determine if the one month time frame was achieved. The information will then be summarized and reported in the Annual Report.

Linkages to Operational Plans:

Operational plans with requirements for public review and comment that are applicable to this indicator include the SFMP, Forest Operations Schedules, and Pest Management Plans. Where specific comments are received regarding operational activities that may impact other plans such as SLP's, harvesting plans, or silviculture plans, the comments will be forwarded to the accountable supervisor, who will be responsible for responding to the comments, and determining if changes to plans are required.

Linkages to LRMP:

This indicator does not directly link to any LRMP objectives.

6.56 EDUCATIONAL OUTREACH

Indicator Statement	Target Statement
Number of people to whom information, presentations, or field trips provided annually.	Minimum of 40 people provided information, presentations, or field trips.
SFM Objective: Develop improved public understanding of SFM	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None.

What is this indicator and why is it important?

This indicator measures the access to relevant information related to forestry operations and sustainable forest management topics that is provided to the PAG and the general public. Providing pertinent information, presentations or field trips assists in increasing the level of understanding of the issues and opportunities in sustainable forest management.
The participants are committed to working with directly affected stakeholders and members of the public on forest management issues and have a well-established history of participation in community meetings, including local planning processes. The sharing of knowledge contributes to informed, balanced decisions and plans acceptable to the majority of public. When informed and engaged, members of the public can provide local knowledge and support that contributes to socially and environmentally responsible forest management.

Current Status:

The Participants currently engage in public outreach by various means including hosting PAG meetings that are open to the public, posting of annual reports and audit summaries to the internet and to the Fort St. John Public Library, participating in local trade shows, meeting with school groups and in hosting a community picnic. These events provide opportunities to share information with interested members of the public. Following is a summary of public comments and responses from the last Annual Reporting period (2013-14).
On April 12, 2013, the Participants operated an information booth at the 2013 CKNL Trade show in Fort St. John. At the trade show the participants answered various questions posed by 67 different members of the public including questions on Mountain Pine Beetle, forest management, tree planting, and employment opportunities. Attendance at the 2013 trade show was over 15,000 people. The Participants handed out 3,000 seedlings, and information on the care and planting of the seedlings, to members of the public.
On May 30, 2013, Canfor & BCTS led a field trip that included 3 individuals from the public. On October 2nd and 3rd 2013, Canfor and BCTS employees acted as field workshop leaders in the 2013 Council of Forest Industries (COFI) fall field camp for high school students. A total of 32 people attended the workshop. The sessions focused on the following themes: block and road development, soils and ecology, timber cruising, and silviculture, and also included tours of the Peace Valley OSB plant and Fort St. John Canfor sawmill.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of opportunities for the public, First Nations and others to gain a better understanding of the

Participants' planned activities and of forest management concepts resulting in an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations..

Strategy and Implementation Schedule:

During scheduled PAG meetings, members are polled on what types of information presentations or field trip topics they would find useful at or prior to the next meeting. The Participants or advisors may also suggest presentation or field trip topics that the PAG may find helpful in future meeting deliberations. Participants' maintain their involvement in educational outreach initiatives (e.g., maintaining an open and active public advisory group, hosting field tours and open houses, providing notification/referrals with educational content to stakeholders, conducting school classroom presentations, participation in trade fairs, publication of informative articles and responding to public inquiries). The Participants will record attendance level at each meeting or tour (public and stakeholders), estimate readership for articles published/posted to the web, count the number of public enquiries responded to, count the number of stakeholders provided information and count the number of students provided information.
Expected results of implementation of this indicator are an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations.

Monitoring Procedure:

Annually track and report the number of people that participated in educational opportunities. During the preparation of the Annual Report a review of minutes from PAG meetings will identify the number of people (PAG members, advisors and the public) in attendance at presentations or field trips. Internal data tracking systems such as ITS & COPI will be used to record:

- the number of public enquiries responded to,
- the number of people reached by notification/referrals including educational content sent to stakeholders,
- the number of people reached by school visits;
- the number of people responding to articles published in local newspapers or posted to the web, and
- the number of people requesting information in response to the Participants' involvement in trade fairs, open houses or similar public events during the April 1- March 31 reporting period.

Linkages to Operational Plans:

None.

Linkages to LRMP:

Not applicable.

6.57 BRUSHING PROGRAM AERIAL HERBICIDE USE

Indicator Statement	Target Statement
The number of hectares removed annually from the participants' aerial herbicide plans based on input from First Nations or the public and final treatment layout.	The participants will report annually, the number of hectares removed from the participants' aerial herbicide plans based on input from First Nations or the public and final treatment layout.
SFM Objective: Involve First Nations in review of forest management plans, provide understanding of forest management plans	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

None.

What is this indicator and why is it important?

This indicator is a measure of the participants' efforts to reduce herbicide use as a vegetation management tool, in response to input received from First Nations and the public regarding the impact of herbicide use on specific non timber resources.
This indicator reflects the Participants' recognition and response to the traditional aboriginal values and uses that are made known in a timely manner during referral processes. The requirement for site-specificity enables both the Participant and First Nations to best qualify and/or quantify the effects of vegetation management and the strategies required to manage for the treatment.

Current Status:

In 2013 the participants had originally proposed to aerially herbicide 1198.1 ha as a vegetation management treatment. Based on input received from First Nations, the public and final treatment layout conducted by the participants, the actual aerial herbicide program was reduced by 157.8 ha to a total of 1040.3 ha actually treated. This reflects that 13.2% of the total area originally planned for treatment was removed from the final treatment area.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of opportunities for the public, First Nations and others to gain a better understanding of the Participants vegetation management activities resulting in an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations.

Strategy and Implementation Schedule:

Participants will continue with ongoing relationship building processes with First Nations, to encourage meaningful engagement and input during the development of the PMP's and the Notification of Intent to Treat (NIT) process.

The Participants will encourage First Nations to provide site-specific information about traditional values and uses (subject to confidentiality agreements) at the SFMP, FOS, PMP and NIT stages.
Detailed operational planning will occur following the review and comment periods. Strategies will be implemented in operational plans to address all site specific known values and uses included in the scope of this indicator.
Information provided subsequent to the formal referral review and comment periods will be considered and addressed to the extent Participants are able to do so without unduly disrupting ongoing operations. Ongoing communication with First Nations will also occur through Joint Management Advisory Committees (JMAC's), and during other meetings that provide additional opportunities for First Nations to identify new site-specific information.

Monitoring Procedure:

Participants will annually track the area originally proposed for vegetation management using aerial herbicide application as the treatment method. Participants will also annually track the area removed from each years aerial herbicide management program.
The Participants will also record information provided by First Nations and the public with regard to requests to alter or revise annual aerial herbicide treatment plans. This information will be tracked as an issue (e.g. in an ITS or similar tracking system such as Creating Opportunities for Public Involvement - COPI), and any resulting action plans and/or strategies to address the values, and identify staff responsibilities to complete or close off the action will be tracked.
A review of the information management systems will be completed for the April 1st to March 31st time period each year, and the results for this indicator will be reported in Annual Reports.

Linkages to Operational Plans:

Operational plans will be consistent with jointly agreed upon strategies between Participants and First Nations.

Linkages to LRMP:

There are no direct links to the LRMP objectives

6.58 PAG Satisfaction Surveys

Indicator Statement	Target Statement
Level of satisfaction with the public participation process as measured by PAG surveys.	At least an 80% (average score of 4 out of 5) satisfaction level as measured from PAG surveys.
SFM Objective: Develop satisfaction with the public participation process	
Linkage to FSJPPR: N/A	

Acceptable Variance:

10%. An average satisfaction level less than 80% will result in follow-up discussions with the PAG to identify opportunities for improving the level of satisfaction with the public participation process.

What is this indicator and why is it important?

The SFM Public Advisory Group (PAG) was established to assist the Pilot Project participants in developing SFM Plans in part by identifying local values, objectives, indicators and targets. The SFM Plan is an evolving document that will be reviewed for effectiveness and revised as needed, with the assistance of the Public Advisory Group, to address changes in forest condition and local community values.

Maintaining the interest and participation of this group is an integral part of a dynamic and responsive SFM Plan. The ability of people to share information, discuss and solve problems, and set and meet objectives is key to achieving and maintaining meaningful participation. A vigorous public participation process helps to ensure issues are identified, discussed, and where possible, resolved.

Current Status:

This is a new indicator, established in 2011, utilizing a new set of survey questions focusing on satisfaction with the public participation process. Prior surveys, conducted in the 2009 and 2010 monitoring years focused on the process of individual PAG meetings assessing satisfaction with meeting process, facilitation, support and logistics. An average satisfaction level of 91% was generated over the 6 surveys completed during the period.

PAG members are given the opportunity to complete an anonymous online or hard copy Public Participation Process Satisfaction survey. Table 42 below, notes the results of the surveys for the reporting periods from April 1, 2011 through March 31, 2014. The average score for the period has exceeded the target score. The satisfaction survey continues to provide insight into areas for future improvement of the public participation process.

Table 42: Public Process Satisfaction Summary

Reporting Period	Average Satisfaction Level	Target Satisfaction Level
2011-12	92%	80%
2012-13	86.4%	80%

2013-14	91.9%	80%
Average	90.1%	

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of a public participation process that is responsive to the needs of the public and will promote an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations.

Strategy and Implementation Schedule:

Managing Participants provide all PAG members and interested public who have shown notable interest (PAG meeting attendance) during the reporting period, a feedback form (survey) to assess their satisfaction with the process. The survey content and process will follow the direction described in the Public Advisory Group's Terms of Reference. All survey questions will have a 1-5 scoring assessment (1 – very dissatisfied, 2 - somewhat dissatisfied, 3 -neutral, 4 - somewhat satisfied, 5 – very satisfied. This survey will be administered annually.

A PAG meeting survey, intended to assess the efficacy of individual PAG meetings, will be administered separately as per the PAG TOR and is considered an additional tool to be used by the Participants to improve the public participation process. However, the results of the PAG meeting surveys are not considered when reporting the average level of satisfaction with the public participation process for this indicator.

It is expected that implementation of this indicator will foster the continuation of an active, engaged Public Advisory Group, and continual improvement of the process related to PAG function.

Monitoring Procedure:

The satisfaction survey will be sent out on or about the time of the annual spring meeting and is intended to reflect upon the PAG's satisfaction with the public participation process over the reporting year that is about to or has drawn to a close. For example, the spring meeting is usually held in February or March and the reporting year runs from April 1 to March 31 annually. Accordingly, the subject time frame for the satisfaction survey will be the current reporting year that is about to conclude on March 31.

The survey will be sent only to those public advisory group members and advisors that submitted written comments regarding the SFMP or attended one of the meetings in the subject reporting period. Public observers who have attended a minimum of 2 PAG meetings in the reporting period will also be offered the opportunity to complete the survey. Therefore, the survey population will consist of PAG members, PAG advisors, and public observers who have attended 2 or more meetings in the subject reporting period.

Survey responses will be coded 1 (very dissatisfied), 2 (somewhat dissatisfied), 3 (neutral), 4 (somewhat satisfied), 5 (very satisfied) or not applicable. A sample of the types of questions to be included in the evaluation form is noted below. The actual evaluation form and questions to be used will be a stand-alone document from this SFMP. Revisions to the evaluation form will not warrant amendment of the SFMP document.

The results of individual surveys returned to the participants will be compiled to generate an average score from all surveys for each question. The average score for each question will then be tallied to determine an overall average score which will be the basis for assessment of the indicator. The overall average score will be converted to a percentage basis and will represent the satisfaction level with the public participation process. The indicator target of a satisfaction level of at least 80% is equivalent to an average survey score of at least 4 out of 5. The overall average satisfaction level will be noted in the annual report.

Linkages to Operational Plans:

None.

Linkages to LRMP:

Not applicable.

Fort St. John Pilot project Sustainable Forest Management (SFM) Plan
PUBLIC PARTICIPATION PROCESS EVALUATION FORM

The purpose of this form is to provide an opportunity for PAG members, advisors and the public to evaluate the effectiveness of the public participation process. Results of the evaluation will be used to effect continual improvement. Thank you for taking the time to complete the form. Only rate the statements that pertain to your experience. Please rate your level of satisfaction or agreement with the following aspects of the public participation process by circling the response which most closely reflects your opinion.

1. I have a good understanding of the purpose of the advisory group and my role as part of that group.

1	2	3	4	5	
ery Dissatisfie	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

2. My concerns related to SFM values and objectives are being adequately listened to at the Advisory Group Meetings.

1	2	3	4	5	
ery Dissatisfie	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

3. Efforts have been made to incorporate my concerns related to SFM values and objectives into the SFM Plan.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

4. My concerns related to SFM indicators and targets are being adequately listened to at the Advisory Group Meetings.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

5. Efforts have been made to incorporate my concerns related to SFM indicators and targets into the SFM Plan.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

6. Information provided in advance of meetings is adequate and organized to allow for me to effectively contribute.

1	2	3	4	5	

ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

7. Advisory Group Meetings are run efficiently and effectively.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

8. The meeting agenda allows for discussion of any related sustainable forestry issues of concern to advisory group members.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

9. The meeting minutes capture important aspects of the meeting.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

10. Additional information I ask for is provided to me.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

11. The participants encouraged open communication.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

12. The outputs generated through discussion with the public advisory group (SFM Plan and annual monitoring reports) are clear and concise.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

13. The participants strived for consensus based decision making.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

14. A broad cross-section of interests is represented at Public Advisory Group Meetings.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

15. The participants have made an effort to recruit new members as needed.

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

16. The Participants are proactive about sharing new information to the PAG members regarding topical issues related to environment, sustainability, forestry, etc?

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

17. **PLEASE RATE YOUR <u>OVERALL LEVEL OF SATISFACTION WITH THE PUBLIC PARTICIPATION PROCESS</u>**

1	2	3	4	5	
ry Dissatisfi	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Not applicable

Questions 1-16 are intended to identify level of satisfaction with individual aspects of the public participation process.
Question 17 is intended to assess the overall satisfaction with the combined aspects of the public participation process.

Note that for the purposes of annual reporting of the participants' performance with regard to SFMP indicator # 58, question 17 is not included in the computation of the average score for indicator.

For any scores less than 3, please provide any comments or suggestions that will explain the reason for the score and how you feel the process can be improved. Scores of less than 3 with no explanatory comment will be excluded from the analysis.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you again for your time in completing the survey – very much appreciated!

Please return completed survey to:
Darrell Regimbald RPF
Canfor
RR#1, Site 13, Compartment 2
Fort St. John BC V1J 4M6
darrell.regimbald@canfor.com
250 787-3651
250 787-3622 (Fax)

6.59 Availability of Information on Issues of Concern

Indicator Statement	Target Statement
SFM monitoring report made available to the public.	SFM monitoring report made available to public annually.
SFM Objective: Develop improved public understanding of SFM	
Linkage to FSJPPR: N/A	

Acceptable Variance:

No variance.

What is this indicator and why is it important?

This target recognizes the importance of keeping members of the public informed on forestry strategies being developed and planning occurring in the FSJPP area. Issues of concern brought forward by the public are part of the discussions occurring at public advisory group meetings and often work their way into a reporting requirement of the SFM Plan such as Indicator 6.60 Public Inquiries. Annual reporting of the Plan's performance measures to the public advisory group and to the broader public provides an open and transparent means of demonstrating how issues of concern are being managed and provides opportunity for the public to respond. This provides members of the public opportunity to share local knowledge that contributes to socially and environmentally responsible forest management.

Current Status:

This is a new indicator established in 2011. The Participants make the annual report and audit reports available to the public by posting the reports to the Fort St John Pilot Project, Canfor and BCTS websites, providing a copy to the MFLNRO and the Fort St. John Public Library. The Participants also discuss the annual report and audit results with the public advisory group.
The 2012 and 2013 SFM Annual Report was posted to the Fort St. John Pilot project website and to the Canfor external website for access by the public. Copies of the 2012 and 2013 SFM Annual Report were also provided to the Fort St. John Public Library, the Fort St. John Public Advisory Group, the MFLNRO and MOE.

Forecasting Assumptions and Analytical Methods:

It is anticipated that implementation of the indicator strategy will result in the generation of opportunities for the public, First Nations and others to gain a better understanding of the Participants forest management activities resulting in an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations.

Strategy and Implementation Schedule:

The Participants' maintain a website that makes the SFM monitoring report publicly available www.fsjpilotproject.com . The monitoring report is provided to government and is also posted to the managing participants' external websites. A copy of the annual report will be provided to the Fort St. John Library.
Expected results of implementation of this indicator are: increased public awareness and understanding of the SFM Plan and annual performance against the Plan's targets, and a

continuously improving SFM Plan that has openly informed, included and responded to the public.

Monitoring Procedure:

Report a yes/no answer as to whether the annual monitoring report was made publically available by way of:

- an external website,
- submission to government agencies,
- submission to the PAG and
- submission to Fort St. John Public library.

Linkages to Operational Plans:

None.

Linkages to LRMP:

Not applicable.

6.60 Deletions to Forest Area

Indicator Statement	Target Statement
Percentage of the gross crown forest landbase in the DFA converted to non-forest land use through forest management activities of the participants during the term of SFMP# 3.	Less than 0.6% of the gross crown forest landbase in the DFA will be converted to non-forest land use through forest management activities of the participants during the term of SFMP# 3.
SFM Objective: Sustain forest lands within the participant's control within the DFA	
Linkage to FSJPPR: N/A	

Acceptable Variance:

Additional +0.2%. The acceptable variance of +0.2% is required to provide the Participants flexibility to exceed the 0.6% target in the event that additional permanent road construction is needed to address unforeseen catastrophic forest disturbance events such as wildfires, insect or disease outbreaks, etc.

What is this indicator and why is it important?

Forest ecosystem productivity can be interpreted to mean both net primary production and forest (i.e wood) productivity. This indicator focuses on wood productivity or the production of wood biomass. SFM should apply to the extent of forest in a landscape, including the encouragement of additions to the forest landbase and discouraging deletions caused by human activity. For the purposes of this indicator, 'non forest land use' is considered to be a condition whereby the land is no longer suitable for growing trees.

Given the Crown tenure situation in British Columbia, forest companies generally have little influence on any additions or deletions to the forest area, which generally are a result of government establishing or varying land use objectives. Where forest companies can have a direct influence is through their management practices, particularly the practices pertaining to access structures such as roads, trails and landings. It must be realized that in order to develop the forest timber resource, a certain amount of permanent access is required. By minimizing the creation of permanent access structures, forest companies can prevent unnecessary deletions to the crown forested landbase.

Unless rehabilitated, these access structures may occupy otherwise productive land suitable for growing trees. This indicator is focused on forest deletions resulting from access management activities for which the participants have management responsibility.

Current status

This is a new indicator established in 2012. The current status of forest deletions resulting from forest management activities is described in Table 43 (Determination of the timber harvesting land base for the Fort St. John TSA), of the "Fort St. John Timber Supply Area Analysis Report – June 2002". A subset of this information is reproduced below. Note that a new timber supply review for the Fort St. John Timber Supply Area is scheduled to be completed in 2016 by the ministry of Forests Lands and Natural Resource Operations (MFLNRO).

Table 43: TSR2 Determination of the Timber harvesting land base for the Fort St. John TSA

Classification	Area (ha)	Per cent (%) of TSA area
Total Timber Supply Area	4,676,636	100
Non forest land	2,121,261	45.4
Woodlots	13,299	0.3
Land not managed by the MFLNRO	208,696	4.5
Range lease	10,373	0.2
Parks and reserves	79,750	1.7
Crown forest area managed by the MFLNRO	**2,243,257**	**48.0**
Reductions to crown forest area		
Existing roads, trails and landings	6,670	0.1
Other crown forest reductions	1,178,047	25.4
Timber harvesting landbase component of crown forest area	1,058,540	22.6
Total crown forest landbase area	**2,243,257**	**48.0**

The 2002 timber supply analysis revealed that reductions to the crown forest area managed by the MFLNRO attributable to existing roads, trails and landings totaled 6,670 ha or 0.1% of the area managed by the MFLNRO. This included roads constructed by various industries, including forestry to that point in time.

Table 44 identifies the amount of new road area constructed by the Participants under SFMP# 1. During the implementation of forest management activities under SFMP# 1 between 2004 and 2010, the participants constructed a total of 1,605.8 km of new road. The Participants assumed an average disturbance width of 20m (for out of block road) and 8m (for in block road) in the calculation of area disturbed due to permanent access construction. This 1,605.8 km of road equates to 3,211.7 ha or 0.14% of the crown forest landbase disturbed by the participants up to and including March 31, 2011.

Table 44: New Road Area Constructed by Managing Participants since 2004

	2004-05 (m)	2005-06 (m)	2006-07 (m)	2007-08 (m)	2008-09 (m)	2009-10 (m)	2010-11 (m)	Total (m)	Total (ha)
BCTS	121,435	169,810	71,994	57,873	50,288	33,745	22,281	527,426	1,054.9
Canfor	144,376	177,226	221,155	191,347	126,425	90,483	127,398	1,078,410	2,156.8

Total	**265,811**	**347,036**	**293,149**	**249,220**	**176,713**	**124,228**	**149,679**	**1,605,836**	**3,211.7**

Table 45 identifies the amount of new road area constructed by the Participants since inception of this indicator under SFMP# 2. Under SFMP#2 the participants have constructed a total of 260.5 kms of new road. The Participants will measure their performance to the indicator at the end of reporting period 2015-16 (March 31, 2016).

Table 45: Road Area Constructed by Managing Participants since 2011 (SFMP # 2)

	2011-12 (m)	2012-13 (m)	2013-14 (m)	2014-15 (m)	2015-16 (m)	Total (m)	Total (ha)
BCTS	26,918	19,547	42,963				
Canfor	234,983	258,571	217,563				
Total	**261,901**	**278,118**	**260,526**				

Forecasting Assumptions and Analytical Methods

Although annual forecasting does not apply, analysis of the access structures proposed by the participants for construction in FOS# 2 indicates a theoretical total potential deletion to the CFLB by new road construction of 8,801 ha or 0.4% of the CFLB. This includes both in-block permanent access (estimated at 4,631 ha based on past performance) as well as permanent roads (estimated at 4,170 ha) constructed to access all cutblocks included in the current FOS. The 0.2% acceptable variance to the CFLB maximum deletion target allows room for the participants to manage for unforeseen events such as catastrophic fires, etc.

Strategy and Implementation Schedule

Foresters preparing SLP's and FOS's will continue to minimize forest area deletions through adherence to the SFMP road access management strategy and the indicator #24 target set for maximum amount of permanent access structures created within harvest blocks. The Participants will continue to coordinate access development activities with the oil and gas industry. Where practicable, the Participants will use existing access infrastructure including those roads created by other industries, such as oil and gas roads, to access areas planned for harvest. This strategy will minimize the total amount of permanent access structures created by the participants.

Monitoring Procedure

During timber supply analysis, netdowns to the crown forest landbase are completed to determine the timber harvesting landbase. Included in the netdown of the crown forest landbase is the area taken out of production by permanent access structures. The CFLB netdown attributed to permanent access structures will be included in annual reports as it becomes available upon the completion of TSR analyses. On an annual basis, the participants will report the total area of permanent access structures constructed by them during the subject reporting year, as a proportion of the CFLB.

Upon completion of the term of SFMP# 3 - end of reporting period 2015-16 (March 31, 2016), the sum total area of permanent access structures constructed by the participants during the term of SFMP# 3 will be reported as a proportion of the CFLB. Any additions to the landbase effected by the participants will be included in annual reports.

Linkages to Operational Plans

Operational plans prepared by Participant staff will continue to prescribe the most appropriate methods to minimize losses to the forest landbase. Staff will be responsible for ensuring that area occupied by permanent access structures constructed by the Participants shall not be disproportionate to the planned total harvest area.

Linkages to LRMP

Restricting the permanent CFLB losses due to permanent access structures helps maintain the productive land available for timber and other resources. This indicator therefore supports the following LRMP objectives:

- *Coordinate access and linear development to minimize negative impacts on other resource values.*
- *Minimize losses to the timber harvesting land base.*

6.61 RARE ECOSYSTEMS

Indicator Statement	Target Statement
Percentage of the area of rare ecosystem groups reserved from harvest.	100% of the area of rare ecosystem groups will be reserved from harvest.
SFM Objective: Maintain the diversity and pattern of communities and ecosystems within a natural range	
Linkage to FSJPPR: N/A	

Acceptable Variance:

10% of the total rare ecosystem group forest area may be harvested, where required to construct safe access or in situations where less overall environmental disturbance is created by building access through the rare ecosystem group versus building access to avoid the rare ecosystem group. Based on assessments completed by professionals, those sites deemed poor representations of the rare ecosystem group may be harvested.

What is this indicator and why is it important?

Maintaining representation of a full range of ecosystem types is a widely accepted strategy to conserve biodiversity. Ecosystem conservation represents a coarse-filter approach to biodiversity conservation. It assumes that by maintaining the structure and diversity of ecosystems, the habitat needs of various species will be provided. For many species, if the habitat is suitable, populations will be maintained.

The following is adapted from Bunnell 2002 and Wells et. al. 2003. Habitat structures and patterns are “medium filters” that are monitored by the indicators of, forest type, seral stage, patch size, snags/cavity sites, coarse woody debris, riparian, shrubs, and wildlife tree patches, and are designed to capture the habitat requirements of many species. There are, however, many more species about which we know little, but that may be restricted to particular ecosystem types or geographic localities. Most species, but especially those for which knowledge is sparse or absent, are best sustained by ensuring that some portion of each distinct ecosystem type is represented in a relatively unmanaged state.

Unmanaged stands also play an important role as a precautionary buffer against errors in efforts intended to sustain species in the managed forest. While we can develop management practices intended to keep many forest-dwelling species in managed forests, we also recognize that we have insufficient knowledge to ensure that proposed practices will meet all species’ requirements in managed stands. That is particularly true of the many poorly known, or completely unknown, organisms. Unmanaged stands are an ecological safeguard against the inevitable errors that may occur during management.

Poorly understood functions also will be sustained in unmanaged areas. For example, natural disturbances can occur that would otherwise be suppressed or reduced. While some aspects of natural disturbance can be mimicked in managed stands, other aspects cannot be (e.g., large patches of burned snags, or large areas attacked by spruce or balsam bark beetles). Some species benefit from or rely on these features of natural disturbance, and so may not be productive in managed landscapes.

A final function of unmanaged areas in the landscape is to provide an ecological baseline against which the effects of human activities can be compared (Arcese and Sinclair 1997). This role as a benchmark is especially critical in the long-term monitoring required to assess effectiveness of forest practices. It is preferable to conduct this type of representative management based on site series or clusters of site series or plant associations. An unmanaged condition for the purposes of this indicator is considered as areas not contributing to the long-term harvest level within the DFA or non-timber harvesting land base (Non-THLB). For the purposes of this SFMP rare forest ecosystem groups are defined as those forest ecosystem groups that make up less than 0.1% (2,166 ha) of the forested portion of the crown forest landbase (2,166,838 ha).

Current Status:

Rare ecosystems are frequently identified as focal points for conservation concern. Provincially, ecosystems are listed based largely on frequency of occurrence or rarity. There are at least three broad reasons for creating local lists, including:

- to help assess the status of an ecosystem throughout a planning area;
- to focus attention and tracking on ecosystems that merit conservation concern; and
- to help rank allocation of resources to conservation efforts, such as parks, Wildlife Habitat Areas, Old Growth Management Areas (OGMA's) or Wildlife Tree Patches (WTPs).

An analysis of ecosystem representation across all Canfor licensee operations was conducted in 2011[36]. This analysis predicted the abundance and representation of ecosystem groups within four distinct regions and 13 management units across Canfor and BCTS operations in BC. The following steps were carried out for this analysis:

- Identifying the non-harvesting land base,
- Classifying the forested land base into ecosystem groups, and
- Evaluating the amount and how the ecosystem groups are distributed in the harvesting and non-harvesting land base.

Classification of the landscape into units that represent the diversity of ecosystems is fundamental to representation analysis. Representation studies worldwide have used various classification systems based on landform-vegetation classes (Awimbo, Norton, and Overmars 1996), climate-physiography-soil-vegetation interactions (Lapin and Barnes 1995), breeding bird communities (Saetersdal and Birks 1993), and physiography alone (Wessels, Freitag, and van Jaarsveld 1999). The Biogeoclimatic Ecosystem Classification (BEC) (Pojar, Klinka, and Meidinger 1987) integrates climate, soils, and vegetation into a hierarchal scheme that lends itself well to representation analysis for forest ecosystems of British Columbia.
Definition of ecosystem types requires classification at an ecologically appropriate scale (Pregitzer, Goebel, and Wigley 2001). Existing provincial BEC mapping is commonly used for coarse filter management using the variant level. This information is often too general since variants describe climate and may contain a wide range of ecosystems that may respond differently to forest management. Conversely, representation at the BEC site series level is not

[36] *Ecosystem Representation Analysis Final Report January 18th , 2012* Forest Ecosystem Solutions Ltd.

appropriate for a coarse filter approach for practical reasons (too many groups) and because there is limited evidence that organisms are linked to this level of detail (Huggard 2000; Bunnell et al. 2003).

The goal for the ecosystem classification was to identify a level of site series aggregation that recognizes the uniqueness of individual sites while providing logical ecosystem units for coarse filter management. Ralph Wells created groups of site series (ecogroups) for this analysis using statistical methods (described in more detail in Appendix C: Site Series Cluster Analysis of the Ecosystem Representation Analysis Report). Expert review of the ecogroups was provided by Bruce Rogers and Michael Ryan (Research Ecologists, MFLNRO).

The Fort St John MU is approximately 4.7 million hectares in north-eastern BC. It is mostly in the North-East Plains region, with the western portion of the MU in the North-East Mountains region. The Timber Harvesting Landbase makes up 51% of the Crown Forest Landbase. The Crown Forested Landbase includes 16,354 ha of area that is considered as non forest ecogroup area (alpine, wetlands, parkland non forest variants).

Table 46: Net down summary

Classification	Net Area (ha)
Total TSA Area	**4,676,639**
Excluded Land	525,837
Non-forest Land	1,822,588
Crown Forested Land Base (CFLB)	**2,328,215***
Parks, Reserves and Recreation Areas	80,901
Wildlife Habitat	63,389
Riparian Reserve Zones	34,740
Visual Quality Objective (VQO) preservation	2,849
Environmentally Sensitive Areas (ESA)	44,562
Physically Inoperable	27,559
Economically Inoperable (Variable NHLB)	889,466
Timber Harvesting Land Base (THLB)	**1,184,748**

*Includes 161,354 ha of non forest ecogroup area.

There are six forested BEC variants in the Fort St John MU, and the highest BEC responsibility is for variant BWBSwk2 at 89%. The ecogroups that occur within this variant in Fort St. John are:

- BWBSwk2 – North-East Plains 3, 6, 11, 12, 14, 19, 20, 26, 27, 28, and 31

Ecosystem Representation Analysis examines the proportion of each ecosystem unit that is expected to remain unharvested. A level of representation of ecogroups in the non harvesting land base (NHLB) provides an ecological safeguard to ensure that some portion of each distinct ecosystem type is represented on the landbase in a relatively unmanaged state. See Table 2 for the analysis of ecogroup representation within the NHLB.

There are a total of 36 ecogroups in Fort St John, 11 in the North-East Mountains region and 25 in the North-East Plains. The North-East Mountains groups have very high NHLB representation (all greater than 50%), and the North-East Plains groups range from a low of 25% for group 24 to 91% representation for group 22. Overall, there is 47% representation of ecogroups in the NHLB.

Table 47 Fort St John MU representation of ecogroups in the NHLB

Region	Group Number	Group Name	Forest Area (ha)	Percent NHLB
NE Mtns	69	hygric SWBmk	2,303	53.2%
	68	subhygric-hygric SWBmk	26,063	58.0%
	25	submesic-mesic SWBmk	95,221	58.5%
	46	submesic-subhygric SWBmk	2,656	63.0%
	9	subxeric ESSFmv4	180	68.5%
	30	subxeric-mesic ESSF	107,640	69.7%
	21	subxeric-hygric ESSF	4,915	70.7%
	43	hygric ESSFmv4	219	70.7%
	48	mesic-hygric ESSF/SBS	29,184	71.6%
	5	subxeric SWBmk	2,538	74.9%
	3	xeric SWBmk	891	76.0%
NE Plains	24	submesic-subhygric BWBWmw	227,678	24.8%
	21	submesic-hygric BWBSmw$	208,483	30.5%
	20	mesic-subhygic BWBSwk2$	679	40.4%
	26	submesic-mesic BWBSwk	148,886	40.5%
	19	submesic-mesic BWBSwk2$	36,681	43.2%
	16	submesic-subhygric BWBSmk$	103,220	44.1%
	31	mesic-hygric BWBSwk$	2,965	44.4%
	11	submesic BWBSwk2$	4,255	45.5%
	8	submesic BWBSmk$	21,459	46.2%
	33	hygric BWBSwk3	207	46.8%
	12	submesic-mesic BWBS	535,897	47.7%
	27	subhygric-hygric BWBSwk2	30,492	49.6%
	9	submesic-subhygric BWBS$	8,135	51.5%
	25	mesic-hygric BWBS (horsetail)	294,252	52.9%
	6	xeric-subxeric BWBSwk2	410	53.6%
	28	mesic-subhygic BWBSwk2	8,466	54.1%
	4	xeric-subxeric BWBS	2,674	59.0%
	1	xeric-subxeric BWBSmk$	1,840	68.3%
	34	subhygric-hygric BWBSmk	9,048	69.0%
	15	submesic-subhygric BWBS	48,486	69.6%

Region	Group Number	Group Name	Forest Area (ha)	Percent NHLB
	23	mesic-subhygic BWBSmw$	4	69.8%
	14	subxeric-hygric BWBS	200,299	74.2%
	3	xeric-subxeric BWBSwk$	36	77.5%
	2	xeric-subxeric BWBSmw$	10	86.0%
	22	submesic BWBS$	467	91.1%
			2,166,838	48.8%

Most of the ecogroups have low abundance, the most common is North-East Plains group 12, at 25% of the CFLB (Table 3). The rarest is North-East Plains group 23, with only 4 ha total. There are 11 ecogroups that are rare, with an abundance of less than 0.1% (Table 3).

Table 48 Ecogroup abundance in the Fort St. John MU

Region	Group Number	Group Name	Forest Area (ha)	Abundance (% of CFLB)	Status
NE Mtns	9	subxeric ESSFmv4	180	0.0%	Rare
	43	hygric ESSFmv4	219	0.0%	Rare
	3	xeric SWBmk	891	0.0%	Rare
	69	hygric SWBmk	2,303	0.1%	
	5	subxeric SWBmk	2,538	0.1%	
	46	submesic-subhygric SWBmk	2,656	0.1%	
	21	subxeric-hygric ESSF	4,915	0.2%	
	68	subhygric-hygric SWBmk	26,063	1.2%	
	48	mesic-hygric ESSF/SBS	29,184	1.3%	
	25	submesic-mesic SWBmk	95,221	4.4%	
	30	subxeric-mesic ESSF	107,640	5.0%	
NE Plains	23	mesic-subhygic BWBSmw$	4	0.0%	Rare
	2	xeric-subxeric BWBSmw$	10	0.0%	Rare
	3	xeric-subxeric BWBSwk$	36	0.0%	Rare
	33	hygric BWBSwk3	207	0.0%	Rare
	6	xeric-subxeric BWBSwk	410	0.0%	Rare
	22	submesic BWBS$	467	0.0%	Rare
	20	mesic-subhygic BWBSwk2$	679	0.0%	Rare
	1	xeric-subxeric BWBSmk$	1,840	0.1%	Rare
	4	xeric-subxeric BWBS	2,674	0.1%	
	31	mesic-hygric BWBSwk$	2,965	0.1%	
	11	submesic BWBSwk2$	4,255	0.2%	
	9	submesic-subhygric BWBS$	8,135	0.4%	

Region	Group Number	Group Name	Forest Area (ha)	Abundance (% of CFLB)	Status
	28	mesic-subhygic BWBSwk2	8,466	0.4%	
	34	subhygric-hygric BWBSmk	9,048	0.4%	
	8	submesic BWBSmk$	21,459	1.0%	
	27	subhygric-hygric BWBSwk2	30,492	1.4%	
	19	submesic-mesic BWBSwk2$	36,681	1.7%	
	15	submesic-subhygric BWBS	48,486	2.2%	
	16	submesic-subhygric BWBSmk$	103,220	4.8%	
	26	submesic-mesic BWBSwk	148,886	6.9%	
	14	subxeric-hygric BWBS	200,299	9.2%	
	21	submesic-hygric BWBSmw$	208,483	9.6%	
	24	submesic-subhygric BWBWmw	227,678	10.5%	
	25	mesic-hygric BWBS (horsetail)	294,252	13.6%	
	12	submesic-mesic BWBS	535,897	24.7%	
			2,166,838	100.0%	

Table 49 Rare Ecogroups BEC site series and association

Region	Ecogroup Number	Ecogroup Name	BEC Site Series	Moisture-Nutrient regime	Site Association
NE Mtns	3	xeric SWBmk	SWB mk-02	Very xeric-subxeric; very poor-poor	Sw - Scrub birch - Cladina
	9	subxeric ESSFmv4	ESSF mv4-02	Subxeric-submes	BlPl - Crowberry - Cladina

Region	Ecogroup Number	Ecogroup Name	BEC Site Series	Moisture-Nutrient regime	Site Association
				ic; poor	
	43	hygric ESSFmv4	ESSF mv4-05	hygric; poor-rich	Bl - Alder - Horsetail
NE Plains	1	xeric-subxeric BWBSmk$	BWBSmk-102$	xeric-subxeric; poor-rich	At - Soopolallie - Kinnikinnick
	2	xeric-subxeric BWBSmw$	BWBSmw102$	xeric-subxeric; poor-rich	At - Soopolallie - Kinnikinnick
	3	xeric-subxeric BWBSwk$	BWBSwk1-102$	xeric-subxeric; poor-rich	At - Kinnikinnick - Fuzzy-spiked wildrye
			BWBSwk2-102$	xeric-subxeric; poor-rich	At - Kinnikinnick - Fuzzy-spiked wildrye
	6	xeric-subxeric BWBSwk	BWBSwk2-102	xeric-subxeric; very poor-medium	Pl - Lingonberry - Reindeer lichen
	20	mesic-subhygic BWBSwk2$	BWBSwk2-110$	mesic-subhygric; medium-rich	At - Highbush cranberry - Bluebells
	22	submesic BWBS$	BWBSwk1-103$	submesic; medium-rich	At - Rose - Fuzzy-spiked wildrye
	23	mesic-subhygic BWBSmw$	BWBSmw-110$	mesic-subhygric; rich	AT - Highbush-cranberry -Oak fern
	33	hygric BWBSwk3	BWBSwk3-	hygric;	Sb - Horsetail -

Region	Ecogroup Number	Ecogroup Name	BEC Site Series	Moisture-Nutrient regime	Site Association
			111	very poor-poor	Stepmoss

Monitoring of management performance under indicator # 61 will begin with cut blocks harvested after April 1, 2015.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes
Area identified as rare ecosystems within the Fort St. John MU represents 4,943 ha or 0.23% of the crown forested land base.
It is anticipated that rare ecosystems, as defined by the current ecosystem representation analysis, will be maintained into the future. It is anticipated that a diversity of ecosystems exhibiting "rare" attributes will be maintained, thereby enabling a diversity and abundance of naturally occurring plants, animals and their habitats to be maintained into the future.

Strategy and Implementation Schedule:

Ecological site identification consists of collecting accurate site, soil, and vegetation information, and then using the various tools and descriptive material presented in the publications "A Field Guide For Ecosystem Identification for the Boreal White and Black Spruce Zone of British Columbia" and "A Field Guide for Site Identification and Interpretation for the Northern Rockies Portion of the Prince George Forest Region" to identify the site unit that best fits the information collected. The development of an appropriate management prescription depends on accurate site description and other site-specific data (e.g., slope gradient, soil texture), as well as correct site unit identification. Combining site identification with the collection of site, soil, and vegetation data provides the most complete ecological description of a site. The intent is to reserve the area of representative rare ecosystems encountered in the field during harvest block layout activities.
There is much natural variability in ecosystems, and it is important to approach ecosystem classification with that understanding. Not every ecosystem can be easily "pigeonholed" into a classification unit. To be reserved from harvest, a candidate "rare" ecosystem must be a good representation of the ecogroup considered to be rare by the ecosystem representation analysis. Based on assessments completed by forest professionals, those ecosystems that exhibit significant variability that prevents definitive identification and are therefore deemed poor representation of the rare ecogroup, may not be reserved from harvest.

All cut block layout completed after June 2014 will incorporate an assessment of ecological site classification to identify rare ecosystems at the fieldwork stage of development. When a mapable unit (typically >= 1. 0 ha that are not part of complexes) of the ecosystems noted as

rare in Table 3, are identified in the field, they will be reserved from harvest. In situations where the rare ecogroup is part of a site series complex, the rare ecogroup will be reserved from harvest if the site series complex is >= 2 ha in size and the rare ecogroup comprises greater than 60% of the total area of the site series complex.
Periodically, revision of the list of rare ecosystems may occur by way of ecosystem representation analyses conducted in conjunction with Timber Supply Review processes or by stand alone ecosystem representation analyses, which may be triggered by forest inventory or predictive ecosystem mapping updates for the DFA.

Monitoring Procedure:

Monitoring of management performance under indicator # 61 will begin with cut blocks harvested after April 1, 2015.
Annually report any incidents of harvesting that occurred in ecosystem groups defined as rare.
During development of site level plans blocks are compared against the predictive rare ecosystem data and retention activities identified where the presence of the rare ecosystem is confirmed in the field. The results of the ground confirmation will be reported annually in the annual report.

Linkages to Operational Plans:

In order to ensure that 100% of the rare ecosystem groups are reserved from harvesting, the following actions will be undertaken.

- Prior to layout being conducted a map identifying the predicted locations of rare ecosystems is compared to proposed road and block locations.
- The requirement to reserve rare ecosystems from harvest is reviewed with layout staff and contractors during the pre-work stage. This will enable the layout crews to identify any of the rare ecosystem sites during their fieldwork.
- Where representative rare ecosystem groups are identified in the field, the areas will be reserved from harvest or road construction by either removing the area from the harvest block or incorporating the area in WTP's or other reserves.
- In the situations noted above where a rare ecogroup is not reserved from harvest, a rational describing the reasons for harvesting the ecogroup will be prepared by the prescribing professional.

Linkages to LRMP:

This indicator helps to support the following LRMP objectives by ensuring that rare forest ecosystem groups are maintained over time across the DFA.

- *Maintain functioning and healthy ecosystems,*
- *Enhance timber harvesting and a sustainable long-term supply,*
- *Maintain timber harvesting and forest management opportunities,*
- *Manage for forest health.*

6.62 EFFECTIVE COMMUNICATION – NON TIMBER RESOURCES

Indicator Statement	Target Statement
Evidence of communication and consideration of non-timber resources into forest management planning.	100% of non-timber resource values, identified through communication, have been responded to and considered and may be accommodated in forest management plans.
SFM Objective: Ongoing communication and meaningful engagement with stakeholders regarding non-timber forest benefits	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Variances are permissible only on reaching mutual agreement between the affected stakeholder and Participant.

What is this indicator and why is it important?

The intent of the indicator is to plan forest management activities with consideration given to concerns brought forward by stakeholders. This indicator measures the Participants' implementation success in addressing these actions.

This indicator was designed to assess the Participant's performance relative to providing tenured and non-tenured stakeholders effective opportunities to be proactively involved in forest management planning activities and provide input on proposed development activities. This will ensure that when forestry activities are planned, information is exchanged in an effective and timely manner, so as to resolve potential land use conflicts before they occur. This process will help to identify interests and non-timber values that require consideration within the planning framework. Resulting stakeholder input could include the identification of interest areas, detail as to the nature of the interest on the land base and site level detail regarding potential impacts resulting from proposed development activities. Addressing issues successfully requires open communication of interests and expectations, a proactive process to address issues, and commitment to implement mutually agreed upon actions at some future time.

When significant disagreement occurs, efforts towards conflict resolution are documented. For the purposes of this indicator, 'significant disagreement' requires the complaint to be submitted to the respective participant in writing. This indicator and target demonstrates the Participants' commitment to track and follow actions through to completion.

Current Status:

The following table displays the number and variety of effective opportunities provided to stakeholders to be proactively involved in planning processes and provide input on forest values, knowledge and uses considered in the forestry planning processes. This information is in addition to the effective communications described within Indicators 41, 42 and 46. (Baseline data – TBD).

Description of Opportunity	Opportunities (Responses)

FOS#3 engagement by way of public ads, emails / phone calls / letters / meetings.	21 contacts were made with Stakeholders. Resulting in provision of 10 specific accommodation requests made by Stakeholders regarding FOS#3. Of the requests made, 9 have been accommodated in the FOS.

Forecasting Assumptions and Analytical Methods:

Continued effective communication between the Participants and stakeholders. It is anticipated that forest operations will respect and reflect the interests of non-timber resource benefits made known from tenure holders, local public and Aboriginals, resulting in the maintenance of known non-timber resource benefits in the Fort St. John TSA.

Strategy and Implementation Schedule:

Forestry planning staff will provide the opportunity for tenured and non-tenured stakeholders to meet, or otherwise provide comments on forestry activities proposed for their area of interest in the FOS, PMP or other operational plans that are made available for review and comment. Where issues are identified during the referral of these plans, potential actions to resolve the issues will be discussed with the applicable stakeholder, and any subsequent forest management plan accommodations will be noted in action plans with completion dates and responsibilities identified.

These action plans and dates will be documented and entered as issues into incident tracking systems, responsibilities will be identified and communicated to affected staff, and progress will be tracked through to completion of the action. In the event circumstances require that changes be made to the action plan the forestry supervisor making the change will note in the action plan what change was made, indicate in the plan that he has discussed and got agreement from the applicable stakeholder for the change, and notify any responsible parties of the changes made.

Outside of the review and comment periods, if concerns regarding forestry operations are raised by tenured and non-tenured stakeholders, the Participants will endeavour to reach an amicable agreement to address the concerns by developing and implementing mutually agreed actions plans.

In the event of a significant disagreement, the Participants shall document all efforts towards conflict resolution. The participants will provide a response within 30-days of receipt and document steps to move towards resolution.

Monitoring Procedure:

The number and type of opportunities provided by the Participants to interested and directly affected stakeholders to be pro-actively involved in forest management planning activities and provide input regarding proposed development will be tracked by planning staff. The Participants will be required to review and summarize this information annually for collating and reporting purposes.

Reporting will include, but is not limited to the number of accommodations actually completed, and the number of accommodations not completed as scheduled, to determine the percentage of consistency with management plans. An annual review of action plans will be completed,

and a summary of conformance to action plans will be prepared and reported in annual reports. Note: – annual reporting will not disclose the proportion of suggestions accommodated.

Linkages to Operational Plans:

Forest Operations Schedules, Pesticide Management Plans, and other operational plans which require public review and comment will be referred to known stakeholders, and actions agreed to will be identified in the final submission of these plans.
Site Level Plans, harvesting and silviculture plans will be consistent with any relevant accommodations to the management Plans (SFMP, FOS, PMP) and associated action plans.

Linkages to LRMP:

This indicator ensures the commercial interests of other stakeholders are considered and addressed by the Participants in a proactive manner. The indicator statement and target therefore support the following LRMP objectives:

- *Maintain guide outfitting opportunities.*
- *Provide quality public and commercial recreational opportunities and values.*
- *Manage backcountry recreation and tourism opportunities in a natural or natural appearing condition.*
- *Ensure future infrastructure requirements are considered when exploring for oil and gas (intent – for agriculture or settlement needs).*

6.63 EFFECTIVE COMMUNICATION – ABORIGINAL COMMUNITIES

Indicator Statement	Target Statement
Evidence of ongoing communication with Aboriginal communities and consideration of information gained.	100% of information on aboriginal titles and rights, identified through on-going communication with Aboriginal communities, has been responded to and considered and may be accommodated in forest management planning.
SFM Objective: Ongoing communication and meaningful engagement with First Nations	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No acceptable variance.

What is this indicator and why is it important?

The intent of the indicator is to plan forest management activities with consideration given to concerns brought forward by Aboriginal communities respecting titles and rights. This indicator measures the Participants' implementation success in addressing these actions.
When significant disagreement occurs, efforts towards conflict resolution are documented. For the purposes of this indicator, 'significant disagreement' requires the complaint to be submitted to the respective participant in writing. This indicator and target demonstrates the Participants' commitment to track and follow actions through to completion.

Current Status:

The following table displays the number and variety of effective opportunities provided to Aboriginal Communities to be proactively involved in planning processes and provide input on forest values, knowledge and uses considered in the forestry planning processes. This information is in addition to the effective communications described within Indicators 33, 56, 57 and 62.

Description of Opportunity	Opportunities (Responses)
FOS#3 engagement by way of emails / phone calls / letters / meetings.	85 contacts were made with First Nations during review of FOS#3. This resulted in provision of 16 general comments and 136 block specific requests made by the responding First Nations.

Forecasting Assumptions and Analytical Methods:

Implementation of this indicator is expected to result in continued effective communication between the Participants and Aboriginal Communities. It is anticipated that forest operations will respect and reflect the interests made known from Aboriginal communities, resulting in the maintenance of Aboriginal values and opportunities to practice treaty rights.

Strategy and Implementation Schedule:

As per the strategy described in Indicators 33, 56, 57 and 62.
Where issues are identified during the referral of management plans, potential actions to resolve the issues will be discussed with the applicable First Nations, and any subsequent forest management plan accommodations will be noted in action plans with completion dates and responsibilities identified. In the event of a significant agreement, the Participants shall document all efforts towards conflict resolution. The participants will provide a response within 30-days of receipt and document steps to move towards resolution.

Monitoring Procedure:

The number and type of opportunities provided by the Participants to Aboriginal communities to be pro-actively involved in forest management planning activities and provide input regarding proposed development will be tracked by planning staff. The Participant's will be required to review and summarize this information annually for collating and reporting purposes.
Contact types will include referrals, general inquiries, educational, etc. Reporting will include, but is not limited to, the number of attempts to contact, actual number of contacts and number of responses with information, the number of accommodations actually completed, and the number of accommodations not completed as scheduled, to determine the percentage of consistency with management plans. An annual review of action plans will be completed, and a summary of conformance to action plans will be prepared and reported in annual reports

Linkages to Operational Plans:

Forest Operations Schedules, Pesticide Management Plans, and other operational plans which require public review and comment will be referred to Aboriginal communities, and actions agreed to will be identified in the final submission of these plans.
Site Level Plans, harvesting and silviculture plans will be consistent with any relevant mutually agreed too action plans.

Linkages to LRMP:

There are no LRMP objectives linked to this indicator.

6.64 RESIDUAL FIBRE UTILIZATION

Indicator Statement	Target Statement
The volume of residual fibre that is being utilized for products other than lumber and oriented strand board production.	Report out annually on the volume of residual fibre utilized by facilities in the production of commodities other than lumber and oriented strand board.
SFM Objective:	
Linkage to *FSJPPR*:	

Acceptable Variance:
No variance.

What is this indicator and why is it important
With the concern for the efficient utilization of a shrinking timber supply, this indicator reports out on how much residual fibre is being utilized for products other than lumber and/or OSB production. This fibre may come directly from timber harvesting, secondary harvesting, or residuals from sawmill production. It is important to note that utilization of this fibre is very sensitive to economic factors. The report out will also indicate what the annual harvest (conifer and deciduous) was for the reporting year. The Participants will also report the amount of residual fibre left un-utilized after completion of their harvesting activities. The list of products generated utilizing residual fibre may change from year to year as the demand for certain products change. Some of the reporting items will include:

- Salvage volume from other industries such as oil and gas, etc
- Timber volume retained in cutblocks for future harvest (excludes Wildlife Tree Patches)
- Sawlog harvest volume (Conifer),
- Deciduous harvest volume for OSB production,
- Pulp log harvest volume delivered to pulp mill,
- Residual fibre harvest from cutblock (post primary harvest),
- Harvest from Fibre Supply Licence to Cut
    - will reference if this fibre comes from a fibre recovery zone,
- Primary harvest specifically for non lumber/OSB product (ie. Chipping on site, bioenergy product, soil remediation, etc)
- Residual fibre from sawmill for:
    - Pellet production
    - Chips for Pulp Mill
    - Hog fuel for power production
    - other

Current Status
Canfor has and continues to seek expressions of interest from other potential users of the residual fibre generated from our timber harvesting activities. Canfor is currently in discussion with a couple of industrial businesses regarding their interest in using residual wood fibre from our harvesting

operations for use in generating soil remediation products and drilling mud remediation, for use by the oil and gas industry. These businesses are trying to secure clients for their products. The economic downturn in the oil and gas sector has resulted in significant reductions in oil and gas activity, which is making it difficult for these emerging business to secure clients for their products. The current lack of market demand for use of on block residual fibre (logs, branches, tops) makes it uneconomic at this time to haul the residual material from the bush to a processing facility.
In addition, recent sawmill closures in the forest industry have resulted in a shrinking chip supply for the pulp and paper industry. This has been a positive influence leading to increased harvest of pulp quality stands in the Fort St John TSA. This trend is expected to continue as the sawmilling industry right sizes in response to shrinking fibre supplies, created by climate change which has resulted in increased timber losses due to wildfires and forest insect epidemics such as the mountain pine beetle. Dead conifer stands which are no longer merchantable for sawlog production present a wildfire hazard. Increased pulp log quality stand harvest will utilize material that otherwise would be left in unharvested forest stands and in cull piles on harvested blocks. The harvest of these pulplog quality stands will reduce wildfire risk on the landbase and improve overall utilization of the timber resource.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply? (y/n) No

Strategy and Implementation Schedule:

The Participants will continue to seek out economically viable uses for the residual fibre generated by our harvesting operations.

Monitoring Procedure:

The Participants will annually report the amount of:

- residual fibre utilized resulting from lumber and OSB production, and
- on block residual fibre utilized to generate products other than lumber and OSB.

Linkages to Operational Plans

FOS's will be analyzed to ensure they are consistent with emerging targets and implementation schedules for on block residual fibre use. Proposed development will be adjusted if necessary to ensure consistency with targets or utilization strategies.

Linkages to LRMP:

The residual fibre utilization indicator helps to support the following LRMP objectives by maximizing use of on block residual fibre:

- *Maintain functioning and healthy ecosystems.*
- *Encourage utilization of pulp quality stands.*

7.0 DESCRIPTION OF PUBLIC INPUT

7.1 Overview of Input Process

The review and comment process for this SFMP has been developed in accordance with Section 37 and 38 of the Fort St. John Pilot Project Regulation. Minimal substantive revisions were made to SFMP# 2 in the creation of SFMP# 3. Because SFMP# 3 is based on SFMP# 2, a summary of the First Nations and public review comments on SFMP# 2 is included here for clarity.

7.2 PAG input prior to the public review and comment period

This SFMP is based upon SFMP# 2. Very minor revisions were made to SFMP# 2 to create SFMP# 3. These revisions were discussed with the PAG on March 17, 2015. The PAG provided feedback in this meeting regarding the proposed new Forest Health climate change adaptation legal strategy, as well as the legal and CSA indicators revised in the development of SFMP# 3. The Participants used this feedback to develop SFMP# 3 for Review and Comment, which was circulated to the PAG members for review.

An additional meeting was held on September 22, 2015 to review the completed SFMP# 3 proposed for Public Review and Comment with the PAG, and receive their comments on the SFMP, prior to the publication of the public review notice required under Section 38 (1) of the Fort St. John Pilot Project Regulation. Comments and recommendations received from the PAG during this meeting, as well as the Participants' consideration and response to these comments is appended to this SFMP# 3 as per section 37(5) of the FSJPPR (Table 50).

A summary of the revisions made to SFMP# 2 in creation of SFMP# 3 are described in Appendix 20 Table 53.

7.3 Public and First Nations Review

SFMP# 3 was made available to the public and First Nations for review during the period December 21, 2015 until March 30, 2016. A notice in a form acceptable to the Regional Executive Director (FSJPPR S 38(1(a))) was published in local newspapers soliciting public review and comment on this SFMP. Notices were published in the December 17 and 21, 2015 and January 21, 2016 editions of the Alaska Highway News. Notices were also published in the December 17 and 24, 2015 and January 21, 2016 editions of the Northeast News. A copy of the notice was also posted to the FSJNow.com website for the duration of the public review period. A copy of the notice is included in Appendix 15 of SFMP #3.

No revisions were made to SFMP# 3 as a result of public or First Nations comment.

7.4 First Nations Input

The Participants engaged First Nations in SFMP# 3 discussions through the PAG which included membership from the Blueberry River, Doig River, Prophet River, Halfway River, and West Moberly First Nations. The Blueberry River First Nation resigned from the PAG in early November 2016.

In addition to PAG discussions, each First Nation with traditional territory in the Fort St. John TSA (Dene Tha', Blueberry River, Doig River, Fort Nelson, Halfway River, Prophet River, Saulteau, Horse Lake and West Moberly) were invited by letter and email to review and comment on the impact of SFMP# 3 on the practice of treaty rights. The Participants provided opportunities for individual First Nations to meet with the Participants to review the plan in detail, or otherwise provide their comments, at their discretion. Individual meetings were held with the Dene Tha' and Blueberry River First Nations to review SFMP# 3. Only verbal comments were provided by the Blueberry River First Nation, written comments were provided by the Dene Tha' First Nation. No other First Nation provided comment on SFMP# 3. No revisions were made to SFMP# 3 as a result of First Nations comment.

With respect to SFMP# 2, the Participants engaged First Nations in SFMP# 2 discussions through the PAG which included membership from the Blueberry, Doig, Prophet, Halfway, and West Moberly First Nations.
Participants also engaged First Nations in SFMP# 2 discussions through the Joint Management Advisory Committee (JMAC), which discusses forest management issues effecting the Blueberry, Doig, Prophet, Halfway, Saulteau and West Moberly First Nations. A total of 5 JMAC meetings were held to review and discuss SFMP# 2. This engagement began prior to, and continued during and after the SFMP# 2 public review period (February 8, 2010 – April 8, 2010).
All comments received from First Nations, and the Participants' responses to those comments, are documented in Table 51 of SFMP# 3.

7.5 Government advisors involvement prior to the public review and comment period

This SFMP is based upon SFMP# 2. Very minor revisions were made to SFMP# 2 to create SFMP# 3. These revisions were discussed with the PAG and government advisors on March 17, 2015. The PAG and government advisors provided feedback in this meeting regarding the proposed new Forest Health climate change adaptation legal strategy, as well as the legal and CSA indicators revised in the development of SFMP# 3. Government advisors provided SFMP# 3 review comments on November 24, 2015. These comments were addressed and where appropriate included in the version of SFMP# 3 that was made available to the public and First Nations for review and comment.
The complete SFMP# 3 was also submitted to the MFLNRO, for additional review and comment during the ninty day public review period for SFMP# 3. As of the date of submission of the approval request for SFMP# 3 no additional comments were provided by government advisors.
The comments provided by the Government advisors are documented in Appendix 22 of this SFMP. The Participants had extensive discussions with government advisors regarding the content of the legal strategies and indicators, prior to meeting with the PAG to solicit their input into the strategies and indicators included in SFMP# 2, which were carried over to SFMP # 3. Copies of the SFMP# 2 Landscape Level Strategies and legal indicators upon which SFMP# 3 is based, were reviewed with the PAG and provided to the MFLNRO Regional representative, and conveyed to local MFLNRO staff and MOE staff, providing the government with a preliminary review by their staff of the strategies and legal indicators prior to the public review of SFMP# 2. These government comments were incorporated in the version of SFMP# 3 that was made available for public review.
All comments received from the Government, and the Participants' responses to those comments, are documented in Appendix 22 of SFMP # 3.

7.6 General Public

Public Advisory Group meetings held during the development of this SFMP were advertised on radio, newspaper and on local Fort St. John websites, with invitations extended to the general public to attend.
With respect to SFMP# 3 a notice in a form acceptable to the Regional Executive Director (*FSJPPR* S 38(1(a))) was published in local newspapers soliciting public review and comment on this SFMP. A copy of the notice was also posted to a local website – www.fsjnow.com. A copy of

the notice is included in Appendix 15 of SFMP #3. No comments were received from the public with respect to SFMP# 3.
No comments were received from the public, all comments received from First Nations, and the Participants' responses to those comments, are documented in Appendix 21 of SFMP # 3.
Subsequent to the completion of the public review of SFMP#3, the Participants initiated a review of SFMP#3 against newly released CSA SFM certification standard CSA Z809-16 (released in 2016). The addition of Indicators 68 and 69, to bring the plan into conformance with CSA Z809-16, were discussed with the PAG October 24, 2017.

7.7 Documentation and Response

Comments received during the review and comment period for SFMP# 3 from all sources, and the Participants' responses are incorporated in Tables 50, 51 and 52 of SFMP# 3.

