



First Nation Woodland Licence: N2T

Forest Stewardship Plan, 2020-2025
Version 2.0

Mackenzie Forest District

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List of Acronyms

ADA	Agricultural Development Areas
BCTS	BC Timber Sales
BEC	Biogeoclimatic Ecosystem Classification (subzone)
CHR	Cultural Heritage Resources
CMT	Culturally Modified Tree
CWD	Coarse Woody Debris
FDU	Forest Development Unit
FLNRORD	Forest Lands Natural Resource Operation and Rural Development
FNWL	First Nations Woodland Licence
FPPR	Forest Planning and Practice Regulation
FREP	Forest and Range Evaluation Program
FRPA	Forest and Range Practices Act
FSP	Forest Stewardship Plan
GP	General Partnership
LOWG	Landscape Objectives Working Group
LP	Limited Partnership
LRMP	Land and Resource Management Plan
MFZ	Machine Free Zone
MITD	Minimum Inter-tree Distance
NDT	Natural Disturbance Type
NDU	Natural Disturbance Unit
NRB	Natural Range Barrier
OGMA	Old Growth Management Area
RMZ	Riparian Management Zone
RRZ	Riparian Reserve Zone
RSTBC	Recreation Site and Trails BC
SFMP	Sustainable Forest Management Plan
SPH	Stems per Hectare
SRA	Settlement Reserve Areas
SRMP	Sustainable Resource Management Plan
THLB	Timber Harvesting Land Base
TSA	Timber Supply Area
UWR	Ungulate Winter Range
VIA	Visual Impact Assessment
WHA	Wildlife Habitat Area

1.0 Introduction

As per the *Forest and Range Practices Act* (FRPA), a Forest Stewardship Plan (FSP) must be prepared by all forest agreement holders (Licensees), and approved by the provincial government before associated permits can be issued to the Licensee. An FSP must specify results or strategies that describe how the Licensee will ensure that their operations on the ground are consistent with government set objectives for soil, timber, wildlife, water, fish, biodiversity, visual quality, cultural heritage, recreation, invasive plants and natural range barriers. An FSP also describes how a Licensee will re-establish a healthy productive forest stand after harvest.

This FSP builds upon the ideas and concepts behind a sustainable forest management plan (SFMP) which demonstrates how a specific set of goals are met using indicators, by setting measurable or verifiable targets, and discussing how those targets will be met. Specifically, this FSP outlines how the Licensee will be accountable for all the management strategies and actions to which they have committed as either a Result or a Strategy. By ensuring that every action is measurable or verifiable, the Licensee can show on an ongoing basis sustainable forest management and continual review and improvement in their practices.

The structure of this document is non-traditional. The information which would have typically been found in the FSP supporting material documents is combined into this FSP for clarity and ease of reading by the public. *Not all statements in this plan are intended to create legally binding obligations.* Plain language summaries are provided under the heading 'Context'; this includes the information which would have previously been found in the supporting information package. Each section then includes the Legal Reference, and the legally enforceable Results or Strategies, as well as how the Results or Strategies can be verified or measured.

2.0 Application

This FSP applies to the Kwadacha First Nation's Woodland Licence (FNWL) N2T. The licence is held by the Nation's economic development corporation, OBO Forest Management General Partnership (GP).

The FSP in effect at the time of harvest applies and will continue to apply to those cut-blocks until such time they are removed from the Licensee's responsibility (typically once declared free to grow).

3.0 Definitions

For purposes of this plan, "Licensee" refers to OBO Forest Management GP, and Kwadacha Natural Resource LP, and "the plan" means this Forest Stewardship Plan.

DEFINITIONS

Result – A description of measurable or verifiable outcomes for a particular established objective, and the situations or circumstances that determine where in a forest development unit these outcomes will be applied.

Strategy – A description of measurable or verifiable steps or practices that will be carried out for a particular established objective, and the situations or circumstances that determine where in a forest development unit the steps or practices will be applied.

Forest Planning and Practices Regulation, Section 1 (2)

"*Qualified*" means being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof;¹

"*Qualified registered professional*" means

- (a) a professional engineer or professional geoscientist, and
- (b) in relation to a forestry operation, a person referred to in paragraph (a) or a registered professional forester, registered forest technologist or holder of a special permit under the *Foresters Act*;

Unless otherwise expressly indicated, or indicated by context, terms used in this FSP have the definition given to them in the *Forest Act*, *Forest and Range Practices Act* and regulations under them, as amended from time to time.

4.0 Submission Approval and Term

The term of this FSP will be five years, effective from the date of approval.

5.0 Forest Development Units

There is one Forest Development Unit (FDU) which comprises the entire area under the Kwadacha FNWL licence as shown in Figure 1 and identified on the FSP overview map (Appendix 1) and content maps (Appendix 2). The results and strategies within this FSP apply to the entire FDU and to the term of the FSP unless otherwise stated.

¹ WorkSafe BC, 2017. *Occupational Health and Safety Regulation* 1.1 Definitions.



6.0 Results or Strategies

The following essential elements are applicable to each result or strategy unless otherwise stated in the result or strategy:

- Who: the Licensee
- What: primary forest activities
- Where: the FDU
- When: for the term of this FSP or until such time cutblocks harvested under this FSP are removed from the Licensee's responsibility (typically once declared free to grow).

The sub-sections below, 6.1 to 6.4, have been organized with **legally binding results and strategies** as well as non-legally binding context (background and references) and description of how the result or strategy will be measured/verified.

6.1 Landscape Biodiversity Objective – Established under the *Land Act*

Context

Biological diversity of the forests and a viable forest industry are dependent upon sustainable use of forests and forest resources. Current harvesting practices attempt to replicate the size, timing and frequency of disturbances that would otherwise occur on the landscape, such as wildfires and insect or pathogen outbreaks. The hope is, that by mimicking the natural disturbances and keeping them within the natural range of variability that occurs in these events, that forest harvesting will be sustainable.

The first efforts made to provide guidance based on natural disturbances was the Biodiversity Guidebook.² The guidebook's recommendations were based on this concept of "natural range of variability", but represented a compromise between biodiversity and timber management objectives.

Since then natural disturbance types (NDTs) have been used to guide management regimes and were widely adopted into a number of Land and Resource Management Plans (LRMPs) including the Mackenzie LRMP.^{3,4,5} More recently, Natural Disturbance Units (NDUs) have been proposed as even more comprehensive guidance based on an increased knowledge of disturbance processes, subsequent stand development, and temporal and spatial landscape patterns.⁶

² Forest Practices Code of British Columbia Biodiversity Guidebook (1995)

<https://www.for.gov.bc.ca/hfd/library/documents/bib19715.pdf>

³ DeLong, C. 2002. Natural Disturbance Units of the Prince George Forest Region: Guidance for Sustainable Forest Management. <http://www.for.gov.bc.ca/hfd/library/documents/bib90746.pdf>.

