

Mackenzie

Sustainable Forest Management Plan



Mackenzie SFMP



2010/11 Annual Report



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1.0 Introduction

This is the fourth Annual Report of the Mackenzie Sustainable Forest Management Plan. It covers the reporting period of April 1, 2010 to March 31, 2011. The Sustainable Forest Management Plan (SFMP) is a result of the combined efforts of Canfor and British Columbia Timber Sales (BCTS) to achieve and maintain Canadian Standards Association (CSA) certification to the CSA Z809-02 standard. The signatories to the plan are:

1. BC Timber Sales, Prince George Business Area – Mackenzie Operations
2. Canadian Forest Products Ltd., Mackenzie Operations

The CSA Standard provides SFM specifications that include public participation, performance, and system requirements that must be met to achieve certification. These specifications were the framework for the development of the Mackenzie SFMP. Canfor and BCTS have existing management systems that contribute to the overall SFM strategy. These may include existing management systems such as ISO 14001 Environmental Management Systems, standard operating procedures, and internal policies.

One of the public participation strategies suggested in the CSA SFM Standard is the formation of a local group of interested and affected members of the public to provide input on an ongoing basis. This strategy provides the base for the formation of a Public Advisory Group (PAG) whose purpose is to achieve CSA standard's public participation requirements. Canfor and BCTS established a PAG to assist with the development of the SFMP. A wide range of public sector interest groups from within the Mackenzie Forest District were invited to participate in the SFM process through the PAG. After completing the Terms of Reference in January 2006, the PAG established the SFMP Criteria and Elements Performance Matrix with the SFMP being completed in June of 2006. It is important to note, the Mackenzie SFMP is a working document and is subject to continual improvement. Over time, the document will incorporate new knowledge, experience and research in order to recognize society's environmental, economic and social values.

This Annual Report summarizes the signatory's performance in meeting the indicator targets outlined in the SFMP over the Mackenzie Defined Forest Area (DFA). The DFA is the Crown Forest land base within the Mackenzie Forest District and the traditional operating areas of Canfor and BCTS, excluding woodlots, Parks, Protected Areas and private land. The intent of this Annual Report is to have sustainable forest management viewed by the public as an open, evolving process that is taking steps to meet the challenge of managing the forests of the Mackenzie DFA for the benefit of present and future generations.

The following Table summarizes the results for the current reporting period. For clarification of the intent of the indicators, objectives or the management practices involved, the reader should refer to the Mackenzie Sustainable Forest Management Plan Document.

1.1 List of Acronyms

Below is a list of common acronyms used throughout this annual report. For those wishing a more comprehensive list should consult the Mackenzie Sustainable Forest Management Plan.

AAC – Annual Allowable Cut
BCTS – BC Timber Sales
BEC – Biogeoclimatic Ecosystem Classification
BEO – Biodiversity Emphasis Option
BWBS – Black and White Boreal Spruce
CSA – Canadian Standards Association
CWD – Coarse Woody Debris
DFA – Defined Forest Area
ESSF – Engellman Spruce Sub-alpine Fir
FRPA – Forest and Range Practices Act
FSR – Forest Service Road
GIS – Geographic Information System
LOWG – Landscape Objective Working Group
LRMP – Land and Resource Management Plan
LU – Landscape Unit
MoFR – Ministry of Forest and Range

NCI – North Central Interior
 NDT – Natural Disturbance Type
 NDU – Natural Disturbance Unit
 NHLB - Non-Harvestable Land Base
 OGMA – Old Growth Management Area
 PAG – Public Advisory Group
 PFI – Peak Flow Index
 RMZ – Resource Management Zone (landscape-level planning)
 RMZ – Riparian Management Zone (riparian management)
 RRZ – Riparian Reserve Zone
 SAR – Species at Risk
 SBS – Sub-Boreal Spruce
 SFM – Sustainable Forest Management
 SFMP – Sustainable Forest Management Plan
 SWB – Spruce Willow Birch
 THLB – Timber Harvesting Land Base
 TOR – Terms of Reference
 TSA – Timber Supply Area
 VIA – Visual Impact Assessment
 VQO – Visual Quality Objective

1.2 Executive Summary

Of the **42** indicators listed in Table 1, **41** indicators were met within the prescribed variances, and **1** indicator was not met within the prescribed variances. A corrective and preventative action plan is contained in the indicator discussions for each non-conformance indicator.

Table 1: Summary of indicators Status, April 1, 2010 to March 31, 2011.

Indicator Number	Indicator Description	Target Met	Pending	Target Not Met
1	Old forest	√		
2	Interior forest	√		
3	Biodiversity reserve effectiveness	√		
4	Productive forest representation	√		
5	Patch size	√		
6	Coarse Woody Debris	√		
7	Wildlife Trees	√		
8	Riparian Management area effectiveness	√		
9	Sedimentation	√		
10	Stream Crossings	√		
11	Peak Flow Index	√		
12	Road re-vegetation	√		
13	Road environmental risk assessments	√		
14	Species within the DFA	√		
15	Sites of Biological Significance	√		
16	Soil conservation	√		
17	Terrain Management	√		
18	Reportable Spills	√		
19	Site Index Removed from plan			
20	Site Conversion	√		
21	Permanent Access Structures	√		
22	Communication of planned Deactivation Projects	√		
23	Regeneration Delay	√		
24	Free Growing	√		
25	Prioritizing harvest of damaged stands	√		
26	Harvest Volumes			√
27	Waste and Residue Removed from plan			
28	First-order Wood Products	√		
29	Local Investment	√		
30	Contract Opportunities for First Nations	√		
31	Range Management Effectiveness	√		

Indicator Number	Indicator Description	Target Met	Pending	Target Not Met
32	Satisfaction (PAG)	√		
33	Representation (PAG) Removed from plan			
34	Input into Forest Planning	√		
35	Public and Stakeholder Concerns	√		
36	Access to SFM Information	√		
37	SFM Educational Opportunities	√		
38	Heritage Conservation	√		
39	First Nations Input into Forest Planning	√		
40	First Nations Concerns	√		
41	Visual Quality	√		
42	Resource Features	√		
43	Safety Policies	√		
44	Accidents	√		
45	Signage	√		
	Totals	41	0	1

1.3 SFM Performance Reporting

This annual report will describe the success of Canfor and BCTS in meeting the indicator targets over the DFA. The report will be available to the public and will allow for full disclosure of forest management activities, successes, and failures. Canfor and BCTS have reported individual performance within their traditional operating areas as well as the performance which contributes to shared indicators and targets across the plan area. Both Canfor and BCTS are committed in working together to fulfill the Mackenzie SFMP commitments including data collection and monitoring, participation in public processes, producing public reports, and continuous improvement.

2.0 SFM Indicators, Targets and Variances

Indicator 1 Old forest

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

This indicator was chosen to monitor the amount of old forest within each Landscape Unit (LU) group. It is assumed that maintenance of all seral stages across the landscape will contribute to sustainability because doing so is more likely to provide habitat for multiple species as opposed to creating landscapes of uniform seral stage. Emphasis is placed on old forest because many species use older forests and the structural elements found therein (e.g. large snags, coarse woody debris, and multilayer canopies). These structural elements are difficult to recreate in younger forests. The targets for old forest are taken from the approved Mackenzie TSA Biodiversity Order.

The Spatial Land Use Objectives for part of the Mackenzie Forest District Area, endorsed on September 23, 2010, identifies Old Growth Management Areas (OGMA's) in 7 landscape units or landscape unit groups in the southern portion of the Mackenzie TSA. This order compliments the Non-spatial Landscape Biodiversity Objectives; which define targets for old forest as described above. Despite these targets, if a block was harvested or a road was built outside the legally established OGMA's then the block/road is determined to have met prescribed old growth targets.

Old Forest

Signatory	Number of Blocks and roads harvested			Number of blocks and roads harvested that meet the old growth targets	%in DFA
	Blocks	Roads	Total		
Canfor	14	16	30	30	100%
BCTS	23	57	80	80	100%
TOTAL	37	73	110	110	100%

Source: April 2011 Analysis Results – See Appendix 1 for analysis tables.

Indicator Discussion:

Indicator 2 Interior Forest

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

Interior forest conditions refer to a situation where climatic and biotic characteristics are not significantly affected by adjacent and different environmental conditions (e.g., other seral stages, other forest or non-forest types, etc.). This indicator is important because provision of habitat for old-forest dependent species (see Indicator #1) can only occur if old forests are not significantly affected by adjacent environmental conditions. Historically, natural disturbance events such as fire, insects, and wind led to diverse landscapes characterized by forests having these interior old forest conditions. Thoughtful planning of harvesting patterns can minimize "fragmentation" of the forested landscape and help create interior old forest conditions. Furthermore, the intent of this indicator is to have interior old forest conditions represented within all ecosystem types to further enhance ecosystem resilience. The targets for interior old are taken from the approved Mackenzie TSA Biodiversity Order.

The Spatial Land Use Objectives for part of the Mackenzie Forest District Area, endorsed on September 23, 2010, identifies OGMA's in 7 landscape units or landscape unit groups in the southern portion of the Mackenzie TSA. This order compliments the Non-spatial Landscape Biodiversity Objectives; which define targets for interior old forest as described above. Despite these targets, if a block was harvested or a road was built outside the legally established OGMA's then the block/road is determined to have met prescribed interior old growth targets.

Interior Old

Signatory	Number of Blocks and roads harvested			Number of blocks and roads harvested that meet the interior old targets	%in DFA
	Blocks	Roads	Total		
Canfor	14	16	30	30	100%
BCTS	23	57	80	80	100%
TOTAL	37	73	110	110	100%

Source: April 2011 Analysis Results – See Appendix 1 for analysis tables.

Indicator Discussion:**Indicator 3 Biodiversity Reserve Effectiveness**

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that are not within legally established protected areas, ecological reserves, or OGMA's.	Target: 100% Variance: 0%

Landscape level biodiversity reserves/ Protected Areas are areas protected by legislation, regulation, or land-use policy to control the level of human occupancy or activities (Canadian Standards Association, 2003). These include legally established Old Growth Management Areas (OGMAs), parks, ecological reserves, and new protected areas. As forestry activities may occur near these areas the chance exists for unauthorized harvesting or road construction to happen within these sites. In addition to being an obvious violation of legislation, such an act would also damage sites and organisms that were set aside for protection.