Table 50: PAG Comments on Preliminary SFMP# 3

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
Strategy to Reduce Forest Health Impacts from Climate Change	A question was asked in light of a recent article in the Vancouver Sun regarding fungus killing poplars. The PAG asked if the Climate Change strategy will result in management of forest health concerns?	It was noted that the Climate Change strategy provides the Participants with the ability to manage the establishment of replacement forest stands that are adapted to climate change and that the forest health strategy requires the participants to identify and manage forest health agents that may have a significant damaging effect on the Participant's silviculture obligations.	Yes	Yes
Review of overall document	Plan very well revised and put together. Consider including a statement in the SFMP and in the notice of Public	The Partcipants acknowledged the comment and agreed to record in the SFMP and Public Review notice that the plan was	Yes	Yes

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
	Review that the SFMP was reviewed and accepted by the PAG.	reviewed and accepted by the PAG.		
Revisions to Indicators 6.6, 6.19, 6.26, 6.49, 6.52, 6.53 and 6.66. Strategy)	PAG expressed acceptance of the proposed revisions to all of the indicators except for Indicator 6.6 Coarse Woody Debris Volume. For Indicator 6.6 the PAG suggested using a 6 year monitoring period to stay consistent with the other indicators.	The Participants reviewed and accepted the suggestion of the PAG and revised the monitoring period of Indicator 6.6 to a 6 year period.	Yes	Yes
Iindicator 6.6	During discussion of the proposed revision to the Coarse Woody Debris indicator, the following questions were asked: Did we not decide to have less Coarse Woody Debris (CWD) on range land? Is this going to happen?	We haven't changed the target, as it was discussed that the target calls for an average amount of CWD to be retained over the DFA. This gives the participants the flexibility to retain less CWD on some blocks where needed to address other values, such as range. Consequently it was decided that the target did not need to be revised as the flexibility to retain less CWD on individual blocks is built into the target.	Yes	N/A

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
Indicator 6.29	Are mixedwoods blocks included with the deciduous compiler?	No, mixedwoods are not included with the deciduous compiler. There likely will be some work completed during the term of SFMP#3 to develop a landscape level reforestation strategy for mixedwoods.	Yes	N/A
Indicator 6.29	Western larch range is expanding, it is not suitable to use at this time. Will this change?	Western larch is not approved for use in the FSJ TSA. There is a variance allowed in the Chief Foresters Standard for Seed Use that provides flexibility to vary from the standard within a specific tolerance. Siberian larch might be better suited to our climatic conditions.	Yes	N/A
Review of summary of revisions made to SFMP# 2 to create SFMP# 3, including Appendices 5, 6 & 7a	There was general consensus among the PAG to accept the changes proposed by the participants to create SFMP# 3. No revisions were suggested by the PAG to be made to draft SFMP# 3.	PAG was thanked for their review and comment regarding SFMP# 3.	Yes	Yes
Review of summary of revisions made to SFMP# 2 to create SFMP#	No revisions were suggested by the PAG to be made to the landscape level reforestation	Application of the landscape level reforestation assessment methodology to	Yes	N/A

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
3, including Section 8.1.3.1 and 8.1.3.2	assessment methodology for deciduous stands or to the deciduous stocking requirements for stands outside of the landscape level assessment population.	deciduous stands was discussed with the PAG.		
Review of proposed indicators 68 and 69 to SFMP#3.	The PAG made suggestions for revision of the proposed wording for indicators 68 and 69.	With slight revisions, the Participants accepted the indicator wording suggested by the PAG.	Yes	Yes

Table 51: First Nations Comments on Preliminary SFMP# 3 and on Preliminary SFMP# 2

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
SFMP# 3 2.4 – First Nations Participation	Why is there not a First Nations advisory Group?	The FSJPPR requires that the Participants must establish and maintain a public advisory group. The Fort St John Pilot Project public advisory group currently consists of membership that includes the Saulteau, West Moberly, Halfway River, Prophet River and Doig River First Nations. Prior to November 2015 the FSJPP PAG membership included representation from the Blueberry River First Nation.	Yes No revision.
SFMP# 3 4.0 – Landscape Level Strategies	Why is there no First Nation Landscape Level Strategy? There should be a Treaty 8 Rights LLS.	The FSJPPR identifies the landscape level strategies that at a minimum, must be included in an SFMP to provide direction for the management of forest resources. In addition to the landscape level strategies, the SFMP includes indicators and targets that are linked to the recognition of Treaty Rights and the management of forest resources that may affect the practice of Treaty Rights. This includes, the indicators that are linked to ecological management and to the recognition of Aboriginal and Treaty Rights (I 67: Rare Ecosystems, I 17: Representative Examples of Ecosystems, I 1: Forest Types, I 28 Species	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		Composition, I 2: Seral Stage, I 3: Patch Size, I 5: Snags and Cavity Sites, I 9: Wildlife Tree Patches, I 6: Coarse Woody Debris Volume, I 7: Riparian Reserves, I 8: Shrubs, I 11: Species at Risk Stand Level Management Guidelines, I 16: Ungulate Winter Ranges, Wildlife Habitat Areas and MKMA, I 10: Invasive Plants/Noxious Weeds, I 15: Class A Parks, Ecological Reserves & LRMP Designated Protected Areas, I 18: Graham Harvest Timing, I 19: Graham Merch Area, I 20: Graham Connectivity, I 22: River Corridors, I 57: Number of Known Values and Uses Addressed in Operational Planning., I 25: Forest Health, I 7: Riparian Reserves, I 34: Peak Flow Index, I 35: Water Quality Effectivenss Evaluation, I 36: Protection of Streambanks, I 37: Spills entering Waterbodies, I 23: value and Total Number of Contracts Awarded to First Nations, I 33: First nations Consultation and Information Sharing, I 56: maintenance of Wildlife and Fisheries Habitat, I 62: Brushing Program Aerial Herbicide Use).	
SFMP# 3 2.2 – Structure and Resonsibility	KPMG has never come to BRFN. BRFN would like their contact information so they can forward an invitation to KPMG this year.	The contact information for KPMG performance Registrar Inc. was provided to the BRFN.	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
SFMP# 3 6.9 – Wildlife Tree Patches 6.36 – Protection of Streambanks and Riparian Values on Small	Why is there no retention along minor creeks? Why are WTP's often located in places where there are no wildlife values (e.g. Rocky outcrops). Who is monitoring to ensure the WTP's are in the right places? The indicator just specifies the amount of area to be retained but it does not check if it is the "right" areas.	Riparian areas occur adjacent to wetlands or bodies of water such as rivers, streams, or lakes, and include stream bank and flood plain areas. On larger streams particularly, riparian areas often provide productive, structurally diverse habitats. In addition to providing ready access to water, these areas also support important habitat features such as coarse woody debris, cavity sites, shrubs and broadleaf trees, which have been identified as key habitat elements necessary to support species richness. Riparian reserve zones (RRZ's) are specific areas on larger fish bearing streams, and some wetlands (W1) and lakes (L1) in which harvesting is not normally permitted, in order to protect significant riparian and aquatic habitats. Maintaining RRZ's provides many of the habitat elements needed to support a diverse species mix across the landscape. Minimum RRZ's widths are identified in Schedule 'D' of the *FSJPPR*, and relate to activities carried out under the FSJPPR by the Participants, excluding road rights of way necessary to cross streams. All streams, wetlands, and lakes in or immediately	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		adjacent to a planned harvest area will be classified and mapped in the field prior to the commencement of harvest operations. RRZ's that meet or exceed the RRZ widths noted in Schedule D of the *FSJPPR* will be located and clearly marked in the field. Current practice when establishing reserve boundaries in the field on S1, S2, and S3 streams is to utilize natural topographic breaks and timber type boundaries that result in irregular shaped edges. In practice reserve widths are normally wider than the minimum, but vary significantly in distance from the stream along their length, based on the natural breaks that are typically used for the boundary. These natural boundaries are usually inherently more windfirm than fixed width RRZ's, and easier to implement, so this practice is the preferred strategy for delineating RRZ's in the field. The majority of riparian classifications completed by Participants within or adjacent to their operations will be on S4, S5 or S6 streams, so management measures on these small streams without mandatory riparian reserve zones can have a very meaningful impact on riparian and	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		water resources. SLP's (Site Level Plans) contain site-specific measures designed to protect streambanks, stream channel stability, and in many cases adjacent riparian vegetation. Protecting the streambanks and stream channels reduces the risk of sedimentation entering the watercourse, and contributes to the maintenance of water quality on streams without mandatory riparian reserve zones. Management strategies for the protection of these values on streams without mandatory riparian reserve zones, as well as for the protection of other non-fishbearing waterbodies, are based on site-specific field assessments. Factors such as riparian classification, topography and slopes, soil characteristics, season of harvest, snow loads, vegetation and habitat characteristics are considered when prescribing management strategies to protect the values on small streams without riparian reserve zones. Measures that may be implemented include designation of Wildlife Tree Patch or other reserve area, restricting harvesting operations to frozen ground conditions, compressible snow pack criteria,	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		establishment of machine free or machine sensitive zones, use of low ground pressure equipment, and prescribing retention of non-merchantable stems within riparian areas. Wildlife Tree Patches (WTP's) are forested areas of timber within or immediately adjacent to a cutblock that are retained primarily for their value in providing a source of habitat elements, or for the protection of important habitat features. WTP's provide sources of shrubs, large live trees, broadleaf trees, coarse woody debris (CWD), and snag/cavity sites. These elements can provide key habitat components that support the residual populations, the reintroduction of populations expatriated by the disturbance, and overall ecosystem function (Bunnell et al 1999). Wildlife Tree Patches (WTP's) within managed stands have been shown to be important in the reestablishment or maintenance of a variety of species, including moose (Gasaway and Dubois 1985), and birds (Seip 1997). Residual patches include both islands within the block (internal WTP's) and patches immediately adjacent to logged areas that are also adjoined to	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		unharvested areas (external WTP's). Both internal and external residual patches may be suitable for WTP's provided they can function as sources of habitat elements, which will depend on their site specific attributes. External WTP's connected to adjacent unharvested areas are typically more windfirm within the DFA, and may receive higher initial use by some wildlife species due to the proximity of adjacent unharvested habitats. Maintaining habitat elements in Wildlife Tree Patches contributes to enhancing species richness by providing the critical features needed to support a variety of species. Designating areas that have composition and structure similar to natural remnants as WTPs will contribute to maintaining a natural range of variability in ecosystem function. Providing diverse habitat structures, including WTP's, within managed stands is consistent with the pattern of natural disturbances. Fire is the most prevalent natural disturbance in the DFA. Maintaining a component of Wildlife Tree Patches in managed stands over the landscape is analogous to fire 'skips'. Skips occur where areas are burnt, but	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		undamaged or lightly burnt patches persist within the perimeter, or on the edge of the fire within a similar forest type. These residual patches in otherwise disturbed areas typically vary substantially in size, shape and composition, so variability in these characteristics of WTP's is desirable. WTP's can also be used to protect site-specific habitats, such as mineral licks and raptor nesting sites and provide a source of local genetic material. Following is the guidance provided in the SFMP to prescribing professionals regarding the placement of WTP's: • Including areas of key site specific habitat importance, such as eagle, osprey, or blue heron nests, mineral licks, and riparian areas, • In areas with species of concern, locate WTP's consistent with stand level management guidelines where practical, • Areas of operational concern which can contribute significantly to the provision of key habitat elements (riparian habitats, large live trees, snags or declining trees, large trees,	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		broadleaf trees, CWD, or shrubs), • Tree species that are uncommon in the LU may provide some unique niche habitats (e.g. cottonwood or birch in the Graham River LU), • Other wind firm forested stands that can provide these habitat elements, • WTP's should be retained for the full rotation, unless there are overriding forest health concerns, or as otherwise approved by the MFLNRO, and WTP's may be more windfirm if located adjacent to cutblock boundaries.	
SFMP# 3 6.11 – SAR Stand Level Management guidelines	Where is the evidence that this indicator is working to protect wildlife? Who is monitoring the success of these indicators? What have the participants done to ensure effectiveness?	Application of landscape level biodiversity management measures contribute to the maintenance of most of the biodiversity needs in the planning area. These management approaches are "coarse filter", i.e., they represent general measures to conserve a variety of wildlife species. However, coarse filter approaches may not be sufficient to ensure the conservation of special status species. Fine filter management guidelines are therefore required to ensure that species "at risk" are maintained within the DFA. The Species at Risk Stand Level Management	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		Guidelines indicator measures whether guidelines that may help conserve and manage specific habitat needs for species at risk where they are likely to occur, are being applied. These guidelines are included in the December 2010 document entitled "Stand-level Management Guidelines for Selected Forest-Dwelling Species in the Fort St. John Timber Supply Area" prepared by Manning, Cooper and Associates for direction. That document summarizes forest dwelling species of interest that may be impacted by forestry operations, the estimated likely geographical extent of the local habitat of these species, the specific niche habitat characteristics applicable to those species, and some stand level management guidelines that may help retain habitat or otherwise support these species. Species at risk included in the Stand Level Management Guidelines document (SLMG) are derived from reviewing available information and authoritative sources including: 1) Federal Species at Risk Act Schedule 1, 2 or 3, 2) Provincially red and blue listed forest	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		dwelling species that are directly and negatively impacted by forestry operations, 3) Regionally rare species that are sensitive to forestry operations (Sandhill Crane), and 4) Information on forest dwelling species from local MOE staff: Local government staff provided input on which local forest dwelling species might benefit significantly by inclusion in the Stand Level Management Guidelines. With respect to the effectiveness of the management guidelines associated with the indicator, the stand-level management guidelines described in this indicator were developed to provide additional ecological information and achievable operational recommendations for forest resource managers. They were developed by referring to relevant scientific literature and regional reports, reviewing associated provincial management guidelines (e.g., see *Identified Wildlife Management Strategy* (IWMS) http://www.env.gov.bc.ca/wld/frpa/iwms/iwms.html	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		), conducting discussions with other forest managers and species experts, and the authors' cumulative knowledge, experience and professional judgment. Forest harvesting alters habitat and may potentially diminish biodiversity (Spies et al. 1988, Hejl et al. 2002). The SFM plan addresses this concern by endeavouring to maintain biodiversity upon its tenure, in part by using indicator species monitored over the long term (see Bunnell et al. 2003). Indicators are classified by Bunnell (2005) as follows: 1. generalists, species that can occupy many different forest types 2. species that can be linked to broad habitat types 3. species linked to specific habitat elements 4. species that use specific or localized habitats 5. species linked to landscape features 6. species not associated with forested habitats Under Bunnell's plan (Bunnell and Vernier 2007), species grouped into classes two and three are best suited for large-scale monitoring to assess the potential impacts of forest management activities. In addition, species	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		chosen to serve as biological indicators must (1) be forest dwelling, (2) be sensitive to forest practices employed, (3) be practical to monitor in terms of sampling, identification, and cost, and (4) provide information useful in guiding forest practices (Bunnell et al. 2003). Because songbirds, especially migratory songbirds, have the ability to modify their presence in an area according to the ability of available habitat to fulfill their foraging and nesting requirements, they are particularly well-suited for use as ecological indicators (Robbins et al. 1986, Canterbury et al. 2000, O'Connell et al. 2000, Carignan and Villard 2002). When the entire forest-dwelling songbird community is preserved, so too is the varied and unique range of habitats which they occupy, which collectively represent a diversity of habitat for other plants and animals (Hutto et al. 1987, Crozier and Niemi 2003, Rempel 2007). Over the course of 2006-2009, the participants collected baseline data to monitor trends in the populations of songbirds in the Fort St John defined forest area. This data maybe assessed in conjunction with additional songbird population	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		data proposed to be collected in the future, in order to assess the effectiveness of the management strategies identified in the SFMP.	
SFMP# 3 6.9 – Wildlife Tree Patches	How are the wildlife features like bear dens and licks protected?	Guidance in the SFMP indicator 9: Wildlife Tree Patches suggests anchoring WTPs over site specific habitat elements such as dens, raptor nests, and mineral licks. Where wildlife features are identified in proposed cutblocks, field staff follow the guidelines identified in the SFMP to manage the features by placing WTPs around them.	Yes No revision.
SFMP# 3 6.23 – Value and Total Number of Contracts Awarded to First Nations	Were offers ever extended to First Nations? Where are our offers?	The Participants (Canfor and LP) managed an agreement with 6 local First Nations that provided First Nations with opportunity to engage in harvesting of timber and other activities. The Participants (Canfor and LP) are working with the First Nations to negotiate a new agreement. The Participant's (Canfor and LP) manage a contract with local First Nations Company 6 Nations Ventures, to manage the log yard at Peace Valley OSB. BRFN stated there is minimal benefit to the community from the contract between 6 Nations Ventures and the OSB mill.	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
SFMP# 3 CSA Z809-08 Element 5.2 – Communities and Sustainability	Why are First Nations communities not included in this indicator?	First Nations are included in Indicator 6.23 Value and Total Number of Contracts Awarded to First Nations. See description above.	Yes No revision.
SFMP# 3 2.0 - Description of the FSJ Pilot Project	Concerns are similar, regardless of border; Clearcutting, Buffering of lakes and streams and wildlife concerns. What is the term of the SFMP and FOS?	SFMP is a 6 year plan, as well as the FOS. In the FSJPPR it identifies that there must be at least 6 years volume shown in the plan (FOS). For consistency, the SFMP is set up at the same timeline as the FOS.	Yes No revision.
SFMP# 3 4.7 - Reforestation Strategy	Are silviculture activities shown on the Plan?	Silviculture activities (site prep, planting, brushing using herbicide) – are not shown. Species management (conifer or deciduous) is identified in the FOS; the brushing program is described in the Pesticide Management Plan (PMP). Part of the PMP, is the Notification of Intent to treat (NIT) - this provides the individual blocks and treatment plan for the block each year. The NIT allows for the public to comment on the proposed brushing treatments. The SFMP identifies the reforestation targets (stocking standards).	Yes No revision.
SFMP# 3 4.1 – Timber	How solid is FOS year 1-6?	The FOS doesn't identify the planned harvest date. Canfor has a 3 year operating plan where the harvest sequencing is planned. The other	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
Harvesting Strategy		licensees, LP, CNRL, Chetwynd Mechanical Pulp, Peace Valley OSB and Dunne - Za have their blocks logging scheduled in Canfor's 3 Year operating plan. Chetwynd Mechanical Pulp (CMP) has a small area in south part of the FSJ TSA that is not part of the SFMP or FOS, they do their own scheduling in this area under their Pulpwood Agreement. BCTS has a sales schedule that identifies harvest dates.	
SFMP# 3 4.7 - Reforestation Strategy	Pesticide Use- DTFN is not supporting the use of Pesticide. There is concerns with the weather monitoring (i.e. Jason's Meeting regarding the BCTS PMP in March). The weather on the ground and the helicopter environment is different. Concern is that the chemical is not applied when the chemical is sprayed.	Pilot Project Participants follow strict weather guidelines to ensure that the chemical application is effective, reaches the intended vegetation and there is no drift. As long as the weather windows are used, the effectiveness is there. We have been trying to reduce the use of herbicide on an annual basis, and the trend is going down. On average we are using herbicide on 20-30% of the total area harvested annually. We are trying to minimize the amount of area treated with herbicide, in the 2014 reporting year approximately 571.4 ha were treated and 5,385.7 ha were harvested. The treated area represents 10.6% of the total area harvested in 2014.	Yes No revision.
SFMP# 3	Water management is a concern around buffers; trapping and trapping	The SFMP proposes following the stream classification and management system identified	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
4.3 – Riparian Management Strategy	access; commenting at the SFMP level (high level) would not be as good as commenting on the FOS level. Streams are identified by stream class, as for the legislation. In Alberta, <1.5m, 1.5m to 5m, >5m Fish presence isn't a factor. How does this compare to this SFMP?	in the FSJPP Regulation: • <1.5 m width Fish Bearing - No Riparian Reserve Zone (RRZ- no harvesting), Riparian Management zone (RMZ) = 30 m; typically RMZ restrict tracks of machines in those zones, but machines can reach in and remove timber. • <1.5-5m width Fish Bearing - 20 m RRZ (timber) and a 20 m RMZ. Intent of RMZ is to provide some windfirmness; feathering of the zone may be done in that RMZ • >5m -20m width Fish bearing - 30 m RRZ and a 20 M RMZ • >20 m in width Fish Bearing - 50 m RRZ and 20m RMZ	
SFMP# 3 6.9 Wildlife Tree Patches	What is the retention targets on cutblocks?	Retention targets are not on a cutblock basis, rather they are assessed on a landscape unit level. Each LU has a different target based on natural disturbance patterns. The targets range from 3% to 8%. Actual retention levels range from a low of 6.9% to a high of 16.8 % in WTP patches in the Milligan. We are exceeding targets in all LU's.	Yes No revision.
SFMP# 3	Do WTPs have to be contiguous to the block boundary? Do you keep	No- they are not required to be non-contiguous to count towards the retention targets; stream	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
6.9 Wildlife Tree Patches	track of external WTP area?	buffers are sometimes considered WTP. External WTP does contribute to the indicator.	
SFMP# 3 6.9 Wildlife Tree Patches	Does the external WTP contribute to the Timber Supply?	No, if identified as a WTP, they are considered to be reserves set aside from harvest for a rotation, they are not considered to be part of the available timber for future harvest.	Yes No revision.
SFMP# 3 4.6.4 – Strategy to Reduce Forest Health Impacts from Climate Change	Drought and climate change are impacting the wetlands. This is a concern due to new diseases being introduced by the stress. Due diligence is needed where land and water are being discussed.	The Participants are confident that the stream buffers and WTPs in place are adequate regarding protection of stream quality, prevention of sedimentation, etc. With respect to climate change, the Provincial government sets the rules regarding tree planting species – what tree species seedlots can be planted by geographic location to ensure that the trees planted are adapted to the climatic conditions of the various sites throughout the province. They have recognized the issues with the climate change. We move tree seedlings in compliance with the provincial regulations and use the latitude inherent in the transfer guidelines to plant species and seedlots that we believe will be best suited to adapt to the changing climate of each site.	Yes No revision.
SFMP# 3	Is climate change monitoring done by the companies?	No instrumented climate change monitoring is done as part of the SFMP. However we will use	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
4.6.4 – Strategy to Reduce Forest Health Impacts from Climate Change		the latitude available in the tree seed transfer guidelines to plant species that we feel will be best adapted to the expected changing climactic conditions.	
SFMP# 3 3.4 – Continuous improvement	Are Cumulative Effects impacts measured as part of the plan? Are the impacts measured against other industries and their plans?	Yes, the participants complete an analysis to look at the proposed road and blocks, which includes previous land clearing, including oil and gas, to determine if we were to go ahead with the harvest of all blocks proposed in the FOS, if we will meet the SFMP targets for land based values such shrubs, old growth forest, patch size, etc. This is reported in the FOS. We do not measure against targets set by other Industries. We can account for their impacts through our analysis if their projects have been completed and mapped into provincial forest inventory databases.	Yes No revision.
SFMP# 3 3.4 – Continuous improvement	Development happens annually, how often is the vegetation inventory updated?	Forestry Depletions to the vegetation inventory are done on an annual basis by the government, based on the industry submissions. Oil and gas submit as-built plans on a similar timeline. Available Spatial data for oil and gas development is reasonably accurate.	Yes No revision.
SFMP# 3	What are the impacts of these Forest Fires on planning?	The SFMP has an indicator that prompts us to assess disturbances from disease and fires for	Yes No revision.

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
6.26 - Salvage		timber salvage opportunities. If possible, the Participants try to harvest damaged timber.	
	Dene Tha First Nations have funding Issues - no funding for this type of engagement is provided by government. Appreciate these meetings, and try to address a lot of the issues in NEBC. At some point, the funding issue needs to be discussed.	Participants are happy to pass your concerns regarding funding on the the provincial government.	Yes No revision.
Follwing are comments generated during the review of SFMP# 2.			
SFMP# 2 6.50 - Coordination	Do oil/gas industry proponents share information on their plans with the participants so that total cumulative impacts are being assessed? Comment that the FSJPP plan coordination process allows for a better assessment of forestry impacts at a landscape level for First Nations because the plans and maps are coordinated.	Information sharing is happening as much as possible. Information around roads is being shared so that duplicate access can be avoided to develop an area, and reduce the overall impact. Acknowledged	N/a
SFMP# 2 6.56 - Conformance	Suggested that the indicators related to First Nations' values should be written by the First Nations and then	The process that was followed allowed for first nations to review the draft indicators before it	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
to Elements Pertinent to Treaty Rights	presented to the PAG.	went out to public review. Even though the licensee participants wrote the original indicators and targets, the first nations representatives had opportunity to influence the wording of the final indicators and targets. The basic intent of the First Nations indicators is specified in the CSA standard. The indicators proposed by the participants are built upon the core requirement noted in the CSA standard. The draft indicators were discussed with First Nations by way of the previous 3 JMAC meetings as well as individual band specific meetings held to review the draft SFMP. The participants have made a number of changes to the indicators related to first nation values however if any first nations values were not addressed than the first nation representatives should bring these forward.	
SFMP# 2 6.56 - Conformance to Elements Pertinent to Treaty Rights	Suggestion that a good starting point for indicators for First Nation values would be to work around the values and specific treaty rights identified in Treaty 8 (i.e. hunt, fish, trap, etc.).	Responded that many of the indicators in the SFMP directly or indirectly relate to treaty rights (i.e. seral stage, patch size, water quality - impacts on wildlife and fish) and are noted by Indicator # 51.	N/A
SFMP# 2	Question asked "what are the	There are no adjacency requirements because of	N/A

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
4.5.3 – Adjacency and Forest Structure Strategy	adjacency guidelines are under the FSJ pilot?"	the focus on emulating the temporal and spatial characteristics of natural disturbance – primarily fire. Adjacency concerns are considered within visual corridors.	
SFMP# 2 6.6 – Coarse woody Debris Volume	Question asked "are Wildlife brush piles addressed in the plan?" Suggested consideration of an indicator to be added to the SFMP related to wildlife piles.	Responded that a specific requirement to produce or retain a specified number of wildlife piles is not addressed in the plan and currently not practiced extensively in the FSJ TSA. SFMP Indicator 6.6 requires the retention of coarse woody debris on harvested areas and recommends the retention of CWD in small piles and in dispersed patterns.	Yes
SFMP# 2 4.7 – Reforestation Strategy	Concern expressed regarding aerial herbicide spraying in the Graham or Cypress areas.	The Participants indicated that they will discuss any plans for harvesting or herbicide application in theses areas with the HRFN.	Yes
SFMP# 2 2.4 – First Nations Participation	The SFMP wording should be changed to reflect that there are now two first nation groups represented on the PAG.	The SFMP will be revised to reflect the # of First Nations represented on the PAG	YES
SFMP# 2 6.35 – Water Quality Concern Rating	Question asked if pre-development water quality samples were taken to determine forestry impacts on water quality. Suggested licensees need to	Described how the current water quality indicator is measured and monitored. Described the water quality monitoring project done in the Meadow Creek watershed (pre and post development), in which in-stream monitoring equipment was	N/a

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
	know what the current water quality is before you can ensure water quality is being protected.	employed to take several measures of water quality.	
SFMP# 2 6.50 - Coordination	Discussion revealed that this indicator allows for the analysis of cumulative forestry impacts. Interest expressed in meeting with the licensees to review this analysis.	Participants' indicated that this analysis would be coming out as part of the referrals of the new 6 year Forest Operations Schedule.	Yes
SFMP# 2 6.53 - Cut Control	Question was asked why 110% was used as the target.	Participants' responded that the target is consistent with the legislated 5 year cut control requirements.	N/a
SFMP# 2 6.48 - Summer and Fall Volume Deliveries	Question was asked where this volume comes from?	Participants' responded the volume can come from private wood purchases, BCTS or other licensee quota volume.	N/a
SFMP# 2 6.19 - Graham Merchantable Area Harvested	Question was asked regarding the purpose for the indicator?	Participants' responded the basic concept of the indicator is to ensure that there are planned levels of harvest and harvest sequencing that is consistent with Graham River Integrated Resource Management Plan. This will reduce negative long term impact on wildlife.	N/a
SFMP# 2 6.21 - MKMA Harvest	Question asked if there is a Caribou Strategy for the herds in the FSJ TSA?	Participants' responded that Indicator #16 deals with ungulate winter ranges and wildlife habitat areas, and that all the UWRs either approved or in draft status pertain to caribou. There are	N/a

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		general wildlife measures (best management practices) developed by Government and the licensees which guide management practices specific for caribou.	
SFMP# 2 6.10 - Noxious Weed Content	Question asked if native seed was used and if it would be used if readily available.	Participants' responded that the Managing Participants use certified seed mixes and would consider using native seed where readily available and appropriate.	N/a
SFMP# 2 6.23 - Value and Total Number of Contracts Awarded to First Nations	Concern was expressed if the Participants' would be identifying the value of contracts awarded to each First Nation.	Participants' responded that the indicator will provide a description of the total number of contracts awarded to First Nations generally and will not identify the number of contracts awarded to each individual First Nation.	N/a
SFMP# 2 6.56 - Conformance to Elements Pertinent to Treaty Rights	A question asked if there were any indicators that deal with the use of herbicide. General comment indicated that the use of herbicides is of great concern to the First Nations. The First Nations would like to see a commitment to reduce the use of herbicides. He acknowledged the need for herbicide use, especially in areas managed for conifer regeneration, but overall supports a	Participants' responded that there are currently no indicators in the draft SFMP that specifically relate to the use of herbicides. Herbicide practices are dealt with through the PMP process. It was pointed out that the clause in the MOA referenced by Lyle is specific to areas harvested under the deciduous licences managed by Canfor only. The use of herbicides in forest management has been proven to be a safe and effective tool for managing competing vegetation. The managing Participants' use of herbicides is strictly controlled through the pesticide	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
	trend to reduce dependence on herbicides.	management planning process. An annual treatment plan is developed each year. All blocks identified for herbicide application, are visited by staff to field verify that a herbicide treatment is required. Pesticide free zones are required on all water bodies, wildlife features and adjacent to known features of significance to First Nations. These reserves reduce the amount of area that is treated in each block. The type of herbicide that may be used is also strictly controlled. The net result of these restrictions is that the overall impact of herbicide use on habitat utilized by wildlife and areas used for the practice of cultural values such as berry picking is minimized, thereby minimizing the potential adverse impact on exercise of treaty rights. The Managing Participants, as noted in indicator 6.33, will offer to meet with First Nations to help First Nations review and understand the planned activities and practices of the Participants. These meetings will review all areas planned for herbicide treatment and will seek to identify specific areas of concern, as well as mitigating measures. Also, Indicator 6.57 requires the participants to address all traditional site specific aboriginal values, uses and features identified through discussions with First Nations as well as through the course of the participants completion of fieldwork activities.	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		These processes provide for: • discussion with First Nations to provide an understanding of the Participants' plans and practices, • discussion with First Nations to identify the areas of concern leading to discussions of the areas to be treated and those to be protected, and • a high degree of control on the use of herbicides to reduce impact to wildlife habitat. The Participants have included a new indicator # 57 Brushing Program Aerial Herbicide Use to in response to the comment. This indicator will report the number of hectares removed annually from the participants aerial herbicide plans based on input from First Nations or the public and final treatment layout.	
SFMP# 2 6.33 - First Nations Consultation and Information Sharing	Comment made that may be a gap that indicator 33 does not address. One step is referring plans to the First Nations, this is acknowledged as a legal requirement, but suggestion was made to include an indicator related to ensuring First Nations are given education so that	This indicator was revised to focus on the Managing Participants' efforts made to meet with and work with First Nations to help First Nations gain an understanding of the Participants management plans and practices. The Indicator description in the SFMP will reflect that the participants will provide opportunities to meet with affected First Nations to help First Nations	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
	they can better understand the plans (i.e. there should be more than just sharing information. Plans must be presented in such a way and/or training provided so that plans are understood by First Nations). It was suggested to incorporate into the existing indicator or develop another indicator to that would provide evidence of the Participant's efforts to provide opportunities to educate First Nations regarding the Participants forestry plans.	understand the Participants management plans and practices. This may be done by various means such as field trips, community meetings, JMAC meetings and workshops.	
SFMP# 2 6.57 - Number of Known Uses and Values Addressed in Operational Plans	Question asked if indicator 6.57 only requires Participants to address values made "known" during the review and comment periods. What about site-specific values that are not specifically made known during those periods that the licensees may encounter during fieldwork or First Nations may subsequently identify – for example mineral licks? It was suggested to expand the indicator target to include site-specific features encountered or made known outside plan review periods.	Using medicinal plants as an example, the Participants indicated that provided that First Nations have made the location of specific sites known to the Managing Participants, the areas would be addressed by our plans. Participants also noted that guidelines are used to identify tactics to deal with mineral licks and other features that are found by field staff conducting field activities (eg. buffers or WTPs are recommended to be anchored on wildlife and cultural heritage features). Participants' field staff are trained to recognize wildlife and cultural heritage features. Sandra Apsassin has provided Canfor's field staff with First Nations Cross Cultural Awareness training.	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input / Revision of SFMP
		This indicator was revised to reflect that the Participants will address cultural heritage values, uses and features identified during fieldwork activities as well as those traditional site specific aboriginal values and uses identified during reviews of the Managing Participants plans and practices.	
SFMP# 2 6.56 - Conformance to Elements Pertinent to Treaty Rights	It was requested that the reference to treaty rights be removed from the title of Indicator 56.	The Participants revised the title of Indicator 56 to remove the reference to treaty rights. Indicator 56 has been re-titled to "Maintenance of wildlife and fisheries habitat values".	Yes

Table 52: Public and Government Comments on SFMP# 3 and Preliminary SFMP# 2

SFMP Reference	Public and Government Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
	See Appendices 20 and 21	See Appendices 20 and 21	See Appendices 20 and 21

8.0 CHANGES IN REQUIREMENTS

The Participants must ensure that the Sustainable Forest Management Plan includes any applicable performance standards that are to be used for the purposes of Part 3 Division 5 and the associated Schedules.

8.1 REVISED FIELD PERFORMANCE REQUIREMENTS

8.1.1 Wildlife Tree Patch Retention Levels

In order to facilitate landscape level management on a common platform by all Participants, the 2004 SFMP proposed that WTP retention levels be consistent between Participants. The revision required a cumulative assessment of all identified WTP's in each landscape unit, in all blocks harvested since the inception of the *FSJPPR*. The basis for the establishment of targets was the process outlined in Table 20 (a) and (b) of the biodiversity guidebook, with modifications upwards in some landscape units to address lower forest management intensities, or minimum natural retention ranges outlined by Delong (2002)(see Appendix 14).

Pursuant to Section 35(5) of the *FSJPPR*, the approval of SMFP # 1, effective April 1, 2004 replaced the Applicable Performance Standard (APS) relating to wildlife trees and Wildlife Tree Patches in Section 29(1) of the *FSJPPR*, with the applicable performance standard as specified by the indicator statement, target statement, and acceptable variance in **Section 6.9 (Wildlife Tree Patches)** of that SFMP. This SFMP #3 proposes to continue the use of Section 6.9 as the APS, with no changes. The minimum targets continue as follows:

Landscape Unit	WTP %
Blueberry	6%
Halfway	3%
Kahntah	7%
Kobes	5%
Lower Beatton	8%
Milligan	6%
Tommy Lakes	3%
Trutch	5%
Sikanni	4%
Graham	4%
Crying Girl	6%

The WTP % applies to the cumulative percentage of all blocks logged under the *FSJPPR*, (irrespective of which Participant harvests the area) in each landscape unit, which will be reported in Annual Reports.

Equivalent Protection

This revised Applicable Performance Standard provides equivalent or better protection than the previous *FSJPPR* APS and Field Performance Requirements for the following reasons:

1. The average WTP minimum retention level is greater than the average WTP levels in the APS
2. Higher WTP retention levels are being proposed for the Kahntah, Lower Beatton, Milligan, Sikanni, Graham, Trutch and Crying Girl LU's, because table 20(b) was used to provide for less risk to biodiversity in these moderate and low forest management intensity zones.
3. Higher WTP levels than were calculated using Table 20(a) are also proposed for the Halfway and Tommy Lakes LU's, to increase the retention levels to a minimum 3%, consistent with the lower end of retention noted by Delong (2002).

4. Managing to one level for all Participants minimizes current issues related to which standard applies, as when different Participants harvest blocks immediately adjacent to each other.

Consistency with the Preamble to the Code

The development of a CSA-Z809/SFMP incorporating the six criterion and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources

The calculation of WTP retention levels is based on procedures outlined in the biodiversity guidebook. The only changes to the levels of retention relative to the biodiversity guidebook levels require increasing the retention levels, consequently the Participants believe this change to field performance requirements contributes to adequately managing and conserving forest resources.

8.1.2 Permanent Access Structures

In order to provide increased flexibility to increase road densities where needed due to site conditions, to encourage decreased densities where practical, and to reduce Participant and government paperwork arising from frequent Section 25 variance requests, the Participants believed it desirable to assess the amount of Permanent Access Structures (PAS) in cutblocks at a larger scale than block by block. SFMP # 1 revised the APS to:

"A maximum of 5% of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average."

Pursuant to Section 35(5) of the *FSJPPR*, the approval of SMFP # 1, effective April 1, 2004 replaced the Applicable Performance Standard (APS) relating to permanent access structures described in Section 30(1)(b) of the *FSJPPR*, with the applicable performance standard as specified by the indicator statement, target statement and acceptable variance in **Section 6.24 (Permanent Access Structures)** of that SFMP. This SFMP# 3 proposes to continue the use of Section 6.24 as the APS, with no changes.

Assessment Population

For the purposes of reporting performance under Indicator 24 Permanent Access, a 3 year rolling average is defined as a list of cutblocks that have completed harvesting by the Fort St. John Pilot Project Participants, in the 3 reporting years previous to the submission date of the annual report. The reporting periods run for the 12 months starting from April 1 to March 31 annually.

Equivalent Protection

This revised Field Performance Requirement provides equivalent or better protection than the APS included in the *FSJPPR* Field Performance Requirements for the following reasons:

The proposed maximum level of permanent access structures that will be constructed on the landbase and reported annually will provide equivalent protection to the current standard. The measurement process has been modified to be more reflective of the cumulative impact of

multi-block (quasi landscape level) than the previous individual block (stand level) measurements on permanent access structures.
The proposed maximum level of 5% for compliance purposes is less than the *FSJPPR* standard of 7%.

Consistency with the Preamble to the Code
The development of a CSA-Z809/SFMP incorporating the six criterion and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources
The calculation of permanent access structure levels has been modified to be more reflective of a multi-block approach versus a single block approach and the allowable percentages have been reduced. The definition of permanent access structures has not been modified and this new standard eliminates the need to request District Manager variances but requires that the Participants adhere to the new allowable percentage. Therefore the Participants believe this change to field performance requirements contributes to adequately managing and conserving forest resources.

8.1.3 Reforestation
Pursuant to Section 35(5) of the *FSJPPR* the Reforestation Strategy and related legal indicators in this SFMP proposes to revise the Field Performance Standards and related Schedules relating to reforestation requirements as outlined in the following sections.

8.1.3.1 Landscape Level Assessment of Coniferous and Deciduous Areas
Pursuant to Section 35(5) of the *FSJPPR*, the approval of the Reforestation Strategy in SFMP #1 effectively revised the Field Performance Requirements relating to reforestation of coniferous areas outlined in Section 32 and Schedule 'F' of the *FSJPPR*.
SFMP #3 proposes to extend this strategy to deciduous reforestation areas, now that the development of the deciduous volume compiler has been completed.
Pursuant to Section 35(5) of the *FSJPPR*, the approval of SFMP # 2, effective November 1, 2010, replaced the performance standard specified in *FSJPPR* sections 32(4), (5), (6), (8), and Sections 98 and 99 with the Applicable Performance Standards (APS) as specified by the indicator statements, target statements and acceptable variances applied to the Landscape Level Reforestation Strategy of that SFMP. This SFMP# 3 proposes to continue the use of the Landscape Level Reforestation Strategy and related legal indicators as the APS.
The SFMP # 3 Reforestation Strategy will apply to all coniferous and deciduous areas logged after November 15th, 2001. This will also apply to coniferous and deciduous areas with commencement dates before November 15th, 2001 if the Participant currently carries reforestation liability, and has submitted a statement to the District Manager that the cutblock(s) will be subject to the SFMP under Section 42 of the *FSJPPR*.

Appendix 6 includes details on crop tree requirements and stocking standards for coniferous, deciduous and mixedwoods areas. Following is a summary of changes to regulatory requirements.

8.1.3.2 Deciduous Stocking Requirements for Areas Outside of the Landscape Level Deciduous Assessment Population

Table C below, provides the applicable performance standard for stocking requirements to be used to assess the establishment of a well growing stand of crop trees on deciduous areas within cutblocks that are outside of the landscape level assessment population.

Table C- Deciduous Stocking Standards

Type of Area	Site	Min. # of Trees/ha (MSS) *	Minimum Height	Countable species BWBS/ESSF
Deciduous	Xeric-Submesic	4000	1.4 m	At (Pli max 15%)
Deciduous	Mesic-Subhydric	4000	1.4 m	At, Ac, (Ep, Pli, Sx to max 15%)

-Minimum strata size is 2 ha contiguous, or 20% of the area in blocks less than 10 ha[37]

-Well growing block assessments can be completed at anytime from 5 years to 15 years after harvest commencement[38]

-No TSS for deciduous

-Ac is only acceptable if not sprouting from a cut stump

Minimum inter tree distance for deciduous areas is 0.5 metres

These standards replace the requirements of Sections 32(4), (5), (6), and 98(1), (2) and (3) of the *FSJPPR* as they apply to deciduous areas outside of the landscape level assessment population. (see Section 6.29)[39].

[37] Consistent with the strata size definition in the FSJPPR

[38] Changed from FSJPP Regulation standard of 9 years minimum

[39] Disapplied Sections of the FSJPPR are fewer than in SFMP#1, as changes to Regulation deleted some sections.

8.1.3.3 Reforestation Landscape Level Strategy- Seed Use

The use of seed will be consistent with the indicator, target and acceptable variance of Indicator #13, found in Section **6.13 Seed Use**, which relies on the Chief Forester's Standards for Seed Use.

For the purposes of Section 35(5) of the *FSJPPR* this indicator statement, target statement and acceptable variance in Section **6.13 Seed Use** will be used to guide seed use, and will replace the requirements of Section 99 (Use of Seed) in Schedule 'F' of the *FSJPPR*.

8.1.3.4 Mixedwood Reforestation Stocking Guidelines

Mixedwood reforestation is a component of the Landscape Level Reforestation Strategy. The landscape level assessment of reforestation, however, as presented in Section 6.29, does not apply to intimate mixedwood areas at this time. The Participants' updated Mixedwood Management Guidelines is presented in Appendix 10. It is the intent of the Participants to move towards adapting the landscape level reforestation assessment to mixedwood areas, consistent with that employed on coniferous and deciduous areas. It is hoped that this will be completed during the term of this SFMP, at which time amendments to the SFMP may be proposed based on Peace District Managers letter dated June 1, 2006. The research paper by Farnden (2009) outlining a process to assess mixedwoods on a multiblock basis will form the basis of this adaptation (see Appendix 18). Farden (2009) survey methodology is new to this SFMP and the participants plan to test this survey methodology for mixedwoods.

In the interim, for the purposes of Section 32 (5) (a) (i) the applicable performance standards that will apply to all areas declared as intimate mixedwoods is presented in Appendix 6, Section 1.4.3 "Stocking Guidelines for Mixedwoods in the BWBS". These replace the requirements of Section 32(4), (5), (6) and Section 98(1), (2), and (3) of the *FSJPPR,* as those sections applied to mixedwood areas.

Mixedwood harvested areas that are not to be managed as intimate mixtures will be stratified into discrete conifer and deciduous areas, and will continue to be managed according to the conifer and deciduous standards outlined in this SFMP.

8.1.3.5 Appendix 6 Supplemental Reforestation Requirements

For the purposes of Section 35(5) of the *FSJPPR*, the following sections of Appendix 6 will be used to replace effected portions of Section 32 of the *FSJPPR*:

Appendix 6 Section 1.2 Crop Tree Requirements and Vegetative Competition replaces the requirements in 32(6)(a),(b),(d), and 98(1) Table A.

Appendix 6 Section 1.3 Minimum Inter tree distance replaces the minimum inter-tree distance requirements in Section 32(6)(d).

Equivalent Protection

This revised Field Performance Requirement and landscape level strategy provides equivalent or better protection than the current Field Performance Requirements for the following reasons:

The reforestation strategy allows trade-offs at the stand level to account for biodiversity and other non-timber values while still ensuring sustainability of the timber resource at the DFA level.
The reforestation strategy provides a landscape level measure of success that exceeds previous practice since landscape level summaries were not in place.

Consistency with the Preamble to the Code
The development of a CSA-Z809/02 SFMP incorporating the six CCFM criteria and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources
The revised Field Performance Requirements provide equivalence to current practice. The landscape level assessment of reforestation will provide an additional measure of the management and conservation of resources, and support feedback to improve silviculture practice.

8.1.4 Coarse Woody Debris
The Participants' objective is to manage CWD on a broad basis, as opposed to a block-by-block basis, in order to accommodate a high variability in CWD volumes between sites, in keeping with what research has indicated occurs in natural stands. Setting an overall minimum target of 46 m^3/ha CWD retention, that was 50% of average pre-harvest volume from preexisting plot, allows for variations above and below the target, is in keeping with natural variability reported in research .
Pursuant to Section 35(6) of the *FSJPPR*, the approval of SMFP # 1, effective April 1, 2004 replaced the Applicable Performance Standard (APS) relating to coarse woody debris in Section 29(2)(b) of the *FSJPPR*, with the applicable performance standard as specified by the indicator statement, target statement and acceptable variance in **Section 6.6 (Coarse Woody Debris)** of that SFMP. This SFMP# 3 proposes to continue the use of Section 6.6 as the APS, with no changes.

Rationale
Previously the *FSJPPR* requirement was as follows:
"For each calendar year, at least 50% of the estimated total amount of pre-harvest coarse woody debris remains among cutblocks in which harvesting was completed that year."
The proponents propose to utilize defensible information on the actual retention rates of CWD at the DFA level by proposing the following revision to the requirement.
Using the systematic DFA grid being implemented as part of the monitoring effectiveness program, the minimum average CWD retention level will be 46 m^3/ha, as determined from plot information collected between December 1st, 2016 and November 30th, 2022 on *FSJPPR* harvested blocks.

This is 50% of the estimated average pre-harvest CWD (92 m^3/ha) on blocks proposed for logging, which was determined from pre-harvest CWD volumes from NIVMA research plots in the Fort St. John TSA (see SFMP # 1, section 6.6).

Equivalent Protection

This Field Performance Requirement provides equivalent or better protection that the *FSJPPR* APS and Field Performance Requirements for the following reasons:

The revised average pre-harvest level of 92 m^3/ha is based on the best available information of pre-harvest CWD in the Fort St. John TSA.

There is a defined process in place to systematically measure a sample of actual post harvest CWD retention levels, which will allow DFA comparisons of average post harvest CWD levels.

Consistency with the Preamble to the Code

The development of a CSA-Z809/02 SFMP incorporating the six CCFM criteria and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources

The basic premise of retaining at least 50% of CWD is unchanged, as the primary objective of the change is to provide specific measurable targets that can be efficiently measured during other monitoring activities. Allowing for block-by-block variation is consistent with the natural variation in CWD between stands that was noted in the NIVMA plots in the Fort St. John TSA, as well as in other CWD research projects.

Consequently the Participants believe this change to field performance requirements contributes to adequately managing and conserving forest resources.

8.1.5 Riparian Reserve Strategy

The Riparian Reserve strategy, and the related indicator # 7 (**see Section 6.7 Riparian Reserves**) is consistent with the requirements of the *FSJPPR*. The variance to this indicator allows a qualified registered professional to prescribe harvest in riparian reserves, subject to the conditions outlined in a variance request acceptable to the District Manager.

For the purposes of Section 35(5), Section 28(1) (b) (i) (A) of the *FSJPPR* may be affected by the application of this Riparian Management Strategy, specifically the acceptable variance to this indicator.

Equivalent Protection

This strategy provides equivalent protection to the *FSJPPR* APS and Field Performance Requirements for the following reasons:

The conditions which would allow the Participants to propose harvesting in riparian reserves are restricted to extraordinary situations where other resource values may be at risk and those identified in the *Forest Planning and Practices Regulation* section 51, and would still require a rationale by a qualified registered professional to identify why some harvesting is proposed in the riparian reserve, and how the riparian values are to be protected to the extent practicable.

Consistency with the Preamble to the Code

The development of a CSA-Z809/02 SFMP incorporating the six CCFM criteria and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources

The basic premise is to maintain riparian reserves except in the rare instance when other highly valued resources may be at risk if harvesting does not occur. Measures will also be identified to minimize the impacts on the riparian values in those instances. Allowing some flexibility to address serious issues such as forest health through some limited harvesting may actually reduce natural mortality in reserve areas. It therefore may have a net benefit to the broader riparian resource values. Consequently the Participants believe this change to these requirements contributes to adequately managing and conserving forest resources.

8.1.6 Visual Quality Strategy

The Visual Quality Strategy and the related indicator # 41 (**see Section 6.41 Visual Quality Objectives)** is consistent with the requirements of the *FSJPPR*, but does allow qualified professionals the option, in exceptional circumstances, to prescribe harvesting that may not be consistent with established visual quality objectives subject to the conditions outlined in a variance acceptable to the District Manager. Under those specific conditions, the variances acceptable to the District Manager will allow the activities of the Participants to not be consistent with visual quality objectives when other high value resources are at risk. The Participants will notify the Ministry of Forests, Lands and Natural Resource Operations regarding proposed variances at the time of harvest authorization request.

For the purposes of Section 35(5), Section 28(1) (c) of the *FSJPPR* may therefore be affected by the application of this Visual Quality Strategy, specifically the acceptable variance for this indicator.

Equivalent Protection

This strategy provides equivalent protection to the *FSJPPR* APS and Field Performance Requirements for the following reasons:

The variance, which may allow a qualified professional to prescribe harvesting that may not be consistent with a visual quality objective, is restricted to extraordinary situations where other resource values may be at risk, and still requires a rationale by a professional to identify why some harvesting is proposed, and how the visual impacts are to be mitigated to the extent practicable.

Consistency with the Preamble to the Code

The development of a CSA-Z809/02 SFMP incorporating the six CCFM criteria and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources

The basic premise is to be consistent with the visual quality objectives except in the rare instance when other highly valued resources may be at risk if harvesting does not occur. In those instances, measures will also be identified to mitigate visual impacts due to the harvesting. Allowing some flexibility to address serious issues such as forest health through some limited harvesting may reduce natural mortality in the visual quality polygon or adjacent visually sensitive areas. It may therefore have a net long-term benefit to the visual resources in the specific polygon, and on visual resources in adjacent areas by reducing long-term mortality due to forest health agents. Consequently the Participants believe this change to these requirements contributes to adequately managing and conserving forest resources.

8.2 Revised Forest Operations Schedule Requirements

The timber harvesting strategy includes a legal indicator for the completion of a joint Forest Operations Schedule (FOS) that encourages coordinated forestry operations, and efficiencies in forest planning and consultation. Further to Section 79 of the *FSJPPR*, changes can be made to Schedule C, which outlines the Forest Operations Schedule requirements, if the SFMP provides that the information requirement should no longer apply.

The following changes to Schedule C requirements for FOS content (highlighted in red text) are proposed to achieve efficiencies in the preparation, administration, and implementation of the FOS:

Map and Information Requirements Sections

The following parts of Section 81 map and information requirements are proposed to be deleted from the requirements of the FOS:

Section 81 (1) (a) forest cover (delete). Seral stage theming will continue to be shown on the maps (similar to the 2004 FOS), but forest cover polygons and labels will not be required. This will reduce map clutter, yet still provide an overall landscape indication of conifer and deciduous seral stage distribution outside of the cutblocks. The FOS will also have analysis information on the plan's seral stage distribution impacts (indicator #2, Section 6.2)

Section 81 (1)(c) (xii) and (xiii) Fish streams, riparian class of streams, wetlands and lakes (delete),

Riparian classifications are not completed until field layout is done, at which time changes to blocks or roads may be made to conform to existing regulatory and SFMP requirements. Streams, wetlands and lakes locations will still be shown as required in Section 81(1)(b).

Section 81 (1)(e) (i): delete the requirement to show the approximate location of roads and bridges. So section (81) (e) (i) would read "proposed construction of a road".

Section 81 (1)(e) (ii) (iii) (iv) - delete the requirement to show proposed replacement or construction of bridges and major culverts. This is a continuation of a change implemented in the 2004 SFMP (#1). Waterbodies will be depicted on maps, and legal requirements regarding crossings will still apply. This provides the flexibility to determine crossing type at the time of field layout, rather than during the FOS development, and will reduce the number of amendments required.

Section 81 (1)(g) - delete this subsection entirely (i, ii, iii, iv). This will delete the requirement to show current and future temporary or semi permanent deactivation. This is a continuation of a change implemented in the 2004 SFMP (#1). With multiple industries operating on the same landbase, road deactivation status changes continually in an unpredictable manner, so attempting to map road deactivation status has little value.

It is proposed that the following requirement be added to Schedule C:

Section 81 (1)(e) (v): The Participants may choose to declare in a Forest Operations Schedule that all existing non status roads within the Fort St. John TSA are considered to be identified in the FOS as roads for the purposes of Section 23(2), even though they may not be individually referenced or delineated in the text or on maps in the FOS.

Many roads exist or are being built that do not have an owner, and may be not be constructed, or known to the Participants at the time of the FOS. Section 23(2) requires roads to be identified in a FOS for a Participant to get an authorization to build or use road. This section originally envisioned all roads either being constructed by the Participants and therefore being shown in the FOS, or having a third party owner that would allow the Participants to legally use the road through road use agreements. The provision has resulted in administrative costs and delays for both the government and the Participants in amending FOS's to show existing non-status roads in order to authorize the Participants to use of the road.

Declaring all non-status roads as being 'identified' in the FOS, even though they may not be specifically shown, will reduce administrative burdens for all parties. As the roads already exist, and legal requirements that come with road use will still apply, environmental and other resource values will be maintained. The existing road will, in many cases, replace an unconstructed proposed FOS road that would no longer be needed, thereby potentially reducing environmental impacts.

Section 81 (1)(e) (vi): Provided the Participants have, during the review and comment period, specifically requested review and comment from First Nations, stakeholders, and the public for a specifically identified area immediately adjacent to proposed cutblocks in any Forest Operations Schedule or previous Forest Development Plan, any existing or proposed roads within that specified area will be considered to be identified in the FOS as roads for the purposes of Section 23(2), even though they may not be individually referenced or delineated in the text or on maps in the FOS.

8.3 Recommendation to Revise Select Sections of the FSJPPR

In order to provide for future administrative efficiencies, the Participants recommend that Government consider revising the requirements of the following sections of the *FSJPPR.*

Clarification of FOS General Content Section- Section 80(3) and (4)

Section 80(3) of the *FSJPPR* currently states that *"A forest operation schedule must be signed and sealed by a professional forester"*. Numerous amendments are made to the FOS that, under Sections 83(3) and 83(4), do not require notice, as they are considered of a minor nature and do not significantly change the objectives or results.

The Participants recommend that Government consider revising the requirements of Section 80(3) of the *FSJPPR* to the following:

"A forest operations schedule and an amendment to a forest operations schedule subject to Sections 83(1) and 83(2) must be signed and sealed by a registered professional forester. Amendments subject to Section 83(3) and (4) not requiring notice may be prepared by a qualified registered professional other than a registered professional forester."

Section 80(4) requires Participants to sign the FOS. Some Participants, through Memorandums of Agreement or similar legal agreements, have effectively delegated that responsibility to other Participants. Furthermore, minor amendments not requiring notice may be submitted by one Participant after consulting with another, and the Participants have no need to each sign these minor amendments. For greater clarity, we are proposing the following change to this section; 80(4): "*A forest operations schedule or amendment that requires notice subject to Section 83(1) submitted to government must be signed by the Participant or a party acting on behalf and with the consent of the Participant (e.g. 'Managing Participant')*".

Notice Requirement Revisions

It is desirable to minimize the requirement to provide notifications of FOS amendments that are very unlikely to impact individuals or stakeholders, or compromise the achievement of the strategic objectives of the SFMP, or government agencies. Provided that the aforementioned review and comment of the FOS has requested comments on areas adjacent to or in proposed cutblocks, and no site specific comments from the public, First Nations, or government agencies were received concerning an area, the following change to the notice requirements of Section 83(4)(c) is proposed:

a) Delete the requirement of 83(4)(c)(i) to provide notice of amendments for block changes within the riparian management zone of streams that have a classification of S1, S2, S3, or S4. Streams are already well protected through the Riparian Management Landscape Level Strategy. The FOS review and comment will have previously identified any specific concerns adjacent to cutblocks that must be dealt with by the Participants if a block boundary is extended slightly. Minor changes to boundaries often occur, and these changes may easily encompass an additional portion of a riparian management zone, simply because a stream exits the cutblock perpendicular to a boundary. Requiring notice of these types of amendments, even though the areas adjacent to blocks have already been through a review and comment process, is administratively burdensome to both government and the Participants.

b) Amend the requirement of 83(4)(c) (iii), from *"(iii) a wildlife tree patch"*, to read *"a wildlife tree patch, other than one that a qualified registered forest professional determines represents a forest health risk (e.g. due to mountain pine beetle or spruce beetle infestation)."*

Blocks have already received a public review and comment process, so the Participants are aware of any concerns, including wildlife issues, in an area. The current infestation of pine beetle has resulted in some WTP's being heavily attacked, and a failure to address the forest health issue in some of these areas can pose a serious threat to surrounding timber. Wildlife tree patch levels are managed at the landscape level, and provided a forester has duly considered the implications to the WTP indicator, and any site specific concerns that were raised in a block which might override forest health concerns, the requirement for additional notice is onerous, and may result in forest health issues not being addressed in a timely manner.

FSJPPR 23.1 Information Required Before Requesting and Authorization (Reforestation Declaration)

Since the advent of RESULTS submissions, the submission of written declarations to the MFLNRO is redundant. We suggest that the process of submitting reforestation declarations should be made flexible to allow submission of the declarations by way of the reforestation information submitted through RESULTS. Consequently this would eliminate the formal written submission of reforestation declarations to the District Manager.

The requirement to identify the reforestation standards that will apply to areas within blocks is recommended to be completed through the formal submission of this information in RESULTS, taking the place of formal (written) declarations. The submission of reforestation standard information into RESULTS would constitute the declaration.

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Appendix 1: Sustainable Forest Management Policies

Sustainable Forest Management Policies

BC Timber Sales

On April 1, 2003 BC Timber Sales replaced the Small Business Forest Enterprise Program (SBFEP) with a mandate to provide the cost and price benchmarks for timber harvested from public land in British Columbia. Through 12 Business Areas and an operational presence in 33 locations, BCTS manages some 20 percent of the provincial Crown allowable annual cut.
BCTS has four business goals. Guided by the overriding principles of safety and sound forest management, BCTS:

1. Is a high performing organization with skilled, motivated and proud people.
2. Provides a credible reference point for costs and pricing of timber harvested from public land in B.C.
3. Provides a reliable supply of timber to the market, through open and competitive auctions - subject to meeting the requirements of cost and price referencing as stated in Goal 2.
4. Maximizes net revenue for the province – subject to the requirements of cost and price referencing as stated in Goal 2 and supplying timber for auction as stated in Goal 3.

Sound forest management is a high priority for British Columbians and central to the BCTS mandate. BCTS is the largest tree planter in British Columbia, with 199 million tree seedlings planted in its first five years. The commitment to forest management excellence includes achieving and maintaining certification of an Environmental Management System in all Business Areas under the International Organization for Standardization (ISO 14001) and achieving Sustainable Forest Management (SFM) certification over three-quarters of its operating areas.
The foundation of the ISO 14001 certification is the Environmental Management System (EMS). BCTS developed and implemented an EMS for the Peace-Liard Business Area in 2004 and achieved ISO certification in 2005. In 2009 BCTS moved towards a single certificate approached and currently maintains one EMS and one ISO certification for all TSO's across British Columbia
In July 1999 the Fort St. John small business program formally announced its commitment to participate in a pilot project within the Fort St. John Timber Supply Area along with several other major licensees in an effort to develop a more streamlined forest management approach. This commitment included its full participation as an equal partner in the development and management of a Sustainable Forest Management Plan to the Canadian Standards Association Z809-02 Sustainable Forest Management (SFM) standard. BCTS participation in the Fort St. John Pilot Project continued through the term of the first SFMP and will continue throughout this plan. BCTS is committed achieveing the expectations our EMS this SFMP and the attached Sustainable Forest Management Policy.
BCTS will ensure that our actions and decisions contribute to an equitable, safe, healthy and satisfying work environment and that our operations are conducted in a manner that will not jeopardize human health and safety and commit to maintaining an excellent safety record.

BC Timber Sales

SUSTAINABLE FOREST MANAGEMENT POLICY

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

It is the policy of BC Timber Sales to:

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

Provide public participation opportunities.

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

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

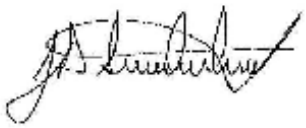
Maintain an organizational culture where all staff proactively participate in providing conditions and safeguards for the health and safety of staff, clients and the public.

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

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

Promote awareness of SFM to our clients and the public.

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



Jim Sutherland, RPF **February 5, 2010**
Director of Forestry
BC Timber Sales

Canfor

In July of 1999 Canfor formally announced its commitment to seek sustainable forest management certification of the company's forestry operations under the Canadian Standards Association Sustainable Forest Management (SFM) standard. The Sustainable Forest Management Plan presented here and its implementation is intended to fulfill that commitment for Canfor's Fort St John operation.

As a preparatory step to sustainable forest management certification, Canfor developed an environmental management system (EMS) for the company's woodlands operations. In December 1999 this environmental management system was certified to the ISO 14001 standard developed by the International Organization for Standardization. The Company EMS provides a platform on which to build the sustainable forest management elements required to meet the CSA SFM standard.

The management of Canfor has set out a number of commitments which define the mission, vision, policies and guiding principles for the company. These include the Canfor Mission, Environment Policy and Forestry Principles. These commitments have been used to enable and guide the development of this Sustainable Forest Management Plan, and also commit us to the continual improvement of our performance in implementing the plan under the principle of adaptive management.

Canfor's Environment Policy includes a commitment to "create opportunities for interested parties to have input to our forest planning activities". The CSA SFM standard requires that sustainable forest management planning be carried out in consultation with those directly affected by or interested in forest management on the defined forest area (DFA). Our Environment Policy commitment has been interpreted and extended to include the involvement of the public in the setting of local values, objectives, indicators and targets for the purpose of developing a plan to achieve and maintain sustainable forest management on the DFA. The Environment Policy and Canfor’s Forestry Principles also include the opportunity for participation by Aboriginal peoples with respect to their rights and interests in SFM on the DFA. The Fort St John Results Based Pilot Project Public Advisory Group is the body that has provided this input.

Additionally Canfor, acting on behalf of Cameron River Logging, Tembec, and as the woodlands manager of the joint venture licence with Dunne-za LP (West Moberly First Nation) and with Louisiana-Pacific Canada, will manage the respective Fort St John licences and Pulpwood Agreements in accordance with Canfor’s SFM commitments.

Canfor's Mission

We will be a highly successful competitor in the global forest products industry, managing with integrity the resources entrusted to our care.

We will be characterized by:

- Employing and developing highly motivated, empowered and committed people who enjoy their work.
- Consistently satisfying customer needs with quality products and services
- Enhancing the forest resource, ensuring responsible stewardship of the environment, and protecting human health and safety.
- Encouraging, recognizing and rewarding excellence in all our endeavours, with an emphasis on innovation and results.
- Increasing value for shareholders.

We will be guided by the core values of integrity, trust, openness and respect for people.

ENVIRONMENT POLICY

We are committed to responsible stewardship of the environment throughout our operations.

We will:

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

Don Kayne
President and Chief Executive Officer

Ronald L. Cliff
Chairman

May 2011

CANFOR

Canadian Forest Products
Sustainable Forest Management Commitments - May 2012

Sustainable Forest Management
We will manage forests to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of current and future generations. In the management of forests we will honour relevant international agreements and conventions to which Canada is a signatory.

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

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

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

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

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

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

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

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

Timber Resource

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

Forest Land Base

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

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Don Kayne



President and Chief Executive Officer
May 2012

Louisiana-Pacific Canada Ltd.

Corporate Policy on Protection of the Environment

Louisiana-Pacific Corporation is committed to a healthy environment worldwide by taking a leadership role in our communities to be good neighbors. Our Corporate Policy on Protection of the Environment is a statement of our environmental goals. We believe that sound business practices and efforts to enhance the environment are compatible. Therefore, Louisiana-Pacific strives to:

Meet or surpass the requirements of environmental laws and regulations and to improve the environment.

Manage natural resources in a responsible and sustainable manner.

Be environmentally conscious stewards of the land.

Meet, as verified by third-party audits, the principles recommended to foster multiple-use and the sustainability of world forest resources.

Conserve non-renewable resources through efficient use and careful planning.

Properly manage and minimize waste through pollution prevention programs

Continuously improve environmental programs.

What Is an Environmental Management System (EMS)?

Unlike regulations, which impose requirements on organizations from the outside, an environmental management system is a voluntary action generated from within a business or industry. The intent of EMS is organizing environmental requirements in such a way that they are well understood and become integrated into routine practices. It is a collection of internal policies, plans and procedures, that, when implemented, provide significant benefits for the organization.

Our Environmental Management System Empowers Our People.

LP has built an environmental management system that is unique to our industry. Our exceptional system taps the ingenuity, resourcefulness, and innovation of LP's employees, enabling them to make decisions about how best to protect the environment.

Objectives for Sustainable Forestry on LP Forests

- **LP will strive to broaden the practice of sustainable forestry by employing an array of scientifically, environmentally, and economically sound practices in the growth, harvest, and use of forests.**
  1. **Develop policies, programs and plans to implement and achieve the sustainable forestry standard principles and objectives.**
  2. **Individually, through cooperative efforts, or through American Forest & Paper Association (AF&PA), provide funding for forest research to improve the health, productivity, and management of all forests, as well as to better understand the role of managed forests in sequestering carbon.**
  3. **Provide public recreational and educational opportunities where consistent with forest-management objectives.**
  4. **Ensure that long-term harvest levels are sustainable and consistent with appropriate growth and yield models and written plans.**
- **LP will strive to ensure long-term forest productivity and conservation of forest resources through prompt reforestation, soil conservation, afforestation and other measures.**
  1. **After final harvest, reforest by planting or by direct seeding within two years, or by planned, natural-regeneration methods within five years.**
  2. **Promote state-level reporting of the overall success rates of reforestation and afforestation.**
  3. **Use forest chemicals prudently, following all applicable label requirements Best Management Practices (BMP's). Meet or exceed the laws and regulations concerning the use of fertilizers, herbicides and other forest chemicals to improve forest health and productivity, while protecting employees, neighbors, the public and the forest.**
  4. **Implement management practices to protect and maintain forest and soil productivity.**
  5. **Protect forests from damaging agents such as wildfire, pests, and diseases in order to maintain and improve long-term forest health and productivity.**
  6. **When utilizing genetically improved seedlings, including those derived through biotechnology, the company will use sound scientific methods and follow all appropriate federal and state regulations and other internationally applicable protocols.**

- **LP will strive to protect the water quality in streams, lakes, and other bodies of water by implementing riparian protection measures based on soil type, terrain, vegetation, and other applicable factors.**
  1. **Use Best Management Practices (BMP) developed under the Environmental Protection Agency (EPA)-approved state water-quality programs. Meet or exceed all applicable state water-quality laws and regulations, as well as the requirements of the federal Clean Water Act.**
  2. **Develop (where they do not currently exist), implement, and document riparian protection measures for all perennial streams and lakes. Involve experts at the state level to help identify goals and objectives for riparian protection.**

3. **Individually, through cooperative efforts or through the AF&PA, provide funding for water quality research.**
4. **Require BMP employee training in woodland management and wood procurement operations. Encourage training for forest management and harvesting contractors.**

- **LP will strive to manage the quality and distribution of wildlife habitats and contribute to the conservation of biological diversity by developing and implementing stand- and landscape-level measures that promote habitat diversity and conservation of forest plants and animals.**
  1. **Enact policies and programs promoting habitat diversity at stand and landscape levels.**
  2. **Individually, through cooperative efforts or through the AF&PA provide funding for research to improve the science and understanding of wildlife management at stand or landscape levels, ecosystem functions, and the conservation of biological diversity.**
  3. **Apply knowledge gained through research, science, technology and field experience to manage wildlife habitat and contribute to the conservation of biological diversity.**
- **LP will strive to manage the visual impact of harvesting and other forest operations.**
  1. **Enact policies and programs to manage the impact of harvesting on visual quality.**
  2. **Develop and adopt appropriate policies for managing the size, shape, and placement of clear-cut harvests. The average size of clear-cut harvest areas shall not exceed 120 acres, except when necessary to respond to forest health emergencies or other natural catastrophes.**
  3. **Adopt a "green up" requirement, under which past clear-cut harvest areas must have trees at least 3 years old or 5 feet high at the desired level of stocking before adjacent areas may be clear-cut; or adopt other, more comprehensive methods that provide age, habitat, and aesthetic diversity.**
  4. **Use harvest methods, age classes and judicious placement of harvest units to promote diversity across the forest landscape.**
- **LP will strive to manage the visual impact of harvesting and other forest operations.**
  1. **Identify special sites and manage them in a manner appropriate to their unique features. We will cooperate with organizations that have expertise in protecting special sites for advice on how these lands can best be managed to maintain their unique character.**
- **LP will strive to promote the efficient use of forest resources.**
  1. Use appropriate forest harvesting technology and practices to minimize waste and ensure efficient utilization of trees harvested while being consistent with other SFI objectives.

Objectives for Sustainable Forestry in the Procurement of Wood and Fiber From Wood Producers and Landowners

- **LP will strive to broaden the practice of sustainable forestry by collaborating with forest landowners, wood producers, consulting foresters, and LP employees who have responsibility in wood procurement and landowner assistance programs.**
  1. **By providing information on the environmental and economic advantages of our practices, encourage landowners to reforest following harvest and to use Best Management Practices.**
  2. **Work closely with state logging and/or state forestry associations, appropriate agencies and others in the forestry community to promote the professionalism of wood producers by establishing state groups (where none exist) and by cooperating with existing state groups to promote the training and education of wood producers in:**
  3. **Awareness of sustainable forestry principles**
     a. **Using best management practices, including road construction and retirement, site preparation, streamside management, etc.**
     b. **Regeneration, forest resource conservation and aesthetics**
     c. **Awareness of responsibilities under the Endangered Species Act and other measures to protect wildlife habitat**
     d. **Logging safety**
     e. **OSHA and wage and hour rules**
     f. **Transportation**
     g. **Business management**
     h. **Public policy and outreach**
     i. **Support and promote efforts of state groups to sponsor training and education programs for wood producers, employees involved in procurement and landowner assistance and contractors.**
  4. **Annually report:**
     a. **The number of landowners who receive information about the SFI program, forest regeneration, BMP, and wildlife habitat management from contractors, LP employees.**
     b. **The percentage of wood delivered by qualified logging professionals.**
  5. **Encourage landowners to utilize the services of qualified resource professionals and qualified logging professionals in applying principles of sustainable forest management on their lands.**
  6. **Ensure that their commitment to the sustainable forestry standard principles is communicated throughout their organizations — particularly to mill and woodland managers, wood procurement operations and field foresters.**
  7. **Support and promote efforts by consulting foresters, state and federal agencies, state groups and programs such as the American Tree Farm System®, to educate and assist forest landowners encouraging them to apply principles of sustainable forest management.**
  8. **Clearly define and implement our own policies, programs and plans to ensure that mill inventories and procurement practices do not compromise adherence to the Principles of Sustainable Forestry.**

Objectives for Public Reporting and Involvement in the Practice of Sustainable Forestry

- **Publicly report our progress in fulfilling our commitment to sustainable forestry.**

- **By providing information on the environmental and economic advantages of our practices, encourage landowners to reforest following harvest and to use Best Management Practices.**
- **Provide opportunities for the public and the forestry community to participate in the commitment to sustainable forestry.**
  1. **Support and promote, at the state or other appropriate levels, mechanisms for public outreach, education and involvement related to forest management, such as, 800 numbers, environmental education, and/or private and public sector technical assistance programs.**
  2. **Support and promote, at the state or other appropriate levels, procedures to address concerns raised by loggers, consulting foresters, employees, the public or Program Participants regarding practices that appear to be inconsistent with the sustainable forestry standard principles and objectives.**

Objectives for Continual Improvement in the Practice of Sustainable Forestry

- **Promote continual improvement in the practice of sustainable forestry and monitor, measure and report performance in achieving the commitment to sustainable forestry.**
- **Establish a management review system that examines findings and progress in implementing the SFI program and policies and make appropriate improvements in policies and plans, and inform their employees of changes.**

Appendix 2: Sustainable Forest Management Indicator Matrix

55 CSA Matrix[40] Fort St. John Pilot Project SFM Matrix

The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements
The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with DFA.

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 1 – Conservation of Biological Diversity						
Conserve biological diversity by maintaining integrity, function and diversity of living organisms and the complexes of which they are part, including ecological elements that contribute to cultural values						
Element 1.1 – Ecosystem Diversity Conserve ecosystem diversity at the stand and landscape level by maintaining the variety of communities and ecosystems that naturally	**Ecosystem Diversity**	**Maintain the diversity and pattern of communities and ecosystems within a natural range**	**1.1.1 – Ecosystem area by type.**	67 – Rare Ecosystems	Percentage of the area of rare ecosystem groups reserved from harvest	100% of the area of rare ecosystem groups will be reserved from harvest
				17 – Representative Examples of Ecosystems	Percentage of area of forest stands in an unmanaged condition, by leading species, by NDU	100% of baseline targets for forested stands in an unmanaged condition, by leading species, by NDU will be met

[40] matrix number reflects the PAG meeting at which it was approved.

