Fort St. John Pilot Project

Sustainable Forest Management Plan #2

Submitted for approval to the

Regional Executive Director, Ministry of Forests and Range

and the

Regional Manager, Ministry of Environment

September 22, 2010

Sustainable Forest Management Plan

Preface

The Sustainable Forest Management Plan #2 for the Fort St. John Pilot Area was prepared in accordance with the Fort St. John Pilot Project Regulation and the Canadian Standards Association Sustainable Forest Management Standard CAN/CSA-Z809-02.

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 the Sustainable Forest Management Plan that pertain to the Fort St. John Pilot Project Regulation.

Several authors and many reviewers contributed in developing key components of this plan. Preparation and submission of this plan was coordinated by:

On behalf of Canadian Forest Products Ltd., Louisiana-Pacific Canada Ltd., Tembec Inc., Cameron River Logging Ltd., Dunne-za LP and BC Timber Sales:

Darrell Regimbald, RPF No. 2512
Planning Coordinator-North & East
Forest Management Group
Canadian Forest Products Ltd.

Mark Van Tassel, RPF No. 4390
Planning Forester
Peace-Liard Business Area
BC Timber Sales

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

Prepared on behalf of the Participants by Forestsense Consulting

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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 in order to provide assurances to buyers of wood products that the management of forests meets identified standards that are considered critical for SFM. As British Columbia forest companies have evolved and have become dependent on the global marketplace for the export of forest products, the issues of sustainable forest management and forest certification have become paramount.

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*

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 in order 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 in order 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 in order 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 DESCRIPTION OF EXISTING STRATEGIC PLANS

1.2.1 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]

An implementation plan for the LRMP has been developed and is reviewed periodically by a core of representatives from the original planning table. The implementation plan is under the direction of the Integrated Land Management Bureau.

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 strategies for meeting the stated objectives. Table 2 in this SFMP summarizes the 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.

1.2.2 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;*

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

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.

1.2.3 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]

1.3 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 4.7 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 (see 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 about 60 percent of the TSA population. First Nations communities in the TSA include settlements at Halfway River, Blueberry River, Doig River and Kahntah. An additional three First Nations have declared traditional territory within the TSA: Prophet River, Assumption (from Alberta) 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 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

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[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)*

wilderness values is a key goal of several resource sectors and provincial, national and international interest groups.[4]

About 48 percent of the Fort St. John TSA (about 2.243 million hectares) is considered productive forest land managed by the Crown. Currently about 47 percent of this area is considered available for timber harvesting under current forest management practices. The current timber harvesting land base is 1,058,540 hectares, consisting of 733,221 hectares dominated by coniferous species and 325,318 hectares dominated by deciduous species.

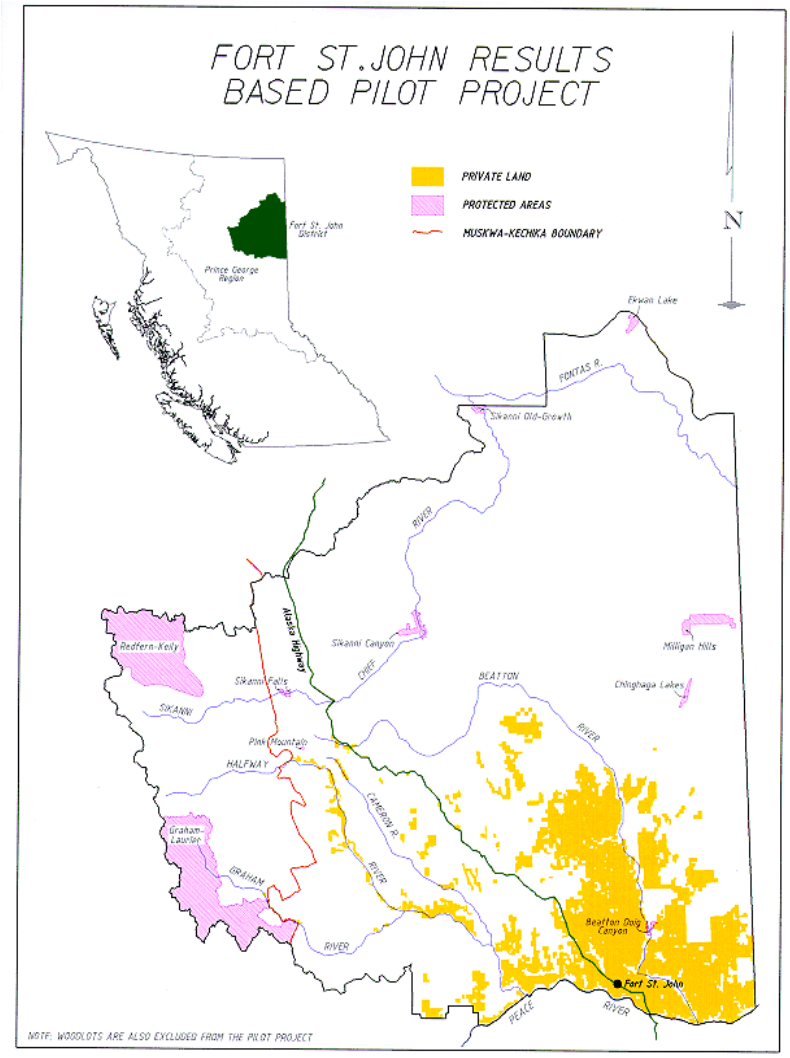


Figure 1: Project Area Map

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

1.3.1 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 mainstem 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, ecosections 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.

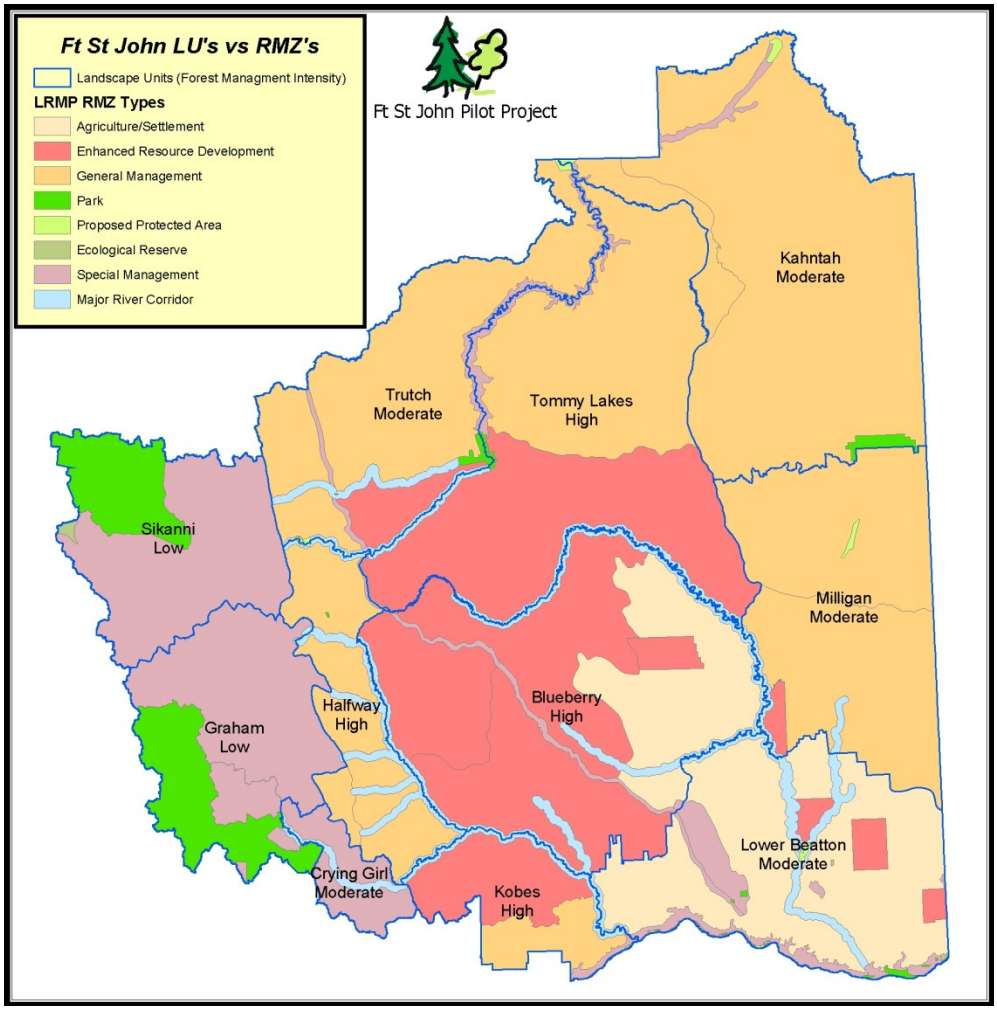


Figure 2: Fort St. Landscape Units and Resource Management Zones

The following Table 1 summarizes the area breakdown of each LRMP resource management 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
	Beatton River Site	186

Landscape Unit	LRMP RMZ Name	Total Area (ha)
	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

Table 2 provides a general summary of the LRMP objectives as they relate to the Landscape Units (LU's). Indicators presented in this SFMP will, where applicable, reference the respective objectives noted in Table 2. 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	Access1	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	Access2	Maintain existing access, coordinate industrial access development including linear development to minimize negative effects on other resource values.							X				
Y	Access3	Manage access to protect alpine areas(e.g. Pink Mountain).				X							
Y	Access4	Manage access to protect significant fish and wildlife habitats, alpine areas and recreation values.		X	X			X					
N	Access5	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				
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
Y	Ecology3	Restore and rehabilitate negatively affected ecosystems.	X	X	X	X		X					
N	Energy1	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	Habitat1	Maintain caribou habitat.		X		X	X	X				X	X
Y	Habitat2	Maintain habitat for priority furbearing species.	X	X	X		X	X	X	X	X	X	
Y	Habitat3	Maintain high capability ungulate winter habitat.	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	Habitat4	Maintain site specific habitats.	X			X			X	X		X	
Y	Habitat5	Manage critical wetland habitats for waterfowl and other wildlife species.						X	X	X			
Y	Habitat6	Minimize wildlife habitat fragmentation and maintain existing large mammalian predator/prey system.		X	X	X		X				X	X
Y	Habitat7	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
N	Recreation7	Provide tourism opportunities in Peace R corridor.						X	X				
Y	Timber1	Enhance timber harvesting and a sustainable long-term timber supply.	X	X	X	X		X		X	X		
Y	Timber2	Maintain timber harvesting and forest management opportunities.		X	X	X	X		X			X	X
Y	Timber3	**Manage for forest health.**							X				
Y	Timber4	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 eg. trapping, guide outfitting, wilderness.			X								
Y	Timber 6	Forest Mgmt Intensity Levels Strategies	Intensive	Moderate	Low	Intensive	Moderate	Intensive	Moderate	Moderate	Intensive	Moderate	Low
Y	Visual1	Manage visually sensitive areas along existing access corridors/trails and adjacent to protected areas.			X								X
Y	Visual2	Manage visually sensitive areas as scenic areas.	X	X	X	X		X	X	X	X	X	X
Y	Visual3	Manage visually sensitive areas within the Peace River Valley.						X	X				
Y	Visual4	Manage visually sensitive areas within Tommy Lakes area.									X		
Y	Visual5	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				

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	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
	Quantify timber harvesting land base and develop policies to reduce permanent losses	X	X	X	X	X	X	X	X	X	X	X
	Establish forest production target for LU's… consistent with high intensity forest mgmt regimes	X			X		X			X		
	Establish forest production target for LU's… consistent with moderate intensity forest mgmt regimes		X	X		X		X	X		X	
	Establish forest production target for LU's… consistent with low intensity forest mgmt regimes							X				X
	Reforest … all PP Br, NC deciduous, and NSR.. while providing for critical wildlife habitat	X			X	X	X	X	X	X		
	Establish and maintain a permanent road infrastructure	X	X		X	X	X		X	X		
	Minimize losses from damaging agents through aggressive fire and pest mgmt, including salvage	X	X			X	X	X	X	X	X	X
	Promptly and aggressively reforest and manage cutovers and burnt areas within the THLB	X	X	X	X	X	X	X	X	X	X	X
	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
	Encourage utilization of pulp quality stands	X			X	X	X	X	X	X	X	
	Vary cutblock adjacency requirements	X	X				X	X			X	
	Encourage afforestation of reverted and low capability ag land	X					X	X		X		
	Develop a long term plan to manage access and forest mgmt activities, incorporating sequential development		X	X								
	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. 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, Northern Interior Forest Region, Ministry of Forests and Range and the Regional Manager, Omineca-Peace Region, Ministry of Environment. 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-Z809-02. 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 MFR 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 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 achieves its mandate by:

- having skilled, motivated, committed and loyal employees;
- pursuing efficient, effective and innovative business practices;
- fostering a culture of continuous improvement;
- being respected managers of public forests;
- contributing to the British Columbia economy; and
- providing opportunities to our customers through the sustainable management of public forests.

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 has been awarded as a Section 13.1 non-

replaceable forest license (A59959) to Cameron River Logging which is also a Participant in the pilot project. 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 Logging Ltd.

Cameron River Logging Ltd. (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 is the holder of Forest Licence A59959 that has 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 is a non-replaceable forest licence with a term of 15 years. 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, 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, and one joint venture facility 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 the Taylor Pulpmill, which also utilizes chips from deciduous logs to produce pulp for its overseas pulp markets. Canfor also operates the Peace Valley Oriented Strand Board (OSB) mill in Fort St. John, in which it has a 50% interest along with 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, 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 our 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 two Forest Licenses in the Fort St John TSA. The timber from these licenses supplies an oriented strand board plant, which is run by Peace Valley OSB Limited Partnership, 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 pilot project 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 Tembec

Tembec is an integrated Canadian forest products company principally involved in the production of wood products, market pulp and papers. The Company has sales of approximately $4 billion with over 55 manufacturing sites in the Canadian provinces of New Brunswick, Quebec, Ontario, Manitoba, Alberta, and British Columbia, as well as in France, the United States and Chile. It employs approximately 10,000 people.

Tembec 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 marketed under the Temcell brand name, and are sold mainly in Canada, the United States, Europe and Asia. Tembec's Chetwynd operations employ 160 persons directly and another 90 to 100 contract employees in log yard and woodlands operations.

Tembec'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 Tembec. 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 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. Tembec 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 Tembec's behalf. In this agreement, an equivalent quantity of softwood chips is to be made available to Tembec from Canfor's sawmills.

Tembec has obtained certification of the majority of its woodlands operations under the ISO 14001 and FSC standards.

2.1.7 Peace Valley Oriented Strand Board

Peace Valley OSB (PVOSB) is a joint venture OSB mill owned by Canfor Corp. (Canfor) and Louisiana-Pacific Canada (LP). On December 31, 2004 the legal structure of Slocan-LP OSB Corp. was changed to a 50/50 partnership rather than a corporation. The company now operates as Canfor-LP OSB Limited Partnership through its General Partner, Canfor-LP OSB (G.P.) Corp. The company announced in July 2005 that the mill would be known as Peace Valley OSB to recognize the key geographic feature in the immediate area of the mill, the Peace River valley.

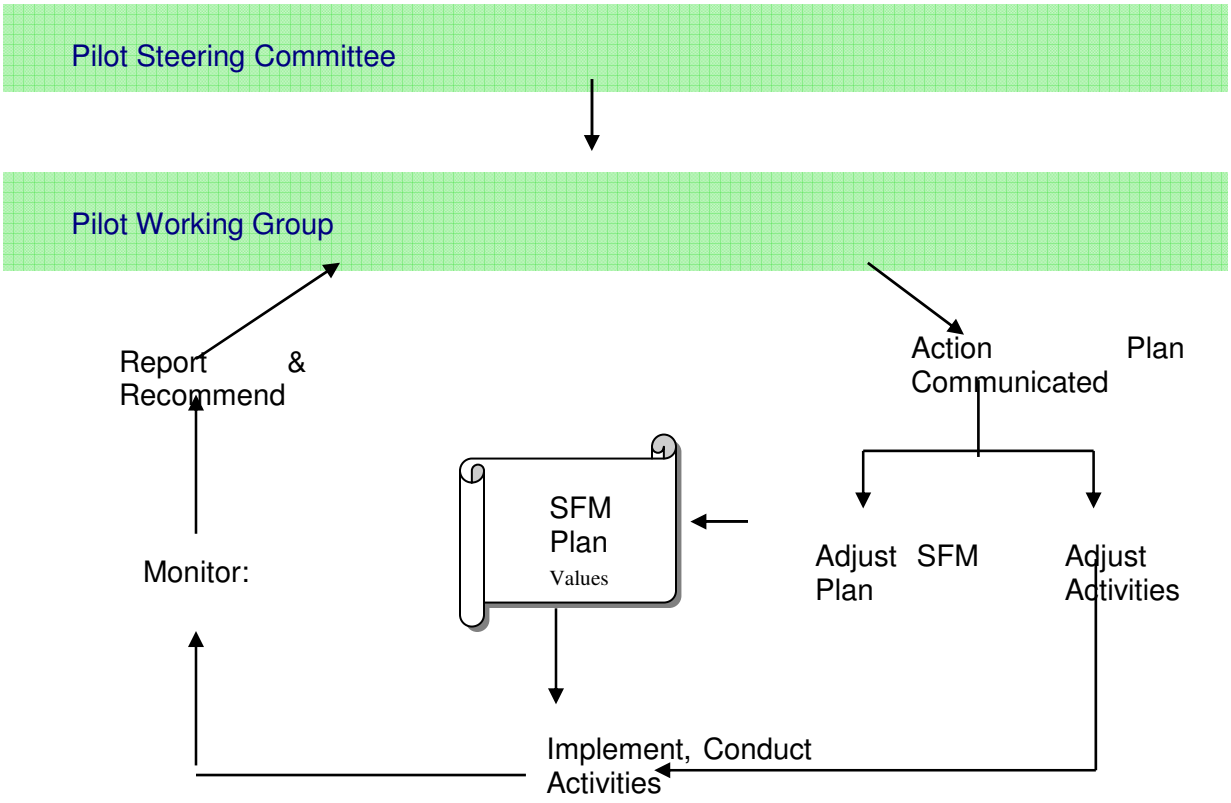
In 2000, Slocan Forest Products Ltd. (Slocan) and Louisiana-Pacific Canada (LP) determined to work collectively to respond to a call for proposals made by the BC Government in 1998 to harvest aspen and cottonwood in the Fort St. John Timber Supply Area. At the time, Slocan operated an OSB mill in Fort 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.

Peace Valley OSB currently has a four member Board of Directors with two senior staff from each company.. LP sells PVOSB product into the North American market while Canfor sells offshore. Woodlands operations for Peace Valley OSB are managed by Canfor staff at the nearby Canfor – Fort St. John Division. Peace Valley OSB holds Forest Licence A85946 with an AAC of 150,000 m3 which is managed by Canfors' 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. Figure 3 identifies the governance model and the continuous improvement model for the SFMP.



Fig

The Pilot Participants' specific responsibilities related to the performance indicators and targets are summarized in a Responsibility Action Matrix (RAM). The Regional Executive Director MFR and the Regional Manager MOE 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 each of the following interests:

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-Z809-02, Public Advisory Groups have opportunities to work with the Participants to:

- identify and select values, objectives, indicators and targets, based on the CSA SFM elements and any other elements of relevance to the DFA;
- develop alternative strategies to be assessed;
- assess alternative strategies and select the preferred one;
- review the SFMP;
- design monitoring programs,
- evaluate results and recommend 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

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

Group, or a parallel process as a separate group from the PAG, if First Nations so requested.

Currently two First Nations representative sits on the PAG as a member. 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.

Joint Management Advisory Committees currently exist between licensees and First Nations that review and discuss strategic level plans (e.g. SFMP) and operational plans (e.g. FOS, PMP's), as well as economic opportunities. JMAC participation includes the Halfway River, Blueberry, Doig, West Moberly, Saulteau, and Prophet River First Nations, as well as Canfor and Louisiana-Pacific. A separate JMAC that addresses Tembec's coniferous Forest Licence A60972 addresses economic opportunities and forestry planning 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.

3. 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.

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 identifies the critical habitat and landscape elements (sub indicators in Table 5) 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 an unmanaged areas 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 Table 5:

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

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

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, Northern Interior Forest Region, in a document entitled "Land Units and Benchmarks for Developing Natural Disturbance-based Forest Management Guidance for Northeastern British Columbia". DeLong, (2010), provides a summary of research findings to illustrate the range of natural variability for some of elements described in Table 6 across a set of Natural Disturbance Units (NDU). The geographical distribution of NDU's in the DFA is presented in Figure 4. The Ministry of Environment and the Ministry of Forests and Range have indicated that the guidance provided in DeLong, (2010), is a synthesis of the most current scientific information on the natural range of variability for habitat management in the Northern Interior Forest Region. The indicators and targets identified in section 6.0 therefore rely on DeLong (2010) 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 Northern Interior Forest Region a number of studies have investigated particular aspects of natural disturbance (DeLong 1998, DeLong and Kessler 2000, Lewis and Lindgren 2000, Rogeau 2001)

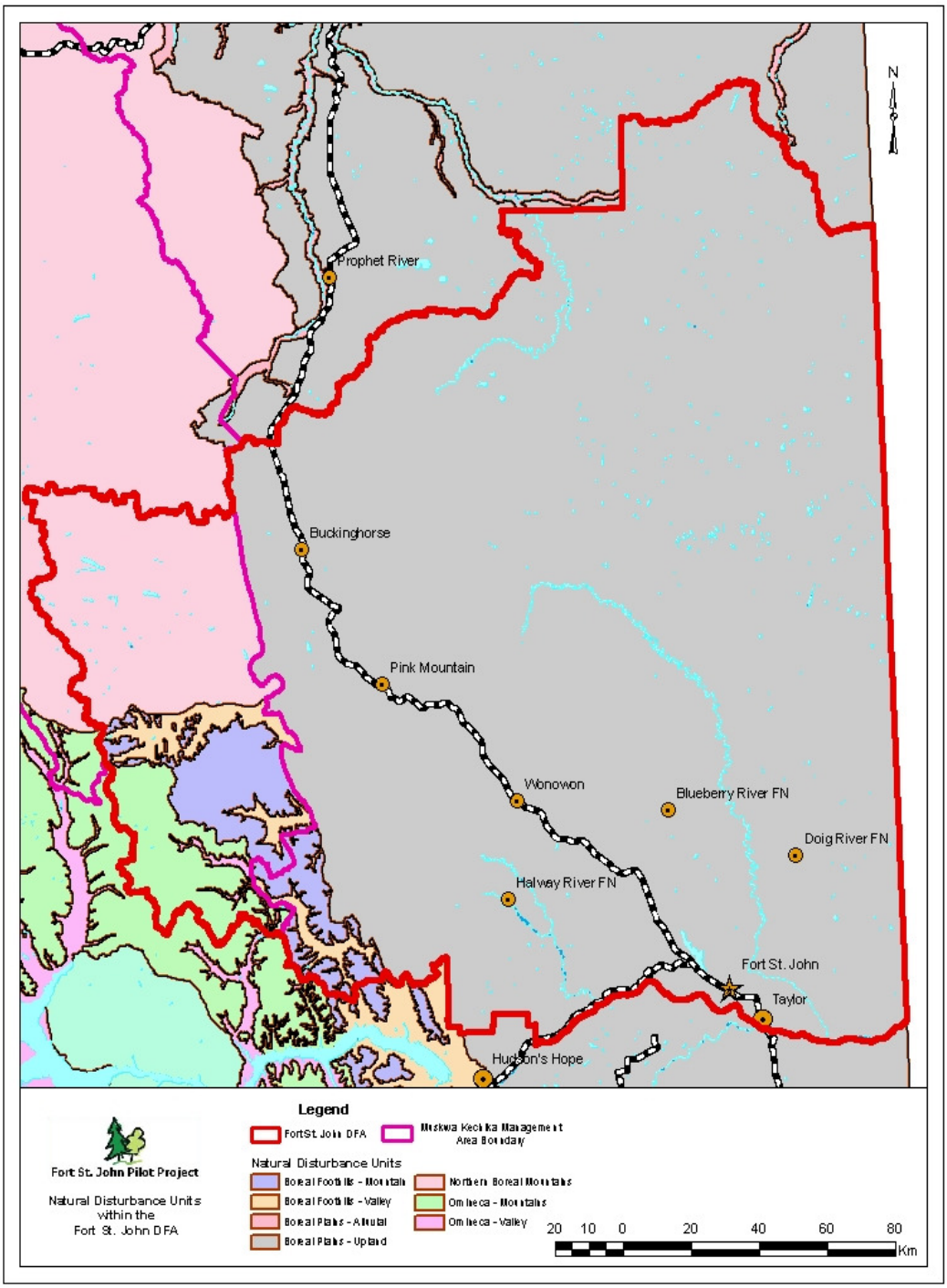


Figure 4: NDU Boundaries within the Fort St. John DFA

Instead of adopting the Natural Disturbance Types (NDT's) presented in the Biodiversity Guidebook (1995) DeLong 2002 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 2002 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 2002 include:

1. Maintenance of some naturally disturbed areas over time, which is 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 cutblocks.