Biodiversity Reserves

Signatory	Number of Blocks and roads harvested			Blocks and roads harvested that are not within protected areas, ecological reserves, or OGMAs	%in DFA
	Blocks	Roads	Total		
Canfor	14	16	30	30	100%
BCTS	23	57	80	80	100%
TOTAL	37	73	110	110	100%

Source: GIS query

Indicator Discussion:**Indicator 4 Productive Forest Representation**

Indicator Statement	Target and Variance
Percent productive forest by BEC variant represented within the non-harvestable land base.	Target: As per the table below Variance: 0%

Maintaining representation of a full range of ecosystem types is a widely accepted strategy to conserve biodiversity in protected areas and is suggested for landscapes managed for forestry. Most species, especially those for which knowledge is sparse or absent, are best sustained by ensuring that some portion of each distinct ecosystem type is represented in a relatively unmanaged state. Unmanaged stands act as a precautionary buffer against errors in efforts intended to sustain species in the managed forest. Unmanaged areas also help to sustain poorly understood ecosystem functions and provide an ecological baseline against which the effects of human activities can be compared based on the approach developed by, ecosystem representation is determined by evaluating the proportion of productive crown forest found in the non-harvested land base (NHLB), including parks and protected areas, but also including areas excluded from harvest for other reasons such as operability constraints.

An evaluation of ecological representation allows managers to identify the 'management footprint' on ecological units within a forest management unit. This in turn allows managers to prioritize management objectives (such as which units to emphasize OGMA placement, Wildlife Tree Patch targets and riparian reserves) and where to focus monitoring efforts.

Productive Forest Representation

BEC Variant	DFA Area (ha)	THLB Area (ha)	THLB Percent of DFA (%)	NHLB Area (ha)	NHLB Percent of DFA (%)	Approved Target (%)
AT	137,420	64	0.0%	553	0.4%	0.4%
BWBS dk1	129,526	76,054	58.7%	46,110	35.6%	35.6%
BWBS mw1	10,247	3,689	36.0%	5,953	58.1%	58.1%
BWBS wk2	21,097	12,442	59.0%	7,641	36.2%	36.2%
ESSF mv2	10,880	6,205	57.0%	3,873	35.6%	35.6%
ESSF mv3	314,568	200,277	63.7%	92,126	29.3%	29.3%
ESSF mv4	330,448	113,448	34.3%	152,437	46.1%	46.1%
ESSF.mvp	92,940	2,489	2.7%	18,608	20.0%	20.0%
ESSF wc3	174,961	46,040	26.3%	68,444	39.1%	39.1%
ESSF wcp	58,320	1,359	2.3%	8,187	14.0%	14.0%
ESSF wk2	111,798	62,900	56.3%	39,488	35.3%	35.3%
SBS mk1	257,289	189,083	73.5%	41,785	16.2%	16.2%
SBS mk2	175,296	115,469	65.9%	37,831	21.6%	21.6%
SBS vk	6,720	4,798	71.4%	1,819	27.1%	27.1%
SBS wk1	8,872	6,766	76.3%	1,257	14.2%	14.2%
SBS wk2	226,617	154,520	68.2%	57,015	25.2%	25.2%
SBS mk	14,672	5,105	34.8%	7,201	49.1%	49.1%

Source: GIS

Indicator Discussion:**Indicator 5 Patch Size**

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

Patches often consist of even aged forests because most are the result of either a natural disturbance such as fire, wind or pest outbreaks, or from harvesting timber in a cutblock. Patches may be created through single disturbance events or through a series of events (i.e. a combination of natural disturbance and harvesting). Mature forests and younger forest patches represent a land base created from a history of disturbances, natural and otherwise. As such, forest stands and patches are often composed of a variety of species, stocking levels and ages. Currently, forest management practices have reduced the occurrence of many natural disturbance events, such as wildfire. In the absence of natural disturbance, timber harvesting is employed as a disturbance mechanism and thus influences the distribution and size ranges of forest patches in the same fashion as historical natural disturbance events. Harvesting activities serve to mimic natural disturbance events characteristic within the Mackenzie DFA. Past social constraints associated with harvesting and resulting patch size have lead to fragmentation of the landscape beyond the natural ranges of variability, which has developed over centuries from larger scale natural disturbance. In order to remain within the natural range of variability of the landscape and move toward sustainable management of the forest resource, it is important to develop and maintain patch size targets based on historical natural patterns. This indicator will monitor the consistency of harvesting patterns compared to the landscape unit group and the natural patterns of the landscape.

Patch Size

Signatory	Number of Blocks and roads harvested			Number of blocks and roads harvested that meet or are trending towards the patch size target ranges	%in DFA
	Blocks	Roads	Total		
Canfor	14	16	30	26	87%
BCTS	23	57	80	53	66%
TOTAL	37	73	110	79	72%

Source: April 2010 Analysis Results – See Appendix 1 for analysis tables.

Indicator Discussion: All of the blocks harvested and roads built in LU/NDT groupings are associated with harvesting the mountain pine beetle. Inherently, natural disturbance patterns are achieved by managing this priority Forest Health factor through salvage harvesting activities.

Indicator 6 Coarse Woody Debris

Indicator Statement	Target and Variance
The percent of cutblocks and roads harvested that exceed coarse woody debris requirements.	Target: 100% Variance: 0%

Coarse woody debris (CWD) as a habitat element provides: 1) nutrients for soil development, 2) structure in streams to maintain channel stability, 3) food and shelter for animals and invertebrates, and 4) growing sites for plants and fungi. Past forestry practices have encouraged the removal of CWD from sites for a number of economic and/or safety reasons, presumably to the detriment of biological diversity. We use this indicator following harvesting to quantify CWD retained in blocks, wildlife tree patches, riparian areas, and in areas of un-salvaged timber. Within the NHLB we assume that natural processes will result in the maintenance of appropriate levels of CWD.

Post-harvest CWD levels will be measured as a standard component of either the silviculture survey or residue and waste survey. The interim target for CWD was taken from the FRPA *Forest Planning and Practices Regulation, Sec. 68* default requirements (BC. Reg 14/2004). Although the PAG members felt that this number was inadequate to protect this element of biodiversity, they recognized that insufficient information exists to determine either the amount of CWD left behind after harvesting or the amount of CWD that occurs in natural pre-harvest stands. Even so, we expect significantly more CWD than the target is retained after harvest and have committed to developing a more comprehensive CWD strategy pending availability of more data.

Coarse Woody Debris

Signatory	Number of Blocks harvested	Number of blocks harvested that exceed CWD requirements	%in DFA
Canfor	14	14	100%
BCTS	23	23	100%
TOTAL	35	35	100%

Source: GIS.

Indicator Discussion: This indicator applies to blocks only. On no road operations were there required coarse woody debris measures stated in any operational plans or site plans.

Indicator 7 Wildlife Trees

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

Stand level retention, including wildlife tree patches, is managed by each signatory in the DFA on a site-specific basis. During the development of a cut block, retention areas are delineated based on a variety of factors. Stand level retention generally occurs along riparian features and will include non-harvestable and sensitive sites if they are present in the planning area. Stand level retention also aims to capture a representative portion of the existing stand type to contribute to ecological cycles on the land base. Retention level in each block is documented in the associated Site Plan, recorded in the signatories' respective database systems and reported out in RESULTS on an annual basis.

Wildlife Trees

Signatory	Total Number of Cutblocks Harvested	Number of Cutblocks Harvested exceeding WTP requirements	Overall %
Canfor	14	14	100.0%
BCTS	23	23	100.0%
TOTAL	37	37	100.0%

Source: Site Plans

Indicator Discussion:

Indicator 8 Riparian Management Area Effectiveness

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

Riparian features found in the field are assessed during the block lay-out stage to determine its riparian class and associated RRZ/RMZ. Appropriate buffers are then applied, considering other factors such as operability and windfirmness. Prescribed measures, if any, to protect the integrity of the RMA are then written into the Operational Plan. The target is a legal requirement. The target value of 100% has been established to reflect this and to ensure that all riparian management practices, specifically RRZ designation and management, continue to remain consistent with the pre-harvest operational plans.

Riparian Management

Signatory	Number of Forest Operations with Riparian Management Strategies Identified in Operational Plans				Forest Operations Completed in Accordance with riparian management requirements	%in DFA
	Roads	Harvest	Silviculture	Total		
Canfor	3	10	0	13	13	100%
BCTS	21	19	3	43	43	100%
TOTAL	24	29	3	56	56	100%

Source: Operational Plans

Indicator Discussion:

Indicator 9 Sedimentation

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

Sedimentation occurrences are detected by forestry personnel during stream crossing inspections, road inspections, silviculture activities, and other general activities. In addition, Canfor supervisors routinely fly their operating areas annually following spring freshet to look for any such occurrences. While in some situations the sites may have stabilized so that further sedimentation does not occur, in other cases mitigating actions may have to be conducted. This may involve re-contouring slopes, installing siltation fences, re-directing ditch lines, grass seeding, or deactivating roads.

Sedimentation

Signatory	Number of identified unnatural sediment occurrences	Number of identified unnatural sediment occurrences with mitigating actions taken	% in DFA
Canfor	0	0	100%
BCTS	0	0	100%
TOTAL	0	0	100%

Source: Inspection monitoring reports

Indicator Discussion:

Indicator 10 Stream Crossings

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

Forestry roads can have a large impact on water quality and quantity when they intersect with streams, particularly by increasing sedimentation into water channels. Sediment is a natural part of streams and lakes as water must pass over soil in order to enter a water body, but stream crossings can dramatically increase sedimentation above normal levels. Increased sedimentation can damage spawning beds, increase turbidity, and effect downstream water users. When stream crossings are installed and removed properly, additional sedimentation may be minimized to be within the natural range of variation. Erosion control plans and procedures are used to ensure installations and removals are done properly. To calculate the success of this indicator it is important to ensure that a process is in place to monitor the quality of stream crossings, their installation, removal, and to mitigate any issues as soon as possible.

Stream Crossings

Signatory	Number of Stream Crossings			Number of Stream Crossings			% Total
	Installed	Removed	Total	Appropriately designed and properly installed	Properly removed	Total	
Canfor	12	5	17	12	5	17	100%
BCTS	11	4	15	11	4	15	100%
TOTAL	23	9	32	23	9	32	100%

Source: Inspection monitoring reports

Indicator Discussion:

Indicator 11 Peak Flow Index

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

The peak flow index is an indicator that indicates the potential effect of harvested areas on water flow in a particular watershed. The H60 is the elevation for which 60% of the watershed area is above. The ECA or "Equivalent Clearcut Area" is calculated from the area affected by logging and the hydrologic recovery of that area due to forest re-growth. After an area has been harvested, both winter snow accumulation and spring melt rates increase. This effect is less important at low elevations, since the snow disappears before peak flow. Harvesting at high elevations will have the greatest impact and is, therefore, of most concern. As a result, areas harvested at different elevations are weighted differently in the calculation of peak flow index. Most hydrologic impacts occur during periods of the peak stream flow in a watershed. In the interior of British Columbia, peak flows occur as the snowpack melts in the spring.

With PFI calculations now complete, the watersheds will next be evaluated to establish the watershed sensitivity and thereby the PFI risk (low to high). With the PFI risk ratings established, harvesting plans will have to consider the impact harvesting will have on the watershed in which it occurs. The goal, in watersheds with a high PFI risk rating, is to either postpone harvesting, or refer to a qualified registered professional for a detailed review.