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
occur in the DFA. Establish forest plantations only in afforestation projects.			**1.1.2 – Forest area by type or species composition.**	1 – Forest Types	Percent distribution of forest type (deciduous, deciduous mixedwood, conifer mixedwood, conifer) >20 years old by landscape unit	All forest type groups by landscape unit will meet or exceed the minimum area percentage in table 9
				28 – Species Composition	Relative change in plantation composition versus harvest composition for spruce and pine	The relative proportion of spruce and pine planted annually will equal the proportions harvested annually (excluding fill planting)
			1.1.3 – Forest Area by seral stage or age class.	2 – Seral Stage	The minimum proportion (%) of late seral forest by NDU	The minimum proportion (%) of late seral forest by NDU as identified in table 11 will be met
				3 – Patch Size	Percent area by Patch Size Class (0-50, 51-	A minimum of 9 of 18 of the baseline targets for early

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					100, and >100 ha) by NDU	patches will be achieved during the term of this SFMP
			1.1.4 – Degree of within-stand structural retention.	5 – Snags / cavity Sites	Number of snags and/or live trees (>23 cm dbh) per ha on prescribed areas	Retain annually an average of at least 6 snags and/or live trees (>23cm dbh) per hectare on prescribed areas
				9 – Wildlife Tree Patches	Cumulative Wildlife Tree Patch percentage in blocks harvested under the FSJPPR in each Landscape Unit	Cumulative Wildlife Tree Patch % will meet or exceed the minimum target in each LU (Blueberry 9%, Halfway 6%, Kahntah 5%, Kobes 8%, Lower Beatton 3%, Milligan 4%, Tommy Lakes 8%, Trutch 5%, Sikanni 4%, Graham 4%, Crying Girl 3%)
Element 1.2 – Species	**Species Richness**	**Suitable habitat elements for**	**1.2.1 – Degree of habitat protection**	5 – Snags / Cavity Sites	See indicator # 5	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
Diversity Conserve species diversity by ensuring that habitats and forest conditions for the native species found in the DFA are maintained through time, including habitats for known occurrences of species at risk.		**indicator species. Maintain habitats for species at risk**	**for selected focal species, including species at risk. ---------- 1.2.2 – Degree of suitable habitat in the long term for selected focal species, including species at risk.**	6 – Coarse Woody Debris Volume	Average retention level of Coarse Woody Debris volume/ (m^3/ha) on blocks logged in the DFA between December 1, 2008 2016 and November 30, 2016 2022	Average retention level over the DFA will be at least 46 m^3/ha (50% of average pre-harvest volume) on harvested blocks assessed between December 1, 2016 and November 30, 2022
				7 – Riparian Reserves	The number of non-compliances to riparian reserve zone standards	No non-compliances to riparian reserve zone standards
				8 – Shrubs	The proportion of shrub habitat (%) by Landscape Unit	Each landscape unit will meet or exceed the baseline target (%) proportion of shrub habitat
				9 – Wildlife Tree patches	See indicator # 9	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				11 – Species at Risk Stand Level Management Guidelines	The percentage of SLP's prepared annually for 'effected' cutblocks that incorporate one or more stand level species at risk management guidelines	100% of SLPs prepared annually for effected cutblocks will incorporate one or more species at risk management guidelines
				16 – Ungulate Winter Ranges, Wildlife Habitat Areas & MKMA	Proportion of activities consistent with the objectives of the Muskwa-Kechika Management Area (MKMA), and general wildlife measures for Ungulate Winter	All pilot Participant activities will be consistent with the objectives of the MKMA, and general wildlife measures for Ungulate Winter Ranges and Wildlife Habitat Areas
				17 – Representative Examples of Ecosystems	See indicator # 17	
			1.2.3 – Proportion of regeneration	10 – Invasive Plants /	The % prohibited and	Seed mix analyses will have

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			comprised of native species.	Noxious Weeds	primary noxious weeds, and known invasive weed species of concern, in seed mix analysis	0% content of prohibited and primary noxious weeds and known invasive plants, as identified in the most current publication of: "Listing of Invasive Plants", available from the Peace River Regional District
				13 – Coniferous Seeds	The percentage of seedlings and vegetative material used and planted in accordance with the Chief Forester's Standards for Seed Use (Nov.20, 2004) as amended from time to time	100% of seedlings and vegetative material will be used and planted in accordance with the Chief Forester's Standards for Seed Use (Nov.20, 2004), as amended from time to time
				14 – Aspen Regeneration	% natural regeneration of deciduous	100% natural regeneration for deciduous

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
Element 1.3 – Genetic Diversity Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically engineered trees	**Genetic Diversity**	**Conserve genetic diversity of tree stock**	**Non-Core**	13 – Coniferous Seeds	See indicator # 13	
				14 – Aspen Regeneration	See indicator # 14	
Element 1.4 – Protected areas and sites of special biological, geological, heritage or cultural significance Respect protected areas identified through	**Protect areas and Conservation Emphasis areas, for example Special Management Zones, Ecological Reserves, etc**	**To have representative areas of naturally occurring and important ecosystems and rare physical environments protected at both the broad and site-**	**1.4.1 –Protection of sites of special significance.** ---------- **1.4.2 – Proportion of identified sites with implemented management strategies.**	15 – Class A Parks, Ecological Reserves & LRMP Designated Protected Areas	Hectares of forestry related harvesting or road construction within Class A parks, protected areas, ecological reserves, or LRMP designated protected areas	Zero hectares of forestry related harvesting or road construction within Class A parks, protected areas, ecological reserves, or LRMP designated protected areas

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
government processes. Co-operate in broader landscape management related to protected areas and sites of special biological or cultural significance. Identify sites of special biological, geological, heritage, or cultural significance within the DFA, and implement management strategies appropriate to their long-term maintenance.		**specific levels across or adjacent to the DFA.** **Management strategies address important values in SMZ areas**		16 – Ungulate Winter Ranges, Wildlife Habitat Areas & MKMA	See indicator # 16	
				17 – Representative Examples of Ecosystems	See indicator # 17	
				18 – Graham Harvest Timing	The number of clusters in the Graham IRM Plan area where active operational harvesting is concurrently occurring	Operational harvesting within the Graham IRM Plan area will be constrained to no more than 1 'cluster' of cutblocks at any one time
				19 – Graham Merch Area	Cumulative merchantable area (hectares) within blocks harvested in the Graham IRM Plan area since 1997	The cumulative merchantable area (hectares) within harvested blocks will not exceed the planned maximum cumulative harvest areas, as measured at the end of each time period: Period 2

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
						(April 2012): 6569 ha; Period 3 (April 2017): 9355 ha; Period # 4 (ending April 2022): 10,858 ha
				20 – Graham Connectivity	Area (hectares) harvested in cutblocks in the Graham IRM area, within the permanent alluvial and non-productive/non-commercial components of the connectivity corridors	Zero hectares harvested within cutblocks in the permanent alluvial and non-productive/non-commercial components of the connectivity corridors
				21 – MKMA harvest	The number of long term harvest plans within the MKMA completed and submitted to government	A minimum of one long-term harvest plan submitted no later than 1 year following government approval of a landscape unit objective under the MKMA Act,

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
						that applies to the Fort St. John TSA portion of the MKMA
				22 – River Corridors	The percentage of harvested areas that create openings greater than 1 hectare within 100 metres of RRZ's in identified major river corridors	No openings exceeding 1 hectare in blocks within the major river corridors harvested under the FSJPPR (i.e. after November 15, 2001)
				57 – Number of known Values and Uses addressed in Operational Planning	Percentage of known traditional site-specific aboriginal values and uses that are addressed in operational plans	100% of known traditional site-specific aboriginal values and uses identified will be addressed in operational plans

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 2 – Maintenance and Enhancement of Forest Ecosystem Condition and Productivity						
Conserve forest ecosystem condition and productivity by maintaining the health, vitality, and rates of biological production.						
Element 2.1 – Forest Ecosystem Condition and Productivity Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species. Reforest promptly and use tree species ecologically suited to the	**Ecosystem Resilience / Ecosystem Productivity**	**Maintain a natural range of variability in ecosystem function, composition and structure with allows ecosystems to recover from disturbance and stress. Ecosystem functions capable of supporting naturally occurring species exist within the range of natural variability.**	**2.1.1 – Reforestation success.**	25 – Forest Health	Percentage of silviculture obligation areas with significant detected forest health damaging agents which have treatment plans developed for them	100% of silviculture obligation areas with significant forest health damaging agents will have treatment plans developed for them, and initiated within 1 year of detection
				27 – Silviculture Systems	Percentage of area harvested annually using even aged silviculture systems	Even aged silviculture systems will be employed on at least 80% of the total area harvested annually in the DFA
				28 – Species Composition	See indicator 28	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
site.		**Maintain or enhance landscape level productivity.**		29 – Reforestation Assessment	Predicted Merchantable Volume (PMV) (cubic meters) coniferous and separate deciduous surveyed areas. See indicator #2	Predicted Merchantable Volume will meet or exceed the Target Merchantable Volume (TMV). The TMV is set at 95% of the Maximum Predicted Merchantable Volume attainable on coniferous areas. The TMV is set at 90% of the Maximum Predicted Merchantable Volume attainable on deciduous areas

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				30 – Establishment Delay	Establishment Delay (years)	The area weighted average establishment delay for coniferous regeneration will not exceed two years. The area weighted average establishment delay for deciduous regeneration will not exceed three years. The area weighted average establishment delay for mixedwood stands regeneration will not exceed three years
			Non-Core	2 – Seral Stage	See indicator # 2	
				9 – Wildlife Tree Patches	See indicator # 9	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				24 – Permanent Access Structures	Percentage of the total area in Managing Participants' cutblocks occupied by permanent access structures, in which harvesting was completed	A maximum of 5% of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average
				26 – Salvage	The relative proportion of area of merchantable fire-damaged stands salvaged within a management intensity class	The relative proportions of salvage will be highest in the high intensity zones, and lowest in the low intensity zones over the SFM Plan period (April 1, 2016 - March 31, 2022
				49 – Forest Health FOS Planning	Percentage of new conifer-leading harvest blocks in the 2017 FOS that	A minimum of 50% of new conifer-leading harvest blocks in the 2017 FOS will

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					are pine-leading	be pine-leading
			2.1.2 – Proportion of regeneration comprised of native species.	13 – Coniferous Seeds	See indicator #13	
				14 – Aspen Regeneration	See indicator #14	
				28 – Species Composition	See indicator #28	
			2.1.3 – Additions and deletions to the forest area.	24 – Permanent Access Structures	See indicator # 24	
				40 – Coordinated Developments	Number of coordinated developments	Report annually the number of proposed coordinated developments that occurred
				66 – Deletions to Forest Area	Percentage of gross crown forest landbased in the DFA converted to non-forest land use through forest management activities of the participants	Less than 0.6% of the gross crown forest landbase in the DFA will be converted to non-forest land use through forest management activities of the participants

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					participants during the term of SFMP #3	during the term of SFMP #3
			2.1.4 – Proportion of the calculated long-term sustainable harvest level that is actually harvested.	25 – Forest Health	See indicator # 25	
				31 – Long Term Harvest Level	Long-term harvest level (LTHL) as measured in cubic metres per year (m^3/yr)	We will propose an Allowable Annual Cut (AAC) that sustains the LTHL of the Defined Forest Area (DFA)
				32 – Site Index	Site index	Average post harvest site index will not be less than average pre-harvest site index on blocks harvested under the pilot project regulation

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				53 – Cut Control	Percentage of total Allowable Annual Cut (AAC) charged to licensee tenure holders or BCTS Participants during the term of the SFMP	Jan 1 2010- Dec 31 2016: Industry Participants: -Not to exceed 110% of the combined cumulative coniferous AAC for the 6 year period, -Not to exceed 110% of the combined cumulative deciduous AAC for the 6 year period. BCTS Participant: -Not to exceed 110% of the combined cumulative coniferous commitment offered for sale for the 6 year period, -Not to exceed 110% of the combined cumulative deciduous commitment offered for sale for

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
						the 6 year period

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 3 – Conservation of Soil and Water Resources						
Conserve soil and water resources by maintaining their quantity and quality in forest ecosystems.						
Element 3.1 – Soil Quality and Quantity Conserve soil resources by maintaining soil quality and quantity	**Soil Productivity**	**Protect soil resources to sustain productive forests**	**3.1.1 – Level of Soil Disturbance.**	4 – Soil Disturbance	Number of blocks with non-conformances to soil disturbance limits reported annually by Managing Participant	Zero blocks will have non conformances to soil disturbance limits
				32 – Site Index	See indicator # 32	
			3.1.2 – Level of downed woody material.	6 – Coarse Woody Debris Volume	See indicator # 6	
Element 3.2 – Water Quality and Quantity Conserve water resources by maintaining water quality and quantity	**Water Quantity**	**Maintenance of water quantity**	**3.2.1 – Proportion of watershed or water management areas with recent stand-replacing disturbance.**	34 – Peak Flow Index	The percentage of watersheds achieving baseline targets for the peak flow index and the percent of watershed reviews completed where the baseline target is exceeded	95% or more of the watersheds will be below the baseline target. All watersheds that exceed the baseline target will have a watershed review completed wherever new harvesting is planned
		Maintenance of water quality	**3.2.2 – Proportion of forest**	7 – Riparian Reserves	See indicator # 7	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			management activities, consistent with prescriptions to protect identified water features.	35 – Water Quality Effectivenss Evaluations	The percentage of surveyed stream crossings annually identified with a high WQEE rating on forestry roads within the DFA for which participants have stewardship (*WQEE – Water Quality Effectivenss Evaluation)	On an annual basis, fewer than 30% of the total number of surveyed stream crossings on roads for which the participants have stewardship will have 'High' WQEE
				36 – Protection of Stream banks and Riparian Values of Small Streams	The number of annual non-conformances to SLP measures related to protecting stream bank, stream channel stability and riparian vegetation from harvesting or	No non-conformances to SLP measures related to protecting stream bank, stream channel stability and riparian vegetation from to harvesting or silviculture activities

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					silviculture activities	
				37 – Spills Entering Water Bodies	Number of spills of a reportable substance (i.e. antifreeze, diesel fuel, gasoline, greases, hydraulic oil, lubricating oil, methyl hydrate, paints and paint thinners, solvents, pesticides, and explosives) entering water bodies	Zero spills entering water bodies

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 4 – Forest Ecosystem Contributions to Global Ecological Cycles						
Maintain forest conditions and management activities that contribute to the health of global ecological cycles.						
Element 4.1 – Carbon Uptake and Storage Maintain the processes that take carbon from the atmosphere and store it in forest ecosystems.	**Carbon Uptake and Storage**	**Maintenance of the processes for carbon uptake and storage**	**4.1.1 – Net Carbon Uptake.**	24 – Permanent Access Structures	See indicator # 24	
				29 – Reforestation Assessment	See indicator # 29	
				30 – Establishment Delay	See indicator # 30	
				38 – Carbon Sequestration Rate	Maintenance of DFA Average carbon sequestration rates	Maintain DFA average carbon sequestration rates that are consistent with or greater than natural sequestration rates
				39 – Ecosystem Carbon Storage	The percentage of ecosystem carbon stored in the Fort St. John DFA relative to projected natural levels	Maintain ecosystem carbon storage at a minimum of 95% of projected natural storage levels

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator	Target
			4.1.2 – Reforestation Success. (2.1.1 – Reforestation Success)	See indicators # 25, 27, 28, 29, 30 (related to CSA z809-08 Core Indicator 2.1.1 above)	
Element 4.2 – Forest Land Conversion Protect forest lands from deforestation. Encourage afforestation where ecologically appropriate.	**Forest Land Base**	**Sustain forest lands within our control within the DFA**	**4.2.1 – Additions and deletions to the forest area. (2.2.1 - Additions and deletions to the forest area)**	See indicators # 24, 40, 55 (related to CSA z809-08 Core Indicator 2.2.1 above)	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 5 – Multiple Benefits to Society						
Sustain flows of forest benefits for current and future generations by providing multiple goods and services.						
Element 5.1 – Timber and Non-Timber Benefits Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services.	**Timber and Non-Timber Multi-use Benefits**	**Provide opportunities for a feasible mix of timber, recreational activities, and non-timber commercial activities**	**5.1.1 – Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA.**	18 – Graham Harvest Timing	See indicator # 18	
				19 – Graham Merch Area	See indicator # 19	
				21 – MKMA harvest	See indicator # 21	
				31 – Long Term harvest Level (Timber)	See indicator # 31	
				41 – Range Action Plan	Percent consistency with mutually agreed upon action plans for range	Operations 100% consistent with resultant range action plans
				42 – Damage to Range Improvements	Number of range improvements damaged by Participants' activities	Zero range improvements damaged by Participants' activities
				43 – Recreation Sites (Non - Timber)	The number of recreation sites maintained by Participants	Participants will maintain a minimum of one recreational site within the DFA

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				44 – Visual Quality Objectives	Consistency with Visual Quality Objectives (VQO's)	Pilot Participants' forest operations will be consistent with the established VQO's
				45 – Recreation Opportunity Spectrum	Area in primitive and semi-primitive non-motorized classifications of the Recreation Opportunity Spectrum (ROS) for the Graham, Sikanni and Crying Girl LU's	A minimum of 65,839 ha in primitive ROS area (100% of 1996 primitive ROS area) and 180,726 ha in semi primitive non-motorized ROS area (50% of the 1996 total semi primitive NM ROS area) in the combined Graham, Crying Girl and Sikanni LU's (excluding the Graham Laurier and Redfern-Keily PA's)

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				46 – Actions Addressing Guides, Trappers, and Other Interests	Percentage of operations consistent with mutually agreed upon action plans for guides, trappers and other known non-timber commercial interests	100% of operations will be consistent with action plans for guides, trappers and other non-timber commercial interests
				47 – Timber processed in the DFA (Timber)	Volume of timber processed in the DFA in proportion to volume harvested in the DFA	The annual equivalent of a minimum of 70% of the DFA's harvest is primary processed in the DFA
				48 – Summer and Fall Volume Deliveries	See Indicator # 48	
			Non – Core	51 – Timber Profile - Deciduous (Timber)	The area(ha) of deciduous leading cutblocks identified in Supply Block F for harvest	A minimum of 200 ha of deciduous leading cutblocks located in Supply Block F will be identified for harvest during the

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					during the term of the SFMP	term of the new SFMP
				52 – Timber Profile - Coniferous (Timber)	The percentage of the total cutblock area in harvested blocks that was identified as preharvest height-class two pine inventory types	April 1, 2006 - March 31st, 2011: 8% or more of the total coniferous cutblock area harvested by managing Participants during the 5-year period will be in height-class two pine inventory types. April 1, 2011- March 31st, 2016: 8% or more of the total coniferous cutblock area harvested by managing Participants during the 5-year period will be in height-class two pine inventory

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
						types. April 1, 2016-March 31, 2022: 8% or more of the total coniferous cutblock area harvested by managing Participants during the 5-year period will be in height-class two pine inventory types.
				53 – Cut Control (Timber)	Percentage of total Allowable Annual Cut (AAC) charged to licensee tenure holders or BCTS Participants during the term of the SFMP.	Jan 1 2016 - Dec 31 2021: <u>Industry Participants</u>: -Not to exceed 110% of the combined cumulative coniferous AAC for the 6 year period -Not to exceed 110% of the combined cumulative deciduous AAC

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
						for the 6 year period BCTS Participant: -Not to exceed 110% of the combined cumulative coniferous commitment offered for sale for the 6 year period -Not to exceed 110% of the combined cumulative deciduous commitment offered for sale for the 6 year period
			5.1.2 — Evidence of open and respectful communications with forest dependent businesses, forest users and local communities to integrate non-timber resources	23 – Value and Total Number of contracts Awarded to First Nations	See Indicator # 23	
				41 – Range Action Plan	See indicator # 41	
				46 – Actions Addressing Guides, Trappers, and	See Indicator # 46	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			into forest management planning. When significant disagreement occurs, efforts towards conflict resolution are documented.	Other Interests		
				47 – Timber Processed in the DFA	See Indicator # 47	
				54 – Dollars Spent Locally on Each Woodlands Phase	See indicator # 54	
				55 – Direct and Indirect Employment	See Indicator # 55	
				68 – Effective Communication – Non Timber Resources	Evidence of communication and consideration of non-timber resources into forest management planning	100% of non-timber resource values, identified through communication, have been responded to and considered and may be accommodated in forest management plans
Element 5.2 – Communities and	**Sustainable and Viable Communities**	**Maintain viable timber processing**	**5.2.1 – Level of participation and support in**	47 – Timber Processed in the DFA	See Indicator # 47	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
Sustainability Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economies.		**facilities in the DFA. No decrease in the LTHL in the DFA**	**initiatives that contribute to community sustainability.**	48 – Summer and Fall Volume Deliveries	Volume of timber (m^3) delivered annually to wood processing facilities within the Fort St. John Defined Forest Area (DFA) wood processing facilities between May 1st and November 30th	Minimum of 100,000 m^3 to conifer mills in the DFA, Minimum of 185,000 m^3 to deciduous mills in the DFA
				50 – Coordination	Percentages of SFMP's and FOS's prepared jointly by the Participants	100% of all SFMP's and FOS's will be jointly prepared by the Participants
				51 – Timber Profile - Deciduous	See indicator # 51	
				52 – Timber Profile - Coniferous	See Indicator # 52	
				54 – Dollars Spent Locally	Percentage of dollars spent	Woodlands Phases to be

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
				on each Woodlands Phase	locally on each woodlands phase in proportion to total expenditures	monitored:
						Logging/hauling: minimum of 80%
						Road construction and maintenance: minimum of 80%
						Silviculture: minimum of 5%
						Planning and administration: minimum of 50%
				55 – Direct and Indirect Employment	Level of direct and indirect employment	Report the current level of direct and indirect employment expressed as a factor of harvest level times employment multiplier
			Non – Core	31 – Long Term Harvest Level	See Indicator # 31	
				53 – Cut Control	See Indicator # 53	
	Fair Distribution of Benefits and Costs	**Development of Skilled Workers**	**5.2.2 – Level of participation and support in training and skills development.**	63 – Worker Training	Percentage of managing participants' employees training that is	100% of managing participants' employees will have training

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
					consistent with training plans	consistent with training plans
				12 – Forest Workers Safety	Implementation and maintenance of certified safety program	Each managing participant will implement and maintain a certified safety program
			5.2.3 – Level of direct and indirect employment.	48 – Summer and Fall Volume Deliveries	See Indicator # 48	
				54 – Dollars Spent Locally on Each Woodlands Phase	See Indicator # 54	
				55 – Direct and Indirect Employment	See Indicator # 55	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 6 – Accepting Society's Responsibility for Sustainable Development						
Sustainable forest management includes society's responsibility for worker and community safety, and the requirement for fair, equitable, and effective forest management decisions.						
Element 6.1 – Fair and effective decision-making / Information for decision-making Demonstrate that SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress. Provide relevant information and educational opportunities to	**Opportunity for Public Participation**	**To facilitate a satisfactory public participation process. To develop satisfaction with the public participation process**	**6.1.1 – Level of participant satisfaction with the public participation process.**	59 – Terms of Reference (TOR) for the Public Participation Process	Current Terms of reference (TOR) for the FSJPPR public participation process	Biennial review of the TOR for the FSJPPR public participation process (PAG)
				64 – PAG Satisfaction Surveys	Level of satisfaction with the public participation process as measured by PAG surveys	At least an 80% (average score of 4 out of 5) satisfaction level as measured from PAG surveys
	Information for Decision-making	**Relevant information used in the decision making process is provided to PAG, general public, and affected parties**	**6.1.2 – Evidence of efforts to promote capacity development and meaningful participation in general.**	41 – Timber Range Action Plans	See Indicator # 41	
				46 – Actions Addressing Guides, Trappers, and Other Interests	See indicator # 46	
				58 – Regulatory Public Review and comment Process	Compliance with the public review and comment process identified in the	100% compliance with public review and comment processes identified in the FSJ Pilot Project

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.					FSJ Pilot Project Regulation	Regulation
				59 – Terms of Reference (TOR) for the Public Participation Process.	See Indicator # 59	
				60 – Public Inquiries	The percentage of timely responses to public inquiries	Respond to 100% of public inquiries regarding Participants' forestry practices, that are additional to the Pilot Public Review and Comment processes, within one month of receipt
				61 – Educational Outreach	Number of people to whom information, presentations, or field trips provided annually	Minimum of 40 people provided information, presentations, or field trips
				64 – PAG Satisfaction Surveys	See Indicator # 64	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			6.1.3 – Availability of summary information on issues of concern to the public.	60 – Public Inquiries	See Indicator # 60	
				65 – Availability of Information on Issues of Concern	SFM Monitoring report made available to the public	SFM monitoring report made available to the public annually
Element 6.2 – Safety Demonstrate that the organization is providing and promoting safe working conditions for its employees and contractors.	**Contribute to Worker and Public Safety. Communities Participate in the Use and Management of the Forest**	**Provide a safe work environment for DFA forestry workers and the public. Diverse local forest employment opportunities exist in the DFA**	**6.2.1 – Evidence of co-operation with DFA - related workers to improve and enhance safety standards, procedures, and outcomes in all DFA-related workplaces and affected communities.**	12 – Forest Workers Safety	See Indicator # 12	
			6.2.2 – Evidence that a worker safety program has been implemented and is periodically reviewed and improved	63 – Worker Training	See Indicator # 63	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
CCFM Criterion 7 – Aboriginal Relations						
Recognize and respect the unique rights and values of Aboriginal Peoples						
Element 7.1 – Aboriginal and Treaty Rights Recognize and respect Aboriginal title and rights, and treaty rights. Understand and comply with current legal requirements related to aboriginal title and rights, and treaty rights.	**Aboriginal and Treaty Rights**	**Recognition of Treaty 8 rights and respect of aboriginal rights through maintenance of landscape level biodiversity**	**7.1.1 – Evidence of a good understanding of the nature of Aboriginal title and rights.**	33 – First Nations Consultation & Information Sharing	Percentage of affected First Nations invited to participate in information sessions or presentations related to the participants' practices and /or plans (SFMP, FOS, and PMP's)	100% of affected First Nations will be invited to participate in information sessions or presentations related to the participants' practices and /or plans (SFMP, FOS, and PMP's)
				56 – Maintenance of Wildlife and Fisheries Habitat	Conformance to the SFMP indicators and targets pertinent to the maintenance of wildlife and fisheries habitat	Participants will conform to the identified SFMP indicators and targets pertinent to the maintenance of wildlife and fisheries habitat
			7.1.2 — Evidence of ongoing open and respectful communications with Aboriginal communities to	33 – First Nations Consultation & Information Sharing	Percentage of affected First Nations invited to participate in information sessions or	100% of affected First Nations will be invited to participate in information sessions or

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			foster meaningful engagement, and consideration of the information gained about their Aboriginal title and rights through this process. Where there is communicated disagreement regarding the organization's forest management activities, this evidence would include documentation of efforts towards conflict resolution.		presentations related to the participants' practices and /or plans (SFMP, FOS, and PMP's)	presentations related to the participants' practices and /or plans (SFMP, FOS, and PMP's)
				69 – Effective Communication – Aboriginal Communities	Evidence of ongoing communication with Aboriginal communities and consideration of information gained	100% of information on aboriginal titles and rights, identified through on-going communication with Aboriginal communities, has been responded to and considered and may be accommodated in forest management planning
Element 7.2 – Respect for Aboriginal Forest Values, Knowledge and Uses Respect	**Aboriginal Forest Values, and Uses**	**Respect known traditional aboriginal forest values and uses. Involve First Nations in**	**7.2.1 — Evidence of efforts to promote capacity development and meaningful participation for Aboriginal**	23 – Value and Total Number of contracts Awarded to First Nations	Value and total number of contracts awarded annually to First Nations	Report the annual total value and number of contracts awarded to companies or groups owned or

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
traditional Aboriginal forest values, knowledge, and uses as identified through the Aboriginal input process.		**review of forest management plans, provide understanding of forest management plans. Provide opportunities for First Nations to participate in forest economy.**	**individuals, communities and forest-based companies.**			operated by First Nations
				33 – First Nations Consultation & Information Sharing	See Indicator # 33	
				57 – Number of Known values and Uses Addressed in Operational Planning	See Indicator # 57	
				60 – Public Inquiries	See Indicator # 60	
			7.2.2 – Evidence of understanding and use of Aboriginal Knowledge through the engagement of willing Aboriginal communities, using a process that identifies and manages culturally important resources and	33 – First Nation Consultation & Information Sharing	See Indicator # 33	
				57 – Number of Known values and Uses Addressed in Operational Planning	See Indicator # 57	
				62 – Brushing Program Aerial Herbicide Use	See Indicator # 62	

CCFM Criteria & CSA SFM Elements	Value	Objective	CSA core Indicator (reference only)	SFMP Indicator		Target
			values.			
			7.2.3 – Level of management and/or protection of areas where culturally important practices and activities occur.	33 – First Nations Consultation & Information Sharing	See Indicator # 33	
				57 – Number of Known values and Uses Addressed in Operational Planning	See Indicator # 57	
				62 – Brushing Program Aerial Herbicide Use	The number of hectares removed annually from the participants' aerial herbicide plans based on input from First Nations or the public and final treatment layout	The participants will report annually, the number of hectares removed from the participants' aerial herbicide plans based on input from First Nations or the public and final treatment layout

List of CSA Matrix Revisions

SFMP #3 – February 7, 2018

- New Indicators #68 & #69 added to SFMP, becomes effective April 1, 2018 for monitoring purposes.

Appendix 3: Growth & Yield Monitoring Plan



Appendix 4: Reforestation Strategy: Stocking Estimators and Future Volume

Silviculture Note
Stocking estimators and future volume

Pat Martin
September 4, 2002

1. Introduction

Tree stocking, the degree to which growing space is occupied, is an important forestry concept. In a young stand, stocking is a main determinant of future stand volume/ha and the distribution of tree sizes at harvest (Clutter et al. 1983). A variety of estimators have been developed to quantify the stocking in regenerated stands (Stein 1978; Shreuder, Gregoire and Woods 1993, pg 291). Typically, these estimators are designed to take on greater values as density and uniformity of tree distribution increase, and many are capped at some maximum value. When stocking estimators are evaluated, the focus has been on ease of use, cost, and the extent to which they exhibit desired behaviour over a range of tree density and uniformity (Stein 1978). Historically, the ability of a stocking estimator to predict future volume has not been an important evaluation criterion.

Recently in B.C. interest has grown in the relationship between stocking estimators and future volume. Bergerud (2001) demonstrated the relationship between the stocking estimator "total well-spaced trees/ha" and TASS predicted merchantable volume/ha at age 67 years for lodgepole pine on site index 18 m. J.S. Thrower and Associates (2002) developed a new stocking estimator "MSQ" and demonstrated its relationship to TASS predicted merchantable volume/ha at age 80 years for lodgepole pine on site index 20 m.

Martin, Browne-Clayton, and McWilliams (2002) described a new system for managing reforestation that is based on the future volume predicted, in part, from the stocking observed in young stands. Though this new system uses the stocking estimator "MSQ," it could be re-formulated to use other stocking estimators. In future implementations of this new system, it is desirable to ensure that the stocking estimator used has high predictive power. In this paper, I report the results of a cursory assessment of the ability of four stocking estimators to predict merchantable volume/ha at age 80 years for lodgepole pine on site index 18 m.

2. Methods

The spatially explicit, individual tree growth model TASS (Mitchell 1975, Mitchell and Cameron 1985) was used to generate a variety of tree spatial patterns in a 100 m x 100 m plot. From bare ground the stand represented by each plot was grown to the silviculture survey date at which time surveys were simulated in the stand. The survey parameters were computed and the stand was grown for 100 years. Volumes at ages 60, 80, and 100 years (site heights of 18.8, 21.9, and 24.0 m, respectively) were extracted from the TASS output, though only the volume at age 80 is reported here. Regression analysis was used to assess the strength of the relationship between the four stocking estimators and merchantable volume/ha at age 80.

2.1 Stocking estimators

Though a total of seven stocking estimators were evaluated, in this paper I report only the results for four (Table 1):

Table 1. Description of the four stocking estimators that were assessed.

Code	Name	Plot procedure	Compilation
TTPH	Total trees per hectare	In a 3.99 m radius plot, the surveyor counts all live trees.	Plot counts are averaged and expanded to a per hectare basis.
WSTPH	Well-spaced trees per hectare	In a 3.99 m radius plot, the surveyor maximizes the count of well-spaced trees. No "M" cap. 2.0 m MITD.	Plot counts are averaged and expanded to a per hectare basis.
MSQ	Mean stocked quadrants	In a 3.99 m plot divided into quarters along cardinal directions, the surveyor counts the number of quarters containing at least one live tree.	Plot counts are averaged.
PERSP	Percent stocked 1.4 m radius plots	The surveyor counts a 1.4 m plot as stocked if it contains at least one live tree.	Percent of all plots that were tallied as stocked is computed.

2.2 TASS simulations

Fifty different tree spatial distributions were taken from the many stem maps used to produce Land Management Handbook 50 (Bergerud 2002). From those distributions classified as clumped, maps with the following initial trees/ha were used: 300, 425, 550, 650, 750, 900, 950, 1020, 1150, 1240, 1400, 1500, 1750, 2000, 2250, 2500, 2750, 2900, 3100, 3265, 3906, 4500, 5200, 5917, 6944, 8000, 10000, and 20000. From those distributions classified as natural (random spatial pattern), maps with the following initial trees/ha were used: 300, 550, 750, 950, 1150, 1400, 1750, 2250, 2750, 3100, 3906, 5200, 6944, and 10000. From those distributions classified as planted (grid spatial pattern), maps with the following initial trees/ha were used: 425, 650, 950, 1240, 1750, 2500, 4500, and 8000.

The following run specifications were used for each TASS simulation:

TASS version: v2.07.14WS
Species: interior lodgepole pine
Site index: 18 m
Site index curve code: PI_THROWNIGH
Merchantable volume
Minimum dbh: 12.5 cm
Top dib: 10 cm
Stump height: 0.3 m

OAFs: No OAFs applied
Plot size: 100 m X 100 m
The TASS runs and the survey simulations were conducted by RamSOFT Systems Ltd.

2.3 Survey simulation

Each stem map was grown to a site height of 5 m, which occurred 16 years from run initialization. Surveys were simulated at this time. Ten plots were randomly located on the stem map, plot values taken, and the sample mean computed. This was repeated 1000 times. Last, the 1000 sample means were averaged. Thus, each survey value is a mean from 10,000 plots. In counting trees, no minimum height criteria were applied. To reduce costs by re-using data previously compiled, one set of plot centers was used for WSTPH and MSQ and a different set for the other estimators.

2.4 Data analysis

A single equation form was identified that could provide a good fit to each of the four volume-stocking estimator relationships. A function in the Weibull family was fit with nonlinear least squares using the SYSTAT statistical software (SPSS Inc. 1998):

$$V = b_0\left(1-\exp\left(b_1\left(X/\phi\right)^{b_2}\right)\right)$$

Where V **is merchantable volume/ha at age 80,**
b_0, b_1**, and** b_2 **are parameters, and**
X is the stocking estimator (TPH, WSTPH, MSQ, and PERSP). ϕ **is a constant assigned before fitting equal to the largest X value in the data set:** $\phi = 16712$ **for TPH,** $\phi = 2182$ **for WSTPH,** $\phi = 4$ **for MSQ, and** $\phi = 100$ **for PERSP.**
The fit statistics and a visual examination of residuals indicated that excellent fits were obtained. Two fit statistics, the mean square error and the squared correlation between observed and predicted values, were taken to indicate the ability of a stocking estimator to predict future volume/ha (Table 2).
The complete data set is provided in Appendix A.

3. Results

The relationship between each stocking estimator and TASS-predicted volume at age 80, with the fitted curve, is displayed in Figures 1-4.
Though volume/ha at 80 years is approximately linearly related to MSQ, the relationship is curvilinear with TTPH, WSTPH, and PERSP. A visual assessment suggests that the stocking estimators TPH, WSTPH and PERSP produce values that are spread more widely, while many of the 50 stem maps assessed returned MSQ values very close to 4. However, an increased spread is not associated with an improved ability to predict future volume (Table 2).
MSQ predicts future volume/ha slightly better than WSTPH and PERSP do and much better than TTPH does (Table 2). The relationships between future volume and WSTPH,

PERSQ, and MSQ are so strong that little improvement can be expected from adding additional explanatory variables or stratifying the data.

Table 2. Fit statistics from regressions relating stocking estimators to future volume.

Stocking estimator	Mean square error	R^2: Correlation of observed and predicted values (squared)
TTPH	703	0.84
WSTPH	142	0.97
MSQ	44	0.99
PERSP	152	0.97

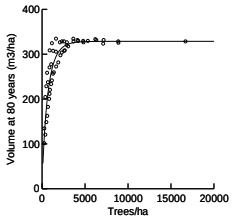


Figure 1. Relationship between merchantable volume/ha at age 80 and total trees/ha at survey. Solid line is fitted regression.

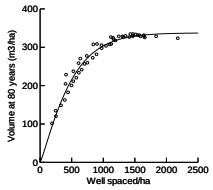


Figure 2. Relationship between merchantable volume/ha at age 80 and total well spaced trees/ha at survey. Solid line is fitted regression.

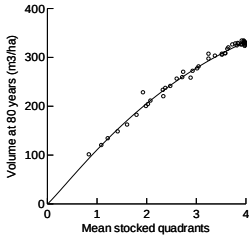


Figure 3. Relationship between merchantable volume/ha at age 80 and mean stocked quadrants at survey. Solid line is fitted regression.

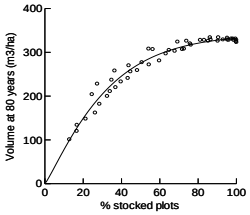


Figure 4. Relationship between merchantable volume/ha at age 80 and percent stocked plots at survey. Solid line is fitted regression.

4. Discussion

In terms of its ability to predict future volume, the stocking estimator MSQ is superior to the three others examined (TTPH, WSTPH, and PERSP). However, WSTPH and PERSP are almost as good so when other factors are considered, such as cost, ease of use, or familiarity of procedure – the use of MSQ, WSTPH, or PERSP could easily be justified. As expected, TTPH is a poor estimator of future volume and, for this purpose, its use is not recommended.

Bergerud (2001) found that the relationship between TASS-predicted future volume and well-spaced trees/ha varied with tree spatial pattern. Though this issue was not specifically examined in this analysis, the excellent fits suggest that little could be gained by stratifying by tree distribution type (random, clumped, or grid). Additional replicates of the planted and natural spatial pattern stem maps and subsequent analysis is recommended to further examine this issue.

The volumes used in this study are TASS-predicted volumes, not actual volumes observed in real stands that originated with the specified tree spatial patterns. Thus, the fit statistics grossly over-state the accuracy with which these stocking estimators will predict real stand future volumes. Moreover, if there is some systematic bias in TASS predictions, for example, if volumes are consistently over-estimated at low stockings, then the shape of the volume-stocking relationships displayed in Figure 1-4 will be incorrect.

These results indicate the correlation between future volume and a stocking estimator when sample size is enormous. Each data point is the mean of 10,000 sample plots. The correlation under operationally realistic sample sizes should be investigated. Furthermore, it would certainly cost less to take a single PERSP plot than to take a single WSTPH plot. In dense stands, TPH is also time consuming to tally. However, cost has not been considered in this analysis. Subsequent study should attempt to identify the stocking estimator that provides the most accurate prediction of future volume at a realistic fixed cost.

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Appendix A: Complete data set

Stem map #	TASS initialization density (#/ha)	Tree spatial distribution type	Trees per hectare at survey (#/ha)	Well-spaced trees per hectare (#/ha)	Mean stocked quadrants with unrotated 3.99 m plots	Percent stocked 1.4 m radius plots (percent)	Merch. volume at age 80 (m^3/ha)
1	300	clumped	278	192	0.84	12.81	101
2	425	clumped	402	254	1.09	16.64	120
3	550	clumped	524	334	1.42	21.28	148
4	650	clumped	628	394	1.61	26.23	162
5	750	clumped	716	446	1.80	28.50	182
6	900	clumped	852	500	1.99	32.54	200
7	950	clumped	898	528	2.08	33.99	211
8	1020	clumped	948	576	2.34	36.91	220
9	1150	clumped	1086	616	2.33	39.68	233
10	1240	clumped	1170	662	2.48	43.32	241
11	1400	clumped	1290	706	2.61	44.67	256
12	1500	clumped	1400	752	2.72	48.21	259
13	1750	clumped	1658	836	2.93	54.34	272
14	2000	clumped	1908	896	3.05	59.73	281
15	2250	clumped	2156	978	3.25	63.15	297
16	2500	clumped	2314	1046	3.38	67.82	303
17	2750	clumped	2582	1104	3.52	71.72	307
18	2900	clumped	2670	1128	3.58	72.64	308
19	3100	clumped	2894	1168	3.65	75.81	320
20	3265	clumped	3064	1196	3.63	76.23	317
21	3906	clumped	3676	1306	3.79	83.15	328
22	4500	clumped	4234	1356	3.84	86.54	329
23	5200	clumped	4842	1416	3.92	90.25	326
24	5917	clumped	5350	1468	3.95	93.00	329
25	6944	clumped	6218	1512	3.96	95.21	333
26	8000	clumped	7184	1572	3.98	97.32	331
27	10000	clumped	8892	1648	3.98	98.58	328
28	20000	clumped	16712	1840	3.98	99.95	328
29	300	random	286	250	1.22	16.76	134
30	550	random	518	414	1.93	27.34	228
31	750	random	702	530	2.38	34.83	237
32	950	random	890	640	2.74	43.77	270
33	1150	random	1086	742	3.02	50.62	277
34	1400	random	1310	846	3.25	56.31	307
35	1750	random	1642	976	3.52	64.82	305
36	2250	random	2102	1124	3.73	73.93	326
37	2750	random	2578	1248	3.85	81.13	328
38	3100	random	2910	1322	3.90	85.30	326
39	3906	random	3662	1432	3.96	90.55	334
40	5200	random	4810	1474	3.97	95.25	329

41	6944	random	6332	1546	3.98	98.17	331
42	10000	random	8906	1660	3.98	99.79	325
43	425	planted	406	406	2.03	24.58	204
44	650	planted	612	612	2.89	36.40	258
45	950	planted	906	904	3.59	54.18	308
46	1240	planted	1170	1158	3.82	69.25	324
47	1750	planted	1646	1472	3.92	86.22	334
48	2500	planted	2336	1594	3.98	95.90	328
49	4500	planted	4150	1644	3.98	99.55	331
50	8000	planted	7138	2182	3.98	100.00	323

Appendix 5: Reforestation Strategy: Survey Design and Field Procdure

Survery Design and Field Procedures

I) Conifer Survey Design and Field Procedures

Scope of this document

This document describes only the survey methods to be employed to meet the requirements of yield assessment and inventory labels. It is limited, at this time, to data collection for conifer plantations.

Prior to collecting plot data in the field the following information should be reviewed and used to develop strata within each cutblock. Minimum strata size is 2 ha.

1. Pre-harvest prescription or plan

Ensure survey map reflects original prescription or plan map and any subsequent revisions. Place SU boundaries with different species or stocking standards on the survey map. Review the prescription or plan for any other requirements or conditions that would affect stocking levels and set boundaries as required.

2. Establish plot locations

Locate 100m grid locations on the survey map following NAD 83 datum. If the survey map has not been accurately geo-referenced then this step will not be practical and plots will need to be established in the field and added to the map. Plots that fall outside the NAR will be null plots.

3. Block assessment in the field

A block walkthrough prior to plot establishment is required to complete the following:

1) **Review blocks in the field and update the map. This may require identification of unmapped features, traversing of boundaries, etc.**
2) **Map inventory polygons utilizing current procedures by reviewing species composition, site productivity and stocking. Separate those areas below minimum stocking levels.**
3) **Identify and map areas that may require further treatment to reach well growing status**

Data Collection

Count Plot

A count plot is located where the last three digits of either or both of the UTM easting and northing are 100, 300, 500, 700, or 900. Area for the plot is 50m^2 (3.99m radius). Quadrants are established along cardinal directions. At a count plot, the following is done:

a) Record the Strata

Based on the strata mapping as above.

b) Count stocked quadrants

Record the number of quadrants that contain at least one acceptable tree. An acceptable tree is:

i) Preferred or acceptable species (as listed in the SP for the SU)
ii) Healthy (Meets forest health standards)
iii) Acceptable advance regeneration (meets adv. regen. standards)

iv) Well Growing

c) Count potential stocked quadrants after brushing

Record the number of quadrants that would contain at least one acceptable tree following a brushing treatment.

d) Record UTM coordinates

Record the UTM coordinates of the plot.

Data Collection at Full Measure Plot

A Full Measure Plot is one where the last three digits of both the UTM easting and northing are 000, 200, 400, 600, or 800. At an enhanced plot, collect all of the data required at a Count Plot plus the following:

a) Record BEC

Assess site series in an area approximately 5.64 m around plot center. Based on a rough ocular estimate, assign the area to the dominant site series. Record BEC zone/subzone/variant/site series.

b) Record species class.

Assess species composition in an area approximately 5.64 m around plot center. Based on a rough ocular estimate, assign the area to 1 of 3 species groups: >= 80% Pl, >= 80% Sx, or mix based on 20% divisions.

b) Height Measure tree

In a 5.64 m radius plot, make a rough ocular estimate of whether Pl or Sx is more common. Locate the tallest tree of this species that is live and not a residual. Measure and record total height and species code. If this tree is also a suitable growth intercept sample tree (healthy, undamaged and unsuppressed), record breast height age by counting whorls.

c) Additional Data

In a 3.99 m plot, collect total tree count, and total conifer count and average height by species.

Map areas of low stocking

If during the survey, a mappable patch (2 ha or larger) of low stocking was found, transfer its boundaries onto the survey map. Map patches that a rough ocular estimate suggests have < MSS preferred and acceptable species, free from brush and healthy. And provide a description of the area and recommendations for treatment.

Map treatment units

If during the survey a mappable area (2 ha or larger) that would benefit from further treatment i.e. fill planting, vegetation control, etc. is found then transfer the boundaries to the map and provide a description of the area and recommended treatment.

Map areas of high density stocking

If during the survey, a mappable patch (2 ha or larger) of stocking >20,000 stems per hectare was found, transfer its boundaries onto the survey map and provide a description of the area and recommendations for treatment.

Data Format

In an ASCII or excel format file provide the following:

For each plot:

1. **Cutblock identity (e.g., CP838 Block 1A)**
2. **Plot identity (e.g., plot # 1)**
3. **UTM coordinates of the plot (e.g., 307200; 5639200)**
4. **Stratum identity (e.g., species class, density class, target stocking class)**
5. **Stocked quadrant tally (e.g., 0, 1, 2, 3, or 4)**
6. **Potential stocked quadrant tally following a brushing treatment (e.g., 0, 1, 2, 3, or 4)**
7. **Plot type (S=count plot, E=full measure plot)**

In addition to the above, for each enhanced plot:

1. **Height sample tree species (e.g., Pl or Sx)**
2. **Sample tree height (e.g., 2.5 m)**
3. **If height sample tree is suitable GI tree, record breast height age (e.g., 4 years)**
4. **BEC classification (zone/subzone/variant/site series) (e.g., MSdm2 01)**
5. **Average height by species**
6. **Total tree count (e.g., 25)**
7. **Total conifer count (e.g., 21)**

Supporting Data

Stratum Description - Brief description of stratum and criteria used to establish the stratum.

Inventory Label - Requires a label for each stratum

II) – Deciduous Survey Design and Field Procedures

Scope of this document

The intention is to utilize the Mean Stocked Quadrant (MSQ) procedure as the desired assessment method throughout the establishment to well growing period. While many of the processes of the assessment are comparable, this document describes only the survey methods to be employed to meet the requirements of yield assessment and inventory label creation.

Prior to collecting plot data in the field the following information should be reviewed and used to develop strata within each cutblock. Minimum strata size is 2 ha.

1. Pre-harvest prescription or plan

Ensure survey map reflects original prescription or plan map and any subsequent revisions. Place SU boundaries with different species or stocking standards on the survey map. Review the prescription or plan for any other requirements or conditions that would affect stocking levels and set boundaries as required.

2. Establish plot locations

Locate 100m grid locations on the survey map following NAD 83 datum. If the survey map has not been accurately geo-referenced then this step will not be practical and plots will need to be established in the field and added to the map. Plots that fall outside the NAR will be null plots.

3. Block assessment in the field

A block walkthrough prior to plot establishment is required to complete the following:

4) **Review blocks in the field and update the map. This may require identification of unmapped features, traversing of boundaries, etc.**

Map inventory polygons utilizing current procedures by reviewing species composition, site productivity and stocking. Separate those areas below minimum stocking levels.

Data Collection

Count Plot

A count plot is located where the last three digits of either or both of the UTM easting and northing are 100, 300, 500, 700, or 900. Area for the plot is 50m^2 (3.99m radius). Quadrants are established along cardinal directions. At a count plot, the following is done:

a) Record the Strata

Based on the strata mapping as above.

b) Count stocked quadrants

Record the number of quadrants that contain at least one acceptable tree. An acceptable tree is:

i) Preferred or acceptable species (as listed in the SLP for the SU)

ii) Healthy (Meets forest health standards)

iii) Well Growing

d) Tally total tree count

e) Tally countable deciduous stems

f) Assess forest health factors

g) Record UTM coordinates

Record the UTM coordinates of the plot.

Data Collection at Full Measure Plot

A Full Measure Plot is one where the last three digits of both the UTM easting and northing are 000, 200, 400, 600, or 800. At an enhanced plot, collect all of the data required at a Count Plot plus the following:

a) Record BEC

Assess site series in an area approximately 5.64 m around plot center. Based on a rough ocular estimate, assign the area to the dominant site series. Record BEC zone/subzone/variant/site series. This will assist in determining the associated BEC site index grouping the stratum will be placed in.

b) Height Measure tree

In a 5.64 m radius plot, locate the largest diameter tree of the leading species that is live and not a residual. Measure and record total height and species code.

c) Additional Data
Inventory label data collection

Map areas of low stocking
If during the survey, a mappable patch (2 ha or larger) of low stocking was found, transfer its boundaries onto the survey map. Map patches that a rough ocular estimate suggests have < MSS preferred and acceptable species, free from brush and healthy. And provide a description of the area and recommendations for treatment.

Data Format
In an ASCII or excel format file provide the following:
For each plot:

8. **Cutblock identity (e.g., CP838 Block 1A)**
9. **Plot identity (e.g., plot # 1)**
10. **UTM coordinates of the plot (e.g., 307200; 5639200)**
11. **Stratum identity (e.g., WG versus NSR)**
12. **Stocked quadrant tally (e.g., 0, 1, 2, 3, or 4)**
13. **Plot type (S=count plot, E=full measure plot)**

In addition to the above, for each enhanced plot:

8. **Sample tree species**
9. **Sample tree height (e.g., 2.5 m)**
10. **BEC classification (zone/subzone/variant/site series) (e.g., BWBS mw 01)**
11. **Average height by species**
12. **Total tree count (e.g., 25)**

Supporting Data
Stratum Description - Brief description of stratum and criteria used to establish the stratum.
Inventory Label - Requires a label for each stratum. Those stratums that did not have a plot established within it must still have an inventory label ocularly assessed.

Appendix 5: Reforestation Strategy Stocking Standards and Crop Tree Requirements



Appendix 6 - Reforestation Strategy Stocking Standards and Crop Tree Requirements

1 .1 Introduction

The Landscape Level Reforestation Strategy proposes alternate "applicable performance standards" for *FSJPP Regulation* Sections 32 (4),(5),(6),(8), and (from Schedule F), Section 98 and Section 99 for coniferous and deciduous areas logged after November 15, 2001. The strategy also applies to coniferous and deciduous areas with commencement dates before November 15, 2001 if a Participant currently carries reforestation liability and submits a statement to the District Manager that the cutblock(s) will be subject to the SFMP under Section 42 of the *FSJPPR*.

This Appendix is intended to summarize the key stocking standards and crop tree requirements for deciduous, coniferous and mixedwood areas for the term of the SFMP. The following changes to requirements apply to coniferous and deciduous areas:

1.2 Crop Tree Requirements and Vegetative Competition

For the purposes of Section 42 of the *FSJPPR* for coniferous areas in which the Reforestation landscape level strategy applies, the following will be used to determine if a crop tree is well growing at the reforestation assessment (Indicator 29, Section 6.29):

A). A crop tree that is at least 100% of the height of all herbaceous competition (e.g. grass), and 150% of the height of brush and deciduous competition within a one metre radius cylinder is well growing.

If the crop tree does not meet the criteria in (A) above, it must meet the following criteria:

B). A crop tree is well growing if it is taller than vegetation excluding aspen and cottonwood (but including birch and brush species), in three of four quadrants in the one metre radius cylinder,and.

C). it is taller than countable aspen and/or cottonwood in at least three of four quadrants of the one metre radius cylinder and the number of countable aspen or cottonwood in the plot does not exceed two. Quadrants may be aligned to minimize the number of quadrants with vegetation taller than the crop tree. A 'countable' aspen or cottonwood is considered to be a tree that is greater than the median height of all potentially well growing trees within the 3.99 metre radius plot and

D) it is at least 100% of the height of all herbaceous competition. [41]

Any vegetation assessment for final reforestation assessments cannot be completed until at least one growing season following chemical brushing, and three growing seasons following manual brushing.

For the purposes of Section 42 of the *FSJPPR* for deciduous areas the following standard will be used to determine if a crop tree is well growing at the reforestation assessment:

[41] **Replaces S 32(6)(c)**

A . A well growing deciduous crop tree is defined as one that meets the minimum height criteria in Table C, and is at least 100% of the height of all herbaceous competition (e.g. grass) within a one metre radius cylinder.

Both conifer and deciduous crop trees must be healthy enough that they can reasonably be expected to reach maturity. Qualified registered professionals will be responsible for establishing and updating crop tree health criteria to use for reforestation assessments. The criteria will be developed using the best information available, (e.g. the "Free-Growing Damage Criteria" found in the "Establishment to Free Growing Guidebook") and in consultation with forest health professionals and /or the MFLNRO.

1.3 Minimum Inter-Tree Distance

Coniferous Areas: The minimum inter tree spacing (MITD) at establishment will be 1.5 metres for coniferous areas. Reductions to a 1.0 metre minimum will be allowed where conditions warrant (e.g. plantable spots are limited), as noted in a foresters rationale, which will be documented and retained by the Participant.[42]. MITD does not apply at the final reforestation assessment survey under the landscape level strategy.

Deciduous Areas: The minimum inter tree spacing (MITD) at establishment, and for areas assessed prior to full implementation of the LLS, will be 0.5 metres[43]for standard well spaced surveys. MITD will not apply for MSQ surveys at either the establishment phase or at the final reforestation assessment survey under the landscape level strategy.

Mixedwood Areas: Mixedwoods will be assessed using MSQ surveys using the standards specified in Section 1.4.3 of this Appendix, consequently there will be no specific MITD for mixedwoods.

1.4 Stocking Requirements

For the purposes of Section 42 of the *FSJPPR* for areas to which the Reforestation landscape level reforestation assessment process applies, the Stocking Standards in Section 1.4.1 will apply as follows:

1. The target stocking standard (TSS) as set out in Table A is required for the SLP and for a landscape level calculation of Maximum Predicted Merchantable Volume (MPMV) at the time of the reforestation assessment (Section 6.29). It is otherwise not used in the final legal assessment of coniferous reforestation success under the Reforestation LLS, as the assessment is based on the cumulative results for all blocks.

2. The minimum stocking standard (MSS) as set out in Table A is required for the SLP and determination of Establishment Delay (Section 6.30). It is otherwise not used in the final legal assessment of reforestation success under the Reforestation LLS, as the assessment is based on the cumulative results for all blocks.

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[42] **Replaces requirements of S 32(6)(d)**

[43] **This is unchanged from the FSJPPR**

1.4.1 Stocking Standards for Coniferous Areas:

Table A below provides a standard for Site Level Plans and determining Establishment Delay (Section 6.30). The Participants may, at their discretion, choose to use an MSQ survey, utilizing the equivalent MSQ numbers included in Table B, to determine establishment delay.

Table A- Coniferous Stocking Standards for Establishment Delay and Max PMV determination

TYPE OF AREA	SITE	MINIMUM # OF TREES/HA (MSS) *	TARGET # TREES/HA (TSS)*	COUNTABLE SPECIES BWBS/ESSF/SWB
CONIFEROUS	XERIC-SUBXERIC	500	1000	SW,PL, BL
CONIFEROUS	SUBMESIC-MESIC	700	1200	SW,PL, BL, SB
CONIFEROUS	SUBHYGRIC	500	1000	SW,PL, BL,SB,LT
CONIFEROUS	HYGRIC-SUBHYDRIC	400	800	SW,PL, BL,SB,LT

***well spaced trees/ha(see Table B for equivalent MSQ values)**
No Specific Minimum heights- adequate height determined in " Crop Tree Requirements and Vegetative Competition"
Minimum strata size is 2 ha contiguous, or 20% of the area in blocks less than 10 ha
Reforestation Assessment completed 15 growing seasons after harvest commencement

Table B - MSQ/Well Spaced Conversions

MSQ Value	# Well Spaced /ha Equivalent

0.0	0
0.3	100
0.7	200
1.2	300
1.7	400
2.1	500
2.5	600
2.8	700
3.1	800
3.3	900
3.5	1000
3.6	1100
3.7	1200
3.8	1300
3.9	1400
3.9	1500
3.9	1600
3.9	1700
4.0	1800

For the purposes of Section 42 of the *FSJPPR* for areas to which the Reforestation landscape level reforestation assessment process applies, the Stocking Standards in Section 1.4.2 will apply as follows:
1. The target stocking standard (TSS) as set out in Table A is required for the SLP and for a landscape level calculation of Maximum Predicted Merchantable Volume (MPMV) at the time of the reforestation assessment (Section 6.29). It is otherwise not used in the final legal assessment of coniferous reforestation success under the Reforestation LLS, as the assessment is based on the cumulative results for all blocks.
2. The minimum stocking standard (MSS) as set out in Table A is required for the SLP and determination of Establishment Delay (Section 6.30). It is otherwise not used in the final legal assessment of reforestation success under the Reforestation LLS, as the assessment is based on the cumulative results for all blocks

1.4.2 Stocking Standards for Deciduous Areas
Well Growing and Forest Health Acceptability Criteria for Deciduous Crop Trees

- **Live aspen tree and the tree pith must not be laterally displaced more than 30 cm from the root crown pith location**
- **Aspen tree must not originate from a cut stump**
- **Aspen tree must have at least one live leader**

- **Aspen tree stem must not have a wound that is greater than 10% of the stem circumference, or is greater than 10% of the total length of the stem**
- **Aspen tree stem must not have any fungal infections or insect infestations affecting tissues below the bark surface, visible without destructive sampling**
- **Aspen tree must not be browsed to such a significant degree so as to limit its ability to become a crop tree**

Table C below provides a standard for Site Level Plans and determining Establishment Delay (Section 6.30). The Participants will choose to use an MSQ survey, utilizing the equivalent MSQ numbers included in Table D, to determine establishment delay.

Table C- Deciduous Stocking Standards for Establishment Delay and Max PMV determination[4]

Type of Area	Site	Min. # of Trees/ha (MSS) *	Target # of Trees/ha (TSS) *	Minimum Height
Deciduous	Xeric-Submesic	1200	4000	1.4 m
Deciduous	Mesic-Subhydric	1200	4000	1.4 m

***well spaced trees/ha (see Table D for equivalent MSQ values)**
Minimum strata size is 2 ha contiguous, or 20% of the area in blocks less than 10 ha
Reforestation Assessment completed 10 growing seasons after harvest commencement
Well growing block assessments can be completed at anytime from 5 growing seasons to 15 growing seasons after harvest commencement[44] - disallowed
Specific establishment delay requirements only – A quadrant is considered stocked if there are 3 acceptable At or Ct or any combination therein over 1m in height. The stratum is considered stocked if there are a minimum of 2000 countable stems.
Specific year 6 or 7 survey requirements. A quadrant is considered stocked if there are 3 acceptable At or Ct or any combination therein over 1.4 metres in height, The stratum is considered stocked if there a minimum of 2000 countable stems.
Countable trees are considered as those trees suitable for selection as crop trees, and are within a minimum of 20% of the height of tallest crop trees selected in the plot.

Table D - MSQ/Well Spaced Conversions Deciduous

MSQ	Well Spaced	MSQ	Well Spaced	MSQ	Well Spaced	MSQ	Well Spaced

[44] **New Applicable Performance Standard to replace 9 yr minimum in S 32 (4) and (S 32(6)(e)(ii) – disallowed)**

	Equivalent		Equivalent		Equivalent		Equivalent
		1	146	2	430	3	1149
0.1	10	1.1	167	2.1	473	3.1	1288
0.2	21	1.2	188	2.2	519	3.2	1453
0.3	34	1.3	211	2.3	571	3.3	1653
0.4	48	1.4	236	2.4	627	3.4	1902
0.5	62	1.5	263	2.5	690	3.5	2224
0.6	77	1.6	291	2.6	760	3.6	2658
0.7	93	1.7	322	2.7	839	3.7	3289
0.8	109	1.8	355	2.8	929	3.8	4324
0.9	127	1.9	391	2.9	1031	3.9	6535

Table E provides the applicable performance standard for stocking requirements to assess the establishment during the reforestation period of a well growing stand of crop trees on deciduous areas that are outside of the landscape strategy population as a result of being 11 growing seasons or more from harvest commencement.

Table E. Stocking Standards for Deciduous Areas Outside of the Landscape Level Population

Type of Area	Site	Min. # of Trees/ha (MSS) *	Minimum Height	Countable species BWBS/ESSF
Deciduous	Xeric-Submesic	4000	1.4 m	At (Pli max 15%)
Deciduous	Mesic-Subhydric	4000	1.4 m	At, Ac, (Birch, Sx, Pli max 15%)

These standards replace the requirements of Section 32(4), (5), (6), and Section 98(1), (2) and (3) as they applied to deciduous areas.

1.4.3 Stocking Guidelines for Mixedwoods in the BWBS

Mixedwood harvested areas that are stratified into discrete conifer and deciduous strata will be managed according to Sections 1.4.1 and 1.4.2 respectively.
The following stocking guidelines utilized Peace District Manager's standards as a guide for intimate mixtures.

Establishment Delay Guidelines

Species	Target MSQ	Minimum MSQ	Regen /Est. Delay
At, Ac, Sw, Pli	3.7	2.8	3

- **"Healthy trees" and "competition from plants, shrubs or other trees" as current standards.**
- **At Establishment delay only, a quadrant should only be considered as stocked with At or Ac if it has at least 3 acceptable At or Ac over 1 m in height.**
- **There is no minimum inter tree distance requirements for MSQ based establishment delay surveys.**
- **Regeneration/Establishment delay assessments should include an inventory label so that potential land classification trajectories can be determined.**

Well Growing Guidelines

Species	Target MSQ	Minimum MSQ	Early Well Growing (Yrs)	Late Well Growing (Yrs)
At, Ac, Sw, Pli	3.7	2.8	15	20

- **"Healthy trees" and "competition from plants, shrubs or other trees" as current standards**
- **For this assessment At & Ac requirements are 1 or more per quadrant**
- **These standards replace the requirements of Section 32(4), (5), (6), and Section 98(1),(2) and (3) as they applied to mixedwood areas.**

Well Growing Criteria

For Aspen

- **Aspen top height must be at least 66% of the tallest tree within the plot**

For intimate mixtures[45] only:

- **Deciduous basal area (BA) must not exceed 8 m2 /ha for Sw and 5 m2/ha for Pli at the Well Growing Assessment as determined from information collected within the plot radius ,or**
- **1/3 of the coniferous crown must be within the deciduous canopy at the Well Growing Assessment and**
- **Sw Coniferous Relative-Height-in-the-Canopy (RHC) must exceed 0.5. (i.e. Sw must be at least 50% of the way through the aspen canopy) and Pli RHC must exceed 0.75.**

For successional mixtures only:

- **Sw height must be 2 m or greater**
- **Sw leader length over the past 3 complete growing seasons must be 20 cm or greater, and**
- **Sw Height Diameter Ratio (HDR) must be 1.0 or less**

- **For all other mixedwood categories :**

[45] **Definitions of Intimate mixtures and successional mixtures are located in Appendix 10 "FSJPP Mixedwood Management Guidelines"**

- **Sw and Pli must be 5 m stem-to-stem in 2 adjacent quadrants and 2 m stem-to-stem in the other 2 quadrants from any At or Ac stems.**

Land Status Classification

- **The target Well Growing mixedwood land status classification will be based upon the classification that characterizes the stand at the time of harvest. The process for classifying areas and tracking forest types over time is included in Appendix 10 "Mixedwood Management Guidelines".**

Survey Guidelines

- **Stocking guidelines are to be evaluated on a plot basis and reported for the block area declared as a mixedwood.**
- **Strata must be clearly mapped.**
- **One (1) plot per hectare (approximately) will be established.**
- **Consistent with the *FSJPPR*, the minimum strata size is two ha, and must be classed as either C, CD, DC, or D.**

1.4.4 Modifying Stocking Standard Requirements

The qualified registered professional may modify target and minimum stocking requirements, however decreases in TSS and MSS require a documented rationale specifying the field conditions that would justify a lower or higher target stocking. Site conditions such as a poor site with a low preharvest stocking, a wet site with limited suitable microsites, are examples of conditions that would justify reduced TSS. These modified target and minimum stocking requirements would require the approval of the District Manager.

If the qualified registered professional who prepared the SLP for the area is of the opinion that the area in the cutblock in which reforestation is required is a complex of different types of sites interspersed, then the minimum and target stocking requirements for the complex are the number of trees per hectare determined by the following procedure:

(i) Estimate the amount of area in each type of site.

(ii) For each type of site, multiply the amount of area of that type by the stocking requirement for that type of site, in accordance with Table A.

(iii) Add the total number of well spaced trees required for all types of sites as determined in (ii).

(iv) Divide the total number of trees required for the complex by the total area of the cutblock.



Appendix 6: Stand Survey & Growth Modeling for the Fort St. John TSA



Development of Models to Predict PMV from MSQ Statistics for Deciduous Stands

Contract Report for Canadian Forest products Ltd Fort St. John, BC

Original: January, 2013 Amended: Nov 2013

Prepared by Craig Farnden PhD RPF Dept. of Forest Resources Management University of British Columbia

1.0 Introduction

This report describes the creation and application of set of models intended to support development of Mean Stocked Quadrant (MSQ) surveys and related stocking standards for deciduous stands in the Peace River region of northeastern British Columbia. It should be considered as an addendum to *Stand Survey & Growth Modeling for the Fort St. John TSA* (J.S. Thrower and Assoc. 2003), and it is assumed here that readers are familiar with the contents of that document. The basic theory and field methods described in the antecedent report continue largely unchanged, with the exception of a few minor alterations as noted in section 2.0

2.0 Deciduous versus Conifer MSQ Assessments

There are two primary differences between conifer and deciduous MSQ surveys and proposed stocking standards:

1. Where conifer stands are assessed at year 15, deciduous stands are assessed at year 10.
2. For conifer stands, management-induced acceleration in growth of newly planted trees is reflected in a reduced number of years to breast height and is recognized through application of the *effective age* concept. Uncertainties in age determination for trembling aspen make this impractical. Corresponding changes have been necessitated in the deciduous compilation procedure, where impacts of *effective age* have been eliminated.

A further addition for deciduous stands is the option for 3 different plot sizes: 30 m^2 (3.09 m radius), 40 m^2 (3.57 m radius) and 50 m^2 (3.99 m radius). However, as of Feb 28, 2013, no decisions have been made with regard to administrative acceptability of plot sizes other than 50 m^2.

3.0 Model Fitting

Models to predict yield from MSQ statistics were generated in a 4-step process:

1. A set of 80 stem maps was generated using routines developed by Farnden (2009). Density[1] levels of root suckers varied in 10 steps from 100 to 51,200 trees/ha, with each density level replicated in 4 spatial patterns (Figures 1 and 2) and 2 temporal patterns of suckering.
2. Stand growth originating from each of the stem maps was simulated using the Tree and Stand Simulator (TASS v. 2) model. Growth of each stand was replicated at 5 levels of site index ranging from 15 to 27 m, with generation of final models expanded to 1 m increments through interpolation.

[1] Stand densities in the modeling environment represent only those trees that would be considered as "acceptable" or "countable" in a field survey - see Section 5.0 for a further

discussion.

3. Stem maps at age 10 were extracted from the TASS output, and simulations were run to generate a sample of 5000 MSQ plots from each stand, using three variations on plot size (30, 40 and 50 m2). The mean of the 5000 plots was assumed to be the true mean for the population for each plot size.
4. The mean MSQ for each stand was used in a modeling exercise to predict merchantable yield at a reference age of 80 years.

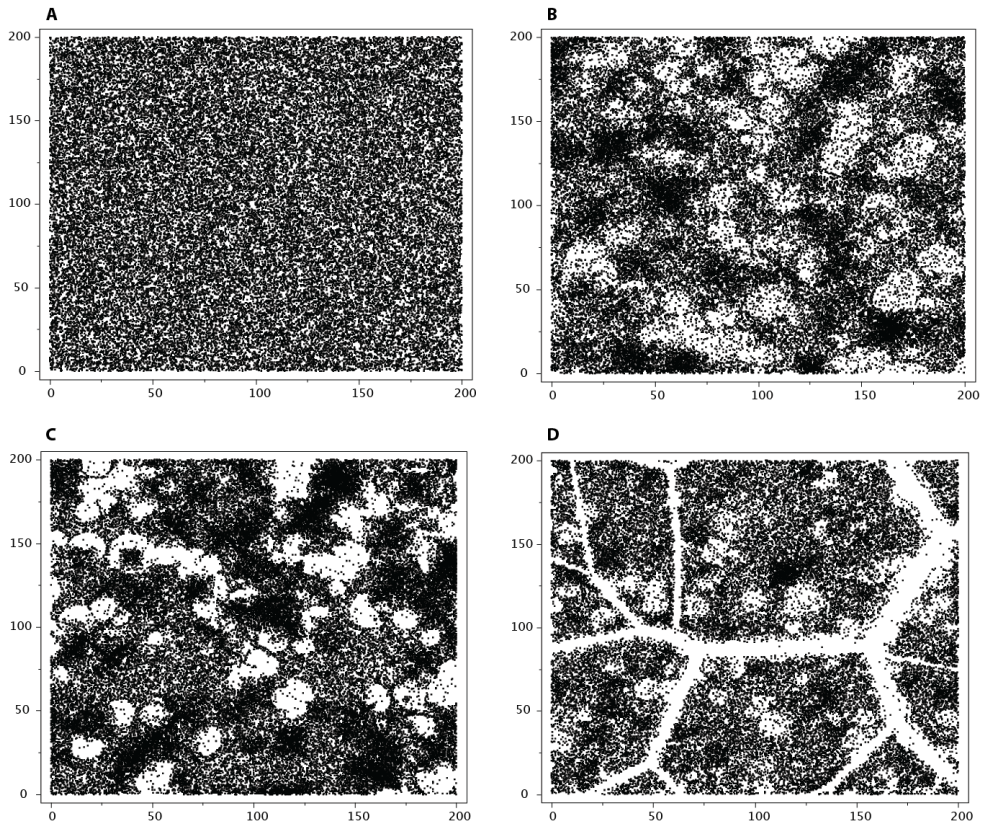


Figure 1. Stem maps illustrating the 4 simulated spatial patterns used to generate deciduous MSQ models, in this case for stands with 12,800 suckers per hectare. The scale is in metres, and each dot represents a tree location. The pattern in (A) represents a completely random distribution, (B) and (C) represent increasing levels of clumping, and (D) builds upon (B) with the addition of linear features such as wet draws and harvest trails that could impact on stocking levels.