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-Z809-02). 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. Table 7 identifies the sources of change with regard to 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 SFM. Examples include, The McGregor Model Forest Association, other industry partners, the Forest Investment Account, 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 take into account 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. 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 is new in SFMP #2.

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

[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) 50 (Coordination) 51(Profile-Decid) 52 (Profile-Conifer)		27 (Silv.Systems) 48 (Deliveries) 53 (Cut Control)
4.2 Road Access	24(Perm Access) 45 (R.O.S.)	24 (P.A.S.)	40 (Coord Developments)
4.5 Patch/Seral/Adjacency	2 (Seral Stage)* 3(Patch Size)* 6 (CWD) 9(WTP)	6 (CWD) 9 (WTP)	
4.3 Riparian	7 (Reserves) 22 (River Corridors) 34 (Peak Flow Index) 36 (Streambanks)	7 (Reserves) 22 (River Corridors)	
4.9 Visual	44(VQO)	44 (VQO)	
4.6 Forest Health	1(Forest Types) 2 (Seral Stage)* 3 (Patch Size)* 25 (Forest Health-Silv) 49 (Forest Health-FOS)		26 (Salvage)
4.4 Range & Forage	10 (Noxious Weeds) 42 (Damage to Range Improvements)		41(Range Action Plans)
4.7 Reforestation	13 (Conif. Seed) 28 (Species Comp.) 29 (Reforest. Assess.) 30 (Est. Delay)	13 (Conif. Seed) 29 (Reforest. Assess.)	13 (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".

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 # 51 (Timber Profile- Deciduous) and Indicator # 52 (Timber Profile- Coniferous) will be the legal indicators used to determine if forest practices are consistent with this landscape level strategy.

Please refer to **Section 6.51 Timber Profile-deciduous and Section 6.52 Timber Profile-conifer**, for the specific details on the indicators, targets, and acceptable variances, that will be 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 6.53 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 6.50 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 Summer / Fall Delivery Strategy

Plan harvesting activities to ensure manufacturing plants' needs for fibre deliveries between May 1st and November 30th can be met.

Refer to indicator #48 in **Section 6.48 Summer and Fall Volume Deliveries** for details on the indicator, the target and 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.

Silviculture Systems

In forested landscapes it is desirable to produce new forests with similar structural characteristics as naturally occur on the landscape. Due to the predominance of fire disturbances in the DFA, the most prevalent forests are even aged stands of one or, less frequently, two layers. Silviculture systems should be implemented that result primarily in similar stand structures in new forests following harvesting disturbances.

4.1.8 Evenaged Silviculture System Strategy

Evenaged 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 a large number of 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, will continue unchanged. Permanent Access Structure % will be assessed on a DFA-wide basis, rather than block-by-block, using three year rolling average measure expressed as a percent value. 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. 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 # 45 (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 6.45 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 # 40 (Coordinated Developments)**, included in **Section 6.40 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 # 36**, included in **Section 6.36 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 6.36 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 1.3.1 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 # 34** included in **Section 6.34 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 6.34 will be used to determine if forest practices are consistent with the landscape level strategies.**

4.4 RANGE AND FORAGE MANAGEMENT STRATEGY

Grazing tenures for domestic livestock on Crown range is authorized under the *Range Act*, 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, 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)
- Damage to existing mature stands due to approved range burns in standing deciduous
- 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 their pre-harvest condition in a timely manner, or as otherwise agreed to between the range tenure holder and Participant.

Refer to **Indicator # 42** located in **Section 6.42 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 # 41** located in **Section 6.41 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 Prince George Forest Region a number of studies have investigated particular aspects of natural disturbance (DeLong 1998, 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 2002 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 (2002) 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 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 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 # 49** located in **Section 6.49 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.**

4.7 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.

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 MFR 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[8]. '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.

Since the advent of RESULTS submissions, the submission of written declarations to the MFR is redundant. Consequently the process to be used once this SFMP is approved will be to 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 will be done through the formal submission of this information in RESULTS, taking the place of formal (written) declarations. The submission of reforestation standard information into RESULTS will now constitute the declaration.

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 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.

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

- 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 is being extended to deciduous reforestation in SFMP #2. The deciduous strategy still requires the completion of a deciduous compiler, which will utilize MFR deciduous yield curves, and the MFR's "Draft Stocking Guidelines for Hardwoods in the BWBS" for 15 year old stands. Interim block level standards for deciduous regeneration will apply until this work is completed (see part 3 below *"Stocking Standards and Crop Tree Requirements*"). The deciduous landscape level strategy will be amended into the SFMP when the strategy is finalized and a deciduous compiler is available.

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 7. 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 reestablished 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 Soil Management Strategy is a new addition to SFMP # 2.

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 needsto 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

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 # 44**, located in **Section** 6.44 **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-Z809-02 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 significance
❑ Maintenance and enhancement of forest ecosystem condition and productivity	❑ Ecosystem resilience ❑ Ecosystem 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
❑ Multiple benefits to society	❑ Timber and Non-Timber Benefits ❑ Communities and Sustainability ❑ Fair Distribution of Benefits and Costs
❑ Accepting society's responsibility for sustainable development	❑ Aboriginal and Treaty Rights ❑ Respect for Aboriginal Forest Values, Knowledge, and Uses ❑ Public Participation ❑ Information for Decision-Making

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)

Part of the CSA SFM Standard is to produce an annual report, which reports on progress, performance and appropriateness of each of the indicators and objectives developed for the DFA.

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, LRMP's 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

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.

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

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 Table 2: LRMP Objectives by Landscape Unit that relate to this indicator 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 Table 9
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 **Table 9** 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.

Table 9 summarizes the target minimums for this indicator. Minimum targets 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%.

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**
	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**
	Conifer	73,882	**56.7%**	**45%**	**58,654**
Milligan Total		130,343	**100%**	**N/A**	

Landscape Unit	Forest Type	2010 Current Status		2010 Target Minimum Area	2010 Target Minimum Area
		Area (ha)	% of L.U.	Percentage	(ha)
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:

Table 10 indicates the current status[9] by forest type and landscape unit, and the target ranges included in the 2004 SFMP #1. Eleven of the forty four forest type resultant areas are outside the targeted ranges. Ten of these are in deciduous mixedwood or conifer mixedwood forest types, while one pure conifer forest type showed an increase that exceeded the maximum range. Six deciduous leading mixedwood forest type areas exceeded the maximum area, while three conifer mixedwoods and one deciduous mixedwood were less than the minimum target area.

SFMP # 1 targets were based on inventory information that was, in many cases, more than thirty years old. The 'current state' areas in Table 10 are based on analysis of forest cover data from the recent reinventory 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 reinventory, some thirty years later than the previous inventory.

[9] Current status projected to March 31, 2010, after accounting for areas planned for harvest in the first three months of 2010

Note the one exception to these trends was a decrease in deciduous mixedwoods in the Milligan LU from 20.4% to 6.7%, at the same time there was a large increase in the pure conifer landbase from 30.5% to 56.7%. As noted in Section 6.9, Table 15, there has only been 30 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	2010 Current Status		2004 Status		2004 SFMP Target Ranges	
		Area (ha)	% of L.U.	Area (ha)	% of L.U.	Min	Max
Blueberry	Deciduous	126,729	**34.6%**	140,289	37.1%	30%	45%
	Deciduous Mixedwood	48,777	**13.3%**	32,500	8.6%	7%	10%
	Conifer Mixedwood	37,973	**10.4%**	50,669	13.4%	11%	16%
	Conifer	152,573	**41.7%**	154,320	40.8%	33%	49%
Blueberry Total		366,052	**100%**	377,778	100.0%		
Crying Girl	Deciduous	556	**1.0%**	646	1.1%	0.50%	2%
	Deciduous Mixedwood	928	**1.7%**	706	1.2%	0.50%	2%
	Conifer Mixedwood	915	**1.7%**	1,205	2.0%	1%	3%
	Conifer	52,206	**95.6%**	58,390	95.8%	93%	98%
Crying Girl Total		54,604	**100%**	60,947	100.0%		
Graham	Deciduous	2,764	**1.4%**	3,061	1.4%	0.50%	2%
	Deciduous Mixedwood	2,142	**1.1%**	1,724	0.8%	0.50%	2%
	Conifer Mixedwood	3,540	**1.8%**	3,866	1.8%	1%	3%
	Conifer	187,878	**95.7%**	205,996	96.0%	93%	98%
Graham Total		196,325	**100%**	214,647	100.0%		
Halfway	Deciduous	13,730	**11.6%**	14,845	11.5%	9%	14%
	Deciduous Mixedwood	7,765	**6.5%**	5,399	4.2%	3%	5%
	Conifer Mixedwood	5,782	**4.9%**	8,936	6.9%	6%	8%
	Conifer	91,345	**77.0%**	100,239	77.5%	73%	82%
Halfway Total		118,622	**100%**	129,419	100.0%		
Kahntah	Deciduous	63,979	**37.8%**	64,727	40.1%	32%	48%
	Deciduous Mixedwood	21,232	**12.5%**	21,274	13.2%	11%	16%
	Conifer Mixedwood	22,217	**13.1%**	25,395	15.7%	13%	19%
	Conifer	61,990	**36.6%**	49,940	31.0%	25%	37%
Kahntah Total		169,419	**100%**	161,335	100.0%		
Kobes	Deciduous	31,736	**34.7%**	34,392	37.0%	30%	44%
	Deciduous Mixedwood	10,107	**11.1%**	8,578	9.2%	7%	11%
	Conifer Mixedwood	9,334	**10.2%**	13,560	14.6%	12%	18%
	Conifer	40,164	**44.0%**	36,442	39.2%	31%	47%
Kobes Total		91,341	**100%**	92,971	100.0%		
Lower Beatton	Deciduous	69,470	**70.6%**	58,825	68.6%	55%	82%
	Deciduous Mixedwood	8,575	**8.7%**	5,372	6.3%	5%	8%
	Conifer Mixedwood	6,494	**6.6%**	7,624	8.9%	7%	11%
	Conifer	13,904	**14.1%**	13,976	16.3%	13%	20%
Lower Beatton Total		98,442	**100%**	85,797	100.0%		

Landscape Unit	Forest Type	2010 Current Status		2004 Status		2004 SFMP Target Ranges	
		Area (ha)	% of L.U.	Area (ha)	% of L.U.	Min	Max
Milligan	Deciduous	38,499	**29.5%**	28,677	26.1%	21%	31%
	Deciduous Mixedwood	8,739	**6.7%**	22,493	20.4%	16%	25%
	Conifer Mixedwood	9,223	**7.1%**	25,259	23.0%	18%	28%
	Conifer	73,882	**56.7%**	33,570	30.5%	24%	37%
Milligan Total		130,343	**100%**	109,999	100.0%		
Sikanni	Deciduous	2,422	**2.2%**	4,608	3.3%	2%	4%
	Deciduous Mixedwood	2,144	**1.9%**	2,662	1.9%	1.50%	3%
	Conifer Mixedwood	3,104	**2.8%**	4,746	3.4%	2%	4%
	Conifer	104,128	**93.1%**	129,392	91.5%	89%	95%
Sikanni Total		111,797	**100%**	141,408	100.0%		
Tommy Lakes	Deciduous	62,243	**22.9%**	64,676	24.0%	19%	29%
	Deciduous Mixedwood	30,505	**11.2%**	19,517	7.2%	6%	9%
	Conifer Mixedwood	26,783	**9.8%**	31,864	11.8%	9%	14%
	Conifer	152,546	**56.1%**	153,325	56.9%	46%	68%
Tommy Lakes Total		272,078	**100%**	269,383	100.0%		
Trutch	Deciduous	43,229	**21.3%**	45,003	23.0%	18%	28%
	Deciduous Mixedwood	22,193	**11.0%**	10,628	5.4%	4%	7%
	Conifer Mixedwood	16,552	**8.2%**	18,072	9.2%	7%	11%
	Conifer	120,509	**59.5%**	122,373	62.4%	50%	75%
Trutch Total		202,483	**100%**	196,076			
All L.U.'s	Deciduous	455,357	**25.1%**	459,749	28.0%		
	Deciduous Mixedwood	163,107	**9.0%**	130,853	8.0%		
	Conifer Mixedwood	141,917	**7.8%**	191,196	11.6%		
	Conifer	1,051,125	**58.0%**	1,057,963	64.4%		
Total All		1,811,506		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 the 2010 FOS. The effect of stand maturation will also be considered in this analysis (projected date set to March 31st, 2016).

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 Cengea Forest Resources ("Cengea") 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 CENGEA 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 CENGEA 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 by NDU	The minimum proportion (%) of late seral forest by NDU as identified in Table 11 will be met.
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%)

What is this indicator and why is it important:

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 *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.

Late seral is defined as stands greater than 140 years old for coniferous leading stands and as greater than 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.

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 12, Table 13, and Table 14 show the current 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 2004 FOS.

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

Table 12: Boreal Plains Deciduous Current and 2016 Seral Stage and Target

Stand Age	< 40 years				40 – 100 years				> 100 years							
	2010		2016		2010		2016		2010- Current			2016				
Landscape Unit	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**	**Surplus/ (Deficit)**	**Area (ha)**	**%**	**Surplus/ (Deficit)**	Target	**Total Area (ha)**
Blueberry	31,919	14.9%	39,260	18.3%	117,098	54.5%	105,681	49.2%	65,678	30.6%		69,753	32.5%			214,695
Crying Girl	0	0.0%	0	0.0%	5	100.0%	5	100.0%	0	0.0%		0	0.0%			5
Halfway	2,150	8.9%	2,124	8.8%	11,137	46.1%	9,825	40.7%	10,852	45.0%		12,190	50.5%			24,139
Kahntah	1,218	1.4%	3,199	3.6%	68,762	78.0%	67,560	76.6%	18,220	20.7%		17,440	19.8%			88,200
Kobes	4,976	11.9%	6,530	15.6%	12,492	29.8%	7,804	18.6%	24,408	58.3%		27,542	65.8%			41,876
Lower Beatton	10,391	11.0%	9,703	10.3%	67,281	71.5%	64,513	68.6%	16,403	17.4%		19,859	21.1%			94,075
Milligan	3,314	6.3%	3,030	5.7%	44,582	84.1%	44,281	83.6%	5,099	9.6%		5,684	10.7%			52,995
Tommy Lakes	4,592	4.8%	5,725	6.0%	56,802	59.3%	49,514	51.7%	34,385	35.9%		40,539	42.3%			95,779
Trutch	535	0.8%	384	0.6%	46,076	66.4%	37,390	53.9%	22,735	32.8%		31,572	45.5%			69,346
Total	59,095	8.7%	69,957	10.3%	424,236	62.3%	386,573	56.8%	197,780	29.0%	88,802	224,580	33.0%	115,602	16%	681,111

2010 - uses all FOS blocks with harvest start date < Jan 1, 2010

2016 - uses FOS blocks with harvest start date >Jan 1, 2010

Table 13: Boreal Plains Conifer Current and 2016 Seral Stage and Target

LU	< 40 years				40 – 100 years				101 – 140 years			> 140 years						TARGET	Total Area (ha)
	2010		2016		2010		2016		2010	2016		2010- Current State			2016				
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	Area (ha)	%	Area (ha)	%	Surplus/ (Deficit)	Area (ha)	%	Surplus/ (Deficit)		
Blueberry	46,662	12.6%	51,372	13.8%	161,252	43.4%	157,187	42.3%	110,916	106,288	28.6%	52,382	14.1%		56,365	15.2%			371,213
Crying Girl	0	0%	0	0.0%	0.0	0%	0	0.1%	4	3	31.5%	6	58.8%		7	68.2%			10
Halfway	9,580	6.4%	12,276	8.2%	36,319	24.3%	28,044	18.8%	48,044	52,028	34.8%	55,432	37.1%		57,029	38.2%			149,376
Kahntah	6,903	1.6%	6,577	1.5%	114,710	25.9%	113,483	25.6%	256,750	257,563	58.1%	64,739	14.6%		65,478	14.8%			443,102
Kobes	9,492	11.3%	11,197	13.3%	17,714.48	21.0%	11,305	13.4%	38,881	41,182	48.8%	18,244	21.6%		20,648	24.5%			84,332
Lower Beatton	2,854	5.8%	3,632	7.4%	24,970.32	51.2%	21,265	43.6%	18,386	19,668	40.3%	2,584	5.3%		4,230	8.7%			48,795
Milligan	7,122	1.8%	6,908	1.8%	259,331	67.3%	252,303	65.5%	72,949	58,838	15.3%	45,971	11.9%		67,326	17.5%			385,374
Tommy Lakes	15,957	2.9%	23,017	4.1%	195,282	34.9%	172,802	30.9%	251,513	251,201	44.9%	96,776	17.3%		112,509	20.1%			559,529
Trutch	3,762	1.1%	3,424	1.0%	145,229	41.0%	123,540	34.9%	125,701	137,487	38.8%	79,204	22.4%		89,443	25.3%			353,895
Total	102,334	4.3%	118,402	4.9%	954,808	39.9%	879,929	36.7%	923,144	924,259	38.6%	415,339	**17.3%**	**32,039**	473,035	19.7%	**89,735**	**16%**	2,395,626

2010 - uses all FOS blks with harvest start date < Jan 1, 2010

2016 - uses FOS blks with harvest start date >Jan 1, 2010

Table 14: Boreal Foothills, Northern Boreal Mountains and Omineca Current and 2016 Seral Stage and Targets

Stand Age		< 40 years				40 – 100 years				101 – 140 years				> 140 years						Target
NDU Sub-Unit	Landscape Unit	2010		2016		2010		2016		2010		2016		2010- Current State			2016			
		Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Surplus/ (Deficit)	Area (ha)	%	Surplus/ (Deficit)	
Boreal Foothills Mountains	Crying Girl	1039	2.5%	1444	3.5%	8853	21.4%	3592	8.7%	15193	36.7%	18799	45.5%	16267	39.3%		17517	42.4%		
	Graham	1932	1.6%	1887	1.5%	25555	20.8%	14258	11.6%	45758	37.3%	56406	46.0%	49481	40.3%		50174	40.9%		
	Halfway	12	0.1%	12	0.1%	3151	23.9%	2048	15.5%	4109	31.2%	4568	34.7%	5905	44.8%		6549	49.7%		
	Kobes	0	1.6%	0	1.6%	3	15.4%	3	15.4%	9	43.1%	9	43.1%	8	39.9%		8	39.9%		
	NDU Total	2983	1.7%	3343	1.9%	37562	21.2%	19902	11.2%	65069	36.7%	79781	45.0%	71661	40.4%	**13,160**	74248	**41.9%**	15,748	**33%**
Boreal Foothills Valley	Crying Girl	1873	8.9%	2211	10.6%	4060	19.4%	2151	10.3%	8511	40.6%	9682	46.2%	6500	31.0%		6900	32.9%		
	Graham	162	1.1%	213	1.4%	3827	25.6%	2249	15.0%	7173	47.9%	8363	55.8%	3816	25.5%		4153	27.7%		
	Halfway	7	0.5%	7	0.5%	336	21.4%	211	13.5%	548	34.9%	480	30.6%	677	43.2%		869	55.4%		
	Kobes	5	2.5%	0	0.0%	10	4.9%	14	7.4%	142	72.4%	92	47.0%	40	20.3%		89	45.7%		
	NDU Total	2047	5.4%	2431	6.5%	8232	21.8%	4626	12.3%	16373	43.4%	18618	49.4%	11033	29.3%	**2,365**	12011	**31.9%**	3,343	**23%**
Northern Boreal Mountains	Graham	310	1.3%	90	0.4%	3441	14.2%	3572	14.8%	6423	26.5%	6153	25.4%	14027	58.0%		14387	59.4%		
	Sikanni	0	0.0%	0	0.0%	29635	17.3%	27305	16.0%	44284	25.9%	46416	27.1%	97222	56.8%		97420	56.9%		
	NDU Total	310	0.2%	90	0.0%	33076	16.9%	30877	15.8%	50706	26.0%	52569	26.9%	111249	57.0%	**38,973**	111807	**57.2%**	39,530	**37%**
Omineca Mountains	Crying Girl	0	0.0%	0	0.0%	0	0.0%	0	0.0%	43	84.7%	43	84.7%	8	15.3%		8	15.3%		
	Graham	65	0.1%	65	0.1%	11236	11.6%	4429	4.6%	18275	18.9%	24507	25.4%	66964	69.4%		67540	70.0%		
	NDU Total	65	0.1%	65	0.1%	11236	11.6%	4429	4.6%	18317	19.0%	24549	25.4%	66972	69.3%	**10,949**	67548	**69.9%**	11,525	**58%**
Omineca Valley	Crying Girl	0	0.0%	0	0.0%	60	44.5%	33	24.1%	57	42.2%	85	62.6%	18	13.3%		18	13.3%		
	Graham	140	1.3%	140	1.3%	3239	29.0%	1456	13.1%	4311	38.7%	5719	51.3%	3461	31.0%		3836	34.4%		
Omineca Total	NDU Total	140	1.2%	140	1.2%	3299	29.2%	1488	13.2%	4369	38.7%	5804	51.4%	3479	30.8%	**1,673**	3854	**34.2%**	2,049	**16%**

2010 - uses all FOS blocks with harvest start date <Jan 1, 2010

2016 - uses FOS blocks with harvest start date >Jan 1, 2010

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:

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 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.

MFR and ILMB have endorsed the concept of managing by seral stage at an NDU level. Participants will work with government to identify spatial rotating old forest reserves within priority NDUs prior to 2016. A higher proportion of old forest areas will be identified in the alluvial portion of the Boreal Plains NDU (i.e. the Boreal Plains Alluvial NDU sub unit – Sikanni-Fontas RMZ).

Monitoring Procedure:

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 the forest cover for all disturbances to the current reporting period based on CENGEA 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.

Forest Operations Schedules (FOS) will be consistent with this indicator, and as such the above steps are required when FOSs are developed.

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 (Table 16)
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 5).

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 Table 15 "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.