Peak Flow Index

Signatory	Number of watersheds with harvest activities in the DFA	Number of those watersheds with Peak Flow Index calculations	Total % DFA
Canfor	7	7	100%
BCTS	9	9	100%
TOTAL	16	16	100%

Source: GIS analysis – See Appendix 1 for a table with the current Peak Flow Index status of all Watersheds within the DFA.

Indicator Discussion:

Indicator 12 Road Re-vegetation

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

This indicator was chosen as a way to assess our ability to minimize or at least reduce the anthropogenic effect of forest roads on adjacent ecosystems. In keeping with the common assumption of coarse-and medium-resolution biodiversity, our underlying assumption with this indicator was – re-vegetating roads will reduce the potential anthropogenic effects that roads have on adjacent ecosystems by minimizing potential for silt runoff or slumps, the amount of exposed soil, the potential for invasive plants to become established, and returning at least a portion of forage and other vegetation to conditions closer to those existing prior to management.

Road Re-vegetation

Signatory	Total Number of Projects Where Re-vegetation is Prescribed	Number of Prescribed Re-vegetation Projects Completed within 12 months of disturbance	% in DFA
Canfor	7	7	100%
BCTS	3	2	66.7%
TOTAL	10	9	90%

Source: Licensee tracking systems

Indicator Discussion:**Indicator 13 Road Environmental Risk Assessment**

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

Environmental risk assessments provide an indicator of “due diligence” in avoiding accidental environmental damage that has potential to occur from forest development in conditions of relatively unstable soil. Through the implementation of risk assessments, we expect to maintain soil erosion within the range that would normally occur from natural disturbance events under unmanaged conditions. Our assumption was – the more we can resemble patterns of soil erosion existing under unmanaged conditions, the more likely it will be that we do not introduce undue anthropogenic effects, from road construction, on adjacent ecosystems. The completion of environmental risk assessments on roads is completed by field staff during road layout and is inputted into the signatories’ respective databases. The assessments provide the basis for future road inspection requirements and highlight areas of special concern that may require professional geotechnical or design work. All assessments are completed in accordance to documented procedures.

Road Environmental Risk Assessment

Signatory	Total Number of roads constructed	Number of constructed roads with environmental risk assessments completed	% in DFA
Canfor	16	16	100%
BCTS	59	59	100%
TOTAL	75	75	100%

Source: Genus

Indicator Discussion:**Indicator 14 Species within the DFA**

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that adhere to management strategies for Species at Risk, Ungulate winter ranges, and other local species of importance.	Target: 100% Variance: -10%

Fundamental to the correct identification of species and habitats is the incorporation of appropriate management strategies where forest activities have the potential to impact species and habitats. Identification of those animals, invertebrates, bird species, vascular plants, and plant communities that have been declared to be at risk is crucial if they are to be conserved. Appropriate personnel are key staff and consultants that are directly involved in operational forest management activities. By implementing training to identify species within the DFA the potential for disturbing these species and their habitat decreases. Maintaining all populations of native flora and fauna in the DFA is vital for sustainable forest management, as all organisms are components of the larger forest ecosystem.

There are various sources to draw upon when developing the comprehensive list of species that are legally protected or species of importance within the DFA. The list of species in Appendix C includes species from the following sources:

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

Incorporation of local species of importance recognizes potential species that are not legally protected. Local species of importance can be proposed by First Nations, PAG members, the licensees, or by members of the public.

Species within the DFA

Signatory	Number of Forest Operations that coincide with Species at Risk, Ungulate Winter Ranges, or other local species of importance as identified in Operational Plans				Number of Forest Operations with Species at Risk, Ungulate Winter Ranges, or other local species of importance as identified in Operational Plans that adhere to specific management strategies.	% in DFA
	Roads	Harvesting	Silviculture	Total		
Canfor	0	0	0	0	0	100%
BCTS	1	4	0	5	5	100%
TOTAL	1	4	0	5	5	100%

Source: Operational Plans

Indicator Discussion:**Indicator 15 Sites of Biological Significance**

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that adhere to management strategies for sites of biological significance.	Target: 100% Variance: 110%

Sites of biological significance include areas that are critical for wildlife habitat, sensitive sites, and unusual or rare forest conditions or communities. Specific management strategies may be required to ensure that these sites are maintained within the DFA. This indicator will ensure that specific management (fine filter) strategies are developed to conserve and manage sites of biological significance. Many types of sites of biological significance are sufficiently known to allow the development of special management areas, or prescribe activities that will appropriately manage these areas. The management strategies will be based on information already in place (e.g., National Recovery Teams of Environment Canada, IWMS Management Strategy), legislation (provincial and national parks), Land and Resource Management Plans (LRMPs), and recent scientific literature. Management strategies will be implemented in operational plans such as site plans to ensure the protection of these sites. Training of appropriate personnel in the identification of these sites of biological importance is critical to the management and protection of these sites. Appropriate personnel include key signatory staff and consultants that are directly involved in operational forest management activities. Having appropriate personnel trained to identify sites of biological significance will reduce the risks of forestry activities damaging these sites.

This indicator evaluates the success of implementing specific management strategies for sites of biological significance as prescribed in operational, tactical and/or site plans. Operational plans such as site plans describe the actions needed to achieve these strategies on a site specific basis. Once harvesting and other forest operations are complete, an evaluation is needed to determine how well these strategies were implemented. Developing strategies and including them in operational, tactical and/or site plans are of little use if the actions on the ground are not consistent with them. Tracking this consistency will ensure problems in implementation are identified and corrected in a timely manner.

Sites of Biological Significance

Signatory	Number of Forest Operations with Sites of Biological Significance Management Strategies Identified in Operational Plans				Forest Operations Completed in Accordance with Identified Strategies	% in DFA
	Roads	Harvesting	Silviculture	Total		
Canfor	0	0	0	0	0	100%
BCTS	0	0	0	0	0	100%
TOTAL	0	0	0	0	0	100%

Source: Operational Plans

Indicator Discussion:

Indicator 16 Soil Conservation

Indicator Statement	Target and Variance
Percentage of forest operations consistent with soil conservation standards as identified in operational plans and/or site plans.	Target: 100% Variance: 0%

Conserving soil function and nutrition is crucial for sustainable forest management. To achieve this, forest operations have limits on the amount of soil disturbance they can create. These limits are described in legislation in the Forest Planning and Practices Regulation, section 35. Soil disturbance is defined in this SFM plan as disturbance caused by a forest practice on an area, including areas occupied by excavated or bladed trails of a temporary nature, areas occupied by corduroy trails, compacted areas, and areas of dispersed disturbance. Soil disturbance is expected to some extent from timber harvesting or silviculture activities, but these activities are held to soil conservation standards in Site Plans (where they are commonly known as "soil disturbance limits"). The Site Plan prescribes strategies for each site to achieve activities and still remain within acceptable soil disturbance limits.

Soil information is collected as a component of site plan preparation, and soil conservation standards are established based on the soil hazards for that block. To be within those limits there are several soil conservation strategies currently used. Forest operations may be seasonally timed to minimize soil disturbance. For example, fine-textured soils such as clays and silts are often harvested when frozen to reduce excessive compaction. EMS pre-work forms require equipment operators to be aware of soil conservation indicators outlined in the site plans. Once an activity is complete the final EMS inspection form assesses the consistency with site plan guidelines. If required, temporary access structures are rehabilitated to the prescribed standards. Road construction within blocks is minimized, and low ground pressure equipment may be used where very high soil hazards exist.

Soil Conservation

Signatory	Number of Forest Operations				Forest Operations Completed in Accordance with Soil Conservation Standards	% in DFA
	Roads	Harvesting	Silviculture	Total		
Canfor	16	14	2	32	32	100%
BCTS	31	23	3	57	57	100%
TOTAL	47	37	5	89	89	100%

Source: Operational Plans

Indicator Discussion:

Indicator 17 Terrain Management

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

Some areas subject to forest operations occur on slopes that warrant special terrain management requirements in operational plans (usually the site plan). These unique actions are prescribed to minimize the likelihood of landslides or mass wasting. Terrain Stability Assessments (TSA) are completed on areas with proposed harvesting or road development that has been identified as either unstable or potentially unstable. The recommendations of the TSA are then integrated into the site plan or road layout/design and implemented during forest operations.

Terrain Management

Signatory	Number of Forest Operations with Terrain Management Requirements Identified in Operational Plans				Forest Operations Completed in Accordance with Requirements	% in DFA*
	Roads	Harvesting	Silviculture	Total		
Canfor	0	0	0	0	0	100%
BCTS	1	1	1	3	3	100%
TOTAL	1	1	1	3	3	100%

Source: Operational Plans

Indicator Discussion:

Indicator 18 Reportable Spills

Indicator Statement	Target and Variance
The number of EMS reportable spills	Target: 0 Variance: < 5

All signatories currently have procedures in place for reducing and reporting spills. EMS checklists and monitoring procedures require the proper storage, handling, and labeling of controlled products. Such indicators include proper storage tank construction, the use of shut off valves, availability of spill kits, and the construction of berms where required. EMS plans also include the indicators to be taken in the event of a spill.

Reportable Spills

Signatory	Number of EMS Reportable Spills						
	Petroleum Products	Pesticides	Antifreeze	Battery Acid	Grease	Paints and Solvents	Total
Canfor	1	0	0	0	0	0	1
BCTS	0	0	0	0	0	0	0
TOTAL	1	0	0	0	0	0	1

Source: Signatory Incident Tracking System

Indicator Discussion:**Indicator 19 Site Index** Removed from plan

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

Indicator 20 Site conversion

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

In addition to maintaining the resources necessary for sustaining the resiliency of forest ecosystems, a stable land base within which productive capability is assessed is also required. In order to assess the maintenance of the productive capability of the land base, this indicator specifically tracks the amount of productive land base loss due to various non-forest uses. Removal of the productive land base occurs as a result of permanent access structures, including roads, landings and gravel pits, as well as converting forested areas to non-forest land use, such as range, seismic lines and other mineral exploration.

Conversion of the THLB to non-forest land also has implications for carbon sequestration. A permanent reduction in the forest means that the removal of carbon from the atmosphere and carbon storage will be correspondingly reduced. The data that is required for monitoring is the number of hectares of productive forest area lost due to conversion to a non-forest use. This data collection and analysis is essentially a GIS exercise that can be completed at 5 year intervals concurrently with the Timber Supply Review process.