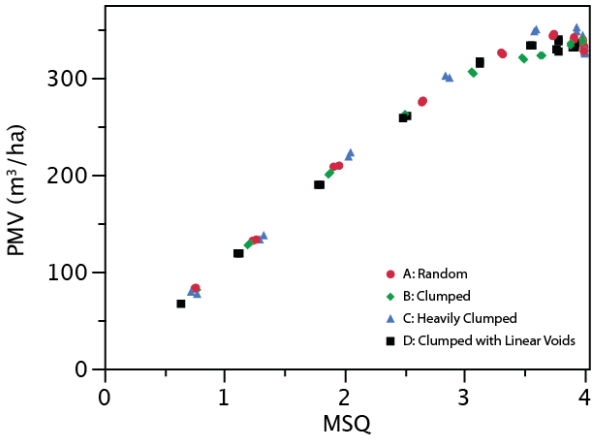


Figure 2. Impact of spatial pattern on relationship between MSQ and PMV for SI50 = 21. The four spatial patterns corresponded to those illustrated in Figure 1, with various points representing variations in establishment density.

A variety of model forms was investigated, with an imposed requirement to "run through zero". The selected model takes the form:

$$PMV = b_0\left(1 - e^{-b_1 \times MSQ^{b_2}}\right)^{b_3}$$

where b_0 is a horizontal asymptote representing the maximum achievable yield (FMV) under full stocking, and where the remaining parameters control a set of sigmoidal curve shapes. Note that for all models, PMV ⇒ FMV as MSQ ⇒ 4. Parameters and fit statistics for the resulting models are provided for SI50=21 in Table 1, with parameter estimates for the remaining models provided in Appendix 1. A table of PMV values by MSQ, SI and plot size is provided in Appendix 2.

Table 1. Parameter estimates and fit statistics for models predicting yield at age 80 for site index = 21 m using MSQ values as predictors.

Plot Size	b0	b1	b2	b3	RMSE	Pseudo
30 m^2	**334.7**	**0.02673**	**4.119**	**0.2165**	**7.05**	**0.994**
40 m^2	**335.0**	**0.002654**	**5.681**	**0.1662**	**6.53**	**0.995**
50 m^2	**335.4**	**0.0001903**	**7.463**	**0.1345**	**6.04**	**0.996**

In the process of developing the deciduous MSQ models, it became apparent that the relationships between PMV and MSQ were strongly polymorphic by site index (see Figure 3). This finding contrasts with the situation for conifer stands where the relationships are assumed to be anamorphic, and PMV could be scaled by site index from a single curve shape. If the

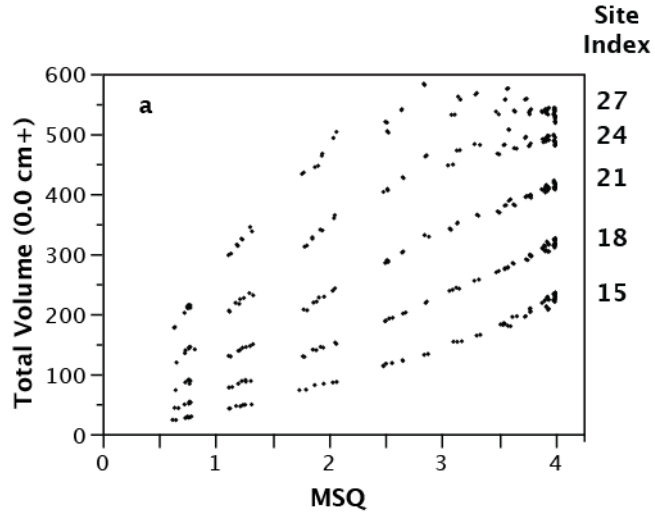


Figure 3a. Impact of growth rates o n PMV curve shape, based on *total* volume. At very high site indices (e. g. SI = 27 m), it takes fewer trees tha n at lower site indices to maximize us e of available growing space. For SI = 21 and lower, total yield continues to increas e right up to MSQ = 4, but yield platea us at lower MSQ's for the higher SI's.

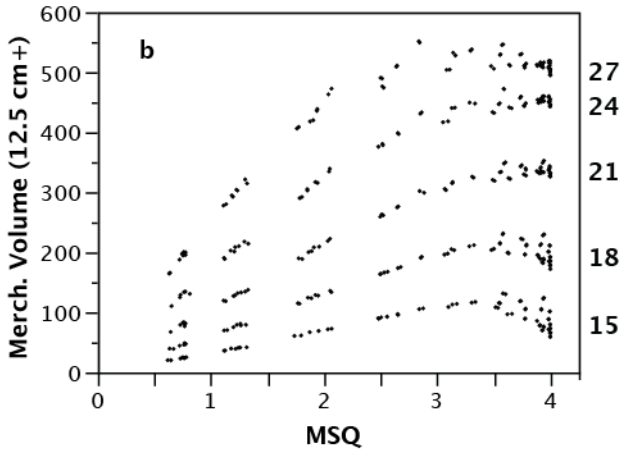


Figure 3b. Impact of merchantabilit y limits on PMV curve shape. For th e lowest site indices, PMV values (mer chantable as opposed to total volume) start to decline at the highest MSQ va lues. This effect results from a signific ant proportion of trees falling below the merchantable dbh limit. This tren d is exacerbated for stands with the h ighest stand densities, which corresp ondingly experience the highest risk of merchantable yield declines. This e ffect is largely absent for site indices 24 and 27.

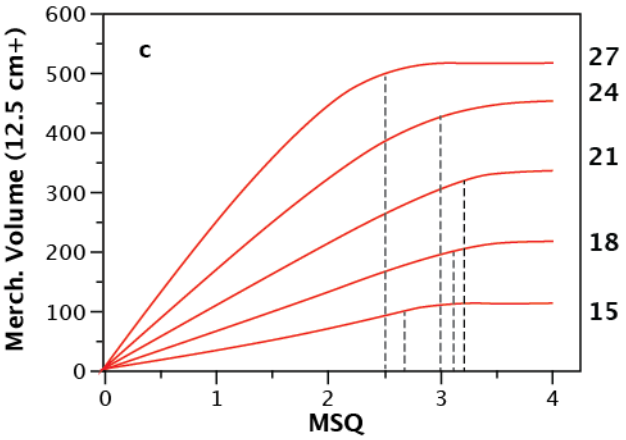


Figure 3c. Impact of site index and merchantability limits on TMV thres holds. PMV curves have been fit to th e data points from 3b. Any stands est ablished at densities above 10,000 tre es/ha for SI's 15 and 18 have been ig nored to avoid the merch volume dro p-off associated with high MSQ values shown in Fig 3b above. Relative to rel ationships for SI=21, SI's 24 and 27 e xperience lower TMV values as a resu lt of improve growing space occupanc y by fewer trees, while SI's 15 and 18 experience lower TMV's as a result of

the merchantable yield reductions associated with high establishment densities (which are strongly correlated to high MSQ's).

conifer approach were to be followed for deciduous stands, the result would be biased outcomes for some site indices, as no one curve would be an appropriate surrogate for all sites.

The net outcome is that there is no single reference site index that can adequately represent th e full range of site indices that might be experienced under operational conditions. For example , the selection of a circum-
median SI = 21 m as the reference SI would result in a stocking standard that is higher than ne cessary for better and poorer sites (Fig 3c), based on the concept of potential yield performanc e. Such an outcome would place an overly restrictive
restocking requirement on licensees working under this system. There
for, despite the difficulty in estimating aspen site index, it is recommended that SI be included in t his system as an input parameter.

In order to utilize site index within the PMV/MSQ assessment procedure, a reasonably reliable estimae of age is required. There are at least two options for achieving this including:

1. assuming that total age is equal to years since harvest (10 years) and that SI is then Simply a function of height, and
2. counting age using bud scale scars on a branch whose origin on the stem is immediately below breast height, or

The first of these options is the most likely to be easily applied in the field and
is recommended. Based on values derived from the computer program Site Tools, a function to derive site index from total height assuming a total age of 10 years was developed as

$$SI = 2.54 + 4.15 \times HT - 0.0845 \times HT^2$$

where HT is the stand top
height (in metres) based on a sample of the fattest tree in each of a set of 0.01 ha plots. The validity
of this model is restricted to a SI50 range from 14 to 28 m. Given that total age is fixed in this method at 10 years, care will be needed to avoid sampling trees that were already established prior to harvest. *Such trees will typically be recognized as emergents*, or trees that are obviou sly taller than the main canopy. In some cases, it may
be possible to confirm that a tree is too old by counting bud scale scars on branches.

Some concern has been expressed that SI values determined for aspen at young ages using t he currently recommended height/age curves will be biased on the high side, based on experie nce with long term monitoring plots starting from sucker regeneration (pers. comm. Richard Ka bzems). For application of the PMV/MSQ models described in this paper, any such bias will have
a minimal impact on decisions regarding acceptability of stocking levels. Of greater concern is

the entry of these SI values into the Results database and ultimately into the forest inventory, w here they will impact future timber supply calculations. A review of this issue with recommendations for operational application and research needs is recommended.

4.0 Well spaced; Conversion to MSQ

In order to explore the relationships between MSQ and WS stocking, an additional set of survey simulations was run on each simulated stand. For each of 4 variations on minimum

inter-
tree distance, 500 plots were assessed at random locations with the mean for each survey/stand combination assumed to be the true mean for the
population. The current stocking standard for deciduous stands, specified in the Fort St. John Pilot Project SFMP, is based on well spaced stocking using a minimum inter-
tree distance (mitd) of 0.5 m and an M value of 50. The TSS is implied to be 10,000 WS trees/ha, with the minimum specified as 4,000 WS trees/ha.

In moving to a stocking standard based on MSQ values, a conversion function is desirable to facilitate the transition. Such a function was derived based on simulated survey outcomes using both systems as illustrated in Figure 4. The resulting equation is a modified Gompertz function where the curve is fixed to "go through zero" and an extra parameter is added as an exponent to the "x" value to allow greater flexibility. The resulting equation is:

$$MSQ = 4.00 * e^{-e^{2-1.85\left(\frac{WS}{200}\right)^{0.322}}}$$

(—)!

with fit statistics of RMSE= 0.073 and pseudo-R^2 = 0.99.

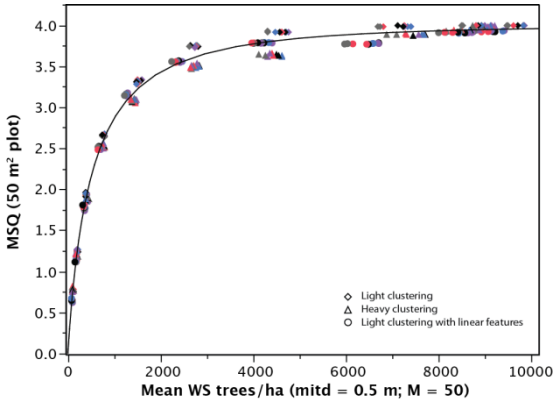


Figure 4. Comparison of simulated WS and MSQ survey outcomes. Spatial patterns correspond to those illustrated in Figures 1B to 1D. Stands with a random spatial pattern were not included.

The reciprocal function is:

$$WS = 200\left(\frac{2 - ln\left(-ln\left(\frac{MSQ}{4}\right)\right)}{1.85}\right)^{3.11}$$

Both of these functions were found to be insensitive to site index, but somewhat sensitive to spatial pattern. The function predicting MSQ from WS trees will slightly overestimate MSQ for relatively uniform stands, and underestimate MSQ for heavily clustered stands (spatial pattern c in Fig. 1

In exploring the relationships between the current WS stocking standards and the proposed MSQ standards, it became apparent that the current deciduous WS standards are poorly suited to evaluating reforestation success using future yield as a criteria for success. The rationale for this conclusion is illustrated in Fig. 6, where TASS-predicted future yields are plotted against simulated survey outcomes. It is apparent that yields are maximized for WS values well below the minimum threshold (MSS) of 4000 WS/ha (mitd=0.5 ; M = 50). The implication suggested here is that, using a yield-based reforestation objective, many stands with WS values below 4000 will be rejected as NSR when they are actually capable of producing perfectly acceptable timber crops. It is also apparent that the use of an mitd as low as 0.5 m results in counting of a large number of redundant WS trees that have no impact on yield.

A yield function based on an mitd of 2.0 m and an M value of 6 is provided in Fig. 6 for comparison. From a yield-based perspective, this option provides equivalent or better precision, while providing a much simpler and cost effective means of assessing stocking.

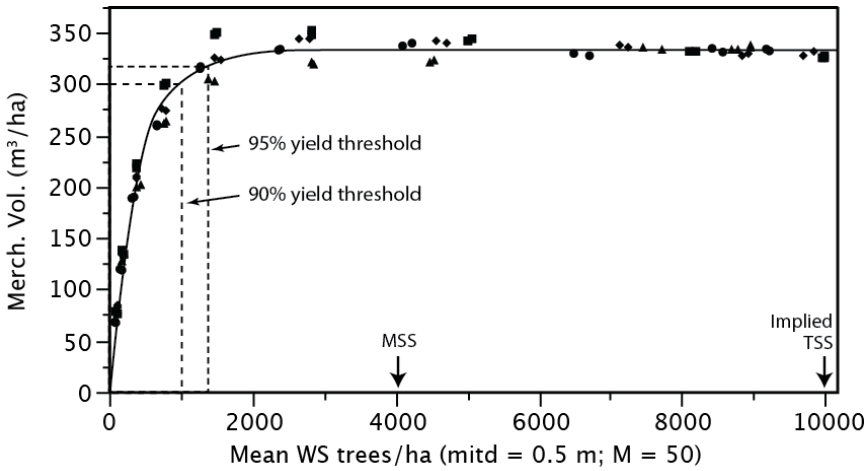


Figure 5. Predicted yield by WS stocking for current stocking standards (MSS = minimum WS). Based on this relationship, it appears thata 0.95 volume threshold would be achieved at

approximately 1400 WS trees/ha. This is roughly equivalent to 2000 to 3000 countable/acceptable trees/ha depending on tree spatial pattern.

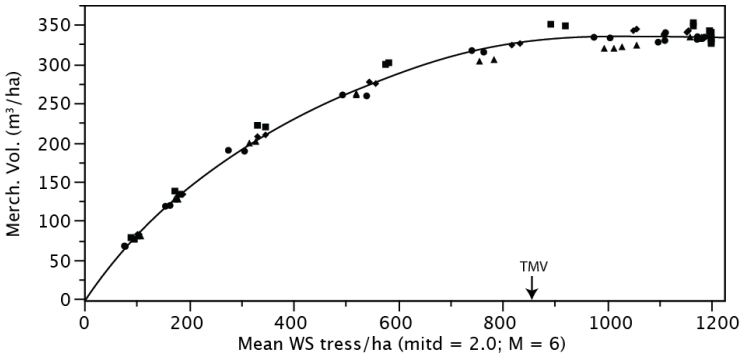


Figure 6. Predicted yield by WS stocking assuming mitd = 2.0 m and M = 6. Based on this relationship, it appears that a 0.95 volume threshold would be achieved at approximately 850 WS trees/ha, or 2000 to 3000 countable/acceptable trees/ha depending on tree spatial pattern.

5.0 Acceptable and Countable Trees

In predicting tree and stand growth using an individual tree model, there are a certain number of poor quality trees whose presence and growth are not well represented in simulations. These trees include those that are genetically inferior or seriously maladapted to the site, or are seriously damaged by agents such as disease, browsing ungulates or hail. For the current project such trees were assumed to have no impact on long term stand dynamics and were eliminate from simulations at the outset. To be compatible, field surveys must follow a similar strategy, and such trees must be ignored in all plot tallies. This is commonly achieved using the concepts of “acceptable" and “countable" trees. In order to be tallied, a tree must meet certain criteria:

1. it must be free of unacceptable damage, and
2. it must be of sufficient vigour and relative size (i.e. > some percentage of top height) that it could form part of the main tree canopy in the future; for trembling aspen this is particularly important because (a) the species is shade intolerant and (b) the species rarely suckers more than 2 years after disturbance, such that trees well behind in height at year 10 are highly likely to have poor long term growth characteristics .

Defining acceptability criteria for aspen is beyond the scope of the current project –if not already available they should be developed by agreement between the Fort St. John

Pilot Project licensees and the BC Ministry of Forests, Lands and Natural Resource Operati
ons.

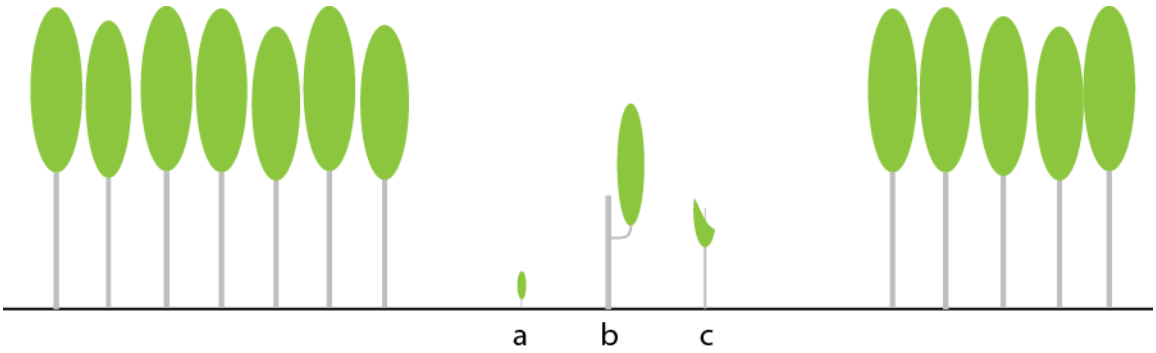


Figure 7. Examples of poor quality trees that should be ineligible for contributing to the stocking of an otherwise unstocked gap. Tree a is of similar age as the rest of the trees but has very low vigour, tree b has sustained serious stem damage and tree c is being continuously browsed by ungulates.

6.0 Impacts of Uncertainty in the TASS Model

The modeling exercise used to develop the MSQ equations in this report depends heavily on the TASS growth model developed by the BC Ministry of Forests, Lands and Natural Resource Operations. It is important to recognize that in building this model, there was no data available for stands at densities less than approximately 2500 trees/ha, and very little data for young stands in general. As a result, some of the model behaviour at low densities and young ages is based on theory and experience with other species rather than on strong empirical evidence.

As illustrated in Figure 8, the density ranges over which critical stocking decisions are being made falls within the range of densities for which there was no calibration data.

Is this a critical problem? Probably not, for the following reasons:

1. A strength of models such as TASS is that they allow us utilize well known principles of forest stand dynamics that apply to all species as a general framework, with adjustments made for individual species. This generality of model construction greatly facilitates interpolation and extrapolation to scenarios where empirical data is weak or missing.
2. At the threshold density for which there is empirical data (2500 trees/ha), the model is predicting yields that are only slightly below the maximum achieved with full stocking.
3. We know from experience with a wide range of species that there is no threshold below which yield drops suddenly with small decreases in establishment density; the drop-off starts slowly and approaches a near-linear pattern as one approaches closer and closer to zero.

Such models are the outcome of extensive work by highly skilled individuals, and generally represent the best information available.

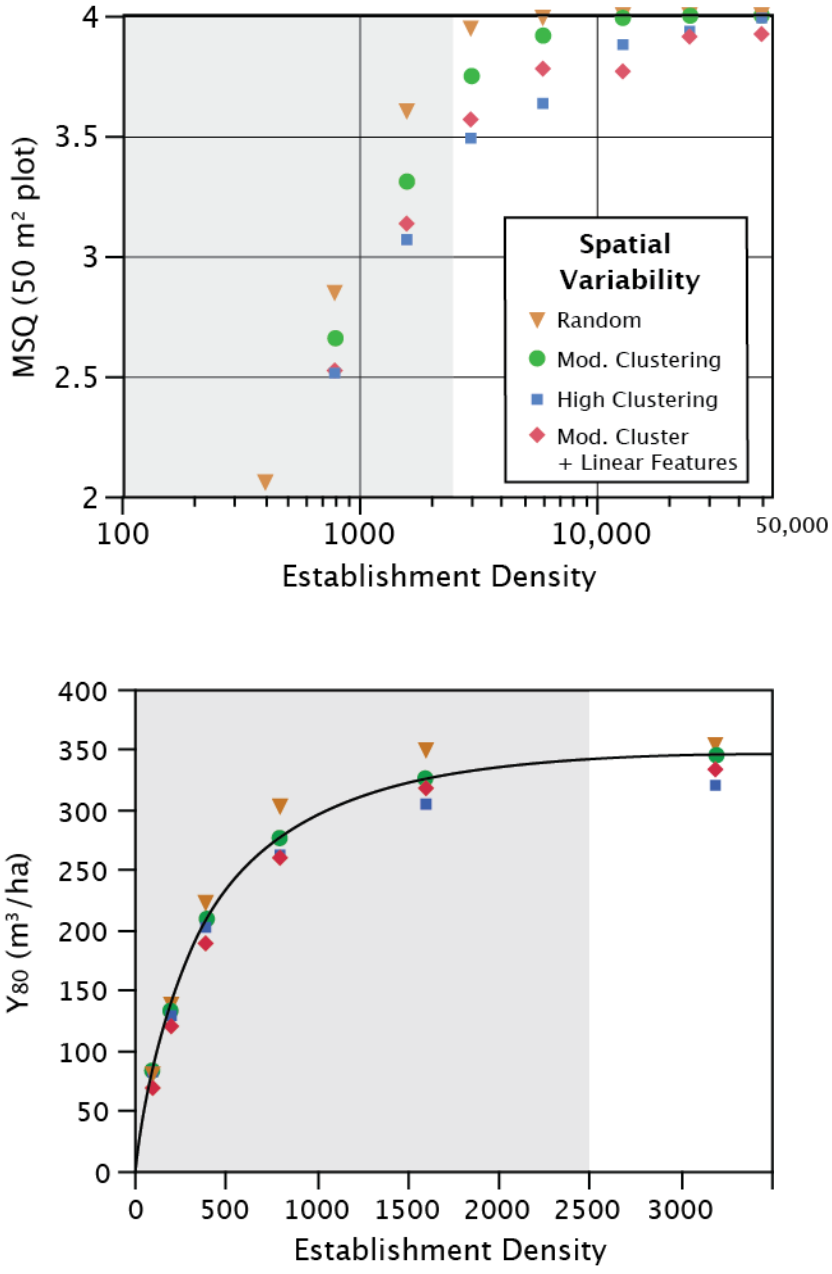


Figure 8. Comparison of total stand densities as modeled in TASS with MSQ values (top) and merchantable yield for SI50 = 21 (bottom). The relationships between these measures vary with spatial pattern, represented here using the four patterns from Figure 1. The grey zones represent stand densities for which there was no calibration data available for TASS. Note that critical MSQ threshold values for stocking acceptability range from 2.5 to 3.25, depending on SI (from Figure 3c). Note also that equivalent total stand densities in the field will be higher whe

ees with unacceptable levels of vigour and damage are i ncluded in the tally.

7.0 Transfer of Risk

The concept of *free growing* in the administration of forest regeneration in British Columbia is a milestone by which the Crown accepts that a harvested unit is acceptably regenerated, and there is minimal risk of future reductions in stocking. In assessing future regeneration performance, the stocking survey is designed to account for the yield impacts of unstocked gaps present at the time of assessment. This includes features such as those characterized by MacIsaac et al. (2006) as persistent preharvest natural gaps, postharvest wet areas, harvest disturbance gaps such as in-block roads, landings and burn piles, and postharvest regeneration voids.

The stocking survey cannot account for stocking issues that may become apparent after the free growing declaration. After this point, the Crown implicitly accepts the risks and consequences for any further damage. To this end, desired conditions at the time of transfer must be defined such that a majority of stands will have a minimal risk of declining to an unacceptable condition. It is important to recognize here that the long term minimally acceptable condition is not the same as that of the free growing threshold, but that the free growing threshold already has an implied safety buffer built in. It must also be recognized, however, that the post-free growing risks and the magnitude of the safety buffer have never been explicitly recognized or quantified in BC. Recent experience with the realization of extensive post-free growing damage to lodgepole pine has brought this issue to the forefront. The degree to which we understand that further stocking losses (as opposed to ongoing and expected self-thinning) might occur needs to be further discussed, and monitoring plots such as those being deployed in the nascent Stand Development Monitoring program will play an important role.

6.0 Summary and Conclusions

It appears from the results of analyses presented in this report that an MSQ-based stocking standard for deciduous (primarily aspen) stands is a viable approach to the administration of reforestation performance by licensees. In comparison to the similar system for conifer stands, there are a few changes necessitated by uncertainty in age determination and the polymorphic nature of the PMV/MSQ relationships by site index. There may also be some work still required to define acceptable/countable stem criteria. Despite an appearance of increased uncertainty for the deciduous MSQ assessment procedure over that for conifer stands, the proposed MSQ standards are a superior approach to the current implementation of WS-based standards.

References

J.S. Thrower and Assoc 2003. *Stand survey & growth modeling for the Fort St. John TSA*. Contract report to Canadian Forest Products ltd., Chetwynd BC.

MacIsaac DA; Comeau PG; Macdonald SE 2006. *Dynamics of regeneration gaps following*

harvest of aspen stands. Canadian Journal of Forest Research 36:1818-1833

Appendix 1: PMV Parameters by Plot Size and Site Index

Data for PMV models were generated using TASS and survey simulations for site indices 15, 18, 21,24 and a27, and an initial set of models were produced. Using these, PMV values were generated for each 0.1 increment of MSQ, and PMV values for th e remaining SI's were interpolated (or extrapolated for SI's 14 and 28) at each 0.1 incremen t of MSQ. The derived values were then used to generate PMV models for the remaining SI' s.

Table 2-1. PMV equation parameters by SI for 50 m^2 plots

SI	b0	b1	b2	b3
14	79.0	1.665×10^{-17}	34.0	0.03534
15	112.0	1.018×10^{-11}	22.92	0.04937
16	146.2	3.377×10^{-6}	11.1	0.09910
17	181.0	3.726×10^{-5}	8.914	0.1225
18	216.6	7.281×10^{-5}	8.21	0.131
19	255.7	1.085×10^{-4}	7.89	0.131
20	295.3	1.483×10^{-4}	7.65	0.132
21	335.4	1.903×10^{-4}	7.46	0.134
22	374.0	.00133	5.990	0.1625
	412.6	3		0.1858
24	451.2	0.007873	4.74	0.2018
25	471.7	0.0275	3.91	0.2438
26	492.1	0.0359	3.97	0.237
27	515.0	0.0182	4.994	0.178
28	538.5	.004895	6.844	0.123

Table 2-2. PMV equation parameters by SI for 40 m^2 plots

SI	b0	b1	b2	b3
14	78.7	8.798×10^{-17}	38.64	0.02882
15	112.0	1.887×10^{-17}	15.46	0.06871
16	146.3	1.348×10^{-4}	8.693	0.1207
19	255.7	0.001137	6.402	0.1535
21	335.0	0.002654	5.681	0.1662
22	373.8	0.006564	5.009	0.1810
24	450.4	0.01804	4.331	0.2012
25	472.0	0.0685	3.404	0.2609
27	515.0	0.07431	3.971	0.2172
28	537.5	0.02552	5.685	0.1403

Table 2-3. PMV equation parameters by SI For 30 m^2 plots

SI		b0		b1		b2		b3
	14	77.86	2.209 x 10^{-7}		17.86		0.0572	
	16	146.5	0.004269		6.197		0.1562	
	17	181.2	0.008118		5.386		0.1765	
	18	215.0	0.009751		5.098		0.1833	
	19	255.7	0.01520		4.691		0.1955	
	20	295.3	0.02095		4.399		0.2065	
	21	334.7	0.02673		4.119		0.2165	
	22	373.7	0.05679		3.565		0.2487	
	23	412.4	0.1012		3.111		0.2868	
	24	450.3	0.1566		2.788		0.3273	
	25	471.9	0.3297		2.295		0.4272	
	27	514.7	0.2149		3.459		0.2421	
	28	537.7	0.05459		6.0230		0.1167	

Appendix 2: PMV Values by Site Index and MSQ

Table 2-1. PMV by MSQ and Site Index for 50 m^2 plot size.

	Site index														
MSQ	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
1.0	0	32	42	52	62	77	91	106	128	148	170	196	223	251	279
1.1	23	36	47	58	69	85	101	117	140	163	186	214	243	273	302
1.2	25	39	51	63	76	93	110	127	152	177	202	232	263	295	325
1.3	28	43	56	69	82	101	119	138	165	191	218	250	283	316	348
1.4	30	47	61	75	89	109	129	149	177	205	233	268	302	337	370
1.5	33	51	66	81	96	117	138	159	189	219	249	285	321	357	391
1.6	36	55	71	87	103	125	148	170	201	232	264	301	339	377	412
1.7	38	59	76	93	110	133	157	180	213	246	279	318	356	395	432
1.8	41	62	80	99	117	141	166	191	225	259	294	333	373	413	451
1.9	44	66	85	105	124	150	176	202	237	273	309	348	388	429	469
2.0	46	70	90	111	131	158	185	212	249	286	323	363	403	445	485
2.1	49	74	95	116	138	166	194	222	260	298	336	376	417	459	499
2.2	52	78	100	122	145	174	203	233	271	310	349	389	429	471	512
2.3	55	82	105	128	152	182	212	243	282	322	362	401	440	482	521
2.4	58	86	110	134	158	190	221	253	293	333	374	412	450	491	528
2.5	61	91	115	140	165	197	230	263	303	344	385	422	459	498	533
2.6	64	95	120	146	172	205	238	272	313	354	395	431	466	504	536
2.7	67	99	125	151	178	212	246	281	322	363	405	438	473	508	538
2.8	70	102	129	156	184	219	254	290	331	372	413	445	478	511	538
2.9	73	106	133	161	190	225	262	298	339	380	421	451	482	513	538
3.0	75	109	137	166	195	232	268	306	346	386	427	456	485	514	538
3.1	78	111	140	170	200	237	274	312	352	392	433	460	487	514	538
3.2	79	112	143	173	204	242	280	318	357	397	438	463	489	515	538
3.3	79	112	144	176	208	246	284	323	362	401	441	466	490	515	538
3.4	79	112	145	178	211	249	288	327	366	405	444	468	491	515	538
3.5	79	112	146	179	213	252	291	330	368	407	447	469	491	515	538
3.6	79	112	146	180	215	253	293	332	370	409	448	470	492	515	538
3.7	79	112	146	181	216	254	294	334	372	410	449	471	492	515	539
3.8	79	112	146	181	216	255	295	335	373	411	450	471	492	515	539
3.9	79	112	146	181	216	255	295	335	373	412	451	471	492	515	539
4.0	79	112	146	181	217	256	295	335	374	412	451	471	492	515	539

Table 2-2. PMV by MSQ and Site Index for 40 m^2 plot size.

	Site index														
MSQ	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
1.0	27	39	50	61	73	90	108	125	150	176	200	232	259	290	321
1.1	30	43	55	68	80	99	118	137	164	191	218	252	281	314	346
1.2	33	47	60	74	88	108	128	148	177	206	234	271	303	337	370
1.3	36	51	66	80	95	117	138	160	190	221	251	290	323	359	393
1.4	39	55	71	87	102	126	149	171	204	236	267	308	342	380	415
1.5	43	59	76	93	110	134	159	183	216	250	283	325	360	399	436
1.6	46	64	82	100	117	143	169	194	229	264	298	341	378	418	456
1.7	49	68	87	106	125	152	179	205	241	278	313	356	393	435	474
1.8	52	72	92	112	132	160	188	216	254	291	328	371	408	450	490
1.9	55	76	98	119	139	169	198	227	265	304	341	385	422	463	503
2.0	59	81	103	125	147	177	208	238	277	316	355	397	434	475	514
2.1	62	85	108	131	154	185	217	248	288	328	367	409	444	485	523
2.2	65	89	113	137	161	193	226	258	299	339	379	419	454	493	529
2.3	69	93	118	143	167	201	234	268	309	349	390	428	462	499	533
2.4	72	97	123	149	174	209	243	277	318	359	399	436	469	505	536
2.5	75	101	128	154	180	216	251	286	327	368	408	444	474	508	537
2.6	78	105	132	159	186	222	258	294	335	376	416	450	479	511	537
2.7	79	108	136	164	192	229	265	301	342	383	423	455	483	513	537
2.8	79	110	139	168	197	234	271	308	349	389	430	459	485	514	537
2.9	79	111	141	171	201	239	276	314	354	395	435	462	488	514	537
3.0	79	112	143	174	205	243	281	319	359	399	439	465	489	515	537
3.1	79	112	145	177	208	247	285	323	363	403	442	467	490	515	537
3.2	79	112	146	178	211	250	288	327	366	406	445	469	491	515	537
3.3	79	112	146	180	213	252	291	329	369	408	447	470	492	515	537
3.4	79	112	146	180	214	253	292	331	370	409	448	471	492	515	537
3.5	79	112	146	181	215	254	294	333	372	411	449	471	492	515	537
3.6	79	112	146	181	215	255	294	334	373	411	450	471	492	515	538
3.7	79	112	146	181	215	255	295	334	373	412	450	472	493	515	538
3.8	79	112	146	181	216	256	295	335	373	412	450	472	493	515	538
3.9	79	112	146	181	216	256	295	335	374	412	450	472	493	515	538
4.0	79	112	146	181	216	256	295	335	374	412	450	472	493	515	538

Table 2-3. PMV by MSQ and Site Index for 30 m2 plot size.

	Site index														
MSQ	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
1.0	32	44	62	77	92	113	133	152	182	211	239	274	309	346	382
1.1	36	49	68	85	100	123	144	166	197	228	259	296	333	371	407
1.2	39	53	74	92	109	133	156	179	212	245	278	317	356	394	431
1.3	42	57	80	99	117	143	168	191	227	262	296	336	376	415	454
1.4	46	62	86	106	125	152	179	204	241	277	313	354	394	435	474
1.5	49	66	92	113	133	162	190	216	255	292	329	370	411	452	492
1.6	52	70	98	120	141	171	200	228	268	306	344	385	425	466	507
1.7	56	75	103	127	149	180	211	239	280	319	358	398	438	479	519
1.8	59	79	109	133	157	189	220	250	292	332	371	410	448	489	527
1.9	62	83	114	139	164	197	230	260	303	343	383	420	458	496	533
2.0	66	87	119	145	171	205	239	270	313	353	393	429	465	503	536
2.1	69	91	124	151	177	213	247	279	322	363	403	437	471	507	537
2.2	72	95	128	156	183	220	255	288	331	371	411	444	477	510	538
2.3	75	99	132	161	189	226	262	295	338	378	418	450	481	512	538
2.4	77	102	136	165	194	232	268	302	345	385	424	454	484	513	538
2.5	78	105	139	169	199	237	274	309	351	390	430	458	486	514	538
2.6	78	107	141	172	202	241	279	314	356	395	434	461	488	514	538
2.7	78	109	143	175	206	245	283	319	360	399	438	464	489	515	538
2.8	78	111	145	177	208	248	286	323	363	402	441	466	490	515	538
2.9	78	111	145	179	211	250	289	326	366	405	443	467	491	515	538
3.0	78	112	146	180	212	252	291	328	368	407	445	469	492	515	538
3.1	78	112	146	180	213	253	292	330	370	408	447	469	492	515	538
3.2	78	112	146	181	214	254	293	332	371	410	448	470	492	515	538
3.3	78	112	146	181	214	255	294	333	372	411	448	471	492	515	538
3.4	78	112	146	181	215	255	295	334	373	411	449	471	492	515	538
3.5	78	112	146	181	215	255	295	334	373	412	449	471	492	515	538
3.6	78	112	146	181	215	256	295	334	373	412	450	472	492	515	538
3.7	78	112	146	181	215	256	295	334	373	412	450	472	492	515	538
3.8	78	112	146	181	215	256	295	335	374	412	450	472	492	515	538
3.9	78	112	146	181	215	256	295	335	374	412	450	472	492	515	538
4.0	78	112	146	181	215	256	295	335	374	412	450	472	492	515	538

Appendix 7: Listing of Invasive Plants

BC Proposed Prohibited Weeds

The following invasive plant species are not present in BC or are present but extremely limited in extent, and pose a significant threat to BC's environment, economy and/or human health. These species have been identified as a result of an extensive review that considered their regulation and status in BC and bordering jurisdictions, presence elsewhere in similar environments to those that occur in BC, and listing under federal regulations. These invasive plant species are proposed BC Prohibited Weeds and candidates for the BC Early Detection Rapid Response Program.

Common Name	Scientific Name	Type
African-rue	*Peganum harmala* L.	Terrestrial
Black Henbane	*Hyoscyamus niger* L.	Terrestrial
Brazilian Elodea/ Waterweed	*Egeria densa Planch.*	Aquatic - submerged, rooted
Camel Thorn	*Alhagi maurorum* Medik.	Terrestrial
Common Crupina	*Crupina vulgaris* Cass.	Terrestrial
Common Reed, European	*Phragmites australis* (Cav.) Trin. ex Steud. *subsp. australis*	Semi aquatic - emergent
Cordgrass, Dense-flower	*Spartina densiflora* Brongn.	Semi-aquatic - tidal
Cordgrass, Salt Meadow	*Spartina patens* (Aiton) Muhl.	Semi-aquatic - tidal
Cordgrass, Smooth	*Spartina alterniflora* Loisel.	Semi-aquatic - tidal
Cordgrass, Common	*Spartina anglica* C.E. Hubbard	Semi-aquatic - tidal
Dyer's Woad	*Isatis tinctoria* L.	Terrestrial
Eggleaf Spurge	*Euphorbia oblongata* Griseb.	Terrestrial
False-brome, Slender	*Brachypodium sylvaticum* (Huds.) P. Beauv.	Terrestrial
Foxtail, Slender/Meadow	*Alopecurus myosuroides* Huds.	Terrestrial
Goatsrue	*Galega officinalis* L.	Terrestrial
Halogeton/Saltover	*Halogeton glomeratus* (M. Bieb.) C.A. Mey.	Terrestrial
Hawkweed, Mouse-ear	*Hieracium pilosella* L.	Terrestrial
Hyacinth, Water	*Eichhornia crassipes* (Mart.) Solms	Aquatic - semi-emergent
Hydrilla	*Hydrilla verticillata* (L. f.) Royle	Aquatic – submerged, rooted
Johnsongrass	*Sorghum halepense* L.	Terrestrial
Jointed Goatgrass	*Aegilops cylindrica* Host	Terrestrial
Knapweed, Squarrose	*Centaurea virgata* Lam. ssp. squarrosa (Boissier) Gugler	Terrestrial
Kudzu	*Pueraria montana* (Lour.) Merr. var. lobata (Willd.) Maesen & S. Almeida	Terrestrial
Meadow Clary	*Salvia pratensis* L.	Terrestrial

B.C. Proposed Prohibited Weeds

Common Name	Scientific Name	Type
Medusahead	*Taeniatherum caput-medusae* (L.) Nevski	Terrestrial
Nightshade, Silverleaf	*Solanum elaeagnifolium* Cav.	Terrestrial
North Africa Grass	*Ventenata dubia* (Leers) Coss.	Terrestrial
Nutsedge, Purple	*Cyperus rotundus* L.	Terrestrial
Nutsedge, Yellow	*Cyperus esculentus* L.	Terrestrial
Pepperweed, Perennial	*Lepidium latifolium* L.	Terrestrial
Red Bartsia	*Odontites serotina* Dum.	Terrestrial
Reed, Giant	*Arundo donax* L.	Terrestrial
Sage, Clary	*Salvia sclarea* L.	Terrestrial
Sage, Mediterranean	*Salvia aethiopis* L.	Terrestrial
Spring Milletgrass	*Milium vernale M. Bieb.*	Terrestrial
Spurge Flax	*Thymelaea passerina* (L.) Coss. & Germ.	Terrestrial
Starthistle, Iberian	*Centaurea iberica* Trev. ex Sprengel	Terrestrial
Starthistle, Purple	*Centaurea calcitrapa* L.	Terrestrial
Starthistle, Yellow	*Centaurea solstitialis* L.	Terrestrial
Syrian Bean-Caper	*Zygophyllum fabago* L.	Terrestrial
Texas Blueweed	*Helianthus ciliaris* DC.	Terrestrial
Thistle, Italian	*Carduus pycnocephalus* L.	Terrestrial
Thistle, Slenderflower	*Carduus tenuiflorus* W. Curtis	Terrestrial
Velvetleaf	*Abutilon theophrasti* Medik.	Terrestrial
Water soldier	*Stratiotes aloides L.*	Aquatic – submerged/emergent, rooted

PRRD Regional Early Detection Rapid Response (REDRR)

Regional EDRR species are a significant threat and is new to the area under consideration. The achievable management objective is eradication. This list includes brand new incursions and high risk invasive plant species that are extremely limited in extent (i.e. have less than 10 very small sites) in the area under consideration. Some of these species may not be present within the PRRD but are found in adjacent areas and are at risk of being introduced.

Common Name	Latin Name	Occurrences/Threat
Baby's breath	*Gypsophila paniculata*	Not present at this time
Big Head knapweed	*Centaurea macrocephala*	One infestation of 6 plants discovered in 2013, is a provincial EDRR species
Blueweed	*Echium vulgare*	Not present at this time

Bohemian knotweed	*Fallopia x bohemica*	Not present at this time
Brown knapweed	*Centaurea jacea*	Exists in the NWIPC along Highway 16.
Cheat grass	*Bromus tectorum*	Not present at this time
Chicory	*Cichorium intybus*	*1 site found in 2013. Numerous sites found in southern BC.*
Creeping bell flower	*Campunaula rapunculiodes*	One small infestation discovered in 2013
Cypress spurge	*Euphorbia cyparissias*	The New Invaders Program notes cypress spurge to be a problem in the Hudson's Hope area. This invasive plant is highly aggressive and toxic.
Field Scabious /Blue button	*Knautia arvensis*	One site between Arras and Groundbirch, may still be sold in nurseries
Giant knotweed	*Polygonum sachalinense*	Not present at this time
Himalayan balsam/Policeman's Helmet	*Impatiens glandulifera*	Horticulture plant in a few gardens in Dawson Creek. 1 new site discovered in 2014.
Himalayan knotweed	*Polygonum polystachyum*	Not present at this time
Hoary alyssum	*Bereroa incana*	Sites present in the Prince George area.
Hoary cress	*Cardaria draba*	None present at this time
Hound's tongue	*Cynoglossum officinale*	Two sites previously mis-identified, plant is under effective bio-control in southern portions of BC since 2007.
Japanese knotweed	*Fallopia japonica*	Not present at this time
Leafy spurge	*Euphorbia esula*	Present in Grande Prairie AB
Marsh plume thistle	*Cirsium palustre*	Less than 10 sites documented with 3 sites under control.
Mountain bluet	*Centaurea Montana*	Noted in horticulture settings in 2011 historically at Telegraph Creek BC
Nodding thistle	*Carduss nutans*	Not present at this time, exists in the NWIPC along Highway 16.
Plumeless thistle	*Carduus acanthoides*	Found in Trail, BC and has biocontrol agents.
Purple loosestrife	*Lythrum spp.*	Present in Grande Prairie AB
Rush skeletonweed	*Chondrilla juncea*	No sites in the PRRD to date
St. John's Wort or goatweed	*Hypericum perforatum*	No sites reported

Sulphur cinquefoil	*Potentilla recta*	Not present at this time
Tansy ragwort	*Senecio jacobeae*	No sites reported
Tartary buckwheat	*Fagopyrum tataricum*	No known sites in the region
Wild parsnip	*Pastinaca sativa*	One small infestation discovered in 2013.

PRRD Category A High Priority for Eradication and Containment		
These invasive plants are highly competitive, have the ability to spread rapidly, and pose as significant threat.		
Common Name	**Latin Name**	**Occurrences/Threat**
Burdock	*Arctium spp.*	Historic sites in Taylor along the rail line, Lynx Creek subdivision at Hudson's Hope, Clayhurst area and areas along the Peace, Jackfish Lake area, and Groundbirch community pastures and East Pine, 46 sites in 2012
Comfrey	*Symphytum spp*	Two sites in Chetwynd, one in Fort St. John ID'd in 2012.
Common tansy	*Tanacetum vulgar*	. Likely present since homesteader times, medicinal plant used to keep insects away and induce miscarriage.
Dalmatian toadflax	*Linaria dalmatica*	Present in small patches since 1987 south of Charlie Lake. Currently there are 45 sites, largest site at the Peace Lookout 7 ha., occupying private and crown land, initial site was small, but present since 1991.
Diffuse knapweed	*Centaurea diffusa*	One historical site within BC HYDRO's Site C. Plant may have spread outwards, need better education around identification and reporting
Green foxtail	*Sertaria viridis*	Plant is difficult to see as it heads out later in the summer, few sporadic sites in Cecil Lake, Hudson's Hope highway, historically in Dawson Creek, Fort St. John, Chetwynd, and Taylor, and the 103 road.
Meadow goat's-beard or salsifly	*Tragopogon pratensis*	Sporadic distribution.
Orange hawkweed	*Heiracium aurantiacum*	62 sites, noted since 1994, sporadic infestations in the region, see notes under yellow

		hawkweed
Russian thistle	*Salsola kali*	Present in the Stewart Lake Gravel Pit, East Pine, historically in Taylor
Spotted knapweed	*Centaurea biebersteinii*	Historically, there were 12 spotted knapweed sites in 1999, 14 in 2000 and 15 in 2001, 2002 and 2003. New IAPP records indicate a total of 24 sites infesting approximately 10 ha in 2011, there were 26 sites spread throughout the area
Invasive yellow hawkweeds	*Pilosella spp.*	Inventory began in 2005. There were 199 sites in 2008, currently there are 108 sites located in the region located at Mile 137 Alaska Highway, Monkman, Tumbler Ridge, Johnson Creek and the Hudson's Hope area. Treatments have occurred since 2007.
Wild caraway	*Carum carvi*	Prevalent north of Pink Mountain, historical infestation at Site C.

PRRD Category B – Medium Priority for Eradication and Containment		
Primary invasive plants have the ability to spread rapidly but are not as aggressive as Category A plants, or have become naturalized, are still considered a threat to the fine seed industry.		
Common Name	**Latin Name**	**Occurrences/Threat**
Annual bluegrass	*Poa Annua*	Present on local golf courses and worldwide on lawns.
Common toadflax	*Linaria vulgaris*	Under biological control since the 1950's, larger patches are surveyed and treated if threatening farm land.
Creeping (Canada) thistle	*Cirsium arvense*	Wide spread, are surveyed and treated if threatening farm land.
Kochia	*Kochia scoparia*	Historically in commercial lots, landfill sites and gas plant at Taylor, minor amounts on private land, Beatton Hills on Cecil Lake

		Road
Night-flowering catchfly	*Silene noctiflora*	Seeds introduced with alfalfa. Important to review seed analysis prior to purchasing seed.
Oxeye daisy	*Chrysanthemum leucanthemum*	Prevalent in Southern BC, Pine Pass and Hudson's Hope several sporadic infestations showing up throughout the region
Scentless chamomile	*Matricaria perforata*	Widespread in the area, rare in southern BC.
Tall/Meadow buttercup	*Ranunculus acris*	First occurrence noted in 2011, species was confirmed in 2013 as *Ranuculus acris.* More infestation discovered in 2013

Other invasive plants may be added to this list as made know by the District Manager.

Appendix 8: Soil Disturbance Information



Appendix 9: Mixedwood Management Guidelines



Appendix 10: Procedure for Selecting Sample Trees in Operational Cruising for Use in Site Index Calculations

Procedure for Selecting Sample Trees in Operational Cruising for Use in Site Index Calculations

The cruiser must first determine the leading species in the plot based on live basal area. In variable radius (prism) plots this can easily be done by determining the species with the highest live stem count as each tree represents equal basal area. In fixed area plots leading species can be approximated by a live stem count in the field as well (has been shown to be accurate 90% of the time).

Once leading species has been determined, select the largest diameter, live, leading species tree within a 0.01 ha area (5.64m radius plot). This tree must be suitable to use as a height and age sample. If the selected tree is not suitable, use the 2nd largest diameter, live, leading species tree within the 0.01 ha area.

Examples of trees that are not suitable for height samples include:

- **broken top**
- **significant dead top**
- **fork or crook that significantly affects height growth**
- **abnormally high amount of scarring or other damage that may have affected height growth (small to moderate scarring is still suitable to use as a sample)**

Examples of trees that are not suitable for age samples include:

- **rotten cores**
- **residual trees (Mature veterans in an immature stand - please note these trees should still be recorded as TC 5's on the cruise card)**

In situations where there is a secondary coniferous species that contributes greater than or equal to 20% of the basal area in an individual plot, the above procedures should be repeated for the secondary coniferous species as well.

All sample tree information (both leading and secondary species information) must be keypunched into the Card Type 3 in the compilation program.

If there are no trees within the 5.64m radius plot, select the most suitable tree (following the standards listed above) within the cruise plot as the sample tree to determine the Maturity Class for the plot for use in the appraisal cruise. Sample trees taken from outside the 5.64 m radius must not be keypunched in the Card Type 3 in the compilation program.



Appendix 11: Stream Crossings and Seasonal Bridge Installation and Removal Procedures



Appendix 12: ROS Polygon Delineation Standards



ROS Polygon Delineation Standards

ROS Class	Factors					
	Remoteness		Naturalness		Social Experience	
	Distance from road (km)	Size (ha)	Motorized Use	Evidence of Humans	Solitude/Self-reliance	Social Encounters
Primitive (P)	>8	>5000 ha	occasional air access, otherwise no motorized access or use in the area	very high degree of naturalness structures are extremely rare generally no site modification little on-the-ground evidence of other people evidence of primitive trails	very high opportunity to experience solitude, closeness to nature; self-reliance and challenge	very low interaction with other people very small party sizes expected
Semi-Primitive Non-Motorized (SPNM)	> 1	> 1000 ha	generally very low or no motorized access or use may include primitive roads and trails if usually closed to motorized use	very high degree of naturalness structures are rare and isolated except where required for safety or sanitation minimal or no site modification little on-the-ground evidence of other people	high opportunity to experience solitude, closeness to nature, self-reliance and challenge	low interaction with other people very small party sizes expected
Semi-Primitive Motorized (SPM)	> 1	> 1000 ha	a low degree of motorized access or use	high degree of naturalness in the surrounding area as viewed from access route structures are rare and isolated minimal site modification some on-the-ground evidence of other people evidence of motorized use	high opportunity to experience solitude, closeness to nature, self-reliance and challenge	low interaction with other people small party sizes expected

ROS Class	Factors					
	Remoteness		Naturalness		Social Experience	
	Distance from road (km)	Size (ha)	Motorized Use	Evidence of Humans	Solitude/Self-reliance	Social Encounters
Roaded Natural (RN)	< 1	N/A	moderate amount of motorized use within the area may have high volume of traffic through the main travel corridor	moderate degree of naturalness in surrounding area structures may be present and more highly developed moderate site modification some on-the-ground evidence of other people some on-site controls typically represent main travel corridors and recreation areas that have natural-appearing surroundings	moderate to high opportunity to experience solitude, closeness to nature, self-reliance and challenge	moderate interaction with other people small to large party sizes expected
Roaded Modified (RM)	< 1	N/A	moderate to high degree of motorized use for both access and recreation	low degree of naturalness moderate number of more highly developed structures highly modified in areas; generally dominated by resource extraction activities on-the-ground evidence of other people and on-site controls	low to moderate opportunity to experience solitude, closeness to nature, self-reliance and challenge	moderate to high interaction with other people moderate to large party sizes expected
Rural (R)	< 1	N/A	high degree of motorized use for both access and recreation	very low degree of naturalness complex and numerous structures, high concentrations of human development and settlements	low opportunity to experience solitude, closeness to nature, self-reliance and	high interaction with other people large party sizes

ROS Class	Factors					
	Remoteness		Naturalness		Social Experience	
	Distance from road (km)	Size (ha)	Motorized Use	Evidence of Humans	Solitude/Self-reliance	Social Encounters
				associated with agricultural land obvious on-the-ground evidence of other people and on-site controls	challenge	expected
Urban (U)	< 1	N/A	very high degree of motorized use for both access and recreation	very low degree of naturalness higly developed and numerous structures associated with urban development very high site modification obvious on-the-ground evidence of other people and on-site control	very low opportunity to experience solitude, closeness to nature, self-reliance and challenge	very high interactions with other people very large party sizes expected



Appendix 13: WTP Retention Target Calculation

Landscape Unit	Forested Area		% Available for Harvest	Harvested with no WTR		Harvested with WTR		WTR	WTR %	Target with LU Objectives	Target No LU Objectives	SFMP targets	Comments
	Total	THLB		Area	%	Area	%						
Blueberry	484,522	319,555	66%	57,107	17.9 %	1,681	1%	163	10%	6%	9%	6%	High intensity zone, accept higher risk to biodiversity
Halfway	155,063	71,299	46%	9,574	12.9 %	704	1%	98	14%	3%	6%	3%	High intensity zone, increase to 3% (from 2%) to fall within Delong range of 3-15% in fire
Kahntah	233,653	120,656	52%	6,763	5.6%	272	0%	60	22%	3%	7%	7%	Medium intensity- use rating consistent with greater protection of biodiversity
Kobes	115,901	74,271	64%	14,433	19.2 %	307	0%	26	8%	5%	8%	5%	High intensity zone, accept higher risk to biodiversity
Lower Beatton	94,349	51,167	54%	15,050	29.4 %	0	0%	0	0%	5%	8%	8%	Medium intensity- use rating consistent with greater protection of biodiversity
Milligan	157,627	74,271	47%	3,145	4.2%	0	0%	0	0%	3%	6%	6%	Medium intensity- use rating consistent with greater protection of biodiversity
Tommy	401,001	107,677	42%	13,207	7.7%	2,802	2%	304	11%	2%	5%	3%	High intensity zone,

Lakes											increase to 3% (from 1%) to fall within Delong range of 3-15% in fire
Trutch	258,178	107,677	42%	2,288	2.1%	90	0%	40	44%	2%	5%	5%	Medium intensity- use rating consistent with greater protection of biodiversity
Sikanni	98,455	30,853	31%	0	0.0%	0	0%	0	0%	1%	4%	4%	Low intensity- use rating consistent with greater protection of biodiversity
Graham	219,455	54,687	25%	96	0.2%	0	0%	0	0%	1%	4%	4%	Low intensity- use rating consistent with greater protection of biodiversity
Crying Girl	62,085	29,931	48%	969	3.2%	1,788	6%	210	12%	3%	6%	6%	Medium intensity- use rating consistent with greater protection of biodiversity
Total All LU's	2,280,291	1,106,746	49%	122,631	11.0%	7,644	1%	901	12%	3%	6%		

Appendix 14: Public Input Process

Copy of public advertisement of SFMP# 3.

Following is the notice of SFMP# 3 public review printed in the December 17 and 24, 2015 and January 21, 2016 editions of the Northeast News and the December 17 and 21, 2015 and January 21, 2016 editions of the Alaska Highway News.

NOTICE OF PUBLIC REVIEW OF SUSTAINABLE FOREST MANAGEMENT PLAN# 3

The Participants in the Fort St. John Pilot Project, which include the major forest licensees and BC Timber Sales, who operate in the Fort St. John Timber Supply Area, have developed Sustainable Forest Management Plan #3 (SFMP# 3). The SFMP will provide strategic direction to future forestry operations in the Fort St. John Timber Supply Area. This SFMP has been developed with input from a Public Advisory Group representing interests from a wide variety of sectors. The SFMP includes landscape level strategies that will be implemented by the Participants to address resource issues that may be impacted by their activities.
The SFMP is available for public review and comment from December 21st, 2015 until March 30th, 2016. Copies of the SFMP are available for review between 8:30 a.m. and 4:00 p.m., Monday to Friday, until March 30th, 2016 at the following locations:
B.C. Timber sales: 9000 -17th Street, Dawson Creek, B.C.
Canfor: 9312 - 259 Road, Fort St. John, B.C.
A copy of the SFMP is also available at **http://www.fsjpilotproject.com/**
Revisions may be made to the SFMP as a result of comments received during the review period. Written submissions received prior to 4 pm March 30th, 2016 are welcome, and should be sent to:
Darrell Regimbald RPF
(250) 787-3651
Planning Coordinator
Forest Management Group
Canadian Forest Products Ltd.
RR# 1, Site 13, Compartment 2, Fort St. John B.C. V1J 4M6
Email: darrell.regimbald@canfor.com

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For Hire: Currently hiring Caregiver to look after my 2 children: 4 year old girl and 2 year old boy. Position is permanent, full time at a rate of $11.50/hour for 40 hours/week. Completion of Secondary School : some college/CEGEP/vocational or related field. 1 to 2 years experience supervision or care for children. Accommodation could be available on a live-in basis at no cost, but is not a condition of employment. Main duties include: Supervise and care; assist/ guide children on personal hygiene; meal preparation; organize and participate in children activities and may perform light housekeeping. Qualified applicant may apply via email joan24garcia@yahoo.com 12.17-



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The successful candidate will be responsible to write multiple news stories a week, take photographs to accompany stories, attend community events as well as design and layout

NOTICE

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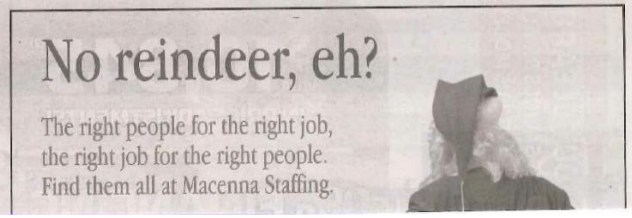
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Email: **darrell.regimbald@canfor.com**

CANFOR

HELP WANTED



unsellor uses nightmare technique to help clients

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at while in a dream-like 's true desires. When the ever, their heart is trying olution must happen.

Holistic Counselling and swers but what they first rs they seek, may not be ould be.

is active and much more to Sabrina Trobak, a reg- ring the dream state, that nes from a time in their out for years. According solved, they are likely to

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neans but a general con- or us to try to sort out and minds haven't been able

who have suffered from ll be more susceptible to nts she sees are there for tmares are symptom of a its own.

who do have nightmares, nortly after a person falls

nscience and aware even wake ourselves up from

ing in who were having nightmares and while their parents were trying to console them, they were not treating the casual issues such as stress or trauma and the bad dreams kept coming back.

During the waking hours, the children would do other things to keep from thinking about the dreams such as reading, playing a game or watching a movie but in the night, the dreams reoccurred.

"In essence what we do is...we face the nightmares, so we talk about them. We don't talk about them in a way that causes them more stress," he said.

For example instead of saying 'that must be terrible,' which can give the nightmare more power, they talk about it in mundane terms as though they were discussing the weather.

"People with nightmares want to normally be around people who feel they have a strength and a capability and not somebody who succumbs to the same terror," said Martens.

According to Trobak, there are certain themes within the nightmares that are universal: dreams of running from something, falling or even teeth falling out, are all anxiety based.

"When we have someone who's gone through lots of trauma, especially as a child, when we grow up, that trauma, if we don't resolve it, it's still there," she said.

The trauma, she explained, sits more in the subconscious and can thus come out at night. For people who have drug problems, relationship issues, anger issues, along with other problems, what generally happens is that people learn coping mechanisms such as meditation and breathing exercises but not necessarily curing the problem.

"If you have anger, you can cope with the anger but the anger's not going to go away, it stays there. What we say is 'there's something else here,' there's something that's feeding all of these things (for example: anxiety or addiction)," she said.

Trobak explained that for people with alcohol issues, alcohol is not the real problem but rather a symptom of some underlying, unresolved issue.

"Alcoholics Anonymous (AA) success rate for AA, 2 per cent...if we just deal with the alcohol, we're missing

Continued on Page 22.

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CANFOR

Pacific Northern Gas Ltd.

Website Notice of SFMP# 3 Public Review

Copy of public advertisement of SFMP# 3, posted on FSJ Now website December 18, 2015.



Appendix 15: Fort St. John TSA Timber Supply Analysis Report



Appendix 16: Development of Carbon Curves for Analysis Units Within the Fort St. John TSA



Appendix 17: Silviculture Survey Methodology for Boreal Mixedwoods (Farnden Report)



Appendix 18: Glossary



S.F.M.P. Glossary

Allowable Annual Cut (AAC)

The annual rate of timber harvesting specified for an area of land by the Chief Forester of the BC Ministry of Forests. The Chief Forester sets AAC's for timber supply areas (TSA's) and Tree Farm Licences (TFL's) in accordance with Section 8 of the *Forest Act*.

Abiotic

Not of biological origin (see biotic), e.g., windthrow, forest fires, flooding.

Access Management

The planning, construction, maintenance, use and deactivation of all roads. May also refer to approved methods of restricting access to certain areas to protect other values**.**

Access Structure

A structure within a cutblock that

a) is either a permanent access structure or a temporary access structure, and
b) was constructed for facilitating the harvesting of timber within the cutblock.

Accumulations

Term used in reference to waste calculations on post harvested areas. It measures the amount of waste in areas that have been piled and accumulated along the road or on a landing.

Act

The Forest Practices Code of British Columbia Act.

Adaptive Management

A learning approach to management that incorporates the experience gained from the results of previous actions into decisions. It is a continuous process requiring constant monitoring and analysis of the results of past actions that are used to update current plans and strategies.

Aerial Logging

Harvest method where the logs are carried (fully suspended) from the felling area to roadside or other decking area using some type of aircraft (usually helicopter).

Anthropogenic

Influenced by the impact of man on nature.

Applicable Performance Standard (APS)

The specific level to which a participant or holder of a Timber Sales License must perform a requirement of the Fort St. John Pilot Project Regulation determined in decreasing order of priority as follows

a) as specified in a higher level plan unless the higher level plan
    i. was in effect less than 4 months before submission for approval of a Sustainable Forest Management Plan or Forest Development Plan for the areas that specifically addressed the standard of performance and
    ii. does not otherwise specify that the higher level plan is to prevail despite any Sustainable Forest Management Plan or Forest Development Plan
b) as specified in a variance with respect to the standard of performance
c) as specified in a Sustainable Forest Management Plan unless a Forest Development Plan
    i. was approved for the areas before the Sustainable Forest Management Plan was approved for the area, and
    ii. specifically addressed the standard of performance
d) as specified in the Forest Development Plan
e) as specified in a Site Level Plan

Archaeological Sites

Locations that contain physical evidence of post human activity for which the application of scientific methods of inquiry (i.e. survey, excavation, data analysis) are the primary source of information.

Archaeological Impact Assessment (AIA)

Field studies conducted by an Archaeologist used to confirm the presence or absence of archaeological resources as defined by the Heritage Conservation Act where potential conflicts are suspected between archaeological resources and a proposed development. An AIA locates, records and assesses the significance of an archaeological resource where present and assesses the nature and extent of expected impacts and makes recommendations to manage the expected site impacts from forestry activities.

Audit

A planned independent and documented assessment to determine whether agreed upon requirements are being met.

BC Timber Sales (BCTS)

Formerly known as the Small Business Forest Enterprise Program. BC Timber Sales is an independent organization within the B.C. Ministry of Forests created to develop Crown timber for auction to establish market price and capture the value of the asset for the public.

Bone Dry Unit (BDU)

A unit of measurement that lumber mills use to measure the amount of byproduct wood chips they can produce. The byproduct chips are used in pulp mills to make paper, etc.

Biogeoclimatic Ecosystem Classification (BEC)

A hierarchical classification scheme having three levels of integration; regional, local and chronological; and combining climatic, vegetation and site factors. The hierarchical classification includes Biogeoclimatic Zone⇒ sub-zone ⇒ variant⇒ site series.

Biogeoclimatic Zone

A geographic area having similar patterns of energy flow, vegetation, and soils as a result of a broadly homogenous macroclimate. British Columbia has 14 biogeoclimatic zones.

Biogeoclimatic Variant

A subdivision of a biogeoclimatic subzone. Variants reflect further differences in regional climate and are generally recognized for areas slightly drier, wetter, snowier, warmer or colder than other areas in the subzone.

Biodiversity (or Biological Diversity)

Diversity of plants, animals and other living organisms in all their forms and levels of organization, including genes, species and ecosystems, and the evolutionary and functional processes that link them.

Biotic

Relating to living beings, or of biological origin (see abiotic), e.g., insect outbreak, disease.

Blue-listed Species

In British Columbia, the designation of an indigenous species, sub-species, or population as being vulnerable or at risk because of low or declining numbers or presence in vulnerable habitats. Included in this classification are populations generally suspected of being vulnerable, but for which information is too limited to allow designation in another category.

Boreal Forest

One of the nine major forest regions of Canada. Typical tree species found in the boreal forest are spruce, pine, aspen and birch.

Botanical Forest Products

Non-timber based products gathered from forest and range land. There are seven recognized categories: wild edible mushrooms, floral greenery, medicinal products, fruits and berries, herbs and vegetables, landscaping products, and craft products.

Cable Logging

Harvest method where the logs are pulled with the use of cables (fully suspended or dragging) from the harvest site to the decking area.

Canadian Council of Forest Ministers (CCFM)

A council made up of the Ministers, Deputy Ministers and Assistant Deputy Ministers of the various Canadian federal and provincial government agencies responsible for managing Canada's forests. The CCFM provides leadership on national and international issues and sets direction for the stewardship and sustainable management of Canada's forests.

Category A Block

Blocks reviewed and approved in previous forest development plans.

Category I Block

Blocks included in the plan for public information purposes only, and not for official approval. Generally comments received on these blocks will be considered prior to submitting the blocks as proposed Category A blocks (i.e. requested for approval as Category A blocks).

Conservation Data Centre (CDC)

The British Columbia Conservation Data Centre (CDC) (see Blue-listed and Red-listed Species). The staff specialists at the CDC, in co-operation with scientists and specialists throughout the province, have identified those vertebrate animals, vascular plants and plant associations in the province, which have become most vulnerable. Each of these rare and endangered species and plant associations has been assigned a global and provincial rarity rank according to an objective set of criteria established by The Nature Conservancy of the United States, and a status on the provincial Red or Blue lists.

Certification

A system of rules or procedures acknowledging conformance to a standard.

RESOURCES Resources (RESOURCES)

The forest management database used by the Managing Participants of the Fort St. John Pilot Project to track and store the spatial and tabular information associated with their forest development activities and obligations.

Culturally Modified Tree (CMT)

A culturally modified tree (CMT) is a tree that has been altered by native people as part of their traditional use of the forest. Non-native people also have altered trees, and it is sometimes difficult to determine if an alteration (modification) is of native or non-native origin. There are no reasons why the term "CMT" could not be applied to a tree altered by non-native people. However, the term is commonly used to refer to trees modified by native people in the course of traditional tree utilization.

Coarse Woody Debris (CWD)

Sound and rotting logs and stumps that provide habitat for plants, animals and insects and, are a source of nutrients for soil development.

Community

A group of people living in the same locality and under the same government, a group of people having similar or common interests

Coniferous

Cone bearing evergreen trees or shrubs, usually with needle-shaped or scale-like leaves. The wood of coniferous trees is known as softwood (e.g. pine, fir and spruce).

Coniferous Stands

Those forest stands in which the most predominant trees by volume are coniferous trees. Deciduous trees such as aspen and birch may be present, but are less abundant than the coniferous trees.

An area where, at rotation age, the coniferous trees, collectively, represent a minimum of 75% of the volume of timber on the area.

Conventional Logging

Harvest method where the logs are pulled using rubber tired skidders or other ground based machines to a roadside decking area, where the logs are loaded onto trucks and transported to the mill.

Conservation

The controlled use and systematic maintenance, enhancement, restoration and/or protection of natural resources, such as forests, soil, and water systems for present and future generations.

Conserve

To protect from permanent loss or irreparable harm, to use carefully or sparingly.

Consistent

Not in material conflict.

Co-operative

A willingness and ability to work with others.

Coordinated Resource Management Plan

A group of management plans dealing with coordinating range resource developments on range tenure areas with other resource users.

Committee on the Status of Endangered Wildlife In Canada (**COSEWIC)**

The Committee on the Status of Endangered Wildlife In Canada (COSEWIC) determines the national status of wild Canadian species, sub-species and separate populations suspected of being in danger. It bases its decisions on the best up-to-date scientific information available.

Crop Tree

A healthy tree that is of a species that is:

(a) ecologically suitable for the site, and
(b) commercially valuable.

Cubic Metre (m^3)

A measure of standing timber volume, based on solid wood 1 metre x 1 metre x 1 metre. A typical merchantable coniferous tree would have approximately 0.45 to 0.5 cubic metres per tree, although some large trees can exceed 2.0 metres per tree.

Cultural Heritage Resources (CHR)

An object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people**.**

Cutblock

A specific area of land

a) identified in a forest development plan, forest operations schedule or a site plan for areas where timber harvesting is to be carried out,
b) identified in a site plan for any of the following areas that are to be reforested:
   i. an area where a contravention of section 96 of the Act has occurred;
   ii. an area that has been naturally disturbed;
   iii. a backlog area;
c) identified in a site plan for areas where silviculture treatments on well-growing stands are to be carried out, and
d) referred to in paragraph (a), (b) or (c) that the District Manager has exempted the Participant from the requirement to prepare the forest development plan or site plan as the case may be.