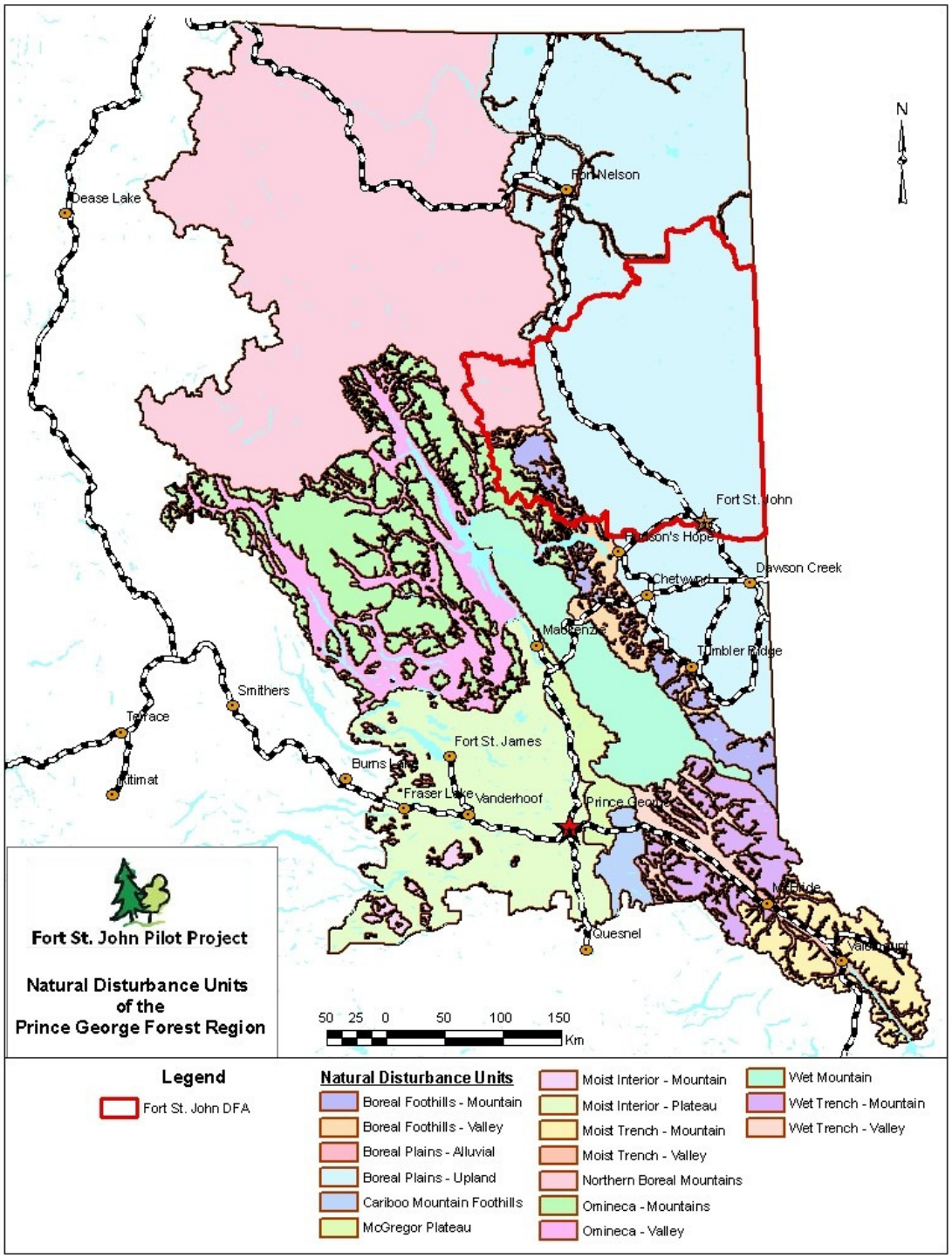


Figure 5: NDU's of the Prince George Forest Region

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 16 summarizes the current status of early patch size distribution by NDU. The distribution in 9 of the 18 target ranges is presented in Table 15. Most harvesting occurs in the Boreal Plains Upland NDU, in which all targets are currently being met.

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							

Forecasting Assumptions and Analytical Methods:

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

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 20 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 in the 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 15, 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, CENGEA block data, Natural Disturbance Unit boundaries and DFA boundaries.

All Participants are using CENGEA to track their operational data, which includes harvesting and silviculture information. Forest inventory cover (VRI) will be supplemented with harvesting data from CENGEA 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 CENGEA 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 2008-2009 Annual Report.

[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)? No

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.

Prescribing foresters 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 MFR 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	

[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

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 are capable of providing 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 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 five year results for this indicator through to March 31, 2009:

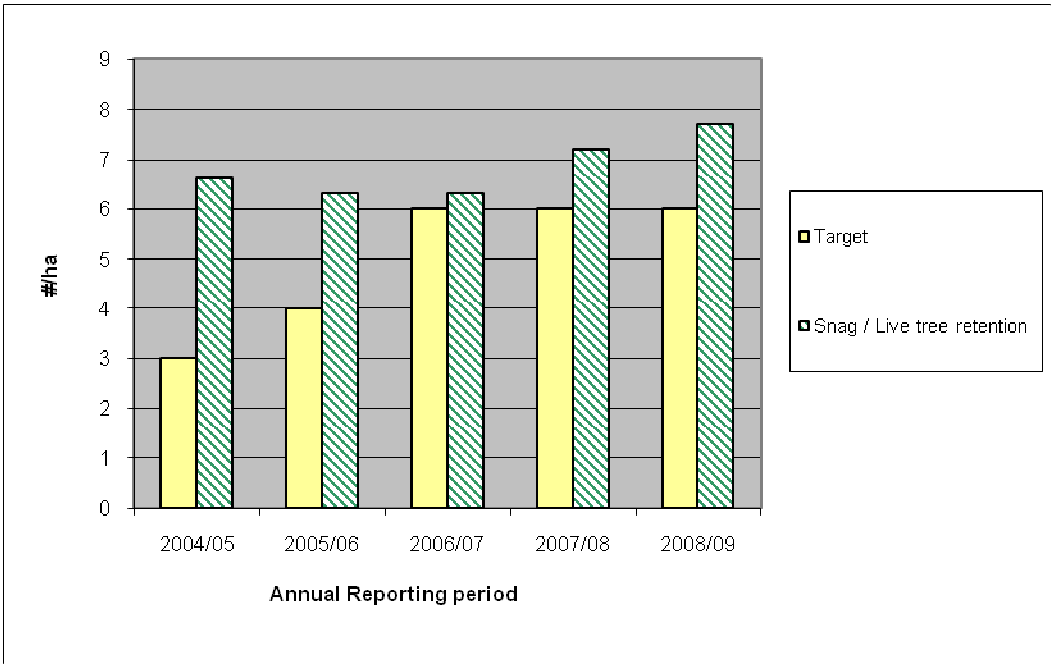


Figure 6: Five years results for Snag/Cavity Site Indicator[12]

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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

Strategy and Implementation Schedule:

Subsequent to 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, unsalvaged 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 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.

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 close 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 safely and economically stub snags or live trees, 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. Actual retention levels will be summarized in annual reports.13

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:

[13] This change to the original SFMP monitoring proposal was presented in the 2004-2005 Annual Report

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, 2008 and November 30, 2016	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, 2008 and November 30, 2016
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 *FSJPPR*s (Section 29(2)).

The most recent Annual Report summarizes the results of the 28 post harvest CWD plots established between December 1st 2003 and November 30th 2008, which was the reporting period for the 2004 SFMP CWD indicator target. The average residual CWD volume of all data showed an average of 251 m^3/ha. One data point, however, yielded a very high value (3390 m^3/ha) that skewed the average significantly. Excluding that one data point, the average residual CWD for the 27 plots was 135 m^3/ha, which exceeds the target. The range of CWD was between 22 m^3/ha and 355 m^3/ha.

Figure 7 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.

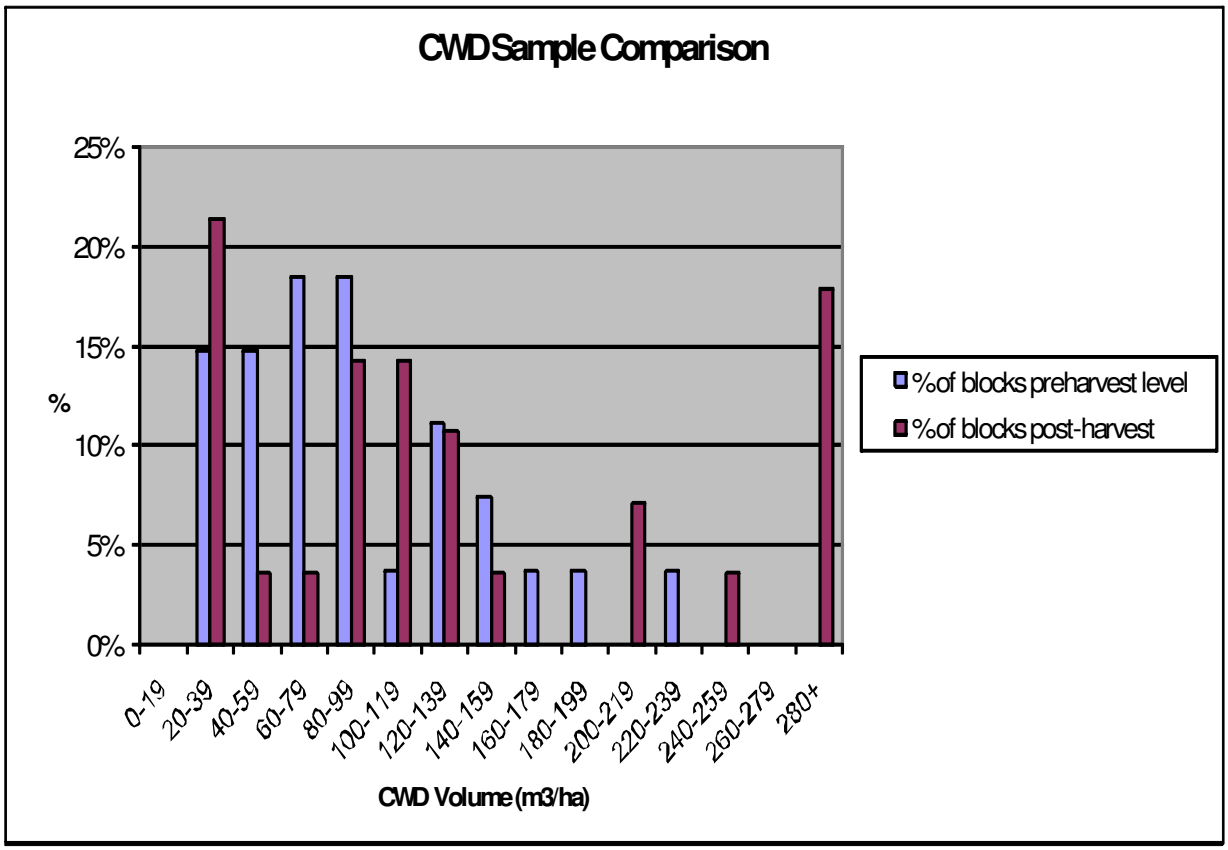


Figure 7: CWD Distribution

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No

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 MFR.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No.

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 (Table 17) indicates the 2010 condition of shrub habitat within the DFA. The proportions of shrubs changed significantly as a result of the reclassification of areas in the recent reinventory 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.

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 CENGEA 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 CENGEA 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 CENGEA 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	6%
Halfway	3%
Kahntah	7%
Kobes	5%
Lower Beatton	8%
Milligan	6%
Tommy Lakes	3%
Trutch	5%
Sikanni	4%
Graham	4%
Crying Girl	6%

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.

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:

Table 18 summarizes the current status as of WTP retention levels for Pilot Project blocks as of March 31, 2009. WTP levels currently exceed the minimum target in all LU's.

Table 18: Cumulative WTP % by LU (2001- March 31, 2009)

LU	Gross Block Area (ha)	WTP Area (ha)	WTP %	Target %
Blueberry	18543.2	1583.8	8.5	6
Crying Girl	1718.2	143.2	8.3	6
Graham	234.1	31.9	13.6	4
Halfway	1831.7	188.6	10.3	3
Kahntah	1281.1	118.1	9.2	7
Kobes	3193.4	270.5	8.5	5
Lower Beatton	2809.4	296.9	10.6	8
Milligan	30.1	3.1	10.3	6
Tommy Lakes	5867.8	540.3	9.2	3
Trutch	887.2	61.6	6.9	5
Sikanni	0	0	N/A	4
Grand Total:	36396.1	3238.2	8.9	N/A

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 MFR.
- 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 November 15, 2001 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 % prohibited and primary noxious weeds, and known invasive weed species of concern, in seed mix analyses	Seed mix analyses will have 0% content of prohibited and primary noxious weeds, and known invasive weed species of concern, as identified in the most current publication of "Listing of Invasive Plants" available from the Peace River Regional District
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. In some isolated instances suitable seed mixes having appropriate government approved analysis may not be available in a timely manner. If seeding must urgently be done to control erosion, it may, on occasion, be necessary to proceed without assurances of the seed source being free of noxious weeds. A maximum of one exception annually will be allowable to provide for this eventuality. In the event of an exception, the Participant will subsequently inspect the seeded areas to assess weed concerns, and will develop and document appropriate action plans to eliminate prohibited and primary noxious weeds, in consultation with the appropriate government agencies.

What is this indicator and why is it important?

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, rights-of-way 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 Canada #1 seed mixes, complete with government approved seed analyses, forestry operations can minimize the likelihood of accidentally introducing weeds.

Current Status:

All reclamation seed broadcast by the licensee Participants between April 1, 2004 and March 31, 2008 were certified as having 0% content of prohibited and primary noxious weeds, and known invasive weed species of concern, as identified in SFMP #1 (2004-2010).

For all seeding done by BCTS licensees, seed tags were retained by BCTS. A review of the seed analysis certificates received confirms conformance to the indicator target.

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)? No

Strategy and Implementation Schedule:

For the purposes of this indicator, the Participants will refer to the "Listing of Invasive Plants" maintained on the Peace River Regional District's website: (http://www.peaceriverrd.bc.ca/services/environmental/weed_control/invasive_plant_listing.php). The list current to the time of writing is included in Appendix 8. The Participants will refer to the website list annually, typically when the Annual Report is developed, to ensure the SFMP is up to date. Additions or deletions to the list will not trigger an amendment to this Plan.

The licensee Participants will request and retain the seed analysis certificates when purchasing seed, to confirm that prohibited and primary noxious weeds and known invasive plant species of concern, of the Peace River Regional District 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 Listing of Invasive Plants at the above noted website to determine if changes to the list have occurred in the last year. The staff will then confirm from the certificate that the seed is free of prohibited and noxious weeds, and known invasive weed species of concern, 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 occurrence.

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

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 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 the 2004-2010 SFMP includes six birds (Cape May Warbler, Bay-breasted Warbler, Black-throated Green Warbler, Connecticut Warbler, Sandhill Crane, and Great Blue Heron), four mammals (Fisher, Wolverine, Grizzly Bear, Woodland Caribou-Northern and Boreal Ecotypes) 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%
Total	**147**	**146**	**99%**

The one effected block where the guidelines weren't applied was a fire salvage block.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No.

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 CENGEA, or a similar activity tracking system) to address Stand Level Management Guidelines. For example, in CENGEA, 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 CENGEA 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.

The Participants will complete reviews of species and plant communities at risk in the Fort St. John TSA, and the SLMG, in consultation with government officials, and will revise the SLMG if needed by May 1st, 2010.

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 CENGEA. 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[14]

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. 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.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No.

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

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

6.13 SEED USE[15]

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.[16]	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

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

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

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 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), which can be accessed on line at (http://www.for.gov.bc.ca/code/cfstandards/) . As improved information may result to changes to this standard, the Participants will modify their future activities to be consistent with any amendments to this standard.

Current Status:

For the Participants' activities reported in the most recent Annual Report (2008-2009), 96.42% of the 2,982,683 seedlings planted by the Participants in the DFA were planted within the transfer guidelines, which is consistent with the allowable variance.

The one cone collection during that period was collected and registered in the Seed Planning and Registry System, and therefore was in conformance with the target. Class "B" Spruce (Sx) seed sown by the participants prior to April 1, 2010, may be planted in the DFA in 2010 and 2011.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 Cengea. Seedlots are tracked and recorded for every area planted.

A report will be generated from CENGEA 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)? No

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 CENGEA or a similar database. Planted deciduous areas will be spatially identified in CENGEA 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.

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.

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 near these Ecological Reserves.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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)[17]	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 Table 2 that apply to the Sikanni LU

Current Status:

There are currently 15 approved Wildlife Habitat Area's (WHA's) and 16 Ungulate Winter Range (UWR) areas 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

[17] 2006-2007 Annual Report made minor wording amendments to be consistent with UWR and WHA terminology

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.

Discussion regarding WHA's and UWR areas for the Caribou in the North and Eastern portions of the Timber Supply Area was ongoing at the time this SFMP was being prepared.

The following table summarizes harvest activities within grandparented blocks within the Muskwa-Kechika Management Area (MKMA) up to March 31, 2009.

Table 20: Harvest Activities in the MKMA

Licensee	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 2010) 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)? No

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 21) if required for access purposes.

No acceptable variance for Leading Species by NDU that are not identified as uncommon in Table 21.

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. These are designed as "medium filter" 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:

Table 21 indicates the current status of forest stands by leading species and NDU for Fort St. John, as of the date of the previous TSR, which defines what types will be unmanaged.

Table 21: Proportion of Leading Species by NDU Unmanaged

Natural Disturbance Unit	Sub NDU	Leading Species	Total Forested Area	Unmanaged Forests		
				Non-THLB	%Non-THLB	Baseline Target %
Boreal Plains		AC	22,037	9,592	43.5%	12%
		AT	550,261	225,543	41.0%	12%
		BL	1,161	846	72.9%	12%
		Ep	39,348	38,773	98.5%	12%
		LT	14,752	14,752	100.0%	12%
		PL	510,157	189,727	37.2%	12%
		SX	362,294	79,930	22.1%	12%
		SB	1,122,681	1,122,393	100.0%	12%
Boreal Plains Total			2,622,690	1,681,555	64.1%	
Boreal Foothills	Valley	AC	173	168	97.0%	80%
		AT	2,589	1,170	45.2%	12%
		BL	0	0	0.0%	0%
		Ep**	5	5	100.0%	100%
		PL	14,623	6,609	45.2%	12%
		SX	15,673	2,930	18.7%	12%
		SB	1,363	1,363	100.0%	12%
	Valley Total		34,425	12,244	35.6%	
	Mountain	AC	92	92	100.0%	100%
		AT	2,616	1,779	68.0%	12%
		BL	13,742	13,599	99.0%	12%
		Ep	28	28	100.0%	100%
		PL	35,835	26,600	74.2%	12%
		SX	100,822	59,842	59.4%	12%
		SB	924	924	100.0%	12%
	Mountain Total		154,058	102,864	66.8%	
Boreal Foothills Total			188,483	115,108	61.1%	

Natural Disturbance Unit	Sub NDU	Leading Species	Total Forested Area	Unmanaged Forests		
				Non-THLB	%Non-THLB	Baseline Target %
Northern Boreal Mountains		AC	626	557	89.0%	70%
		AT	8,558	8,514	99.5%	12%
		BL	5,384	5,361	99.6%	12%
		PL	31,874	19,943	62.6%	12%
		SX	114,208	94,445	82.7%	12%
		SB	4,913	4,912	100.0%	12%
Northern Boreal Mountains Total			165,562	133,732	80.8%	
Omineca	Valley	AC	33	33	100.0%	100%
		AT	364	248	68.2%	50%
		BL*	8	8	100.0%	100%
		PL	3,773	2,763	73.2%	12%
		SX	4,445	2,737	61.6%	12%
		SB	269	269	100.0%	12%
	Valley Total		8,892	6,059	68.1%	
	Mountain	AC*	2	2	100.0%	100%
		AT	510	432	84.8%	50%
		BL	17,861	17,674	99.0%	12%
		PL	9,945	8,291	83.4%	12%
		SX	59,039	51,187	86.7%	12%
		SB	313	313	100.0%	100%
	Mountain Total		87,669	77,899	88.9%	
Omineca Total			96,561	83,958	86.9%	
Grand Total			3,073,297	2,014,353	65.5%	

* 100% contained within a Park

** Polygon is a portion of polygon split by the NDU Line between Boreal Foothills Valley and Mountain.

Areas highlighted in yellow in Table 21 above have an uncommon distribution within the NDU. These areas have a higher potential to provide unique habitat values for the landscape that they occur in and as such have had a higher level of protection afforded to them.

Analysis of the 2004 FOS identified that harvesting was proposed at that time in only one of the uncommon timber types identified in the 2004 SFMP indicator. The Boreal Foothills – Valley – AC group had 173 ha total forested area, with a target to leave 80% or 138 ha unmanaged. This left 35 ha available, of which fewer than 4 ha were identified in cutblocks in the 2004 FOS, consequently the FOS planned harvesting was consistent with the requirements of 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 2. New inventory information and assumptions on which forest types contribute to timber supply will require a new forecast following completion of TSR 3.

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[18]); and 2) areas intentionally set aside to protect biological diversity (e.g., wildlife tree patches, riparian buffers). 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.[19]

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, CENGEA data, Natural Disturbance Unit boundaries and DFA boundaries. All Participants are using CENGEA to track their operational data. Forest cover will be updated with harvesting data from CENGEA as

[18] 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.

[19] 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.

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.

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:

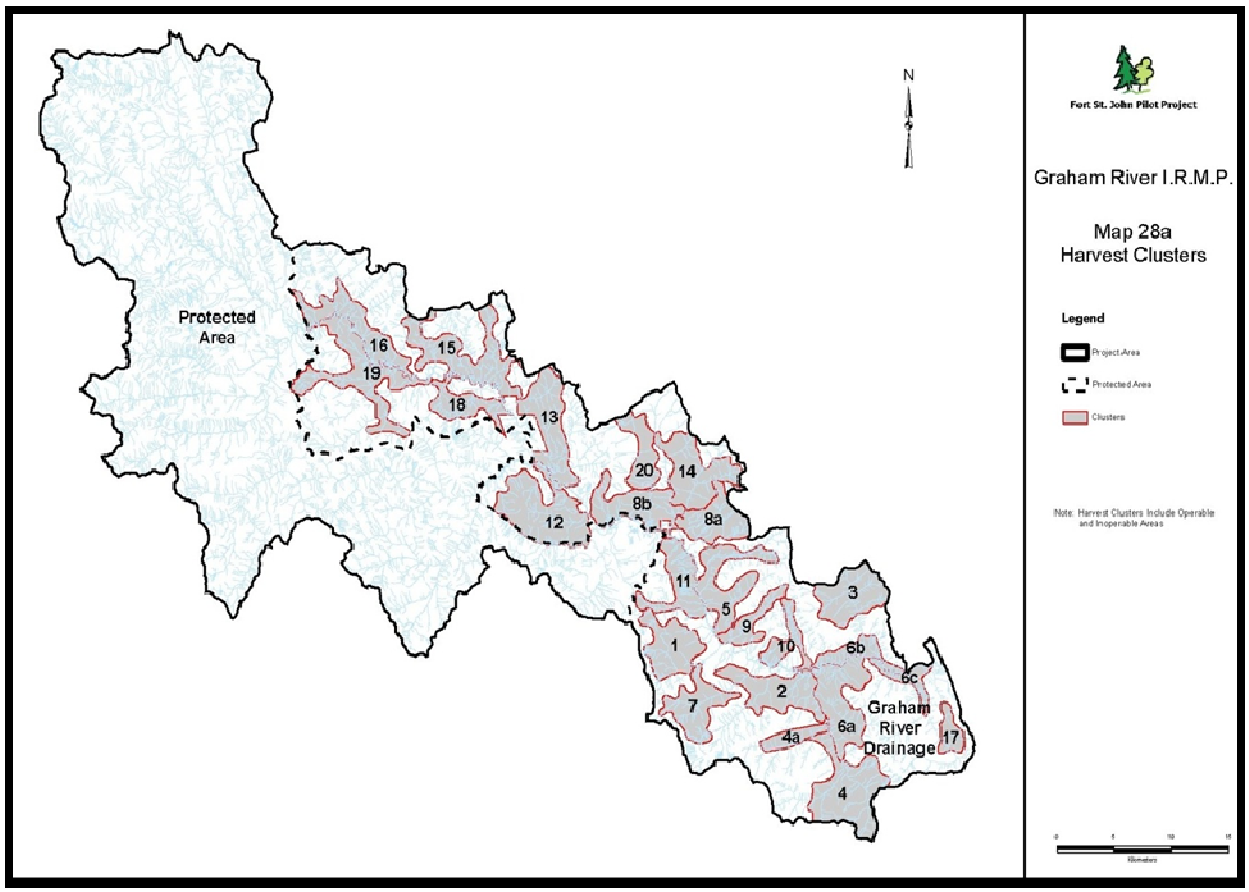
Operational harvesting (i.e. falling and/or skidding of timber, *excluding predevelopment of road right of ways*) in more than one cluster at a time may occur concurrently, if required to address significant forest health concerns (e.g. Mountain Pine Beetle infestations, wildfire), with the authorization of the MFR.

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 8. 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 8: 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. Cluster 4 is partially harvested, but has had harvesting operations suspended so that the Participants can redirect harvesting activities to high priority mountain pine beetle sanitation logging in the central part of the Timber Supply Area. There is no active harvesting in the area at this time.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 # 2 (ending April 2012): 6569 ha Period # 3 (ending April 2017): 9355 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:

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 22:

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)? No

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 indicator's 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 Figure 9.