Site Conversion

Signatory	Total THLB	Area Converted to Non-forest Land	Percent of THLB Area
Canfor	624,762	18,762	3.0%
BCTS	411,007	19,460	4.7%
TOTAL	1,035,770	38222	3.7%

Source: GIS analysis

Indicator Discussion:

Indicator 21 Permanent Access Structures

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

This indicator indicates the amount of area developed as permanent access structures (PAS) within cutblocks, in relation to the area harvested during the same period. Limits are described in legislation in the Forest Planning and Practices Regulation, section 36. Permanent access structures include roads, bridges, landings, gravel pits, or other similar structures that provide access for timber harvesting. Area that is converted to non-forest, as a result of permanent access structures and other development is removed from the productive forest land base and no longer contributes to the forest ecosystem. Roads and stream crossings may also increase risk to water resources through erosion and sedimentation. As such, minimizing the amount of land converted to roads and other structures protects the forest ecosystem as a whole.

Permanent Access Structures

Signatory	Total Cutblock Area Harvested	Total Cutblock Area in Permanent Access Structures	Percent
Canfor	2004.4	68.4	3.4
BCTS	1557.1	33.6	2.2
TOTAL	3561.5	102.0	2.9

Source: Operational Plans

Indicator Discussion:

Indicator 22 Communication of planned Deactivation Projects

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

The forest is utilized by a variety of users. Access to the forest resource is important to First Nations, stakeholders, and the general public. Deactivation of off-block access roads can limit or remove access to the forest for other users. Where the signatories need to deactivate off-block roads, communication of their intention is required. Our assumption with this indicator is simply that – by increasing communication regarding signatory deactivation plans among stakeholders, we can increase the efficiency of access to resources. For the purpose of this indicator, stakeholders include trappers, guides, private land owners, and woodlots. First Nations will also be communicated with where their consultative boundary overlaps the planned deactivation projects.

Communication of Planned Deactivation Projects

Signatory	Number of deactivation projects communicated to First Nations and Stakeholders	Total number of deactivation projects completed	Percent
Canfor	0	0	100.0%
BCTS	4	4	100.0%
TOTAL	4	4	100.0%

Source: Signatory communication records

Indicator Discussion:

Indicator 23 Regeneration Delay

Indicator Statement	Target and Variance
Percent of standards units declared stocked prior to the regeneration date consistent with operational plans	Target: 100% Variance: <5%

Regeneration delay is defined in this SFM plan as the time allowed in a prescription between the start of harvesting in the area and the earliest date by which the prescription requires a minimum number of acceptable, well-spaced trees per hectare to be growing in that area. There is a maximum permissible time allowed and comes from standards developed and/or approved by government. The regeneration delay period is usually within two years, where planting is prescribed and five years where the stand is expected to reforest naturally. Ensuring that all harvested stands meet the prescribed regeneration delay date within the specified time frame is an indication that the harvested area has maintained the ability to recover from a disturbance, thereby

maintaining its resiliency and productive capacity. It also helps to ensure that a productive stand of trees is beginning to grow for use in future rotations. A regeneration survey is completed after planting to ensure adequate stocking of harvested blocks. The current status of this indicator was derived from a review of signatories' records for the reporting period.

Regeneration Delay

Signatory	Number of standards units required to meet Regeneration Date During Period	Number of standards units that Meet the Regeneration Date	% in DFA
Canfor	80	79	98.8%
BCTS	31	31	100.0%
TOTAL	111	110	99.1%

Source: Signatory silviculture records and/or RESULTS

Indicator Discussion:

Indicator 24 Free Growing

Indicator Statement	Target and Variance
Percent of standards units declared free growing prior to the late free growing date consistent with operational plans.	Target: 100% Variance: <5%

A free growing stand is defined in this SFM plan as a stand of healthy trees of a commercially valuable species, the growth of which is not impeded by competition from plants, shrubs or other trees. The free growing status is somewhat dependent on the regeneration delay date of a forest stand and could be considered the next reporting phase. A free growing assessment is conducted on stands based on a time frame indicated in operational plans. The late free growing dates are established based on the biogeoclimatic classification of the site and the tree species prescribed for planting after harvest.

In order to fulfill mandates outlines in legislation, standards are set for establishing a crop of trees that will encourage maximum productivity of the forest resource (BC MOF 1995b). The free growing survey assesses the fulfillment of a Licensee's obligations to the Crown for reforestation and helps to ensure that the productive capacity of the forest land base to grow trees is maintained. Continued ecosystem productivity is ensured through the principle of free growing. This indicator illustrates the percentage of harvested blocks that meet free growing obligations across the DFA.

Free Growing

Signatory	Number of Standards Units Required to Meet Free Growing During Period	Number of Standards Units declared Free Growing	% in DFA
Canfor	203	203	100.0%
BCTS	17	17	100.0%
TOTAL	220	220	100.0%

Source: Signatory silviculture records and/or RESULTS

Indicator Discussion:

Indicator 25 Prioritizing harvest of damaged stands

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

Damaging agents are considered to be biotic and abiotic factors (fire, wind, insects etc.) that reduce the net value of commercial timber. To reduce losses to timber value it is necessary to ensure that if commercially viable timber is affected by damaging agents, that the timber is recovered before its value deteriorates. At the time of this SFMP's preparation, the most serious stand damaging agent in the Mackenzie DFA is the Mountain Pine Bark Beetle, which has killed millions of mature, commercially viable lodgepole pine. Prioritizing infested stands for treatment can contribute to sustainable forest management in several ways. Removing infested trees can slow the spread of beetles to adjacent un-infested stands and allow Licensees to utilize trees before they deteriorate. Also, once harvesting is complete the area can be replanted, turning an area that would have released carbon through the decomposition of dead trees into the carbon sink of a young plantation.

Treating areas with stand damaging agents will provide other societal benefits. Burned and diseased killed stands may be aesthetically unpleasing, and their harvesting and reforestation will create a more pleasing landscape. Windthrown stands restrict recreational use and can foster the growth of insect pests such as the

spruce bark beetle. Thus, prioritizing areas with stand damaging agents for treatment will help to maintain a more stable forest economy and achieve social benefits through enhanced aesthetics and recreational opportunities.

Prioritizing Harvest of Damaged stands

Signatory	Number of hectares harvested in the stands considered a high risk to stand damaging agents	total number of hectares harvested during the reporting period	% in DFA
Canfor	1736	1925	90.2%
BCTS	1402.5	1402.5	100%
TOTAL	3138.5	3327.5	94.3%

Source: Signatories Operational Plans

Indicator Discussion:

Indicator 26 Harvest volumes

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

To be considered sustainable, harvesting a renewable resource such as timber cannot deteriorate the resource on an ecological, economic or social basis. It is expected that certain resource values and uses will be incompatible; however, a natural resource is considered sustainable when there is a balance between the various components of sustainability. During Allowable Annual Cut (AAC) determination, various considerations are examined including the long term sustainable harvest of the timber resource, community stability, wildlife use, recreation use, and the productivity of the DFA. The AAC is generally determined every five years by the Chief Forester of British Columbia, using a number of forecasts to assess the many resource values that need to be managed. On behalf of the Crown, the Chief Forester makes an independent determination of the rate of harvest that is considered sustainable for a particular Timber Supply Area (TSA). The Mackenzie DFA is part of the larger Mackenzie TSA, comprising about 42% of the TSA area.

The harvest level for a TSA must be met within thresholds that are established by the Crown. By following the AAC determination, the rate of harvest is consistent with what is considered by the province to be sustainable ecologically, economically and socially within the DFA. As stated above, the Chief Forester makes a determination of the rate of harvest for a particular TSA. The licensee then by law must achieve the AAC within the specified thresholds. In the case of BC Timber Sales, they are mandated to offer timber sale licenses matching the allocated AAC. Each truckload of wood is assessed and accounted for at an approved Ministry of Forests and Range (MOFR) scale site. The MOFR uses this information to apply a stumpage rate to the wood, and monitors the volume of wood harvested and compares it to the AAC thresholds. BC Timber Sales tracks volume for timber sale licenses issued based on volume cruised, and compares this to its AAC allocation. Canfor tracks the scaled volume of wood harvested.

The volume of timber actually harvested within the DFA will be determined annually by a review of MOFR timber scale billing summaries for the period of January 1st to December 31st each year, on an annual basis. BC Timber Sales will track the volume sold annually relative to their apportionment. The signatories will report out on the volume harvested (Canfor) or sold (BCTS) over the previous 5 year period. With each annual report, the actual reported years within the 5 year period will change as the first year drops off and the current year is added on.

Harvest Volumes

Signatory	Volume Harvested (CF) or Sold (BCTS)						5 year Apportionment	Percent of 5 year cut in DFA
	Year 1	Year 2	Year 3	Year 4	Year 5	Total		
	05-06	06-07	07-08	08-09	09-10			
Canfor	1,034,139	491,314	105,011	127,478	509,000	2,266,942	5,414,520	41.9%
BCTS	801,475	787,404	377,673	170,630	346,512	2,483,694	3,594,430	69.1%
Total	1,835,614	1,278,718	482,684	298,108	855,512	4,750,636	9,008,950	52.7%

Source: Signatory harvest records, HBS, and/or Sales Schedules

Indicator Discussion: For the 10-11 SFMP annual report, BCTS Mackenzie operations failed to meet this indicator. It was expected and noted in the last annual report that the local forest industry is starting to get back on track increasing BCTS's ability to sell wood in Mackenzie. Approximately 2 times more wood was sold in 2009/2010 compared to 2008/2009. The 5 Year average will take some time to catch up to the indicator target of 100% +/- 10%. Until the sawmills are on 2 or 3 shifts, BCTS will not likely be able to meet this indicator since the volume requirements can be satisfied with the Licensee quota volumes. The success of BCTS meeting this target is, in part, largely dependent on the increase in local and regional sawmill production.

Canfor also failed to meet this indicator due to the recent curtailments and the re-configuration of the sawmill operations. The Canfor Mackenzie operation has been reduced to one sawmill with a projected annual consumption of approximately 750,000m³. Under this scenario, it will not be possible for Canfor to meet this indicator as currently presented.

A proposal was made to the PAG to increase the variance to 50% during the June 2, 2010 meeting in order to make this indicator achievable under current conditions. The PAG could not reach agreement on the LSC recommendation, or any other combination, therefore the indicator was not modified. All rationale in regards to this discussion is contained in the PAG meeting minutes and the Facilitator's report. In the current economic climate, it is expected that a few more years of increased sales (BCTS) and harvesting (Canfor) is required before this target can be achieved, especially since this target is based on a 5 Year rolling average.

Indicator 27 Waste and Residue **Removed from plan**

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

Indicator 28 First-Order Wood Products

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

This indicator helps to show how forest management activities can contribute to a diversified local economy based on the range of products produced at the local level. Forest management's contribution to multiple benefits to society is evident through this indicator, as well as an indication of the level of diversification in the local economy. First order wood products are often used to supply value-added manufacturers with raw materials for production, such as pre-fabricated houses components. These provisions help to maintain the stability and sustainability of socio-economic factors within the DFA. By ensuring a large portion of the volume of timber harvested in the DFA is processed into a variety of products at local facilities, the local economy will remain stable, diverse, and resilient.