Cut to Length Harvesting (CTL)

A harvesting method that uses special low ground pressure equipment. The same piece of machinery (harvester) cuts the tree and then bucks it into predefined lengths. A forwarder then brings these pieces to roadside or the landing.

Data

Factual information, especially information organized for analysis or used to reason or make decisions; values derived from scientific experiments.

Deactivation

A term used to describe the process of restoring drainage on roads that are not currently being used. Through the use of ditches across the road surface (perpendicular to the road), water is channeled off the road.

Deciduous

Trees or shrubs, commonly broad leafed, that shed their leaves annually. The wood of deciduous trees is known as hardwood (e.g. aspen).

Deciduous Stand

An area where, at rotation age, the deciduous trees, collectively, represent a minimum of 75% of the volume of timber on the area.

Defined Forest Area (DFA)

A specific area of land, forest and water delineated for the purposes of registration of a Sustainable Forest Management system.

Dispersed

Term used in reference to waste calculations on post harvested areas. It refers to the amount of waste not associated with the road or landing systems (i.e. in the cutblock).

Disturbance

A discrete force that causes significant change in structure and/or composition through natural events such as fire, flood, wind, or earthquake; mortality caused by insect or disease outbreaks or by human-caused events such as the harvest of the forest. Disturbances can occur at very small scales or large scales.

Equivalent Clearcut Area (ECA)

Equivalent Clearcut Area (ECA) is the area that has been harvested, cleared or burned, with consideration given to the silvicultural system, regeneration growth, and location within the watershed. ECA and road density are the two primary factors considered in an evaluation of the potential effect of past and proposed forest harvesting on peak flows.

Ecosystem

A community of animals, plants and bacteria and its interrelated physical and chemical environment.

Ecosystem Management

A management system which recognizes and incorporates the natural variability of an ecosystem and attempts to emulate these responses with man-made disturbance while managing forests for a range of values.

Environmental Management System (EMS)

An Environmental Management System is a set of standards established by the International Organisation for Standardization (ISO 14001). This process includes commitment, public participation, preparation, planning, implementation, measuring and assessing performance, and review and improvement of a management system. The incorporation of feedback loops into the process allows for ongoing enhancement of the integrity and performance of the management system, and is designed to lead to continual improvement.

Endemic

A disease or organism that is consistently present, but populations are generally not increasing.

Ensure

To make sure or certain of an outcome.

Even-aged

Term given to areas of timber where the tree species are all approximately the same age (+/- 20 years).

Facilitate

To make easier, applied typically to discussion between parties with varying views.

Forest Development Plan (FDP)

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.

Fisheries-Sensitive Zone

A flooded depression, pond or swamp, that:

a) either perennially or seasonally contains water, and
b) is seasonally occupied by a species of fish listed in the definition of "fish stream" in the Operational Planning Regulation,
c) but does not include a wetland or lake that has a riparian management area established under Part 8 of the Operational Planning Regulation, Schedule C of the Pilot Regulation, or a stream.

Forage

Vegetation that is suitable as food for wildlife or domestic animals - may refer to an area where this vegetation occurs in abundance.

Forest Cover Type

A stand of trees that have very similar characteristics. Most often grouped together according to tree species, age, and size.

Forest Fragmentation

A process whereby large contiguous forest patches are transformed into one or more smaller patches surrounded by disturbed areas. Fragmentation occurs naturally by fire, disease, wind and insect attack.

Forest Licence

A volume based tenure awarded by the BC Provincial Government which sets out an annual allowable cut a company is allowed to harvest from a specific timber supply area, as well as commitments the company must make, such as operating a manufacturing facility continuously, reforesting cutblocks to government approved standards, payments to the government, etc. Failure to harvest the minimum amount of timber can result in loss of all or a portion of the allowable cut.

Forest Operations Schedule (FOS)

An operational plan required by the Fort St. John Pilot Project Regulation and described in Part 4 Division 5 of that regulation.

Forest Practice

Timber harvesting, road construction, road maintenance, road use, road deactivation, silviculture treatment, botanical forest product collecting, grazing, hay cutting, fire use and fire control and suppression.

Forest Practices Code (FPC)

The Code is a term commonly used to refer to the Forest Practices Code of BC 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 Resources

Resources and values associated with forests and range including timber, water, wildlife, fisheries, recreation, botanical forest products, forage and biological diversity.

Forest and Range Practices Act (FRPA)

An act that governs the activities of forest and range licensees in B.C. The statute sets the requirements for planning, road building, logging, reforestation, and grazing.

Forest Stand

An area of forest that is distinct from the surrounding forest by reason of some combination of topography, species composition, age or other feature.

Fort St. John Land and Resource Management Plan (LRMP)

The Fort St. John Land and Resource Management Plan approved by government on October 8, 1997 and as amended from time to time.

Free Growing (FG)

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.

Government Actions Regulation (GAR)

A regulation under the Forest and Range Practices Act that provides the criteria and processes for the creation of localized areas that require special management of certain forest values. These values include wildlife, fish, water quality, visual quality, stream and lake sides and recreation. The regulation also provides for the creation of objectives for managing these areas.

Geographic Information System (GIS)

Computer systems designed to allow users to collect, manage, and analyze large volumes of spatially referenced information and associated attribute data.

Goal (as applied to CCFM Criteria and Critical Elements)

A broad, general statement that describes a desired state or condition related to one or more forest values.

Grade "Z"

A firmwood reject log where (i) heart rot or hole runs the entire length of the log and the residual collar of the firmwood constitutes less than 50% of the gross scale of the log, (ii) rot is in the log and the scaler estimates the net length of the log to be less than 1.2 m, or (iii) sap rot or charred wood exists and the residual firmwood is less than 10 cm in diameter at the butt end of the log (b). That portion of a log that is less than 10 cm in diameter or that portion of a slab that is less than 10 cm in thickness.

Graham River Integrated Resource Management Plan (GRIMP)

A long term strategic plan developed for the Graham River watershed that guides resource development within that area

Green Attack

Term given to trees that have been attacked by insects but have not yet shown signs of mortality. Usually occurs at the early stage of attack.

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. Also, if under a silviculture 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 Executive Director.

Habitat

An area in which a plant or animal naturally lives, part of a broader unit such as the ecosystem.

Harvested Area

The area within a cutblock, other than that which is occupied by permanent access structures, where timber harvesting has occurred.

Harvest Authorization (HA)

An authorization given by the Ministry of Forests and Range District Manager for a Participant to harvest timber or construct road under 23.1 of the Fort St. John Pilot Project Regulation.

Herbaceous

A plant that remains soft and does not develop woody tissue.

Herbicide

A controlled product used solely to control or manage weeds.

Higher Level Plan (HLP)

Government approved plans that provide strategic context for operational plans that determine the mix of forest resources to be managed in a given area.

Hydrology

The science of the waters of the earth, water properties, circulation, principles and distribution.

Hygric

Term used to describe soils that receive an abundant input of water in the form of soil seepage.

Identified Wildlife Management Strategy (IWMS)

Those species at risk that the Deputy Minister of Environment, Lands and Parks or a person authorized by that Deputy Minister, and the Chief Forester, agree will be managed through a higher level plan, wildlife habitat area or general wildlife measure.

Indicator (as applied to CCFM Criteria and Critical Elements)

A measurable variable used to report progress toward the achievement of a goal.

Indicator Species

Species chosen for their ecological, social and economic attributes to monitor habitat supply over time. Based on the LRMP, provincial and federal endangered species lists, the Identified Wildlife Guide and input from the PAC Canfor has selected the following indicator species: grizzly bear, marten, fisher, wolverine, moose, elk, caribou, mountain goat, Blackthroated Green Warbler, Northern Goshawk, Trumpeter Swan and Three-toed Woodpecker.

Or, in a silviculture prescription, species of plants used to predict site quality and characteristics.

Integrated Land Management Bureau (ILMB)

An organization within the BC provincial government that is tasked with integrated Crown land and resource authorizations, planning dispositions and resource information services

Integrated Resource Management (IRM)

a planning and decision making process that coordinates resource use so that the long term sustainable benefits are optimized and conflicts among users are minimized

Interior Forest Habitat

Areas generally greater than 600 metres wide which now, or will in the future have continuous forest stand conditions which are relatively consistent. Important because some wildlife species require these larger forested areas to thrive.

Joint Management Advisory Committee (JMAC)

A committee comprised of a subset of Participants and First Nations with interests in the DFA created to discuss, among other things forest management concerns of First Nations and opportunities for affected First Nations within forest industry the Fort St. John TSA

Known

When used to describe a feature, objective or other thing referred to in this regulation as known, means a feature, objective or other thing that is:

a) contained in a higher level plan, or
b) otherwise identified or made available to a Participant by the District Manager or designated environment official at least 4 months before the forest development plan, forest operations schedule or site plan for the area was prepared.

Land and Resource Use Planning

The sub-regional integrated resource planning process for British Columbia. LRMP considers all resource values and requires public participation, interagency co-ordination and consensus building in land and resource management decisions.

Land and Resource Management Plan (LRMP)

A plan that provides strategic level direction for managing Crown land resources and identifies ways to achieve community economic, environmental, and social objectives.

Landscape

A large area encompassing a wide diversity of adjacent landforms, land cover, habitats and ecosystems.

Landscape Level Strategy (LLS)

Those activities that are required to be undertaken in order to achieve forest management objectives identified in a sustainable forest management plan.

Landscape Unit (LU)

A planning area delineated according to topographic or geographic features such as a watershed or series of watersheds and, as designated by a district forest manager (from: Biodiversity Guidebook, September 1995).

Linear Developments

Manmade features which extend in a linear manner, e.g. roads, seismic lines or pipelines.

Long Run Sustained Yield (LRSY)

The maximum biological capacity of the land base with no recognition of items such as Non Recoverable Losses.

Long-term

At a minimum, twice the period in years of the average life expectancy of the predominant tree species up to a maximum of 300 years.

Long Term Harvest Level (LTHL)

The level at which harvest can occur given management assumptions and rate of harvest. In contrast to LRSY, LTHL takes into account Non Recoverable Losses.

Machine Free Zone (MFZ)

Areas within a cut block that forestry equipment may not enter. These are usually associated with streams and wetlands, and are established to prevent soil disturbance and erosion.

Manage

To handle or direct with a degree of skill; to treat with care; to exercise executive, administrative, and supervisory direction.

Managing Participant

The Participant that manages tenures within the pilot project on behalf of another Participant(s).

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.

Merchantable

At or above minimum specific timber values (i.e. diameter, age and height).

Mesic

Term used to describe soil moisture. This refers to sites on which the moisture conditions experienced by plants are primarily under the control of the local climate, with no excessive influx of moisture due to slope position or soil conditions.

Mfbm

A measure of lumber produced - a thousand foot board measure. A board foot is 12 inches x 12 inches x 1 inch in thickness. Approximately 240 board feet of lumber can be extracted from 1 cubic metre of timber, with wood chips being made from the edges.

Mixedwood Forest

Forests that include deciduous and/or coniferous species at landscape and/or site levels over time. These forests occur in compositions ranging from intimate mixtures of coniferous and deciduous species to irregular groupings of discrete species in a patchwork distribution.

Mixedwood Management

A forest management system that incorporates strategies to maintain a deciduous and coniferous component in the forest over time.

Mixedwood Stand

An area where, at rotation age, the coniferous trees, collectively, and
the deciduous trees, collectively, each represents a minimum of 25% of the volume of timber on the area.

Modified Shelterwood

A shelterwood system designed to protect an existing established understorey stand while removing most or all of the overstorey stand.

Ministry of Environment (MOE)

The BC provincial government ministry responsible for the management and protection of the province's environmental values such as water and wildlife and fisheries values as well as the management and maintenance of recreational values such as hunting, fishing, trapping and Provincial Parks.

Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)

Provincial government ministry responsible for the management and protection of the province's forest and range resources for the best balance of economic, social, and environmental benefits to British Columbia.

Monitoring

The process of checking, observing and measuring outcomes for key variables or specific ecological phenomena against a predefined qualitative objective or standard.

Muskwa-Kechika Management Area (MKMA)

A designated area of special resource management in north eastern British Columbia which is approximately 6.4 million hectares in size and was established in 1998 under the MKMA Act.

Net Area to be Reforested (NAR)

The area under a Silviculture Prescription that will be reforested. This excludes areas occupied by permanent roads, areas incapable of growing a stand of trees (rock, wetland etc.), and reserves. This may include areas that did not contain a commercial stand of trees, but because it is capable of growing a stand of trees, will be reforested. See also harvested area.

Naturally Disturbed Area

An area where timber has been damaged or destroyed by causes other than harvesting.

Natural Disturbance Types (NDT)

Characterize areas with different natural disturbance regimes. Natural stand initiating disturbances are those processes that largely terminate the existing forest stand and initiate secondary succession in order to produce a new stand. Native species have adapted to the historical extent and distribution of these events, so timber harvesting patterns which approximate the patch sizes and distribution of natural disturbances are desirable. The boreal forest is in the NDT 3, which is characterized primarily by very large fires, often hundreds or thousands of hectares in size.

Natural Disturbance Unit (NDU)

Spatially defined areas within the Ministry of Forests and Range Northeast Region that have had landscape level biodiversity targets established for them for the management of forest resources on the landscape level so that the predominant natural disturbance of the area and its effects can be emulated.

Net Forest Landbase

That portion of the land that can potentially produce commercial forests. It includes both mature forests, immature and new forests, and potentially productive land which presently does not have forests established.

Net Area to be Reforested (NAR)

The area on which the licensee is responsible for establishing a free growing crop of trees. This figure is the sum of Standard Unit (SU) areas. The NAR does not include any man caused non-productive areas, reserves of immature trees, and natural non-productive areas that are large enough to stratify and map, as well as non-commercial brush areas greater than 4 hectares that are not deemed to be the obligation of the licensee. Non-productive or non-commercial areas that are too small to stratify are included in the SU area.

Northern Interior Vegetation Management Association (NIVMA)

A forest industry co-operative initiated by major forest products companies in northern BC and Alberta, the BC Ministry of Forests and Range, the Canadian Forest Service, the University of British Columbia and the University of Alberta. NIVMA uses a common monitoring protocol to track plantation and managed stand development and performance.

Non-Commercial Brush (NCBR)

Describes a potentially productive forest site that is occupied by shrubs and other deciduous species that are not utilized commercially.

Non-harvestable Land Base (NHLB)

Area not considered part of the timber harvesting land base. This would include areas excluded from contributing to timber supply during the TSR process, such as parks, riparian areas, inaccessible areas, inoperable areas, non-merchantable forest types, low productivity sites, recreation features, and environmentally sensitive areas.

Non Productive (NP)

Land that is incapable of growing a merchantable stand within a reasonable length of time.

Non Recoverable Losses (NRL's)

Losses of timber due to fire, insects or windfall that are either too small or too inaccessible to be retrieved for lumber production.

Not Satisfactorily Restocked (NSR)

Productive forest land that has been denuded and has not been regenerated to the specified stocking standards for the opening.

Notice of Intent to Treat (NIT)

A notice required under the Integrated Pest Management Act that is required to be published annually that describes areas to be treated under a Pest Management Plan

Objective (as applied to CCFM Criteria and Critical Elements)

A clear, specific statement of expected quantifiable results to be achieved within a defined period of time related to one or more goals. An objective is often stated as a desired level of an indicator.

Note: In the context of the Forest and Range Practices Act, objective is a statement of management direction applied to forest resources.

Old Growth Management Area (OGMA)

Defined in the Forest Practices Code of British Columbia Act Operational Planning Regulation as an area established under a higher level plan which contains or is managed to replace structural old growth attributes.

Old growth forests on BC's coast are characterized by the following:

a) Two or more tree species of variable sizes and spacing;
b) Large live trees;
c) Patchy understorey;
d) A deep, multi-layered crown canopy with gaps;
e) Standing dead trees (snags) and coarse woody debris of variable sizes**.**

Old Growth

A climax forest that contains live and dead trees of various sizes, species, composition and age class structure. The age and structure of old growth forests varies significantly by forest type and from one biogeoclimatic zone to another ***(from: Biodiversity Guidebook, September 1995)*****.**

Operational Plan

A plan describing the logistics for forestry development. Methods, schedules and responsibilities for accessing, harvesting, renewing and protecting the resource are set out to enable site specific operations to proceed. Includes Forest Development Plans, Forest Operations Schedules, Sustainable Forest Management Plans, Site Level Plans, Access Management Plans, Range Use Plans Silviculture Prescriptions and Stand Management Prescriptions.

Participant

The BCTS program or a major forest tenure holder who has consented in writing to take part in the pilot project. Currently this includes those listed in Section 2.1 of this SFMP.

Performance Indicator

A measurable variable used to report progress toward the achievement of a goal.

Permanent Access Structure (PAS)

A road, landing, logging trail, pit, quarry or other similar structure in a cutblock that

a) is constructed by a Participant or holder of a Timber Sale License and is
   i. required to be used for timber harvesting or other forest management activities and whose use will continue long enough to prevent the production of a commercial crop of trees on the area occupied by the structure that will be harvestable concurrently with the crop of adjacent trees, or
   ii. either constructed through material that is not suitable, or contains materials that are not suitable, for use in carrying out the soil rehabilitation treatments necessary to grow a commercial crop of trees, or
b) was constructed by a person other than a Participant or holder of a Timber Sale License.

Pest Management Plan (PMP)

A plan that describes

b) a program, for managing pest populations or reducing damage caused by pests, based on integrated pest management, and
c) the methods of handling, preparing, mixing, applying and otherwise using pesticides within the program;

Pilot Project

For the purposes of this SFMP, means the Fort St. John Forest Practices Pilot Project authorized under Section 221.1, Forest Practices Code Act and approved by the Government of British Columbia.

Preferred and Acceptable Species

Preferred and acceptable tree species are those commercial tree species that are suited to the growing conditions of the site, and are identified in the Silviculture Prescription.

Prescribed Broadcast Burning

Term given to the act of burning a large area (i.e. harvested cutblock) to minimize the amount of slash or reduce the fire hazard thus allowing a better area for planting.

Proposed Roads

Planned roads that have not been previously approved in a forest development plan.

Protected Area

An area protected by legislation, regulation, or land-use policy to control the level of human occupancy or activities.

Note: "Categories of protected areas include protected landscapes, national parks, multiple us management areas, and nature (wildlife) reserves" (The State of Canada's Forests 2001/2002), also includes "sites of biological significance" (i.e. critical areas for wildlife habitat, sensitive sites, and unusual or rare forest conditions, as established according to scientific and traditional criteria).

Public Advisory Group (PAG)

For the purposes of this proposal, means the group established under the Fort St. John Pilot Project Regulation to provide advice to the Participants regarding the Sustainable Forest Management Plan and to review Pilot Project Annual Reports, and the results of Pilot Project audits.

Qualified Auditor

A person who is competent to assess compliance with this regulation.

Qualified Registered Professional (QRP)

With respect to an activity for which this plan or the Fort St. John Pilot Project Regulation requires a qualified registered professional, a person who

a) has the education and experience that is appropriate to carry out the activity, and
b) is a member of, or licensed by, a regulatory body in British Columbia that has the legislated authority to regulate its members or licensees carrying out the activity.

Quantify

To make explicit the logical quantity of; to determine, express or measure the quantity of.

Red-listed Species

In British Columbia, the designation of an indigenous species, sub-species, or population as endangered or threatened because of its low abundance and consequent danger of extirpation or extinction. Endangered species are any indigenous species threatened with imminent extinction or extirpation throughout all or a significant portion of their range in BC. Threatened species are any indigenous species that are likely to become endangered in BC if factors affecting that vulnerability are not reversed.

Reforest

To establish on a harvested area, a naturally disturbed area or a backlog area, as the case may be, within the reforestation period, a stand of crop trees that meets or exceeds the stocking requirements for the area; a well-growing stand in accordance with section 35 of the Pilot Regulations.

Reforestation Period

The period specified in a site plan within which an area must be reforested.

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.

Regional Executive Director (RED)

A regional manager employed in the Ministry of Forests and Range.

Regional Manager

A regional manager employed in the Ministry of Environment.

Regional Protected Areas Team (RPAT)

a group of representatives from local government agencies tasked with identifying potential protected areas.

Registered Seed

Seeds which are tested to standards for germination and quality, from a healthy source and ensures the uses of local seed sources.

Rehabilitate

To restore to a stable condition and to a condition that does not prevent the reforestation requirement from being met.

Resource Agencies

Any government agency, ministry or department having jurisdiction over a resource that may be affected by any activity or operation proposed under a higher level plan or plan required under this regulation.

Resource Management Zone (RMZ)

A land use designation category under the Forest Practices Code that establishes strategic objectives and special requirements to guide subsequent sub-regional, local and operational planning.

Resource Management Zone Objectives

Statements that apply to specific resource management zones and are derived by the LRMP working group to sustain or enhance identified resource values.

Riparian Area

In proximity to the edge of rivers, streams, lakes and wetlands.

Riparian Assessments

The evaluation of watercourses or wet areas to determine if it can be classified into one of the Riparian Classes, and if so, whether they are fish bearing or not. Management requirements for reserve zones and management zones depend on the assessed fisheries values and size of the stream.

Riparian Classes

Determined from riparian assessments, streams are classified as follows: S1- fish bearing >20 metres wide; S2 fish bearing 5-20 m wide; S3 fish bearing 1.5 to 5 metres wide; S4 fish bearing < 1.5 metres wide; S5 not fish bearing; >3 metres wide; S6 not fish bearing < 3 metres wide.

Riparian Management Area (RMA)

An area of a width determined in accordance with Schedule C of the Pilot Regulations that is adjacent to a stream or wetland or a lake with a riparian class of L3, and consists of a riparian management zone and, depending on the riparian class of the stream, wetland or lake, a riparian reserve zone.

Riparian Management Zone (RMZ)

An area adjacent to a stream, wetland or lake where constraints to forest practices apply for the purpose of maintaining the integrity of the stream, wetland or lake and associated wildlife habitat.

That portion of the riparian management area that is outside of any riparian reserve zone, or if there is no riparian reserve zone, that area located adjacent to a stream, wetland or lake of a width determined in accordance with Schedule C of the Pilot Regulations.

Riparian Reserve Zone (RRZ)

An area adjacent to a stream, wetland or lake, within the Resource Management Zone, where no logging may occur unless consistent with an approved SFMP.

That portion, if any, of the riparian management area or lakeshore management area located adjacent to a stream, wetland or lake of a width determined in accordance with Schedule C of the Pilot Regulations.

Road Deactivation

The process of modifying an existing road which will not be used for a period of time to minimize access and environmental effects through such measures as water bars, removing bridges and culverts, reseeding with grass or trees, or rollback of slash onto the running surface. The extent of road deactivation is determined by the amount of time the road is not required for use, and the potential risks to the environment posed by the road.

Recreation Opportunity Spectrum (ROS)

A recreation opportunity is the availability of choice for someone to participate in a preferred recreation activity within a preferred setting and enjoy the desired experience.

Rotation

Broadly, the time needed from regeneration of a crop of trees through to harvestable timber. Can be classified under financial, technical, biological or ecological parameters.

Satisfactorily Restocked (SR)

Productive forest land that has been denuded and subsequently regenerated to the specified stocking standards in the silviculture plan or prescription.

Scale

Defined on the basis of elements such as size, shape and distribution of ecosystem components.

Selection Silviculture System

A silviculture 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 Code's Operation Planning Regulation, group selection removes trees to create openings in a stand less than twice the height of mature trees in the stand.

Sequential Clustered Development

The scheduling of operable timber into groups of neighbouring blocks with a single access route, usually within a subdrainage, with each group being developed in sequence over the full harvest cycle. A one pass, one entry harvesting system which concentrates harvesting, thereby minimizing the amount of new access being created, and reducing the amount of forest fragmentation.

Seral Stages
The stages of ecological succession of a plant community over time.

Shelterwood Silviculture System
A silviculture 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.

Siltation
The act of introducing foreign substances into a stream or wetland. Usually comes as a result of eroding stream banks.

Silviculture
The art, science and practice of controlling the establishment, composition, health, quality and growth of vegetation of forest stands.

Silviculture Prescription (SP)
A site-specific operational plan or site plan that prescribes the nature and extent of timber harvesting and silviculture activities that are designed to achieve desired forest management objectives including reforestation of a free growing stand to specified standards.

Site Degradation
Productive forest land significantly degraded or permanently lost to forest production.

Site Index (SI)
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 (height of the largest diameter tree on a 0.01 ha plot, providing the tree is suitable), which is a more objective measure (FP Code). The measure of the relative productive capacity of a site for a particular tree species, based on height at a given reference or base age (50).

Site Level Plan (SLP)
A plan describing the logistics for forestry development prepared under the Fort St. John Pilot Project regulation, but excluding Forest Development Plans. Includes silviculture prescriptions, stand management prescriptions, road deactivation prescriptions, road layout and design and road deactivation prescriptions.

Site Series
Variation in site conditions encountered within a biogeoclimatic unit is accommodated within the site classification of BEC. The site series describes all land areas capable of supporting specific climax vegetation. This can usually be related to a specified range of soil moisture and nutrient regimes within a subzone or variant, but sometimes other factors, such as aspect or disturbance history, are important determinants as well. A classification of site series for most of the biogeoclimatic units of the province has been developed by the BC Ministry of Forests and is presented in regional field guides.

Small Business Forest Enterprise Program (SBFEP)
The government program administered by the Ministry of Forests that facilitates the entering into agreements under the Forest Act that generate small business forest enterprise revenue. Now referred to as B.C. Timber Sales.

Special Management Zone (SMZ)

The Fort St John LRMP has Special Management Zones based on major resource values to be given a high priority in land and resource planning and development. Resource development is permitted but must consider and address all significant values identified. SMZ include wildlife habitat and wilderness recreation, major river corridors, and culture and heritage.

Snag

Standing dead tree or part of a dead tree.

Soil Disturbance

The portion of the harvested area where

a) the area has been altered by timber harvesting or related forest practices, and
b) that alteration inhibits reforestation of the area.

Spatial

Pertaining to the physical size, location, pattern and distribution.

Spatial Distribution

The distribution of openings over a landscape, usually in reference to natural disturbance patterns, or to logging. Logging that mimics the natural spatial distribution of natural disturbance patterns is considered to minimize long term effects on wildlife and ecosystems.

Stakeholder

Individual, organization or other entity concerned with or by management activities on a given forest area.

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.

Standards Unit (SU)

An area within a cutblock that is subject to uniform: limits for soil disturbance and regeneration dates, stocking standards, free growing dates and free growing heights.

Stocking Requirements

For an area under a site plan, the stocking requirements specified in the site plan for that area.

Strategic

Broad scope using generalities, not specifics.

Stub Trees

Snags or live trees that are cut off during harvesting at heights of 3 to 5 metres by feller bunchers, to provide vertical structure and coarse woody debris for wildlife use in the new forest.

Stumpage

Price charged for the right to harvest timber from publicly owned forest land.

Sustainability

The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time. Applied more broadly, the ability of society to maintain a balance of economic, social and ecological values over time.

Sustainable Forest Management (SFM)

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.

Table Interpolation Projection Program For Stand Yields (TIPSY)

A program that interpolates data from TASS (tree and stand simulator) – a computer model that simulates the growth of individual trees and stands. This program is based on growth trends observed in fully stocked research plots growing in a relatively pest free environment. The yields will be very close to the potential of a specific site, species and management regime.

Temporary Access Structure

An access structure, the area under which will be reforested.

Terrain Stability Map

Terrain mapping is a method to categorize, describe and delineate characteristics and attributes of surficial materials, landforms, and geological processes within the natural landscape. Terrain stability mapping is a method to delineate areas of slope stability with respect to stable, potentially unstable, and unstable terrain within a particular landscape. Terrain stability map polygons indicate areas or zones of initiation of slope failure.

Timber

Timber means trees, whether standing, fallen, living, dead, limbed, bucked or peeled (Forest Act)

Timber Harvesting Land Base (THLB)

The portion of the total area of a management unit considered contributing to, and being available for, long-term timber supply. The harvesting land base is defined by reducing the total land base according to specified management assumptions.

Timber Range Action Plan (TRAP)

A plan completed between Forest Licensees and Range Licensees to mitigate or minimize the impacts of one licensees activities on the other on overlapping forest and range tenures.

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 administrative boundary determined by the Ministry of Forests in which annual allowable cuts are determined, and from which timber harvesting rights may be awarded. Forest Licence A18154 provides harvesting rights only to timber within the Fort St. John timber supply area.

Timber Sales Office (TSO)

The head office for each BC Timber Sales Business Area.

Timber Sales Manager (TSM)

The senior manager for a BC Timber Sales Business Area

Timber Supply Review (TSR)

The timber supply review program regularly updates timber supply in each of the 37 TSA's and 34 TFL's areas throughout the province. By law, the Chief Forester must re-determine the AAC at least once every five years to ensure AAC's are current and reflect new information, new practices and new government policies.

Topographic

The general configuration of the land surface, including relief and position of natural and man-made features.

Tree and Stand Simulator (TASS)

A three dimensional growth simulator that generates growth and yield information for even-aged stands of pure coniferous species of commercial importance in coastal and interior forests of British Columbia.

Ungulate

A hoofed mammal (eg. deer, elk, moose, caribou).

Ungulate Winter Range (UWR)

An area that contains habitat that is necessary to meet the winter habitat requirements of an ungulate species. Sections 9 and 12 of the *Government Actions Regulation* of the *Forest and Range Practices Act* outline the regulatory authority for establishing UWR

Value (as applied to CCFM Criteria and Critical Elements)

A principle, standard, or quality considered worthwhile or desirable.

Vegetation Resources Inventory (VRI)

A photo-based, two-phased vegetation inventory program consisting of:

- Phase I: Photo Interpretation
- Phase II: Ground Sampling

Vertical Structure

Those components of a forest which are vertically oriented, eg. live and dead trees of various heights and species.

"Vision"

A registered herbicide that targets annual and perennial weeds and hardwoods (grass, aspen birch, etc.) while leaving coniferous trees undamaged. The herbicide is the forestry version of "Roundup", which is used extensively on agricultural and urban areas for the control of grass and other vegetation.

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.

Watershed
An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.

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.

Waterbody
Any land covered by water.

Wildlife Habitat Area (WHA)
Spatially defined areas that are necessary to meet the habitat requirements of an Identified Wildlife element. WHAs designate critical habitats in which activities are managed to limit their impact on the Identified Wildlife element for which the area was established. The purpose of WHAs is to conserve those habitats considered most limiting to a given Identified Wildlife element.

Windfirm
Areas of forest that are able to withstand the effects of heavy gusts of wind.

Windthrow
A tree or trees uprooted by the wind.

Woodlot Licence
A licence issued by the Ministry of Forests to an individual or group to manage a specific area of Crown timber, plus any private forest land the individual or group owns.

Wildlife Tree Patch (WTP)
An area specifically identified for the retention and recruitment of suitable wildlife trees. It can contain a single wildlife tree or many. A wildlife tree patch is synonymous with a group reserve.

Appendix 19: SFMP# 3 Revisions



Table 53: SFMP# 2 revisions in development of SFMP# 3

SFMP section	Nature of Revision	Comment
Preface	Update: reference to CSA std., list of Pilot Project Participants.	
2.1 Description of the Participants	Update description of the Pilot Project Participants.	Note purchase of Tembec by Paper Excellence, Canfor sale of interest in PVOSB to LP
2.3 Description and Role of the PAG	Revise reference to CSA Z809-08 std.	
2.4 First Nations Participation	Update number of First Nations on the PAG. Update status of MOA.	
3.4 Continuous Improvement	Update Table 7	Delete reference to Forest Investment Account
6.0 Indicator Forecasts	Added a forecast statement to the indicators which did not have a forecast.	Updated description of current condition of indicators
6.6 Coarse Woody Debris	Revise period of measurement	New period for measurement 2016 – 2022
6.6 Graham Merch Area Harvested	Identify additional period of measurement	Additional period to monitor during term of FOS 3.
6.26 Salvage	Revise period of measurement	New period for measurement 2016 – 2022 to coincide with SFMP 3 term
6.29 Reforestation Assessment	Update indicator variance, implementation strategy and monitoring procedure to include deciduous blocks.	Note the completion of the deciduous compiler and application of the landscape level reforestation assessment strategy to deciduous blocks.
6.49 Forest Health Planning	Target reduced due to expected deterioration of dead Pl.	As time passes from the death of a Pl stand the timber dries out and deteriorates. Shelf life for the dead Pl maybe 10 years. Participants will need to begin transitioning to harvesting green stands when the dead Pl is no longer suitable for milling. The revision will ensure there are Sw harvest opportunities identified in FOS 3 to support the transition from harvesting

		primarily beetle impacted Pli to Sw.
6.52 Timber Profile Conifer	Revise period of measurement	New measurement period added 2016 - 2022, period to coincide with FOS 3 term
6.53 Cut Control	Revise period of measurement	New measurement period – 2016 – 2021
6.66 Deletions to Forest Area	Revise period of measurement	New measurement period –to coincide with term of SFMP# 3.
6.10 Noxious Weed and Invasive Plant Content	Revised the website address of the PRRD list of noxious weeds	Included the provincial list of prohibited weeds.
6.38 and 6.39 Carbon Indicators	Statement regarding next analysis timing tied to completion of carbon budget analysis, expected to be a component of the 2015-16 timber supply review for FSJ TSA.	
4.2.1 Permanent Access Strategy	Define population of blocks to be assessed.	Noted as a condition of approval of SFMP2 permanent access strategy.
4.6.4 Forest Health Climate Change Strategy	Added a Climate Change strategy.	Utilize the to latitude inherent inthe Chief Forester's standard for seed use.
APPENDIX 5, 6, 7a	Note the application of the landscape level assessment methodology to deciduous stands	Identify MSQ survey standards for deciduous stands.
Public Review	To be written after the public review is complete.	
8.1.3.1 Reforestation Field Performance Requirements, Landscape Level Assessment	Note the application of the landscape level assessment methodology to deciduous stands	Deciduous compiler has been developed.
8.1.3.2 Reforestation Field Performance Requirements, Deciduous Stocking Requirement for Blocks Outside of the Landscape	Revise minimum height from 1.5 to 1.4 m, specify limit on secondary species to be included in stocking assessment.	

Level Assessment Population		
6.9 Wildlife Tree Patches	Landscape Unit wildlife tree patch targets revised	Revision made April 18, 2017 to reduce risk to conservation of biodiversity in LUs with higher levels of timber harvesting and to reduce downward pressure on timber supply in LUs with low risk to conservation of biodiversity.
6.10 Noxious Weed and Invasive Plant Content	Indicator write-up revised to include additional measures to prevent the introduction and spread of invasive plants	Revision made April 18, 2017 to specify additional measures to prevent the introduction and spread of invasive plants.
6.42 Damage to Range Improvements	Revision to indicator implementation strategy	Revision made April 18, 2017 to note that damage to range structures caused by the participants will be repaired to the standard specified in the MFLNRO Peace Resource District range structure guidelines.
6.68 Effective Communication – Non Timber Resources	New indicator added	Revision made Dec. 30, 2017 to meet the requirements of CSA809-16 – Indicator 5.1.2.
6.69 Effective Communication – Aboriginal Communities	New indicator added	Revision made Dec. 30, 2017 to meet the requirements of CSA809-16 – Indicator 7.1.2.

Table 54: SFMP# 3 revisions in development of SFMP# 3 Amendment

SFMP Section	Nature of Revision	Comment
Preface	Added additional preface to include SFI standards and introduce amendment	
6.2 Seral Stage	Indicator target statement revised	Revisions made April 1, 2020 to specify targets and reporting for spatial old forest retention areas
6.10 Noxious Weed and Invasive Plant Control	Indicator target statement revised	Revisions made April 1, 2020 to specify the target must meet the standards established by the Canadian Seed Growers Associations
6.33 First Nations Consultation & Information Sharing	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.38 Carbon Sequestration Rate	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.39 Ecosystem Carbon Storage	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.42 Damage to Range Improvements	Indicator statement, target statement and acceptable variance revised	Revisions made April 1, 2020 to address management of natural barriers
6.48 Summer and Fall Volume Deliveries	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.51 AAC Partition – Deciduous Planning	New Indicator	New harvest performance indicator added as of April 1, 2020
6.51A AAC Parition – Deciduous Harvest	New Indicator	New harvest performance indicator added as of April 1,

Performance		2020
6.52 AAC Partition – Conifer Planning	New Indicator	New harvest performance indicator added as of April 1, 2020
6.52A AAC Partition – Conifer Harvest Performance	New Indicator	New harvest performance indicator added as of April 1, 2020
6.55 Direct and Indirect Employment	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.56 Maintenance of Wildlife and Fisheries Habitat	Table 8: Landscape Level Strategies and Related Performance Indicators Submitted for Approval	Indicator tables revised to include new indicators
6.63 Worker Training	Indicator deletion	Indicator deleted as of April 1, 2021 as it was a requirement of CSA certification
6.33-6.70	Change in indicator numbering	Indicator numbers 6.33 through 6.70 were revised due to the deletion of 6 non-legal indicators
Public Review		SFMP# 3 Amendment was available for public review from April 20, 2020, to July 18, 2020. See Public Review Appendix for a summary of comments.

Appendix 20: Public Comments

Public Comments

No comments were submitted by the the public regarding SFMP# 3.

Public comments on SFMP# 2 were received from one party – Jim McKnight. His comments follow:

1

Jim McKnight
RR1 Site 1 Compartment 4
Station Main
Fort St John
V1J 4M6

Re: Sustainable Forest Management Plan #2

To whom it may Concern.

The following are my personal observations about this plan and must be taken in that context. I have read the complete document as presented on the Website.

A bit of background about myself. I am 63 years old, born and raised in Fort St. John. I have lived on the Swanson Lumber road for nearly 38 years. I would like to describe myself as a realistic environmentalist. I believe that the resources are there for our use but this use must be done in a responsible and sustainable manner. I do not have any formal education in forestry or environmental issues but consider myself very well read and observant. When I moved here, it was before there was any serious level of logging. The Swanson Lumber mill at the time was only a planer mill with no kilns yet. The feed stock was from a number of small sawmills in the area. Since that time there have been 10 or 12 very hungry mills come and gone in the area.

I have watched the loss of forest cover for many years, and recognize that a lot of this loss has not been for forestry, but from oil and gas development, fires, hydro development and agriculture.

I will address the rest of my comments in a point format as I have not been able to organize my thought into a more logical form.

1. The plan as presented on the website is certainly a step in the right direction.
2. There are huge quantities of information contained.
3. **What if we have got it wrong?**
4. I regret that for a number of reasons I was not able to attend earlier meeting of the pilot group. Quite likely many of my concerns were discussed during this process.
5. The plan is an example of bullshit trying to baffle brains. There are more than 90 abbreviations used in the plan and more than a few of them are not explained. This plan should be available in a format that is easily read and understood by the lay people.
6. No where in this plan is there any discussion of the vast areas that were classed as NSR Not sufficiently restocked?
7. What about the land base that was logged before this plan was implemented?
8. In a recent publication it was stated that it was taking 7 years from the time logging was completed until planting began. I strongly feel that there should not be ANY delay in restocking and in some cases no further logging should be allowed until replanting is completed.
9. It was just announced this week that the government is going to require a tree be planted for every on taken down. I feel very strongly that this requirement should be more like 4 or 5 to one.
10. I have serious concerns that the level of inputs in all areas of silviculture are lacking. I believe that we are not paying enough attention to areas that are reforested and others that should have some form of stand tending such as juvenile spacing, fertilization, brush control carried out.
11. The mills are not utilizing the raw material in the most effective and responsible methods. The demand for production targets does not always result in the best recovery of the raw product.

12. In the plan it stated that the last inventory was more than 30 years ago. There is no way that any AAC (Annual Allowable Cut) can be accurate. With this in mind how accurate is this inventory?
13. In that the Peace River country is just an extension of the Great Plains of North America and as such is very nearly desert land what effect will Climate Change have on these inventories? If the climate continues as it seems to have done for the last number of years what effect will that have on seedling survival rates and growth rates?
14. What is the projected time from planting until trees will be available for use? I have been told a number of times that this projected to be 85 years. I feel that here a more realistic term would be 100 to 115 years.
15. The pine beetle infestation was shown the folly of using a single species for reforestation. Much more research must be done into other species, crossbreeds etc to ensure that we do not just start some other type of plague. As has been pretty evident over the last couple of years Mother Nature still dictates.
16. Page 93 as base line information not available?
17. Page 114 250 year plan horizon. I find this to be an exceptional long time scale, as the people now making these decisions will have been gone for more than 200 years and as such will bear no responsibility for their actions.
18. I have always been concerned about our methods of logging. The clear cut methods presently used not only take out any merchantable timber but typically destroy any new growth that maybe 15 or 20 years old and completely acclimatized for the area. If we do not damage it logging we slash burn or ripper plow everything else.
19. Page 178 This is the first of a number of waffle words that I am concerned about. If the plan does not meet the requirements the District Manager may waive the requirement to additional treatment.
20. Page 180 Assuming a very aggressive reforestation level.
21. Page 184 Waffle words unless agreed to by District Manager.
22. Page 200 I could find no mention of Maurice Creek on the south side of the Peace River at Hudson's Hope.
23. Page 320 merchantable volume/ha at 80 years?
24. Page 321 5 meter at 16 years.
25. There are too many references to allowing the forester, district manager and others to use their discretion. In situations there should be established minimums that must be met. Any variance should be to the positive side rather than the other ways. No lowering or standards.

In closing I will restate my concerns that while this plan is a substantial improvement on our past performance we are still not sustainable and as economic pressures for profit increase many of the provisions of this plan will be overridden by the politicians.

Following is the Participants' response to Jim McKnight's comments on SFMP# 2:

June 18, 2010

Jim McKnight
RR Site 1 Compartment 4
Station Main
Fort St John, BC
V1J 4M6

Dear Mr. McKnight:

RE: Sustainable Forest Management Plan #2

Thank you very much for your letter in response to our advertisement for public review and comment of our proposed Sustainable Forest Management Plan for the Fort St John Timber Supply Area. You have made several good points and recommendations in your letter and we will do our best to answer your questions and address your concerns. Where appropriate, we've included internet addresses for websites where you can get further information about the topics you had questions on.

You are quite correct; there is a significant amount of information contained within this plan, the large majority of it very technical in nature as is required for a legal plan of this type. The content of the plan is largely dictated by the Fort St. John Pilot Project Regulation (FSJPPR) as well as the Canadian Standards Association (CSA) Z809-02 and Z809-08 standards and must meet certain content requirements. It is regrettable that the content of this plan cannot be presented in a format that is more familiar to the lay person, however the managing participants of the Fort St. John Pilot Project (Canfor and BC Timber Sales) are more than willing to meet with concerned or interested members of the public to discuss the plan with any member of the public to facilitate an increased understanding of this plan. Additionally, as you mentioned, Public Advisory Group (PAG) meetings are held at regular intervals throughout the year that are open to members of the public so that they may gain a better understanding of the process.

You asked "What if we have got it wrong?". While forestry is not an exact science, the Participants are trying to minimize the risk of getting "it wrong" by trying to utilize the latest relevant research and knowledge that is applicable to the Defined Forest Area (DFA) as well as by employing the concepts of adaptive management in our practices. This includes monitoring the results of our activities and making the necessary adjustments to achieve the desired outcomes.

Thank you for notifying us of the acronyms and abbreviations that were used in this plan that were not defined or explained. We will try to correct this prior to final submission of this plan to government for approval.

It is currently the responsibility of the Participants to reforest all of the stands that they harvest to an acceptable standard. This is addressed thoroughly in the Reforestation Landscape Level Strategy and the associated indicators. The Ministry of Forests and Range retains the silviculture obligation for blocks harvested prior to 1987 and it is their responsibility to ensure they are reforested to an acceptable standard. There are a large number of these pre-1987 or "backlog" blocks that are classified as Not Sufficiently Restocked (NSR). Many of these blocks are reforested to some extent, however lack the appropriate silviculture survey data to determine if further silviculture treatments such as fill planting or brushing, are required. While the Participants do not directly manage these blocks, the unknown status of these blocks is taken into consideration during the Timber Supply Review (TSR) process by the Ministry of Forests and Range when setting the Allowable Annual Cut (AAC), and by the participants when conducting analyses to set targets for, and assess conformance to the various Landscape Level Strategies and Indicators and Targets contained in the SFMP.

In most cases the Participants conduct planting activities on blocks that are scheduled for artificial regeneration (planting) with a year or two of harvest completion. It is our belief that the "seven years" to which you refer is the Regeneration Delay of seven years allowed on certain sites. The Regeneration Delay period is identified in the approved stocking standards as the maximum amount of time allowable for a block to achieve a satisfactorily restocked state. In most cases the participants plant harvested blocks within one or two years of the completion of harvest, however when natural regeneration is used to reforest a site (eg. dragging for pine regeneration) a slightly longer period is required to accurately measure stocking levels. The additional time allowable also accommodates the possibility of a plantation failure due to disease, pests or other issues.

> The comments made by government can be very general at times, and may not necessarily be indicative of actual practices occurring on the ground. In blocks managed for conifer regeneration, the participants generally replant at densities anywhere from 1200 to 1600 trees per hectare, which in most cases is more than what was on the site prior to harvesting. The number of trees planted and spacing between the trees that are planted, on any given site are prescribed by Registered Forest Professionals so that the stand can grow to produce trees with desirable characteristics for forest industry when they reach maturity. Deciduous stands within the Fort St. John Timber Supply Area are usually not planted as they grow back naturally via root suckers. However if a deciduous area fails to regenerate satisfactorily, the typical approach is to plant the NSR area with spruce.

All of the participants' blocks on which they retain silviculture obligations are surveyed on a regular basis to determine stocking levels, and overall health and condition of the stands. The participants regularly engage in stand tending activities, primarily brushing treatments, to reduce competition on the crop trees until such a time as they have reached an age and height at which competition from other species will likely not impact their growth rates and chances of survival. By planting conifer at the prescribed numbers and spacing as identified above, it makes it highly

unusual for treatments such as spacing or thinning to be required within the DFA, however it is possible that, due to natural regeneration of conifer on some sites, that a site will exceed the prescribed maximum number of trees per hectare, in these cases spacing or thinning treatments may be considered if the high density of trees has the potential to cause forest health issues in the stand, or so that the stand produces trees with more desirable characteristics for the forest industry at maturity. Fertilization of stands is not currently a common practice within the DFA as it is a relatively expensive treatment and the returns of conducting fertilization on the stands (increased growth rates) do not currently justify the financial investment required for the treatment. Fertilization is also generally carried out on older stands that have already achieved a "Free Growing State" if this type of treatment is conducted before that state is reached, fertilization will equally impact tree and shrub species that are competition for the target crop species and therefore potentially impede the growth of the target species. Additionally, once a stand reaches a Free Growing state, it becomes the obligation of the Ministry of Forests and Range to manage from then on to maturity. Further information on silviculture activities and obligations can be found on the Ministry of Forests and Range silviculture website at the following location: http://www.for.gov.bc.ca/hfp/silviculture/index.htm. It may also interest you that the government has recently set new priorities for the Forest Investment Account program (http://www.for.gov.bc.ca/hcp/fia/). One of the top priorities identified was mid-term timber supply for the areas severely impacted by the mountain pine beetle. To address this there will be some fertilization projects taking place, but nothing in the Fort St. John Timber Supply Area.

> The existing processing facilities within the DFA currently consist of a sawmill, pulp mill, and an Oriented Strand Board (OSB) plant operated by Canfor and a remanufacturing facility operated by Cameron River Logging. The Canfor facilities operate cooperatively to put the material to the best use. The Cameron River Logging facility uses some residual fibre (sawdust) from Canfor's sawmill as raw material in its production, in addition to pine logs for the power pole market. Additionally, Canfor has recently invested in, and constructed a co-generation plant to utilize additional residual fibre (primarily bark) from milling operations to generate heat to run the kilns. The participants however, are still constrained by the quality requirements of their customers for the end product and the current abilities of the existing facilities to utilize certain profiles of timber. At this time, economic realities do not allow for the significant capital investment required to construct new facilities, such as a plywood plant, to put certain sizes of timber to better use. Nor can the costs of hauling this material to other facilities elsewhere, or to haul waste material and logging slash to town for the purposes of electricity production be justified at this time. Also, the participants with milling facilities work with other industries such as oil and gas, mining and wind tenures, to try and utilize the merchantable timber harvested through their activities so that it is not wasted. While it is not currently feasible for the Participants to invest in new facilities, we are willing to work with other potential parties that would be willing to make such investment.

While the old inventory that was being utilized was outdated, and the quality of the data in many cases was in question, certain key aspects of stands (age, height, diameter, etc.) are projected forward annually at expected growth rates to accommodate time and tree growth. The concerns about the accuracy of the old inventory, and the potential impact to the Timber Supply Review

process are why the Participants requested that the last Timber Supply Review, originally scheduled for 2008, be postponed until the new inventory was completed. The new inventory, while not exact, is well within the tolerances of acceptability of the Ministry of Forests and Range Inventory Branch, and has been confirmed through ground sampling. Further information on forest inventories and the acceptable standards for those programs can be found on the Ministry of Forests and Range Inventory and Analysis Branch website at the following location: http://www.for.gov.bc.ca/hts/vri/standards/index.html.

Climate change and the impacts of climate change on the forest resources are of significant concern to the participants. While an increase in temperature in this area of the province, if that were to occur, would likely result in increased growth rates in general due to a longer growing season, some sites may become unsuitable for some species, and there would also likely be a large increase in forest health factors (disease and pests) that would impact the stands within the DFA, as we are currently seeing with mountain pine beetle. At this time the Ministry of Forests and Range is doing research into the potential impact of climate change on BC's Forest Resources and the participants will work with the Ministry of Forests and Range to implement any practical results of this research into our planning and practices where feasible. http://www.for.gov.bc.ca/hts/Future_Forests/

The time it takes from planting a tree until it becomes merchantable varies from site to site across the DFA depending on various conditions including the species in question, and the growing conditions of the site. When determining whether or not a stand is merchantable depends more on the diameter and height of a tree and the volume of timber in the stand than the age. However, the Participants do not generally target stands younger than 80 years to maximize fibre production potential. In general, the growth rates for the primary species that are currently targeted for harvest in the DFA tend to decline after approximately 80 years and therefore it is usually more economically advantageous to harvest the stand once it exceeds that age and plant a new, faster growing stand in its place thus maintaining maximum rates of fibre production over time. Currently in the DFA, we are still harvesting virgin stands of timber and have an overabundance of old timber which can be demonstrated in our seral stage analysis indicator. As a result, we are often harvesting stands of timber much older than 80 years of age. This however, has changed for our conifer harvest in consideration of the current mountain pine beetle epidemic, as our current strategy is to target merchantable infested, dead or susceptible pine stands for harvest regardless of age. The Timber Supply Review also models these same assumptions in the analyses to establish sustainable Allowable Annual Cut levels. http://www.for.gov.bc.ca/hts/tsa/tsa40/

The participants prescribe preferred and acceptable tree species in site plans for each site that is harvested. If a block is to be planted, the seed used must meet certain standards set by government. It is the current practice of the participants to prescribe for planting, the tree species that is most suitable for the site, this is usually the primary species that was harvested off of the site. It is also common to plant intimate mixtures of pine and spruce across a site if

that is deemed to be ecologically appropriate. The Tree Improvement Branch of the Ministry of Forests and Range http://www.for.gov.bc.ca/hti/ conducts research into, and sets the standards as to what seed and genetic resources are to be used on Crown land in the province. The participants are committed to conducting their activities consistent with the standards that are set.

For the Patch Size, Seral Stage Distribution and Adjacency strategy, the participants have relied heavily on the research and guidance in Natural Disturbance Management conducted by Craig DeLong of the Ministry of Forests and Range. DeLong's work states that historically, large wildfires were the primary natural disturbance factor that occurred on the landscape. He has conducted research into the historical sizes and occurrence of these disturbances and set targets based on this research for appropriate amounts of old forest on the landbase as well as young forest (Seral Stage Distribution) and the size of the openings created by these fires (Patch Size). This research is currently considered to be the best available and most appropriate knowledge available for the DFA and has been endorsed by several government ministries including the Ministry of Forests, Ministry of Environment and the Integrated Land Management Bureau. Interior forest condition is important for certain species of wildlife that dwell deeper in the forest that may be adversely impacted by being too close to an opening such as a cutblock or road. Unfortunately there is insufficient historical information currently available at this time to make appropriate estimates of natural levels of interior forest so the participants have not set a target for this value at this time. Until such time as information is available to set appropriate targets for interior forest condition, we are confident that our strategy of managing by creating large openings through harvest, while leaving large areas of mature intact forest will sufficiently accommodate this value.

The presence of understory in mature stands is common throughout the DFA, and where feasible the participants try to retain this existing structure through harvesting activities. Indeed the contribution that advanced regeneration can make to reforesting a site can be significant and beneficial. There can be significant logistical challenges to retaining advanced regen (understorey) but we do make the effort to identify opportunities (i.e. areas where it's feasible). It is not always possible, or wise to do so as by removing the mature forest that previously surrounded these young trees, they are invariably exposed and very susceptible to damage from wind and early fall/late spring snow. Alsoin some cases retaining them in may impede either harvesting or other future silviculture treatment activities. It is no longer a common practice to conduct broadcast burning as a site preparation treatment however burning of slash piles is still common. The Ministry of Forests and Range requires the participants to dispose of these piles as they are a potential fire hazard. Mechanical site preparation treatments such as mounding, dragging or ripper ploughing are common practices in areas managed for conifer, that are often conducted by the participants to prepare the site for planting and to assist in seedling survival and initialization.

Variances to the accepted standards are common throughout this plan as well as throughout legislation and often require approval by government. In your letter you referred to silviculture obligations and the ability of the Participants to ask the District Manager to be relieved of silviculture obligations. This is not unique to the Fort St. John Pilot Project and is in fact common throughout the province. While this relief is not often requested it does allow the Participants to be relieved of their obligations if they have made reasonable attempts to re-forest a stand and through no fault of their own the stocking remains below an acceptable level and it would be unreasonable to spend further amounts of money on bringing that stand to an acceptable stocking level. In this particular case a formal request with a rationale with all of the pertinent information must be made to the District Manger of the Ministry of Forests and Range who then decides whether to approve the request or not.

A very “aggressive” reforestation regime on page 180 of the plan refers to prompt planting of blocks (i.e. the season immediately after harvest), utilizing improved planting stock and possibly conducting a site preparation treatment prior to planting, to increase seedling survival and increase growth rates in the first few years. Conducting these treatments helps us achieve the Maximum Predicted Merchantable Volume targets.

The area covered by this plan is the Fort St John Timber Supply Area, the location you mention in your letter “Maurice Creek on the south side of the Peace River at Hudsons Hope” is outside of the area of this plan.

The silviculture note on starting on page 319 and continuing on to 320 describes a computer-based model that simulates tree growth over time. The purpose of this is to estimate the volume that a mature stand of timber will achieve based on the density of trees occupying the site at a young age. In this case age 80 was used as a common age for comparison for stands with different tree densities at a young age as it is consistent with the general assumptions discussed earlier about timber supply.

Your comment about tree growth to 5 metres at 16 years appears to be a typographical error, we will investigate this further.

One of the main purposes of the Fort St. John Pilot Project was to test a “Results Based” legislative environment for forest sector and to place increased reliance on Forest Professionals. This was due, in part, to the very cumbersome and expensive (for government and industry) administration required under the Forest Practices Code of BC Act. Under the Fort St John Pilot Project regulation, and through other regulations under the Forest and Range Practices Act in the rest of the province, Registered Professional Foresters, Registered Forest Technicians, Registered Professional Biologists and many more other types of professionals are required to utilize their training and experience and exercise their professional judgement to determine what is the best course of action in a given circumstance. The SFMP and the Fort St John Pilot Project Regulation set minimum standards that are to be achieved for various values,

and it is the participants' intent to show performance beyond that required wherever possible. In some specific and rare circumstances however, it may not be feasible to achieve these targets due to site specific circumstances, or where one issue such as management of forest health factors outweighs consideration for other values.

In closing we would again like to thank you for your interest in this plan and for the comments provided. We trust that the above response addresses your concerns and comments, if not please do not hesitate to contact us for further information.

Appendix 21: First Nations Comments

Information Sharing Communication Log
Following is the SFMP# 3 information sharing contact summary.

Doig River First Nation
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2015: Initial SFMP info share e-mail sent by DR
Jan 25, 2016: Follow-up E-mail sent by JM
March 23, 2016: JM attempted to send final follow-up e-mail but Jane Calvert's in-box was too full. JM called DRFN and left message.
March 24, 2016: Final follow-up e-mail sent by SS (BCTS)
March 30, 2016: Info-share period for the draft 2016 SFMP closed.

Blueberry River First Nation
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2016: Initial SFMP info share e-mail sent by DR
Jan 25, 2016: Follow-up e-mail sent by JM
Jan 25, 2016: BRFN sent an e-mail confirming they received the follow-up e-mail and acknowledged the close of the info-sharing period.
Feb 12, 2016: BRFN requested a presentation be made to chief and council regarding the draft SFMP.
Feb 18, 2016: Canfor and BCTS presented the SFMP to BRFN Chief and Council and Land Manager.
Feb 19, 2016: JM emailed Norma Pyle the information that had been requested during the Feb 18, 2016 meeting.
Feb 26, 2016: Comments received from BRFN during the presentation on Feb 18, 2016 were summarized and emailed to BRFN.
March 14, 2016: A meeting unrelated to the SFMP between Canfor and BRFN was cancelled so JM called and emailed BRFN to request that that meeting time be used to continue discussing the SFMP. They were reminded of the upcoming deadline for comments. No reply was received.
March 30, 2016: Info-share period for the draft 2016 SFMP closed.

Halfway River First Nation
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2016: Initial SFMP info share e-mail sent by DR.
Jan 25, 2016: Follow up e-mail sent by JM
Feb 19, 2016: Brent Fox sent a letter requesting shapefiles for the SFMP. JM explained that the SFMP is not spatial and there are no shapefiles. The link to the FTP where the plan can be found was resent.
March 23, 2016: Final call for comments was sent out.
March 24, 2016: Lyle Mortenson on behalf of HRFN replied stating HRFN was satisfied that HRFN interests were addressed provided the terms outlined in the CCUA MOA are followed.
March 30, 2016: Info-share period for the draft 2016 SFMP closed.

West Moberly First Nation:
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2015: Initial SFMP info share e-mail sent by DR.
Jan 25, 2016: Follow up e-mail sent by JM
March 24, 2016: Final call for comments of draft SFMP was made. No comments were received
March 30, 2016: info share period for 2016 draft SFMP closed.

Saulteau First Nation:
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2015: Initial SFMP info share e-mail sent by DR.
Jan 25, 2016: Follow-up e-mail was sent by JM
Jan 25, 2016: John Stokmans replied to follow-up e-mail stating he acknowledges the referral and will call if he has questions or wants to request an extension.
March 8, 2016: JM discussed some of the content of the SFMP with John Stokmans. John was busy with other referrals at the time and said he hadn't reviewed it yet.
March 23, 2016: final call for comments on draft SFMP was made.
March 23, 2016: John Stokmans replied that he had not reviewed the plan yet but was working on finding time.
March 30, 2016: info share period for 2016 draft SFMP closed.
April 5, 2016: John e-mailed Darrell to tell him that he was unable to review the SFMP in the time provided and asked whether it would be going through FLNRO consultation. Darrell informed John that the SFMP would be going through the FLNRO consultation process.

Horse Lake First Nation:
Dec 22, 2015: Initial SFMP info share e-mail was sent by DR.
Jan 25, 2016: Follow up e-mail sent by JM
March 24, 2016: Final call for comments on the draft 2016 SFMP was made. No comments were received.
March 30, 2016: info share period for 2016 draft SFMP closed.

Prophet River First Nation:
Invited to attend March 17, 2015 and Sept 22, 2015 PAG meeting discussions of SFMP# 3.
Dec 18, 2015: Initial SFMP info share e-mail was sent by DR.
Jan 25, 2016: Follow up e-mail sent by JM

March 24, 2016: Final call for comments on the draft 2016 SFMP was made. No comments were received.
March 30, 2016: info share period for 2016 draft SFMP closed.

Fort Nelson First Nation:
Dec 18, 2015: Initial SFMP info share e-mail was sent by DR.
Jan 14, 2016: DR received an e-mail from Lana Lowe requesting that Canfor provide time and resources to allow them to review the SFMP plan.
Jan 24, 2016: DR replied to Lana's request.
Jan 25, 2016: Follow up e-mail sent by JM
March 24, 2016: Final call for comments on the draft 2016 SFMP was made.
March 24, 2016: out–of-office reply was received from 2 member of the lands department from FNFN. No comments were received.
March 30, 2016: info share period for 2016 draft SFMP closed.

Dene Tha' First Nation:
Dec 18, 2015: Initial SFMP info share e-mail sent by DR.
Jan 25, 2016: Follow up e-mail sent by JM
March 24, 2016: Final call for comments of draft SFMP was made. No comments were received
March 29th, 2016: Kevin Kuhn e-mailed DR with a request for some specific information related to the SFMP and info-sharing to date.
March 30, 2016: DR replied to Kevin Kuhn's inquiry.
March 30, 2016: info share period for 2016 draft SFMP closed.
March 31, 2016: Baptiste Metechooya sent a formal response to Canfor regarding SFMP 3.
April 6th, 2016: JM replied to DTFN's comments. A meeting was arranged to discuss the SFMP on April 29th, 2016
April 29th, 2016: conference call between SS, DR, JM, Courtney Booker, BM, KK to discuss details of SFMP 3
May 4, 2016: JM sent BM, KK summary of the conference call.

May 20, 2016: DR sent BM, KK update regarding discussion of WTP calculation.

No further comments were received.

Summary of Written Comments Received

Written comments were submitted by the Dene, Tha First Nation (DTFN). No other First Nation provided written comments regarding SFMP# 3.
Following are the comments provided by the DTFN:

Dene Tha First Nation
PO Box 120
Chateh, Alberta
T0H 0S0

Telephone:
(780) 321-3774
(780) 321-3775
(780) 321-3842

Fax:
(780) 321-3886

March 31, 2016

Delivered by Email

Canadian Forest Products Ltd.
RR #1, Site 13, Compartment 2,
Fort St. John, BC
V1J 4M6

BC Timber Sales
Dawson Creek Timber Sales Office
9000 – 17th Street
Dawson Creek, BC V1G 4A4

Attention: **Darrell Regimbald,** Planning Coordinator (darrell.regimbald@canfor.com)
Jennifer McCracken, Planning Forester (stephanie.smith@gov.bc.ca)

Dear Sirs/Mesdames:

Re: Fort St John Pilot Project Draft 2016 Sustainable Forest Management Plan #3

I write to you on behalf of the Dene Tha' First Nation (the "DTFN") in regards to the Fort St John Pilot Project draft 2016 Sustainable Forest Management Plan #3 (the "SFMP").

As you may be aware, DTFN is a signatory to an adhesion of Treaty No. 8, (1900) and has constitutionally protected s.35 Aboriginal and Treaty rights, that its members exercise, within our Traditional Territory and overlapping SFMP areas.

Over the last number of years, Dene Tha's ability to exercise its Treaty 8 rights has been significantly eroded. With each new development that takes place, whether it be logging, oil or gas projects, dams or some other type of development, more and more lands are taken up, leaving fewer and fewer areas for Dene Tha' to practice its Treaty rights. Our Traditional Territory contains thousands of miles of roads, pipelines, seismic lines and other linear corridors, and numerous well sites, processing plants, power plants, cut blocks and other developments. Dene Tha' has been seriously affected by this development, and its Treaty rights compromised.

Cumulative effects of all of this development threaten not only our ability to continue to exercise our Treaty 8 rights, but also our cultural existence as Dene Tha' people. Being Dene Tha', we are intimately connected to the lands, waters and resources in our Traditional Territory and we have stewardship responsibilities to take care of them. We teach our children our cultural and

harvesting practices and language, and what it means to be Dene Tha', by being out on the lands with them in our Territory. We continue to be sustained by the wildlife, birds, fish, plants and medicines that we harvest out on the land. We prefer our traditional diet over store-bought products, and it is critically important to us to be able to continue to rely on resources in our Traditional Territory to feed our community into the future.

Development needs to be proactively and carefully managed to ensure that sufficient wild places and suitable areas to harvest remain to support a meaningful ability to successfully hunt, trap, fish, and gather the many species of animals, fish, birds, plants and medicines upon which our culture and traditional livelihoods rely.

The DTFN are holders of unique traditional ecological knowledge and traditional use study information within the SFMP area – it is very likely, if not certain, that this information could assist in the identification, assessment, mitigation, and accommodation of potential site-specific and landscape level concerns, issues or opportunities that may arise in relation to the SFMP and any proposed or future forest operation schedules or plans that may require Ministerial approvals.

We understand very well from experience, that forestry and logging activities, including future execution of forest management plans, within our Traditional Territory can pose a very high risk for potential adverse impacts to the environment and the ability of our members to meaningfully exercise their s.35 rights.

We would like to take this opportunity and schedule a meeting with you to discuss the SFMP and any future development plans including a review of the SFMP and descriptions of how any proposed changes from previous versions might affect future forestry and logging operations – in practice, within DTFN's Traditional Territory.

We look forward to your reply and our next meeting.

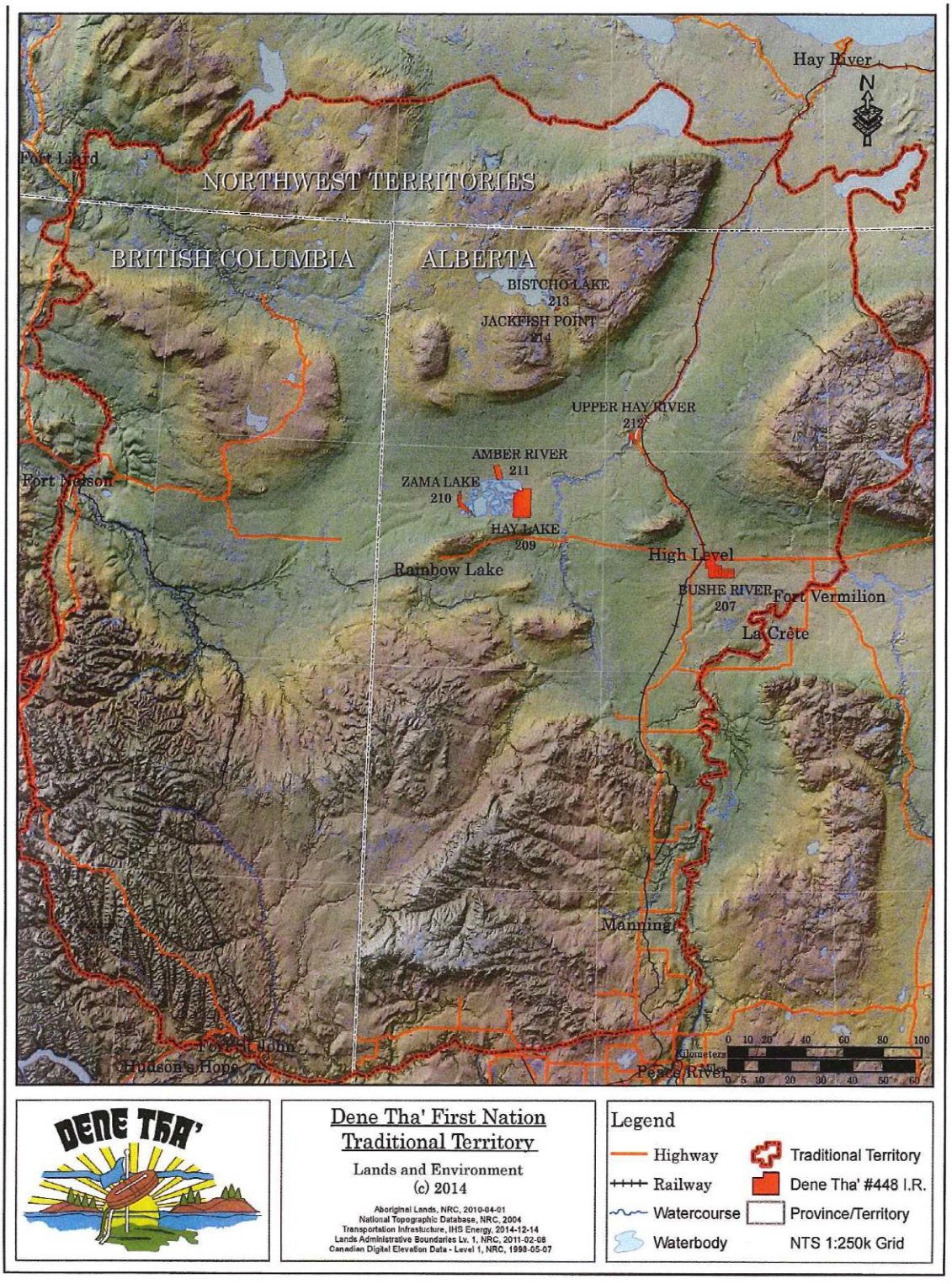
Yours truly,

[DENE THA' FIRST NATION]

Baptiste Metchooyeah
Lands Department, Manager
(baptiste.metchooyeah@denetha.ca)

Cc: Dene Tha' First Nation, Attn.: Chief Joe Pastion and Council (joe.pastion@denetha.ca)
Dene Tha' First Nation, Attn: Fred Didzena (fred.didzena@denetha.ca)
MFLNRO – Peace Forest District, attn.: Ashlyn Exley (ashlyn.exley@gov.bc.ca)

Enc: Map of DTFN's Traditional Territory


Hay River
N
Fort Liard
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
BISTCHO LAKE
213
JACKFISH POINT
214
UPPER HAY RIVER
212
AMBER RIVER
211
ZAMA LAKE
210
HAY LAKE
209
Fort Nelson
Rainbow Lake
High Level
BUSHE RIVER
207
Fort Vermilion
La Crête
Manning
Fort St John
Hudson's Hope
Peace River
0 10 20 40 60 80 100
Kilometers
0 5 10 20 30 40 50 60
DENE THA'
Dene Tha' First Nation
Traditional Territory
Lands and Environment
(c) 2014
Aboriginal Lands, NRC, 2010-04-01
National Topographic Database, NRC, 2004
Transportation Infrastructure, IHS Energy, 2014-12-14
Lands Administrative Boundaries Lv. 1, NRC, 2011-02-08
Canadian Digital Elevation Data - Level 1, NRC, 1998-05-07
Legend
Highway
Railway
Watercourse
Waterbody
Traditional Territory
Dene Tha' #448 I.R.
Province/Territory
NTS 1:250k Grid

Summary of SFMP# 3 Review Discussion with DTFN

Following is the summary of the SFMP# 3 review discussion held with DTFN:

SFMP 3 Review Discussion

Conference Call April 29 2016
Attendees: Baptiste Metchooyeah, Kevin Kuhn, Darrell Regimbald (Canfor), Jennifer McCracken (Canfor), Stephanie Smith (BCTS), Courtney Booker (MFLNRO)

DTFN Concerns

Baptiste: Concerns are similar, regardless of border; Clearcutting, Buffering of lakes and streams and wildlife concerns

Fort St John Pilot Project Regulation (FSJPPR) Overview

Canfor and BCTS are the managing participants in the FSJPPR; prepare the Sustainable Forest Management Plan and Forest Operations Schedule on behalf of all FSJPPR participants. There are 2 managing participants and 6 companies that have agreed to the Pilot Project and have Canfor manage their planning. The FSJPPR only applies to the Fort St John Timber Supply Area.