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 (previously WLAP) 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)? No

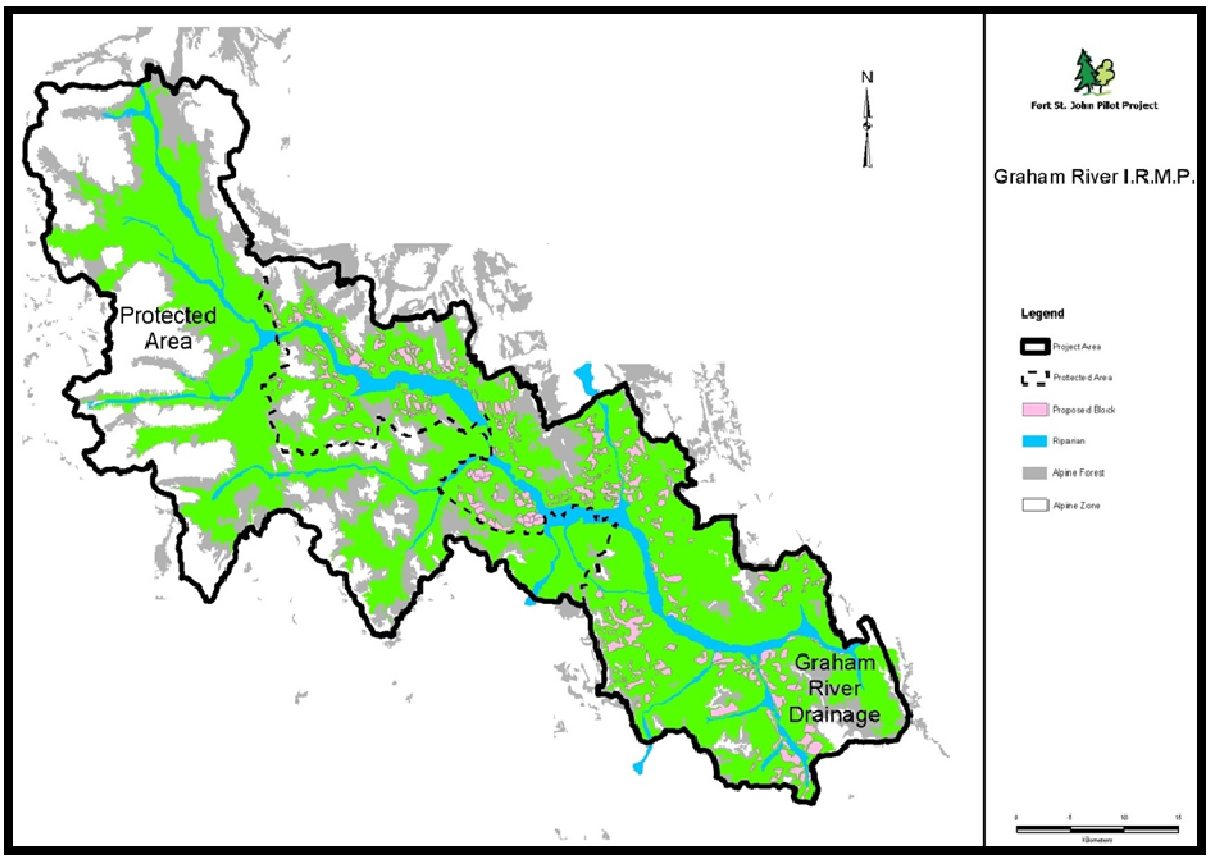


Figure 9: Corridors within the Graham River Area

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 CENGEA 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:

To date harvesting has only occurred in the MKMA on a few previously approved grandparented blocks. Blocks 20015, 20016 and 20027 are grandparented 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, Table 20).

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)? No

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 grandparented 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 1.3.1 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 in 2004 a digital coverage was created for those portions of streams identified in the LRMP as being in the Major River Corridor RMZ. The coverage assigned a one hundred metre buffer to the riparian reserve zones. This coverage is displayed on all 1: 50000 maps in which 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 SFMP. A review of this indicator in Annual Reports from April 1st 2004 to March 31st 2009 identified the Participants were consistent with this indicator's target in four of the five Annual Reporting periods, and consistent with the acceptable variance in the fifth reporting period (2008-2009).

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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[20]

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 2008-2009 reporting period, the Participants provided six contracts to companies or groups owned, operated, or sponsored by First Nations. These contracts provide First Nations with the opportunity to be involved in the local forest industry and economy by

[20] New indicator in 2010 SFMP. Replaces old indicator # 23 'Visual Screening' which has been deleted

harvesting and hauling approximately 315,000m^3 of timber and by operating the Peace Valley OSB log yard. The contract to manage the PVOSB logyard was worth approximately $ 1.4 million in 2009.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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.

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 three year average area in permanent access structures ending March 31, 2009 is presented in the following table.

Table 23: Permanent Access Structures 2007-2009

Managing Participant	Annual Reporting Period (Ending Mar 31st of Year Indicated)	Total Area (ha).of PAS	Total Block Area (ha)	% PAS
Canfor	2007	216.1	4368.6	4.9%
	2008	161.3	3258.5	5.0%
	2009	115.6	2474.7	4.7%
Canfor Total		**493.0**	**10101.8**	**4.9%**
BCTS	2007	42.2	1270.7	3.3%
	2008	43.0	1742.5	2.5%
	2009	23.8	842.0	2.8%
BCTS Total		**109.0**	**3855.2**	**2.8%**
All Participants		**602.0**	**13957.0**	**4.3%**

Following is a summary of the trend in the Permanent Access Structure indicator results since the approval of SFMP # 1 in 2004:

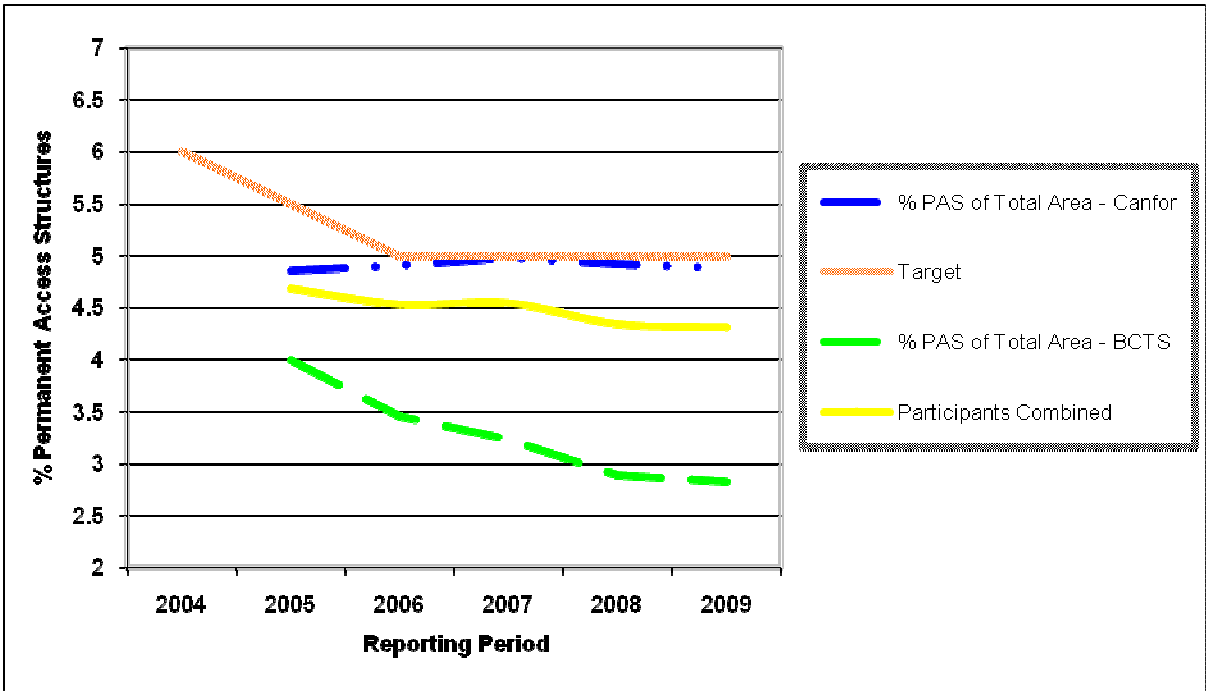


Figure 10: Permanent Access Structures

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.[21]	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.

[21] Indicator changed in 2010 SFMP to apply to silviculture obligation areas

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.

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.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply? No

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[22]	The relative proportions of salvage hectares will be highest in the high intensity zones[23], and lowest in the low intensity zones over an SFMP period (April 1, 2010- March 31, 2016)
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.

[22] Modified in 2010 from SFMP # 1 to include only fire damaged stands

[23] See section 1.3.1 for description of LU's in high and low management intensities

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.

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 2009.

LU Forest Management Intensity Classifications

	Low			Medium			High		
Year	total Ha burnt	total ha merch burnt	ha salvaged	total Ha burnt	total ha merch burnt	ha salvaged	total Ha burnt	total ha merch burnt	ha salvaged
2004-2005	0.0	0.0	0.0	708.4	145.0	59.2	0.0	0.0	0.0
2005-2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-2007	11.8	0.0	0.0	5495.1	352.0	0.0	12287.0	2895.0	643.7
2007-2008	93.4	0.2	0.0	40.4	0.0	0.0	33.0	2.5	0.0
2008-2009	0.0	0.0	0.0	800.0	38.5	0.0	53.8	0.0	0.0
Totals	**105.2**	**0.2**	**0.0**	**7043.9**	**535.5**	**59.2**	**12373.9**	**2897.5**	**643.7**
% Salvage of Merch			**0.0 %**			**0.1 %**			**22.2 %**

Table 24: Salvage Harvesting of Fire Damaged Timber

A total area of approximately 19,523 ha burnt from April 1, 2004 to March 31, 2009. 3,433.2 ha, or 17.6% was in merchantable timber stands (based on TSR limits of 140 m^3/ha 17.5 cm dbh or greater). The Participants salvage harvested 22.2% of the merchantable timber that burnt in high management intensity LU's, 0.1% in medium management intensity LU's, and none in low management intensity LU's.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 MFR 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, 2009, an average of 99% of the area harvested by the Participants was completed using even aged silviculture systems, with all years between 97% and 100%24.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.

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[24] Information was derived from the five Annual Reports covering the SFMP # 1 period, up to March 31, 2009.

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.)[25]

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.

[25] The original variance was amended in the 2006-2007 Annual Report- clarified that the assessment is based on cruised volumes vs seedlings planted

Current Status:

Table 25 illustrates the proportions of pine and spruce planted compared to the proportions cruised in the same blocks, as reported in the 2006-2008 Annual Reports.

Table 25: Species Composition for Previous 3 Years

Participant	Data	2006-2007	2007-2008	2008-2009	3 Yr. Totals	3 Yr. Percentage
BCTS Participants	Cruise Sw (m^3)	131,037	123,266	226,132	480,435	63.3%
	Cruise Pl (m^3)	90,223	105,436	83,047	278,706	36.7%
	Planted Sw Seedlings	645,185	653,729	988,600	2,287,514	77.1%
	Planted Pl Seedlings	220,111	213,570	247,600	681,281	22.9%
Licencee Participants	Cruise Sw (m^3)	673,864	372,283	338,015	1,384,162	64.0%
	Cruise Pl (m^3)	365,098	233,993	178,661	777,752	36.0%
	Planted Sw Seedlings	2,513,514	1,281,484	1,068,477	4,863,475	62.4%
	Planted Pl Seedlings	1,591,527	646,110	695,832	2,933,469	37.6%
All Participants Total Cruise Spruce volume (m^3)	**Cruise Sw (m^3)**	**804,901**	**495,549**	**564,147**	**1,864,597**	**63.8%**
All Participants Total Cruise Pine volume (m^3)	**Cruise Pl (m^3)**	**455,321**	**339,429**	**261,708**	**1,056,458**	**36.2%**
All Participants Total Planted Spruce seedlings	**Planted Sw Seedlings**	**3,158,699**	**1,935,213**	**2,057,077**	**7,150,989**	**66.4%**
All Participants Total Planted Pine seedlings	**Planted Pl Seedlings**	**1,811,638**	**859,680**	**943,432**	**3,614,750**	**33.6%**

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 63.8% spruce cruise volume, while 66.4% of the planted trees were spruce. The blocks contained 36.2% pine cruise volume compared to 33.6% of the planted trees were pine seedlings. The planted species percentages over the three years were 2.4% to 2.6% different 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.

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 CENGEA 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. CENGEA) 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%.[26]

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.

[26] 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% of the Maximum Predicted Merchantable Volume for coniferous areas, and 85% 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.

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.

The MSQ values for deciduous will be developed in conjunction with development of a deciduous volume compiler. The TMV target for deciduous blocks will be reviewed in conjunction with development of the deciduous compiler and MSQ values. An amendment to the SFMP will be submitted prior to implementation of the landscape level assessment of deciduous reforestation performance. 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.

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:

Assessment of coniferous strata commenced following the approval of the landscape level coniferous reforestation strategy in the 2004 SFMP. Following is a summary of results for coniferous from Annual Reports since then:

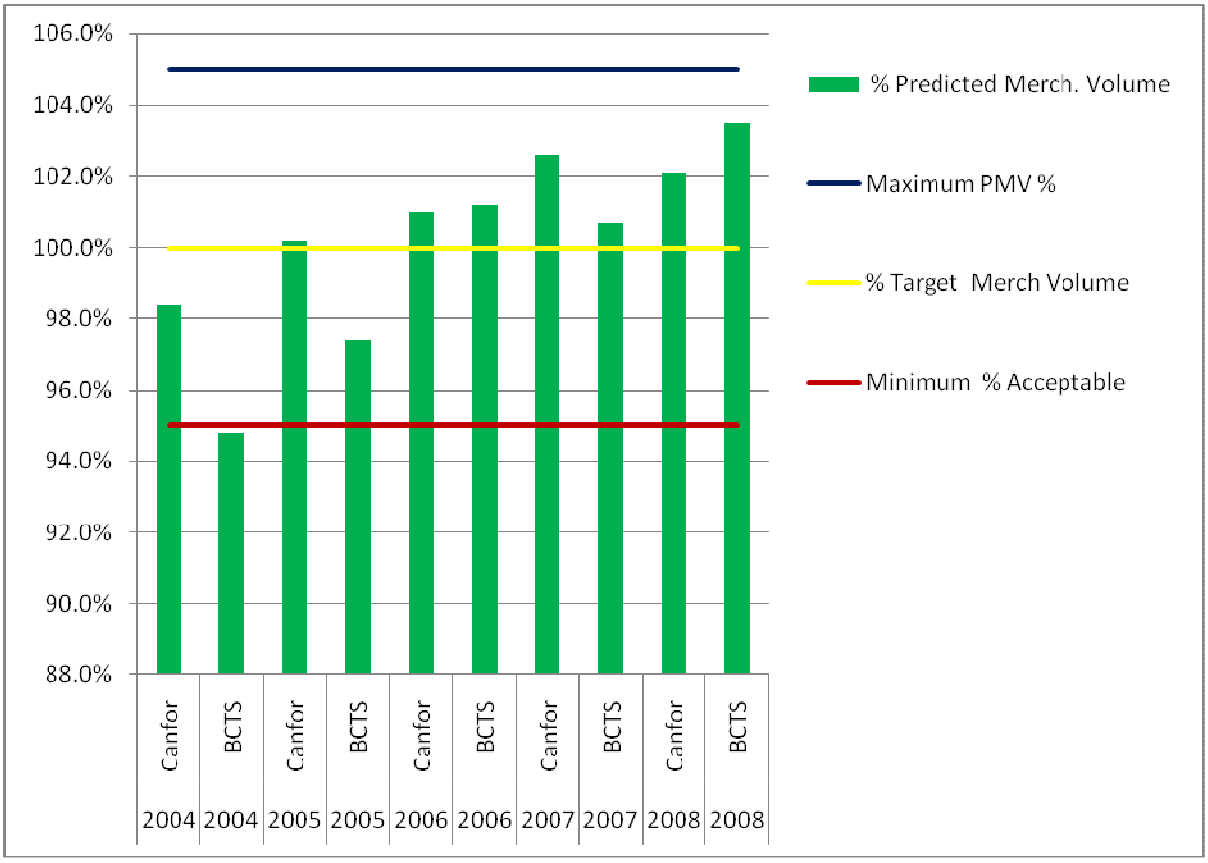


Table 26: Five Year Reforestation Assessment Results

Since 2006 the Participants have exceeded the coniferous targeted merchantable volume for conifer. Since the approval of SFMP #1, in one instance a Participant did not meet the minimum acceptable level (BCTS-2004). The subsequent Annual Report noted this and included an action plan to address the concern.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No.

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.

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.

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.[27]MPMV = function (Species, Site Index, Effective Age_p, Harvest Rotation Age, MSQ_p)

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.[28]

$TMV = a * MPMV$

Predicted Merchantable Volume (PMV) is the predicted volume that will be attained at a defined post harvest rotation age for a population of cutblocks[29].

PMV = function (Species, Site Index, Effective Age_m, Harvest Rotation Age, MSQ_m)

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.

[27] See Section 3.4 of Appendix 7

[28] Section 3.4 of Appendix 7 discusses setting the current TMV at 90% of the theoretical Maximum PMV attainable

[29] See Section 3.3.3 of Appendix 7 "Stand Survey and Growth Modelling for the Fort St. John TSA"

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 7. 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:

Site Index:

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.

Effective Age:

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.

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.

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 (i.e. 15 complete growing seasons following log 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 target population to sample is the total NAR based on all blocks with log start dates fifteen growing seasons in the past. 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.

Deciduous and 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.

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 Appendix 5: Reforestation Strategy: Survey Design and Field Procedures.

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 Appendix 5.

The above method follows current accepted survey procedures under MFR 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.

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 MFR of a non compliance to the landscape level reforestation strategy.

For 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.

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.

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 chart in **Figure 11** summarizes the results from Annual Reports completed during SFMP # 1 for conifer and deciduous stands.

The establishment delay target was achieved in all but one instance. In that instance (2004-BCTS-deciduous) the establishment's delay was consistent with the allowable variance of 3.5 years.

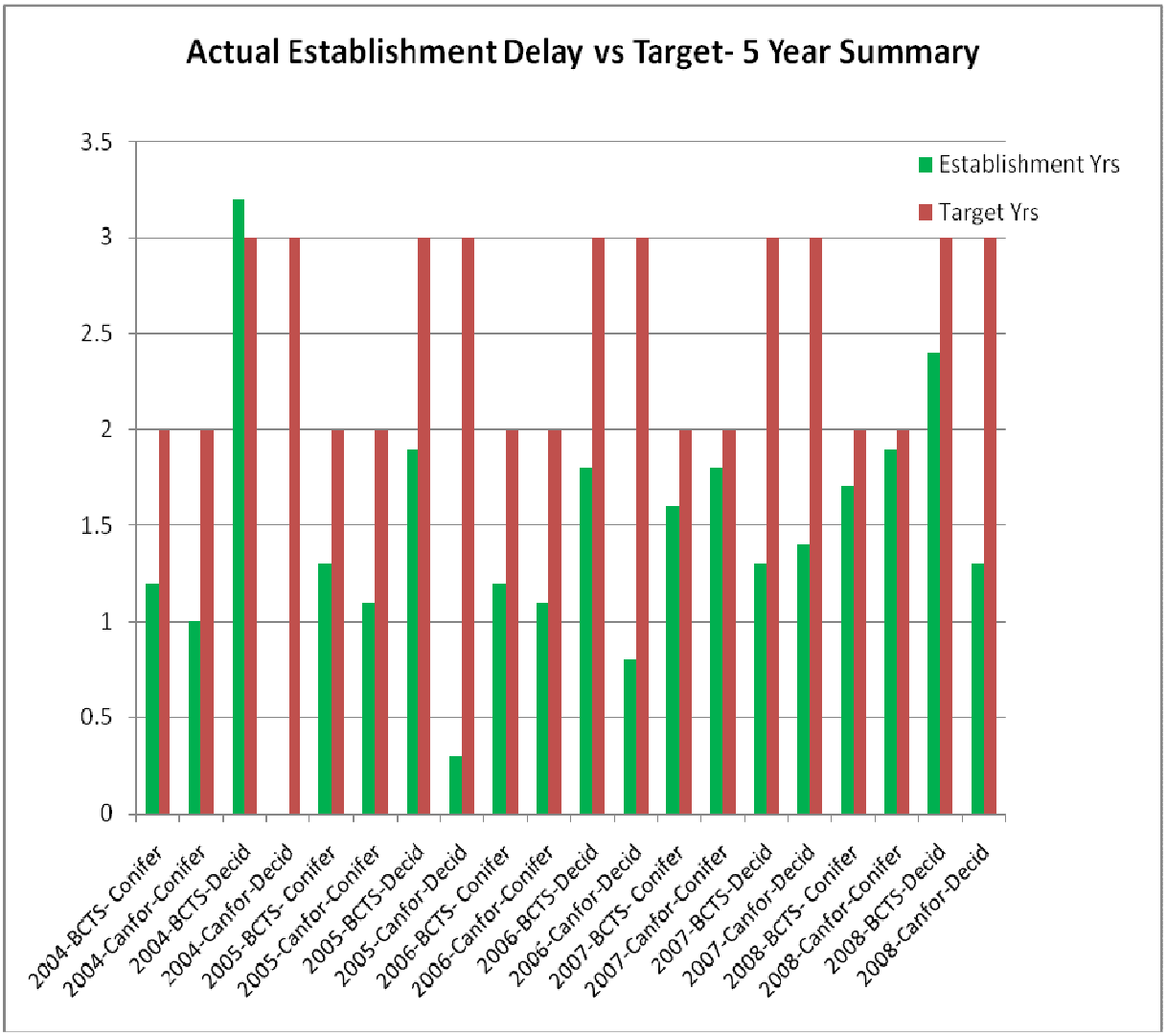


Figure 11: Establishment Delay for SFMP #1[30]

[30] Note there was no establishment delay data for the 2004-Canfor-Decid strata as harvesting of deciduous on those licences had not commenced

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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. CENGEA) 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. CENGEA). 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 Cengea 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 Cengea[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] Cengea refers to 'Cengea 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 latest TSR Base Case Analysis Report was completed in June 2002, and the AAC Rationale was effective March 1st, 2003. The AAC established for Fort St. John was established at 2,115,000 m^3/year.

The harvest level includes as partition of 1,200,000 m^3/year for coniferous leading stands and 915,000 m^3/year for deciduous leading stands.

The TSR base case indicates that the conifer harvest level is below the long-term harvest level. The deciduous harvest level, while currently above the long-term harvest level, can be maintained for the first 3 decades before declining at 10% per decade to the long-term harvest level of 632,000 m^3/year. Subsequent sensitivity analysis indicates that the initial harvest rate may be able to be maintained for more than 10 decades before declining at 10% per decade to a long-term harvest rate of 741,000 m^3/year. Both of these harvest flows indicate that the initial harvest level will not adversely impact the long-term harvest level.

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 term, medium term 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.

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 remeasured 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.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 First Nations Consultation & Information Sharing[32]

Indicator Statement	Target Statement
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).
SFM Objective: Involve First Nations in review of forest management plans, provide understanding of forest management plans	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No acceptable variance.

[32] New indicator in 2010 SFMP- previous SFMP#1 Indicator # 33 was Landslides, which has been deleted

What is this indicator and why is it important?

This indicator reflects the Participants' referral of all SFMP's, FOS's and PMP's, and major amendments to these plans, that may have an impact on First Nations and their exercise of rights guaranteed by Treaty 8. This indicator also reflects the efforts of the Participants to work with affected First Nations to help First Nations gain an understanding of the Participants' forest management plans and practices.

Providing opportunities for First Nations to comment on the Participants' plans and practices allows them to identify site-specific traditional values and uses, and opportunity to identify if activities may have an impact on their treaty rights. "Affected First Nations" refers to those First Nations with known traditional territory that overlaps an area referenced in the proposed plan.

The exchange of information with First Nations regarding the Participants' forest management plans and practices may occur by various means such as field trips, community meetings, JMAC meetings and workshops.

Current Status:

During the 2008-2009 reporting period one major FOS amendment (# 42) was prepared to address forest health concerns, which went through a review and comment period. The amendment was reviewed with the local Canfor-LP-Treaty 8 First Nations Joint Management Advisory Committee (JMAC) First Nations representatives prior to public advertising. As well, the amendment was sent to the affected First Nations, and followed up with phone discussions and a meeting with representatives of one of the affected First Nations. Details of this information sharing and subsequent discussion were included in the final FOS amendment, which was submitted to government.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

Strategy and Implementation Schedule:

Prior to or in conjunction with public advertising, the Participants will offer to review proposed SFMP's, FOS's, and PMP's and any major amendments to these plans requiring review and comment periods, with the JMAC. Minor amendments to plans will not be referred. Information sharing (licensee participants), or BCTS consultation will be carried out during the public review and comment period, and opportunities provided to affected First Nations to meet and discuss the proposed plans with the Managing Participants. During these meetings the Managing Participants will help First Nations to understand the plans presented and the practices to be used to implement the plans. Information on these efforts will be documented and included with submission of these plans to government.