First-Order Wood Products

Signatory	Sawlogs	Pulp Logs	House logs	Lumber	Custom cut lumber	Trim Blocks	Pulp chips	OSB strands	Hog	Wood shavings	Plywood	Veneer	Pole Logs	Railway tie logs	Sawdust	Instruments	Finger joint	Total
Canfor	1	0	0	1	0	1	1	0	1	1	0	0	1	0	1	0	0	8
BCTS	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
TOTAL	2	2	0	1	0	1	1	0	1	1	0	0	1	0	1	0	0	11

Source:

Indicator Discussion:

Indicator 29 Local Investment

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

Forests provide many ecological benefits but they also provide substantial socio-economic benefits. In order to have sustainable socio-economic conditions for local communities associated with the DFA, local forest related businesses should be able to benefit from the work that is required in the management of the DFA.

Furthermore, for small forestry companies to contribute to and invest in the local economy there must be assurances that there will be a consistent flow of work. In the same way that larger licensees depend on a secure flow of resources to justify investment in an area, small businesses depend on a sustained flow of opportunities to develop and invest in the local community.

Local is defined in this SFMP as the communities of Mackenzie, McLeod Lake, Germanson Landing, Manson Creek, Tsay Keh Dene, and Fort Ware. The total dollar value of goods and services purchased within the local communities will be calculated relative to the total dollar value of all goods and services used. This calculation will be used to derive the percentage of money spent on forest operations and management of the DFA from local suppliers. Woodlands employee salaries are considered goods purchased where the employee lives within the local area and therefore contribute to community stability.

Forest Operations and Management consider all money spent within the signatory's woodlands departments, excluding stumpage. Harvesting and road building costs, where applicable, will be included in the total.

Local Investment

Signatory	Money spent in local area on Forest operations and management	Total money spent on forest operations and management	% in DFA
Canfor	\$7,395,245.50	\$22,282,860.00	33%
BCTS	\$1,260,371.37	\$2,012,206.37	63%
TOTAL	\$8,655,616.87	\$24,295,066.37	36%

Source: Signatories accounting records

Indicator Discussion:**Indicator 30 Contract Opportunities to First Nations**

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

This indicator is intended to monitor the impacts of forest industry and government activities on the ability of First Nations to access forestry related economic opportunities. At present, this indicator is not intended to assess how successful First Nations are at taking advantage of the opportunities. BCTS provides opportunities for all eligible bidders including First Nations. Canfor has explored forestry related opportunities with First Nations in the past. Capacity amongst the First Nations to take advantage of opportunities will likely have to be addressed in order for available opportunities to be acted upon. This indicator tracks the existence of opportunities available.

Contract Opportunities to First Nations

Signatory	Contract Opportunities							Total for DFA
	Employment	Road Building & Deactivation	Other Volume Purchased	Logging	Silviculture Forestry	Other Contracts	Management Services	
Canfor	0	1	0	3	4	0	0	8
BCTS	0	12	0	18	3	4	0	37
TOTAL	0	13	0	21	7	4	0	45

Source: Signatory contract records

Indicator Discussion:**Indicator 31 Range Management Effectiveness**

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

Range resources can include grazing or hay cutting permits, or areas with potential for these ventures. Range managers and forest managers share the forest for their particular purposes, and must work cooperatively in order to achieve sustainable development and management of its resources. The indicator is designed to ensure that operational plans with identified range requirements have those requirements implemented on the ground. Maintenance of range resources is an important aspect of sustainable forest management because it contributes to the social and economic needs of people who traditionally and currently use the DFA for purposes other than forestry. This indicator will help to ensure that various range values are conserved for current and future generations.

Range Management

Signatory	Total Number of Forest Operations with Range Requirements				Number of Forest Operations Consistent With Requirements	Percent
	Roads	Harvesting	Silviculture	Total		
Canfor	0	0	0	0	0	100.0%
BCTS	0	0	0	0	0	100.0%
TOTAL	0	0	0	0	0	100.0%

Source: Signatory operational plans

Indicator Discussion:**Indicator 32 Satisfaction (PAG)**

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

The PAG is one of the key elements of public involvement in the SFM process. The Mackenzie PAG provides guidance, input and evaluation during development of the SFMP. It is also instrumental in maintaining links to current local values and forest resource uses within the DFA. Therefore, it is important that the signatories have a positive and meaningful working relationship with the PAG, where the signatories are able to respond to all issues and concerns the PAG may have during the process. This indicator will use an average of the PAG meeting evaluation forms to determine the level of satisfaction of the PAG with the public participation process.

Following all PAG meetings to date, PAG participants completed meeting evaluations. One question is in the PAG meeting evaluation form to address this indicator which asked participants "Your overall satisfaction with PAG process?" This indicator is specific to responses to questions M10, M11, and M12 combined.

PAG Satisfaction

Mackenzie DFA SFM Plan Public Advisory Group Meeting Evaluation Question									
Meeting Date	Question MQ10			Question MQ11			Question MQ12		
	Score	Percent (score / 5)	Variance (from 100%)	Score	Percent (score / 5)	Variance (from 100%)	Score	Percent (score / 5)	Variance (from 100%)
6/2/2010	4.5	90.0%	10.0%	4.7	94.0%	6.0%	4.6	92.0%	8.0%
10/20/2010	4.3	86.0%	14.0%	4.5	90.0%	10.0%	4.4	88.0%	12.0%
2/23/2011	4.5	90.0%	10.0%	4.6	92.0%	8.0%	4.6	92.0%	8.0%

Source: PAG satisfaction surveys

Indicator Discussion:

Indicator 33 Representation (PAG) Removed from plan

Indicator Statement	Target and Variance
Percentage of the public sectors as defined in the TOR invited to participate in the PAG process.	Target: 100% Variance: 0%

Indicator 34 Input into Forest Planning

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

Forestry activities can impact a wide section of the public and individual stakeholders within the DFA. This indicator was designed to monitor the signatory's success at providing effective opportunities to residents and stakeholders to express concerns and be proactively involved in the planning process. This involvement may include the identification of areas of interest, definition of the nature of their interest in the land base, and any specific forestry activity that may impact their specific interests. This process ensures that when forestry activities are planned, information is exchanged in an effective and timely manner, so as to resolve potential conflicts before they occur. This process will help to identify the public values, interests and uses of the forest that will be considered within the signatories planning framework.

Stakeholders include the following forest sectors; trappers, guide outfitters, water licence holders, range tenure holders, woodlot owners, private land owners, other licensees, and specific government agencies. Opportunities for input into forest planning will be offered to stakeholders where their tenured area coincides with the signatories planned activities.

Input into Forest Planning

Opportunity	The Number of Opportunities For Public And Stakeholders			
	Canfor	BCTS	Joint	Total
FSP original ads	0	0	0	0
FSP letters to stakeholders	0	0	0	0
LRMP meetings	0	0	0	0
PMP original ads	1	0	0	1
PMP letters to stakeholders	37	0	0	37
PMP signage	0	0	0	0
Other ads (deactivation)	0	1	0	1
Field tours	0	0	0	0
Newsletters	0	0	0	0
Open houses	0	1	1	2
PAG Meetings	0	0	3	3
Documented Meetings	1	2	0	3
Documented phone calls	3	0	0	3
Other referrals	23	3	0	26
TOTAL	65	7	4	76

Source:

Indicator Discussion:

Indicator 35 Public and Stakeholder Concerns

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

All signatories solicit feedback for their public forest management plans in the DFA. As mentioned in previous indicators, public involvement is an important aspect of SFM as it promotes inclusiveness in how Crown forests

are managed. Considering a diverse range of opinions and concerns will result in operational forest management decisions that consider views other than those of the forest industry. A forest industry that respects public and stakeholder input will maintain the support of the public, creating a more economically stable and open forest economy. Operational concerns from the public may be provided in many ways, including written letters, e-mails, or faxes to the signatories. There may also be written comments made during an in-person or telephone meeting between a staff member and the person providing comment. This indicator will compare the number of operational concerns that have been acted on relative to the total number of operational concerns raised. Operational plans are generally FSPs. Tactical plans can include AIAs, operating plans, and cutblock and road referrals.

Public and Stakeholder Concerns

Signatory	Number of concerns brought forward that have been considered and incorporated into operational plans	number of operational concerns brought forward	Percent
Canfor	0	0	100%
BCTS	12	12	100%
TOTAL	12	12	100%

Source:

Indicator Discussion:

Indicator 36 Access to SFM information

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

With this indicator we intend to monitor our effort to ensure effective and comprehensive distribution of the SFMP, annual reports, and audit results for the Mackenzie DFA. In order to gain trust and confidence in the SFMP process, it must be an open and transparent process. By ensuring access to the Plan, annual reports, and audit results, the results of our efforts in achieving sustainable forestry and continuous improvement can be clearly seen and monitored by the public, stakeholders, and First Nations. In this manner, the public, stakeholders and First Nations can hold the signatories accountable for achieving the desired results and have confidence that forest resources are being managed sustainably.

Access to SFM Information

Opportunity	The Number of Distribution/Access Opportunities			
	Canfor	BCTS	Joint	Total
Newsletters	0	0	0	0
Open houses/Trade Shows	0	1	1	2
SFM/PAG Meetings	0	0	3	3
Website	1	1	0	2
Distribution of SFM Information	0	0	0	0
TOTAL	1	2	4	7

Source:

Indicator Discussion:

Indicator 37 SFM Educational Opportunities

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

This indicator was designed to monitor the signatories' success at providing training and educational opportunities in sustainable forest management. SFM relies on residents and stakeholders making informed decisions on forest management. To achieve this, it is incumbent on the signatories to ensure the public are sufficiently informed about SFM to make the choices we request of them. The indicator is intended to ensure that the signatories provide the required opportunities for residents and stakeholders to learn about SFM. It is

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

SFM Educational Opportunities

Opportunity	The Number of SFM Educational Opportunities			
	Canfor	BCTS	Joint	Total
Field tours	0	0	0	0
Newsletters	0	0	0	0
Open houses	0	0	1	1
Presentations	0	0	0	0
PAG Meetings	0	0	3	3
Trade Shows, etc.	0	1	0	1
TOTAL	0	1	4	5

Source:

Indicator Discussion:

Indicator 38 Heritage Conservation

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

The protection of cultural heritage values assures they will be identified, assessed and their record available to future generations. A cultural heritage value is a unique or significant place or feature of social, cultural or spiritual importance. It may be an archaeological site, recreation site or trail, cultural heritage site or trail, historic site or a protected area. Cultural heritage values often incorporate First Nation's heritage and spiritual sites, but they can also involve features protected and valued by non-Aboriginal people. Maintenance of cultural heritage values is an important aspect to sustainable forest management because it contributes to respecting the social and cultural needs of people who traditionally and currently use the DFA for a variety of reasons.