⁴ DeLong, S.C. and Tanner, D. 1996. Managing the pattern of forest harvest: lessons from wildfire. Biodiversity and Conservation 5, 119-1205.

⁵ Mackenzie Land and Resource Management Plan (November 2000). Available at:

<https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/omineca/mackenzie-lrmp>

⁶ DeLong, S.C. 2011. Land units and benchmarks for developing natural disturbance-based forest management guidance for northeastern British Columbia. B.C. Min. For. Range, For. Sci. Prog., Victoria, B.C. Tech. Rep. 059. www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr059.htm.

The *Order Establishing Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District*⁷ (April 9, 2008, Amended September 23, 2010) creates objectives for old forest retention and old interior forest retention. These objectives were developed considering the social direction provided by the *Mackenzie LRMP* in combination with current scientific information regarding the natural range of variability. The government has indicated that these objectives may be periodically reviewed and updated to reflect new knowledge or changing environmental, economic, and/or social conditions, which may include establishing objectives for mature forest retention. Implementation guidance is available which supports this Order and provides further advice on managing for old forest retention and old interior forest retention.

The *Order Establishing Spatial Land Use Objectives for part of the Mackenzie Forest District Area*⁸ (September 23, 2010) is intended to complement the Non-Spatial Order by creating spatially defined Old Growth Management Areas (OGMAs) in seven landscape units or landscape unit groupings. The remainder of the Mackenzie Forest District landscape units continue to be managed through the Non-Spatial order. There are no landscape units within the FDU that contain spatial landscape objectives under this order.

There are four landscape units within the FDU: Buffalohead, Fox, Lower Akie, and Akie. The *Order to Establish the Obo River and Fox Landscape Units and Objectives* (October 24, 2002) is intended to complement the Spatial and Non-spatial Orders with landscape unit specific biodiversity objectives. This Order applies to the Fox landscape unit within the FDU.

The *Order Establishing Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District* combines biogeoclimatic (BEC) units to facilitate operational implementation of the order. The combination of BEC units creates some conflict with the *Order to Establish the Obo River and Fox Landscape Units and Objectives*.⁹ In the event of uncertainty regarding management of old forest retention, the *Order Establishing Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District* will be followed.

The Licensee commits reviewing available information from the Mackenzie TSA's Landscape Objectives Working Group (LOWG) upon approval of this FSP. The LOWG is a collaboration among Signatories in meeting landscape objective targets for the amount of old forest, old interior forest, and young forest patch size distribution in the Mackenzie TSA. The group also works to ensure that primary forest activities conducted by Signatories abide by the boundaries of current and future OGMA's, and provide evidence to government that Mackenzie TSA Licensees and BC Timber Sales, Prince George Business Area, are working together to achieve the objectives of the Orders.

To manage for patch size, the Licensee will use the NDT guidance as written into the Mackenzie LRMP, which is the current and accepted trend in the Mackenzie Forest District. However, should the

⁷ Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District (dated April 9, 2008, and as amended on September 23, 2010). Available at: <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/omineca-region/mackenzie-lrmp/mackenzie-srmp/non-spatial-landscape-biodiversity-obj-mackenzie-forest-district.pdf>. Accessed April 4, 2019

⁸ Spatial Land Use Objectives for part of the Mackenzie Forest District Area (dated September 23, 2010) https://www.for.gov.bc.ca/tasb/slrp/pdf/srmp/signed_mackenzie_OGMA_order_20100923.pdf

⁹ Order to Establish the Obo River and Fox Landscape Units and Objectives (October 24, 2002) https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/omineca-region/mackenzie-lrmp/mackenzie-srmp/order_obo_river_fox_landscape_units_objectives.pdf Accessed April 4, 2019

opportunity arise for a more comprehensive examination of landscape level management and tracking of disturbances using an NDU approach, the Licensee would participate in that process.

The results and strategies for Objectives Set by Government for Wildlife and Biodiversity – Landscape Level are addressed in the FSP in Section 6.1.1 (non-spatial) and 6.1.2 (spatial)

6.1.1 Objectives Set by Government for Wildlife and Biodiversity – Landscape Level (Non-Spatial)

Biodiversity Objectives: Old Forest, Old Interior Forest and Natural Disturbance Type Patch Distribution (Non-spatial)	
Legal Reference	Result
<ul style="list-style-type: none"> • <i>FPPR</i> Section 9 • <i>Ministerial Order establishing Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District</i> (dated April 9, 2008, and as amended on September 23, 2010) under Section 93.4 of the <i>Land Act</i> • Mackenzie Land and Resource Management Plan (November, 2000) • <i>Ministerial Order establishing the Obo River and Fox Landscape Units and Objectives</i> (October 24, 2002) 	<p>The Licensee commits to achieving the old forest retention and old interior retention targets in accordance with the requirements and variances set out in the <i>Mackenzie Forest District Non-Spatial Landscape Biodiversity Objectives Order</i> and the <i>Obo River and Fox Landscape Units and Objectives Order</i>.</p> <p>The Licensee also commits to conducting primary forest operations under this FSP that progress towards achieving the NDT patch size distribution targets in the Mackenzie LRMP and Fox Landscape Unit Order (Table 1). With District manager approval, primary forest operations may result in deviations from the NDT patch size targets referred to in Table 1 to the extent necessary to address a forest health concern.</p> <p>Landscape level biodiversity objectives for the Fox landscape unit are met by the Obo/Fox Landscape Unit Order and the proposed result applies to the remaining landscape units in the FDU.</p>
Scale of Measurement:	Landscape Units
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (measures and verification):	
<p><u>Old Forest and Old Interior Forest</u></p> <p>Compliance with non-spatial biodiversity objectives is tracked and reported annually by the Mackenzie TSA Landscape Objectives Working Group (LOWG). This information is used to support operational planning and is incorporated at the planning level and documented in site plans. Retention targets are from the Mackenzie LRMP and the <i>Order to Establish the Obo River and Fox Landscape Units and Objectives</i> (October 24, 2002). Where uncertainty regarding the management of old forest retention occurs, targets for old forest and old interior forest outlined in the <i>Order establishing Non-Spatial</i></p>	

Landscape Biodiversity Objectives in the Mackenzie Forest District (April 9, 2008, amended on September 23, 2010) and the Order to Establish the Obo River and Fox Landscape Units and Objectives (October 24, 2002) will be used. Applicable landscape units are listed in Table 2.

Natural Disturbance Patch Size Distribution Targets

Compliance with NDT patch size targets are also tracked and reported annually by the LOWG; results are used to support operational planning as well as incorporated at the site plan level.

Table 1. Patch size distribution targets from the Mackenzie LRMP (2000) and the *Order to Establish the Obo River and Fox Landscape Units and Objectives* (October 24, 2002).