The Forest Operations Schedule (FOS) is the plan that show planned blocks and roads for all participants. There is a new FOS being developed, and should be ready for public and First Nations review and comment this summer.

What is the term of the SFMP and FOS? SFMP is a 6 year plan, as well as the FOS. In the FSJPPR it identifies that there must be at least 6 years volume shown in the plan. For consistency, the SFMP is set up at the same timeline as the FOS.

Question (Kevin): Are silviculture activities shown on the Plan?
Response (DR): Silviculture activities (site prep, planting, herbicide) – are not shown. Species management (conifer or deciduous) is identified in the FOS; the brushing program is described in the Pesticide Management Plan (PMP). Part of the PMP, is the Notification of Intent to treat (NIT) - this provides the individual blocks and treatment plan for the block each year. The NIT allows for the public to comment on the proposed brushing treatments. The SFMP identifies the reforestation targets (stocking standards).

Question (Kevin): How solid is FOS year 1-6?
Response (DR): The FOS doesn't identify the planned harvest date. Canfor has a 3 year operating plan where the harvest sequencing is planned. The other licensees, LP, CNRL, Chetwynd Mechanical Pulp, Peace Valley OSB and Dunne - Za have their blocks logging scheduled in Canfor's 3 Year plan. Chetwynd Mechanical Pulp (CMP) has a small area in south part of the FSJ TSA that is not part of the SFMP or FOS, they do their own scheduling in this

area under their Pulpwood Agreement. BCTS has a sales schedule that identifies harvest dates.

Comment (Baptiste): Pesticide Use- DTFN is not supporting the use of Pesticide. There is concerns with the weather monitoring (i.e. Jason's Meeting regarding the BCTS PMP in March). The weather on the ground and the helicopter environment is different. Concern is that the chemical is not applied when the chemical is sprayed.
Response (DR): Pilot Project Participants follow strict weather guidelines to ensure that the chemical is effective, reaches the intended vegetation and there is no drift. As long as the weather windows are used, the effectiveness is there. We have been trying to reduce the use of herbicide on an annual basis, and the trend is going down. On average we are using herbicide on 20-30% of the total area harvested annually. We are trying to minimize the amount of area treated with herbicide, in the 2014 reporting year approximately 571.4 ha were treated and 5,385.7 ha were harvested. The treated area represents 10.6% of the total area harvested in 2014.

Comment/Question (Kevin): Water management is a concern around buffers; trapping and trapping access; commenting at the SFMP level (high level) would not be as good as commenting on the FOS level. Streams are identified by stream class, as for the legislation. In Alberta, <1.5m, 1.5m to 5m, >5m Fish presence isn't a factor. How does this compare to this SFMP?
Response (DR): The SFMP proposes following the stream classification and management system identified in the FSJPP Regulation:

- <1.5 m Fish Bearing No Riparian Reserve Zone (RRZ- no harvesting), Riparian Management zone (RMZ) = 30 m; typically RMZ restrict tracks of machines in those zones, but machines can reach in and remove timber.
- <1.5-5m- 20 m RRZ (timber) and a 20 m RMZ. Intent of RMZ is to provide some windfirmness; feathering of the zone may be done in that RMZ
- >5m -20m in width - 30 m RRZ and a 20 M RMZ
- >20 m in width- 50 m RRZ and 20m RMZ

Comment (Baptiste) DTFN have asked for these buffers because those areas were historically travelled by people. Reserves protect cultural sites.

Questions (Kevin): What is the retention targets on cutblocks:
Response (DR): Retention targets are not on a cutblock basis, rather they are assessed on a landscape unit level. Each LU has a different target based on natural disturbance patterns. The targets range from 3% to 8%. Actual retention levels range from a low of 6.9% to a high of 16.8 % in WTP patches in the Milligan. We are exceeding targets in all LU's.
Question (Kevin): Do WTPs have to be contiguous to the block boundary? Do you keep track of external WTP area?

Answer (DR): No- they are supposed to be non-contiguous to count towards the retention targets; stream buffers are sometimes considered WTP. External WTP does not contribute to the indicator.
Question (Kevin): Does the external WTP contribute to the Timber Supply?
Answer (DR): No, if identified as a WTP, they are considered to be reserves set aside from harvest for a rotation, they are not considered to be part of the available timber for future harvest.
Comment (Kevin): The target in High Level is 1%. The landscape is not that different from High Level. The Northern part of the FSJ TSA is similar to High Level.

Comment (BM): Drought and climate change are impacting the wetlands. This is a concern due to new diseases being introduced by the stress. Due diligence is needed where land and water are being discussed.
Answer (DR): The Participants are confident that the stream buffers and WTPs in place are adequate regarding protection of stream quality, prevention of sedimentation, etc. With respect to climate change, the Provincial government sets the rules regarding tree planting species – what tree species seedlots can be planted by geographic location to ensure that the trees planted are adapted to the climatic conditions of the various sites throughout the province. They have recognized the issues with the climate change. We move tree seedlings in compliance with the provincial regulations.

Question (BM): Is climate change monitoring done by the companies?
Answer (DR): No instrumented climate change monitoring is done as part of the SFMP. However we will use the latitude available in the tree seed transfer guidelines to plant species that we feel will be best adapted to the expected changing climactic conditions.
Question (BM): Are Cumulative Effects impacts measured as part of the plan?
Answer (DR): Yes, the participants complete an analysis to look at the proposed road and blocks, which includes previous land clearing, including oil and gas, to determine if we were to go ahead with the harvest of all blocks proposed in the FOS, if we will meet the SFMP targets for land based values such shrubs, old growth forest, patch size, etc. This is reported in the FOS.
Comment (BM): DTFN has traplines in BC, so Forestry is a concern for DTFN.
Question: Are the impacts measured against other industries and their plans?
Response (DR): We do not measure against targets set by other Industries. We can account for their impacts through our analysis if their projects have been completed and mapped.
Question (Kevin): Development happens annually, how often is the vegetation inventory updated?
Answer (DR): Forestry Depletions to the vegetation inventory are done on an annual basis by the government, based on the industry submissions. Oil and gas submit as-built plans on a similar timeline. Available Spatial data for oil and gas development is reasonably accurate.

Question (BM): What are the impacts of these Forest Fires on planning?

Answer (SR): SFMP has an indicator that prompts us to assess disturbances from disease and fires for timber salvage opportunities. If possible, the Participants try to harvest damaged timber.

Comment : Dene Tha First Nations have funding Issues - no funding for this type of engagement is provided by government. Appreciate these meetings, and try to address a lot of the issues in NEBC. At some point, the funding issue needs to be discussed.

Clarifcation email sent to DTFN May 20, 2016.
Baptiste, Kevin,

Today while I was reviewing the summary of our discussion with you on April 29, 2016 of the draft Fort St John Pilot Project Sustainable Forest Management Plan# 3 (SFMP# 3), I noticed an error with respect to the discussion of the contribution of Wildlife Tree Patches (WTP) that are external to a cut block or contiguous to a cut block boundary, to the calculation of WTP %.

Our discussion and the meeting summary erroneously indicates that external WTPs do not contribute to the calculation of WTP % for the purpose of reporting on the SFMP WTP performance indicator. This is not correct. WTPs that are external or contiguous to a cut block boundary do contribute to the calculation of WTP area retention for the purposes of reporting on WTP retention performance by the Fort St. John Pilot Project Participants.

I apologize for any confusion this error may have caused.
Cheers!

Darrell Regimbald RPF
Canfor FMG North Planning Coordinator
Tel 250 787-3651
Cell 250 793-1705
Fax 250 787-3622

Summary of SFMP# 3 Review Discussion with BRFN

Following is the summary of the SFMP# 3 review discussion held with BRFN:

BRFN Feedback on Draft SFMP #3 received at the presentation
February 18, 2016 10am -3pm

Comment on Slide #7.
Re: values and objectives in SFMP were based in part on input from the PAG
BRFN Lands Manager: Why is there not a First Nations advisory Group?

Response: The FSJPPR requires that the Participants must establish and maintain a public advisory group. The Fort St John Pilot Project public advisory group currently consists of membership that includes the Saulteau, West Moberly, Halfway River, Prophet River and Doig River First Nations. Prior to November 2015 the FSJPP PAG membership included representation from the Blueberry River First Nation.

Comment on slide #13
Re: list of landscape level strategies.
BRFN Lands Manager: Why is there no First Nation Landscape Level Strategy? There should be a Treaty 8 Rights LLS.
Response: The FSJPPR identifies the landscape level strategies that at a minimum, must be included in an SFMP to provide direction for the management of forest resources. In addition to the landscape level strategies, the SFMP includes indicators and targets that are linked to the recognition of Treaty Rights and the management of forest resources that may affect the practice of Treaty Rights. This includes, the indicators that are linked to ecological management and to the recognition of Aboriginal and Treaty Rights (I 67: Rare Ecosystems, I 17: Representative Examples of Ecosystems, I 1: Forest Types, I 28 Species Composition, I 2: Seral Stage, I 3: Patch Size, I 5: Snags and Cavity Sites, I 9: Wildlife Tree Patches, I 6: Coarse Woody Debris Volume, I 7: Riparian Reserves, I 8: Shrubs, I 11: Species at Risk Stand Level Management Guidelines, I 16: Ungulate Winter Ranges, Wildlife Habitat Areas and MKMA, I 10: Invasive Plants/Noxious Weeds, I 15: Class A Parks, Ecological Reserves & LRMP Designated Protected Areas, I 18: Graham Harvest Timing, I 19: Graham Merch Area, I 20: Graham Connectivity, I 22: River Corridors, I 57: Number of Known Values and Uses Addressed in Operational Planning., I 25: Forest Health, I 7: Riparian Reserves, I 34: Peak Flow Index, I 35: Water Quality Effectivenss Evaluation, I 36: Protection of Streambanks, I 37: Spills entering Waterbodies, I 23: value and Total Number of Contracts Awarded to First Nations, I 33: First nations Consultation and Information Sharing, I 56: maintenance of Wildlife and Fisheries Habitat, I 62: Brushing Program Aerial Herbicide Use).

Comment on slide #14
RE: accountability to Government and Public.
BRFN Lands Manager: KPMG has never come to BRFN. BRFN would like their contact information so they can forward an invitation to KPMG this year.
Response: The contact information for KPMG performance Registrar Inc. was provided to the BRFN.

Comment on slide #21
RE: Ecosystem Diversity Indicators: Indicator 9: Wildlife Tree Patches
BRFN Lands Manager: Why is there no retention along minor creeks? Why are WTP's often located in places where there are no wildlife values (e.g. Rocky outcrops). Who is monitoring to ensure the WTP's are in the right places? The indicator just specifies the amount of area to be retained but it does not check if it is the "right" areas.

Response:
Riparian areas occur adjacent to wetlands or bodies of water such as rivers, streams, or lakes, and include stream bank and flood plain areas. On larger streams particularly, riparian areas often provide productive, structurally diverse habitats. In addition to providing ready access to water, these areas also support important habitat features such as coarse woody debris, cavity sites, shrubs and broadleaf trees, which have been identified as key habitat elements necessary to support species richness.
Riparian reserve zones (RRZ's) are specific areas on larger fish bearing streams, and some wetlands (W1) and lakes (L1) in which harvesting is not normally permitted, in order to protect significant riparian and aquatic habitats. Maintaining RRZ's provides many of the habitat elements needed to support a diverse species mix across the landscape.
Minimum RRZ's widths are identified in Schedule 'D' of the *FSJPPR*, and relate to activities carried out under the FSJPPR by the Participants, excluding road rights of way necessary to cross streams.
All streams, wetlands, and lakes in or immediately adjacent to a planned harvest area will be classified and mapped in the field prior to the commencement of harvest operations. RRZ's that meet or exceed the RRZ widths noted in Schedule D of the *FSJPPR* will be located and clearly marked in the field.
Current practice when establishing reserve boundaries in the field on S1, S2, and S3 streams is to utilize natural topographic breaks and timber type boundaries that result in irregular shaped edges. In practice reserve widths are normally wider than the minimum, but vary significantly in distance from the stream along their length, based on the natural breaks that are typically used for the boundary. These natural boundaries are usually inherently more windfirm than fixed width RRZ's, and easier to implement, so this practice is the preferred strategy for delineating RRZ's in the field.
The majority of riparian classifications completed by Participants within or adjacent to their operations will be on S4, S5 or S6 streams, so management measures on these small streams without mandatory riparian reserve zones can have a very meaningful impact on riparian and water resources.
SLP's (Site Level Plans) contain site-specific measures designed to protect streambanks, stream channel stability, and in many cases adjacent riparian vegetation. Protecting the streambanks and stream channels reduces the risk of sedimentation entering the watercourse, and contributes to the maintenance of water quality on streams without mandatory riparian reserve zones.
Management strategies for the protection of these values on streams without mandatory riparian reserve zones, as well as for the protection of other non-fishbearing waterbodies, are based on site-specific field assessments. Factors such as riparian classification, topography and slopes, soil characteristics, season of harvest, snow loads, vegetation and habitat characteristics are considered when prescribing management strategies to protect the values on small streams without riparian reserve zones. Measures that may be implemented include designation of Wildlife Tree Patch or other reserve area, restricting harvesting operations to frozen ground conditions, compressible snow pack criteria, establishment of machine free or machine sensitive

zones, use of low ground pressure equipment, and prescribing retention of non-merchantable stems within riparian areas.

Wildlife Tree Patches (WTP's) are forested areas of timber within or immediately adjacent to a cutblock that are retained primarily for their value in providing a source of habitat elements, or for the protection of important habitat features.
WTP's provide sources of shrubs, large live trees, broadleaf trees, coarse woody debris (CWD), and snag/cavity sites. These elements can provide key habitat components that support the residual populations, the reintroduction of populations expatriated by the disturbance, and overall ecosystem function (Bunnell et al 1999).
Wildlife Tree Patches (WTP's) within managed stands have been shown to be important in the reestablishment or maintenance of a variety of species, including moose (Gasaway and Dubois 1985), and birds (Seip 1997). Residual patches include both islands within the block (internal WTP's) and patches immediately adjacent to logged areas that are also adjoined to unharvested areas (external WTP's). Both internal and external residual patches may be suitable for WTP's provided they can function as sources of habitat elements, which will depend on their site specific attributes. External WTP's connected to adjacent unharvested areas are typically more windfirm within the DFA, and may receive higher initial use by some wildlife species due to the proximity of adjacent unharvested habitats.
Maintaining habitat elements in Wildlife Tree Patches contributes to enhancing species richness by providing the critical features needed to support a variety of species. Designating areas that have composition and structure similar to natural remnants as WTPs will contribute to maintaining a natural range of variability in ecosystem function. Providing diverse habitat structures, including WTP's, within managed stands is consistent with the pattern of natural disturbances. Fire is the most prevalent natural disturbance in the DFA. Maintaining a component of Wildlife Tree Patches in managed stands over the landscape is analogous to fire 'skips'. Skips occur where areas are burnt, but undamaged or lightly burnt patches persist within the perimeter, or on the edge of the fire within a similar forest type. These residual patches in otherwise disturbed areas typically vary substantially in size, shape and composition, so variability in these characteristics of WTP's is desirable.
WTP's can also be used to protect site-specific habitats, such as mineral licks and raptor nesting sites and provide a source of local genetic material. Following is the guidance provided in the SFMP to prescribing professionals regarding the placement of WTP's:

- Including areas of key site specific habitat importance, such as eagle, osprey, or blue heron nests, mineral licks, and riparian areas,
- In areas with species of concern, locate WTP's consistent with stand level management guidelines where practical,
- Areas of operational concern which can contribute significantly to the provision of key habitat elements (riparian habitats, large live trees, snags or declining trees, large trees, broadleaf trees, CWD, or shrubs),
- Tree species that are uncommon in the LU may provide some unique niche habitats (e.g. cottonwood or birch in the Graham River LU),

- Other wind firm forested stands that can provide these habitat elements,
- WTP's should be retained for the full rotation, unless there are overriding forest health concerns, or as otherwise approved by the MFLNRO, and
- WTP's may be more windfirm if located adjacent to cutblock boundaries.

Comment on slide #24
RE: Species Richness Indicators. SAR Stand Level Management Guidelines.
BRFN Lands Manager: Where is the evidence that this indicator is working to protect wildlife? Who is monitoring the success of these indicators? What have the participants done to ensure effectiveness?
Response: Application of landscape level biodiversity management measures contribute to the maintenance of most of the biodiversity needs in the planning area. These management approaches are "coarse filter", i.e., they represent general measures to conserve a variety of wildlife species.
However, coarse filter approaches may not be sufficient to ensure the conservation of special status species. Fine filter management guidelines are therefore required to ensure that species "at risk" are maintained within the DFA. The Species at Risk Stand Level Management Guidelines indicator measures whether guidelines that may help conserve and manage specific habitat needs for species at risk where they are likely to occur, are being applied.
These guidelines are included in the December 2010 document entitled "Stand-level Management Guidelines for Selected Forest-Dwelling Species in the Fort St. John Timber Supply Area" prepared by Manning, Cooper and Associates for direction. That document summarizes forest dwelling species of interest that may be impacted by forestry operations, the estimated likely geographical extent of the local habitat of these species, the specific niche habitat characteristics applicable to those species, and some stand level management guidelines that may help retain habitat or otherwise support these species.
Species at risk included in the Stand Level Management Guidelines document (SLMG) are derived from reviewing available information and authoritative sources including:

5) Federal Species at Risk Act Schedule 1, 2 or 3,
6) Provincially red and blue listed forest dwelling species that are directly and negatively impacted by forestry operations,
7) Regionally rare species that are sensitive to forestry operations (Sandhill Crane), and
8) Information on forest dwelling species from local MOE staff: Local government staff provided input on which local forest dwelling species might benefit significantly by inclusion in the Stand Level Management Guidelines.

With respect to the effectiveness of the management guidelines associated with the indicator, the stand-level management guidelines described in this indicator were developed to provide additional ecological information and achievable operational recommendations for forest resource managers. They were developed by referring to relevant scientific literature and regional reports, reviewing associated provincial management guidelines (e.g., see *Identified Wildlife Management Strategy* (IWMS) http://www.env.gov.bc.ca/wld/frpa/iwms/iwms.html),

conducting discussions with other forest managers and species experts, and the authors' cumulative knowledge, experience and professional judgment.

Forest harvesting alters habitat and may potentially diminish biodiversity (Spies et al. 1988, Hejl et al. 2002). The SFM plan addresses this concern by endeavouring to maintain biodiversity upon its tenure, in part by using indicator species monitored over the long term (see Bunnell et al. 2003). Indicators are classified by Bunnell (2005) as follows:

1. generalists, species that can occupy many different forest types
2. species that can be linked to broad habitat types
3. species linked to specific habitat elements
4. species that use specific or localized habitats
5. species linked to landscape features
6. species not associated with forested habitats

Under Bunnell's plan (Bunnell and Vernier 2007), species grouped into classes two and three are best suited for large-scale monitoring to assess the potential impacts of forest management activities. In addition, species chosen to serve as biological indicators must (1) be forest dwelling, (2) be sensitive to forest practices employed, (3) be practical to monitor in terms of sampling, identification, and cost, and (4) provide information useful in guiding forest practices (Bunnell et al. 2003).

Because songbirds, especially migratory songbirds, have the ability to modify their presence in an area according to the ability of available habitat to fulfill their foraging and nesting requirements, they are particularly well-suited for use as ecological indicators (Robbins et al. 1986, Canterbury et al. 2000, O'Connell et al. 2000, Carignan and Villard 2002). When the entire forest-dwelling songbird community is preserved, so too is the varied and unique range of habitats which they occupy, which collectively represent a diversity of habitat for other plants and animals (Hutto et al. 1987, Crozier and Niemi 2003, Rempel 2007).

Over the course of 2006-2009, the participants collected baseline data to monitor trends in the populations of songbirds in the Fort St John defined forest area. This data maybe assessed in conjunction with additional songbird population data proposed to be collected in the future, in order to assess the effectiveness of the management strategies identified in the SFMP.

BRFN Lands Manager: How are the wildlife features like bear dens and licks protected?

Response: Guidance in the SFMP indicator 9: Wildlife Tree Patches suggests anchoring WTPs over site specific habitat elements such as dens, raptor nests, and mineral licks. Where wildlife features are identified in proposed cutblocks, field staff follow the guidelines identified in the SFMP to manage the features by placing WTPs around them.

Comment on slide #56

RE: Sustainable and Viable Communities.

BRFN Lands Manager: Why are First Nations communities not included in this indicator?

Comment on slide #59

RE: Indicator 23: Value and Total number of contracts awarded to First Nations.
BRFN Lands Manager: Were offers ever extended to First Nations? Where are our offers?
The Participants (Canfor and LP) managed an agreement with 6 local First Nations that provided First Nations with opportunity to engage in harvesting of timber and other activities. The Participants (Canfor and LP) are working with the First Nations to negotiate a new agreement. The Participant's (Canfor and LP) manage a contract with local First Nations Company 6 Nations Ventures, to manage the log yard at Peace Valley OSB. BRFN stated there is minimal benefit to the community from the contract between 6 Nations Ventures and the OSB mill.

Summary of SFMP# 3 Review Discussion with HRFN

Following is the summary of the SFMP# 3 review discussion held with HRFN by email:

McCracken, Jennifer
From: Lyle Mortenson <lyle@lrm.ca>
Sent: Thursday, March 24, 2016 9:55 AM
To: McCracken, Jennifer
Cc: rnotseta@hrfn.ca; referral@hrfn.ca
Subject: RE: review request - Fort St John Pilot Project draft 2016 SFMP

Thanks Jennifer for following up regarding receiving our comments,
I checked and yes I did receive it alright, in December, and did not respond however, providing the terms of our draft
CCUA MOA between Canfor and HRFN are followed, this specifically covers HRFN's main concerns. That will address the
SFMP stage and provide consideration to be included in subsequent plans and PMP's within the CCUA.
We appreciate Canfor's efforts to live up to the draft terms of the MOA.
Regards,
Lyle Mortenson
Forestry Consultant on Behalf of HRFN.

From: McCracken, Jennifer [mailto:Jennifer.McCracken@canfor.com]
Sent: March-23-16 5:13 PM
To: lyle@lrm.ca
Cc: rnotseta@hrfn.ca; referral@hrfn.ca
Subject: FW: review request - Fort St John Pilot Project draft 2016 SFMP

Hi Lyle,

Here is the initial letter from Darrell and I have attached the follow up e-mail from mid February. These two e-mails,
combined with the string attached to my e-mail this morning would be a complete picture of the info-sharing
contacts. Sorry for leaving you off the follow-up e-mail.
Regards,
Jen

From: Regimbald, Darrell
Sent: Friday, December 18, 2015 1:43 PM
To: Roslyn Notseta <rnotseta@hrfn.ca>; Lyle Mortenson (lyle@lrm.ca) <lyle@lrm.ca>; Lyle Mortenson
(lylemort@telus.net) <lylemort@telus.net>
Cc: Smith, Stephanie B FLNR:EX (Stephanie.Smith@gov.bc.ca)
<Stephanie.Smith@gov.bc.ca>; Ashlyn Exley
(ashlyn.exley@gov.bc.ca) (ashlyn.exley@gov.bc.ca) <ashlyn.exley@gov.bc.ca>; McCracken, Jennifer
<Jennifer.McCracken@canfor.com>
Subject: FW: review request - Fort St John Pilot Project draft 2016 SFMP

Roslyn, Lyle,
I hope that you are both well!
Please find attached a request for your First Nations review and comment regarding the Fort St John Pilot Project draft
2016 Sustainable Forest Management Plan (SFMP).
2
A copy of the SFMP has been posted to Fort St. John Pilot Project website and to the Canfor FTP site.
Link to Fort St. John Pilot Project website:
http://www.fsjpilotproject.com/documents/Draft_SFMP_3_Public_Rev_vers_2015_11_25.pdf
Link to Canfor FTP site:
ftp://ftp.canfor.com/
User: EcoSystem
Password: F0rest4Tr33s
Please note that “0” in the password “F0rest4Tr33s” is a zero, it is not an “O”!
The SFMP files are stored in the following folder:
ftp://ftp.canfor.com/outgoing/FSJohn/SFMP/
Please contact us if you prefer to receive a paper copy of the draft 2016 SFMP.
Please note that the SFMP describes the resource management strategies to be implemented by the Participants within
the Fort St John Timber Supply Area. The SFMP does not identify proposed timber harvest areas and roads, these are

identified in the Forest Operations Schedule, which will be made available for review in mid to late 2016.
Please contact myself, Jennifer McCracken or Stephanie Smith if you have questions regarding the SFMP. We look
forward to discussing the draft SFMP with you.
We wish you all the best for the holiday season, cheers!

Darrell Regimbald, RPF
Planning Coordinator
FMG North
Canadian Forest Products Ltd.
T 250-787-3651 **C** 250-793-1705 **F** 250-787-3600
darrell.regimbald@canfor.com www.canfor.com

9312 – 259 Rd, RR 1, Site 13, Comp. 2, Fort St John, BC, V1J 4M6

SFMP #3 Indicator Amendment - Summary of First Nations Communications

Halfway River First Nation

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
4/26/2020	Email – Received	Lyle responded that HRFN has no issues with the amendment.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.

West Moberly First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.

Saulteau First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.
07/15/2020	Email – Received	Email from Jason asking if there are any shapefiles associated with the amendment.
07/15/2020	Email – Sent	Responded to Jason's email that there were no shapefiles associated with the SFMP amendment.
07/17/2020	Email –	Email from Jason with response on behalf of SFN.

	Received	
08/25/2020	E-mail - Sent	Email sent with response to SFN's questions.

Horse Lake First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.

Prophet River First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.
07/14/2020	Call – Out	Call with Melissa regarding the SFMP. She indicated that she hadn't had time to review the document and would like a meeting with Darrell to explain the changes.
07/14/2020	Email – Sent	Sent email as a follow up to the call. Proposed dates for meeting with Darrell to discuss SFMP amendment. Never received response.
08/11/2020	Email – Sent	Sent email alerting Melissa that managing participants would be requesting approval with FLNRO for SFMP Amendment 1. Indicated that we are still open to discussions regarding this amendment.

Doig River First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP

		indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/8/2020	Email – Received	Email from Sara requesting clarification of changes to Indicator 56.
5/11/2020	Email – Sent	Emailed document highlighting changes to Indicator 56.
5/29/2020	Email – Received	Email from Sara with questions regarding Indicator 2.
5/29/2020	Email – Sent	Darrell responded to Sara's questions by email.
06/30/2020	Email – Received	Email from Sara with DRFN official response to amendment package.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.
08/21/2020	Email – Sent	Email sent with response to DRFN comments.

Dene Tha' First Nation

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.

Fort Nelson First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/02/2020	Email – Received	Katherine replied to pre-engagement email confirming receipt and that FNFN would like to receive digital amendment package as offices are closed.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
5/27/2020	Email – Received	Cynthia emailed back that they are still in the process of reviewing the document as they have limited capacity.
5/27/2020	Email – Sent	Reiterated to Cynthia that the review period has been extended to accommodate the extenuating circumstances.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.
07/15/2020	Email –	Cynthia sent response on behalf of Fort Nelson First Nation.

	Received	
08/21/2020	Email – Sent	Email sent with response to FNFN comments.

Blueberry River First Nations

Date	Type	Notes
04/01/2020	Email – Sent	Pre-engagement email sent alerting to upcoming SFMP indicator amendment.
04/16/2020	Email – Sent	Copy of SFMP 3 Amendment 1 sent requesting comments by June 18th, 2020.
5/27/2020	Email – Sent	Follow-up email sent with review and comment period extension to July 18th, 2020.
07/09/2020	Email – Sent	Reminder email sent requesting written comments by July 18th.

Appendix 22: Government Comments

SFMP# 3 Government Review Comments
Submitted by Elizabeth Hunt, RPF November 24, 2015

SFMP Page #	Government Comment	Participant Response
71	Section 23.1 of the FSJPPR requires a reforestation declaration, however this section of the SFMP notes that once the plan is approved this will no longer be done prior to harvest but at the time RESULTS is updated. This doesn't meet the requirements of Section 23.1, where the DM has the opportunity to reject the reforestation declaration if they deem it incorrect/inappropriate. If it is only when RESULTS is updated, this could be up to a year later, and effectively too late to deny.	Proposal of Reforestation declaration submission via RESULTS deleted and moved to section 8.3 Recommendations to revise sections of the FSJPPR.
93	Second paragraph, under Strategy and Implementation, there is still mention of identifying spatial rotating old forest reserves, however direction from FLNRO for SFMP 2 was to move to delineating OGMA's spatially.	Deleted the reference to rotating old forest reserves. Identified commitment to work with government to identify spatially explicit old forest reserves during the term of SFMP# 3.
99	Forecasting to 2016; should the date be when this SFMP expires?	SFMP statement is correct. A new forecast will be completed through to the end on FOS # 3. The new forecast will be described in FOS# 3 and the 2016 annual report.
101	Refer to the 2014/2015 Annual Report?	Reference revised to cite the 2014/2015 SFM annual report.
107	Reference to Prescribing Foresters, as opposed to Forest Professional?	Reference to Prescribing Foresters, revised to Forest Professionals.
114	Referencing the 2013/2014 Annual Report?	Reference revised to the 2014/15 SFM annual report.
125	Date November 15, 2001 to March 31; is this correct?	Yes. Data presented is from Nov 15, 2001 to March 31, 2015.
148	Notes the FSJ TSR to be released mid 2015 (update)	Reference to TSR revised to note 2016 as estimated completion date.
186	Under Current Status, is there some wording missing? It starts with "illustrates the . . . "	Sentence modified to read as "The following table illustrates…"
206	Notes the FSJ TSR to be released mid 2015	Reference to TSR revised to note

	(update)	2016 as estimated completion date
256	Under Strategy and Implementation Schedule, the last paragraph notes RESOURCES ITS; what is ITS?	The acronym has been written out ITS - Incident Tracking System.
267	Under Strategy and Implementation, need to update dates (notes FOS 2010 instead of when this SFMP is approved).	Revised reference to specify FOS# 3.
280	Third bullet is truncated (bracket at end of sentence with nothing afterward).	Title of Indicator # 35 added in to bullet.
297	Under Acceptable Variance, it has – 10%? I think the '-' is a typo.	The '-' was a typo and has been removed.
338	Confirming that the Reforestation Strategy for deciduous is being back dated to November 15, 2001?	Yes this is correct.
341	Under the Rationale for the CWD levels, the plot information collected will be from December 1, 2008 and November 30, 2016?	Data collection period revised to reflect "collected between December 1st, 2016 and November 30th, 2022".
342	Under Riparian Reserve Strategy, is it only RPF's prescribing harvest in riparian reserves; under the Equivalent Protection section there is the wording 'qualified professional'.	Reference has been revised to specify "qualified registered professional".
343	Under the Visual Quality Strategy, change the Ministry of Forests and Range to FLNRO. Consistently refer to 'forester' as opposed to 'qualified professional'.	References have been revised to specify "qualified professional" and to "MFLNRO".
344	Changes to Section 81(1)(j)(ii) to delete the requirement for reforestation declarations goes against legislation and cannot be changed in the SFMP/FOS (legislation change is required).	This section referencing FSJPPR Section 81(1)(j)(ii) proposing to delete the requirement for reforestation declarations has been deleted from the SFMP.
346	Section 8.3; will you suggest removing the requirement to provide a reforestation declaration as required in Section 23.1 of the FSJPPR?	Proposal for Reforestation declaration submission via RESULTS moved to section 8.3 "Recommendations to revise sections of the FSJPPR".
348	Is this intentionally left blank or is anything missing?	Blank page has been deleted.
399	Silviculture Note ?? Does this have a number assigned yet?	We are not aware that a number has been assigned to this Silviculture Note. We have

		revised the reference to “Silviculture Note”.

Government comments on the draft SFMP# 2 that was provided for public review were received from the MFLNRO and MOE. Following is a summary of all Government comments on SFMP# 2 and the response of the FSJPP participant's to the Government comments.

Fort St John Pilot Project

Collation of technical input received for the draft SFMP# 2 and Participant Responses

The following is a complete list of the comments received by the Fort St. John Pilot Project Participants in response to their draft SFMP from Ministry of Forests and Range and Ministry of Environement staff members. The comments and responses to each comment have been grouped by landscape level strategy and responses from the Participants have been highlighted in YELLOW. Where a comment may not pertain to a Legal Landscape Level Strategy it has been grouped where appropriate under either "Section 8 – Changes in Requirements" or Non-Legal or Indicators not linked to a Landscape Level Strategy"

The participants would like to thank the reviewers for their comments and questions and trust that the responses contained in the following document adequately address the comments or concerns noted by the reviewers.

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1. Timber Harvesting Strategy

Comments from: Joelle Scheck, Ecosystems Section Head, MOE

Dated: April 21, 2010

Please find attached comments from my review of SFMP#2. Please note that I did not review each and every section of the SFMP, but focused on sections that seemed relevant to the MOE Environmental Stewardship mandate. Thank-you again for forwarding the technical review comments of the MOFR staff experts, who have taken the time to review the plan in detail.

Overall I do not have significant concerns with respect to the SFMP#2. As you know, over the course of the last year and a half or so, I have participated as a government advisor in Working Group meetings as well as at Code Pilot Public Advisory Meetings. During the course of those meetings my comments and advice was provided to the Code Pilot Participants and the Participants made accordingly or I accepted the rationale given by the Participants for not making changes. The vast majority of revisions in this second plan were made to clarify wording and not to change intent.

Having said that, I have a number of comments, questions or suggestions of a more minor nature that are outlined in the attached table.

Sec. 4.1.1 Graham River IRM Plan – page 50	• With respect to pre-development of road ROW's to facilitate entry to other clusters while harvesting is occurring in a cluster, suggest that if this occurs that the Participants commit to implementing appropriate mitigation (e.g. operating within least-risk timing windows, and implementing operational mitigations such as minimizing snow-plowing, etc. to minimize negative impacts to wildlife) • Negative impacts could be direct or indirect such as displacement from preferred habitat, increased metabolic stress, increased risk of predation, etc.) • Was this concession part of the original GRIRMP or is it an adaptation? Participants response **Action** We will add a statement in the SFMP wrt to minimizing impact on wildlife.

	We assume the species of concern is caribou? – please clarify/confirm the species in question.
Sec. 4.1.3 MKMA Strategy – page 52	Note: consistency with other approved MKMA Plans, such as the recently approved MKMA Wildlife Plan, may be required in addition to consistency with legal Objectives under the Act. Comment noted. **Action** Participants will add a statement to Ind 21 wrt to ensuring operations in MKMA are consistent with approved MKMA plans prepared by Govt.
Sec. 6.21 MKMA Harvest – page 159	Same comment as for Sec. 4.1.3 MKMA Strategy Comment noted.
Sec. 6.16 UWR, WHA, MKMA – page 141	• WHAs – suggest replacing the word "mapped" with "spatially defined" • Suggest removing reference to "or are remaining examples of identified plant communities" • Replace "MWLAP" with "MOE" • All "Identified Wildlife" are Species at Risk (provincially red or blue listed species). Currently "Regionally Important" wildlife (yellow listed species) are not considered "Identified Wildlife" although this may change within the term of this new plan. Comment noted. **Action** Will revise SFMP text accordingly.

2. Road Access Management Strategy

Comments from: Sandy Currie,Technical Advisor, Timber Harvesting Practices FPB(*retired*)

Dated: March 11, 2010

Please find attached my comments and suggestions regarding the FSJ SFMP #2 (Feb 8/2010 version). The strategies that I will be commenting on are the:

1. **Soils Management Strategy (Section 4.8); and,**
2. **Road Access Management Strategy (Section 4.2).**

I have divided my comments and suggestions into two parts:

- **General overall comments regarding each of these strategies (these will be included as text in this email itself); and,**
- **Specific suggestions for change where I feel there is a need to change the strategy to better express our expectations (these will be attached to the email as pdfs showing suggested changes to specific pages of the document).**

Road Access Management Strategy (Section 4.2)

1. **General Overall Comments**
   - 4.2 Road Access Management Strategy – page 55-56 – this is an excellent section. There is a clear identification of collaboration with other industrial users of the land base (see the first pdf –under specific suggestions for change below – to view specific examples of this collaboration);
   - 4.21 Permanent Access Strategy – page 56 – I have a question for the Participants regarding the choice of using a 3 year rolling average to determine the Permanent Access Structure (PAS) % (this question is illustrated in the second pdf – under specific suggestions for change below); and, (The question was *"Is there a specific reason why a 3 year rolling average was chosen rather than say, a 5 yr rolling average for the PAS? MFR uses a 5 yr rolling average for use in its internal Performance Mangement System.")*
   - Yes, the Participants chose a 3 year rolling average due to the timeframe of the plan, as this target must be achieved by the end of the SFMP (6 years) a 3 year rolling average is more reactive and gives the Participants a more reasonable timeframe to adjust their practices and still conform to the targets if they find they are exceeding PAS targets.
   - No revisions to be made to SFMP.
   - 4.2.3 Strategy to Coordinate Road Development with Other Industries – page 57 – this area identifies one of the centrepieces of this SFMP. There is a clear illustration of coordinating road development presented in the second pdf – under specific suggestions for change below.
2. **Specific Suggestions for Change**


20100311145909.pdf


20100311145959.pdf


20100311170203.pdf

Sandy Currie, M.F., R.P.F.
Technical Advisor - Timber Harvesting Practices

Leading Learning Organizations Practitioner
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3. Riparian Management Strategy

Comments from: Dave Maloney, Technical advisor, watershed science, Forest Practices Branch (FPB)

Dated: March 5, 2010

Thank you for forwarding the materials.

I will review the materials as requested – comments will follow. I've had a quick look at several section, ie. the peak flow / riparian management / water quality concern (p.195) components – all contain references and recommendations (?) that are out of date and need to be revised/updated. For example, the water quality section refers to the SCQI procedure which has been superseded by the FREP water quality effectiveness evaluation (WQEE) which is FIA fundable. The document does not identify which procedure SCQI or WQEE will be followed. Also where is Appendix D? Note also, there is a new procedure for assessing fish passage and for culvert replacement that needs to be updated in the document.

- The reference to SCQI is historical and relevant. In fact the WQEE procedures were developed based on the SCQI procedures. Since 2007 the Participants have been following the WQEE procedures and this is referenced in the SFMP. The Participants will refer provide clarity to the fact that the WQEE procedures are used in the description of Indicator # 35.
- The Participants are following only the tasks and procedures of the WQEE that are tailored to meet the reporting needs for indicator #35.
- Indicator # 35 deals with water quality by assessing the potential for sediment delivery to streams at road crossings, it is not meant to assess fish passage at road crossings. We assume the reference in the comment above to "Appendix D" is actually to **Schedule D** of the *FSJPPR*, as indicated in section 4.3.1 and 6.7 of SFMP #2.
- As mentioned Indicator #35 is not meant to deal with fish passage. The participants have recently completed fish passage analysis in the Upper Halfway River watershed utilizing FIA funds. Completion of fish passage assessments and rehabilitation of existing crossings is not an obligation under the SFMP. Appendix 12 of SFMP #2 – Stream Crossing and Seasonal Bridge Installation and Removal Procedures provide guidance when developing stream crossings. These guidelines were developed with input from MOE and were part of the approved SFMP #1.
- No revisions to be made to SFMP.

Comments from: Dave Maloney, Technical advisor, watershed science, Forest Practices Branch (FPB)

Dated: March 31, 2010

Regarding the Fort St. John Pilot – I have 2 concerns.

1) It wasn't obvious to me which road erosion monitor methodology Canfor was intending to use – is it SCQI or WQEE?
- See above comments
2) It wasn't obvious what Canfor was planning to do in the riparian areas of small streams – is it to leave 10 stems/100 metres of stream – if so, Rex's & DFO's research shows this strategy to be ineffective for several riparian functions.

- The SFMP does not specify any one particular management strategy or retention level for riparian areas of small streams. As discussed in the write up for indicator #36, measures to protect stream banks and riparian values are included in Site Level Plans, and are prescribed by a qualified registered professional after consideration of the site-specific factors present.
-

No revisions to be made to SFMP.

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Comments from: John Rex, Regional Hydrologist, NIR

Dated: April 20, 2010

Thanks for the opportunity to provide comment on the SFMP report. I know from the size of the document you must be busy managing it and collating the comments you receive. I am cc'ing Dave as some comments complement his and I may have missed some others. I will brief and only highlight issues I see with the SFMP, some are similar to the comments for last year's report:

4.3.1. Riparian Reserve Strategy (S1-S3 streams) – I assume the Schedule D minimum widths are the same as the FPPR/FPC widths but am not sure as Appendix D was not provided. I am making the assumption here that the reserves in App.D are the same as legislated reserves.

- See above comment. Yes, Schedule D offers equivalent protection as FPC/ FPPR (note somewhat different formatting). The Fort St. John Pilot Project Regulation was not appended to the SFMP.

With respect to the indicator in section 6.7, I am confused by the final paragraph on page 111 as it does not appear to address maintenance of reserves but instead access to them. The paragraph states that where there is a topographic break that prevents harvesting, reserves will be higher than legislated reserves. When access is easier, reserves may be less than legislated because the riparian can be harvested more easily. Is this appropriate? I would suggest that minimums are in fact minimums and should not be reduced in an easy access sites because riparian harvesting was limited upstream because of a topographic break.

- Please note that the target for indicator 6.7 is "No non-compliances to riparian reserve zone standards". The cases in which reserve zone widths may end up being less than those in Schedule D of the FSJPPR are specified in the Acceptable Variance statement, and relate solely to forest health issues (rationale required by prescribing forester). Minimums are indeed minimums, unless serious forest health issues are present.

Further, more retention is required where there is some concern about windthrow to buffer reserves rather than less as implied.

- The SFMP does not specify any one particular management strategy or retention level for riparian areas of streams. As discussed in the write up for indicator #36, measures to protect stream banks and riparian values (from hazards including windthrow) are included in Site Level Plans, and are prescribed by a qualified registered professional after consideration of the site-specific factors present.

4.3.2 Strategy to Address Riparian Management on Small Streams – Indicator in section 6.36 – small point numbers in paragraph 3 p. 209 add to 101 rather than 100.

- Acknowledged. Participants will correct in final version.

As stated, the objective of the indicator is to protect the stream bank, channel stability and riparian veg for S4-S6 streams. However, the indicator does not provide a strategy to meet this objective. Instead, this indicator focuses on the verification that a site plan is followed. Although it is important to verify site plans, there is no measure or indicator to verify that the site plans followed protect the stream bank, channel stability or riparian vegetation for S4-S6 streams. This indicator should be re-visited and revised so that it addresses its objective.

- The indicator is structured using the CSA guidelines to be SMART (specific, measurable, achievable, realistic, and time bound) to facilitate efficient measuring and reporting. While there is no specific indicator to verify post harvest that the measures identified in the site plans were sufficient to protect stream bank channel stability or riparian vegetation for S4-S6 streams, the participants are subject to 3rd party audits under their certification system, inspections and monitoring by MoFR C&E staff, FREP monitoring, Forest Practices Board audits etc. and must be able to prove due diligence should the prescribed measures prove to be insufficient, therefore the participants do not feel that a separate indicator to demonstrate the effectiveness of their prescribed retention requirements is warranted at this time.

4.3.3 Major River Corridor Strategy – Indicator 6.22 why do natural features such as a slope break provide a rationale for harvesting more than the allowable 1ha? Why is 10% failure rate allowed?

- The variance is in place because in some cases it may be appropriate to follow natural features and avoid such things as excessive windthrow or isolation of merchantable timber. The 10% value (not a “failure rate”) is to accommodate this concept, and considered to be a very conservative level.

4.3.4 Strategy to Manage Excessive Runoff Impacts to Riparian Habitats – indicator 6.34 Harvesting levels in the identified watersheds will remain below ECA levels identified by a professional hydrologist (range 37-62 ECA). UP to 10% will be allowed to exceed these thresholds when a **hydrologist** deems it is okay to have more harvesting than the initial limits set by the first professional hydrologist. I understand this is general practice but am not sure how this is a strategy to manage excess runoff impacts? Why substitute one professional’s opinion for another?

- There are two levels of assessment involved with indicator #34. The first is a ‘coarse’ filter (landscape level, with all watersheds in DFA) done with 6 years worth of proposed blocks in mind, based on the most current inventory and land use data available. Any watersheds with PFI values above baseline target require a finer-filter, more detailed, assessment (could be done by the same hydrologist) . Recommendations made by

hydrologist are incorporated into operational plans. Note that this indicator takes into consideration all land in watersheds, not just that affected by forest management (eg. Private land, burned over areas, etc.)

Page 197, bullet 1 of watershed review refers to the Prince George DM Policy minimum retention for small streams. Our research found this amount of retention to be insufficient to maintain health of small streams we are suggesting retention is increased to 10m. Hence the strategy they propose here may not meet FRPA objectives.

- This is a historical example quoted from a watershed review completed prior to harvesting, and not intended to represent a standard practice. It is expected that any future detailed watershed reviews would incorporate the latest accepted standards and information.
- Please note that FRPA objectives do not apply to The SFMP for the Fort St. John Pilot Project.

Water Quality Effectivenss Evaluation – Indicator 6.35

Allowing up to 35% of all streams to be in the high range translates to stating 35% of crossings can contribute significant levels of sediment to streams, some of which may be fish streams. Can MFR approve/be part of such a program? How does allowing 35% high risk crossings protect water quality? The report states where high WQEE in excess of targets (i.e. 35%) is reached recommendations will be developed about road and crossing management as well as deactivation... but what is done about the crossings themselves are they fixed? Does the decrease in Figure 13 (title seems off as it mixes of PFI and WQEE) reflect the fact that previous high ranking crossing were fixed or that new areas surveyed have fewer crossing problems, detail would help here.

- Please note, this indicator is not associated with a legal landscape level strategy, and as such is not a legally-approved indicator (referred to as a 'CSA' indicator). While the participants strive to do a very good job of managing stream crossings, we recognize that some level of erosion and sediment delivery is inevitable. Working within the CSA framework requires designing SMART indicators (see above), with some measureable target. 30% (with a 5%) variance is the target agreed to by the participants and the PAG and considers the nature of the operations and physical characteristics of the DFA (predominantly fine-textured soils).
- If the target is not achieved, then yes, among other things "high" crossings may receive remediation work. Such work has been done on crossings in the DFA, and has been largely focussed on fish-bearing streams.
- **Action** Yes, the Fig 13 title is mixed. Has been corrected.
- **Action** – SFMP will be revised to specify that the WQEE survey procedures will be implemented and add more detail regarding the decline in "high" WQEE through time (it is most likely a combination of remediation work and improved practices through education) to current status section.

Indicator 6.37 – Spills entering waterbodies – looks good- zero spills.

Comments from: Ian Miller, Manager Integrated Resources Section, FPB

Dated: August 12, 2009

Re: Riparian, Range and Soils

20100412163738.pdf

Hi Anna.....I've been reading the attached strategies, and have just a few comments/suggestions:

For RIPARIAN:
1. The proposed riparian strategy #2 now reads: "Site-specific management practices will be incorporated into SLP's to protect streambanks, stream channel stability, and riparian vegetation to protect water quality and other riparian values." I found the double usage of the term "...to protect..." in this sentence to be confusing. I think the same concepts could be more clearly and accurately stated as follows:
"Site-specific management practices will be incorporated into SLP's to protect streambanks, stream channel stability, riparian vegetation, water quality and other riparian values."

2. In proposed riparian strategy #3: What is a "major" river? Is this term defined somewhere, or left to individual interpretation? If the later, how is this enforced?

3. In current riparian strategy #4: (just in case this strategy is retained) I think the term should be "practicable", not "practical" as in the current version. See FPC General Bulletin #30 for more on the difference between the two terms:
http://www.for.gov.bc.ca/hen/bulletins/general.htm
Also, what is a "river corridor area"? Is this defined, and if not, how are the practices enforced?

4. In the newly proposed strategy #4: this one now reads "Excessive runoff at the watershed level, which can disturb stream channel integrity and adjacent habitats, will be managed by limiting the extent of harvesting within watersheds, as determined through peak flow index analyses." This seems like a very ambiguous strategy.....it doesn't seem to commit to any specific limit to harvesting, just commits to doing peak flow index analyses. Is this intended to work this way? How does this play out on the ground?

Action – revise SFMP wording as per Point #1.

Major rivers refers to major river corridors identified in the FSJ SFMP and these are spatially defined and noted in the SFMP section 1.3.1. – description of landscape units.

WRT to point #3 – the 2004 SFMP riparian strategy #4 has been dropped.

WRT to point #4 – refer to indicator #34 for more information regarding actions to be taken when PFI levels exceed threshold values.

Comments from: Dave Maloney, Technical advisor, watershed science, Forest Practices Branch (FPB)

Dated: August 12, 2009

Re: Riparian management

20100412165312.pdf

Anna,
I've reviewed the proposed riparian management SFMP landscape level strategies and have no comments to provide as the document does not identify strategies that can be measured or verified. Some tightening of the wording in a couple of the strategies might be possible, for example:
Strategy #2 identifies "qualified personnel" and "assessments" but does not identify the type of qualified personnel ("qualified hydrologists"?) or type of assessments and how these assessments would fit/become site-specific management practices.
Strategy #4 - the wording sounds a bit off. The current wording sounds like an admission that excessive runoff will occur due to logging and that it will be managed somehow by through peak flow analyses - question - how? (peak flow analyses - which one, what type?). I think what they are trying to say is that peak flow analyses (might not need to identify type or procedure) will be used to limit harvesting to prevent excessive runoff.

All in all, I understand that the riparian management strategies are scaled for landscape level application and therefore cannot be too specific. Consequently, no concerns at this time.

Particpants response

WRT strategy # 2 – comment noted, qualified personnel is meant to refer to anyone skilled in conducting a riparian classification assessment – adequate training, education and

experience. Qualified personnel is defined in FRPA and professional reliance guidance statements provided by the ABCFP. No revisions will be made to the SFMP.

WRT strategy # 4 – please refer to Indicator #34 for a description of how PFI is used to limit the effects of harvesting on limiting excessive runnoff. No revisions will be made to the SFMP.

Comments from: Joelle Scheck, Ecosystems Section Head, MOE

Dated: April 21, 2010

Section/page no.	Comment
Sec. 4.3 Riparian Management Strategy – page 58	Suggest defining "Qualified Personnell" Participants response – qualified personnel is defined in FRPA and professional reliance guidance statements provided by the ABCFP. No revisions to the SFMP will be made.
Sec. 6.36 Protection of …Small Streams – page 214	• Assume classification defaults to fish bearing unless otherwise proven (as per past practices) Participants response – classification does default to fish bearing unless proven otherwise by various methods. In absence of fish presence data, the participants use the fish presence assessment procedure developed by Vince Poulin for the Peace and Fort Nelson Forest Districts. The MOE has accepted this procedure.
Sec. 6.22 Major River Corridors Strategy – page 59	• What is a "high level of forest retention"? Is there a range or target of what is considered high retention? • Unsure of the meaning of "applies separately to the harvesting plans of each managing participant". Does this mean that each participant could harvest within the same corridor, each with a high level of forest retention, but the cumulative effect of the harvesting would not be accounted for? Response – the high level of retention is provided by virtue of the fact that harvest openings are limited in size to 1 ha or less. This is managed on a block by block basis, cumulative impact of harvesting within major river corridors is not assessed within this plan. This strategy is a measure to minimize the cumulative impact to the major river corridors. Very little harvesting has been completed to date within the major river corridors and very little is planned to occur in major river corridors in the new FOS.

Sec. 6.22 River Corridors – page 162	In addition to comments above (page 59), who determines "relative habitat values"? What are they relative to (surrounding riparian areas? Upland areas, etc.)? Response – the prescribing forester reviews the site conditions and values present when chosing an appropriate silviculture system.
Sec. 6.22 River Corridors Monitoring Procedure – page 163	Suggest it may be important to report out on areas > 1ha in size for areas harvested for forest health/salvage reasons within the digital corridor coverage area. As an advisor, I'd like to know if this type of harvesting is widespread/prevalent within major river corridors and how other values are still being maintained. Large diameter standing dead trees can have high value to many different ecological functions. Response Conformance to this indicator will be determined by overlaying the digital corridor coverage over areas harvested during an annual reporting period. The associated silviculture system employed on those harvested areas within the coverage area will be identified. Where clearcut type openings occur, the number of openings one hectare or less, and the number greater than one hectare in size (excluding areas identified for forest health or salvage harvesting) will be recorded and used to calculate conformance to the indicator target. This information will be made available upon request and in the SFMP annual report.

Comments from: Tony Hun, C&E Officer, Peace Forest District
Dated: May 17, 2010

Although this is a lot longer that I had hoped for, I am not sure how else to provide comments on the SFMP.
Riparian Reserve Strategy:

Harvesting will be allowed to address serious forest health concerns. This strategy does not list any further instances where harvesting may occur (i.e. harvesting in a reserve to eliminate a safety hazard would not be consistent with the SFMP). It appears that FH may give carte blanche to harvest within a reserve.

Participants response - comments noted.

ACTION - THE VARIANCE FOR INDICATOR # 7 HAS BEEN REVISED TO NOTE THAT HARVESTING WILL OCCUR FOR SALVAGE OR SANITATION OF FOREST HEALTH CONCERNS. THE VARIANCE WILL BE REVISED TO ALLOW HARVESTING IN RRZ FOR SAFETY AND OTHER CONSIDERATIONS IDENTIFIED IN THE FPPR.

4. Range and Forage Management Strategy

Comments from: Dale Gross, Range Officer, Peace Forest District

Dated: August 10, 2009

To: Blonski, Laura J FOR:EX

Subject: RE: Action Required (Deadline August 28): Fort St. John Pilot Project SFM Plan - review of landscape level strategies

Hi Laura,

It looks good to me. I like the part where the logging companies must restore damaged fencelines to satisfaction of range holder. That's a pretty contentious issue up here. Most fences are in disrepair, but act as effective barriers if surrounded by dense trees. The loggers figure these crappy fences are not worth replacing. But a crappy fence in dense bush is often as good as a good fence in open prairie.

_____

Dale Gross, M. Sc., P. Ag.
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Fax: 250-784-0143

- The participants would like to point out that the indicator is specific to range improvements **damaged by participants' activities**. This is slightly, but significantly, different than restoring damaged fence lines (that may be in disrepair). It is also important to note that this indicator does not account for natural range barrier mechanisms.
- Repair of damaged range improvements is to "substantially the pre-impact condition". Any a*lternatives* must be to "the satisfaction of affected Range tenure holders".

Comments from: Laura Blonski, Range Ecology Specialist, Range Branch

Dated: August 25, 2010

Hi Dale,

Sorry for the delay in getting back to you - but I am basically in full agreement with your comments/perspective.

Nothing really stood out to me in the pilot documentation (relative to the Range and Forage Management Component) as being erroneous or irrelevant.

Further comments from Dale Gross

Dated: April 23, 2010

I just had a few comments on the recent draft of the Fort St. John pilot draft sustainable forest management plan for 2010-2016:

1. Section 6.6 Coarse woody debris

- I would like to see a variance for the amount of coarse woody debris within range tenures
- Large amounts of coarse woody debris can limit access of livestock to forage in cutblocks

Participants response – CWD retention is managed at a landscape level. This provides the Participants the opportunity to reduce CWD retention where desired, to manage for other values. This is noted in the Indicator strategy and implementation write-up. No revision to the variance is required.

2. I like the wording in Sections 6.41 & 6.42 that links the indicators to the LRMP: *Maintain livestock grazing opportunities on existing grazing tenures. Maintain or enhance opportunities for livestock grazing.*
    - This has been a serious issue in the Peace area due to the loss of carrying capacity for livestock from aspen logging and subsequent aspen regeneration. I intend to hold the signatories of this SFMP to these objectives.

Participants response – the strategy and associated indicator and target are legally enforceable. The linkages to the LRMP are for reference only. Participants intent is to minimize short term negative impacts from harvesting on existing range tenures.

Comments from: Joelle Scheck, Ecosystems Section Head, MOE

Dated: April 21, 2010

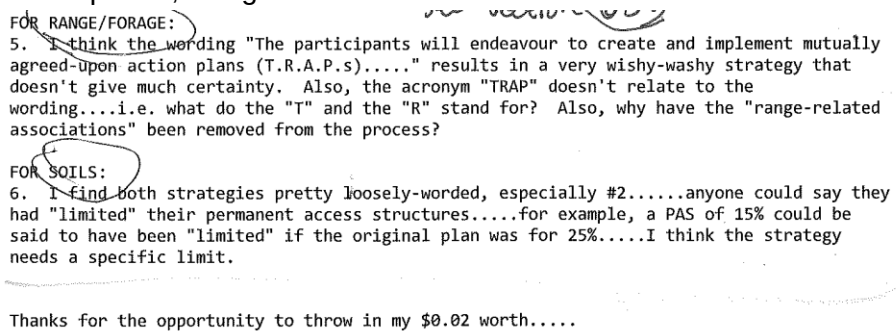
Section/page no.	Comment
Sec. 4.4.2 Noxious Weed Management Strategy	Is "Noxious" weed correct or should this simply be entitle "Invasive Plant" Management Strategy Participants response – the title of the strategy and indicator have been revised to Noxious Weed and Invasive Plant Management Strategy.
Sec. 6.10 Noxious Weed Content – page 124	• This comment may be at a level of detail not necessarily warranted at the SFMP level, but I would like to see some operational consideration by the Participants to utilizing unpalatable seed mixes along road sides to avoid increased ungulate/wildlife mortality due to vehicle collisions. Participant response – road side seeding is done primarily on secondary bush roads. The amount of road side seeding is quite small in relation to the total amount of seeding conducted. The majority of seeding is done on deactivated road surfaces to prevent erosion. To the Participants' knowledge, there is no data available to substantiate the amount of mortality actually incurred on the Participants'

	bush roads. • Unsure whether seeding with uncertified mixes is part of SOP's elsewhere where urgent conditions warrant it, but suggest Participants only consider this after other appropriate "urgent" erosion control methods have been considered (e.g. straw mats,etc.) Participant response – comment is well taken. In the past 6 years we have not experience3d a situation where uncertified seed has not been available. **Action** – Revise Indicator 10 implementation strategy to reflect that in situations where certified seed is not available, Participants will consider using other erosion control measures where practicable and appropriate.

Comments from: Ian Miller, Manager Integrated Resources Section, FPB

Dated: August 12, 2009

Re: Riparian, Range and Soils



FOR RANGE/FORAGE:
5. I think the wording "The participants will endeavour to create and implement mutually agreed-upon action plans (T.R.A.P.s)....." results in a very wishy-washy strategy that doesn't give much certainty. Also, the acronym "TRAP" doesn't relate to the wording....i.e. what do the "T" and the "R" stand for? Also, why have the "range-related associations" been removed from the process?

FOR SOILS:
6. I find both strategies pretty loosely-worded, especially #2.....anyone could say they had "limited" their permanent access structures.....for example, a PAS of 15% could be said to have been "limited" if the original plan was for 25%.....I think the strategy needs a specific limit.

Thanks for the opportunity to throw in my $0.02 worth.....

Participants response – WRT to comment #5 please see indicator 41 for a full description of implementation of the strategy. Provides clarification of the strategy. TRAP acronym stands for Timber Range Action Plans – mutually agreed upon by participants and range tenure holder.
Participants response – WRT to comment #6 – please see indicator # 24 for a full description of the strategy – note that the PAS limit has been set at 5% - which is less than the PAS limit specified in the FSJPPR.

5. Patch Size, Seral Stage Distribution and Adjacency Strategy

Comments from: Nancy Densmore, Biodiversity Specialist, FPB

Dated: April 16, 2010

Hi Anna – as discussed, this is a summary of the stand-level biodiversity FREP data collected in the Peace district. This represents harvesting from about 1998 through 2006. The numbers quoted in my previous e-mail were the sum total of BWBS data collected by FREP which would include area from Fort Nelson district. The above summary is likely more specific to the IFPA. My comments remain the same. Patch retention being achieved is close to 10% on average – a fair bit higher than the minimum averages in the SFMP. I do not have the history of HLPs from the area or what the old numbers from the Landscape Unit Planning Guide might be – but do note that the FRPA default at 7% minimum average is higher than the SFMP's patch retention targets. Dispersed retention being achieved is close to 2% (basal area equivalent – i.e. stating as equivalent to patch area) on average.

CWD volumes being found are higher than the minimum average of 46 m^3/ha being targeted in the SFMP (both CWD found on the ground in retention patches and on the ground in NAR) – however, 46 is probably a reasonable number considering their stated objective of maintaining at least 50% of natural levels. As I've mentioned before, it is the quality of the CWD in terms of density of large pieces that is the concern at the moment, rather than volume – and that isn't mentioned in the SFMP as far as I can see.

It may be clearly stated, but I wasn't sure if the target of 6sph >23 cm dbh is a target for dispersed retention within the net area to be reforested. If so that sounds reasonable.

Thanks Anna!

Nancy Densmore

Forest Practices Branch

Victoria BC

250 356-5890



DPC DRAFT SLB Report Jan 2010....

Participants' response – the SFMP indicates that retention of larger pieces of CWD is preferable to smaller pieces. Also, the target for retention of stems/stubs > 23 cm dbh is for dispersed retention within the NAR. WTP retention targets are based on relative contribution in the NHLB, forest management intensity levels and retention levels experienced in natural disturbance. Please see indicator 9 for a full description of the factors considered in developing the WTP retention targets.

Comments from: Nancy Densmore, Biodiversity Specialist, FPB

Dated: April 13, 2010

Hi Anna – if you would like to discuss some of the Fort St. John indicators in relation to what FREP has been finding in the BWBSmw and mk – please give me a call.

On second look at the SFMP – it is not clear if the average of 6 sph >23 cm dbh live or dead is to come from non-patch retention only – or a sum of all the retention on the block. If it is non-patch only – then my calculations below do not apply. Average of 6 largish dispersed stems per hectare of NAR would be good. If it is all retention (patch plus dispersed) – then the 6 sph is very low.

- Non-patch retention only. Exerpt from draft SFMP:
  This strategy is designed to encourage the retention of some snags or live trees capable of providing cavity sites, within the harvested portion of the timber harvesting landbase. The strategy is intended to supplement the retention of this habitat element found in wildlife tree patches, unsalvaged burns, and the approximately 50% of the DFA (2002 Timber Supply Review) that is not in the timber harvesting landbase.

For patch retention only – we have found an average of 9.9% retention in the BWBS FREP sampled blocks. For dispersed retention only it is an average of 0.7% retention (basal area equivalency).
(first message here)
Well, they are not tying themselves to very much.
Looking at the FREP BWBSmw/mk data (83 blocks) there is an average of 11% wildlife tree retention. The SFMP calls for minimum average of 3-7%.

- LU targets in the SFMP are 3-8%. Actual retention values vary by LU from 6.9-13.6% (2001-2009). Factors that the targets are based on are outlined in plan (sec 6.9), and are relative and relevant to the DFA .

FREP data shows an average of 125m^3/ha of CWD within patch retention and 107 on the harvest area. The SFMP is calling for minimum average of 46 m^3/ha. They are calling for ½ of the natural amount – so not too far off (a little low) if you call the amount on the ground in retention areas natural.

- Please note that the participants also manage the deciduous landbase, which generally has lower levels of CWD. The indicator target is a combination of conifer, deciduous, and mixedwood areas.

FREP has found the density of large pieces the issue for CWD retention – the SFMP is silent on that.

- Please see section 6.6 (pg. 108-109) for reference to large pieces. The participants understand the importance of large CWD pieces and try to incorporate into operational plans where practicable.
- FREP has found an average of 32 stems >=30 cm dbh (live or dead) left on average per hectare of gross block size. The SFMP is calling for a minimum average of 6 sph of >23 cm dbh.
- See above comments. Target is based on managed stands (i.e. net area, not gross).

Craig DeLong (April 21, 2010)

Update reference TR059-2010 - contact Craig for details.

Comments from: Joelle Scheck, Ecosystems Section Head, MOE
Dated: April 21, 2010

Section/page no.	Comment
Sec. 6.2 Seral Stages – page 87	• If deciduous stands comprise a much lower (insignificant) amount of the TSA outside the Boreal Plains NDU (approx. 3% overall and 1.5% THLB) then doesn't it make them more unique/uncommon, therefore heightening the importance of maintaining a high proportion within these other NDU's in a late seral stage? Or is this being done operationally, but simply not identified with a retention target? Participants' response - See indicator 17 – acknowledges the importance of less common stand types (leading species) in NDUs outside the Boreal Plains. The old growth retention targets are based on C. Delongs NDU work and advice from ILMB. The Participants' have not historically targeted deciduous stands for harvest in the non boreal plains NDUs. The Participants developed the Boreal plains seral targets in conjunction with advice from the FSJPPR Technical advisors (MFR, MOE and ILMB). • Suggest that the Participants review/re-examine the need for a mixedwood late seral target with the Boreal Plains NDU upon preparation of a SFMP#3 if/when more mixedwood stands become part of the THLB. Participants' response - Comment is noted and will be considered in development of SFMP #3.

6. Forest Health Management Strategy

Complete e-mail string consisting of: review by FPB staff and response by Darrell. I have left it as is so it can be followed in order the comments were made.

From: Regimbald, Darrell [mailto:Darrell.Regimbald@canfor.com]
Sent: Thursday, November 5, 2009 3:27 PM
To: Winter, Ralph FOR:EX
Cc: Van Tassel, Mark A FOR:EX; Farwell, Brian FOR:EX; Griffin, Dawn FOR:IN; Rosen, Don; Tyrrell, Andrew FOR:IN; Fister, Walter C FOR:EX; Backmeyer, Rod ILMB:EX; Hunt, Elizabeth A FOR:EX; Scheck, Joelle ENV:EX; St Jean, Roger OGC:EX
Subject: RE: Forest Health strategy in SFMP for the pilot project

Ralph,
Thank you for sending along the comments from Jennifer, I would like to respond on behalf of Canfor and BCTS and offer the following.

To put things in context of the thinking at the time of the development of the existing SFMP, as you recall in 2003/2004 the government policy direction was to have industry become largely responsible for forest health management in TSA's, through the DFAM process. Consequently forest health was incorporated as a mandatory strategy in the FSJ Pilot Project regulation. The provincial policy direction subsequently reverted back to having the MOFR retain the lead responsibility for forest health management outside of licensee silviculture obligation areas. This is recognized in the revised forest health strategy to be incorporated in the new SFMP.

In keeping with this shift in policy, the Peace Forest District has developed a Forest Health Plan which is to be updated annually at the Dawson Creek MFR office. The plan also includes the Fort St. John TSA., this plan is considered as an addition to the forest health strategy in the SFMP, and we therefore feel that some of the urgency for the FSJPPR SFMP to deal with broad Forest Health issues has diminished over time by the change in policy direction and development of the Peace District Forest Health plan.