The indicator is designed to ensure that operational plans with identified strategies to conserve cultural heritage values have those strategies implemented on the ground. Tracking the level of implementation will allow the signatories to evaluate how successful this implementation is and improve procedures if required.

Heritage Conservation

Signatory	Total Number of Forest Operations that have associated sites protected under the Heritage Conservation Act (pre 1846)				Number of Forest Operations Completed in Accordance with the Heritage Conservation Act	Percent
	Roads	Harvesting	Silviculture	Total		
Canfor	0	0	0	0	0	100.0%
BCTS	1	0	0	1	1	100.0%
TOTAL	1	0	0	1	1	100.0%

Source: Signatory operational plans

Indicator Discussion:

Indicator 39 First Nations Input into Forest Planning

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

This indicator was designed to list and report out on all documented opportunities provided to First Nations people to be involved in forest management planning processes. Incorporation of First Nations people and their unique perspective into the forest planning process is an important aspect of SFM. This indicator will contribute to respecting the social, cultural and spiritual needs of the people who traditionally and currently use the DFA for the maintenance of traditional aspects of their lifestyle. The Mackenzie SFM PAG is a process designed to

identify public values and objectives within the DFA. Within the PAG process, First Nations has been identified as an important sector for representation.

First Nations Input into Forest Planning

Input Opportunity	Signatory	First Nation								Total
		Tsay Keh	Kwadacha	Takla Lake	Nak'azdli	McLeod Lake	West Moberly	Saulteau	Halfway River	
Operational Planning Referrals	Canfor	2	0	2	2	2	2	0	2	12
	BCTS	2	1	2	2	3	3	1	3	17
Open House Style Meetings	Canfor	0	0	0	0	0	0	0	0	0
	BCTS	0	0	0	0	0	0	0	0	0
Trade Shows	Canfor	0	0	0	0	0	0	0	0	0
	BCTS	1	1	1	1	1	1	1	1	8
Formal Operational Meetings	Canfor	0	0	0	0	0	0	0	0	0
	BCTS	0	0	0	0	0	1	0	0	1
Pest Management Prescriptions	Canfor	1	1	1	1	1	1	1	1	8
	BCTS	0	0	0	0	0	0	0	0	0
FSP referrals / Consultation	Canfor	0	0	0	0	0	0	0	0	0
	BCTS	0	0	0	1	2	2	0	2	7
TOTAL		6	3	6	7	9	10	3	9	53

Source: Signatory communication records.

Indicator Discussion:

Indicator 40 First Nations Concerns

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

Incorporating management strategies into the planning process in order to resolve issues raised by First Nations leadership is a key aspect to sustainable forest management. This indicator contributes to respecting the social, cultural heritage and spiritual needs of people who traditionally and currently use the DFA for the maintenance of traditional aspects of their lifestyle.

Forest planning can include information sharing for both operational and tactical plans. Operational plans, such as the FSP process, are currently referred to First Nations. Tactical plans that may be referred to First Nations include AIAs, operating plans, cutblock and road referrals, and annual operating maps. Active forest operations are considered to be current harvesting, road construction, and mainline deactivation projects, planned vegetation management projects, as well as forest planning of new cutblocks and roads.

First Nations Concerns

Signatory	Number of concerns brought forward that have been considered and incorporated into operational plans	Total number of operational concerns brought forward	Percent
Canfor	0	0	100%
BCTS	0	0	100%
TOTAL	0	0	100%

Source: Signatory communication records and operational, tactical, or site plans.

Indicator Discussion:

Indicator 41 Visual Quality

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

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

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

Visual Quality

Signatory	Total Number of Road construction and Harvesting Operations			Number of Harvesting and road construction operations completed that have visual quality requirements	Total number Forest operations completed that are consistent with the visual quality requirements specified	Percent
	Roads	Harvesting	Total			
Canfor	14	16	30	0	0	100.0%
BCTS	31	23	54	0	0	100.0%
TOTAL	45	39	84	0	0	100.0%

Source: Signatory operational plans

Indicator Discussion:

Indicator 42 Resource Features

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

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

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

These features are generally considered to have value to society so we assume that through conservation of these features we are contributing to social value. Our intent with this indicator is to monitor our commitment to manage and protect regulated resource features.

Resource Features

Signatory	Number of blocks and roads harvested with identified resource features	Total number of blocks and roads harvested where identified resource features are managed or protected	Percent
Canfor	0	0	100.0%
BCTS	0	0	100.0%
TOTAL	0	0	100%

Source:**Indicator Discussion:****Indicator 43 Safety Policy**

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

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

Safety Policy

Signatory	Written Safety Policies in Place and Implementation Documented? (Y/N)
Canfor	Y
BCTS	Y
TOTAL	2

Source: Signatory safety certification records**Indicator Discussion:****Indicator 44 Accidents**

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

Health and safety of forest workers and members of the public is an important quality of life objective that is essential to SFM. All signatories consider employee and public safety as a primary focus of all forestry related operations. Evidence of this high priority can be seen in various company mission statements and individual EMS policies. This indicator was developed to track and report out on the number of lost time workplace accidents that occur within Canfor's woodlands division and the field operations of BCTS. Operations conducted outside the woodlands division and field operations have been excluded from this indicator; however the signatories currently promote safety in all aspects of forest management operations. Two types of workplace accidents are the most common within the forest industry including lost time accidents (LTA) or incidents where medical aid or treatment was necessary but no loss of work time was experienced by the employee. Through this indicator, only LTA will be tracked and monitored.

Accidents

Signatory	Number of Lost Time Accidents
Canfor	0
BCTS	0
TOTAL	0

Source: Signatory safety records**Indicator Discussion:**

Indicator 45 Signage

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

People value being informed of most activities that take place on public lands including those associated with industrial forestry. Signage establishes a standard for safety and otherwise helps inform public about the nature and extent of industrial activity. Conversely, if signage is not kept current, credibility of the signs declines resulting in a potential safety hazard. With this indicator we will monitor our commitment to making information about our activities current and available to those traveling the roads and trails of the Mackenzie DFA.

Signage

Signatory	Number of completed operational projects requiring signage where the signs were posted during the activity and removed following completion	Number of Completed operational Activities requiring signage	Percent
Canfor	12	12	100%
BCTS	54	54	100%
TOTAL	66	66	100%

Source:

Indicator Discussion:

Appendix 1

Old Growth Current, Old Growth Future, and Old Interior Forest Retention in the Mackenzie Defined Forest Area



Old Growth & Old Interior

19-May-2011

Mackenzie DFA

Old Growth - Forest in BEC SBSmk1, SBSmk2 that are > 120yrs. Forest in BEC BWBS decid leading that are > 100yrs. All other stands that are > 140yrs.
 Old Interior areas are a minimum of 200m from unnatural disturbance, Pine and decid leading stands in age class 1-3, and all other species in age class 1-4.

<u>Landscape Unit</u>	<u>BEO</u>	<u>BEC Group</u>	<u>Gross Area(ha)</u>	<u>CFLB Area(ha)</u>	<u>Target Min %</u>	<u>Old Growth Current</u>		<u>Old Growth Future</u>		<u>Target Min %</u>	<u>Old Interior Current</u>	
Akie, Akie River												
	L	1	4,746	4,746	0	3,187	67.2%	3,187	67.2%	10	2,864	89.9%
	L	2	65,326	64,896	9	47,749	73.6%	48,052	74.0%	10	44,983	94.2%
	L	7	23,755	22,306	11	14,001	62.8%	14,680	65.8%	10	10,433	74.5%
	L	8	1,852	1,805	13	1,686	93.4%	1,686	93.4%	10	1,256	74.5%
	L		52,142	16,415		616	3.8%	616	3.8%	10	520	84.3%
Blackwater												
	L	1	125	125	0	116	92.8%	116	92.8%	10	116	100.0%
	L	2	15,689	15,639	9	12,467	79.7%	12,654	80.9%	10	9,602	77.0%
	L	4	39,561	32,672	11	21,272	65.1%	20,162	61.7%	10	8,358	39.3%
	L	5	23,636	21,789	0	11,628	53.4%	11,145	51.2%	10	3,847	33.1%
	L	7	95	95	11	3	3.6%	3	3.6%	10	3	99.6%
	L		109,727	91,940						10		
Buffalohead												
	L	1	852	852	0	605	71.0%	605	71.0%	10	605	99.9%
	L	2	29,222	29,158	9	21,345	73.2%	21,602	74.1%	10	19,262	90.2%
	L	7	16,934	16,374	11	9,464	57.8%	9,546	58.3%	10	6,245	66.0%
	L	8	740	733	13	632	86.2%	632	86.2%	10	278	43.9%
	L		28,131	14,077						10		
Clearwater												
	I	1	4,766	4,537	0	1,533	33.8%	1,533	33.8%	25	1,372	89.5%
	I	2	7,921	7,853	9	1,616	20.6%	1,679	21.4%	25	1,254	77.6%
	I	3	53,982	53,903	19	38,209	70.9%	38,220	70.9%	25	33,726	88.3%
	I	5	15,543	15,472	9	7,878	50.9%	7,888	51.0%	25	4,234	53.7%
	I		27,537	22,025		31	0.1%	31	0.1%	25	31	100.0%
Collins - Davis												
	L	1	8,211	8,203	0	4,942	60.3%	5,842	71.2%	10	4,080	82.6%
	L	2	40,100	40,087	9	23,737	59.2%	26,741	66.7%	10	20,922	88.1%
	L	3	24,522	24,486	19	19,880	81.2%	20,409	83.4%	25	16,823	84.6%
	L	4	9,429	8,751	11	3,727	42.6%	5,512	63.0%	25	1,389	37.3%
	L	5	13,611	13,467	9	6,868	51.0%	7,184	53.3%	25	3,908	56.9%
	L	7	6,478	6,121	11	4,155	67.9%	4,638	75.8%	25	2,687	64.7%
	L	8	1,733	1,730	13	1,709	98.8%	1,709	98.8%	25	1,058	61.9%
	L		116,055	67,637		69	0.1%	69	0.1%		69	100.0%
Connaghan Creek, Eklund, Jackfish, S. Germanser												