Caribou Management Strategy Areas (Section 6.8.1 of the Mackenzie LRMP)			
<i>Patch Size</i>	<i><40 ha</i>	<i>40-250 ha</i>	<i>250-5,000 ha</i>
NDT 2	30-40%	30-40%	20-40%
NDT 3	10-20%	10-20%	60-80%
Enhanced RMZ (Section 7.1.1 of the Mackenzie LRMP)			
<i>Patch Size</i>	<i><40 ha</i>	<i>40-80 ha</i>	<i>80-250 ha</i>
NDT 1	30-40%	30-40%	20-40%
NDT 2	30-40%	30-40%	20-40%
<i>Patch Size</i>	<i><40 ha</i>	<i>40-250 ha</i>	<i>250-5,000 ha</i>
NDT 3	10-20%	10-20%	60-80%
General RMZ (Section 7.1.2 of the Mackenzie LRMP) and Special RMZ (Section 7.1.3 of the Mackenzie LRMP)			
<i>Patch Size</i>	<i><40 ha</i>	<i>40-80 ha</i>	<i>80-250 ha</i>
NDT 1	30-40%	30-40%	20-40%
NDT 2	30-40%	30-40%	20-40%
<i>Patch Size</i>	<i><40 ha</i>	<i>40-250 ha</i>	<i>250-1,000 ha</i>
NDT 3	10-20%	10-20%	60-80%
Fox Landscape Unit (<i>Order to Establish the Obo River and Fox Landscape Units and Objectives</i>)			
<i>Patch Size</i>	<i><40 ha</i>	<i>40-80 ha</i>	<i>80-250 ha</i>
NDT 2	30-40%	30-40%	20-40%
<i>Patch Size</i>	<i><40 ha</i>	<i>40-250 ha</i>	<i>250-1000 ha</i>
NDT 3	10-20%	10-20%	60-80%

Table 2. Applicable Landscape Unit Groups for Non-Spatial Old Growth Management (2016-2017 LOWG data).

Caribou Management Strategy Areas	Enhanced RMZ	General RMZ and Special RMZ
Buffalohead	Akie, Buffalohead	Lower Akie*

*Landscape unit groups for Lower Akie differ between the Mackenzie LRMP and the current LOWG data. This FSP follows the LOWG guidance. As LOWG patch distribution targets are updated, the Licensee will amend this FSP accordingly.

Other References:

1. Mackenzie Sustainable Resource Management Plan. Available at: <https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/omineca/mackenzie-lrmp/mackenzie-srmp> . Accessed April 4, 2019.
2. Omineca Region Forest Health Strategy 2018-2019. BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development. Available at: https://www.for.gov.bc.ca/ftp/HFP/external/!publish/Forest_Health/TSA_FH_Strategies/180817_2018%20OFHS_signed.pdf. Accessed on April 4, 2019.

6.1.2 Objectives Set by Government for Wildlife and Biodiversity – Landscape Level (Spatial)

Biodiversity Objectives: Old Growth Management Areas (Spatial)	
Legal Reference	Result
<ul style="list-style-type: none"> Ministerial Order establishing the Spatial Land Use Objectives for part of the Mackenzie Forest District Area (dated September 23, 2010), under Section 93.4 of the <i>Land Act</i> 	<p>Not Applicable. There are no established Old Growth Management Areas within the landscape units within the FDU.</p> <p>The FDU overlaps four Landscape Units: Buffalohead, Lower Akie, Akie, and Fox.</p>
Scale of Measurement:	Old Growth Management Areas
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
<p>The spatial Order applies to the following landscape units and/or groupings:</p> <ol style="list-style-type: none"> Connaghan Creek/Eklund/Jackfish/South Germansen - Upper Manson; Twenty Mile; Gaffney/Manson River; Kennedy; Gillis/Klawli; Misinchinka/Tudya B; and, Parsnip. <p>OGMAs are spatially defined and verified during all planning exercises and the creation of relevant map products in order to ensure compliance with the objectives of <i>Spatial Land Use Objectives for part of the Mackenzie Forest District Area (September 23, 2010)</i>.</p> <p>As circumstances regarding OGMAs change and the need arises to establish other designated areas, the Licensee will amend this FSP accordingly.</p>	

Other References:

- District of Mackenzie's Old Growth Management Area Amendment Policy (January, 2015).
- Mackenzie Sustainable Resource Management Plan. Available at: <https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/omineca/mackenzie-lrmp/mackenzie-srmp> . Accessed April 4, 2019.

6.2 Agriculture Development Areas and Settlement Reserve Areas – Established under the *Land Act*.

Context

In light of the mountain pine beetle epidemic, and the need to balance social, economic and environmental benefits, the Regional Executive Director of the Integrated Land Management Bureau – Ministry of Agriculture and Lands, established land use objectives for agricultural development areas (ADAs) and settlement reserve areas (SRAs). The purpose of these is to provide economic opportunities for alternative resources such as agriculture within forested areas of the Crown land base, while also acknowledging the need for management of forest health issues such as insect or pathogen outbreaks. Currently, there are no ADAs or SRAs within the FDU.

Agriculture Development Areas (ADAs) and Settlement Reserve Areas (SRAs)	
Legal Reference	Result
<ul style="list-style-type: none"> <i>Order of the Minister of Agriculture and Lands Establishing Land Use Objectives under Section 93.4 of the Land Act for the Purposes of the Forest and Range Practices Act</i>, dated November 21, 2006 	Not Applicable. There are no established ADAs or SRAs within the FDU.
Scale of Measurement:	ADAs and SRAs
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
<p>Agriculture Development Areas and Settlement Reserve Areas are spatially defined and available on all relevant maps in order to ensure compliance with the objectives of the <i>Order of the Minister of Agriculture and Lands Establishing Land Use Objectives under Section 93.4 of the Land Act for the Purposes of the Forest and Range Practices Act</i>, dated November 21, 2006¹⁰.</p> <p>As circumstances regarding ADAs and SRAs change and the need arises to establish other designated areas, the Licensee will amend this FSP accordingly.</p>	

¹⁰ Order of the Minister of Agriculture and Lands Establishing Land Use Objectives under Section 93.4 of the *Land Act* for the Purposes of the *Forest and Range Practices Act*, dated November 21, 2006. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/omineca-region/mackenzie-lrmp/mackenzie-srmp/order_min_agriculture_lands.pdf

6.3 Objectives Set by Government – Section 149 of the *Forest and Range Practices Act*

Context

Objectives set by Government are defined in Section 149 of the *Forest and Range Practices Act* for the purpose of managing and protecting forest and range values. These are broad objectives for soil, timber, wildlife, water, fish, biodiversity, visual quality, cultural heritage and recreation. In addition, the Licensee commits to an information sharing process and to measures for invasive plants and natural range barriers. By way of this FSP, the Licensee has committed to managing the resources and planning forest development in accordance with the objectives for each of these values as outlined in the sub-sections 6.3.1 to 6.3.7, 6.4, and 7.1 to 7.2 below.