Monitoring Procedure:

Documentation of information sharing and BCTS consultation efforts for the Participants practices and FOS, SFMP, and PMP's, or major amendments to these plans, will be reviewed annually for conformance to this indicator's target, and the results presented in Annual Reports.

Linkages to Operational Plans:

The FOS, SFMP, and PMP's or major amendments to these plans that are submitted to government will summarize information sharing or consultation with First Nations related to those plans

Linkages to the LRMP:

None

6.34 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:

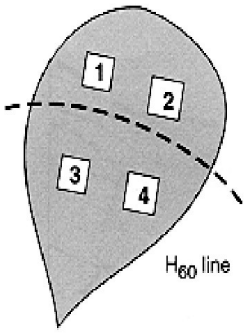
A variance to a minimum of 90% of the watersheds below the baseline targets will be acceptable.

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?

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).

Figure 12: Peak Flow Index - Example Calculation



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**

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. **Figure 12** provides an example of how PFI is calculated for 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. Table 27: PFI FOS Condition and Targets "*Baseline Threshold PFI*" and "*PFI FOS*" columns identify the projected baseline targets, and the current status, as presented in the 2004 FOS, which extrapolated the 2004 FOS blocks as harvested. All watersheds (103 of 105 or 98%) were projected to be within the target threshold except for Charlie Lake and Martin Creek, which are highlighted in the PFI table above. The Charlie Lake watershed features extensive agricultural development, while the Martin Creek watershed has been impacted by large wildfires in the past. There are two blocks currently planned in the Martin Creek watershed (19059 and 38019). A detailed watershed review will be conducted prior to field layout of these blocks.

A watershed review was conducted on the Charlie Lake watershed, with the final report produced November 10th, 2005 for BCTS, whose proposed TSL A63404 was located in the watershed. The report indicated that "*the amount of forest cover removal attributable to recent and proposed forest harvesting could not have a detectable impact on increased flows, as it only represents a total of 3% of the entire watershed*". The report also indicated that "*since the commercial forest harvesting within the DFA occurs in the upper most parts of this watershed it has a lesser impact that other developments that occur along the main branch or main tributaries of the Stoddard Creek System*".

The watershed review had the following recommendations:

- Maintain properly functioning riparian buffer along streams within or adjacent to cutblocks. This means that at least 10 trees, with a dbh of at least 15 cm, be maintained along all streams, for every 100 metres of stream length. These trees should be maintained within a 10 metre wide buffer along the edge of the stream.

- Effective erosion control and sediment control practices should be implemented at all stream crossings, no matter what size of the stream.

Applicable recommendations were implemented by BCTS for the block area in question.

Table 27: PFI FOS Condition and Targets

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS
Fontas	Bedji Creek		230.42	460 – 600	508	50	3.28
Fontas	Chasm Creek		168.21	539 – 680	599	50	5.74
Fontas	Dazo Creek		260.27	360 – 494	460	50	4.05
Fontas	FONT Unnamed 1		117.73	361 – 481	461	50	3.11
Fontas	Fontas River		320.35	536 - 800	660	50	3.89
Fontas	Kataleen Creek		162.95	380 – 451	413	50	2.95
Fontas	Teklo Creek		212.81	380 – 474	426	50	1.56
Fontas	Upper Etthithun River		404.45	620 – 842	680	50	17.25
Fontas	Ekwan Creek	LB	850.5	360 – 481	420	50	4.46
Fontas	Etthithun River	LB	1161.6	440 – 842	535	50	8.29
Fontas	Fontas River - LB	LB	714.32	440 – 800	580	50	3.70
Kahntah	Dahl Creek		412.84	535 – 943	700	50	0.62
Kahntah	Helicopter Creek		147.32	505 - 742	613	62	3.89
Kahntah	KAHN Unnamed 4		226.87	640 – 944	720	50	30.22
Kahntah	KAHN Unnamed 5		126.05	538 – 721	624	62	6.37
Kahntah	Upper Cautley Creek		478.27	660 – 1022	740	62	22.64
Kahntah	Cautley Creek	LB	865.02	518 – 1022	680	62	15.83
Kahntah	Kahntah Creek	LB	1096.59	518 - 944	700	50	9.18
Lower Beatton	Aitken Creek		828.45	654-985	815	43	12.70
Lower Beatton	Charlie Lake		292.66	690-889	773	62	80.89
Lower Beatton	Doig River		983.34	623-852	731	43	3.81
Lower Beatton	Osborn River		735.95	623-987	745	43	25.95
Lower Beatton	Umbach Creek		430.91	611-866	741	43	23.93
Lower Beatton	Upper Blueberry		857.77	655-1048	820	50	20.27
Lower Halfway	Aikman Creek		118.74	640 - 1120	815	43	24.12
Lower Halfway	Blair Creek		230.44	698 – 1142	902	43	16.44
Lower Halfway	Cameron Creek		495.18	699 – 1203	944	43	12.86
Lower Halfway	Colt Creek		158.53	719 – 1701	913	43	16.76

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS
Lower Halfway	Deadhorse Creek		208.99	560 – 959	820	43	25.40
Lower Halfway	Ground Birch Creek		338.39	558 – 1062	735	43	29.79
Lower Halfway	Horn Creek		426.61	1079 – 2347	1474	37	0.01
Lower Halfway	Kobes Creek		299.88	620 – 1648	828	50	21.17
Lower Halfway	LHAF Unnamed 1		216.47	699 – 1022	860	43	22.84
Lower Halfway	Needham Creek		328.94	938 – 2269	1430	43	0.04
Lower Halfway	Poutang Creek		179.97	1098 – 2393	1453	43	0.00
Lower Halfway	Townsend Creek		295.8	698 – 1081	880	43	21.35
Lower Halfway	Cameron River - Residual	LB	2029.32	538 - 1205	837	37	19.53
Lower Halfway	Graham River	LB	2309.94	530 – 2404	1279	43	4.64
Lower Sikanni	Bull Creek		351.34	639 – 981	752	50	0.79
Lower Sikanni	Dechacho Creek		172.51	378 – 762	516	50	8.59
Lower Sikanni	Katah Creek		594.82	419 – 915	660	50	0.68
Lower Sikanni	Kenai Creek		78.86	400 – 621	1000	50	5.42
Lower Sikanni	LSIK Unnamed 2		162.43	536 – 858	720	43	8.17
Lower Sikanni	LSIK Unnamed 4		59.29	519 – 721	641	50	3.57
Lower Sikanni	Niteal Creek		516.6	359 – 520	475	50	6.80
Lower Sikanni	Upper Gutah Creek		806.45	559 – 901	728	62	1.27
Lower Sikanni	West Conroy		248.28	638 – 1020	782	50	1.11
Lower Sikanni	Conroy Creek	LB	1096.67	417 – 1020	720	50	2.45
Lower Sikanni	Gutah Creek	LB	1450.99	380 – 901	645	50	2.53
Milligan	Dede Creek		128.35	680 – 740	720	62	1.84
Milligan	Flick Creek		203.24	700 – 859	780	62	3.74
Milligan	Little Beaverdam Creek		334.14	690 – 854	732	62	4.20
Milligan	MILL Unnamed 3		325.52	780 – 962	880	62	10.81
Milligan	Milligan Creek		432.38	680 – 941	780	50	5.23
Milligan	Upper Milligan Creek		382.2	719 – 941	832	50	4.91

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS
Milligan	Milligan Creek - LB	LB	1836.56	619 – 941	758	50	5.94
Upper Beatton	Arrow Creek		507.02	661 – 902	783	50	25.26
Upper Beatton	Beatton River		1071.09	777 – 1780	984	43	6.57
Upper Beatton	Black Creek		666.11	700 – 1022	807	50	7.01
Upper Beatton	Grewatsch Creek		269.73	736 – 1103	927	50	7.37
Upper Beatton	Holman Creek		150.18	719 – 1080	896	50	15.93
Upper Beatton	Jedney Creek		128.76	779 – 1101	952	43	5.50
Upper Beatton	La Prise Creek		338.99	717 – 1021	860	50	6.54
Upper Beatton	Martin Creek		120.24	700 – 980	830	50	57.35
Upper Beatton	McMillan Creek		103.34	659 – 770	736	43	4.10
Upper Beatton	Nig Creek		476.81	680 – 920	782	50	28.62
Upper Beatton	UBTN Unnamed 9		156.26	677 – 880	757	50	10.19
Upper Beatton	Upper Beatton Lrg	LB	2345.63	719 - 1782	924	50	8.04
Upper Halfway	Blue Grave Creek		158.63	720 – 1722	960	37	15.01
Upper Halfway	Horseshoe Creek		197.41	739 - 1762	1060	37	4.86
Upper Halfway	Two Bit Creek		160.23	980 – 1888	1235	37	0.00
Upper Halfway	UHAF Unnamed 3		127.86	922 – 1862	1221	37	0.47
Upper Halfway	UHAF Unnamed 6		211.34	778 – 1981	976	37	14.86
Upper Halfway	Upper Chowade		426.75	925 – 2336	1395	37	2.70
Upper Halfway	Upper Cypress		334.89	1099 – 2316	1493	37	0.00
Upper Halfway	Upper Halfway River		629.22	1103 – 2590	1235	37	1.55
Upper Halfway	Chowade River	LB	988.88	779 - 2331	1475	43	5.59
Upper Halfway	Cypress Creek	LB	620.07	840 – 2229	1200	37	4.56
Upper Halfway	Upper Halfway River - LB	LB	1096.06	914 – 3057	1241	37	1.36
Upper Peace	Coplin Creek		350.04	582-942	773	43	21.90

Watershed Group	Watershed Name	Class	Size (km2)	Elevation range (m)	H60 Elevation (m)	Baseline Threshold PFI	PFI FOS
Upper Peace	Farrel Creek		646.01	447-1686	713	43	10.60
Upper Peace	North Cache Creek		187.89	548-909	759	43	18.46
Upper Peace	Red Creek		239.85	446-919	753	43	12.65
Upper Prophet	Besa Creek		515.61	1136 – 2993	1568	43	0.01
Upper Prophet	Minaker River		170.31	859 – 1742	1060	43	0.12
Upper Prophet	Nevis Creek		182.43	1019 – 2102	1422	37	0.01
Upper Prophet	Pocketknife Creek		235.85	860 – 1884	1110	43	0.00
Upper Prophet	Upper Keily Creek		269.62	1137 – 2920	1683	37	0.00
Upper Prophet	Minaker River - Residual	LB	555.08	819 – 1820	1070	43	0.25
Upper Prophet	Upper Prophet	LB	1177.85	1020 - 2993	1569	37	0.00
Upper Sikanni	Boat Creek		391.83	455 – 1081	719	50	0.00
Upper Sikanni	Buckinghorse River		389.18	840 – 1936	1119	43	0.03
Upper Sikanni	Coal Creek		214.49	637 – 1079	900	43	7.88
Upper Sikanni	Daniels Creek		223.39	758 – 1263	1041	43	0.99
Upper Sikanni	Donnie Creek		122.16	520 – 1043	822	50	10.79
Upper Sikanni	Loranger Creek		132.18	1025 – 2018	1390	43	5.98
Upper Sikanni	Medana Creek		138.68	702 – 1183	1000	43	1.92
Upper Sikanni	Middle Fork Creek		207.97	857 – 1269	1060	43	3.97
Upper Sikanni	Sidenius Creek		460.87	1119 – 2619	1489	43	0.04
Upper Sikanni	Sikanni Chief		470.52	1119 – 2739	1488	43	0.53
Upper Sikanni	Temple Creek		216.19	458 – 901	760	43	3.45
Upper Sikanni	Trimble Creek		160.27	1082 – 2122	1439	43	0.00
Upper Sikanni	Trutch Creek		858.44	491 – 1262	781	43	1.94
Upper Sikanni	Buckinghorse River - Residual	LB	1239.18	618 - 1936	1029	43	1.28
Upper Sikanni	Sikanni Chief - Residual	LB	2902	618 – 2739	1143	43	4.08

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 2010 FOS which is scheduled to be completed in the fall of 2010. 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 CENGEA data. All Participants are using CENGEA 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 (Cengea 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.

6.35 WATER QUALITY CONCERN RATING

Indicator Statement	Target Statement
The percentage of surveyed stream crossings annually identified with a high WQCR rating on forestry roads within the DFA for which Participants have stewardship *WQCR – water quality concern rating	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' WQCR. [33]
SFM Objective: Maintenance of water quality	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

Maximum allowable 'high' WQCR will be 35%.

[33] 2010 SFMP target revised to annual measurement from three year rolling average of 2004 SFMP

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 Scrivener1990; 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 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.

Current Status:

This indicator and target were based on three year rolling averages for the term of SFMP #1. Table 27 provides a summary of WQCR data collected during the 2006-2008 timeframe:

Figure 13 summarizes the results of three year rolling averages with ‘high’ WQCR for data collected between 2002 -2008. 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 field-trip 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.

Figure 13: Three Year Roll Average of WQCR

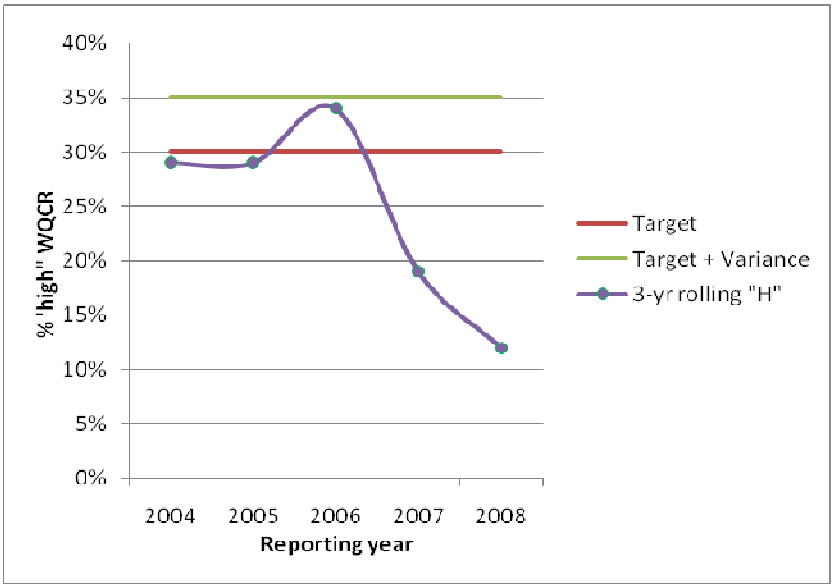


Table 28: Water Quality Concern Ratings- 2006-2008

Status	*WQCR 'High' (# crossings)*	*WQCR 'Medium' (# crossings)*	*WQCR 'Low' (# crossings)*	*WQCR 'None' (# crossings)*	*Total (#)*	*% crossings rated 'High'*
All combined	60	50	207	195	512	**12%**

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

Strategy and Implementation Schedule:

Management practices for stream crossings and seasonal bridge installation and removal will be consistent with the procedures in Appendix 12.

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 aspects of the 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.

6.36 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 SFMP. A review of conformance issues for this indicator in Annual Reports from April 1st, 2004 to March 31st 2009 identified that the Participants were consistent with this indicator's target in two of five years (2006 and 2007 Annual Report submissions), and within the acceptable variance in the other 3

years, with only one minor inconsistency with SLP measures noted in each of those three years.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.

6.37 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:

There were no reportable spills entering water bodies noted in the Annual Reports completed to date over the term of the first SFMP (2004-2009).

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.

6.38 CARBON SEQUESTRATION RATE

Indicator Statement	Target Statement
Maintenance of DFA average carbon sequestration rates.	Maintain DFA average carbon sequestration rates that are consistent with or greater than natural sequestration rates.
SFM Objective: Maintenance of the processes for carbon uptake and storage	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No decline lower than the natural disturbance sequestration rate as modeled in support of this indicator is acceptable.

What is this indicator and why is it important?

As a result of the 1997 Kyoto protocol, international attention has been focused on the problem of global greenhouse gas emissions. This has placed considerable pressure on the public and private sectors to account for the role of forests in storing carbon and reducing global CO2 emissions. The capacity of forest ecosystems to sequester carbon ('C') can thus be considered an environmental value and should therefore be included as one aspect of sustainable forest management practice. For carbon sequestration to be effectively represented within an ecosystem-level management plan, however, it must be considered within the context of timber production, wildlife conservation, and visual aesthetics. Presently, there are few forest-level decision support tools available to managers for assessing carbon sequestration as part of an integrated suite of indicators of SFM (Seely and Nelson, 2002).

Sequestration is defined as the net amount of C removed from the atmosphere and stored in the ecosystem each year. The calculation of average net C sequestration rates within a timber supply area allows for a long-term evaluation of effects of management activities and/or natural disturbance on the rate at which the forested landscape is sequestering C. Average sequestration rates are based on changes in ecosystem carbon storage over time without accounting for C removed in harvested biomass. The rationale is that the carbon in harvested materials will be stored in wood products following harvest. An assessment of the sequestration rate provides a measure of the rate and direction of carbon exchange between the forest ecosystem and the atmosphere.

Current Status:

Figures 14 and 15 provides an example of the average C sequestration rate for both an individual stand (Forecast AU 3 – Natural and Forecast AU 34 – Managed), and shows the average C sequestration rate over the whole DFA over time.

At the stand level there is a greater release of C to the atmosphere following the decomposition of the larger pool of dead organic matter (snags and CWD) in the natural stand which results in a lower sequestration rate during the first several decades of stand development (

Figure **14**). In the example provided, the average sequestration rate takes longer to return to positive values in the natural stand versus the managed stand. This is partly related to the fact that the harvested wood removed from the site during harvesting does not contribute to ecosystem C release to the atmosphere. Rather, it is assumed to be stored in wood products.

At the DFA level (Figure 15) the average sequestration rate declines from the present level of about 0.67 Mg C/ha/yr over the next 50 years and stabilizes between 0.3 and 0.4 Mg C/ha/yr in the long term. The decline from the current situation is due to the large amount of area (approximately 45%) that is between 40 and 100 years old. Over time the age class distribution is more evenly distributed with more area in younger stands and older stands with lower sequestration rates therefore the DFA level sequestration rate declines. For comparison purposes an estimate of the rate of C sequestration is provided for both the current AAC and the Fort St. John DFA under a natural disturbance regime.

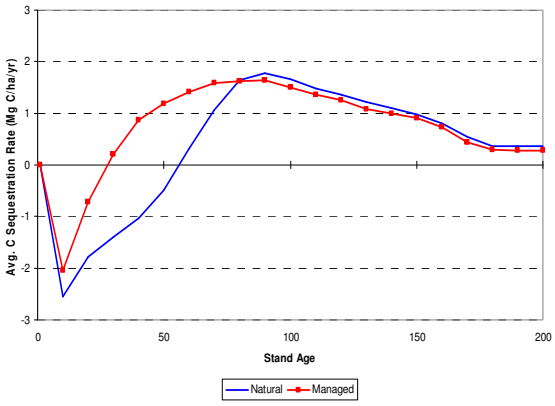


Figure 14: An Example of Average C Sequestration Rates for a Natural Spruce Leading Site Index 17 Stand (Forecast AU 3) and an Associated Managed Stand (Forecast AU 34)

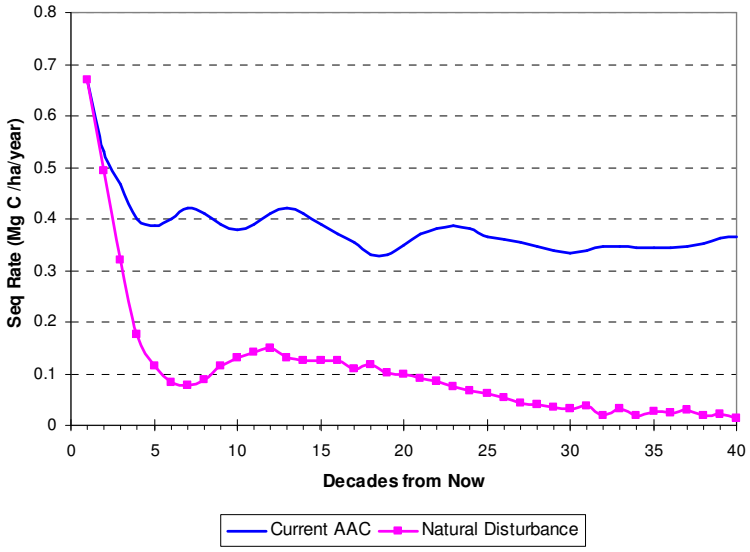


Figure 15: Average Carbon Sequestration (Mg C/ha/year) within the Fort St. John DFA Over Time

Forecasting Assumptions and Analytical Methods:

Stand level C curves were generated for the Fort St. John DFA on both the THLB and the NHLB using the FORECAST model. Since many of the existing analysis units (AU's) used in TSR 2 were similar in terms of species and average SI, they were clumped together to fit within a series of 49 carbon analysis units developed for simulation in FORECAST. The FORECAST carbon analysis units were designed to represent a range of a site quality classes and a range of species mixtures that was consistent with the existing AU's. The regeneration assumptions for each of the carbon AU's were based on those described for the existing managed-stand AU's. Each of the existing THLB and new NHLB AU's was subsequently assigned to one of the new carbon AU's based on species, site index, and regeneration assumptions. Details of the FORECAST C AU's are provided in Appendix 17.

A carbon curve database was subsequently prepared by summarizing the results for total ecosystem C storage on 10-year time steps for each of the FORECAST carbon AU's. In addition, average rates of C sequestration were calculated for each time step based on the following equation:

$$\text{Avg. Sequestration Rate}_t = \frac{\text{Ecosystem } C_t - \text{Ecosystem } C_{t-10}}{10}$$

These curves were incorporated into the FSSIM forest estate model used to do forecasting in support of this SFMP.

In order to provide a context of C sequestration in relation to a natural landscape a simulation of natural disturbance was completed (i.e. no harvesting or fire control). Removing the volume target and applying an area target by Natural Disturbance Unit

accomplished this. Minimum disturbance age was set to 10 years to mimic that fire can burn young stands as well as old stands and disturbance priority was set to random. Areas disturbed by NDU were based on DeLong 2002 and is summarized in Table 29 below.

Table 29: Area Disturbed/Year in Natural Disturbance Simulation

Natural Disturbance Unit	Stand Replacement Disturbance Cycle (years)	Annual Disturbance Rate (% Area/year)	Total Forested Area (ha)	Average Disturbance (ha/year)
Boreal Plains - Alluvial	200	0.500%	31,227	156
Boreal Foothills - Mountain	150	0.667%	154,048	1,027
Boreal Plains – Upland	100	1.000%	1,855,662	18,557
Boreal Foothills – Valley	120	0.833%	34,470	287
Northern Boreal Mountains	180	0.556%	108,603	603
Omineca - Mountain	300	0.333%	87,602	292
Omineca - Valley	120	0.833%	8,680	72
Total				20,995

Separate C AU's were not completed which account for the different transitional pathway of a natural disturbance regime versus a natural stand transitioning to a managed stand. As such the natural disturbance simulation likely has some additional error.

Strategy and Implementation Schedule:

The strategy to manage sequestration rates is through prompt reforestation, and maintaining acceptable levels of stocking over the landscape on previously harvested and regenerated sites, as outlined in the reforestation strategy and associated indicators.

Fire suppression as well contributes to maintaining the sequestration rates by controlling age class distributions.

The process described for this indicator is a first approximation of the effects of forest management on sequestration rates in comparison to a natural disturbance regime. The models and inventory used to predict C sequestration rates are still rudimentary at this point and as new knowledge is gained this indicator will be assessed to determine if this data and methods are appropriate and methods will be adjusted if necessary.

Monitoring Procedure:

During TSR processes sequestration rates will be calculated for both the Timber Harvesting Land Base and the Non-Timber Harvesting Land Base and compared to the targets.

Linkages to Operational Plans:

The most direct link to operational plans is prompt reforestation and ensuring that sufficient stocking is on the harvested and regenerated sites. This is monitored through indicator 30 and 29 respectively.

Results from the monitoring plots and estimates of MAI influences harvest levels and long-term harvest levels. This indicator is reviewed and incorporated into Timber Supply Review process, which influences actual harvest levels within the DFA.

Linkages to LRMP:

This indicator helps to support the following LRMP objective:

Maintain functioning and healthy ecosystems.