<u>Landscape Unit</u>	<u>BEO</u>	<u>BEC Group</u>	<u>Gross Area(ha)</u>	<u>CFLB Area(ha)</u>	<u>Target Min %</u>	<u>Old Growth Current</u>		<u>Old Growth Future</u>		<u>Target Min %</u>	<u>Old Interior Current</u>	
	H	1	3,434	3,428	0	2,997	87.4%	2,997	87.4%	25	2,895	96.6%
	H	2	30,305	30,154	13	18,115	60.1%	18,322	60.8%	25	16,300	90.0%
	H	4	4,405	4,341	11	3,769	86.8%	3,769	86.8%	25	2,481	65.8%
	H	5	781	781	13	652	83.5%	652	83.5%	25	224	34.3%
	H	7	12,079	11,301	16	807	7.1%	1,035	9.2%	25	594	73.6%
	H	8	977	975	19	972	99.7%	972	99.7%	25	828	85.2%
	H		12,677	5,708						25		
Gaffney, Manson River												
	L	1	333	332	0	324	97.7%	324	97.7%	25	305	93.9%
	L	2	62,052	61,647	9	47,978	77.8%	48,006	77.9%	25	36,709	76.5%
	L	4	43,966	41,869	11	31,074	74.2%	31,171	74.4%	25	15,397	49.5%
	L	5	2,082	2,075	9	1,855	89.4%	1,855	89.4%	25	986	53.2%
	L		65,333	54,675						25		
Germansen Mountain												
	L	1	949	948	0	728	76.8%	728	76.8%	10	682	93.7%
	L	2	7,362	7,273	9	3,893	53.5%	3,900	53.6%	10	3,535	90.8%
	L	7	687	616	9	162	26.3%	174	28.2%	10	87	53.9%
	L		2,411	252						10		
Gillis, Klawli												
	I	1	2,316	2,311	0	2,179	94.3%	2,179	94.3%	25	1,991	91.4%
	I	2	73,128	71,680	9	46,054	64.2%	46,108	64.3%	25	39,320	85.4%
	I	4	9,793	9,336	11	6,189	66.3%	6,189	66.3%	25	4,107	66.4%
	I	7	4,834	4,522	11	1,268	28.1%	1,274	28.2%	25	987	77.8%
	I	8	153	152	13	150	98.4%	150	98.4%	25	125	83.3%
	I		26,370	13,527						25		
Kennedy												
	H	3	15,351	15,231	28	14,208	93.3%	14,208	93.3%	50	12,379	87.1%
	H	4	189	189	13	125	66.2%	125	66.2%	25	67	53.7%
	H	5	1,652	1,562	13	976	62.5%	976	62.5%	25	564	57.7%
	H		6,636	6,059								
Lower Akie, Pesika												
	H	1	2,612	2,611	9	1,973	75.6%	2,020	77.4%	25	1,614	81.8%
	H	2	24,789	24,784	13	15,448	62.3%	15,559	62.8%	25	14,206	92.0%
	H	7	11,025	10,380	16	4,519	43.5%	4,563	44.0%	25	2,537	56.1%
	H	8	1,022	999	19	990	99.0%	990	99.0%	25	503	50.9%
	H		45,346	21,726		373	1.7%	373	1.7%	25	187	50.2%
Lower Ospika												
	I	1	3,715	3,693	0	1,704	46.1%	1,904	51.6%	25	1,220	71.6%
	I	2	26,456	26,431	9	13,322	50.4%	13,540	51.2%	25	8,708	65.4%
	I	3	12,091	12,054	19	8,852	73.4%	8,907	73.9%	25	7,382	83.4%
	I	4	11,157	11,016	11	7,677	69.7%	7,698	69.9%	25	3,796	49.4%
	I	5	3,721	3,708	9	2,705	72.9%	2,705	72.9%	25	2,058	76.1%

<u>Landscape Unit</u>	<u>BEO</u>	<u>BEC Group</u>	<u>Gross Area(ha)</u>	<u>CFLB Area(ha)</u>	<u>Target Min %</u>	<u>Old Growth Current</u>		<u>Old Growth Future</u>		<u>Target Min %</u>	<u>Old Interior Current</u>	
Lower Pesika	I		77,302	45,437		26	0.1%	26	0.1%	25	8	31.7%
	L	1	79	79	0	9	10.8%	9	10.8%	25	9	100.0%
	L	2	912	912	9	640	70.2%	662	72.6%	25	631	98.6%
	L	7	2,703	2,570	11	1,258	48.9%	1,258	48.9%	25	880	70.0%
	L	8	183	176	13	176	100.0%	176	100.0%	25	136	77.2%
	L		1,077	715						25		
McCusker												
	L		161	28		3	11.7%	3	11.7%	25	3	100.0%
Misinchinka, Tudyah B												
	L/I	1	469	466	0	67	14.4%	67	14.4%	25	66	97.7%
	L/I	3	38,718	38,334	19	31,794	82.9%	31,795	82.9%	25	29,093	91.5%
	L/I	4	8,429	4,909	11	3,013	61.4%	3,058	62.3%	25	1,311	43.5%
	L/I	5	20,150	16,446	9	13,544	82.4%	13,545	82.4%	25	7,053	52.1%
	L/I		33,629	22,968		0	0.0%	0	0.0%	25	0	0.0%
Morfee												
	I	4	128	128	11	101	78.8%	101	78.8%	25	38	38.1%
	I		896	872								
Muscovite												
	L	4	69	44	11	2	4.4%	4	9.7%	10	1	25.5%
	L		132	121						10		
Nabesche												
	I	1	7,094	7,056	0	3,524	49.9%	3,528	50.0%	25	2,128	60.4%
	I	2	21,846	21,789	9	16,228	74.5%	16,243	74.5%	25	10,902	67.2%
	I	3	37,153	37,017	19	24,487	66.2%	24,487	66.2%	50	19,774	80.8%
	I	4	2,225	2,176	11	592	27.2%	613	28.2%	25	254	42.9%
	I	5	8,325	8,294	9	4,511	54.4%	4,514	54.4%	25	3,261	72.3%
	I	6	5,017	4,884	11	2,489	51.0%	2,616	53.6%	25	981	39.4%
	I		70,249	46,888		9	0.0%	9	0.0%		9	100.0%
Nation												
	L	4	4,161	4,117	11	3,211	78.0%	3,239	78.7%	25	1,218	37.9%
	L	5	306	306	9	124	40.4%	124	40.4%	25	5	4.3%
	L		6,998	5,922						25		
Omineca												
	L	2	442	442	9	313	70.7%	318	72.0%	25	293	93.8%
	L	7	554	426	11	113	26.5%	115	26.9%	25	104	91.9%
	L	8	139	139	13	138	99.7%	138	99.7%	25	110	79.5%
	L		315	47						25		
Parsnip												
	I	1	2,385	2,385	0	884	37.1%	884	37.1%	50	829	93.7%
	I	3	29,686	29,590	19	20,470	69.2%	20,636	69.7%	50	18,219	89.0%

<u>Landscape Unit</u>	<u>BEO</u>	<u>BEC Group</u>	<u>Gross Area(ha)</u>	<u>CFLB Area(ha)</u>	<u>Target Min %</u>	<u>Old Growth Current</u>		<u>Old Growth Future</u>		<u>Target Min %</u>	<u>Old Interior Current</u>	
	I	4	6,931	5,336	11	2,014	37.7%	2,051	38.4%	25	819	40.7%
	I	5	10,014	9,412	9	3,836	40.8%	3,941	41.9%	25	2,642	68.9%
	I		23,740	18,948		1	0.0%	1	0.0%		0	0.0%
Philip, Philip Lake, Tudyah A												
	L/I	2	40,154	39,647	9	28,872	72.8%	28,747	72.5%	25	18,415	63.8%
	L/I	4	54,859	52,057	11	31,026	59.6%	32,117	61.7%	25	14,372	46.3%
	L/I	5	1,570	1,508	9	577	38.3%	577	38.3%	25	205	35.6%
	L/I		105,559	90,827		0	0.0%	0	0.0%	25	0	0.0%
Pine Pass												
	L	5	72	68	9	60	88.9%	60	88.9%	25	14	23.0%
Schooler												
	I	1	3,537	3,533	0	2,257	63.9%	2,257	63.9%	25	1,332	59.0%
	I	2	22,039	21,926	9	16,441	75.0%	16,495	75.2%	25	12,883	78.4%
	I	6	4,338	4,146	11	1,943	46.9%	1,956	47.2%	25	986	50.7%
	I		35,951	33,392		38	0.1%	38	0.1%	25	13	33.5%
Selwyn												
	L	1	1,700	1,676	0	1,290	77.0%	1,290	77.0%	50	1,258	97.5%
	L	2	55	55	13	3	5.6%	3	5.6%	25	3	100.0%
	L	3	18,647	18,584	28	14,011	75.4%	14,017	75.4%	50	13,093	93.4%
	L	4	491	491	16	256	52.2%	256	52.2%	25	180	70.2%
	L	5	9,537	9,517	13	4,153	43.6%	4,153	43.6%	25	2,597	62.5%
	L	6	693	693	16	214	30.9%	214	30.9%	25	104	48.5%
	L	8	146	146	19	146	99.8%	146	99.8%	25	84	57.4%
	L		24,954	18,095		160	0.9%	160	0.9%		152	95.1%
Tudyah Lake												
	L		52	3						25		
Twenty Mile												
	I	1	1,084	1,082	0	909	84.1%	909	84.1%	25	816	89.8%
	I	2	12,626	12,532	9	9,556	76.3%	9,720	77.6%	25	8,934	93.5%
	I	7	2,829	2,306	11	912	39.5%	912	39.5%	25	776	85.1%
	I	8	105	105	13	105	100.0%	105	100.0%	25	105	100.0%
	I		4,198	877						25		
Upper Ospika												
	H	1	4,263	4,260	0	2,504	58.8%	2,600	61.0%	50	1,757	70.2%
	H	2	21,576	21,280	13	17,769	83.5%	17,818	83.7%	50	15,123	85.1%
	H	4	2,652	2,561	16	2,515	98.2%	2,515	98.2%	25	1,669	66.3%
	H		16,135	9,939		116	1.2%	116	1.2%		73	62.8%
			2,087,310	1,767,122		770,679		780,971			578,482	

Historical, Current and Future State Patch Size Analysis Results in the Mackenzie DFA



Early Patch Size Mackenzie DFA

Early patches include blocks harvested within the past 40yrs. These blocks are grouped into patches based on a standard distance. Historical state looks back 5yrs. Future state is 3yrs forward and includes planned blocks.