6.3.1 Objectives Set by Government for Soils

Context

Healthy and productive soils are integral to growing future forests and thus forestry practices. Road building must be carried out in a manner which limits soil disturbances and soil degradation as well as erosion, landslides, and sediment delivery to water systems. In order to minimize disturbances from primary forest activities, soil disturbance, and permanent access structures (roads on the block, landings, gravel pits, etc.) are regulated. The *Forest Planning and Practices Regulation* limits soil disturbance on the harvested portion of a block as well as the percentage of permanent access structures¹¹. Should circumstances warrant exceeding these percentages, a rationale must be provided by a Qualified Registered Professional.

The Licensee has committed to meeting the legal requirements of the soil disturbance and permanent access limits.

Soil Disturbance Limits and Permanent Access Structures

Legal Reference	Result
<i>FPPR</i> Section 5, 35 and 36	The Licensee undertakes to comply with the practice requirements of <i>FPPR</i> Sections 35 and 36.
Scale of Measurement:	N/A
Map Reference:	None
Monitoring (Measures and Verification):	
The Licensee has committed to adopting the practices requirements specified in <i>FPPR</i> Sections 35 and 36, which are measurable and verifiable at the site plan level in conjunction with accepted field verification methods. Strategies needed to meet this result would be prescribed at the site plan level.	

¹¹ B.C. Ministry of Forests and Range, 2004. *Forest Planning and Practices Regulation*. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/14_2004#section35. Accessed January 12, 2017

6.3.2 Objectives Set by Government for Wildlife

Species at Risk and Regionally Important Wildlife

Context

Two categories of wildlife are established under the *Forest and Range Practices Act* by the Minister responsible for the *Wildlife Act* (the Minister of Environment and Climate Change): Species at Risk and Regionally Important Wildlife. These categories have been established because the wildlife or wildlife habitat attribute recognized under them require special management attention to address impacts of forest and range activities on Crown land.

Species at Risk include endangered, threatened, or vulnerable species of vertebrates and invertebrates, and endangered or threatened plants and plant communities that are negatively affected by forest or range management on Crown land and are not adequately protected by other mechanisms. The Regionally Important Wildlife category includes species that are considered important to a region of BC, rely on habitats that are not otherwise legally protected, and may be adversely impacted by forest or range practices. In BC, these two categories of wildlife are referred to as Identified Wildlife.

The establishment of these categories of species enables provisions under the *Forest and Range Practices Act* to manage identified wildlife species including wildlife habitat areas (WHAs), ungulate winter ranges (UWRs), and associated general wildlife measures and objectives.

Section 7 Notice, Species at Risk¹²

There is one Species at Risk Notice for Northern Caribou, given authority under Section 7(2) of the *Forest Planning and Practices Regulation* (

Table 3) applicable to the FDU. This notice provides indicators of the amount, distribution, and attributes of wildlife habitat required for the winter survival of ungulate species, and species at risk within the Mackenzie TSA.

The Licensee undertakes to comply with this Notice.

Table 3. Species at Risk in the FDU.¹³

Forest District	Date Given Notice	Species	Amount Included in Current Notice		Amount remaining following exemption		Future WHAs
			Total area (ha)	Mature THLB Impact (ha)	Total area (ha)	Mature THLB Impact (ha)	
Mackenzie	Dec 2004	Northern Caribou	Total Amount Not Specified	10,100	Total Amount Not Specified	10,100	202

Ungulate Winter Range

Ungulate Winter Range (UWR) is defined as an area(s) that contains habitat necessary to meet the winter habitat requirements of an ungulate species such as caribou, deer, or elk. UWRs are based on current scientific and management information, local knowledge, and other expertise from the region as to what is critical habitat for winter survival. Social and economic values also play a role in developing

¹² Section 7 Notices for Species at Risk available at: <http://www.env.gov.bc.ca/wld/FRPA/notices/index.html> Accessed April 2, 2019.

¹³ Approved Wildlife Habitat Areas <http://www.env.gov.bc.ca/wld/frpa/notices/sar.html> Accessed April 2, 2019.

UWR units and objectives. Sections 9 and 12 of the Government Actions Regulation (BC Reg. 582/2004) of *FRPA* describe the formal legislative basis for establishing UWR.

There are currently six legally established UWRs that overlap the FDU (Table 4).

The Licensee commits to comply with these orders, which includes restrictions on harvesting, requirements to maintain forest cover in specific areas, restrictions on some forest harvesting in areas near the UWR, road building restrictions, and limits to resource development in general. UWR Orders that are listed as adjacent to the Licensee's FDU will be adhered to should development occur near these adjacent areas, as required by the Order itself.

As per Section 7(3) of the *Forest Planning and Practices Regulation* the Licensee is exempt from preparing results or strategies for (Caribou) Ungulate Winter Range Orders #U-007.

As circumstances regarding habitat change and the need arises to establish other UWRs, the Licensee will amend this FSP accordingly.

Table 4. Established Ungulate Winter Range Overlapping the FDU.¹⁴

UWR - ID	Species	Area	Date	Total Hectares
U-7-007	Northern Caribou	Mackenzie	June 14, 2007	54,633
U-7-017	Moose, Mountain Goat and Elk	Mackenzie TSA	December 12, 2008	26,112
U-7-025	Northern Caribou	Mackenzie	May 24, 2016	1,243,236
U-7-028	Stone's Sheep	Mackenzie	May 24, 2016	87,186 (core), 3,487,166 (buffer)
U-7-029 and U-7-030	Mountain Goat	Mackenzie	May 24, 2016	107,204

Wildlife Habitat Areas

Wildlife habitat areas (WHAs) are areas that have been deemed necessary to meet the habitat requirements of an Identified Wildlife element, such as salt licks or calving grounds. WHAs designate critical habitats in which human activities are managed to limit their impact on the Identified Wildlife element. The purpose is to conserve those habitats considered most limiting to a given wildlife species. Currently there are no established WHAs in the FDU (as of April 2019).

As circumstances regarding habitat change and the need arises to establish other WHAs, the Licensee will amend this FSP accordingly.

6.3.2.1 Northern Caribou

Legal Reference	Result and Strategy
<u>Section 7 Notice</u> <ul style="list-style-type: none"> <i>FPPR</i> Sec 7 Notice entitled "Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Survival of Species at Risk in the Mackenzie Forest District", issued December 2004; 	<p>Through the establishment of the associated Orders, the Minister has exempted the Licensee from preparing results or strategies for Ungulate Winter Range Orders #U7-007 and #U7-025.</p> <p>The Licensee commits to comply with the requirements of these Orders.</p>

¹⁴ Approved Ungulate Winter Ranges http://www.env.gov.bc.ca/wld/FRPA/uwr/approved_uwr.html Accessed April 2, 2019.