Of course it must also be recognized that the unexpected major occurrences of significant large fire events, and the much more rapid spread of MPB than the experts had predicted (2011 was the projected date for MPB to arrive in the TSA) basically overwhelmed all the other minor forest health issues and became our main focus.

Regarding Jennifer's Point #1:
re: Table 28 on page 150, the 'Severity Class Breakpoints' to differentiate between Low, Medium and High were set for each Pest Damage Agent in the table. Jeff Beale differentiated between those pests where a forest health expert (Mr. Reich) provided the information for the break points, and those pests for which no external expert guidance was available (all the 'e.g.'s). The levels for those pests where no external info was available were set by the best available information, which was primarily the working group's local experiences on the impacts these pests had in the FSJ TSA, as there was little or no local research to assist in the delineation of severity class breakpoints. The terminology used in the table stating 'e.g. prefix denotes classification is under development' reflects Jeff's view that forest health experts are most qualified to set limits. It likely should have stated

'classifications will be updated as new information becomes available', as it has been a very low priority to further define specific limits on L-M-H classifications , since most of the pests are unlikely to be to the extent they require management effort in FSJ.

The main point of the forest health strategy in the existing SFMP was that the participants needed to be cognizant of forest health issues, and, since the participants spend a great deal of time on the landbase, and are potentially impacted more than most by forest health problems, the participants should track 'significant' issues, and make a conscious decision to either act or not act on a forest health issue . The decision would be made depending on the risk posed to the overall forest, or to the achievement of other targets (e.g. reforestation success, etc), weighed against the cost of doing the treatment. This will remain as key component of the forest health strategy inn the new SFMP.

Page 149 of the SFMP discusses what would be considered 'significant' forest health issues, which was the real key to determine if management action was needed.

Forest health treatment plans developed for the beetle have been quite simple, early on we decided to focus our efforts (fall and burn and sanitation logging) on the leading edge of the beetle front. Where funding has been available, and of late no funding has been available, we have conducted aerial detection flights followed up by ground probing in accessible areas and fall and burn in accessible areas on the leading edge of the beetle advance. Salvage harvesting has also occurred in the wake of the beetles advance and will continue, in addition to our efforts to sanitation log and remove green mature stands in an attempt to slow the beetle's advance.

Point # 2:
The risk management classification system was completed and submitted to the MoFR. Please see attached documents.

Point 3:
Training on MPB was done, specialized contractors have been used for MPB aerial surveys, probing and fall and burn. Also, consultants/contractors used for silv. surveys must be certified and therefore have received the training needed to identify forest health problems. When there have been unidentifiable forest health issues, they have been forwarded to forest health specialists for identification (e.g. the participants involved forest health experts in attempting to identify spruce regen dieback issues in some western blocks in the TSA).

Point 4:
With regards to the MPB, the most common treatments utilized have been salvage/sanitation logging, or trap/fall and burn, or fall and burn (no traps) and no treatment. Treatment plans are largely driven by prioritization of problems, and available funding. Non lethal lindgren funnel traps have been used in the mill yard to monitor beetle activity.

We feel that one of the reasons the FSJ TSA is less effected than many other TSA's by forest health issues is the variability inherent in complex landscapes (plains, foothills, mountains, wetlands) with a great mix of conifer and deciduous stands and lots of mixedwoods. The participants have recognized this and have incorporated mixing of species (eg Sw and Pl, as well as Aspen) in plantations. Going forward the next SFMP will

recognize the change in management policy and that the Peace District Forest Health Plan has been developed and consequently the strategy will continue to focus on plantation pests and significant pest infestations at a landscape level that can be managed through harvesting activities - the primary tool at our disposal.

I hope that the foregoing has helped to answer Jennifer's questions. I wish to recognize the valuable input provided by Dave Menzies, Andrew Tyrell, Walter Fister and Mark van Tassel in developing this email response.

Cheers!

Darrell Regimbald, RPF
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Forest Management Group
Canadian Forest Products Ltd.

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-----Original Message-----
From: Winter, Ralph FOR:EX [mailto:Ralph.Winter@gov.bc.ca]
Sent: October 15, 2009 1:23 PM
To: Hunt, Elizabeth A FOR:EX; Currie, Sandy A FOR:EX; Regimbald, Darrell
Cc: Farwell, Brian FOR:EX; Bedford, Lorne FOR:EX
Subject: Forest Health strategy in SFMP for the pilot project

Hi folks...

Do you know if the new SFMP will be addressing some of these issues?

-----Original Message-----
From: Burleigh, Jennifer FOR:EX
Sent: Tuesday, August 18, 2009 9:15 AM
To: Winter, Ralph FOR:EX; Hays-Byl, Winn FOR:EX
Cc: Britneff, Anthony FOR:EX; Ebata, Tim FOR:EX; Baumber, Stephen FOR:EX
Subject: RE: Ft St John multiblock stocking standards review February 17th from 8:30 to 1:00 pm

Hello Winn,
Ralph had asked Anthony to comment on the FH component of the plan, which was passed down to us. Seeing as Ralph is away for two weeks, I thought I would include you on my response in case it gets buried in Ralph's in box during his absence.

I reviewed the FH section of the 2004 Plan, which was set up a good start. It committed to several action items, which from what I can tell from my review of the 2005/06 and 06/07

annual reports, have not been completed. They may be in the next version of the plan, but I have not seen a copy of that.

Specifically, here are the items that were committed to and are not in any of the annual reports that I saw:
1. Table 28, page 150 of the 2004 plan states that "e.g." means the classification is still under development. The entire table except for 3 factors were under development. Has this classification system been finalized? Along those lines, how are they determining what is low, mid and high severity classes? What references are they using and what criteria were used to determine severity?

2. Item 2 on page 151 states the participants will establish and maintain a risk management classification system, which was to be completed by April 1, 2005. I have not found this in either subsequent report.

3. Item 3.c on page 151 states they will ensure appropriate forest workers, consultants and industry staff are competent at identifying specific forest health concerns within the pilot project area. How was this achieved or determined?

4. Item 5 on page 151 states treatment plans will be developed using forest health specialists as needed. I am assuming a treatment plan for mountain pine beetle was developed. Are they available for review? Are they simply salvage plans or what content is in a treatment plan?? Also, there is a bulleted point under item 5 that states lethal trap tree programs will be used in mill yards - what are they using for the lethal trap tree? MSMA is no longer registered for use, and the only other option I know of (but not aware of anyone actually using it) is to spray carbaryl (A broad spectrum insecticide) on standing trees - used mostly for tree protection in urban areas. So I would like clarification on what they are using as a lethal trap tree.

If this information is in a report that is not available off the website (http://fsjpilotproject.com/annualreports.html), if you can send me the documents I will review them for their content and revise my review accordingly.

So an overall review from my perspective is that they say a lot of good things, but there is no evidence any of it has been carried through on, based on the annual reports. I really liked their discussion on patch size, species mixes and seral stages, but I would like to see a broader tie in with a landscape management strategy. Not just maintaining what is there now, but how to manage the forest going forward such that it will be more "resilient" to changes in forest health as a result of pests and climate change. The approach is still quite reactive (as is the case most of the time), so it would be nice to see some more thought into the landscape level planning that takes in forest health considerations (wish list!!).

Jennifer Burleigh, RPBio., RPF.
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Comments from: Robert Hodgkinson, Forest Entomologist, Northern Interior Region(NIR)

Dated: March 9, 2010

I reviewed the forest health sections in the attached. Overall, it looks good and I offer the following brief comments:

- Sect. 4.6.1 (pg. 64) and 4.6.3 (pg. 66) refer to "catastrophic" forest health events/agents.

Not just potentially catastrophic FH agents require attention. Many forest pests cause significant yet sub-catastrophic losses. Suggest changing "catastrophic" to "significant".

- Participants will consider this wording. The intention with "catastrophic" is to focus effort on the highest risk.

- One of the bullets in Sect. 4.6.1 should include a commitment to being "proactive."

- The participants will consider adding wording to this effect. They consider indicators #25 and 49 as having "proactive" characteristics.

- I couldn't help but notice that "Salvage" (sect. 6.26 on pg. 168) only refers to fire-damaged stands. What about blowdown?

- The indicator is specific to fire-damaged stands as the participants can obtained reasonable reliable information related to these stands in a timely manner. The same cannot be said for blow down areas. Therefore, the participants have chosen to focus the indicator on fire-damaged areas. However, they have and will continue to salvage timber from blow-down areas when feasible.

Robert Hodgkinson
Forest Entomologist
Northern Interior Forest Region
Phone: (250) 565-6122
Fax: (250) 565-6671
E-mail: Robert.Hodgkinson@gov.bc.ca

Comments from: Richard Reich, Forest Pathologist,NIR

Dated: March 9, 2010

In my opinion, having spent considerable time there in the past, the FS John SFMP area is generally very low risk to most forest pathogens. The exception is Tomentosus root rot in the <700m elevation band, which becomes high risk. It is well known and documented in this plan. Until there is evidence to the contrary, this area of the province concerns me the least.
Ralph, I would be very interested to see a RESULTS summary of FH factors for this area. I presume it would rank among other districts that have the absolute lowest occurrence of pests in the province. Could you tell me what would be involved in creating a district level summary of pest occurrence for the province so that we could make a science based objective evaluation?

Richard Reich, R.P.F., M.Sc.
Regional Forest Pathologist
Ministry of Forests and Range
Northern Interior Forest Region
5th Floor, 1011 4th Ave
Prince George BC V2L 3H9
Ph: (250) 565-6203 fax: (250) 565-6671

7. Soil Management Strategy

Comments from: Richard Kabzems, Research Silviculturist, NIR

Dated: January 26, 2010 (Pre-February 1, 2010 version)

6.4 Soil Disturbance

The draft SFMP identifies winter decking on roadsides for summer loading and hauling as a strategy to minimize site disturbance. This practice has been clearly identified as detrimental for aspen regeneration (Renkema et al. 2009. Aspen regeneration on log decking areas as influenced by season and duration of log storage. New Forests 38: 323-225). This strategy is contrary to the following LRMP objectives: 1) minimize losses to the timber harvesting land base, and 2) maintain functioning and healthy ecosystems.

- Acknowledged, however the soil disturbance strategy is intended to minimize overall soil disturbance on the harvest area (rutting, scalping and compaction). Reduction of deciduous stocking on site specific basis can be countered through provisions in the landscape level silviculture strategy and site productivity is addressed in the SFMP through indicator #32, while balancing the economic objectives of the participants (Indicator #48 – Summer and Fall Volume Deliveries). A reduction in the THLB will not take place in this instance as, even if the area were to be NSR to aspen it could be reforested with conifer and substitute areas for deciduous would be identified.

Comments from: Sandy Currie,Technical Advisor, Timber Harvesting Practices FPB(*retired*)

Dated: March 11, 2010

Soils Management Strategy (Section 4.8)

1. **General Overall Comments**

- 4.8.1 Soil Disturbance Strategy - page 72 –this is a good piece – particularly the point (in red) that addresses the inherent sensitivity of a site to soil degrading processes; and,
- Operational Practices and Field Monitoring – page 100 – in general this whole section is extremely good – expressing appropriate points and accountabilities (the only exception to this is identified in the first pdf (under specific suggestions for change below). (The comment states *"Suggestion for expanding & clarifying the level of expertise required for conducting the "Boot Survey" is the following: This assessment will be conducted by an experience person (for example a person who, if they are not an accredited soil disturbance surveyor has related experience")*

2. **Specific Suggestions for Change**



Comments in document #2 are related to indicator #6.4 – Soil Disturbance (p.99) and states: *"Suggest adding wording to account for potentially required changes to standards unit (NDU) delineation. For example they may determine that an NDU located in the foothills has a large enough component of fine textured that the 5% dispersed disturbance limit should be applied to it"*
Participants' response – this direction is captured in the description of Indicator #4.
Comments in document #3 & 4 are related to the Ministry of Forests Vision and Mission (p.300) and states: *"Suggest change to reflect the "actual" name of the ministry" (Ministry of Forests and Range)*
Participants' response – Completed revison suggested.

Comments from: Shannon Berch, Research Scientist, Research Branch
Dated: August 17, 2009

I'm not all that familiar with the FSJ pilot project so my comments may reflect my unfamiliarity. The two statements wrt soils seem pretty basic and open to interpretation. I don't see anything in them that addresses the use of 'environmental management and forest certification systems as surrogates for existing administrative process'; I assume these details are available elsewhere. I would think that the pilot project participants would want to outperform wrt existing soil conservation regs and outcomes. What indicators will be used? Is organic matter being conserved (forest floor and deadwood)? Will the harvested areas within the pilot project be subjected to FREP or third party monitoring? If so, how have they done thus far?

Shannon Berch, phone # 250-952-4122

- A Sustainable Forest Mangement Plan is a mandatory requirement of the Fort St. John Pilot Project Regulation specifically Canadian Standards Association.
- Details on soil disturbance indicators are available in Indicator #4 in section 6.4 (Soil Disturbance)
- Conservation of organic matter is addressed in indicator #6 (Coarse Woody Debris).
- The SFMP is subject to third party certification and auditing as well as FREP monitoring, Forest Practices Board audits, and C&E inspections & monitoring.
- Details on the historic performance of the Participants against the SFMP and applicable legislation is available in the Annual Reports posted to the Fort St. John Pilot Project Website.

Comments from: Stephane Dube, , Regional Soil Specialist, NIR
Dated: August 13, 2009

Name: Stephane Dube 250-565-4363 august 13
How did the pilot go in your opinion?
Sorry, I can not really speak to this other than what I read in the annual reports and information from other sources. I did not get involved during implementation. I recall vaguely having made

comments on the soil objectives in the original management plan. However, I believe Sandy Currie knows more about it.
Some information is available.
Results from 2004-2005, 2005-2006 and 2006-2007 annual reports show that PAS activities were consistent with targets set in the Plan.
I am aware that the FPB conducted an audit on BCTS operations within the Pilot in 2006 and as a result, did not find any significant issues in terms of soil conservation (though it was not an soil audit per se). Was soil resources evaluated and if so, were forest practices conserving them?
As part of a pilot project on water monitoring in 2004, water diversion and surface erosion were identified as common problems along roads. This may have major implications for natural drainage patterns and loss of soil productivity. Has it been addressed?

What would you like changed?

Not having been involved in operations, I don't know the results on the ground. I have never been called in to assist staff on any soil issues . Richard Kabzems is closer so he should be contacted.
Engage other industries e.g. oil & gas to coordinate landscape level target for PAS. What's the point of having a target of 5% for forestry if oil & gas industry got green lights to build roads and drill holes anywhere they want?!
I would like to see reporting done on cutblocks that may contain large soil disturbance areas (also known as areas of potentially inordinate soil disturbance) that contribute significantly to loss of site productivity but often ignored by forest practitioners. This is an important concern raised by the FPB and FREP staff.

What would you like to see improved if it goes forward?

I can only comment on what I know. If the Pilot is to meet obligations at least equivalent to what is found in FRPA and associated regulations, in my opinion the landscape soil objectives being proposed are not sufficient. Let me explain. In FRPA, the objectives set by government for soils is to CONSERVE the productivity and the hydrologic function of soils. The proponent quotes: "…will sustain those forest lands… by LIMITING THE AMOUNT OF LOSSES of productive land in the timber harvesting landbase from permanent access structures within cut blocks (Soil Management Strategy #2)" is not the same as conserving or maintaining. You can't pretend to sustain forest lands if losses or depletion of productive land occur from PAS or other activities. This is unless you restore site productivity to what it was or replace those landings and roads with incremental silviculture to maintain productivity at the landscape level.

What governance changes would you like to see?

All FSJPP regulations must be enforced (e.g., monitoring done by government, Part 5 sec 52)

Are there any outstanding soil landscape issues?

See above.

Participant response – these comments are from the Pilot Project review process and were dealt with previously. These comments do not apply the draft SFMP and therefore no response is provided here.

8. Reforestation Strategy

Comments from: Gordon Nigh, Superviosr, analysis group, Research Branch

Dated: March 8, 2010

I reviewed the document titled "A Silviculture Survey Methodology for Boreal Mixedwoods in Northeastern BC" and have the following comments. I am coming into this at a late stage so my comments may have been brought up before and taken into consideration. Also, I've only reviewed the document. Other supported documentation may answer some of my questions.

1. The sample population is not well defined. Is it a cut-block or all cut-blocks harvested in one year? The plots are quite small and any statistics generated at the cut-block level may have a large variance. I don't know what area a typical cut-block is, but it is not hard to imagine that smaller cut-blocks will have very few plots, especially of the enhanced type. The enhanced plots are established at a rate of 1 every 4 ha, so a cut-block that is 10 ha may only have 2 enhanced plots.

The intent of Craig Farnden's approach is to assess cutblocks on an individual basis.

2. Section 2.2, bullet 6, section 2.5.4: How is site series determined? Does the surveyor do a full ecosystem assessment or just a quick glance around? The latter technique may not be good enough, especially on young sites where the vegetation may not be indicative of the site. Is the age that is recorded total age or breast height age?

Site series have already been assessed when the site level plan was originally developed. The surveyor will be responsible for confirming that the site series is correct (usually completed in a very quick fashion)

The age recorded is total age.

3. Section 2.4.3: This process for avoiding linear features affecting stocking introduces bias as well. Avoiding linear features is probably not necessary unless they occur at the same frequency as the survey lines (e.g., every 100 m).

This section of the report was added in by Craig Farnden on the basis of hearing the concerns from the participants regarding their experiences with the MSQ surveys for conifer. With a significant portion of the landbase taken up by linear features such as pipelines, and seismic lines, the participants made it known to Craig that there were large numbers of plots being taken out as null. Craig's attempt in the report was to devise some alternative strategies to mitigate this issue without intentionally introducing bias

4. Section 2.5.2: A walk-through will have to be pretty intense to meet the objectives of the walk-through. It's hard to imagine a surveyor doing a walk-through on a 100 ha block that is brushed in. That might take the surveyor a full day alone to do a thorough job.

The intensity of this walkthrough was never intended to be any more or less difficult for the surveyor than what is expected from another survey.

5. Section 2.5.2, Note: It's not clear why post-stratification is so taboo. Seems to me that post-stratification is a reasonable way to stratify the blocks. Maybe I am missing something.

The intent of Craig's statement was to discourage post-stratification, however in practice the participants will include it as a process when necessary.

6. Section 2.5.3, middle of page 6: Why not just have the surveyor count the trees. The plots are not that big so counting trees shouldn't be that onerous.

Due to the fact that the participants have not field tested the process, it is not fully understood what impact counting or estimating the total number of trees will have.

7. Section 2.5.3, middle of page 6: The minimum trees heights are fairly small. Projecting volumes on 30 cm tall trees seems to me to be dicey at best. Maybe it doesn't matter when everything is all rolled up, though, but I can't tell.

The process is to survey the block at 15 year post harvest. The likelihood that the selection of 30 cm tree is going to occur at that time is remote.

8. Section 2.5.4: it could turn out that few conifer trees have enough growth above breast height to estimate site index with growth intercept models, resulting in more reliance on less preferable methods of estimating site index.

This discrepancy is as likely to occur with other surveys that wish to calculate site index in this fashion. Should there be insufficient trees above breast height for selection, there is no alternative but to use other methods.

9. Section 3.2: It should state "If the PMW exceeds the TMV" instead of the other way around.

Correct, we agree that it should read that "predicted mean volume exceeds the target mean volume..."

10. Section 3.3.3: I wonder how these results compare with TASS.

The participants are not aware that Craig made any comparison to TASS modelling.

11. Section 3.3.5: Seems like an arbitrary process.

Comment from Craig Farnden The 10% value *is* somewhat arbitrary, given that there are no published relationships upon which this value could be based. The value of 10% is therefore "expert opinion", based on my own extensive field experience and consultations with peers both in the research and operational community. It is a crude estimate of the "real" value

12. Section 3.3.7: Again, this procedure seems arbitrary and I cannot understand why it is done.

Craig stated in his report that his basis for setting the theoretical and target volumes was tied to the already established values set in the SFMP for the Pilot Project.

After reading the survey procedures, I was left wondering if the procedures will actually get the information that is desired with the necessary accuracy. Field testing would be a good idea at this point.

Note from the participants: There is no question that this is a new process and there are some questions and issues that still need to be examined. However part of the Pilot Project process is about identifying new ideas and concepts and the commitment from the participants is to field test Craig's survey methodology over the term of this SFMP and beyond.

No changes proposed to the SFMP in response to these comments.

Gord Nigh

British Columbia Ministry of Forests and Range

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Comment from May 17, 2010. Here are my quick comments after reading the Farnden Oct 27th, 2010 document entitled: *A Silviculture Survey Methodology for Boreal Mixedwoods*.

- The author fails to address "Why this survey method?" The various different surveys proposed for deciduous / mixed-woods / conifers may add un-necessary complexity and cost?
- The author does not sufficiently address the objectives given (2.1). What is "theoretical maximum achievable volume", "predicted mean volume"?
- There is insufficient information provided on key components, models and linkages. The result is a lot of unknowns, confusion and complexity which makes it difficult to understand.
- How will it work and what will be the impact on the Crown risk and liability cannot be presently answered.
- The dependency on model output (MGM?) and empirical models that are poorly presented creates a "black box" scenario. A lot more detail is required to clarify how these functions apply to real world examples. What are the underlying modelling assumptions? Have the models been validated and to what dataset? Where should these models not be used?
- % cover is as a model parameter (3.3.3 model fitting – species composition): this is a subjective measure which may have high variation. It is not a measure to use if there is a need to legally confirm or challenge results & thresholds (C&E).
- I cannot confirm or support whether this is a positive survey method for boreal mixed-woods and any policy which may evolve from it.

I look forward to reviewing and continuing to participate on this project.

Cheers,
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Note from the participants: There is no question that this is a new process and there are some questions and issues that still need to be examined. However part of the Pilot Project process is about identifying new ideas and concepts and the commitment from the participants is to field

test Craig's survey methodology over the term of this SFMP and beyond. This survey methodology is new to the second SFMP and will be field tested and further implementation will be done with Government input.

No changes proposed to the SFMP in response to these comments.

Comments from: Richard Kabzems, Research Silviculturist, NIR

Dated: January 26, 2010 (Pre-February 1, 2010 version)

Review Fort St. John SFMP, Pre February 1 2010 version

I have limited my review of this document to the reforestation assessment, the reforestation strategy stocking standards and a related portion of the soil disturbance assessment.

Deciduous reforestation

6.29 Reforestation Assessment refers to "the MOFR's Draft stocking guidelines for hardwoods in the BWBS". With no other information provided in the draft SFMP , I have been unable to find this document.

The minimum number of trees identified in Table C of Appendix 6 the draft SFMP is lower than any previous or existing deciduous standard used by the MoFR that I am aware of. The minimum aspen height of 2 m has been used in British Columbia aspen regeneration guidelines since 1997 if not before. Using a minimum height of 1.5 m for aspen regeneration assessments increases the risk to the Crown of accepting aspen areas while they are still vulnerable to a number of damaging agents (particularly browse), and before other problematic conditions may have been fully expressed.

The draft MOFR stocking guidelines for hardwoods were not included due to the fact that the development of the deciduous compiler is to occur in the future. As the measurement components of the deciduous landscape strategy are finalized the stocking guidelines will be appended to the SFMP.

The minimum height for deciduous was approved in Appendix F of the Fort St. John Pilot Project Regulation. There has not been a deviation from that height in Table C.

With the combination of low aspen numbers and low minimum height, an area could 'pass' the proposed deciduous reforestation assessment even with a reduction in site productivity.

Coniferous reforestation

6.29 Crop tree requirements and Vegetation Competition

Part E "While A to D above will normally define a well growing crop tree, despite these criteria, an individual crop tree may be accepted as well growing if the surveyor believes the vegetation clearly does not impede the growth of the crop tree, and is not expected to impede the future growth of the tree. These well growing trees must be clearly identified on the plot cards to facilitate field checking, if required for verification purposes."

I see no defensible reason to include 'Surveyor belief' in a regeneration assessment. Criteria A to D are based on the best available scientific knowledge. All criteria used in the SFMP should meet this standard.

Criteria E is not an addition to the selection criteria, as it was included in the original SFMP for crop tree requirements. Despite the absence of available scientific background to make this

selection defensible should not discredit the professional accountability of the surveyor to rationalize a well growing crop tree decision.

Appendix 6 1.4.3 Stocking guidelines for Mixedwoods in the BWBS

The draft SFMP uses the June 2006 Peace District Stocking Guidelines for mixedwoods in the BWBS and the Boreal Mixedwood Survey procedures (Silviculture Survey Procedures Manual April 2009) to define quantifiable guidelines for intimate and successional mixtures of broadleaf and conifer mixedwoods. These summarize the best available current scientific information for this topic.

Subject: Additional information for Code Pilot Review

Hi Elizabeth: I have done a few simple examples to demonstrate that the proposed deciduous regeneration standards are not appropriate for maintaining productive stands in the Code Pilot area.

This could be added on, or inserted into my earlier review comments (I can do that if you would like a clean copy).


Additional information for pro...


Aspen Example.txt

"Additional information for FSJ Code Pilot proposed deciduous stocking standards

1) *Height of regeneration assessment*

The proposed height of 1.5 m for assessing deciduous regeneration is very low. Using the attached table of aspen site index and regeneration, even an aspen SI of 10 would reach 1.5 m at year 7. The height for regeneration assessment should be clearly based on site index values found in merchantable aspen stands using the most recent TSR analysis.

2) *Minimum stocking for deciduous assessment*

The table below summarizes a series of MGM 2009 simulations for aspen regeneration in British Columbia. Site index 16, assessment at year 10, average stand height 2.5 m, minimum merchantable diameter of 12.5 cm, Operational Adjustment Factor (OAF) of 20%, and 20% decay and breakage were the assumptions used for these simulations.

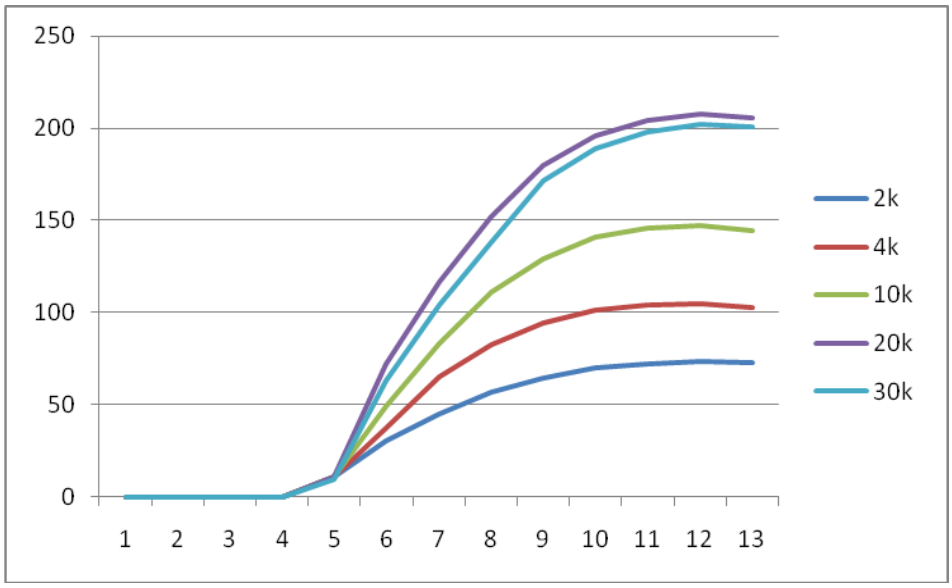
A stocking level of 4,000 st/ha total stems in these simulations would not reach a minimum merchantable volume of 140 m^3/ha. With 10,000 st/ha, this would be achieved at 90 years, and at 20,000 stem/ha before year 70.

The Code Pilot SFM should be providing regeneration assessments which are consistent with current TSR analysis (e.g. 140 m^3/ha minimum merchantable stand), and are supported by modelling tools which are currently available. "

- The Timber Supply Analysis report for Fort St. John (June 2002) used >120 m3/ha as the minimum criteria for aspen stands (Table A-15), and OAF 1 / OAF 2 values of 15% and 5% respectively for assumptions in managed stands.

Age	2k	4k	10k	20k	30k
10	0	0	0	0	0
15	0	0	0	0	0

20	0	0	0	0	0
30	0	0	0	0	0
40	10.926365	11.105683	11.197674	10.997811	9.7237614
50	30.528543	37.468664	49.100725	71.895896	63.30738
60	44.888939	65.316399	83.403302	116.69567	103.94274
70	56.674545	82.73183	111.07594	151.99768	137.91772
80	64.684045	94.63374	129.21619	179.52746	171.58854
90	69.758959	101.40325	140.75757	195.72504	188.61326
100	72.329058	104.38455	146.1288	204.43181	198.10503
110	73.188141	104.65275	146.8635	207.62766	201.83548
120	72.818843	102.83577	144.32357	205.31364	200.46733



SiteTools Version 3.3
Research Branch, British Columbia Ministry of Forests
Date: 2010-01-26 8:41:33 AM
Species: At - Trembling aspen
Site index equation: Nigh, Krestov, and Klinka 2002
Table of height by total age and site index

Total age	Site index (m) 10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0
	Height (m)							
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2

2.0	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.8
3.0	0.4	0.6	0.6	1.0	1.0	1.0	1.0	1.5
4.0	0.7	1.0	1.0	1.4	1.5	1.5	1.5	2.1
5.0	1.1	1.4	1.4	1.7	1.8	1.9	2.0	2.8
6.0	1.4	1.6	1.7	2.1	2.2	2.4	2.6	3.4
7.0	1.5	1.8	1.9	2.5	2.7	2.9	3.2	4.1
8.0	1.7	2.1	2.2	2.8	3.1	3.4	3.7	4.8
9.0	1.9	2.3	2.5	3.2	3.6	3.9	4.3	5.4
10.0	2.1	2.5	2.9	3.6	4.0	4.4	4.9	6.1
11.0	2.3	2.8	3.2	3.9	4.4	5.0	5.5	6.7
12.0	2.5	3.1	3.5	4.3	4.9	5.5	6.1	7.4
13.0	2.6	3.3	3.8	4.7	5.3	6.0	6.6	8.0
14.0	2.8	3.6	4.1	5.1	5.7	6.5	7.2	8.6
15.0	3.0	3.8	4.4	5.4	6.2	6.9	7.8	9.2
16.0	3.2	4.1	4.7	5.8	6.6	7.4	8.3	9.8
17.0	3.4	4.3	5.0	6.2	7.0	7.9	8.8	10.4
18.0	3.6	4.6	5.3	6.5	7.4	8.4	9.4	10.9
19.0	3.8	4.8	5.6	6.9	7.8	8.8	9.9	11.5
20.0	4.0	5.1	5.9	7.2	8.2	9.3	10.4	12.0
Y2BH	5.5	4.5	4.5	3.5	3.5	3.5	3.5	2.5

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Further comments received form Richard Kabzems April 21, 2010

Review of "Mixedwood Management Guidelines", Fort St. John Pilot Project, January 7, 2010

The Fort St. John Pilot Project still lacks a coherent approach to boreal mixedwoods at the stand and landscape level. In his review of the 2002 draft SFMP, Scientific and Technical Advisory Committee member Dr. Vic Lieffers identified that *"the mixedwood component is more or less ignored*" (Appendix 15, p 371 in the 2003 SFMP). In the 2010 SFMP the Pilot Project partners still have not presented a coherent vision for boreal mixedwoods based on the best available science. Development of a scientifically defensible mixedwood strategy has again been postponed to an indefinite future.

Specific points in the document:

1) These guidelines will produce fine scale pure stands as noted on pages 3 and 8. The guidelines are designed to create a landscape composed of mosaics of small single-species stands, which is only a portion of the mixedwood landscape spectrum (MacDonald 1995).

2) The language of the document creates confusion by ambiguous use of the term 'mixedwood' with a variety of terms: "cutblock', "area", 'forest types', "Standards Unit" and "landscape". This could be addressed by using clear definitions similar to those provided in MacDonald (1995). A ***boreal mixedwood site*** is an area with climatic, topographic and edaphic conditions that favour the production of closed canopies dominated by aspen in early successional stages, and white spruce in mid successional stages – the successional pattern is a key component of the definition. A ***boreal mixedwood stand*** is a tree community on a boreal mixedwood site in which no single species exceeds 80% of the basal area. A ***boreal mixedwood forest*** is the aggregate of all boreal mixedwood sites in any distinct area. (From Macdonald, B.G. 1996. The emergence of boreal mixedwood management in Ontario: background and prospects. pp 11-20 IN: Advancing Boreal Mixedwood Management in Ontario: Proceedings of a Workshop. C.R. Smith and G.W. Crook compilers. Natural Resources Canada and the Ontario Ministry of Natural Resources, Sault Ste. Marie, Ontario, 1996.)
3) The proposed Ledger system only addresses species composition in harvested volumes, and does not address the variation in spatial arrangement, vertical structure and successional change which are fundamental to boreal mixedwoods stands, summarized in Table 1. Without addressing these fundamental concepts, the document title phrase "Mixedwood Guidelines" does not match the content.

The tracking system is the participants internal tool to assist them with tracking the forest type areas over time. However, the participant's are attempting in their operational trials to produce stands with variability in spatial arrangement, vertical structure and successional change.

4)The statement "Current policies, practices and information bases in BC do not effectively support mixedwood management using intimate mixtures" combined with only two citations demonstrate the lack of existing scientific knowledge found in the document. There is a large body of relevant information available. Joining the Western Boreal Growth and Yield Association and the Alberta Mixedwood Management Association would provide the Pilot Project partners with very large and applicable source of relevant information which could be applied to regenerate boreal mixedwood stands, and develop suitable guidelines.

See SFMP revised May 7, 2010 Mixedwood Management Guidelines (Appendix 10) which is attempting to address items 1,2, and 4.

Below is an incomplete list of scientific literature relevant to the topic of intimate mixtures of aspen and conifers published between 2007 and 2010.

Bokalo, M., P.G. Comeau and S.J. Titus. 2007. Early development of tended mixtures of aspen and spruce in western Canadian boreal forests. For. Ecol. Manage. 242: 175-184

Filipescu, C.N. and P.G. Comeau. 2007. Competitive interactions between aspen and white spruce vary with stand age in boreal mixedwoods. For. Ecol. Manage. 247:175-184

Man, C.D., P.G. Comeau, and D.G. Pitt. 2008. Competitive effects of woody and herbaceous vegetation in a young boreal mixedwood stand. Can. J. For. Res. 38: 1817-1828

Pitt, D.G., P.G. Comeau, W.C. Parker, D. MacIsaac, S. McPherson, M. K. Hoepting, A. Stinson, and M. Mihajlovich. 2010. Early vegetation control for the regeneration of a single-cohort, intimate mixture of white spruce and trembling aspen on upland boreal sites. Can. J. For. Res. 40: 549-564

Cortini, F., and P.G. Comeau. 2007. Evaluation of competitive effects of green alder, willow and other tall shrubs on white spruce and lodgepole pine in Northern Alberta. For. Ecol. Manage. 255:82-91
Filipescu, C.N. and P.G. Comeau. 2007. Aspen competition affects light and white spruce growth across several boreal sites in western Canada. Can. J. For. Res. 37: 1701-1713
Gradowski, T., D. Sidders, T. Keddy, V.J. Lieffers, and S.M. Landhausser. 2008. Effects of overstory retention and site preparation on growth of planted white spruce seedlings in deciduous and coniferous dominated boreal plains mixedwoods. For. Ecol. Manage. 255: 3744-3749
Kabzems, R., A.L. Nemec, and C. Farnden. 2007. Growing trembling aspen and white spruce intimate mixtures: Early results (13-17 years) and future projections. B.C. Jour. Ecosystem. Man. 8(1):1-15
Harper, G., M. O'Neill, P. Fielder, T. Newsome, and C. DeLong. 2009. Lodgepole pine growth as a function of competition and canopy light environment within aspen dominated mixedwoods of central interior British Columbia. For. Eco. Manage. 257:1829-1838
Comeau, P.G., Filipescu, C.N., Kabzems, R. And DeLong, C. 2009. Growth of white spruce underplanted beneath spaced and unspaced aspen stands in northeastern B.C. – 10 year results. For. Ecol. Manage. 257: 1087-1094

Please contact me if I can provide any additional information.

Richard Kabzems, MSc. P. Ag., R.P.F.
Research Silviculturist
Research and Knowledge Management Branch

- Thank you for the references!!!

Comments from: Allan Powelson, Forest Establishment Initiatives officer

phone: 250-812-5954

Dated: March 11, 2010

The following are my comments on Appendix 10 – Mixedwood management guidelines

1) Section III (B) – page 5 bullets 3 and 4: if mixedwood stands are to be divided into pure species patches for reforestation at what size does a pure species reforested patch not become a mixedwood stand anymore. For example, if a macro or meso-patch strategy is pursued on a 50 ha block and to be considered mixedwood (say conifer leading) one could have patches of up to 26 ha of pure conifer and 24 ha of pure deciduous. Does this reforestation strategy actually result in the maintenance of a mixedwood across the landscape. The entire 50 ha would be classified as a mixedwood but in reality it is function as separate coniferous and broadleaf forests. My suggestion would be to put in place maximum size limits to ensure that the funcrional reality of these patches matches the mixedwood classification.

The participants are basing the maximum size limits not on area, but on a percentage of the net area to be reforested. Local experience has shown that as succession occurs the species composition is likely to progress towards a mixedwood stand irregardless.

2) Section III(C) – page 5 last paragraph running into first paragraph of page 6: Balancing should not occur between landscape units or across the TSA. Concern here is focused on the fact that one can achieve compliance by just changing the scale of view. If the goal is to truly balance and achieve landscape level targets balancing should be restricted to the landscape unit in question.

Harvesting levels vary between landscape units over time. To not unduly limit the participants' ability to balance among other landscapes is the reasoning behind this statement.

3) Section IV – page 8 paragraph 5: document states that policy does not effectively support mixedwood management using intimate mixture. I would argue that it is this section of the SFMP that should outline the guidleines for intimate mixtures. Unfortunately beyond a definition of intimate mixtures this document gives no guidance on what the proponent believes should be appropriate parameters for achieving intimate mixtures.

Defininition of a intimate mixture has been addressed within the revised Mixedwood Management Guidelines

4) General comments:
   a. Format and structure should be consistent with the FSJPP SFMP. Each section should have direct linkages to the specific indicators and targets outlined in the SFMP.

   This was intended to be a guideline for the participants and was not meant to be written in the same format as the SFMP

   b. Beyond initial classification of sites, and a description of procedures for macro and meso patch mixedwoods this document does not include any guidance for intimate or successional mixedwoods.

   Has been dealt with in the revised Mixedwood Management Guidelines

   c. Does not outline what happens if targets are not met, what strategies would be undertaken if target not met, and what potential penalties might apply

   This was intended to be a guideline for the participants and was not meant to be written in the same format as the SFMP.

No further revisions made to the SFMP in relation to these comments.

Comments from: Tony Hunt, C&E Officer, Peace Forest District

Dated: April 19 and 20, 2010

Since the participants have to meet a volume target at year 15, I am unsure how the ledger system proposal of "The population of standards units to be balanced should be within a defined period of time, using the harvesting commencement dates, and preferably within the same landscape unit" will meet this target or commits to anything concrete. It seems to leave this open to interpretation, lack of commitments, and the potential inability to enforce anything if this strategy is not met. I am unsure how wording such as "... preferably across LU and over a defined period of time." can actually be enforced. This document also implies that exchanges

can occur across the entire landscape within the first 14 years. Does this pose a risk to the Ministry?
In the C&E world, I think that it would be very difficult to enforce guidelines, or references to a defined period of time that is not specified. The way that this strategy is written is that exchanges can occur up to year 14 which is a long period of time. I am also unsure what the following sentence really means "Once standards units are declared well growing, they will not be eligible for exchange, but will remain in the population for intimate mixedwood percentage calculations." Is it referring only to areas that have been declared well growing?
The ledger system was designed for the purpose of tracking the participants's forest type commitments over time. The guidelines and the ledger were designed to assist the participants in managing business functions. Participant's understanding is that Enforcement's role would be directed towards legal indicators and whether those targets have been achieved.

Hi Anna, I just noticed that the January 7, 2010 Mixedwood Management Guidelines document specifies that pure coniferous stands are >75% conifer and that pure deciduous stands are >75% deciduous, these values and the leading mixedwood ones are different than those specified in Section 1 of the Fort St. John Pilot Project Regulation.
According to the FSJPPR:
"coniferous stand" means an area in which, at rotation age, the coniferous trees, collectively, represent a minimum of 80% of the net merchantable volume of timber on the area;
"deciduous stand" means an area in which, at rotation age, the deciduous trees, collectively, represent a minimum of 80% of the net merchantable volume of timber on the area;
"mixedwood stand" means an area in which, at rotation age,

(a) the coniferous trees, collectively, and
(b) the deciduous trees, collectively,

each represent a minimum of 20% of the net merchantable volume of timber on the area;
Action – Despite the definition of a mixedwood stand as identified in the FSJPPR the Participants intend to use the mixedwood percentage breakdowns as identified in the landscape level silviculture strategy (75/25 gross volume) as we believe that it is a better surrogate for basal area under VRI. This diversion from the FSJPPR definition will be reflected within the plan and will be submitted by the participants as a potential amendment to the FSJPPR.
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Comments from: Leslie McAuley, Decision Support Officer, Tree Improvement Branch
phone # 250-356-6208
Dated: March 30, 2010

Thanks for the opportunity to comment on the seed use components of the FSJPP#2. The following review comments pertaining to the Legal Indicator for seed use, s.6.13 and s.6.14 are provided below (see also TIB Review Comments Mar 2010, attachments).

RE: General comments:

See all attachments, including:
FSJPP#2_Legal_Indicator_Seed_Use_TIB_Review_&_Comment_Mar_2010.docx, and
FSJPP#2_Legal_Indicator_Seed_Use_TIB_Review_&_Comment_Mar_2010 (with tracked changes).docx


FSJPP#2_Legal_Indicator_Seed_U...


FSJPP#2_Legal_Indicator_Seed_U...

Add clarity to address the following:

1. References to 'this Standard'; consider explicitly defining as an 'Applicable Performance Standard' for Seed Use, or clarify that the CF Standards for Seed Use are in place of an 'applicable performance standard' within the text of the Legal Indicator section - see Section 4.7, Reforestation Strategy, s.4 Reforestation Performance Indicators, a) Legal Indicators p. 71. Also, make explicit reference to the Chief Foresters Standards for Seed Use amendments (e.g. "as amended from time to time" or "and its amendments").
2. Scope of the 'Standard' as identified in the FSJPP#2; see 'seed use standards' as defined in the Chief Foresters Standards for Seed Use publication (i.e. includes: registration (collection), storage and testing, selection and use, transfer limits).
3. Acceptable Variance - only applies to transfer limits; consider broadening to include seed selection.
4. Record keeping (stated in s.99 of FSJPR) and annual reporting requirements (not explicitly stated in FSJPR, but should be as per s.86 of FPPR) for seed used.
5. Innovation. Ability to consider 'alternatives' to the Chief Forester's Standards for Seed Use (similar to those allowances specified in s.43 of FPPR).

RE: 6.13 Seed Use

See attachment - FSJPP_2_TIB_Review_&_Comment_6-13_Seed_Use.docx


FSJPP_2_TIB_Review_&_Comment_6...

RE: FSJPP #2 (Feb 2010) – TIB Review and Comment
s. 6.13 Seed Use
Review comments are as follows:
Applicable Performance Standard - NEW

Consider, for clarity the development of an 'Applicable Performance Standard for Seed Use' in addition to the Legal Indicator.
The applicable performance standard for Seed Use (referred to as the Standard) is as follows: The minimum legal requirements for seed use required to be met are defined by: 1) the Chief Forester's Standards for Seed Use (Nov 24, 2004) as amended from time to time; 2) the requirement to keep records of registered seedlots used and a map of the location of where the seed is planted; and 3) the requirement to report on an annual basis the registration numbers of seed used, and the number of trees planted, area treated and number of trees planted beyond transfer limits for each seedlot.
Question: For licensees with silviculture obligations that must follow FPPR seed use regulations (see s. 43 seed use), the Chief Forester can approve alternatives to the standards if consistent with achieving the intent of the standard. *Should this provision also be included within the FSJPP #2? Note: The standard that the acceptable variance (specified below) is based on (95% compliance) was intended for the purposes of operational flexibility, and only applies to transfer beyond the limits.*
Action – update seed use indicator variance to include alternatives to standards. Approval from the Chief Forester will be sought for alternatives to the direction provided in the Chief Foresters Seed Use Standard.

Indicator Statement

- Replace "the percentage of seeds and vegetative material collected and planted in accordance with..." with "the percentage of seedlings and vegetative material used and planted in accordance with the Standard."

Target Statement

- Replace "100% of seeds and vegetative material will be collected and planted in accordance with..." with "100% of seedlings and vegetative material will be used and planted in accordance with the Standard."

SFM Objectives

- Consider replacing with "Conserve genetic diversity of tree genetic resources used and planted for reforestation purposes."

Linkage to FSJPPR

- Revise, by inserting ..." For the purposes of Section 42 of the FSJPPR this Standard, indicator statement, target statement and acceptable variance will be used to determine..."
- Revise, by inserting..."For the purposes of Section 35(6) this Standard, indicator statement, target statement and acceptable variance will replace the..."
- Add..."For the purposes of Section 32 of the FSJPPR this Standard will be used to determine applicable performance standards for seed use."

Acceptable Variance

- Replace "As per the Chief Forester's Standards for Seed Use, no less than 95% of...will comply with the transfer requirements outlined in Appendix 3 (Seedlots and Vegetative Lots from Natural Stands) of that standard. As the standard is updated, the...update." with "As per Section 8 Transfer Limits of the Standard, no less than 95% of the combined total of the number of seedlings and vegetative material planted during each fiscal year within the DFA will comply with the transfer requirements of sections 8.2 through 8.7. As the standards are amended from time to time, the allowable variance will change consistent with any amendment.

Consider broadening acceptable variance to also include seed selection - see requirements specified in Section 7 Selection and Use of the Standard.

Note: s. 8.8 was repealed and replaced with " See : Amendments to the Standards (Chief Forester's Standards for Seed Use), June 2008 at http://www.for.gov.bc.ca/code/cfstandards/amendments.htm

What is this indicator and why is it important?

- Replace references to 'guidelines' with 'the Standard' or 'standards'
- Consider broadening concept of genetic diversity. "This indicator measures... adherence to standards to ensure the identity, adaptability, diversity and productivity of the Province's tree genetic resources and reforestation efforts in the DFA.
- Consider replacing explicit references to detailed seed use standards (which may be amended over time) with broader overarching rationale – such as:

"Genetic diversity, a fundamental component of biological diversity, is required for adaptation and evolution." Genetic diversity is genetic variation within individual organisms, within populations and among populations of a species. Genetic diversity plays an important role in the survival, adaptability, and productivity of species and populations. Maintenance of natural genetic diversity within ecosystems is important to survival and adaptation. Reforestation using a range of genetically adapted seed sources is a forest management strategy to produce healthy, productive, diverse and resilient forests.

- see text in Indicator 6 Genetic Diversity and Indicator 14 Silviculture (14-3 and 14-4) State of the Forest Report for consideration and/or reference. http://www.for.gov.bc.ca/hfp/sof/. Note: An update (SoF 2010 Report) has been completed – publication (and pdf posting online) is anticipated in Spring 2010 (if you are interested, contact me for a copy of the draft GD indicator at Leslie.Mcauley@gov.bc.ca).
- Replace "are able to withstand any biotic...and abiotic.... or climate change event" with something like "...contain sufficient genetic diversity to adequately respond and adapt to....abiotic and biotic natural disturbance events and potential climate change impacts for future generations over the longer term.

Current Status:

- Replace "The one cone collection...was collected and registered in the Seed Planning and Registry System,..." with "...was collected and registered in accordance with the Standard (or more specifically with Section 5 and Appendix 1 of the Chief Forester's

Standards for Seed Use, Nov 24, 2004, as amended from time to time). Information on the registered seed is stored on the Seed Planning and Registry (SPAR) system.

Forecasting Assumptions and Analytical Methods

- Genetic gain assumptions are incorporated into timber supply modelling based on actual seed use (seedlot Genetic Worth values weighted by quantity of seed used). Is this assumption correct? See reference: Extension Note 1, Incorporating Genetic Gain in Timber Supply Analysis, March 2001 (Adobe Acrobat PDF, 760 Kb).

Strategy and Implementation Schedule

- Use genetically adapted seed sources of high genetic value. Use select (orchard and natural stand superior provenances) seed sources over non-select (natural stand non-superior provenance) seed uses, where available. Note: Interior spruce orchards for the 'Peace River' seed planning zone are beginning to produce seed for use in Crown land reforestation. See SPAR for information on current seed inventories.
- Seek opportunities for the consideration and use of genetic resource management (GRM) strategies, actions and plans through consultation with forest genetic research and technical specialists.
- Seek opportunities for consideration and use of climate change adaptation strategies, actions and plans associated with GRM and seed use, including the introduction of genetic variation at multiple scales (e.g. plant a range of seed (seedlots) and vegetative lots over spatio-temporal scales).

Monitoring Procedure

- Consider adding, "Monitoring of GRM and seed use will be conducted through field-based silviculture surveys (regeneration, species composition).

Linkages to Operational Plans

- Replace, with "the Standard or add "as amended from time to time."

Linkages to LRMP

- Consider replacing with, "used in reforestation is adapted to the site, and able to grow healthy, productive and resilient forests, now and in the future,..."

Footnotes

15 "Changed due to applicability of seed use standards as per Chief Foresters Standards for Seed Use." Note: not due to deciduous as this is covered in separate section 6.14?

Some revisions have been made to the SFMP incorporating some of the comments.

Seed Use Legal indicator already has an applicable performance standard.

RE: 6.14 Deciduous Regeneration

See attachment - FSJPP_2_TIB_Review_&_Comment_6-14_Deciduous_Regeneration.docx



FSJPP_2_TIB_Revie
w_&_Comment_6..

RE: FSJPP #2 (Feb 2010) – TIB Review and Comment
s.6.14 Deciduous Regeneration
Review comments are as follows:

Acceptable Variance:
Revise as follows: "A maximum of 10% of the area prescribed for deciduous regeneration may be restocked with deciduous propagules or seedings (e.g. 90% minimum natural regeneration of deciduous) in accordance with the Chief Foresters Standards for Seed Use, as amended from time to time." In such cases, records must be kept of vegetative lots used and locations of where vegetative lots are planted.

What is this indicator and why is it important?
Replace highlighted text in yellow, "This indicator identifies the percentage of reforested deciduous areas that will be from natural sources, and therefore genetically appropriate for the site." with "...from locally adapted wild seed sources."

Further comments received form Leslie McAuley May 7, 2010

Not knowing what revisions were made (based on TIB review and input, sent on March.30/2010) makes this task somewhat difficult. Section 99 Use of Seed specified a number of requirements, some of which are now covered by the CF standards for Seed use, but not all (i.e. record and map keeping).

I noted this need for record and map keeping in the recommended revisions that I sent previously on Mar. 30. I also suggested that the FSJPP SFMP#2 may wish to add a reference to allow them to apply for alternatives to the CF Standards for Seed Use.
Some revisions have been made to the SFMP incorporating some of the comments. Seed Use Legal indicator already has an applicable performance standard.
Anna, let me know how we should proceed in making recommendations to ensure that the FSJPP and SFMP#2 captures requirements not included in the CF Standards. Thanks.

FSJPP REG, Section 99:

A. s.99 (a) to (e) – requirements covered by CF Standards for Seed use.

B. s.99 (f) – "keep a record of the registration numbers of the seedlots or vegetative lots used and the locations in which they are planted." Note: A reference should also be added to keep...a **'map'** of the locations in which they are planted.

The legislated requirement as per 'alternatives' and 'record and map keeping in 'B' above are stated in the FPPR under s.43 Use of Seed: **Use of seed**

43 (1) In this section, transfer means the process by which seed is selected and used, based on the origin of the seed and its genetic suitability for the site on which trees grown from the seed are to be planted.

(2) The chief forester may make standards for matters referred to in section 169 (1) (a) (i) to (v) [chief forester standards for forest practices] of the Act if the chief forester considers such standards to be necessary or appropriate for the purpose of regulating the use, registration, storage, selection or transfer of seed to be used in the establishment of free growing stands.

(3) The chief forester may authorize a person to exercise a discretion of the chief forester described in subsection (5), (6) or (7).

(4) Unless an alternative is approved under subsection (6), a person who plants trees while establishing a free growing stand must use only seed registered, stored, selected and transferred in accordance with the standards, if any, established by the chief forester.

(5) A person referred to in subsection (4) may submit to the chief forester for approval an alternative to any standard established by the chief forester under subsection (2).

(6) The chief forester may approve an alternative submitted under subsection (5) if the chief forester considers that the alternative is consistent with achieving the intent of the standard.

(7) If the chief forester approves an alternative submitted under subsection (5), the person who submitted the alternative

(a) is exempt from the requirement of subsection (4) for which the alternative has been approved, and

(b) must comply with the alternative.

(8) A person who is required to establish a free growing stand must keep a record of the registration numbers of the seed that is used, if any, and a map of the location where the trees grown from the seed are planted.

Information is tracked in RESOURCES database and maps can be generated. Some revisions have been made to the SFMP incorporating some of the comments. Seed Use Legal indicator already has an applicable performance standard.

Comments from: Davis Weaver, Silviculture Survey Specialist, FPB

Dated: March 10, 2010

I have been asked to comment formally on the document - ***A Survey Methodology for Boreal Mixedwoods in Northeastern BC***, proposed by the FSJ Pilot SFMP

The following are my comments and recommendations:

1) **Survey Outcome - Appropriate Inventory Label Generated**

Section 4.0 of the procedure outlines the detail that is needed for an adequate inventory label. Provisions have been included in the data collection at Enhanced Plots (section 2.5.4). However, there is one omission in the list of data generated for the label in section 4.0 – damage agent and pest incidence. This is a mandatory requirement as stated in the legal document – *RESULTS Information Submission Specifications* – signed by the Chief Forester Oct. 2008. The collection of the data – for pest incidence – is recorded at each quadrat plot as stated in section 2.5.3 Quadrats. Therefore it appears this is just an apparent oversight that it was not included in the text in section 4.0.

RECOMMENDATION:

Include damage agent and pest incidence to the list of survey outcomes in section 4.0 on page 12.

2) **Competitive Impacts on Well Growing Conifers and Spatial Distribution of Well Growing Conifers / Deciduous Trees**

These two factors are commonly addressed in other survey systems at the plot level. However, under this system they are NOT addressed at the plot level, and are instead determined and/or addressed by model simulations and model fittings using the field data as a basis for the analysis. The models appear to address conifer success in growth relative to competition and at the same time models the spatial distribution into the competition impacts. Having stated these points, I have articulated the maximum I am capable of understanding the model process presented. I personally find the process a grey box of implied trust in the models and the outcomes. I have no scientific rationale to assess or verify the validity of these models and their ability to address these two fundamental aspects of survey systems used elsewhere. The result is a level of uncertainty in this proposed system, until complete comparisons have been performed to verify a level of confidence and risk acceptable to the province - that sufficient stands and volume are the outcome.

RECOMMENDATION:

1) That this proposed survey system - ***A Survey Methodology for Boreal Mixedwoods in Northeastern BC –*** be implemented during the next FSJ Pilot SFMP period, but that an established comparison study be completed during its term, to document the level of accuracy of the survey outcomes in addressing the two factors mentioned above - Competitive Impacts on Well Growing Conifers and Spatial Distribution of Well Growing Conifers / Deciduous Trees.
   The form, scope and manner of this study is to be determined.

Note from the participants: There is no question that this is a new process and there are some questions and issues that still need to be examined. However part of the Pilot Project process

is about identifying new ideas and concepts and the commitment from the participants is to field test Craig's survey methodology over the term of this SFMP and beyond.

Dave Weaver RPF
Silviculture Survey Specialist
Ministry of Forests and Range
Forest Practices Branch
Victoria BC
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250-387-4768
Silviculture Surveys Website: http://www.for.gov.bc.ca/hfp/silviculture/Silviculture_Surveys.html
Provincial Silviculture Call SharePoint Site:
https://sharepoint.forests.gov.bc.ca/HFP_PSCC/default.aspx

Comments from: Pat Martin, FIA Stand Development Specialist, FPB
Dated: March 19, 2010
From: Martin, Pat J FOR:EX
Sent: Friday, March 19, 2010 5:02 PM
To: Winter, Ralph FOR:EX
Subject: RE: Fort St. John Pilot Project SFMP # 2
Yes it's possible under their system – the target is below the maximum that the yield predictions can reach – so they can get above 100%.
I really dislike that aspect of how the participants have set up the system.

From: Winter, Ralph FOR:EX
Sent: Tuesday, April 13, 2010 9:01 AM
To: Martin, Pat J FOR:EX
Cc: Monetta, Anna FOR:EX; Bedford, Lorne FOR:EX
Subject: FW: Fort St. John Pilot Project SFMP # 2
Pat
Should we ask CANFOR to modify procedures so that PMV should not be able to be 104% above the target and that the max should be only 100%
Further comments – April 14, 2010
It would make more sense to me. Getting over 100% seems weird to me. However, as i recall they wanted 100% to reflect their target level – not the biological max.
That is correct, Participant's will continue to report as per the current system.

From: Hunt, Tony L FOR:EX
Sent: Monday, May 17, 2010 2:47 PM
To: Hunt, Elizabeth A FOR:EX; McAmmond, Shaun N FOR:EX
Subject: RE: Further review required of the Fort St John Code pilot SFMP #2
Appendix 6:
1.2 (E) Discussed on the call. Subjective language regarding when competition may not be deleterious to crop establishment. Who makes that determination? Is it a forest professional, or "just" a surveyor? The criteria presented is not enforceable.
Criteria E is not an addition to the selection criteria, as it was included in the original SFMP for crop tree requirements. Despite the absence of available scientific background to make this selection defensible should not discredit the professional accountability of the surveyor to rationalize a well growing crop tree decision.
Well Growing Guidelines for mixedwood (pg 342 of draft SFMP – Appendix 6):
Beneath the Well Growing Guidelines table, there is a bullet that states...."For this assessment At & Ac requirements are one or more per quadrant" – What does this mean? Is this independent of conifers, or is it inclusive?
Reference to June 2, 2006 Stocking Guidelines for Mixedwoods in the BWBS in the Peace Forest District letter from D.L.Way, District Manager.
APPENDIX 6
Section 1.1 Introduction
Why is there wording about disapplying sections 32(3), (4), (5), (6), (8) of the *Fort St. John Pilot Project Regulation* (FSJPPR) in the Sustainable Forest Management Plan (SFMP)? Shouldn't this be dealt with through a change in legislation? Otherwise, there is an increased risk of conflicting wording between the FSJPPR and the SFMP.
Section 35 (1) states participants must prepare landscape level strategy, and SFMP can disapply the regulation without having to amend regulation.
Why is there also a reference to deciduous areas logged after November 15, 2001?
E) While A to D above will normally define a well growing crop tree, despite these criteria, an individual crop tree may be accepted as well growing if the surveyor believes the vegetation clearly does not impede the growth of the crop tree, and is not expected to impede the future growth of the tree. These well growing trees must be clearly identified on the plot cards to facilitate field checking, if required, for verification purposes.
Criteria E is not an addition to the selection criteria, as it was included in the original SFMP for crop tree requirements. Despite the absence of available scientific background to make this selection defensible should not discredit the professional accountability of the surveyor to rationalize a well growing crop tree decision.
Wording such as "… may be accepted as well growing if the surveyor believes the vegetation clearly does not impede the growth of the crop tree, and is not expected to impede the future growth of the tree" is very subjective and needs to be changed.

Any vegetation assessment for final reforestation assessments cannot be completed until at least one growing season following chemical brushing, and three growing seasons following manual brushing.

What is the risk to the Crown of reducing the brush recovery period to one year for chemical brushing? According to Section 32(6)(c) of the Fort St. John Pilot Project Regulation, this is a two year period?

This is more restrictive than FRPA, tied to professional accountability.

Why is the following wording referring to "criteria that will be developed"? How verifiable and measureable is "..crop trees must be healthy enough that they can reasonably be expected to reach maturity."?

Both conifer and deciduous crop trees must be healthy enough that they can reasonably be expected to reach maturity. Forestry professionals will be responsible for establishing and updating crop tree health criteria to use for reforestation assessments. The criteria will be developed using the best information available, (e.g. the "Free- Growing Damage Criteria" found in the "Establishment to Free Growing Guidebook") and in consultation with forest health professionals and /or the MFR. Participants agree with this statement.

Section 1.3 Minimum Inter-Tree Distance

Coniferous Areas: The minimum inter tree spacing (MITD) at establishment will be 1.5 metres for coniferous areas. Reductions to a 1.0 metre minimum will be allowed where conditions warrant (e.g. plantable spots are limited), as noted in a foresters rationale, which will be documented and retained by the Participant.42. MITD does not apply at the final reforestation assessment survey under the landscape level strategy. Deciduous Areas: The minimum inter tree spacing (MITD) at establishment, and for areas assessed prior to full implementation of the LLS, will be 0.5 metres43for standard well spaced surveys. MITD will not apply for MSQ surveys at either the establishment phase or at the final reforestation assessment survey under the landscape level strategy. Mixedwood Areas: Mixedwoods will be assessed using MSQ surveys using the standards specified in Section 1.4.3 of this Appendix, consequently there will be no specific MITD for mixedwoods.

Wording such as "as noted in a foresters rationale" is very subjective and needs to be changed. According to Wendy Bergerud's report entitled The Effect of the Silviculture Survey Parameters on the Free-Growing Decision Probabilities and Projected Volume at Rotation, Land Management Handbook 50, a reduction in MITD can greatly increase the risk of incorrectly classifying an area as free growing, or in this case, well-growing. Since the MITD for most coniferous blocks is 2, reductions of the MITD to 1.5 or 1.0 will likely reduce stocking standards that already have low Minimum Stocking Standards.

1.5 metres is the value for MITD already established in the FSJPPR for coniferous. Reductions to 1.0 minimum will be under special condition to be rationalized by professional as noted in SFMP.

Section 1.4.1 Stocking Standards for Coniferous Areas

Wording such as "The participants, may at their own discretion, choose to use…" is very subjective and needs to be changed.

Unless the Participants are actually harvesting and utilizing subalpine fir, black spruce, and larch, these species should not be considered to be "Countable Species" for meeting silviculture obligations.

Professional accountability and reliance is key to implementation of the SFMP. Species growing on site should be utilized in stocking standards for biodiversity.

Section 1.4.2 Stocking Standards for Deciduous Areas

Why approve something that is incomplete and currently unknown?

Table C provides the applicable performance standard for stocking requirements to assess the establishment during the reforestation period of a well growing stand of crop trees on deciduous areas that are declared prior to the completion of the deciduous compiler, after which time the legal deciduous reforestation assessment will be assessed based on the criteria included in Indicator # 29, in Section 6.29 (Reforestation Assessment).

Why was the height requirement for aspen reduced from 2.0 to 1.5 m. and how will browsing further impact this lower height requirement. Unless birch is actually being harvested and used by the Participants, it should not be considered to be a "Countable Species" for meeting silviculture obligations.

No change from original regulation.

Section 1.4.3 Stocking Guidelines for Mixedwoods in the BWBS

Why use a minimum of 3 acceptable At or Ac over 1 m at Establishment Delay and 1 or more at Well Growing?

Reference to June 2, 2006 Stocking Guidelines for Mixedwoods in the BWBS in the Peace Forest District letter from D.L.Way, District Manager.

Section 1.4.4 Modifying Stocking Standard Requirements

Wording such as "The forestry professional may modify target and minimum stocking requirements…" is very subjective and needs to be changed.

Why does the SFMP contain "acceptable variances" that further reduce the target values that need to be met. This is likely not in any other legislation.

Acceptable variances are in place to accommodate variations in data or fieldwork that could be the result of natural features or events. Based on CSA standards 6.1(d) states "Each target shall set acceptable levels of variance". Variance are built in to legislation e.g. the DM may vary a performance standard. The Pilot Project was meant to explore administrative efficiencies, variances are a prime example.

Section 8 Changes in Requirements

Section 32 and Schedule 'F' to identify a reforestation standard be submitted to government as follows:

For the purposes of Section 32 and Schedule 'F', the applicable reforestation stocking standards (coniferous, deciduous, or intimate mixedwood standard) that apply to each area within cutblocks will be tied to stocking standard ID's , which correspond to conifer, deciduous, or mixedwood stocking standards (i.e. declarations). These ID's are submitted into the MFR tracking system (i.e. RESULTS). Changes to stocking standard designations within cutblocks may occur prior to final assessment, and will be revised in RESULTS. This will eliminate the need to submit redundant written declarations.

The reference above to “Changes to stocking standard designations within cutblocks may occur prior to final assessment, and will be revised in RESULTS.” implies that stocking standards can be changed without approval at any time.
Stocking standards should not be rewritten.
Yes that is correct. Submitting them in RESULTS gives transparency to Participants’ activities. The Participants are reassigning SU designation, not re-writing stocking standards. The ability to revise SU designation provides the flexibility for the landscape level reforestation strategy.
The Chief Forester’s Standards for Seed Use are not applicable to the Participants of the FSJPPR.
With the rewrite of the SFMP see Indicator 13, we have elected to follow the Chief Forester’s standards for seed use.

9. Visual Quality

Comments from: Paul Picard, Survey Specialist, Visual Landscape Inventory Specialist, FPB and Luc Roberge, Visual Resource specialist, NIR
(I have included a series of e-mail strings for clarity and completeness)
Dated: August 13, 2009 and March 10, 2010

From: Picard, Paul FOR:EX
Sent: Thursday, August 13, 2009 9:11 AM
To: Roberge, Luc FOR:EX
Cc: Bedford, Lorne FOR:EX; Winter, Ralph FOR:EX; Marc, Jacques FOR:EX; Monetta, Anna FOR:EX; Hunt, Elizabeth A FOR:EX
Subject: RE: Visuals in Fort St-John Pilot, how good are they?
Thanks Luc,
From your note below, "The SMP wording is very similar to the Woodlot MP model where there is no requirement to present Results or Strategies like in FSPs, which are often ambiguous and non measurable. The SFMP strategy is simply a commitment to meeting established VQOs, which is clear, verifiable, and measurable".
That actually sounds like a big improvement to me. Under FRPA, licensees could (in theory of course) write obscure/convoluted strategies and weasel themselves out of VQOs where as it seems they can't do that under that woodlot/FSJ Pilot model. Am I missing something?

From: Roberge, Luc FOR:EX
Sent: Thursday, August 13, 2009 9:05 AM
To: Picard, Paul FOR:EX
Cc: Bedford, Lorne FOR:EX; Winter, Ralph FOR:EX; Marc, Jacques FOR:EX; Monetta, Anna FOR:EX; Hunt, Elizabeth A FOR:EX
Subject: RE: Visuals in Fort St-John Pilot, how good are they?
From a visuals perspective, there is no major differences between the Pilot and FRPA. The scenic areas and established VQOs are all the same and everybody is bound to meeting the VQOs from either regimes. I've attached the current SFMP visual quality management strategy and what is proposed for the next plan that Anna sent me for comment. The current strategy is to the point and the fact that the Working Group is proposing the status quo is fine with me. The SMP wording is very similar to the Woodlot MP model where there is no requirement to present Results or Strategies like in FSPs, which are often ambiguous and non measurable. The SFMP strategy is simply a commitment to meeting established VQOs, which is clear, verifiable, and measurable. The second part of the strategy commits to do design to minimize visual impact in scenic areas without established VQOs which is ok but irrelevant in the Fort St. John TSA. Currently, all the known scenic areas have established VQOs in place. There are a few new polygons that have no established VQOs but these are not known scenic areas. The district will have to go through the GAR process to enact them.

- Thank you for noting this, Participants have revised the indicator to remove the irrelevant reference.

Besides the above, I don't really have too much to add especially if you're after more specific information on how the Pilot Project Regulation works on the ground compared to FRPA. District staff are in better position to provide that kind of input and you may want to start with Elizabeth Hunt, Stewardship Officer.

From: Roberge, Luc FOR:EX
Sent: Friday, April 9, 2010 9:17 AM
To: Picard, Paul FOR:EX
Cc: Marc, Jacques FOR:EX
Subject: RE: Comments on Visuals on Fort St-John pilot

Salut Paul:

You may or may not have seen the note I sent to Jacques about this in early March (see attachment). The Variance and the Strategy and Implementation schedule sections are indeed very troublesome and should not be approved as such. A licensee cannot dictate where and when it will achieve a VQO or change a VQO at will.

There is also a statement on p. 232 that is an absolute joke. Basically it says that they will carry-out pre-harvest VIAs and landscape design processes only when deemed necessary to assist in block design and the meeting of VQOs. In other words, carrying-out VIAs and design will be an exception more than a rule, which goes against the due diligence test. I guess they will rely on pure luck to meet VQOs.