6.39 ECOSYSTEM CARBON STORAGE

Indicator Statement	Target Statement
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.
SFM Objective: Maintenance of the processes for carbon uptake and storage	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

No acceptable variance.

What is this indicator and why is it important:

As a result of the 1997 Kyoto protocol, international attention has been focused on the problem of global greenhouse gas emissions. This has placed considerable pressure on the public and private sectors to account for the role of forests in storing carbon and reducing global carbon dioxide (CO_2) emissions. (Seely and Nelson, 2002).

Carbon (C) storage is contained in several components of forests including tree biomass, plant biomass, coarse woody debris, forest floor litter, and soil. Forest soils are a large but relatively stable reservoir of C with minimal changes over time. In contrast, variation is C storage in tree biomass is the dominant factor regulating temporal patterns in total ecosystem C storage (Seely and Nelson, 2002).

Total volume (m^3) of standing time in both the THLB and Non-THLB is used as a surrogate for storage of C within the Fort St. John DFA. This indicator is influenced by harvest levels over time, natural disturbances, fire protection policies and fire suppression success.

Current Status:

There is an estimated 398 million Mg of C currently stored in the Fort St. John DFA ecosystem declining in the long term to approximately 336 million Mg of C (Figure 17). Both the C storage levels based on current the AAC and the estimation of natural disturbance decline over the next 150 years and then stabilize for the remainder of the simulation. At the end of the 400-year simulation the current AAC results in 3.7% less C storage than the estimated storage in the natural disturbance regime.

For comparison a stand level graph (

Figure **16**) is provided which demonstrates a natural stand and its associated managed stand C storage levels over time. Note that while the natural stand started with more C remaining on the site after the disturbance the managed stand catches up in about 60 years.

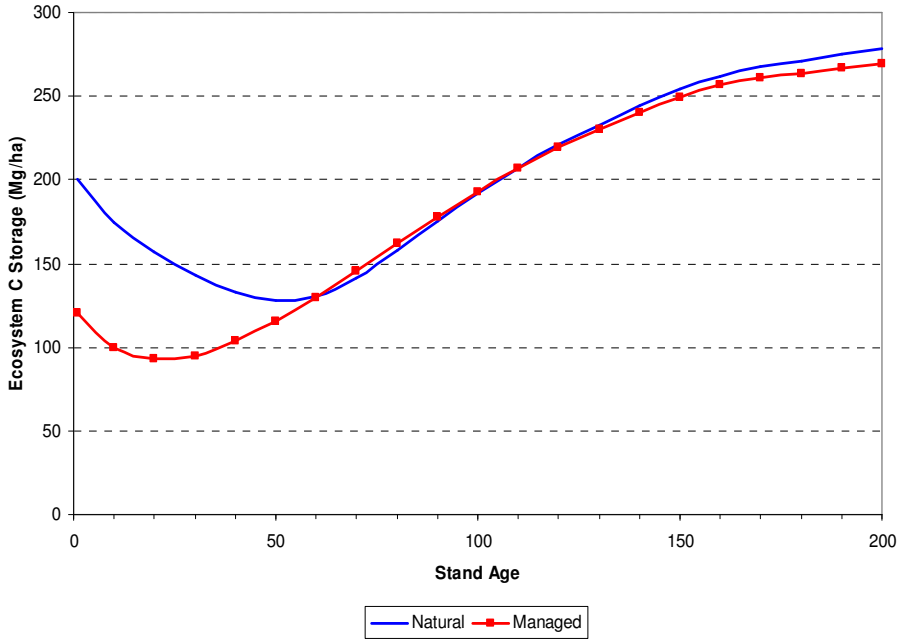


Figure 16: An Example of average C Storage for a Natural Spruce Leading Site Index 17 Stand (Forecast AU 3) and an Associated Managed Stand (Forecast AU 34)

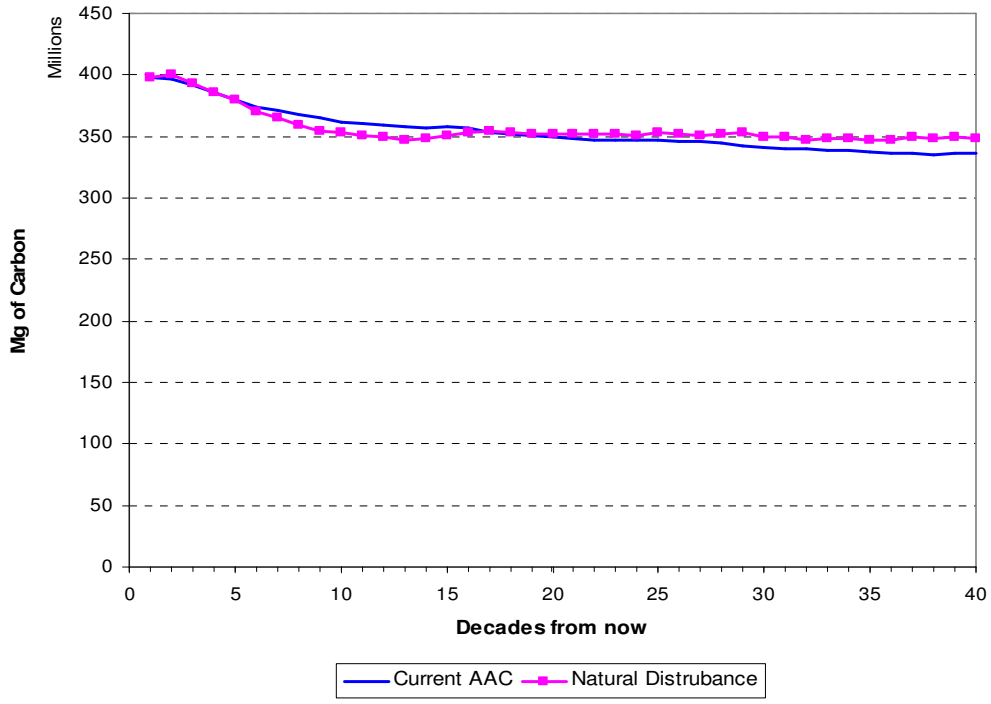


Figure 17: Total Carbon (Mg) Storage in the Fort St. John DFA Over Time

Forecasting Assumptions and Analytical Methods:

See indicator 38 for details on how the C indicators were forecasted and analyzed. The only difference for indicator 39 is that total ecosystem C storage is tracked, rather than sequestration rates.

Strategy and Implementation Schedule:

The strategy to manage C storage is through prompt reforestation and maintaining acceptable levels of stocking over the landscape on previously harvested and regenerated sites, as outlined in the reforestation strategy, and associated indicators.

Fire suppression as well contributes to maintaining C storage by controlling age class distributions and minimizing C release into the atmosphere through wildfires.

The process described for this indicator is a first approximation of the effects of forest management on C storage in comparison to a natural disturbance regime. The models and inventory used to predict C storage are still rudimentary at this point and as new knowledge is gained this indicator will be assessed to determine if this data and methods are appropriate and methods will be adjusted if necessary.

Monitoring Procedure:

During TSR processes C storage will be calculated for both the Timber Harvesting Land Base and the Non-Timber Harvesting Land Base and compared to the targets.

Linkages to Operational Plans:

Forestry activities influence total C storage through harvest levels, and reforestation-stocking levels, which are monitored through indicators 31, 53, 29 respectively.

Linkages to LRMP:

This indicator helps to support the following LRMP objective:

Maintain functioning and healthy ecosystems.

6.40 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 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 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.

Currently total number of referrals received and the number of changes to plans is tracked. In 2008-2009 a total of 127 referrals were received by the Participants, who responded with 12 proposed changes to these plans to minimize impacts on the THLB. There is currently no formal tracking system to monitor the three reporting metrics proposed for this indicator.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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 (CENGEA) 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

6.41 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 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. 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 at some future time. 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:

Table 30 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 , 2009 (SFMP #1):

Table 30: Results of Mutually Agreed Range Action Plans

Annual Report Period	# Actions Planned	# Actions Completed	# Formal TRAPS
2004-2005	1	1	0
2005-2006	10	10	6
2006-2007	21	21	4
2007-2008	8	8	5
2008-2009	1	1	1
Total	41	41	16

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

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

Strategy and Implementation Schedule:

Forestry planning staff will provide the opportunity for range tenure holders to meet, or otherwise provide comments on forestry activities proposed for their tenure area 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 range tenure holder, and any subsequent mutually agreed action plan will have completion dates and responsibilities identified.

Prior to the commencement of harvesting on deciduous blocks, forestry staff will also offer to engage range tenure holders in discussions to formulate a mutually agreed timber range action plan (TRAP) to address issues for all or part of the proposed forestry activities on their tenure area, as identified in the most current Forest Operations Schedule (FOS).

Additionally, if range tenure holders identify an issue related to his tenure during forestry field operations, a mutually agreed action plan may be developed by the two parties to address the concern at that time.

These action plans and dates will be documented and entered as range 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 range tenure holder for the change, and notify any responsible parties of the changes made.

Monitoring Procedure:

An annual review of the incident tracking system will identify the number of range related mutually agreed action plans planned to be completed during the reporting period, the number of actions actually completed, and the number of actions not completed as scheduled, to determine the percentage of consistency with 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

6.42 DAMAGE TO RANGE IMPROVEMENTS

Indicator Statement	Target Statement
Number of range improvements damaged by Participants' activities.	Zero range improvements damaged by Participants' activities.
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:

Temporary removal or alteration of a range improvement to enable short-term forestry activities to proceed is permissible. However repairs to or replacement of improvements must be completed in less than one year from the time they were damaged. The indicator target would not apply if a Participant can implement alternative mitigation measures to the satisfaction of the range tenure holder.

What is this indicator and why is it important?

The overlapping nature of forest and range tenures may result in range improvements being present in cutblocks planned for harvest by the forest industry. Range improvements include fences, cattle guards, dugouts, or trails constructed by range-tenure holders for specific range management purposes. Range improvements may need to be temporarily modified to conduct business, or they may be inadvertently damaged by the forest industry.

Alteration or removal of range improvements may occur, on the understanding that the improvements will be reconstructed or replaced in a timely manner, to substantially the pre-impact condition. Alternatively, the Participants may implement other mitigation measures provided they are acceptable to the affected range tenure holders.

This indicator demonstrates the Participants' commitment to address direct impacts to range tenure improvements resulting from forestry activities, and to minimize disruption to range tenure holders.

Current Status:

There were 11 instances of damaged range improvements between April 1 2004 and March 31 2009 resulting from the Participants' activities. All eleven had formal action plans developed, tracked and successfully implemented to repair the damage in a timely manner, consistent with the indicator's target.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply.

Strategy and Implementation Schedule:

Information on the location and preharvest condition of range improvements is provided by range tenure holders through responses to referral requests on Forest Operations Schedules, and other operational plans (e.g. PMP's), or through the Timber Range Action Plan process (TRAP's- see indicator # 41). In addition, range improvements may be identified and mapped during Site Level Plan (SLP) field data collection. Proposed actions related to mitigating damage to range improvements, are tracked by the Participants in an incident tracking or similar system.

The location of range improvements is shown on operational maps, and preworks with staff and contractors identify what measures are needed, if any, to avoid, modify and/or repair improvements.

Damage to range improvements is recorded by Participant staff through field inspections. Staff develop action plans to ensure mitigation, repair, or restoration measures are conducted in a timely manner.

Monitoring Procedure:

The Participant incident tracking systems identifies all action plans and target dates, including those derived from TRAP's. 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.

Site Level Plans will identify range improvement 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 address range improvements during operations.

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.

6.43 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.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.

6.44 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 professional forester, 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:

The government established scenic areas for the Fort St. John TSA in 1997. Known scenic areas in the DFA are focused primarily in the Muskwa Kechika Management Area and along the Alaska Highway corridor. Currently, all known scenic areas have established visual quality objectives.

Figure 18 shows the current VQO polygon distribution in the Fort St. John TSA.

Table 31 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 8 cutblocks. These variances were granted in order to address Mountain Pine Beetle sanitation logging in visually sensitive areas, and were reported in the 2007-2008 and 2008-2009 Annual Reports.

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Table 31: Summary of Post harvest Visual Quality Assessments 2004-2009

Year	# Licensee Assessments	# BCTS Assessments	Total # Assessment	Total # Consistent with VQO
2008-2009	13	3	16	16
2007-2008	2	0	2	2
2006-2007	4	2	6	6
2005-2006	1	0	1	1
2004-2005	8	0	8	8
Total	**28**	**5**	**33**	**33**

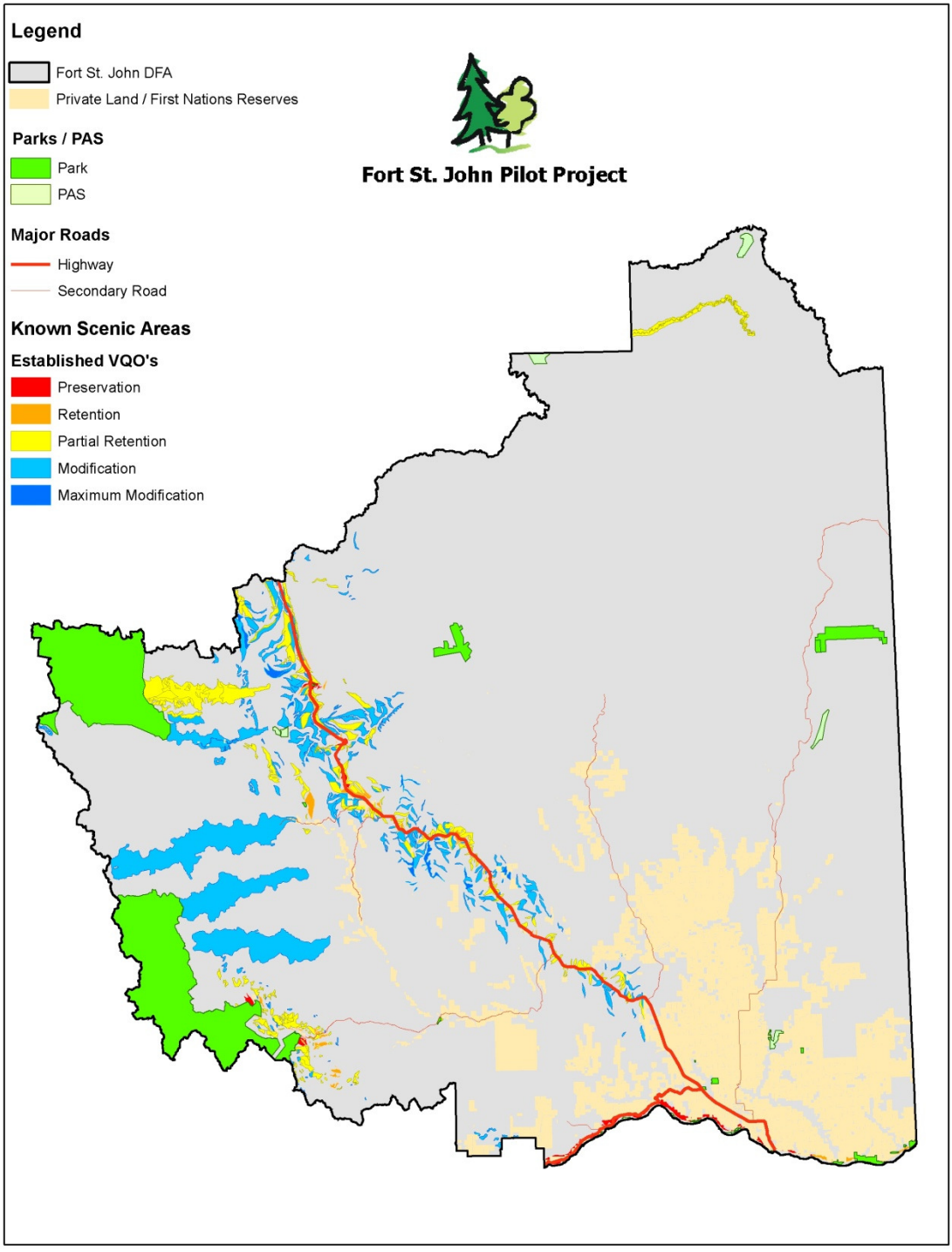

Figure 18: Fort St. John VQO's (updated December 2009)

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.

6.45 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 13 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:

The 2004 Forest Operations Schedule projected the impact of planned development presented in the FOS on the ROS for the six years of logging outlined in the FOS. No additional harvesting has been planned in these LU's since that time, so the projection is still applicable. Table 32 summarizes the projected ROS condition presented in the 2004 FOS.

Table 32: Projection of Changes to ROS Class from 1996 to 2010

Crying Girl Graham & Sikanni LU	ROS Class Projection to 2010- After Modeling Impact of Proposed Development in 2004 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)? No

Strategy and Implementation Schedule:

All forest management activities within each of the specified Landscape Units will be evaluated in the development of the 2010 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.

6.46 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 2008-2009 Annual Report:

Canfor completed two mutually agreed upon actions with trappers during the reporting period. Both actions related to sharing more detailed mapping information and block scheduling. There were no mutually agreed upon actions developed with guides during the reporting period, nor were there any outstanding actions relating to trappers or guides to be completed.

During BCTS's Notification of Intent to Treat (NIT) period for 2008 proposed herbicide treatments, a specific inquiry was received from the trapline holder in the Graham River area (TR0736T001). During the telephone call on May 20th with the trapline holder, BCTS was requested to leave a 100m buffer along all areas of the block that paralleled the Graham River Mainline. The trapline holder recognized from the referral information provided to him that this block was to be discretionary sprayed and thought that this request should not affect BCTS's ability to spray a good portion of the block regardless. BCTS agreed to the trapline holder's request and ensured that this area was properly delineated on all operational spray maps and that the pilot was further informed to leave the buffer area during the pre-application flight.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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. CENGEA 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).

6.47 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 MFR 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 1st 2008 to March 31st, 2009.

Table 33: Proportion of Total Volume Locally Processed[34]

Total Scaled Volume of Timber Originating Within the DFA	Total Scaled Volume of Timber Delivered to Local Processing Plants	Percentage of Total Volume Processed Locally
523,767 m^3 coniferous	602,640 m^3 coniferous	115%
442,812 m^3 deciduous	519,651 m^3 deciduous	117.4%
966,579 m^3 total	**1,122,111 m^3 total**	**116.1%**

During the term of SFMP # 1 (commencing April 1st 2004) the volume of timber processed in the DFA has exceeded the indicator target in each year, as reported in Annual Reports.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No

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

[34] 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

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.

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.

6.48 SUMMER AND FALL VOLUME DELIVERIES

Indicator Statement	Target Statement
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
SFM Objective: Maintain viable timber processing facilities in the DFA	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

The target volumes assume planned production levels are achieved at the local mills. Allowable variances for the minimum acceptable deliveries may be reduced proportionally for the number of actual operating weeks, divided by the normal fifty operating weeks of the facilities per year.

What is this indicator and why is it important?

This indicator is the volume of logs delivered during the summer and fall months. These deliveries are essential to providing an uninterrupted fibre supply to run major timber processing facilities. The minimum targets are approximately 10 to 15 percent of normal annual deliveries. Providing for deliveries between May 1st and November 30th (the frost free period) to major facilities reduces the amount of wood that must be decked in mill yards at breakup (i.e. the end of March). This substantially reduces carrying costs, and minimizes fibre value losses associated with excessive drying, which significantly improves the cost competitiveness of the local forest industry.

These deliveries provide summer employment opportunities that increase the length of the work season for harvesting and road contractors. This improves the contractors' efficiency,

and supports more stable employment, thereby also contributing to the stability of local communities.

Variances to the target are required to reflect situations where facilities may be closed for reasons other than lack of fibre supply.

Current Status:

In 2008 the coniferous sawmill received 176,202 m^3 between May 1st and November 30th. The deciduous mills received 322,012 m^3 during this time period in 2008. Since the inception of SFMP # 1, the targets for this indicator have been achieved in every year.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

The amount of summer ground available to the Participants will be estimated in the FOS, and the FOS data will be analyzed to demonstrate that there is potentially sufficient timber available for summer deliveries to meet the targeted volumes.

Strategy and Implementation Schedule:

Areas that are suitable for harvesting operations during frost free conditions are limited within the TSA. Harvest planning therefore needs to emphasize the identification and development of these areas.

Implementing this strategy will require careful assessment of all areas which may have the potential for summer or fall log deliveries, the identification of potential constraints to frost free operations, and the scheduling of road and block development to support this strategy accordingly. Harvest delivery plans need to review available information from the FOS and subsequent SLP field assessments to determine specifically the location of the timber that can reasonably be expected to be delivered during the May 1st to November 30th time period.

Management practices on areas planned for summer harvesting will be implemented to ensure site productivity is not compromised by this strategy. Proposed blocks will be assessed to determine if moisture regime, soil conditions, and access opportunities are potentially conducive to operations during frost free periods. Measures to protect soils during frost free activities are included in the Soil Disturbance indicator (see section 6.4)

Monitoring Procedure:

The volume delivered to the mills from May 1st to November 30th of each year will be determined from scale deliveries and reported in Annual Reports, along with information on the number of operating weeks at each mill, when relevant for the purposes of the allowable variance.

Linkages to Operational Plans:

The location of blocks identified in the FOS will, among other criteria, be based on the potential for summer harvesting. The amount of summer ground available to the Participants will be estimated in the FOS, and the FOS data will be analyzed to demonstrate that there is

sufficient timber available for summer deliveries for the Participants to potentially meet these targets.

SLP's will note site conditions and the relative opportunities for summer harvesting or hauling in cutblocks, as well as identify potential issues to consider when determining if summer harvesting is feasible.

Annual harvesting plans will utilize information in these plans to assign season and year of harvest to blocks.

Linkages to LRMP:

This indicator relates to LRMP forestry strategies to maintain permanent road infrastructures to facilitate summer harvesting opportunities in some LU's, which supports the following LRMP objective:

Maintain or enhance timber harvesting opportunities.

6.49 FOREST HEALTH FOS PLANNING[35]

Indicator Statement	Target Statement
Percentage of new conifer-leading harvest blocks in the 2010 Forest Operations Schedule that are pine-leading.	A minimum of 60% of new conifer-leading harvest blocks in the 2010 FOS will be pine-leading.
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 10% variance (i.e. minimum of 50% new conifer leading blocks in the 2010 FOS will be pine leading) is required in the event some FOS proposed blocks are dropped prior to submission of the final FOS due to public input during or after the public review and comment period.

[35] New indicator in 2010- previous # 49 in SFMP # 1 was Harvest Systems which has been deleted

What is this indicator and why is it important?

For the purposes of the forest health strategy sanitation harvesting, harvesting of green susceptible stand types, and salvage harvesting are the primary tactics to be considered in dealing with landscape level forest health damaging agents such as mountain pine beetle.

This indicator determines the percentage of new conifer blocks identified for all of the 2010 FOS that are considered pine leading. It is a cumulative assessment of all of the Participants' conifer leading blocks. A pine leading block is defined as a block with greater than or equal to 50% of its gross FOS area that consists of VRI polygons in which pine (Pl or Pli) is designated as the leading species (i.e. 'SP1' in the inventory file).The indicator measures the extent to which timber harvesting priorities are adjusted to concentrate future harvesting in pine leading forest stands which may be infested, or susceptible to infestation, from Mountain Pine Beetle.

This indicator is important because it demonstrates the Participants' commitment to react to forest health concerns by responding with changes to forest planning to prioritize areas which are more susceptible to mountain pine beetle attack. Addressing major forest health issues through proactive planning is expected to reduce the potential impacts to forest ecosystems, and support the long term economic viability of the timber industry.

Current Status:

Pine is typically intermixed with variable amounts of white spruce, aspen, and black spruce throughout the TSA, with 'pure' pine stands (i.e. greater than 80% pine by volume) being rare relative to TSAs in the south of the province. Historically, conifer harvesting has averaged approximately 65% white spruce, 32% pine and 3% subalpine fir in the Fort St. John TSA. The 2004 Forest Operations Schedule, which was prepared prior to any detection of mountain pine beetle (MPB) in the TSA, included a suite of conifer blocks with a timber profile similar to these historical averages.