	Historical State					Current State					Future State											
	Small	Med	Large	XL	Total Ha	Small	%	Target	Med	%	Target	Large	%	Target	XL	Total Ha	Small	Med	Large	XL	Total Ha	
CARIBOU																						
Connaghan Creek, Eklund, Jackfish, S																						
NDT2	133	1,105	412	0	1,650	103	8.8	30-40	1,065	91.2	30-40	0	0.0	20-40	0	1,168	138	362	0	0	501	
NDT3	291	1,019	0	0	1,310	291	43.0	10-20	386	57.0	10-20	0	0.0	60-80	0	677	259	238	0	0	497	
Gaffney, Manson River																						
NDT2	1,084	5,071	3,635	0	9,789	1,279	17.5	30-40	5,062	69.4	30-40	950	13.0	20-40	0	7,291	1,796	3,135	1,518	0	6,449	
NDT3	999	6,042	6,881	0	13,922	1,071	8.8	10-20	4,776	39.4	10-20	6,267	51.7	60-80	0	12,115	801	3,199	10,786	0	14,786	
Gillis, Klawli																						
NDT2	511	1,236	1,949	0	3,695	539	14.3	30-40	1,185	31.5	30-40	2,036	54.1	20-40	0	3,760	446	1,632	6,498	0	8,575	
NDT3	301	734	350	0	1,385	315	18.4	10-20	720	42.1	10-20	675	39.5	60-80	0	1,710	238	349	2,194	0	2,781	
Kennedy																						
NDT1	32	0	0	0	32			30-40			30-40			20-40								
NDT2	102	72	698	0	872	68	8.1	30-40	72	8.6	30-40	698	83.3	20-40	0	838	55	0	698	0	753	
Misinchinka, Tudyah B																						
NDT1	43	166	0	0	208	19	16.6	30-40	96	83.4	30-40	0	0.0	20-40	0	115	21	82	0	0	103	
NDT2	661	4,314	1,439	0	6,413	744	14.8	30-40	3,030	60.4	30-40	1,242	24.8	20-40	0	5,017	893	1,940	2,451	0	5,284	
NDT3	82	256	1,929	0	2,268	72	3.7	10-20	341	17.3	10-20	1,553	79.0	60-80	0	1,966	253	684	1,251	0	2,189	
Twenty Mile																						
NDT2	0	63	0	0	63	0	0.0	30-40	63	100.0	30-40	0	0.0	20-40	0	63	0	63	0	0	63	
NDT3	0	90	0	0	90	0	0.0	10-20	90	100.0	10-20	0	0.0	60-80	0	90	0	90	0	0	90	
ENHANCED																						
Akie																						
NDT2	20	44	104	0	168	0	0.0	30-40	44	29.7	30-40	103	70.3	20-40	0	147	0	44	96	0	140	
NDT3	283	1,588	1,517	0	3,387	283	9.9	10-20	1,588	55.7	10-20	981	34.4	60-80	0	2,851	305	1,259	615	0	2,179	
Blackwater																						
NDT2	1,135	1,307	9,861	0	12,302	1,157	16.1	30-40	1,528	21.3	30-40	4,487	62.6	20-40	0	7,172	1,180	1,546	5,737	0	8,463	
NDT3	1,660	4,507	16,284	0	22,450	1,732	10.9	10-20	2,981	18.7	10-20	11,235	70.5	60-80	0	15,947	1,522	2,775	11,866	0	16,163	
Buffalohead																						
NDT2	169	254	2,332	0	2,754	169	6.7	30-40	254	10.0	30-40	2,106	83.3	20-40	0	2,528	113	48	2,082	0	2,243	
NDT3	385	1,406	3,435	0	5,225	371	7.4	10-20	1,453	28.9	10-20	3,210	63.8	60-80	0	5,034	333	994	3,210	0	4,537	
Collins - Davis																						
NDT1	38	132	1,391	0	1,561	0	0.0	30-40	132	19.8	30-40	536	80.2	20-40	0	668	12	124	313	0	448	
NDT2	420	1,414	7,266	0	9,101	409	8.8	30-40	1,180	25.4	30-40	3,065	65.9	20-40	0	4,653	446	1,019	1,434	0	2,899	
NDT3	338	2,634	3,126	0	6,098	382	11.6	10-20	2,108	64.2	10-20	794	24.2	60-80	0	3,285	294	1,315	586	0	2,195	
NDT5	10	0	23	0	33			10-20			10-20			60-80								

Resultant Location: Forest_WIM.WIM_Analysis.WIM_Early_Patch_Size
Forest_WIM.WIM_Analysis.WIM_Mature_Patch_Size

	Historical State					Current State					Future State										
	Small	Med	Large	XL	Total Ha	Small	%	Target	Med	%	Target	Large	%	Target	XL	Total Ha	Small	Med	Large	XL	Total Ha
Germansen Mountain																					
NDT2	0	21	0	0	21	0	0.0	30-40	21	100.0	30-40	0	0.0	20-40	0	21	0	21	0	0	21
NDT3	0	48	0	0	48	0	0.0	10-20	48	100.0	10-20	0	0.0	60-80	0	48	0	48	0	0	48
Morfee																					
NDT2	0	0	0	0	0	0	0.0	30-40	0	0.0	30-40	0	100.0	20-40	0	0	0	0	0	0	0
NDT3	50	72	170	0	291	18	6.7	10-20	82	31.1	10-20	164	62.2	60-80	0	263	39	82	0	0	121
Philip, Philip Lake, Tudyah A																					
NDT2	1,294	1,861	7,483	0	10,637	1,237	13.8	30-40	1,661	18.5	30-40	6,094	67.8	20-40	0	8,993	977	1,231	5,966	0	8,174
NDT3	1,510	5,945	15,005	0	22,460	1,605	8.4	10-20	5,362	28.2	10-20	12,036	63.3	60-80	0	19,002	1,290	4,648	14,227	0	20,165
GENERAL																					
Clearwater																					
NDT1	176	325	295	0	796	176	22.1	30-40	324	40.8	30-40	295	37.1	20-40	0	795	176	328	291	0	794
NDT2	626	397	1,610	0	2,633	593	30.5	30-40	438	22.5	30-40	912	46.9	20-40	0	1,943	584	556	590	0	1,730
Lower Akie, Pesika																					
NDT3	95	223	870	0	1,187	79	8.2	10-20	462	48.1	10-20	420	43.7	60-80	0	960	65	353	275	0	693
Lower Ospika																					
NDT1	63	0	766	0	829	63	8.4	30-40	0	0.0	30-40	685	91.6	20-40	0	748	29	123	215	0	368
NDT2	31	0	1,133	0	1,164	31	11.4	30-40	0	0.0	30-40	244	88.6	20-40	0	276	56	3	113	0	171
NDT3	178	993	1,022	0	2,192	192	8.8	10-20	1,047	48.2	10-20	934	43.0	60-80	0	2,173	199	803	932	0	1,935
NDT5	7	0	6	0	13	7	100.0	10-20	0	0.0	10-20	0	0.0	60-80	0	7				0	7
Nabesche																					
NDT1	200	0	365	0	565	68	89.6	30-40	0	0.0	30-40	8	10.4	20-40	0	76	68	0	0	0	68
NDT2	184	246	1,355	0	1,785	107	9.6	30-40	264	23.8	30-40	740	66.6	20-40	0	1,111	122	138	345	0	605
NDT3	86	829	1,330	0	2,245	147	12.0	10-20	685	55.7	10-20	397	32.3	60-80	0	1,230	75	487	389	0	951
NDT5	50	0	62	0	112	7	97.7	10-20	0	0.0	10-20	0	2.3	60-80	0	7	7	0	0	0	7
Nation																					
NDT2	0	0	251	0	251	0	0.0	30-40	0	0.0	30-40	98	100.0	20-40	0	98	13	0	0	0	13
NDT3	42	272	308	0	622	35	6.1	10-20	292	50.8	10-20	248	43.1	60-80	0	575	56	233	372	0	661
Parsnip																					
NDT1	60	57	360	0	477	83	34.0	30-40	31	12.8	30-40	130	53.2	20-40	0	244	92	4	132	0	228
NDT2	184	112	1,856	0	2,152	165	23.5	30-40	174	24.7	30-40	364	51.8	20-40	0	703	231	200	519	0	950
NDT3	107	1,843	2,118	0	4,068	144	4.1	10-20	1,161	32.7	10-20	2,248	63.3	60-80	0	3,553	179	662	2,916	0	3,757
Schooler																					
NDT2	64	128	2,105	0	2,298	64	2.8	30-40	149	6.5	30-40	2,073	90.7	20-40	0	2,287	93	61	1,754	0	1,908
NDT3	51	482	403	0	936	56	6.9	10-20	353	43.4	10-20	403	49.6	60-80	0	813	55	255	152	0	462
NDT5	0	0	9	0	9	0	0.0	10-20	0	0.0	10-20	9	100.0	60-80	0	9	0	0	9	0	9
Selwyn																					
NDT1	0	0	121	0	121	0	0.0	30-40	0	0.0	30-40	108	100.0	20-40	0	108	0	73	98	0	171
NDT2	186	306	884	0	1,375	147	17.0	30-40	136	15.8	30-40	579	67.2	20-40	0	862	95	121	324	0	539
NDT3	20	35	0	0	55	3	6.8	10-20	35	93.2	10-20	0	0.0	60-80	0	37	3	35	2	0	39

Resultant Location: Forest_WIM.WIM_Analysis.WIM_Early_Patch_Size
Forest_WIM.WIM_Analysis.WIM_Mature_Patch_Size

Historical State					Current State						Future State						
Small	Med	Large	XL	Total Ha	Small	% Target	Med	% Target	Large	% Target	XL	Total Ha	Small	Med	Large	XL	Total Ha
13,960	47,644	102,517	0	164,120	14,031		40,878		69,128		0	124,038	13,610	31,361	80,957	0	125,928

Patch Categories by RMZ for Mackenzie TSA

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

Table of current Peak Flow Index status for the water sheds within the Mackenzie DFA

Watershed Name	Assessment Year	Licensee Responsibility	Watershed Sensitivity Rating	Current ECA (ha)	Current ECA (%)	PFI (%)	PFI Risk Rating	Hydrological Risk Rating	State
Blackwater	2011	CFP	2	8556.3	17.3	23.1	Low	Low	No Action
Dastaiga	2011	BCTS	2	583.6	7.2	9.3	Low	Low	No Action
FINAWSD000046	2011	CFP	1	1502.2	22.7	33.8	Low	Low	No Action
Gaffney	2011	CFP	1	9404.5	19.1	24.4	Low	Low	No Action
Lignite	2011	BCTS	2	1275	7.7	9.9	Low	Low	No Action
Manson	2011	CFP	2	6485.8	10.4	12.6	Low	Low	No Action
Mischinsinlika	2011	BCTS	2	1642.2	7	7.2	Low	Low	No Action
Munro	2011	CFP	2	3557.1	18.4	25.1	Low	Low	No Action
Nation	2011	BCTS	2	9776.6	14.2	19.2	Low	Low	No Action
Peace Williston	2011	BCTS	2	67992.6	12.5	18.6	Low	Low	No Action
Phillip Creek	2011	CFP	2	14360	21	28.2	Low	Low	No Action
Rainbow	2011	CFP	2	5504.2	17.8	25.5	Low	Low	No Action
Scott Creek	2011	BCTS	2	380.6	1.9	1.9	Low	Low	No Action
Scovil Creek	2011	BCTS	2	1674.3	14.6	20	Low	Low	No Action
Sylvester	2011	BCTS	2	4223.3	14.7	19.7	Low	Low	No Action
Weston	2011	BCTS	2	660.2	6.2	6.2	Low	Low	No Action