<u>Ungulate Winter Range</u> <ul style="list-style-type: none">• Order #U7-007 for Northern Caribou UWR, approved June 14, 2007;• Order #U7-025 Northern Caribou High Elevation Ungulate Winter Range approved May 24, 2016; <u>Wildlife Habitat Areas</u> <p>There are no established WHAs in the FDU.</p>		<p>Until the appropriate government agency approves a Recovery Action Plan for Northern Caribou or until such time that better guidance from government is available, the Licensee will comply with the requirements for Northern Caribou as established by the Section 7 Notice for the term of the FSP.</p> <p>The licensee commits to using the spatial dataset developed by Wildlife Infometrics Inc. (2015) that models Northern Caribou's post-rut aggregation areas, calving range, and migration corridors. Using this data, the Licensee will work with or employ a Qualified Registered Professional Biologist to ensure that any forest operations in these areas which are not already managed under an existing UWR or WHA meets or exceeds the recommendations of the professional regarding caribou. Recommendations from a Qualified Registered Professional Biologist will be incorporated into site plans where appropriate.</p>
Scale of Measurement:	UWR and WHAs	
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit	
Monitoring (Measures and Verification):		
<p>The Section 7 Notice for species at risk, Ungulate Winter Range and Wildlife Habitat Areas are spatially identified, and most requirements can be verified against the applicable requirements listed above for those which do not require a results or strategy prepared. All requirements will be checked by a Qualified Registered Professional during the planning and operational phases.</p>		

6.3.2.2 Mountain Goat		
Legal Reference		Result
<p><u>Ungulate Winter Range</u></p> <ul style="list-style-type: none"> Order #U7-017 for Moose, Elk and Mountain Goat UWR, approved Dec. 12, 2008; Order #U7-029 Mountain Goat Ungulate Winter Range Mackenzie District; Akie-Pesika, Oslinka, and Ospika Populations, approved May 24, 2016; Order #U7-030 Mountain Goat Ungulate Winter Range Mackenzie District, approved May 24, 2016; and, <p><u>Wildlife Habitat Areas</u></p> <p>There are no established WHAs in the FDU.</p>		<p>Wildlife orders, which contain General Wildlife Measures, are legally binding, and thus the Licensee is exempt from preparing Results or Strategies for ungulate Winter Range Orders #U7-017, #U7-029 and #U7-030.</p> <p>The Licensee commits to comply with the requirements of these Orders.</p>
Scale of Measurement:	UWR and WHAs	

Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
Ungulate Winter Range and Wildlife Habitat Areas are spatially defined and all requirements can be verified against the applicable Orders as listed above. All requirements will be checked by a Qualified Registered Professional during the planning and operational phases.	

6.3.2.3 Stone's Sheep	
Legal Reference	Result
<u>Ungulate Winter Range</u> Order #U7-028 Stone's Sheep Ungulate Winter Range, approved May 24, 2016.	Wildlife orders, which contain General Wildlife Measures, are legally binding, and thus the Licensee is exempt from preparing Results or Strategies for #U7-028. The Licensee commits to comply with the requirements of this Order.
Scale of Measurement:	UWR and WHAs
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
Ungulate Winter Range and Wildlife Habitat Areas are spatially defined and all requirements can be verified against the applicable orders as listed above. All requirements will be checked by a Qualified Registered Professional during the planning and operational phases.	

6.3.2.4 Rocky Mountain Elk	
Legal Reference	Result
<u>Ungulate Winter Range</u> Order #U7-017 Moose, Elk and Mountain Goat UWR, approved December 12, 2008.	Wildlife orders, which contain General Wildlife Measures, are legally binding, and thus the Licensee is exempt from preparing Results or Strategies for #U7-017. The Licensee commits to comply with the requirements of this Order.
Scale of Measurement:	UWR and WHAs
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
Ungulate Winter Range and Wildlife Habitat Areas are spatially defined and all requirements can be verified against the applicable orders as listed above. All requirements will be checked by a Qualified Registered Professional during the planning and operational phases.	

6.3.2.5 Moose	
Legal Reference	Result
Ungulate Winter Range Order #U7-017 Moose, Elk and Mountain Goat UWR, approved December 12, 2008.	Wildlife orders, which contain General Wildlife Measures, are legally binding, and thus the Licensee is exempt from preparing Results or Strategies for #U7-017. The Licensee commits to comply with the requirements of this Order.
Scale of Measurement:	UWR and WHAs
Map Reference:	Appendix 1: Overview Map of the Forest Development Unit
Monitoring (Measures and Verification):	
Ungulate Winter Range and Wildlife Habitat Areas are spatially defined and all requirements can be verified against the applicable orders as listed above under Legal Reference and as described under the Result. All requirements will be checked by a Qualified Registered Professional during the planning and operational phases.	

6.3.3 Objectives Set by Government for Water, Fish, Wildlife and Biodiversity in Riparian Areas

Context

The Licensee's goals for riparian areas are to prevent or minimize any adverse impacts of primary forest activities on water quality. While current practices provide sufficient protection for larger fish bearing streams, research and monitoring from the Forest and Range Evaluation Program (FREP) suggests that the legal requirements for smaller stream protection are not always adequate.^{15,16,17,18,19} For example, FREP findings indicate that increasing tree (and vegetation) retention within 6-10 m directly adjacent to a small stream assists in maintaining function in terms of filtering, ability to withstand peak floods, connectivity to fish habitat, temperature, large woody debris, and water storage. Increased retention on smaller streams (< 3m wide) further mitigates adverse impacts of primary forest activities including wind throw, fine sediment from roads, and bank instability. Recent research has shown that increased

¹⁵ Densmore, N., and A.F. Nemec. 2008. Resource stewardship monitoring: stand-level biodiversity analysis of 2005/2006 field season data by biogeoclimatic zone. FREP Report #17. <http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-reports-extension-notes..>

¹⁶ Rex, J., D. Maloney, and P. Tschaplinski. 2016. Small Stream Riparian Management. BC Forest Professional. Jan-Feb 2016: 16-17. http://member.abcfp.ca/WEB/Files/magazine/BCFP_2016_JanFeb.pdf.

¹⁷ Tschaplinski, P.J. 2010. State of Stream Channels, Fish Habitats, and their Adjacent Riparian Areas: Resource Stewardship Monitoring to Evaluate the Effectiveness of Riparian Management, 2005–2008. FREP Report # 27. <http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-reports-extension-notes>.

¹⁸ Tschaplinski, P.J. and K. Brownie. 2010. Forest and Range Evaluation Program Riparian Protocol – Why these Indicators? FREP Report # 9. http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/frep/frep-docs/frep_report_09.pdf?fileName=frep_report_09.pdf

¹⁹ Tripp, D., L. Nordin, J. Rex, P. Tschaplinski, and J. Richardson. The Importance of Small Streams in British Columbia. FREP Report #38. http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/frep/frep-docs/frep_report_38_adm_resource_stewardship_report.pdf.

retention up to 10m has less than a 3% impact to timber supply.^{20,21} Higher levels of retention also assist with the recruitment of large woody debris, and can provide valuable habitat for wildlife. The Licensee will observe these findings and incorporate them into their management of smaller streams.