Subsequent to the arrival of the pine beetle in the TSA in 2006, annual FOS amendments have been made to add in cutblocks where MPB has been detected, in an effort to minimize the impact and spread of the insects by removing infested or threatened stands. In many cases the infested stands have been in mixed pine-spruce or spruce-pine forests. These stands are thought to be more susceptible to MPB attack, because the more favorable growing conditions produce larger diameter pine trees that are favoured by the MPB.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

Strategy and Implementation Schedule:

The preparation of the second FOS is expected to be completed in the fall of 2010, following approval of this SFMP. The 2010 FOS will include old blocks from the 2004 FOS which have yet to be harvested, as well as new proposed cutblocks, in order to provide at least six years of timber supply for the Participants.

The location of stands susceptible to MPB will be determined from VRI data, aerial pest surveys, ground reconnaissance, photo interpretation, and existing MPB susceptibility

mapping. These sources will be used to prioritize new pine leading blocks for inclusion in the 2010 FOS.

Planners will document inventory information for each polygon included in all newly identified FOS blocks, and the area of pine leading VRI polygons within each new conifer leading cutblocks will be used to determine which blocks are pine leading.

Monitoring Procedure:

The process for monitoring this indicator will be as follows:

- New conifer blocks will be distinguished in the FOS from old blocks carried forward from the previous FOS. They will be designated as a C (conifer block- licensees), CD (conifer leading-mixedwood-licensees), or BCc (BCTS conifer leading block).
- GIS spatial analysis will be done by intersecting VRI polygons with new proposed conifer block boundaries to derive areas.
- For each block, GIS analysis will determine what percentage of the gross area is encompassed by VRI polygons where SP1= Pl or Pli.
- The number of blocks where more than 50% of the area is in SP1=pine will be determined
- The indicator's percentage of pine leading new blocks will be calculated by dividing the number of new conifer blocks with more than 50% SP1=pine by the total number of new conifer blocks.
- This summary will be provided in the FOS text, and included in the Annual Report following completion of the FOS.

Linkages to Operational Plans:

The FOS will identify whether blocks are pine leading, and will provide an analysis to demonstrate the level of conformity.

Linkages to the LRMP:

This indicator links to the following LRMP objective: *Manage for forest health*

6.50 COORDINATION[36]

Indicator Statement	Target Statement
Percentages of SFMP's and FOS's jointly prepared by the Participants	100% of all SFMP's and FOS's will be jointly prepared by the Participants

[36] The indicator was made a legal indicator in SFMP#2 to emphasize the commitment to coordinated planning 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 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 by effected Participants, or prepared by one Participant and reviewed prior to submission for any concerns by the other Participants.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

Strategy and Implementation Schedule:

The preparation of the second FOS is expected to be completed in the fall of 2010, 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.

6.51 TIMBER PROFILE-DECIDUOUS [37]

Indicator Statement	Target Statement
The area (ha) of deciduous-leading cutblocks identified in Supply Block F for harvest during the term of the SFMP.	A minimum of 200 ha of deciduous-leading cutblocks located in Supply Block F will be identified for harvest during the term of the new SFMP.
SFM Objective: No decrease in the LTHL 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:

None.

[37] New indicator in 2010 SFMP. Previous Indicator # 51 in SFMP # 1 was 'Utilization' which has been dropped

What is this indicator and why is it important?

This indicator quantifies the gross cutblock area in deciduous leading stands from Supply Block F in the Fort St. John TSA, that are included as proposed cutblocks in a FOS or FOS amendment during the term of this SFMP.

The 2002 Timber Supply Area Analysis Report sensitivity analysis suggests that if there is no deciduous harvest in Supply Block F, the initial deciduous harvest can only be maintained for one decade, and the LTHL would decrease by 22%, or 140,000 m^3/year.

While significant deciduous harvesting within the TSA has only just started, initiating harvesting in this Supply Block during the second SFMP will help support the maintenance of the deciduous AAC at current levels. Other issues related to the deciduous timber supply that were identified by the Chief Forester as areas of uncertainty requiring further work are being addressed through ongoing projects.

Current Status:

To date there has been no harvesting in deciduous leading cutblocks located in Supply Block F. Some incidental deciduous volumes have been delivered from coniferous leading blocks.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

Strategy and Implementation Schedule:

The Participants are required to include the approximate location of cutblocks and roads planned for harvest for a period of at least six years in Forest Operations Schedules, which must be consistent with this SFMP.

The next FOS is scheduled for submission for review and comment in 2010, and will include harvesting plans for the term of this SFMP (2010-2016). The Participants will identify for harvest a minimum of 200 hectares of deciduous leading cutblocks located within Supply Block F. The deciduous stands will be classified based on the most current forest inventory classification, and the blocks will be assigned in the FOS to one or more of the Participants authorized to harvest in deciduous leading stands.

Monitoring Procedure:

Conformance to the indicator's target will be demonstrated in the FOS, and reported in the subsequent Annual Report.

Linkages to Operational Plans:

The FOS will identify the area of deciduous blocks to be harvested in Supply Block F, and note whether the FOS is consistent with this indicator's target. SLP's must be generally consistent with any proposed FOS block size and location.

Linkages to LRMP:

This indicator and strategy supports the sustainability of timber harvesting levels. It therefore supports the following objective:

Maintain timber harvesting and forest management opportunities.

6.52 TIMBER PROFILE-CONIFER

Indicator Statement	Target Statement
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 31, 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 31, 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 types.
SFM Objective: No decrease in the LTHL 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:

April 1st, 2006-March 31st, 2011: Allowable minimum reduced to 0% for this five-year period to provide flexibility to address urgent forest health issues.

April 1st, 2011-March 31st, 2016: Allowable Minimum 0%. This indicator is to be reviewed after the next TSR to ensure relevance to the new TSR.

The recent dramatic shift in harvesting directed at Mountain Pine Beetle (MPB) infested or "at risk" stands is expected to continue for the next few years. The impacts on mid-term AAC sustainability in the TSA are likely to be less if activities are directed towards the currently infested MPB areas, (which tend to be in larger diameter mixed pine/spruce stands) and away from lower risk, smaller diameter pine stands (i.e. Height class two pine polygons).

Due to improved inventory typing (VRI), it is expected that the next Timber Supply Review (TSR III), to be completed by 2013, will better define the merchantable pine stands from the non-merchantable stands that the old inventory had lumped together under height class two

pine. As a consequence, it would be prudent to review this indicator's relevance to sustainability of the harvest levels at that time.

What is this indicator and why is it important?

This indicator measures the proportion of small pine (height class two) forest cover type polygons (as depicted on inventory maps available at the time of the TSR) included in the total cutblock areas of blocks logged over a five year period by each managing Participant.

Harvesting similar timber profiles to those assumed in the TSR process can help support the maintenance of sustainable long-term timber supplies. The Chief Forester identified in 2003 his expectation that approximately 8% (100,000 m^3) of the coniferous AAC be harvested from "small pine stands" (Fort St. John TSA Rationale for Allowable Annual Cut (AAC) Determination, 2003). One of the primary assumptions used in determining an AAC is that a certain timber harvesting profile will be harvested. Harvesting similar timber profiles to those assumed in the TSR process can therefore support the maintenance of sustainable long-term timber supplies.

Harvesting plans however, need to be flexible to respond to changing environmental and economic conditions. Forest fires, and the earlier than anticipated 2006 infestation of Mountain Pine Beetle in the central operating areas in the TSA has recently resulted in coniferous harvest planning being directed towards these new high priority harvest areas, and away from height class two pine stands. The allowable variance recognizes these changing priorities, while still acknowledging the desire to address the height class two pine stands in due course.

Current Status:

The 2004 FOS projected an estimate of the amount of height class two pine (HC2) stands in blocks planned from April 2004 to March 2010. The plan projected the area in HC2 pine in proposed blocks would meet the 8% target. The Participants reported that, for the first reporting period of cumulative results between 2001 and 2006, the Participants harvested 5% in HC2 pine stands, which was within the allowable variance for that period.

Forest health considerations in recent years have necessitated that harvesting of coniferous stands be directed solely at fire salvage and mountain pine beetle infested or threatened stands since that time, consequently no harvesting has been recorded in height class two pine stands from 2007 through 2009.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? Yes

The 2010 Forest Operations Schedule will specify the estimated areas of height class two pine polygons in proposed cutblocks (based on inventories available in 2002). The FOS will include an analysis report with the percentage of the total cutblock area planned for harvest that consists of HC 2 pine polygons, for each Managing Participant (i.e. all licensees managed by the Participant, including those managed on behalf of other Participants).

Strategy and Implementation Schedule:

The Participants will plan a proportion of coniferous harvesting in merchantable height class two pine types (as denoted on forest cover inventories available in 2002, which were used in the Timber Supply Review), to be generally consistent with the most current assumptions of the Chief Forester AAC determination rationale.

During preliminary identification of potential blocks to be included in Forest Operations Schedules, height class two pine polygon coverage's (2002 information) will be used to identify the general location of these types. A photo interpreter will locate these areas on aerial photographs in general areas of interest for harvesting, and then makes an initial assessment of merchantability. Where a stand's merchantability is still questionable, a field reconnaissance assessment is completed to determine if the stand is merchantable, and qualifies for inclusion in the FOS.

Sufficient suitable merchantable stands to meet the target will be included initially in the Forest Operations Schedules. These inventory polygons normally only make up a portion of the forest cover polygons within a cutblock, so the area included in these small pine forest cover polygons in proposed blocks will be calculated, and compared to the total area within the coniferous leading blocks in the plan to provide an expected proportion of height class two pine stands.

Annual coniferous harvest plans will incorporate these blocks, subject to forest health priorities and economic conditions.

Monitoring Procedure:

The proportion (%) of area of height class two pine types compared to the total cutblock area in all blocks actually harvested in the time period will be monitored annually for progress towards the targets. The actual percentage of area in height class two pine polygons will be reported in the annual report at the end of each reporting time period (i.e. 2011 and 2016)

Linkages to Operational Plans:

FOS's identify the expected percentage of area included in height class 2 pine stands over at least a 6-year period. During field layout and the completion of SLP's, the actual area included in the total block area is determined.

Linkages to the LRMP:

This indicator and strategy supports the sustainability of timber harvesting levels. It therefore supports the following objective:

Maintain timber harvesting and forest management opportunities.

6.53 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 2010- Dec 31 2016: <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 for the 6 year period <u>BCTS Participant:</u> -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 current approved cuts for licensees and BCTS to be used as the basis for the calculation are as follows:

Table 34: AAC Volumes Jan 1/10--Dec 31/16

	Licence/ Agreement	Annual Volume (m^3)	# Yrs	Cumulative AAC 2010-2016 (m^3)	**Maximum Cumulative AAC (m^3)**
Conifer	A56771	150,000	6	900,000	
Conifer	A18154	394,952	6	2,369,712	
Conifer	A60972	83,494	6	500,964	
Conifer	A59959	70,000	6	420,000	
Total Licencee Conifer:		**698,446**		**4,190,676**	**4,609,744**
Decid	PA 12	500,000	6	3,000,000	
Decid	A60049	193,000	6	1,158,000	
Decid	A60050	119,300	2	238,600	
Total Licencee Decid.:				**4,396,600**	**4,836,260**
Total BCTS Conifer:		**372,059**	**6**	**2,232,354**	**2,455,589**
Total BCTS Deciduous		**180,000**	**6**	**1,080,000**	**1,188,000**
A60050 has 2 years remaining in its term-expires Dec 31 2011					
Maximum Cumulative AAC=110% of Cumulative AAC					

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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, 2016. 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 MFR'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.

6.54 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 8% 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 Forest 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 2008-2009 Annual Report are summarized by woodlands phase in Table 35 below:

Table 35: Dollars Spent Locally on Each Woodlands Phase

Woodlands Phase	Total dollars expended	Total dollars spent locally	Local %	Indicator target
Logging and Hauling	49,466,178	47,821,538	**97%**	80%
Reforestation	3,248,204	270,371	**8%**	8%
Road construction and Maintenance	2,932,698	2,875,130	**98%**	80%
Planning and Administration	4,920,372	3,324,583	**68%**	50%

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, 2008-March 31, 2009, 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)? No. Forecasting assumptions for this indicator do not apply as the dollars to be spent fluctuate annually, depending on the amount of harvesting activity.

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.

6.55 VALUE AND TOTAL NUMBER OF TENDERED CONTRACTS VERSUS TOTAL CONTRACTS

Indicator Statement	Target Statement
Value of tendered contracts in proportion to the total value of all awarded contracts on an annual basis.	A minimum of 50% of the total value of contracts will be tendered on an annual basis.
SFM Objective: Provide opportunities for a range of interests to access benefits	
Linkage to *FSJPPR*: N/A	

Acceptable Variance:

A variance of 10% (i.e. 40% of the total value of contracts is the minimum acceptable tendered amount) is required for this indicator as the dollars to be spent fluctuate annually, dependent on the amount of harvesting completed.

What is this indicator and why is it important?

This indicator is a measure of the proportion of the total dollar value of contracts that are tendered, relative to the total value of contracts that are awarded directly, cumulative for all the Participants.

This indicator supports the objective by effectively measuring the percentage of the value of contracts that are tendered through a competitive bid process, thus providing an opportunity for the private sector to secure work, and realize economic benefits.

This indicator does include any contracts where more than one contractor is considered, such as selected tendered projects where qualification criteria to bid may apply. This indicator does not include any quota logging contracts that the major licensees enter into with their contract loggers. These contracts are normally direct awarded with little option for open tendering due to the long term or replaceable contract conditions as required within Bill 13 *Timber Harvesting Contract and Subcontract Regulation,* and previous commitments made to First Nations for logging opportunities. It does include all purchase wood contracts.

Current Status:

The following table (Table 36) outlines the total of number of contracts and total value of contracts for the most recent reporting period (April 1st 2008 to March 31st 2009)

Table 36: Total Number and Value of Contracts Awarded in 2008

Contract Type	# of contracts	Total value of contracts	% Value	Indicator target
Tendered	44	$12,566,761.16	48.2%	50%
Direct Award	217	$13,483,432.77	51.8%	n/a
Total number of contracts	**261**	**$26,050,193.93**	**100%**	

The percentage of the value of contracts tendered did not meet the indicator target, but was within the acceptable variance range for this indicator.

Forecasting Assumptions and Analytical Methods:

Does Forecasting apply (y/n)? No, forecasting assumptions for this indicator do not apply, as the award of contracts, and the dollars to be spent on contracts fluctuates unpredictably, depending on product market cycles.

Strategy and Implementation Schedule:

All contracts awarded by the Participants will be tracked annually and a query of the business plan database will conducted to determine the total value (actual realized value of contracts during the reporting period, if available) of all contracts, and a review of the award process will determine whether they were direct awarded or not. A percentage will then be calculated to determine the relation between the values of contracts tendered versus the total value of all contracts awarded annually.

It should be noted that BCTS costs for this indicator will refer to April 1st to March 31st annually, whereas other Participant's costs will be based on calendar year reports due to reporting limitations. This is consistent with the methodology used in previous annual reports for this indicator.

Monitoring Procedure:

A summary will be provided in the annual report.

Linkages to Operational Plans:

None

Linkages to LRMP:

There are no linkages between this indicator and the LRMP objectives

6.56 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 the ecosystem diversity, species diversity, and water quality and quantity CSA elements to elements 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 CSA elements are tied to the resources that support the hunting, fishing, and trapping rights embodied in Treaty 8. The following indicators are linked to these three elements:

- Ecosystem Diversity Element: Indicators #2 (6.2 Seral Stages), and #3 (6.3 Patch Size);
- Species Diversity Element: Indicators #5 (6.5 Snags/Cavity Sites), # 6 (6.6 Coarse Woody Debris, #7(6.7 Riparian Reserves), # 8 (6.8 Shrubs), and #9 (6.9 Wildlife Tree Patches);
- Water Quality and Quantity Element: Indicators #34 (6.34 Peak Flow Index), #35 (6.35 Water Quality Concern Rating), #36 (6.36 Protection of Streambanks and Riparian Values on Small Streams), and #37 (6.37 Spills Entering Waterbodies)

The DFA is within the larger 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 eight First Nations have known traditional territory in the DFA: Prophet River, Doig River, Blueberry River, Halfway River, West Moberly, Saulteau, Fort Nelson, and Dene-Tha (Assumption).

The indicator identifies and measures the Participants' effectiveness in recognizing and respecting existing treaty rights. 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, as follows:

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.

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.

Refer to the write-ups for Indicators #2, 3, 5, 6, 7, 8 and 9 for the current status of the ecosystem and species diversity (habitat elements) indicators.

Refer to the write-ups for Indicators #34, 35, 36, and 37 for the current status of the water quality and quantity indicators.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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 11 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 Operational Plans:

Operational plans will be consistent with the strategies to manage for the Indicators and Targets for SFM Element 1.1 (Ecosystem Diversity), SFM Element 1.2 (Species Diversity), and SFM Element 3.2 (Water Quality and Quantity).

Linkages to LRMP:

No linkage to specific LRMP objectives.

6.57 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 will be addressed in operational plans
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 does not apply to values which may otherwise be well represented in the same general area, or sites where information cannot be validated through traditional or scientific knowledge sources from both within and outside of the First Nations.

Current Status:

Following is a summary of efforts to elicit information, and information identified regarding traditional aboriginal site-specific values and uses between April 1, 2008 and March 31, 2009.

Between April 1, 2008 and March 31, 2009, 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, and the deciduous *Memorandum of Agreement* Joint Management Advisory Committee (Canfor, LP and the First Nations), as well as other formal or informal communication. Archaeological Impact Assessments (AIAs) are another method used by the Participants to gather information on site-specific First Nations' values.

One site-specific concern relating to harvest areas proposed by licensee Participants were raised by local First Nations during the reporting period. The case involved the identification of a mineral lick that was located within 5 m of a recently harvested area (ITS-FSJ-2008-0024). There was concern expressed regarding the proximity of the harvested edge to the mineral lick. This mineral lick was not a feature 'known' previous to harvesting operations and was included on operational maps after the identification of it, to ensure that future operations address this site-specific feature.

Notification of Intent to Treat (NIT) conducted under the PMP's during the reporting period brought forward no site-specific comments to BCTS or Canfor. No further changes were required to the operating plans.

During the reporting period, BCTS commissioned the completion of seven Archaeological Impact Assessments. There were no previously unrecorded archaeological sites found in these assessed blocks.

During the reporting period, licensee Participants commissioned fifteen separate Archaeological Impact Assessments. A total of two previously unrecorded archaeological sites were found in two of the blocks assessed. Two previously recorded sites were also reexamined. Management of the identified archaeological sites was, or will be consistent with the recommendations of the supervising archaeologists.

Consistent with the target for this indicator, 100% of known traditional site-specific values identified were addressed in operational plans.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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

6.58 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 (MFR) 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 2008-2009 reporting period there were two cases where the Participants were required to follow formal Public Review and Comment Processes. One was an amendment to the Forest Operations Schedule (amendment #42). The other was an amendment to the Sustainable Forest Management Plan (amendment #2). 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:

Does forecasting apply (y/n)? No.

Strategy and Implementation Schedule:

The SFMP 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 SFMP will be available for public review and comment according to the regulatory requirements, or as otherwise agreed to by the Regional Executive Director (MFR) or his designate.

This indicator will also apply to the FOS, which is scheduled to be redone following approval of the SFMP, in 2010.

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.

6.59 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 TO R 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 February 1st, 2010. 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 2012.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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.

6.60 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 (2008-09)

Licensee Participants received four public inquiries concerning their forestry practices, and one additional inquiry was received regarding Notification of Intent to Treat.

The Participants received comments on three separate occasions relating to the Forest Operations Schedule Amendment # 42, which was advertised and available for public review and comment. All comments received were documented, and responded to within 30 days of receipt. Comments and responses to them were included in the final amendment notification to government.

A concern was expressed by two rural residents regarding a blocked ditch. The blockage resulted from recent Canfor road construction, and was causing water to run down the road and was overflowing on the residents' driveway (ITS-FSJ-2008-007). The blockage was removed by a Canfor contractor, and the ditch flow was reestablished properly.

Canfor received a request from a local First Nation member, requesting maps to facilitate the review of planned harvesting blocks (ITS-FSJ-2008-0039). Canfor provided the maps requested, and made staff available to conduct a joint field visit general areas the member was interested in, which was done on Dec. 4 2008. No site-specific concerns were expressed during the visit.

Canfor received a call from a member of the public who was concerned about impending log hauling on the road accessing their property (ITS-FSJ-2008-0046). They were concerned about maintenance and safety on the road. Canfor staff provided the concerned party with maps and contact information for the contractor working in the area. Shortly after the commencement of logging and hauling Canfor received a complaint from the same resident

regarding management of the road. Canfor ensured that road grading equipment dealt with the issue promptly.

Canfor was notified of a small area of blown-down spruce adjacent to one of its blocks by a local farmer (ITS-FSJ-2009-0060). The individual expressed interest in recovering the timber. Canfor staff reviewed the blow-down, and determined that there was an insufficient amount to mobilize equipment into the area for salvage and there was risk to the adjacent regenerating crop trees. They advised the individual that they could apply to the Ministry of Forests and Range for authorization if they desired.

BC Timber Sales received an unsolicited written inquiry/request on March 13, 2008 requesting consideration of alternate vegetation control methods other than the advertised method of ground application of herbicide (ITS # 08-012-A). BC Timber Sales responded to the letter on March 16, 2008, explaining the various methods of vegetation management employed in the Peace-Liard Business Area and extended an offer to further discuss the Vegetation Management Plan. No further correspondence was received.

All inquiries received by the Participants during the reporting period were responded to within 30 days.

Forecasting Assumptions and Analytical Methods:

Does forecasting apply (y/n)? No

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. Cengea 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.

6.61 INFORMATION PRESENTATIONS AND FIELD TRIPS

Indicator Statement	Target Statement
Number of information presentations or field trips provided to PAG and public.	Provide the PAG and public with at least one presentation or field trip annually.
SFM Objective: Relevant information used in the decision making process is provided to PAG, general public, and affected parties	
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.

Current Status:

During the 2008-2009 reporting period, the Participants hosted one field trip for the PAG. The field trip focused on (1) water quality management, and specifically how the Water Quality Concern Rating indicator information was gathered, (2) forestry-range interactions, (3) mixedwood silviculture management.

Two Public Advisory Group meetings were held during the reporting period. These meetings, which were open to the general public, included information presentations on Mountain Pine Beetle, Water Quality Concern Rating, Heritage Trails, and Sustaining Biodiversity.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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 fieldtrip topics that the PAG may find helpful in future meeting deliberations.

Monitoring Procedure:

During the preparation of the Annual Report, a review of minutes from PAG meeting will identify all presentations or field trips in which PAG members and the public may have attended during the previous April 1- March 31 period.

Linkages to Operational Plans:

None.

Linkages to LRMP:

Not applicable.

6.62 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:

This is a new indicator that did not previously exist in SFMP #1. In 2009 the participants had originally proposed to aerially herbicide ***x*** 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 ***y*** ha to ***z*** ha actually treated.

Forecasting Assumptions and Analytical Methods:

Forecasting does not apply to this indicator.

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

7. 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.

7.2 PAG input prior to the public review and comment period

A series of six PAG meetings were held from May 28th 2009 through November 19th, 2009 to solicit PAG input prior to the development of this SFMP. The PAG provided feedback in these meetings on all the legal strategies, as well as the legal and CSA indicators in the development of this second SFMP. The Participants used this information to develop SFMP #2 for Review and Comment, which was circulated to the PAG members. An additional meeting was held on February 1st, 2010 to review the completed SFMP # 2 for Review and Comment with the PAG, and receive their comments on the SFMP, prior to the publication of the notice 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 # 2 as per section 37(5) of the *FSJPPR* (Table 37).

7.3 First Nations input

Participants engaged First Nations in SFMP 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 public review period (February 8, 2010 – April 8, 2010).

In addition to JMAC discussions, each First Nation with traditional territory in the Fort St. John TSA (Assumption, Blueberry River, Doig, Fort Nelson, Halfway River, Prophet River, Saulteau, and West Moberly) received a copy of the complete SFMP #2 for Public Review and Comment. 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 Saulteau, West Moberly and Blueberry River First Nations to review SFMP # 2. Only verbal comments were provided by First nations, no

written comments were provided. All comments received from First Nations, and the Participants' responses to those comments, are documented in Table 38 of SFMP # 2.

7.4 Government advisors involvement prior to the public review and comment period

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. Government staff were also represented at all six PAG meetings to act as advisors to the PAG during those meetings. Copies of the Landscape Level Strategies and legal indicators reviewed with the PAG were provided to the MFR Regional representative, and conveyed to MFR staff and MOE staff, providing the government with a preliminary review by their staff of the strategies and legal indicators prior to the notice of publication.