In summary, this plan requires a major re-write when it comes to the Variance and Implementation sections and the Current Status section needs to be updated.

RE: Fort St. John Pilot Projec...

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Luc Roberge, R.P.F., M.Sc.
Visual Resource Specialist
B.C. Forest Service
Northern Interior Forest Region
Tel.: 250- 565- 6142
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- The participants are exploring administrative efficiencies and further implementing the principles of professional reliance with the proposed variance and have identified the bounds to which the variance would apply.
- The participants are committed to achieving the identified result (established VQO's). Whether or not a formal VIA is completed in a given situation, it is the participants responsibility to ensure due diligence in achieving the established objective. This is in keeping with the tenets of professional reliance and results based management
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Comments from: Paul Picard, Survey Specialist, Visual Landscape Inventory Specialist, FPB and Luc Roberge, Visual Resource specialist, NIR

(I have included a series of e-mail strings for clarity and completeness)

Dated: March 8, 2010 and March 9, 2010

Hi:

A few months ago, I was asked by a regional rep to provide input into an earlier version of the plan and I was happy with it. Like the previous version, it contained a commitment to meet the VQOs, practice good design and carry out VIAs. The newer version still makes these commitments but now I see that they have a much different and much more elaborated Variance section (S. 6.44 on p. 229). It contains an option of changing a VQO based on some pre-defined conditions and on top of that, they wrote that they do not need to get approval from the DM for future VQO variances. This is new to me and obviously unacceptable from a FRPA perspective and as far as I know, the FSJPPReg must still be consistent with FRPA Act and regulations.

- The Reg states that the SFMP must be *"Consistent with the Pre-amble to the Code"* which is obviously out of date as the FSJPPR has been moved under FRPA. The FSJPPR acts in place of the FPPR in the Fort St John DFA.
- Please see above comments re: administrative efficiencies

Something else I noticed in the "Current Status" section is that it stills refers to the 1997 DM letter making known scenic areas with EVQOs and also making known scenic areas with RVQCs only. These RVQCs were grandparented under GAR 17 in 2004 and the changes have been on the LRDW since 2008. I took some time to compare Figure 18 on p. 231 with the LRDW data and they match. The map on figure 18, which it says was updated in 2009, comes from the LRDW except that they took the time to cut off the private ownership from the data so some VQO polygons are chopped off. The GAR 17 EVQOs from the LRDW file are showing correctly as established VQOs on Figure 18 so all there is to do is to update the text accordingly.

- Figure 18 was created using data from the LRDW, the Participants have reviewed the wording in the section noted above and have made appropriate changes as necessary in the final submission copy of the SFMP.

The same section also provides the old VQO definitions. These should be replaced with a reference to FPPR 1.1 or if they really want to spell out the definitions in the plan, they should simply copy and paste the definitions from the regulation to make sure it is a perfect match with the legal definitions.

- Thank you for the suggestion, the references have been checked and updated in the final version of the plan.

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Luc Roberge, R.P.F., M.Sc.
Visual Resource Specialist
B.C. Forest Service
Northern Interior Forest Region
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eMail: Luc.Roberge@gov.bc.ca
VRM Web Site: http://www.for.gov.bc.ca/hfp/values/visual/index.htm

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From: Marc, Jacques FOR:EX
Sent: Tuesday, March 9, 2010 10:39 AM
To: Roberge, Luc FOR:EX
Subject: FW: Fort St. John Pilot Project SFMP # 2
Hello Luc,
Have you seen the attached SFMP for the Fort St. John Pilot area?
How well do you know the regulation?
It looks like the same strategy as elsewhere.
Lets exempt our self from meeting the VQO when conditions are not favourable.
Jacques Marc RFT
Visual Resource Officer
Forest Practices Branch
Ph: (250) 387-8481
Fx: (250) 387-2136
http://www.for.gov.bc.ca/hfp/values/visual/index.htm

Comments from Luc Roberge, Visual Resource Specialist, NIR
Received May 13, 2010

Section 8.1.6 of draft SFMP #2 refers to Indicator #44 discussed in section 6.44 “Visual Quality Objectives”, for which you have already received a number of comments on. Jacques and I have discussed this again and we want to reiterate that the strategy presented in section 8.1.6, like section 6.44, is not only unacceptable, but legally unfeasible. GAR 7 (2) makes it very clear that the only person who can establish, vary, or cancel VQOs is the Minister, who has delegated this authority to district managers. The Ministry of Forests and Range has received legal advice recently that it is not appropriate to use plans for self-exemptions or circumvent the exemption process established in the legislation. Government has to go through a rigorous process to establish objectives (GAR process) so any changes to an objective should also be done with the same rigour. This rigour may seem onerous at times but until the legislation provides us with better tools, we have to live by it. There is also the very salient point that forest licensees are one tenure holder on the land and their decision of what is appropriate may run contrary to other tenure holders (e.g. a tenured tourism operator) so the need for a due process to make changes to established objectives.
Consequently, the current law does not allow for or enable licensee field foresters to start making their own judgement calls as to where and when a VQO should be achieved, even under “exceptional occasions”. The debate could go on and on as to what these “occasions” might be, which in itself, would make it very difficult for C&E staff to enforce instances where VQOs are not met. Should a field forester encounter a situation where a change to the VQO is

necessary, the licensee should identify this issue to the DDM. Where all parties agree that a change is in the best interest of all stakeholders, a GAR order can then be introduced by the DDM to make the change.
Jacques and I both share this view so please consider this as a combined submission from the NIFR and Branch. Jacques will not send you a separate reply. Thank you.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Luc Roberge, R.P.F., M.Sc.
Visual Resource Specialist
B.C. Forest Service
Northern Interior Forest Region

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Participant response
With all due respect, GAR section 7 (2) does not specify that only the Minister can vary or alter VQOs. To wit: the FSJPPR section 25(1) specifies that the District Manager may vary a performance requirement of the regulation such as 28(1) (c) – established VQOs. So in this case the DM may vary the requirement to be consistent with the established VQOs, if satisfied that implementing the variance will adequately manage and conserve the forest resources on the area affected by the variance request.
Further, Section 35 (6) of the FSJPPR gives the Pilot participants the authority to specify any applicable performance standards that are to be used for the purposes of Part 3 Division 5 (Field Performance Requirements) and the associated Schedules of the FSJPPR. This gives the participants the authority to vary the field performance standards within the FSJPPR, which includes FSJPPR Section 28(1) (c) - established VQOs .
In this instance the FSJPPR provides the participants with the ability to seek a variance to not be consistent with established VQOs.

Following is an excerpt from Section 8 of the draft SFMP that describes the variance we are proposing to implement in only specific circumstances:

8.1.6 Visual Quality Strategy
The Visual Quality Strategy and the related indicator # 44 (**see Section 6.41 Visual Quality Objectives)** is consistent with the requirements of the *FSJPPR*, but does allow foresters the option , in exceptional circumstances, to prescribe harvesting that may not be consistent with established visual quality objectives subject to the conditions outlined in the acceptable variance. Under those specific conditions, the provision effectively eliminates the requirement to get variances from the District Manager to exceed visual quality objectives when other high value resources are at risk, although the District Manager still is responsible for authorizing a harvest authority. The Participants will notify the Ministry of Forests and Range regarding proposed variances at the time of harvest authorization.
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For the purposes of Section 35(5), Section 28(1) (c) of the *FSJPPR* may therefore be affected by the application of this Visual Quality Strategy, specifically the acceptable variance for this indicator.

Equivalent Protection

This strategy provides equivalent protection to the *FSJPPR* APS and Field Performance Requirements for the following reasons:

The variance, which may allow a forester to prescribe harvesting that may not be consistent with a visual quality objective, is restricted to extraordinary situations where other resource values may be at risk, and still requires a rationale by a professional to identify why some harvesting is proposed, and how the visual impacts are to be mitigated to the extent practicable.

Consistency with the Preamble to the Code

The development of a CSA-Z809/02 SFMP incorporating the six CCFM criteria and indicators, and the ongoing participation of the Public Advisory Group provides assurance that the Participants are managing the forests based on sustainable use for all British Columbians.

Adequate Management and Conservation of Forest Resources

The basic premise is to be consistent with the visual quality objectives except in the rare instance when other highly valued resources may be at risk if harvesting does not occur. In those instances, measures will also be identified to mitigate visual impacts due to the harvesting. Allowing some flexibility to address serious issues such as forest health through some limited harvesting may reduce natural mortality in the visual quality polygon or adjacent visually sensitive areas. It may therefore have a net long-term benefit to the visual resources in the specific polygon, and on visual resources in adjacent areas by reducing long-term mortality due to forest health agents. Consequently the Participants believe this change to these requirements contributes to adequately managing and conserving forest resources.

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10. Section 8 - Changes in Requirements

Comments from: Ralph Winter, Stand Management Officer, FPB

Dated: April 13, 2010

The section 108 clause is not consistent with legislation....
Section 108 is limited to prescribed circumstances only....
This section in the SFMP must be deleted and removed
The SFMP cannot change the conditions for where section 108 applies

- Participants' have deleted the reference to section 108 in the SFMP .

From: Winter, Ralph FOR:EX
Sent: Tuesday, March 9, 2010 8:51 AM
To: Osbourne, Kelly FOR:EX
Subject: FW: Fort St. John Pilot Project SFMP # 2

Section 108 of *FRPA* will apply if an event causing damage to a plantation or site occurs that will result in significant extra expense to the Licensee in meeting the obligation to establish a free growing stand. The Licensee must not have caused or contributed to the damage unless by officially induced error and must have exercised due diligence in relation to the cause of the damage.

- See above comments

See page 282

Comments from: Joelle Scheck, Ecosystems Section Head, MOE

Dated: April 21, 2010

Sec. 8 – Changes in Requirements Sub-sec. 8.1.1 WTP Retention Levels – page 279	Support the revision to the APS
Sec. 8.1.4 Coarse Woody Debris – page 285	Does CWD monitoring address/record piece size and quality of CWD? Response – CWD sampling follows the VRI ground sampling procedures (section 8) - piece size and decay classes are tallied. For the purposes of the indicator (section 6.6), consistent with the performance standard, the data are only compiled to report on CWD volume.

Review of Fort St. John Code Pilot SFMP Section 8
May 14, 2010

Additional Comments from: Richard Kabzems, May 17th

8.1.2 Permanent Access Structures

The participants have achieved 5% or less of area in Permanent Access Structures in 2007, 2008 and 2009 (Table 23 in the February 2010 draft SFMP). The three year average for CANFOR was 4.9%, and the BCTS average for the same time period was 2.8%.
The FSJPPR standards of 7% in Permanent Access Structure was greater than operational performance PAS levels of less than 5% even when it was first established. The Pilot Participants have demonstrated that 5% PAS is consistently achievable, even when applied on an individual block basis, and reported on an annual basis. The 5% PAS serves as a regular benchmark in the planning phase to encourage decreased road densities.
Reporting on an annual basis for Permanent Access Structures is more consistent with a results based approach as it shortens the time between action and evaluation. The annual assessment also increases the ability for the participants to successfully rehabilitate areas which have exceeded 5% in PAS, and maintain land as productive forest.
There is no need to change the requirements for permanent access structures from the current maximum 5% PAS on a cutblock basis, reported annually.
Participant response – to address the comment above, the PAS strategy has not been changed from that presented in SFMP #1. SFMP #2 continues to indicate that PAS will be measured at a DFA level by managing participant rather than an individual cutblock basis.

8.1.3.3 Deciduous reforestation

I understand this section to mean that the existing deciduous stocking requirements will remain in use until the 'deciduous compiler' is ready to use and a landscape level assessment of deciduous regeneration is used.
The minimum number of trees identified in Table C of Appendix 6 the draft SFMP is lower than any previous or existing deciduous standard used by the MFR that I am aware of. The minimum aspen height of 2 m has been used in British Columbia aspen regeneration guidelines since 1997 if not before. Using a minimum height of 1.5 m for aspen regeneration assessments increases the risk to the Crown of accepting aspen areas while they are still vulnerable to a number of damaging agents (particularly browse), and before other problematic conditions may have been fully expressed.
With the combination of low aspen numbers, low minimum height and up to 15 years before assessment, an area could 'pass' the proposed deciduous reforestation assessment even with a reduction in site productivity due to management actions such as harvesting under unsuitable conditions. Using the Site Index equations of Nigh, Krestov and Klinka (2002) in Site Tools 3.3, a height of 1.5 m at year 15 would be a Site Index of 4.
As described above, the proposed changes in requirements refers to a number of items in the text of the SFMP which do not meet the test of adequately managing and conserving forest resources.
The draft MOFR stocking guidelines for hardwoods were not included due to the fact that the development of the deciduous compiler is to occur in the future. As the measurement components of the deciduous landscape strategy are finalized the stocking guidelines will be appended to the SFMP.
The minimum height for deciduous was approved in Appendix F of the Fort St. John Pilot Project Regulation. There has not been a deviation from that height in Table C.

8.1.3.5 Mixedwood Reforestation Stocking Guidelines

The amendments are based on the Peace District Managers letter of June 1, 2006. These were based on based on the best available science at the time.

The SFMP should properly reference the source of the material.

Action - the SFMP will be revised to reference the DM's letter.

I have provided comments on Appendix 10, "Mixedwood Management Guidelines" in a previous communication.

8.1.4 Coarse Woody Debris

The goal of a minimum overall target of 50% of the pre-harvest volume CWD is a reasonable starting point and could be applied more widely in British Columbia.

Please contact me if I can provide any additional information.

Code Pilot SFMP Section 8 "Changes in Requirements" – additional review comments May 17, 2010

In Section 8 of the 2010 Draft SFMP, there are a number of vague statements that are not verifiable as written, and cannot be considered as a performance standard or a regulatory requirement.

8.1.3.2 Landscape Level Assessment of Coniferous and Deciduous Areas

"SFMP #2 proposes to extend this strategy to deciduous reforestation areas, to be effective upon the completion of the deciduous compiler."

Action – revise SFMP to add in timelines when we expect this to occur. The landscape level deciduous reforestation Strategy will be reviewed by MFR when an SFMP amendment is submitted for this section.

8.1.3.5 Mixedwood Reforestation Stocking Guidelines

"It is the intent of the Participants to move toward adapting the landscape level reforestation assessment to mixedwood areas, consistent with that employed on coniferous and deciduous area. It is hoped that this will be completed during the term of this SFMP, at which time amendments to the SFMP may be proposed. The research paper by Farnden (2009) outlining a process to assess mixedwoods on a multiblock basis will form the basis of this adaptation (see Appendix 18)."

As written, these sections create confusion regarding what changes are being proposed, and confusion regarding whether these changes are based on previous regulation or schedules within the 2004 SFMP. There should be another place in the document to describe a vaguely defined future intent.

Proposed changes in requirements need to be limited to items which are clearly defined, using a well established methodology that can be utilized and verified by any qualified professional. To remove any confusion regarding performance standards during the term of the SFMP, these two sections need to be revised and the vague statements removed. These two sections should be rewritten in a style which is consistent with the language found in e.g. 8.1.1 Wildlife Tree Patch Retention Levels.

Please contact me if I can provide any additional information.

Richard Kabzems, M.Sc., P.Ag., R.P.F.

Action – revise SFMP to add in timelines when we expect this to occur. An amendment will be done to SFMP when mixedwood landscape level process is developed. The landscape level mixedwood reforestation Strategy will be reviewed by MFR when an SFMP amendment is submitted for this section.

8.1.5 Riparian Reserve Strategy

The Riparian Reserve strategy, and the related indicator # 7 (**see Section 6.7 Riparian Reserves**) is consistent with the requirements of the *FSJPPR*, but does allow foresters some leeway to harvest in riparian reserves, subject to the conditions outlined in the acceptable variance. Under those specific conditions, the provision effectively eliminates the requirement to get variances from the District Manager to harvest in riparian reserves, although the District Manager still is responsible for authorizing a harvest authority. **For the purposes of Section 35(5), Section 28(1) (b) (i) (A) of the *FSJPPR* may be affected by the application of this Riparian Management Strategy, specifically the acceptable variance to this indicator**

Wording above such as "...but does allow foresters some leeway to harvest in riparian reserves,.. is very subjective and needs to be changed. Same goes for the reference to "... extraordinary situations where other resource values may be at risk." Reserves are there for a good reason!

Participants have revised the wording in the indicator as well as section 8 to address the concerns noted above and have specifically listed instances where variances to the indicator and target will be applied (FPPR section 51).

Adequate Management and Conservation of Forest Resources

The basic premise is to maintain riparian reserves except in the rare instance when other highly valued resources may be at risk if harvesting does not occur. Measures will also be identified to minimize the impacts on the riparian values in those instances. Allowing some flexibility to address serious issues such as forest health through some limited harvesting may actually reduce natural mortality in reserve areas. It therefore may have a net benefit to the broader riparian resource values. Consequently the Participants believe this change to these requirements contributes to adequately managing and conserving forest resources.

Reference to "... allowing for some flexibility to address serious issues..." is very subjective and needs to be changed.

This concern should be address with the changes to the indicator and section 8 as noted above.

8.1.6 Visual Quality Strategy

The Visual Quality Strategy and the related indicator # 44 (**see Section 6.44 Visual Quality Objectives)** is consistent with the requirements of the *FSJPPR*, but does allow foresters some leeway to, in exceptional occasions, exceed visual quality objectives subject to the conditions outlined in the acceptable variance. Under those specific conditions, the provision effectively eliminates the requirement to get variances from the District Manager to exceed visual quality objectives when other high value resources are at risk, although the District Manager still is responsible for authorizing a harvest authority. *Reference to "... but does allow foresters some leeway..." is very subjective and needs to be changed.*

This concern should be address with the changes to the indicator and section 8 as noted in response to comments made by Luc Roberge.

From: Winter, Ralph FOR:EX
Sent: Tuesday, May 11, 2010 10:47 AM
To: Weaver, David W FOR:EX; Powelson, Allan FOR:EX; Monetta, Anna FOR:EX; Hunt, Elizabeth A FOR:EX; Bankowski, Jacek T FOR:EX
Cc: Martin, Pat J FOR:EX; Hays-Byl, Winn FOR:EX; Astridge, Kevin FOR:EX; Hunt, Tony L FOR:EX; Bedford, Lorne FOR:EX
Subject: FW: Further review required of the Fort St John Code pilot SFMP #2
Importance: High

Hi Dave, Al, jacek and Anna and tony
Can you please review and advise if there are issues here
I note very different veg competition stds. Have you folks and been involved in the development of the changes in red in the SFMP document with regard to appendix 6?...

8.1.3.6 Appendix 6 Supplemental Reforestation Requirements

For the purposes of Section 35(5) of the *FSJPPR*, the following sections of Appendix 6 will be used to replace effected portions of Section 32 of the *FSJPPR*: **Appendix 6 Section 1.2 Crop Tree Requirements and Vegetative Competition** replaces the requirements in 32(6)(a),(b),(d), and 98(1) Table A.

Appendix 6 Section 1.3 Minimum Inter tree distance replaces the minimum inter-tree distance requirements in Section 32(6)(d).

Comments on to the above noted sections made by District and Regional Staff have been addressed previously in this document

SECTION 8 – CHANGES IN REQUIREMENTS (to FSJPPR)

Comments from Al Rodine, Tenures supervisor, Peace Forest District
Received: April 27, 2010

A couple of comments from a review of SFMP Chapter 8 amendments.

8.1.6 Visual Quality

Proposed change would allow licensee to write their own exemption from achieving established VQO when this would protect higher value resource.
DM still approves the HA so we would want to be notified of these blocks at time of HA application. Application should include the professionals' rationale for exceeding VQO.
Will there be a list of situations for which this exemption opportunity applies? E.G. MPB infested timber, other?. Will we get a chance to review/approve the list?

A change has been made to the Section 8 as well as the indicator write up, please see response to Luc Roberge's comments

Roads on the FOS

Proposal to write SFMP language that tweaks FOS content for type of roads to be shown. Only roads proposed for construction would be shown. Existing non-status roads would not be shown. E.G. is upgrading a seismic line road construction?

Clarification: It is the intent of the Participants to not have to show proposed locations of bridge and culvert construction in the FOS, just new roads proposed for construction.

It is the intent of the participants to show all known roads on the FOS maps for which spatial information is available, however in many circumstances it has been found that there may not be spatial data for a previously constructed “non-status road” that exists on the ground that the participants wish to utilize. Upgrading a seismic line would be considered construction of a road for the purposes of this strategy

Is the definition of ‘construction’ objective enough?

I think this is a good change. Will reduce the amount of amendments required to show existing non-status roads. A Road Authorisation is still required. Perhaps a bit of risk with First Nations groups for roads not shown?

Al Rodine R.F.T.
Tenures
Peace Forest District
250 784 1230 or FAX 250 784 0143
EMAIL...al.rodine@gov.bc.ca

Comments from Ralph Winter, Stand Management Officer, FPB
Received May 11, 2010

I note the following

8.1.2 Permanent Access Structures

In order to provide increased flexibility to increase road densities where needed due to site conditions, to encourage decreased densities where practical, and to reduce Participant and government paperwork arising from frequent Section 25 variance requests, the Participants believed it desirable to assess the amount of Permanent Access Structures (PAS) in cutblocks at a larger scale than block by block. SFMP # 1 revised the APS to:

“A maximum of 5% of the total area in Managing Participants’ cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average.” Pursuant to Section 35(5) of the *FSJPPR*, the approval of SMFP # 1, effective April 1, 2004 replaced the Applicable Performance Standard (APS) relating to permanent access structures described in Section 30(1)(b) of the *FSJPPR*, with the applicable performance standard as specified by the indicator statement, target statement and acceptable variance

I note the current RNI average is 3.6 % over 3 years (see Mof Report above) Is there a reason why we would want to allow the 3 year rolling average to have a max of 5%...

See comments above in the response to comments made by Sandy Currie regarding the Road Access Management Strategy

Comments from Ralph Winter, Stand Management Officer, FPB
Received May 11, 2010

I note the proposed changes below...

I thought that there were still significant outstanding issues with regard to the Decidous and mixed wood standards. Can you confirm that is true or not.

The company is also proposing to revise the compiler to address these new standards using FIA funds. To my knowledge there will be no FIA funds for this.

I don't think this clause should be allowed to go ahead with district, region approval of the new approach. Al and Dave can you advise district and region on your perspectives please

8.1.3.2 Landscape Level Assessment of Coniferous and Deciduous Areas

Can you please review and advise if there are issues here

I note very different veg competition stds. Have you folks and been involved in the development of the changes in red in the SFMP document with regard to appendix 6?...

Responses to all comments made on the Landscape Level Silviculture Strategy have been addressed above in the pertinent section of this document and corresponding changes have been made where appropriate to the SFMP document.

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11. Comment Received on Indicators not Linked to Landscape Level Strategies or "non-legal" aspects of the plan

COMMENTS AND RESPONSES CONTAINED IN THIS SECTION ARE IN REFERENCE TO INDICATORS AND TARGETS THAT ARE REQUIREMENTS OF THE CSA STANDARD AND ARE NOT REQUIRED UNDER THE FSJPPR OR ARE PART OF A LANDSCAPE LEVEL STRATEGY AND ARE THEREFORE NOT SUBJECT TO APPROVAL BY GOVERNMENT. THE PARTICIPANTS WILL HOWEVER, ENDEAVOUR TO ANSWER THE QUESTIONS AND COMMENTS BELOW.

Comments from: Caren Dymond, Forest Carbon and Climate Change Researcher, MOF

Dated: March 24, 2010

OK, I was able to review the modelling details behind
MAR 1 SFMP_public_review_and_comment_version_2010_02_08.pdf

The fundamental issue is in the way natural disturbances are defined in the modelling scenarios.

On page 213 the target statement is to maintain average sequestration rates consistent with or greater than natural sequestration rates. However, in Figure 15, page 215, it clearly shows natural sequestration rates dropping precipitously over the next 50 years. That clearly indicates to me that either their natural disturbance rates of 20,000 ha per year is way too high. Alternatively, the carbon stocks at t=0 are way too high and not in sync with natural disturbance rates. We see a change like the sequestration rates dropping precipitously that as a modelling artefact and not helpful. The authors of the report argue that the drop is due to a changing age class structure to a more even distribution with more younger and older stands. However, there will be approximately 4% of the area in stands older than 150 years - not much different than currently. Will there be substaintially more young stands (<50) yes, because the natural disturbance regimes applied are much higher than reflected in the current age class distribution. To me, that says they are too high.

OK, so if we look beyond year 50, why is the average sequestration rate higher in the AAC scenario? Because they dropped the natural disturbance rate from 20,000 ha per year to 1,000 ha per year (possibly zero). I can't find any justification of this low a natural disturbance rate. Perhaps this is in the TSR2 report. Of course, they added approximately 21,000 ha of logging (~2.8 Mm^3/yr at ~130 m^3/ha). The sequestration rates are higher because of the transition from natural to managed yield curves.

On page 219, Figure 17 shows the total carbon starage in the DFA. the natural disturbance and the AAC appear to be the same. That's very odd, since harvesting removes a lot more carbon from the ecosystem than natural disturbances do. Given what we understand about disturbance rates and sequestration rates described above, it appears they modelled the impact of fire and harvest the same way. On page 218 they state the standing volume is used as a surrogate for storage of ecosystem C. Of course, it is not. Burned stands have more carbon remaining in surviving trees and deadwood than clearcut stands. There may also be more remaining in the forest floor and soil, depending on the relative severity.

As an editorial, it seems odd to plan a harvest rate than results in such a draw-down of growing stock.

Forest Carbon and Climate Change Researcher
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The participants will review the indicators and targets associated with carbon sequestration and carbon storage in future iterations of this plan to assess their accuracy, effectiveness and appropriateness. At this time the participants are awaiting TSR 3 to do another carbon budget analysis prior to making any significant changes to these indicators.

Comments from: Joelle Scheck, Ecosystems Section Head, MOE

Dated: April 21, 2010

Section/page no.	Comment
Page 142	First full paragraph refers to the SFMP as an "annual report" – suggest editing Change was made in plan to address this comment
Page 143	First paragraph – add "and UWRs" into the first sentence ("The location of the WHAs and UWRs are maintained….") Change was made in plan to address this comment
Sec. 6.17 Representative Examples of Ecosystems, page 145	What is the rationale for the 12% baseline target for the majority of ecosystems? Is this consistent with Bunnell and Wells et al? The participants used the values identified by the Brundtland Commission as identified in the indicator write up.

Ministry of Forests and Range
Fort St. John Pilot Project
Draft SFMP Participants Response to Government Comments #2

Participants responses are in Red and highlighted in Yellow

From: Marsh, Chris R FOR:EX
Sent: Wednesday, May 26, 2010 8:45 AM
To: Rodine, Al J FOR:EX
Subject: Tenure Review of SFMP

Note: Some of my comments may be covered off in other plans but since I am not familiar with them, I have written what comes to mind when reading the SFMP text. Therefore some of my concerns may be covered elsewhere. My review is cursory due to time restraints but I have tried to target some forest management related concerns that jumped out at me that may not already be covered by other's review.

I have not been able to find the part of the Reg that allows proposed changes to the Reg to be included in an SFMP. Yes they can propose changes for review but not in an SFMP. As noted in my attached comments, I don't believe this is the vehicle to complete that type of review. Reg changes are passed through an Order in Council and including them in an SFMP for approval by the regional manager MoFR and regional director (MOE) when they don't have the authority to approve Reg changes is not correct.

The FSJPP Regulation does not allow changes to the Reg by the Participants, however the mechanism that is available is similar to proposing what is available to FSP's where a licensee can propose alternate results and strategies rather than use the defaults. In the case of the FSJ Pilot Reg Part 4 section 35 (5) & (6) of the Fort St. John Pilot Reg allows the participants to propose alternatives to Part 3 Division 5 – Field Performance Requirements and the Schedules with Landscape Level strategies.

"(5) The participants must ensure that the sustainable forest management plan

(a) specifies the provisions, if any, of Part 3 Division 5 and the Schedules that are to be affected through the application of the proposed landscape level strategy, and
(b) includes a rationale on how the proposed landscape level strategy will

(i) provide at least equivalent protection for forest resources and resource features as that provided in the provisions referred to in paragraph (a),
(ii) be consistent with the preamble to the Act, and
(iii) provide for adequate management and conservation of forest resources.

(6) The participants must ensure that the sustainable forest management plan includes any applicable performance standards that are to be used for the purposes of Part 3 Division 5 and the associated Schedules."

Section 4.1 Timber Harvesting Strategy- Pg 49

- Does the Fort St John Land & Resource Plan adequately address the need to ensure that the location of cutblocks ensures the stands selected for harvest provide for sustainability in managing at the landscape unit level . I see a lot of reference around the economic viability of the processing facilities linked to the harvesting costs. I would like to see some reference to balancing wood costs according to profit margins. In other words the higher cost wood should be utilized when times are good to avoid a "donut" effect around the mills which could threaten their viability when fibre supply tightens up and markets again head down. I see the FOS has analysis information on the plan's seral stage distribution impacts. Is this summarized for the past term in the SFMP?

The SFMP does not currently have an indicator specific to changing harvest profile with changing market conditions (i.e. increasing haul distance with increasing profitability). The Forest Operations Schedule, by the requirement to have a minimum of six years worth of volume identified, allows the participants the ability to be somewhat flexible with their choice of profile to harvest at any given time in response to changing market conditions. The Participants try to balance the timber profile within and over the term of the FOS and between the Participants. Indicators within the Timber Harvesting Strategy (Indicators 48, 49, 51, 52, and 53) speak to the current values accounted for in the Timber Harvesting strategy that deal with sustainability and some of the values identified in the TSR.

The Seral Stage Analysis contained in the SFMP is an analysis of the state against the identified SFMP targets moving forward. It is the values that we will compare the proposed 2010 FOS to for consistency. A Seral Stage analysis will be completed on the current FOS in this year's annual report comparing the harvesting that occurred over the term of the current FOS to the targets set in the 2004 SFMP.

- Sequential Clustered Development – This is referenced in Section 4.1.1. – pg 50 If this is a one pass, one entry system for harvesting, how does this adequately manage on the landscape level. Is the timber the same age in this area? Is one pass a 4 year timeframe? This appears to be a strong reference to the need to lower costs re the economic viability issue, or is the Graham area already a high cost area and this assists in making this timber cost efficient by grouping the cutblocks in one area.

The Graham area is in fact one of the highest cost areas in the DFA, however the one pass system (carried over from the previous plan) is a timber harvesting strategy that is designed primarily to minimize impacts to wildlife in an area identified in the LRMP as being an area of concern while allowing for timber harvesting to take place. The proposed strategy is consistent with the principles identified in the Graham River Integrated Resource Management Plan

(GRIMP) which divides the Graham River planning area into several smaller clusters based on the sub-watershed level. The general intent is to go into one cluster, harvest all the operable merchantable timber within that cluster within a shortened timeframe and then pull out and deactivate until the next rotation. The intent is to minimize the amount of time that harvest operations are current in a given cluster (sub-watershed) to minimize negative impact on wildlife. This strategy was built with input from the MOE. There are several clusters that are identified as "no go" clusters that no harvesting will be proposed in. Further information is available on request. A side benefit from the clustered harvesting is concentration of harvest operations which may reduce overall harvesting costs

Section 4.1.5 Sustainable Timber Harvest Level Strategy- pg 53

- Not only is there a need to demonstrate to the public that the short term harvest levels are consistent with the allocated cut levels, there needs to be some assurance that the economic viability of the mills is not being compromised by excessive logging of blocks within close proximity of the mill . Or provide a caveat that wood costs be balanced against market upturns and downturns to ensure long term economic sustainability.

Acknowledged,

In determining annual harvest plans the Participants must balance a number of concerns in the short term such as cost (stumpage and haul costs) as well as managing for forest health concerns (indicator 49) and harvesting the timber profile (indicators 51 and 52). These indicators require performance in height class 2 Pli as well as deciduous stands in the northern reaches of the DFA. If this performance is not shown the participants' run the risk of incurring downward pressure on setting the AAC at the next TSR. These indicators, as well as the seral and forest types indicators serve as checks that put pressure on the Participants to ensure that harvest areas are well distributed throughout the DFA rather than concentrating operations in the "near" areas. Because these "checks" are already built in to the SFMP combined with the requirement that the FOS 6 year suite of blocks identified for harvest must be consistent with the SFMP indicators, the Participants feel that an indicator to assess the balancing of logging costs against profit margins is not required.

. A review of past history reveals that the harvest pattern has been wel distributed across the DFA in order to maintain close harvesting opportunities into the future.

Section 4.1.6 Coordination of Planning Strategy – Pg 53-54

- Since a significant portion of annual deliveries of fibre is required during the fall and winter, would it not be practical to mention that BCTS as a participant should be targeting summer ground for most of their TSL's since the large tenure holders could then balance wood costs by providing the majority of their fibre supply from winter blocks. Or use the principle where possible of "Sequential Clustered Development" on summer ground areas for multiple participants if possible without over harvesting an area.

No, this would not be practical, as the Participants attempt to balance the profile equally between themselves. The Participants balance the near, far, summer and winter operable areas equally. This is an underlying requirement in the management agreement that the Participants have developed which guides our joint development of the FOS. By disproportionately weighting BCTS volume to a specific profile (i.e. summer harvest) you would also be interfering with BCTS' mandate to be a benchmark for the MPS. Additionally, while BCTS may offer volume on ground available for summer harvest, the term of BCTS Sales is generally 2 years and BCTS cannot dictate to their licensees when to harvest, making it entirely possible that all of the summer volume offered by BCTS would be logged in the winter.

Section 2.1.6 Tembec – Pg 33

- Tembec's Forest licence A70730 is issued in the Dawson Creek TSA . It is not clear in the plan that this licence is not part of the Tembec's contribution to the Pilot. You should also make it clear that Pulpwood Agreement 13 that Tembec holds has an 18,000 m^3 apportionment associated with the Farrell Creek area in the Fort St John TSA. However, this volume is also not associated with the Code Pilot and is managed separately from the Pilot participants by LP for Tembec.

As license A70730 is issued in the Dawson Creek TSA not the Fort St. John TSA it would not be appropriate to mention it in this plan.

While PA 13 does encompass a portion of the DFA the participants are not aware of any specific apportionment contained within that agreement that limits them to 18,000m3/year within the Fort St. John TSA, although this number is referenced within the TSR. The participants will consider adding clarification around this in the SFMP

Action: add reference to PA-13 to the SFMP

- Also the stock symbol for Tembec is TMB not TMC if this info is required for interest.

Thank you for the clarification

Section 8.2 Revised Forest Operations Schedule –pg 286

- Should proposed legislation revisions to Pilot Reg be a part of the SFMP? I don't see this as a content requirement for an SFMP. I don't think this is an appropriate place to get the proposed changes approved by approval of the SFMP. I would suggest the suggestions receive separate review by the district , the Pilot working group and Branch staff familiar with FRPA with legal support. It doesn't get proper review by including them in the SFMP. Also as per myy opening comments , I doubt the legality of including them in An SFMP for approval. We have had some surprises in the past re Reg changes that didn't get a full review by the correct parties. Considerations were missed.

It is the opinion of the participants that this is consistent with and in fact required by the FSJ Pilot Project Regulation. (see comments above re: "Changes in Requirements" Revised Forest Operations Schedule Requirements were identified and approved in SFMP #1 and the identified changes do not deviate a great deal from the changes approved in SFMP #1. By proposing these changes the Participants believe there will be numerous administrative efficiencies gained by the Participants as well as government staff reviewing the FOS and Harvest Authorizations. The identification of administrative efficiencies, while still providing for equivalent or better protection of forest resources is one of the goals of the FSJPP. It is the opinion of the Participants that these proposed changes regarding FOS map and information requirements will provide the desired administrative efficincies and maintain the high degree of management and conservation of forest resurces that the Participant's are known for.

However, I will comment on some of the suggested Reg changes:

- An example of one of the recommended changes not being consistent to FRPA is the suggested change to allow a Forestry Professional to sign an FSP. In FRPA the Forester's Act, Section 20 and the definition of the "practice of professional forestry" requires that a person must be a forestry professional under the Association to practice forestry in BC. This fits under professional reliance where signing and sealing is required. FRPA doesn't specify the requirement so the REG should also be changed to conform to FRPA as we move towards FRPA'izing the Pilot.

I believe the comment that is referred to above is the proposal to allow a Forestry Professional to prepare minor amendments to the FOS, not an FSP as referencing an FSP in this document would not be appropriate. This should be changed to "Qualified Registered Professional" to be consistent with the current definitions in the FSJPPR

Action: Participants change occurrences of Forestry Professionals in the SFMP to "Qualified Registered Professional"

- Section (j)(ii) suggestion to delete the requirement to identify areas to be reforested as coniferous areas, deciduous areas, or mixed wood areas in Section 23 and in the FOS. The DM does not approve the FOS but does approve the Harvest Authority. Therefore, the DM should be aware of what is the proposal in regards to reforestation options. Reporting in Results is after the fact and this gives the appearance of no planning to maintain the existing timber profile. Maybe it is better to move to professional reliance and make direct reference in the Reg to maintaining the existing timber profile by reference to the use of the Compiler to track this. The lack of a deciduous Compiler clouds this issue.

Indicator # 1 forest types ensures that the Participants balance the existing timber profile. Reporting via RESULTS of the planned reforestation pathway has historically occured after harvest has been initiated, well prior to completing silviculture surveys.

- Section 81(e) (i)- Proposal to delete the requirement to show the approximate location of roads and bridges. This may be a concern where there are contentious issues associated with road locations. If this is removed , First Nations would likely have a concern , since the FOS works similar to an annual work schedule that other licensees provide as a service because FSP's don't provide enough information under FRPA to adequately complete consultation. I realize that providing an annual work schedule is not legal requirement under FRPA but since we are toting the FOS as a desirable way to provide information to get through the consultation hurdle, I think the information level should remain as is However, I would agree that all existing non status roads need not be identified for the purposes of Section 23 (2), since this creates the need for copious amendments when not shown in the FOS. However, is it unreasonable to expect to show proposed access to the blocks in the FOS? If there is an existing road to a cutblock we should know if you intend on using that road. The TRIm roads file in the LRDW is up to date enough to be used in this context. Also the consultation issue creates concerns. This may not be in the best interest of the govt to change.

The intent of this proposed change is to remove the requirement to show the approximate location of bridges on proposed roads as it is not practical, while planning 6 years worth of harvesting across and entire TSA, to identify what type of crossing structure will be required on a particular stream, or if a structure will even be required. The intent is to still show proposed access to blocks within the FOS and new proposed mainline roads etc. The way the mapping requirements for the FOS are currently identified in the FSJPPR, it also does not allow the participants to use roads constructed by other industry (i.e. oil and gas) identified and constructed during the term of the FOS to access the block under the Harvest Authorization without a minor amendment to the FOS. The proposed change should allow for this efficiency. **To clarify, all of the roads that the participants intend to construct outside of a proposed block boundary will be shown as a proposed road in the FOS and go through the info sharing/consultation process**

- Section 81 (ii) (iii) (iv) – Proposal to delete the requirement to show proposed replacement or construction of bridges and major culverts. The crossings should still be shown to flag the proposal. As suggested crossing type can be determined later at field layout. If the crossing is shown then the site is at least flagged for inspection later.

As stated above: the Participants feel that it is not efficient or practical, while planning 6 years worth of harvesting across an entire TSA, to identify what type of crossing structure will be required on a particular stream, or if a structure will even be required.

- Section 81 (j) (ii) – Proposal to delete the requirement to identify if areas within authorized cutblocks are to be reforested as coniferous , deciduous or mixed wood areas.- This would effectively allow any form of regen and /or compliance checks. The administrative penalties in Schedule G are unenforceable . It would be better to amend the Reg to make reference to balancing the regenerated areas to maintain the timber

profile re the THLB over a period of time. Perhaps a target range could be placed into the Reg. Anyway the SFMP is not the place to decide this as there are more qualified than me who should be deciding what's best.

Making these changes within the SFMP will allow us to "test drive" the changes and asses the administrative efficiencies the changes provide without incurring the effort of revising the Regulation, that will be replaced in 6 years when the FSJPP is eliminated. This eventuial fate of the FSJPP was identified in the MFR letter confirming the extension of the FSJPP for one additional 6 year planning period.

- Section 81 (c) (xii) and (xiii)- Proposal to remove the need to show the riparian class of streams wetlands, and lakes. The FOS is to be used as a planning document for stream crossings , reserves etc. This is basic information needed to determine what type or size of culvert , bridge type etc. If you are planning on removing the determination of culvert sizes and bridges at the FOS stage, I think this requirement should remain.

If government would like to conduct classifications of all streams, lakes and wetlands for the entire DFA and provide that to the Participants we would be more than happy to put that information on the FOS maps. Until such time as an inventory of this nature is available the participants wish to continue to classify riparian features during block and road layout. This is in keeping with the tenets of professional reliance. In order to meet the indicator targets for water quality and riparian management the Participants must conduct proper stream classification assessments and build crossings that will maintain the values present.

Also, the participants are trying to reduce the amount of "clutter" on the maps so that they can be more easily read and understood to facilitate the information sharing process.

From: Harper, George J FOR:EX
Sent: Monday, May 17, 2010 2:37 PM
To: Monetta, Anna FOR:EX
Cc: Winter, Ralph FOR:EX; Kabzems, Richard FOR:EX; Hays-Byl, Winn FOR:EX; Martin, Pat J FOR:EX
Subject: FW: Review mixed wood and deciduous portions of the FSJ SFMP

Hi Anna,

Here are my quick comments after reading the Farnden Oct 27th, 2010 document entitled: *A Silviculture Survey Methodology for Boreal Mixedwoods*.

- The author fails to address "Why this survey method?" The various different surveys proposed for deciduous / mixed-woods / conifers may add un-necessary complexity and cost?

- The author does not sufficiently address the objectives given (2.1). What is "theoretical maximum achievable volume", "predicted mean volume"?
- There is insufficient information provided on key components, models and linkages. The result is a lot of unknowns, confusion and complexity which makes it difficult to understand.
- How will it work and what will be the impact on the Crown risk and liability cannot be presently answered.
- The dependency on model output (MGM?) and empirical models that are poorly presented creates a "black box" scenario. A lot more detail is required to clarify how these functions apply to real world examples. What are the underlying modelling assumptions? Have the models been validated and to what dataset? Where should these models not be used?
- % cover is as a model parameter (3.3.3 model fitting – species composition): this is a subjective measure which may have high variation. It is not a measure to use if there is a need to legally confirm or challenge results & thresholds (C&E).
- I cannot confirm or support whether this is a positive survey method for boreal mixed-woods and any policy which may evolve from it.

I look forward to reviewing and continuing to participate on this project.
Note from the participants: There is no question that this is a new process and there are some questions and issues that still need to be examined. However part of the Pilot Project process is about identifying new ideas and concepts and the commitment from the participants is to field test Craig's survey methodology over the term of this SFMP and beyond. This survey methodology is new to the second SFMP and will be field tested and further implementation will be done with Government input.
No changes proposed to the SFMP in response to these comments.

Cheers,

George Harper P.Ag., R.P.F.
Research Scientist Stand Development
Research and Knowledge Management Branch,
Competitiveness and Innovation Division,
Ministry of Forests and Range,
PO Box 9519 Stn Prov Govt, Victoria, BC V8W 9C2
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BRANCH WEBSITE: http://www.for.gov.bc.ca/hre/
Material and opinions contained herein are solely those of the author and do not necessarily represent in whole or in part the position of the BC Ministry of Forests and Range.
"Nothing is permanent except change" Heraclitus of Ephesus (c. 535 – 475 BCE)

From: Winter, Ralph FOR:EX
Sent: Wednesday, May 12, 2010 4:25 PM
To: Martin, Pat J FOR:EX; Turcotte, Shirley FOR:EX
Cc: Kabzems, Richard FOR:EX; Harper, George J FOR:EX; Hays-Byl, Winn FOR:EX; Winter, Ralph FOR:EX
Subject: RE: Review mixed wood and deciduous portions of the FSJ SFMP

See material below

<< Message: FW: Fort St. John Pilot Project SFMP # 2 >>

Note in the documents

Strategy and Implementation Schedule:
The conifer strategy is currently implemented, while the deciduous strategy will be implemented on similar principles to the conifer strategy. The deciduous strategy still requires the development of a deciduous compiler, and will utilize MFR deciduous yield

curves, and the MFR's "Draft stocking guidelines for hardwoods in the BWBS" for 15 year old stands. In the interim deciduous reforestation will be assessed based on the revised applicable performance standards outlined in Appendix 6, and summarized in Section 8.1.3.3. The Participants are planning on evaluating the applicability of extending this survey methodology to mixedwoods during the term of this SFMP. The development of a landscape level mixedwood survey methodology will be based on the research document *" A Silviculture Survey Methodology for Boreal Mixedwoods*" developed by Craig Farnden, which is included in Appendix 18.
Following is a description of the Assessment System which will be used for both conifer and deciduous. The key components of the assessment system are:
- The assessment will measure success with a comparative estimate of theoretical predicted potential yield (volume) to actual expected yield (volume).
- The system will be based on data from individual cutblocks, but the data will be assessed over many blocks across the landscape.
- Areas are evaluated at a predetermined age following harvest.
- The results are tracked at the landscape and cutblock levels.
- Foresters will have flexibility at the cutblock level to vary regimes and provide for other values as they progress to a landscape level target for yield.
- The system will provide data to improve silviculture regimes and targets over time.

Also note

The "*Mixedwood Management Strategy for the Fort St. John TSA"* which was submitted to the government in December of 2005 has recently been revised. A copy of the current revised version is located in Appendix 10 ("*Mixedwood Management Guidelines for the Fort St. John TSA").* This document forms an integral part of the overall reforestation strategy. The document outlines the methodology for defining 'pure' and 'mixedwood' stands, for the purpose of determining the declaration of areas. To support business objectives, the strategy also describes an internal ledger system the Participants use to track original declaration areas and the result of any changes to area declarations from subsequent silviculture activities.

No changes proposed to the SFMP in response to these comments.

From: Martin, Pat J FOR:EX
Sent: Wednesday, May 12, 2010 3:51 PM
To: Turcotte, Shirley FOR:EX; Winter, Ralph FOR:EX
Cc: Kabzems, Richard FOR:EX; Harper, George J FOR:EX; Hays-Byl, Winn FOR:EX
Subject: RE: Review mixed wood and deciduous portions of the FSJ SFMP

Ralph and Shirley: as you know, Winn suggested research support for this. I canvassed the deciduous/mixedwoods folks and both George Harper and Richard Kabzems are going to join in. Please send them any background that you feel they will need for the meeting. thanks

-----Original Appointment-----
From: Winter, Ralph FOR:EX **On Behalf Of** Turcotte, Shirley FOR:EX
Sent: Wednesday, May 12, 2010 9:15 AM
To: Martin, Pat J FOR:EX
Subject: FW: Review mixed wood and deciduous portions of the FSJ SFMP
When: Monday, May 17, 2010 1:00 PM-2:00 PM (GMT-08:00) Pacific Time (US & Canada).
Where: Douglas-fir Bdrm / Eliz to Phone Douglas-fir Bdrm at 250 356-1616 (R. Winter link in Al if needed)

You are welcome if you have time

-----Original Appointment-----
From: Turcotte, Shirley FOR:EX
Sent: Wednesday, May 12, 2010 9:00 AM

To: Turcotte, Shirley FOR:EX; Winter, Ralph FOR:EX; Hunt, Elizabeth A FOR:EX; Hunt, Tony L FOR:EX; Powelson, Allan FOR:EX; Weaver, David W FOR:EX
Subject: Review mixed wood and deciduous portions of the FSJ SFMP
When: Monday, May 17, 2010 1:00 PM-2:00 PM (GMT-08:00) Pacific Time (US & Canada).
Where: Douglas-fir Bdrm / Eliz to Phone Douglas-fir Bdrm at 250 356-1616 (R. Winter link in Al if needed)

Elizabeth/Tony: Can you please sit together and dial into the Douglas-fir Bdrm at 250 356-1616

Al: If you are not able to join in person, Ralph Winter will link you into this call. Thanks.

Purpose

To

1. Identify and discuss what are the key outstanding issues with regard to the Mixed woods standards and the Deciduous standards in the SFMP
2. identify next steps / next meetings

Anna

I think these are important issues to discuss with CANFOR

Is there a forest sustainability issue if the carbon sequestration is dropping so much?

From: Dymond, Caren FOR:EX
Sent: Friday, June 11, 2010 10:54 AM
To: Winter, Ralph FOR:EX
Subject: RE: Response to Govt. comment on FSJPP SFMP #2

Hi
In Figure 15, page 215, shows natural sequestration rates dropping precipitously over the next 50 years.

Either the carbon stocks at t=0 are too high or the natural disturbance rates are too high.

-Caren

Forest Carbon and Climate Change Researcher
BC Ministry of Forests and Range
Caren.Dymond@gov.bc.ca
Tel: 250-387-8763
5TH Floor, 727 Fisgard St.
PO Box 9519 Stn Prov Govt
Victoria, BC
V8W 9C2

From: Winter, Ralph FOR:EX
Sent: Friday, June 11, 2010 10:32 AM
To: Dymond, Caren FOR:EX
Subject: RE: Response to Govt. comment on FSJPP SFMP #2

What is the modelling artefact

From: Dymond, Caren FOR:EX
Sent: Friday, June 11, 2010 8:59 AM
To: Winter, Ralph FOR:EX
Subject: RE: Response to Govt. comment on FSJPP SFMP #2

Hi Ralph

Sorry, the best I can do is 3 reasons:
Indicator 38

1. Has a large modeling artefact in years 1-50.
2. Unrealistic assumption that the natural disturbance rate drops from 20,000 ha per yr to 1,000 or less ha per year in the managed scenario.

Indicator 39

3. Unrealistic assumption that fire equals harvest.

Does that help?

Caren

Forest Carbon and Climate Change Researcher
BC Ministry of Forests and Range
Caren.Dymond@gov.bc.ca

Tel: 250-387-8763
5TH Floor, 727 Fisgard St.
PO Box 9519 Stn Prov Govt
Victoria, BC
V8W 9C2

From: Winter, Ralph FOR:EX
Sent: Friday, June 11, 2010 08:47 AM
To: Dymond, Caren FOR:EX
Subject: FW: Response to Govt. comment on FSJPP SFMP #2

Hi Caren

Can you give me again the key reason you think the modelling is flawed...

Sorry i am slow on the uptake...

From: Dymond, Caren FOR:EX
Sent: Wed 09/06/2010 9:59 AM
To: Winter, Ralph FOR:EX; Monetta, Anna FOR:EX
Subject: RE: Response to Govt. comment on FSJPP SFMP #2
Hi Anna

CANFOR is not planning on changing their flawed carbon modelling, so indicators 38 and 39 should be removed.

Best regards,
Caren

Forest Carbon and Climate Change Researcher
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Victoria, BC
V8W 9C2

As noted in the previous responses to government comments document, the SFMP indicators related to Carbon Storage and Sequestration are not part of a Landscape Level strategy, or required by the FSJPPR but rather are included for CSA purposes only. With this in mind, it is

appropriate to point out that the non legal indicators (those included for CSA purposes only) are therefore not subject to approval by government.

The Participants appreciate the comments provided and intend to modify these indicators sometime in the future, however as these are not “legal” indicators they are currently considered to be a low priority for the participants and as such will not be changed at this time.

The Participants intend to revise the carbon indicators when the next TSR analysis is completed for the FSJ TSA, this will likely result in revised carbon modeling and assumptions around disturbance level and existing carbon stocks. Defering the revision of the carbon analysis to coincide with the next TSR was proposed in the original approved SFMP and will provide the Participant’s with administrative and cost efficiencies that are most definitelky appreciated given the poor economic conditions prevalent in the forest industry.

Anna

I think the biggest concern is

:”Prescribing foresters may incorporate more or less restrictive soil disturbance limits in SLP’s if they determine soil conditions warrant these changes”.

See comments below

From: Dube, Stephane FOR:EX
Sent: Friday, May 28, 2010 1:09 PM
To: Monetta, Anna FOR:EX
Cc: Winter, Ralph FOR:EX
Subject: Comments on FSJPP 2010 Draft SFMP - 4.9 Soils and 4.2 Road Access

Hi. Thanks again for the opportunity to review the material pertaining to the Road Access and Soils Strategies of the FSJPP 2010 Draft SFMP. I will expend further upon issues raised in my previous email dated August 13, 2009.

4.2 Road Access Strategy.

Proponents propose to assess PAS on a wider basis (i.e. total harvested areas) and using a 3 yr rolling average; I agree that it has a business value in that it provides flexibility to Industry in terms of total chance planning. On the other side, it will make it harder to monitor PAS given the number of managing participants and the geographical extend of the area covered. In addition to that, how will C&E be able to inspect for compliance if the performance requirement is no more on a cutblock basis? That should be addressed.

My other point is that based on recent published data, PAS% averages just over 3% provincially. Given the FSJPP operating area is not particularly known for problems of road construction and that, roads used by oil & gas will not be included in the PAS calculations there is not a strong argument here to replace the existing regulatory PAS requirement of 7% per cutblock by 5% of the total cutblock area over 3 years as proposed. In a result-based environment, a 3 year-period represents a long time to report on the state of a resource.

Clarification: The current approved standard for the FSJ TSA (SFMP #1) is 5% on a 3 year rolling average. This is reported on by the Participants annually in the Annual Report, as required by the FSJPPR. The Participants conduct this analysis and provide the results to government. Government may choose to conduct their own analysis if they so wish, and in fact MFR C&E staff have done this in the past. The recognition by the Participants that the PAS limit is 5% rather than 7% requires the Participants' to actively manage permanent access construction in order to achieve the lower target by design rather than by default.

Also please note that this is not a "regulation change" but rather a revised performance standard.

A PAS of 5% is better than 7%; It is a standard's improvement and accomplished fact. However, I don't see the proposed regulation change as a way to do more towards minimizing permanent losses of site productivity than the existing performance standard (*FSJPPR* sec 30(1)).

4.9 Soils.

The participants propose to align its new soil disturbance strategy on existing *FRPA* default targets for maximum disturbance limits of 5% for sensitive soils and 10% for any other soils by NDU's. For all Roadside Work Areas (RWA's), the limit increases to 25% for accommodating decking and processing timber. This is a positive step and a welcome change to the 2004 landscape level strategies. These limits aim to lessen damages to soil functions and biota during heavy equipment traffic. They are scientifically sound and guided by past experiences.

Up until now, it is my opinion that those standards have supported adequate conservation of the soil and related resources for carefully planned and harvested sites. It has not proven to be costly and inconvenient for the Forest Industry. They have become "acceptable results" for forest certification.

There is a statement on page 99 that needs some clarification. They quoted:"Prescribing foresters may incorporate more or less restrictive soil disturbance limits in SLP's if they determine soil conditions warrant these changes". Of course, a soil limit can be changed in response to an accurate site description and site-specific determination of soil disturbance hazards. However, if the participants choose to apply a soil limit other than the 5%, 10% or 25%

(for RWA's), they must provide new data to support varying limits while still protecting soils. I want to be certain that one cannot change a limit at will, particularly in situations of excessive site degradation.

The intent of the above noted statement is so that a Qualified Registered Professional would be able to (and should) adjust the soil disturbance limit as dictated by the site specific factors, despite the defaults. For example, the current default is 5% on the Boreal plains NDU, which has predominantly sensitive soils. If a site with less sensitive soils is encountered the prescribing forester may prescribe a higher limit (i.e. from 5% to 10%). Conversely, if in the other NDU's where the soils are predominantly non-senstive, a sensitive soil is encountered a prescribing forester can reduce the soil disturbance limits (i.e. from 10% to 5%). Information on soil sensitivity will be collected at the block layout and Site Level Plan (SLP) preparation stage, the soil disturbance limits will be set in the SLP at this time and will not be manipulated post SLP preparation to allow for excessive site degradation.

The planning, operational practices and field monitoring and monitoring procedure sections are sound and specific. Good work!

Hope this helps you.

That's all folks!
"It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change." - Charles Darwin
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Fort St. John Pilot Project

Participants Response to Government Comments #3 on Draft SFMP #2

Following are comments provided by Leslie McAuley and Richard Kabzems:

Monetta, Anna FOR:EX

Send back to Darrell/Mark

From: McAuley, Leslie FOR:EX
Sent: Tuesday, June 8, 2010 1:22 PM
To: Monetta, Anna FOR:EX
Cc: Winter, Ralph FOR:EX; McAuley, Leslie FOR:EX; Charleson, Lee FOR:EX
Subject: RE: Response to Govt. comment on FSJPP SFMP #2
Attachments: RE: Further review required of the Fort St John Code pilot SFMP #2

yes - I verified that seedlot info goes into RESULTS + told Leslie.

Anna,

A couple of points, for your consideration:

1. Explicit linkages to legislated requirements. CF standards apply only to persons operating under s. 29 of FRPA (with FSP or WLP). As Tony Hunt points out (see email attachment), the FSJPP SFMP#2 (as proposed) may require an amendment to the CF standards to include participants operating under the FSJPPR. *Note: Lee returns June 28th.*

2. Explicit reference to annual reporting requirements. My review comments (Mar 30/10) indicated that there should be an explicit requirement in the FSJPP SFMP#2 (see s.99 of FSJPP - record keeping; no explicit reference to seedlots) for reporting planting activities as per seed used. The FSJPP SFMP#2 participants have stated that " information is tracked in (the) Cengea database and maps can be generated." However, I am also looking for a linkage to RESULTS reporting (as per FPPR – requirement to report on an annual basis the registration numbers of seed used, and the number of trees planted, area treated and number of trees planted beyond the transfer limits for each seedlot).

Can you confirm that FSJPP SFMP seed use information (as described above) is reported annually in RESULTS? Also, can you confirm that this is a requirement has been explicitly identified in the FSJPP SFMP#2, or FSJPPR?

in the SFMP

using C.F. standards

in the SFMP

Pg. 293

This information is critical for a number of reasons, including, *but not limited to*:

- tracking seed from source to site (maintaining genetic identity of province's genetic resources);
- measuring performance in the field (maintaining productivity of provinces' genetic resources; linking genetic source/planting stock with timber, non timber, forest health, carbon);
- criteria and indicator reporting of genetic diversity (maintaining genetic diversity of province's genetic resources);
- assessing current and future vulnerability of genetic resources (maintaining genetic adaptation of provinces' genetic resources, climate change adaptation).

From: Winter, Ralph FOR:EX
Sent: Tuesday, June 8, 2010 9:17 AM
To: Berch, Shannon M FOR:EX; Weaver, David W FOR:EX; Maloney, David A FOR:EX; Densmore, Nancy FOR:EX; Burleigh, Jennifer FOR:EX; Nigh, Gordon D FOR:EX; Powelson, Allan FOR:EX; Kabzems, Richard FOR:EX; McAuley, Leslie FOR:EX; Marc, Jacques FOR:EX; Picard, Paul FOR:EX; Hunt, Tony L FOR:EX; Dymond, Caren FOR:EX; Turcotte, Shirley FOR:EX; Miller, Ian C (Forests) FOR:EX; Kope, Harry FOR:EX
Cc: Monetta, Anna FOR:EX; Bedford, Lorne FOR:EX; Hays-Byl, Winn FOR:EX
Subject: FW: Response to Govt. comment on FSJPP SFMP #2
Importance: High

Hi folks

Please find attached the responses from CANFOR that are addressing the previous submitted comments from you.

- Please see what you submitted for comments
- Please see how CANFOR is proposing to address or not address your comments

Monetta, Anna FOR:EX Send back to Darrell/Mark

From: Kabzems, Richard FOR:EX
Sent: Thursday, June 10, 2010 6:57 PM
To: Monetta, Anna FOR:EX
Cc: Winter, Ralph FOR:EX
Subject: Responses to DJO

1) Surveyor belief as a free to grow criteria. Well established criteria which all trained surveyors can consistently apply are given in A to D. The Pilot participants response:
"Criteria E is not an addition to the selection criteria, as it was included in the original SFMP for crop tree requirements. Despite the absence of available scientific background to make this selection defensible should not discredit the professional accountability of the surveyor to rationalize a well growing crop tree decision."

I cannot accept surveyor belief over science.
Including this Criteria creates the opportunity for not free growing areas to be accepted by the Province, with negative implications for future timber supply.

2) Deciduous stocking standards. The Code pilot participants did not appear to understand that the main point of the example given was that the standards they are using are so low, that regenerating uncontrollable stands would still be acceptable under the Code Pilot. The point was not addressed in the response by the code participants.
There are clear negative implications to future timber supply when a regeneration standard that is so very low is used.

3) Permanent access structures. The response:

Participant response – to address the comment above, the PAS strategy has not been changed from that presented in SFMP #1. SFMP #2 continues to indicate that PAS will be measured at a DFA level by managing participant rather than an individual cutblock basis.

Based on this response, I am not clear if the Code Pilot participants are planning to use a three year rolling average of 5% PAS, even though this is above operational performance in northern British Columbia. Reduction of loss of the timber harvest land base is fundamental to maintaining future timber supply.

Richard Kabzems, MSc, PAg, RPF
Research Silviculturist, Ministry of Forests and Range
Research and Knowledge Mangement Branch
9000 17th St., Dawson Creek, B.C. V1G 4A4
250 784 1258
Richard.Kabzems@gov.bc.ca

Participants Response to Leslie McAuley's comments dated June 8, 2010:

#1 We would have no objection to Government proposing an amendment to the Chief Forester's Standards to include the participants of the FSJPPR. In the interim, the requirement to follow the Chief Forester Standards has been written into the SFMP.

#2 We are reporting much of this information now by way of the annual report (reqired by the FSJPPR) and via RESULTS. Section 51 of the FSJPPR requires that we report the following: a summary of the reforestation activities carried out including the regeneration method, year of establishment, estimated species composition and density at establishment. We would like to be able to drop the reforestation activity reporting requirement in the annual report and simply report this information via RESULTS alone. This however would likely require a FSJPPR amendment to revise the reporting requirements of Section 51. In addition, please consider that section 99 of the FSJPPR requires that we must keep a record of the seedlots used and the locations where they are planted. This information is collected and is available upon request. Requiring us to commit to report this information is an added administrative burden that in our opinion is not warranted and not in keeping with the intent of the FSJPP to identify and implement administrative efficiencies and to focus on results based management and professional reliance.

Participants Response to Richard Kabzem's comments dated June 10, 2010:

#1 In our opinion, Criteria E does not create the opportunity for otherwise not-free-growing areas to be accepted by the province. The landscape level silviculture strategy recognizes that some strata will not meet the criteria for well-growing, but that this is acceptable if the population as a whole meets target volume within variance. However, we believe that Richard is concerned that data collected from MSQ surveys will lead to inaccurate volume predictions through the use of Criteria E (trees being called well-growing when they won't contribute to future volume). In practice, criteria E is used sparingly. Surveyors are instructed to make comments on plot cards when using criteria E to denote a crop tree as well-growing. This is done to facilitate a site visit by the forester in charge of the survey contract. The forester completing the data compilation for the SFMP annual report must be confident that the data going into the compiler is complete, accurate, and collected appropriately. Thus, if a surveyor used criteria E to denote a crop tree as well-growing, the forester in charge, in my opinion, should verify the assessment of the crop tree made by the surveyor. This has been included as a requirement in the statement describing criteria E, in Appendix 6 of the final version of SFMP 2 submitted for approval. This way, professional judgment will be used to decide if a particular tree will live to contribute to future harvestable volume, but the SFMP participants are exposed to less risk of having to complete additional treatments on blocks that in reality do not have serious brush problems.

#2 Section 98 of the FSJPPR identifies the minimum free growing stocking requirements for deciduous areas. With a minor exceptions regarding the timing of completion of well growing assessments, the deciduous stocking standards proposed in the SFMP as interim standards until a landscape level strategy and volume compiler are developed, are the very same stocking requirements noted in the *FSJPPR*. The participants intend to apply the well growing height and stocking criteria to the assessment of 6 to 9 year old deciduous stands. The participants intend to manage deciduous stands such that the well growing requirements are achieved by 9 growing seasons after harvest commencement. When the deciduous landscape level management strategy is developed a new standard for the timing of well growing assessments that is consistent with the ability to accurately predict future yield will be developed and will replace the SFMP interim deciduous stocking standards that are taken from the FSJPPR .

#3 SFMP # 2 continues to indicate that permanent access structure management will be measured at a DFA level, using a 3 year rolling average with a maximum threshold of 5% of the total area in managing participants cutblocks that may be occupied by PAS. For greater clarity the SFMP indicator target statements are noted below:

Indicator Statement	Target Statement
Percentage of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed.	A maximum of 5% of the total area in Managing Participants' cutblocks occupied by permanent access structures in which harvesting was completed, as determined on a 3 year rolling average.

The target statement 5% max threshold for PAS is more restrictive than the FSJPP threshold of 7%.

Following are Chris Marsh's comments on SFMP Section 8:

Darrell.... Yes ... it appears we need some clarification on what is allowed to be varied , how and by who. We are concerned that as per Section 25(2) (c) (ii) of the Reg, only those Field Performance Requirements listed under Division 5 that specify that an applicable performance standard can be established, are the only ones that can be varied under the SFMP and approved by the regional manager and regional director. Initial observation puts these constraints on forest practices as being stand level biodiversity , namely coarse wood debris targets (S 29(2), and wildlife trees and patches (S 29(1), permanent access structures (S 30), stocking requirements
(S 32(5)), reforestation performance such as the period, stocking standard, and well growing crop tree standards such as minimum heights and spacing as outlined in Section 32(6)

and 32(8). In some cases the DM must consult with the participants before establishing standards (S 35(7).

All the other field performance standards such as visual quality, conserving the soil, protecting the productive capacity of the harvested areas may or may not be allowed to be varied , but it appears these would be one off variances allowed by the DM under harvesting authorizations under Section 25(2) (c)(i) & (iii) and
Section 25(3) . What I think is key is that since the SFMP is approved by the regional manager and regional director (MOE), they cannot approve any changes to the applicable performance standards unless they are included under the umbrella of Section 35(6). This section provides for content of the SFMP and links only those Field Performance Requirements which have "applicable performance standards " as the ones that can be altered by approval of the SFMP. In my mind it does not provide the ability to change all the standards established in the Reg.

An example of this is some of your requests in Section 8.2 which deals with Revised Forest Operations Schedule Requirements. You are correct that under Section 79 **information** can be varied or deleted from the Forest Operations Schedule (FOS) if conditions included in the SFMP. The key word in the legislation is **information. Section 81 of the Reg deals with information requirements of the FOS, while the other sections mostly deal with legal process requirements only altered by amending the Reg.** There are certain requirements under Schedule C such as Section 80(3) and Section 80(4) , which deal with who signs the FOS. These are requirements not **information** under the Reg which cannot be altered through the approval of the SFMP. The same should apply to the "Notice requirement Revisions" on page 288 of the SFMP where you are requesting deleting the requirement of Section 83(4) (c)(i), which requires a notice if the block is increased an includes a riparian management zone of a stream with a classification of S1, S2, S3 or S4.

Some of your suggested changes to the legal process requirements are most likely good streamlining changes, but the point I am making is that they cannot be altered through approval of the SFMP.

In summary here are my concerns:

- SFMP is trying to "pre- vary " Field Performance Requirements that only the district manager can vary either as a "one off" or by varying a performance requirement under section 42
- If the Reg doesn't state there is an "applicable performance standard under Division 5, Field Performance Requirements can other requirements or standards a be altered at the SFMP stage. It appears only the district manager has the authority to alter other variances.

- Section 8.2 – Revised Forest Operations Schedule – Legal process requirements cannot be altered through the approval of the SFMP.

We should discuss the above on a call to see if we can resolve this before contacting Trevor Swan for legal interpretation.

Participants' response to Chris Marsh's comments:

Sections 35(5) &(6) of the FSJPPR provide the participants with the ability to specify applicable performance standards in the SFMP that may be different from the field performance requirements noted in the regulation. We feel that building a variance into an applicable performance standard is an acceptable and appropriate means to effect administrative efficiencies in dealing with unique situations such as forest health concerns. Regardless of the variances built into any applicable performance standard, by virtue of the fact that the MFR District Manager must approve all harvest authorities, the District Manager in effect retains actual authority over the approval and implementation of the variance. Without approval of the harvest authority, the participants will not be able to implement any variance built into any harvesting related applicable performance standard in the SFMP.

With regard to the review of the proposed FOS process changes (section 8 of SFMP#2), conducted with Anna Moneta and Chris Marsh on June 23, the participants have revised the SFMP to reflect that the participants are recommending that government consider revising the FSJPPR to take advantage of the administrative efficiencies that would be realized through the suggested revisions to:

- FOS Notice Requirements *FSJPPR* Section 83(4)(c)(i) and 83(4)(c)(iii) and
- FOS General Content Section 80(3) and 80(4).

The SFMP has been revised to make it clear that the SFMP approval is not effecting these proposed changes to the FSJPPR, rather the SFMP now only recommends that Government consider these recommendations for incorporation into a future amendment of the FSJPPR.