In addition, tree retention around streams will be carried out in consideration of ecological suitability and natural disturbance factors. **Riparian management zones (RMZ)** are given high priority for retention of wildlife trees, for the maintenance of biodiversity, habitat and stream integrity. The amount of timber and vegetation retained in any given riparian area will also be determined through a consideration of factors such as, stream channel degradation potential, safety hazards, percent of merchantable versus non-merchantable stems, and habitat function.

Riparian Areas	
Legal Reference	Result
<ul style="list-style-type: none"> • <i>FPPR</i> Sections 8 and 12(3) • <i>FPPR</i> Section 47, 48, 49, 50, 51, 52(2) and 53 • <i>FPPR</i> Schedule 1, Section 2 	<p>The Licensee adopts Section 47 (Stream Riparian Classes) of the <i>FPPR</i> as a result for water, fish, wildlife and biodiversity in riparian areas with the exception of the addition of a reserve zone (RRZ) on S4 and S5 streams.</p> <p>Specifically, the Licensee adopts Section 52(2), with the addition of a 10m riparian reserve zone for S4 and a 6 m riparian reserve zone for S5 streams, when these streams are direct tributaries to S1, S2, S3 streams or to fish bearing lakes (Table 5).</p> <p>The Licensee adopts Sections 48 (Wetland Riparian Classes), 49 (Lake Riparian Classes) and 50, 51, and 53 of the <i>FPPR</i> as a result for water, fish, wildlife and biodiversity in riparian areas.</p> <p>As per the requirement of Section 12(3) of the <i>FPPR</i>, the result that applies to the retention of trees in RMZs is outlined in Table 5.</p>
Scale of Measurement:	N/A
Map Reference:	None
Monitoring (Measures and Verification):	
<p>The Licensee completes a riparian assessment for each block, which is filed and incorporated into the site plan. These FSP commitments are measurable and verifiable at the planning level (assessments, timber cruise, and site plan) and with field verification methods pre and post-harvest.</p> <p>Minimum retention requirements will be calculated from pre-harvest merchantable tree density information (stems per hectare) as surveyed in the timber cruise. A Qualified Registered Professional will determine the amount and location of the retention following Table 5, as well as by considering the factors set out in <i>FPPR</i> Schedule 1, Section 2.</p>	

²⁰ BC Ministry of Forests, Lands and Natural Resource Operations. May 15, 2015. Riparian Indicators Assessment. Draft Report. Forsite Project 1281-1.

²¹ Rex, J., D. Maloney, E. MacIsaac, H. Herunter, P. Beaudry, and L. Beaudry. 2011. Small stream riparian retention: the Prince George Small Streams Project. B.C. Min. For. Range, For. Sci. Prog., Victoria, B.C. Exten. Note 100.
www.for.gov.bc.ca/hfd/pubs/Docs/En/En100.htm.

Machine free zones (MFZ) will be applied to those small streams, lakes and wetlands which are not tributary to S1, S2 and S3 fish bearing streams (Table 5– streams without a reserve zone). The intent of the MFZ is to ensure a planned focus to tree and vegetation management within the RMZ. A MFZ increases protection of streamside vegetation and the stream bank while still allowing for the safe harvest of merchantable trees and trees impacted by forest health agents that require a sanitation treatment.

In riparian management zones all brush species, advanced regeneration, non-merchantable conifers and deciduous stems will also be retained.

Table 5. Riparian Classes and Corresponding Retention Levels.

Riparian Class	Riparian Reserve Zone Minimum Width (m)	Riparian Management Zone Minimum Width (m)	Riparian Management Area Minimum Width (m)	Minimum Retention of standing trees per hectare-dispersed over the length of the Riparian Management Zone ^{1,2,3}
Larger, fish bearing streams, wetlands and lakes				
S1 - A	0	100	100	25%
S1 - B	50	20	70	
S2	30	20	50	
S3	20	20	40	
W1 and W5	10	40	50	
L1-A	0	0	0	
L1-B	10	0	10	0
Small streams which <u>are</u> tributary to S1, S2, and S3 streams and lakes				
S4	10	20	30	15% and 5-6m Machine Free Zone (MFZ) on S6
S5	6	25	31	
S6 ⁴	0	20	20	
Small streams, lakes and wetlands which <u>are not</u> tributary to S1, S2, and S3 streams				
S4	0	30	30	Within 10 m of stream, 15 overstory trees (at minimum) per 100 m of stream length ⁵ and a 6-10 m MFZ ⁶
S5	0	30	30	
S6	0	20	20	5-6m MFZ ^{4,5}
W3	0	30	30	10%
L3	0	30	30	10%

Riparian Class	Riparian Reserve Zone Minimum Width (m)	Riparian Management Zone Minimum Width (m)	Riparian Management Area Minimum Width (m)	Minimum Retention of standing trees per hectare-dispersed over the length of the Riparian Management Zone ^{1,2,3}
<p>¹ The primary objective of retention in the riparian management zone is to manage the risk of wind throw to the riparian reserve zone, protecting the integrity of the corresponding riparian feature. If a Qualified Registered Professional performs or oversees a wind throw hazard assessment and determines that the potential for wind throw is moderate to high, an alternate prescription will be made with $\geq 0\%$ retention. This will be identified and documented within the site plan and accompanying wind throw hazard assessment. Percent retention will be verified through timber cruise data.</p> <p>² Regardless of wind throw potential, brush species, advanced regeneration, non-merchantable conifers and deciduous stems (live or dead) will also be retained within the riparian management zone.</p> <p>³ Trees retained must be reasonably representative of the pre-harvest stand structure of the riparian management area; live and/or dead stems as determined through timber cruise data.</p> <p>⁴ The MFZ of an S6 can be increased by a Qualified Registered Professional up to 6 m in areas where there are no merchantable trees in order to further buffer the stream bank and vegetation.</p> <p>⁵ Exceptions as per the <i>FPPR</i> Section 51 and the following:</p> <ul style="list-style-type: none"> • If there are less than 15 overstory trees within 10 m of the stream all overstory stems within 10 m of the stream will be retained. • If there are less than 15 overstory trees within 10m of the stream due to the necessity of removing danger trees all overstory stems within 10 m of the stream will be retained. • A tree or trees must be removed to address a forest health agent that would spread if the tree or trees were not removed. <p>⁶ The MFZ of an S4 or S5 can be increased by a Qualified Registered Professional up to 10 m in areas where there are no merchantable trees in order to further buffer the stream bank and vegetation.</p>				

6.3.4 Objectives Set by Government for Wildlife and Biodiversity – Stand Level

Context

The intent of stand-level retention is to provide for ecological characteristics, including structure, tree species, nesting cavities, and food sources, that are important for wildlife habitat at a smaller scale. Natural disturbances such as fire or insects, create a mosaic of intact older forest and younger seral forests and this variability on the landscape provides key habitat and habitat connectivity for many species of wildlife.