The complete plan was also submitted to the MFR, MOE, and other agencies as directed for additional review and comment during the sixty day review period. MFR and MOE staff completed a thorough review of the draft SFMP. They provided several suggestions for revision of SFMP content. Where appropriate these suggestions were incorporated into the SFMP. All comments received from the Government, and the Participants' responses to those comments, are documented in Appendix 21of SFMP # 2.

7.5 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.

A notice in a form acceptable to the Regional Executive Director (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. A copy of the notice is included in Appendix 15 of SFMP #2. Only one member of the public provided comments. The comment provided was in written format. All comments received from the public, and the Participants' responses to those comments, are documented in Appendix 20 of SFMP # 2.

7.6 Documentation and Response

Comments received during the review and comment period for SFMP #2 from all sources, and the Participants' responses are incorporated in SFMP # 2.

Table 37: PAG Comments on Preliminary SFMP

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
Map figures - general	Suggestion made to (1) include major road systems, rivers, and local towns on maps for points of reference, (2) to enlarge maps for easier viewing, and (3) include a map of B.C., with Pilot Project area highlighted.	Agreed to consider. Revised Figures 4 and 5 to make full page size, and included major roads, rivers, and towns. Will consider revising other map figures (1, 8, 9) during review and comment period, and producing a new map figure of BC with Pilot Project area highlighted.	Yes	Yes
Overall document	Plan very well revised and put together	Acknowledged.	Yes	Yes
4.4 (Range and Forage Management Strategy)	PAG member expressed concern regarding temporal reference of potential grazing reduction due to aspen harvesting ("several years").	The intention was to acknowledge that potential grazing reduction was not permanent, and to reflect the dynamic nature of forest and range land. The Participants offered to rewrite the sentence of concern to more closely reflect the actual time scale (eg. "several decades").	Yes	Yes

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
4.1.6 – Coordination of Planning Strategy	What is the meaning of this strategy and how is it measured?	Strategy relates to consolidated planning, and development of FOS's and SFMP's by all participants. Result are products that can be reviewed by interested / affected parties to assess cumulative impacts. Efficiencies realized by all parties (participants, public, First Nations, stakeholders, government) in reviewing consolidated planning products. More detail on measurement present in section 6.50.	Yes	N/a
6.40 – Coordinated Developments	Where are the results for this indicator reported?	The information pertinent to reporting progress to this indicator's target are presented in Annual Reports. The Reports are reviewed with the PAG prior to submission to government, and are posted to the FSJPP website.	Yes	N/a

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
8.2 – Revised Forest Operations Schedule Requirements	Regarding proposed addition to (S. 81(e)(v)) declare non-status roads as "identified in the FOS": would the road still be required to be under some kind of permit when actually used by the Participants?	Participants explained that all such roads used would require authorization from government prior to use (i.e. participants would have to seek tenure, or have road use agreement with 3rd party in cases where roads were tenured subsequent to display in FOS). The proposed addition is simply to avoid frequent and unnecessary administrative amendments to the FOS.	Yes	N/a
Appendix 6	Incorrect reference to "height in Table B". Table B does not have height as a metric.	Corrected reference error.	Yes	Yes
Appendix 6	Table B headings are reversed.	Revised Table B to have column headings correct.	Yes	Yes
Appendix 6	Typographical error - "0" instead of ")"	Corrected error	Yes	Yes
Glossary	Suggestion made to include more acronyms in Glossary section.	The participants agreed to review the glossary and add any acronyms or other technical terms that may be missing from the draft.	Yes	Yes
Glossary	Suggestion made to put Glossary section at front of document.	The participants would prefer to keep the glossary at the back of the	Yes	No

SFMP Reference	PAG Comments and Questions	Participants' Response or Information	PAG Support (Yes/No)	Participants' Acceptance of PAG Input
		document. This is standard practice for forestry documents.		

Table 38: First Nations Comments on Preliminary SFMP

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
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
6.56 - Conformance to Elements Pertinent to Treaty Rights	Suggested that the indicators related to First Nations' values should be written by the First Nations and then presented to the PAG.	The process that was followed allowed for first nations to review the draft indicators before it 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	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
		were not addressed than the first nation representatives should bring these forward.	
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 # 56.	N/A
4.5.3 – Adjacency and Forest Structure Strategy	Question asked "what are the adjacency guidelines are under the FSJ pilot?"	There are no adjacency requirements because of the focus on emulating the temporal and spatial characteristics of natural disturbance – primarily fire. Adjacency concerns are considered within visual corridors.	N/A
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
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
2.4 – First Nations	The SFMP wording should be changed to	The SFMP will be revised to reflect the # of	YES

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
Participation	reflect that there are now two first nation groups represented on the PAG.	First Nations represented on the PAG	
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 know what the current water quality is before you can ensure water quality is being protected.	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 employed to take several measures of water quality.	N/a
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
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
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
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.	N/a

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
		This will reduce negative long term impact on wildlife.	
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 general wildlife measures (best management practices) developed by Government and the licensees which guide management practices specific for caribou.	N/a
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
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
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	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	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
	for conifer regeneration, but overall supports a trend to reduce dependence on herbicides.	tool for managing competing vegetation. The managing Participants' use of herbicides is strictly controlled through the pesticide 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	

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
		participants completion of fieldwork activities. 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 # 62 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.	
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 they can better understand the plans (i.e. there should be	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	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
	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.	First Nations to help First Nations understand the Participants management plans and practices. This may be done by various means such as field trips, community meetings, JMAC meetings and workshops.	
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. 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	Yes

SFMP Reference	First Nations Comments and Questions	Participants' Response or Information	Participants' Acceptance of Input
		identified during reviews of the Managing Participants plans and practices.	
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 39: Public and Government Comments on Preliminary SFMP

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. 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 #2 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 that 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 proposes to continue the use of Section 6.24 as the APS, with no changes.

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 Reforestation Declaration Process Change

Changes to MFR reporting procedures have evolved significantly since the *FSJPPR* and SFMP # 1 were developed. Reforestation standards for areas within blocks are developed in SLP's and are submitted digitally directly into the governments' information system (i.e. RESULTS). Section 23(1) of the *FSJPPR* states that *"For the purposes of section 32 and Schedule F, (the Participants) must submit written notice to the District Manager of whether the Participant proposes to reforest an area within the cutblock as a coniferous area, a deciduous area or a mixedwood area."* It is proposed in this SFMP that the requirements of

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.

8.1.3.2 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 #2 proposes to extend this strategy to deciduous reforestation areas, to be effective upon the completion of the deciduous compiler.

As per Section 6.29 Reforestation Assessment, for the purposes of Section 35(5) (a) of the *FSJPPR*, the Landscape Level Reforestation Strategy will disapply Sections 32(3),(4),(5)(6)(8), and Sections 98 and 99 for 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.

8.1.3.3 Deciduous Stocking Requirements for Areas Declared Prior to the Full Implementation of the Landscape Level Assessment of Deciduous Areas

Table C provides the applicable performance standard for stocking requirements to be used to assess the establishment of a well growing stand of crops trees on deciduous areas within cutblocks that are declared prior to the completion of the deciduous compiler.

Table C- Deciduous Stocking Standards

Type of Area	Site	Min. # of Trees/ha (MSS) *	Minimum Height	Countable species BWBS/ESSF
Deciduous	Xeric-Submesic	4000	1.5 m	At
Deciduous	Mesic-Subhydric	4000	1.5 m	At, Ac, Birch (to max 15%)

-Minimum strata size is 2 ha contiguous, or 20% of the area in blocks less than 10 ha[38]
-Well growing block assessments can be completed at anytime from 5 years to 15 years after harvest commencement[39]
-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 assessed prior to the full implementation of the landscape level assessment of deciduous regeneration (see Section 6.29)[40].

8.1.3.4 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*.

8.1.3.5 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

[38] Consistent with the strata size definition in the FSJPPR

[39] Changed from FSJPP Regulation standard of 9 years minimum

[40] Disapplied Sections of the FSJPPR are fewer than in SFMP#1, as changes to Regulation deleted some sections.

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

8.1.3.6 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).

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#2 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, 2008 and November 30th, 2016 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 definied 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 Registered Professional Forester 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 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 # 44 (**see Section 6.44 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 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 and Range 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 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.

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 that 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.

Section 81 (1)(j) (ii) - delete the requirement to identify if the areas within authorized cutblocks (under section 23) are to be reforested as coniferous areas, deciduous areas, or mixedwood areas. This information is now provided digitally in RESULTS submissions to the government which was not previously the case, therefore there is no need to duplicate this information in the FOS.

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, and 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.

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Personal Communications

Delong, Craig. Regional Ecologist, Ministry of Forest, Northern Interior Forest Region, Prince George, B.C.

Hiebert, Darryl. Ecologist. Consultant, Cranbrook, B.C.

Seip, Dale. Wildlife research ecologist. Ministry of Forests, Northern Interior Forest Region, Prince George, B.C.

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.

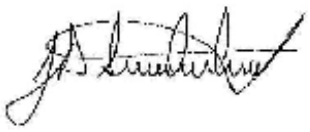
Maintain an organizational culture where all staff proactively participate in providing conditions and safeguards for the health and safety of staff, clients and the public.

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 surpass legal requirements.

Comply with other environmental requirements to which the company is committed.

Set and review environmental objectives and targets to prevent pollution and to achieve continual improvement in our environmental performance.

Create opportunities for interested parties to have input to our forest planning activities.

Practice forest management that recognizes ecological processes and diversity and supports integrated use of the forest.

Promote environmental awareness throughout our operations.

Conduct regular audits of our environmental management system.

Communicate our environmental performance to our Board of Directors, shareholders, employees, customers and other interested parties.

Jim Shepard

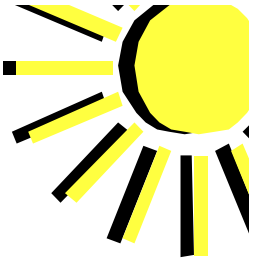
President and Chief Executive Officer

Ronald L. Cliff

Chairman

October 2009

CANFOR



Canfor's Forestry Principles

Ecosystem Management

We will use the best available science to develop an understanding of ecological responses to natural and human-caused disturbances. We will incorporate this knowledge into higher level and operational plans by applying ecosystem management principles to achieve desired future forest conditions.

Scale

We will define objectives over a variety of time intervals (temporal scales), and at spatial scales of stand, landscape and forest

Adaptive Management

We will use adaptive management to continually improve forest ecosystem management. This will require the development and implementation of collaborative research and monitoring programs.

Old Growth

We will include old growth and old growth attributes as part of our management strategies and philosophy in the forests where we operate.

Timber Resource

Canfor will ensure a continuous supply of affordable timber in order to carry out its business of harvesting, manufacturing and marketing forest products. Canfor will strive to maximize the net value of the fibre extracted for sustained economic benefits for employees, communities and shareholders.

Forest Land Base

We advocate the maintenance of the forest land base as an asset for the future.

Health and Safety

We will operate in a manner that protects human health and safety.

Aboriginal Peoples

We will pursue business partnerships and cooperative working arrangements with aboriginal people to provide mutual social, cultural and economic benefits and address mutual interests.

Communities

We will engage members of the public, communities and other stakeholders in the delivery of the Forestry Principles.

The process will be open, transparent and accountable.

Accountability

We will be accountable to the public for managing the forest to achieve present and future values. We will use credible, internationally recognized, third party verification of our forestry operations as one way of demonstrating our performance.

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.

As a part of this system, employees work in teams to develop and continuously improve procedures that either meet or exceed all applicable environmental standards. Every LP plant operates under an environmental management system specific for the facility. As a result, we have experienced an 80 percent reduction in reportable environmental incidents since 1996, and we can attribute improved

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 Matrix

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

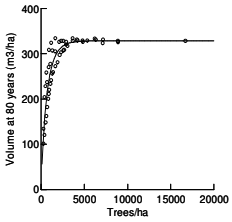


Figure 1. Relationship between merchantable volume/ha at age 80 and total trees/ha at survey. Solid line is fitted regression.

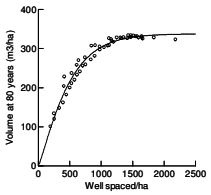


Figure 2. Relationship between merchantable volume/ha at age 80 and total well spaced trees/ha at survey. Solid line is fitted regression.

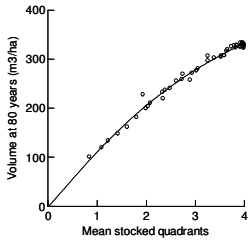


Figure 3. Relationship between merchantable volume/ha at age 80 and mean stocked quadrants at survey. Solid line is fitted regression.

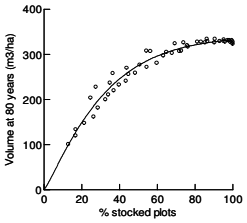


Figure 4. Relationship between merchantable volume/ha at age 80 and percent stocked plots at survey. Solid line is fitted regression.

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 (m3/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 Procedures

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 Gl 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

Appendix 6: 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 disapplies Sections 32(3),(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.

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[41] **Replaces S 32(6)(c)**

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:

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 MFR.

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 and 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

[42] **Replaces requirements of S 32(6)(d)**

[43] **This is unchanged from the FSJPPR**

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.

3. The MSS still legally applies in Table C for the final reforestation assessments on deciduous blocks that are submitted prior to the completion of the deciduous compiler and the subsequent full implementation of the landscape level strategy for deciduous. No target stocking standard is currently required for deciduous assessments, however for the purposes of developing a MPMV in the Landscape Level Strategy a TSS will be developed concurrent with the development of the deciduous compiler

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

1.4.2 Stocking Standards for Deciduous Areas

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).

Table C- Deciduous Stocking Standards[44]

Type of Area	Site	Min. # of Trees/ha (MSS) *	Minimum Height	Countable species BWBS/ESSF
Deciduous	Xeric-Submesic	4000	1.5 m	At
Deciduous	Mesic-Subhydric	4000	1.5 m	At, Ac, Birch(to max 15%)

Minimum strata size is 2 ha contiguous, or 20% of the area in blocks less than 10 ha

Well growing block assessments can be completed at anytime from 5 growing seasons to 15 growing seasons after harvest commencement[45]

No TSS for deciduous for the purposes of the Landscape Level Strategy a TSS will be developed concurrently with the development of the deciduous compiler

Ac is only acceptable if not sprouting from a cut stump

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.**

[44] APS replacing S 32 (3)

[45] New Applicable Performance Standard to replace 9 yr minimum in S 32 (4) and S 32(6)(e)(ii)

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[46] 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 :
  - 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".

[46] Definitions of Intimate mixtures and successional mixtures are located in Appendix 10 "FSJPP 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 7: Stand Survey & Growth Modeling for the Fort St. John TSA

Appendix 8: Listing of Invasive Plants

Prohibited Noxious Weeds

These weeds possess highly competitive characteristics, inherent means for rapid spread, and may pose difficulties for control. These weeds are known to be very serious problems in other countries or provinces, but are not well established here.

Common Crupina (*Crupina vulgaris*)

Diffuse Knapweed (*Centaurea diffusa*)

Dodder (*Cuscuta* spp.)

Hound's-tongue (*Cynoglossum officinale*)

Giant Burdock (*Arctium spp.*)

Jointed Goatgrass (*Aegilops cylindrica*)

Leafy Spurge (*Euphorbia esula*)

Rush Skeletonweed (*Chondrilla juncea*)

Spotted Knapweed (*Centaurea maculosa*)

Tansy Ragwort (*Senecio jacobaea*)

Velvetleaf (*Abutilon theophrasti*)

Yellow Starthistle (*Centaurea solstitialis*)

Green Foxtail (*Setaria viridis*)

Kochia (*Kochia scoparia*)

Oxcye Daisy (*Chrysanthemum leucanthemum*)

Tartary Buckwheat (*Fagopyrum tataricum*)

Russian Thistle (*Salsola kali*)

Marsh Plume Thistle *(Cirsium palustre)*

Primary Noxious Weeds

Primary Noxious Weeds must be controlled. While this does not entail eradication, weeds in this category must be prevented from forming viable seed. These weeds have the potential to spread rapidly and cause major crop losses.

Canada Thistle (*Cirsium arvense*)

Perennial Sow Thistle (*Sonchus arvensis*)

Common Toadflax (*Linaria vulgaris*)

Dalmation Toadflax (*Linaria dalmatica*)

Scentless Chamomile (*Mairicaria maritima*)

Annual Sow Thistle (*Sonchus oleraceus*)

Wild Mustard (*Sinapsis arvensis*)

Nightflowering Catchfly (*Silene noctiflora*)

White Cockle (*Lychnis alba*)

Invasive Species of Concern

Orange Hawkweed (*Hieracium aurantiaeum*)

Cypress Spurge (*Euphorbia cyparissias*)

Other invasive plants may be added to this list as made know by the District Manager.

Appendix 9: Soil Disturbance Information

Appendix 10: Mixedwood Management Guidelines

Appendix 11: 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 12: Stream Crossings and Seasonal Bridge Installation and Removal Procedures

Appendix 13: 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
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 associated with agricultural land obvious on-the-ground evidence of other people and on-site controls	low opportunity to experience solitude, closeness to nature, self-reliance and challenge	high interaction with other people large party sizes 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 14: WTP 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 Lakes	401,001	107,677	42%	13,207	7.7%	2,802	2%	304	11%	2%	5%	3%	High intensity zone, 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 15: Public Input Process

Copy of public advertisement.

NOTICE OF PUBLIC REVIEW OF SUSTAINABLE FOREST MANAGEMENT PLAN # 2

The Participants in the Fort St. John Pilot Project, which include the major forest industry companies and the Ministry of Forests BC Timber Sales, who operate in the Fort St. John Timber Supply Area, have developed a Sustainable Forest Management Plan #2 (SFMP). The SFMP will provide strategic direction to future forestry operations. 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 February 8th, 2010 until April 8th, 2010. Copies of the SFMP are available for reviewing between 8:30 a.m. and 4:00 p.m., Monday to Friday, until April 8th, 2010 at the following locations:

B.C. Ministry of Forests: 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://fsjpilotproject.com/

Revisions may be made to the SFM Plan as a result of comments received during the review period. Written submissions received prior to 4 pm April 8th, 2010 are welcome, and should be sent to:

Darrell Regimbald RPF

(250) 787-3651

Planning Coordinator-North-East
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

Copy of public web advertisement, posted on FSJ Now.

Appendix 16: Fort St. John TSA Timber Supply Analysis Report

Appendix 17: Development of Carbon Curves for Analysis Units Within the Fort St. John TSA

Appendix 18: Silviculture Survey Methodology for Boreal Mixedwoods (Farnden Report)

Appendix 19: 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.

Cengea Resources (Cengea)

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 (MFR)

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 Northern Interior Forest 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 20: Public Comments

Public Comments

Public comments 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:

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: Government Comments

Government comments on the draft SFMP provided for public review were received from the MFR and MOE. Following is a summary of all Government comments 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.

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
Forest Practices Branch
(250) 387-8627

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.

David Maloney, P.Ag.
Technical Advisor, Watershed Science
Forest Practices Branch
Ministry of Forests and Range
441 Columbia Street
Kamloops, BC, V2C 2T3
Phone: (250) 828-4173
Fax (250) 371-3798
email: david.maloney@gov.bc.ca

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 Concern Rating – 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 WQCR 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 WQCR) 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" WQCR 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.
Range Officer
Peace Forest District
9000 17th St. Dawson Creek, BC
Tel: 250-784-1264
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 m3/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 125m3/ha of CWD within patch retention and 107 on the harvest area. The SFMP is calling for minimum average of 46 m3/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

Planning Coordinator - North - East

Forest Management Group

Canadian Forest Products Ltd.

Office (250) 787-3651

Cell (250) 261-9722

Fax (250) 787-3622

email darrell.regimbald@canfor.com

-----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.

Provincial Forest Entomologist

BC Ministry of Forests

PO Box 9513 Stn Prov Govt

Victoria, BC V8W 9C2

Phone: (250) 356-6810

Fax: (250) 387-2136

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


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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
Research Branch
P.O. Box 9519, Stn. Prov. Govt.
Victoria, B.C. V8W 9C2
Canada
Phone: (250) 387-3093

Fax: (250) 387-0046
E-mail: Gordon.Nigh@gov.bc.ca
Visit the B.C. Forest Service Research Branch website at http://www.for.gov.bc.ca/hre

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,

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

ph: 250-387-8904 fx: 250-387-0046
em: george.harper@gov.bc.ca

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 nformation 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.

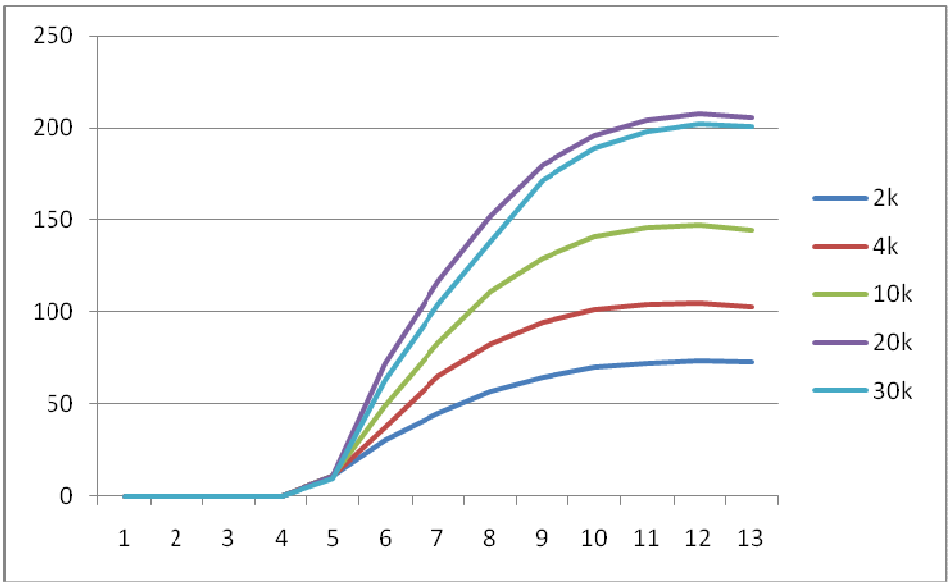
A stocking level of 4,000 st/ha total stems in these simulations would not reach a minimum merchantable volume of 140 m3/ha. With 10,000 st/ha, this would be achieved at 90 years, and at 20,000 stem/ha before year 70.

The Code Pilot SFM should be providing regeneration assessments which are consistent with current TSR analysis (e.g. 140 m3/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

Richard Kabzems, MSc, PAg, RPF
Research Silviculturist, Northern Interior Forest Region
9000 17th St., Dawson Creek, B.C. V1G 4A4
250 784 1256
Richard.Kabzems@gov.bc.ca

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.

Definiinition 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.

Tony Hunt, R.P.F.
C&E Officer
Peace Sub Region

Resource Management Coordination Division

Ministry of Forests and Range
9000 17 Street
Dawson Creek, BC
V1G 4A4
Ph: 250-784-1274, Fax 250-784-0143
MailTo:Tony.Hunt@gov.bc.ca

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 Cengea 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
David.Weaver@gov.bc.ca
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

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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
- Fax: 250- 565- 6671

eMail: HYPERLINK mailto:Luc.Roberge@gov.bc.ca

- 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
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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.
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Visual **Resource** **Specialist**
B.C. **Forest** **Service**
Northern Interior Forest Region

Tel.: 250- 565- 6142
Fax: 250- 565- 6671
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

- Tel.: 250- 565- 6142
- Fax: 250- 565- 6671
- eMail: Luc.Roberge@gov.bc.ca

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 6.44 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.

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.

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

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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.

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 Mm3/yr at ~130 m3/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
BC Ministry of Forests and Range
Caren.Dymond@gov.bc.ca
Tel: 250-363-0655 (at PFC)
Tel: 250-387-8763 (at 727 Fisgard)
Cell: 250-686-7300

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 m3 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

ph: 250-387-8904 fx: 250-387-0046
em: george.harper@gov.bc.ca
BRANCH WEBSITE: http://www.for.gov.bc.ca/hre/

"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 AI 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
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

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

Stéphane Dubé, M.Sc. RPF
Soil Scientist
Ministry of Forests and Range
1011 4th Ave 5th Floor
Prince George, BC
V2L 3H9, Canada
Tel.:(250) 565-4363 Fax:(250) 565-6671

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/Marie

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?

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; Kopo, 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 uncontainable 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 1256
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.