A study from the Forest and Range Evaluation Program (FREP) investigated the current status of stand level retention in the Northern Interior of BC and found that while retention patches were consistently left post-harvest, there were a few gaps in the composition and structure of the retention in terms of large snags, large trees, and number of trees species retained.^{22,23} The recommendations of these

²² Densmore, N. 2011. Northern Interior Forest Region: analysis of stand-level biodiversity sampling results in six predominant biogeoclimatic subzones. FREP Extension Note # 19.

<https://www.for.gov.bc.ca/ftp/hfp/external!/publish/frep/extension/FREP%20Extension%20Note%2019.pdf>

²³ Densmore, N., and A.F. Nemec. 2008. Resource stewardship monitoring: stand-level biodiversity analysis of 2005/2006 field season data by biogeoclimatic zone. FREP Report #17. <http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-reports-extension-notes>.

reports provide guidance for the structure and composition of the forest pre-harvest based on the biogeoclimatic subzones (BEC), to assist the Licensee in ensuring that similar areas are retained so that sufficient larger trees and snags are retained post-harvest. Within the FDU, there are two BEC subzones that make up the majority of the timber harvesting land base (THLB); BWBSdk and ESSFmv4 (see Appendix 3, Map #1 for BEC map). Maintaining retention areas with large tree densities, retaining three or more tree species, and retaining higher densities of coarse woody debris (CWD) are the principle recommendations for these BEC zones.

The *Order to Establish the Obo River and Fox Landscape Units and Objectives* (October 24, 2002) specifies stand level wildlife tree retention requirements in Table 6. The percentage of a cutblock area required for wildlife tree retention depends on the percentage of the BEC subzone within the landscape unit that is available for harvest and the percentage of the harvested areas within the LU that do not have wildlife tree retention areas.

Table 6: Percentage of a Cutblock Area Required in Wildlife Tree Retention

% of the BEC Subzone Within the LU Available for Harvest		90	70	50	30	10
						→
% of the Area Available for Harvesting in the LU that has Been Harvested Without Recommended Wildlife Tree Retention Areas	10	10	8	6	4	3
	30	12	10	8	6	4
	50	14	12	10	8	6
	70	16	14	12	10	8
	90	18	16	14	12	10

The Licensee will comply with the legal requirements for stand level wildlife tree retention. The Licensee will ensure that, in any given 12 month period starting April 1 of the calendar year, the minimum wildlife tree retention related to any given cutblock will be at least 3.5% of the cutblock area. Overall however, the total area covered by wildlife tree retention related to cutblocks will be at least 7% of the total area of the cutblocks, except where the *Order to Establish the Obo River and Fox Landscape Units and Objectives* applies. In this case, the retention requirements in Table 6 will be adhered to. Wildlife tree retention may, in some cases, relate to more than one cutblock as long as the other above requirements are met. Timber will not be harvested from a wildlife tree retention area unless the block to which the retention is associated has reached maturity.

Stand Level Wildlife and Biodiversity	
Legal Reference	Result
<ul style="list-style-type: none"> • <i>FPPR</i> Sections 66 and 67 • <i>Ministerial Order Establishing the Obo River and Fox Landscape Units and Objectives</i> (October 24, 2002) 	The Licensee undertakes to comply with <i>FPPR</i> Sections 66 and 67 as the practice requirement for wildlife tree retention when undertaking forest operations for the term of the FSP. Where operations take place within the Fox Landscape Unit, the licensee undertakes to comply with the <i>Ministerial Order establishing the Obo River and Fox Landscape Units and Objectives</i> (October 24, 2002) as the practice requirement for wildlife tree retention.
Scale of Measurement:	N/A
Map Reference:	None

Monitoring (Measures and Verification):

Retention commitments are measurable and verifiable at the site plan level and with standard field verification methods. In addition, the Licensee maintains a spatial database of wildlife tree retention for blocks harvested under their Licence.

6.3.5 Objectives Set by Government for Visual Quality

Context

The purpose of visual quality objectives (VQOs) are to ensure that the scenic qualities of a forested hillside continue to meet the expectations of the public and the tourism industry while providing opportunities for harvesting to the forest industry. These scenic areas are typically steep forested hillsides which are important to the tourism industry and public social values. Management of the area does not exclude timber harvesting but instead requires harvesting practices to be carried out in a manner whereby the designated objective for the area continues to be met. There are established VQOs within the FDU that allow for modification and partial retention harvesting activities.

The Licensee will meet the objectives by carrying out primary forest practices as described in *FPPR* 9.2(2) for areas which have VQOs. This may include recommendations on a minimum number of trees retained, protection of a viewscape by orienting the block in a certain direction, green up requirements for adjacent blocks etc. Recommendations for scenic areas are provided in the Mackenzie Land and Resource Management Plan (LRMP) and are available spatially. Where applicable, the Mackenzie LRMP will be referred to when planning primary forest activities, however the licensee will assess the LRMP for continued relevancy and validity through professional accountability; information for this assessment will come from government and government driven processes as well as from stakeholder input through the documented information sharing process outlined in Section 6.4.

Visual Quality Objectives**Legal Reference**

- *FPPR* Section 9.2(2)

Strategy

For the term of the FSP, the Licensee commits to carrying out primary forest operations consistent with *FPPR* Section 9.2(2) in scenic areas:

- established on or before October 24, 2002, and
- for which there is no visual quality objective, by meeting or exceeding the recommendations of a visual impact assessment completed by a qualified Registered Professional.

Scale of**Measurement:**

Areas with Established Visual Quality Objectives

Map Reference:

Appendix 1: Overview Map of the Forest Development Unit

Monitoring (Measures and Verification):

The strategy outlined above will allow the Licensee to meet the VQOs established by the Province. All scenic area polygons for the FDU are available spatially. A Qualified Registered Professional will complete a Visual Impact Assessment (VIA) prior to harvesting. This assessment will guide the harvest and site plans, and is verifiable at the planning stages as well as post-harvest in the field.

The Licensee understands that scenic area designations may change over time (additions and subtractions), and will remain current on their status through ongoing communication with the District.

6.3.6 Objectives Set by Government for Cultural Heritage Resources

Context

The *Forest Act* defines a cultural heritage resource as, "an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people." This may include culturally modified trees, medicinal plants, or traditional use sites. In this FSP, the following applies:

Cultural Heritage Resource (CHR) – in addition to the above definition, CHR refers solely to those resources that are the focus of traditional use by First Nations people that are of continuing importance to that people, and not regulated under the *Heritage Conservation Act*. This includes, but is not limited to bear dens, trails, berry patches, lithic sites and any other feature(s) identified through processes outlined below.

Cultural Heritage Resource(CHR) Assessment – is a process conducted by a Qualified Professional and consists of the following:

1. If the CHR contains only culturally modified trees (CMTs), then:
 - a. The Licensee will conduct a CMT survey; and
 - b. If the CHR is in addition to the CMTs or other than CMTs then:
 - i. The location of the CHR is documented; and
 - ii. The direct impact of the proposed forest practice on the CHR is evaluated.
2. Recommendations to mitigate the impact, conserve or if necessary, protect the CHR are prepared in consideration of:
 - a. The relative value or importance of the CHR to traditional use by an aboriginal people;
 - b. The relative abundance or scarcity of the CHR; and
 - c. The historical context of the traditional use of the CHR.

The Licensee commits to identifying and documenting CHRs (bear dens, large stick nests, trails, berry patches, lithic sites, CMTs, etc.) when encountered in the field, and complete a full assessment of the CHR by a Qualified Registered Professional, keeping in mind the relative importance and abundance of the CHR. A Qualified Registered Professional in this instance is an individual who has the education and demonstrated experience in the archeological field in British Columbia and abides by the principles of the *Heritage Conservation Act*. The Licensee will adhere to the recommendations of the CHR assessment with regards to primary forest activities, and will share this information with First Nations whose Traditional Territories overlap the proposed development area.

The First Nations' whose Traditional Territories are located within the Licensee's proposed FDU were identified at the time this FSP was written by the Mackenzie Forest District Aboriginal Tenures Officer as:

1. Kwadacha First Nation;
2. West Moberly First Nation;
3. Halfway River First Nation; and
4. Doig River First Nation.

In addition to the CHR assessment process outlined above, the Kwadacha First Nation have created a map of traditionally used sites and resources. While confidential, this map contains the locations of traditional sites such as those used for fishing, hunting, berries and medicinal plants as well as trails, camp sites, and burial sites. The licensee commits to sharing relevant information with the Kwadacha Nation about all proposed areas for development so that they may be assessed with these traditional resources in mind.

Cultural Heritage Resources	
Legal Reference	Strategy
<ul style="list-style-type: none"> • <i>FPPR</i> Section 10(a) and (b) 	<p>The Licensee will comply with the following strategies:</p> <ol style="list-style-type: none"> 1. Field staff will be appropriately trained to recognize CHRs 2. CHR assessments will be conducted for areas where: <ol style="list-style-type: none"> a. CHRs are identified by the Licensee or their contractors during reconnaissance and/or field activities; or b. Site-specific information regarding CHRs is brought forward or made available to the Licensee by First Nations, government employees or others (see information sharing period in Section 6.4 below). 3. When CHRs are discovered during primary forest activities, the operations will cease to ensure their protection until a CHR assessment is completed. 4. The Licensee will invite First Nations whose Traditional Territories overlap the forestry operation to view, assess and provide input regarding CHRs in the field within 30 days of identification. 5. A Qualified Registered Professional will complete the CHR Assessment and include, at minimum: <ol style="list-style-type: none"> a. The location of the CHR; b. An evaluation of the direct impact of the proposed forest activities on the CHR; c. Recommendations to mitigate the impact, conserve or if necessary, protect the CHR are prepared in consideration of the factors listed in <i>FPPR</i> Schedule 1 Section 4: <ol style="list-style-type: none"> i. The relative value or importance of the CHR to traditional use by an Aboriginal people; ii. The relative abundance or scarcity of the CHR; iii. The historical context of the traditional use of the CHR; iv. The impact of conserving or protecting the CHR on timber harvesting; and, v. Options for mitigating the impact that a forest practice might have on the CHR. 6. The results of the assessment of the CHR will be provided to the applicable First Nation(s) for consideration and comment. Consistent with processes in Section 6.4, the CHR results will be included with the information sharing package. 7. The Licensee will conduct primary forest activities consistent with the recommendations provided in the CHR assessment and in

	<p>consideration of input from applicable First Nations in clause 5 and 3 above.</p> <p>8. The Licensee will retain documentation of all CHRs, related information, meetings, reconnaissance surveys and referrals until such time cutblocks harvested under this FSP are removed from the Licensee's responsibility (typically once declared free to grow).</p>
Scale of Measurement:	N/A
Map Reference:	None
Monitoring (Measures and Verification):	
<ul style="list-style-type: none"> • CHRs identified during reconnaissance, field activities, and primary forest activities are documented in field notes and on maps; • CHR assessments completed prior to harvesting are incorporated into site plans and the assessment reports are sent to First Nations whose Traditional Territories overlap the proposed development; • CHRs are communicated to operational crews during Pre-works, which is documented and signed off; • CHR assessments which must be completed during harvesting may require a site plan amendment and the assessment reports are sent to applicable First Nations; • First Nations' input is solicited when the CHR is identified and documented; and • Conformance with the CHR Assessment can be verified at the site planning level and in the field. 	

6.3.7 Objectives Set by Government for Recreation Resources

Context

In BC, there are more than 1,350 recreation sites and over 800 trails managed as recreation resources by Recreation Sites and Trails BC (RSTBC). These sites include rustic camping sites in remote areas, single track trails, and well maintained wide tracked rail trails. It also includes trails with historical significance to the Province. These sites and trails are important to the public, local communities, and the tourism industry.

The value of recreation in the Mackenzie area is considered very high. Communication and Information sharing with local First Nations, residents and other tenure holders will help provide guidance to the Licensee with regards to future recreation objectives. The Mackenzie LRMP will also be used for guidance.

The Licensee commits to conducting all primary forestry activities which occur near these recreation resources in a manner that maintains the values of the recreation resource. In the Mackenzie District, there are 42 sites and 3 trails which have been identified by RSTBC. Currently there are no legally established recreation sites or trails within the FDU (as of April 2019).

As circumstances regarding recreation resources change and the need arises to establish other legally established sites and trails, the Licensee will amend this FSP accordingly.

Recreation Resources	
Legal Reference	Strategy
<ul style="list-style-type: none"> FRPA Sections 56, 180 and 181 	Not Applicable. There are no established recreation sites and/or trails within the FDU.
Scale of Measurement:	Recreation Trails and Recreations Reserves
Map Reference:	None
Monitoring (measures and verification):	
The strategy outlined above will allow the Licensee to meet the objectives for recreation resources. Recreational sites and trails are available spatially, and consistency with the strategy above can be verified during the planning stages, and in the field post-harvest.	

6.4 Information Sharing

Context

Consultation with First Nations is the legal obligation of the Provincial Government for proposed development within Traditional Territories. The government involves the Licencee in the process of consultation by requesting that the Licencee engage with First Nations, at a minimum, during the planning process, often initially through information sharing.

Information sharing about proposed primary forest activities is key to building strong relationships with other First Nations with Traditional Territories in the FDU as well and tenure holders such as trappers, guides and range users who may be impacted by the primary forest activities. Information sharing is a process where pertinent information is shared in the form of maps, reports, and/or field cards which elicits feedback from those who may value the proposed development area for non-timber considerations such as CHRs, traditional use, trapping grounds, recreational opportunities, or for range use. Feedback from the information sharing process can then be incorporated into planning in order to mitigate or minimize any potential impacts.

The Kwadacha First Nation have a number of non-timber resource values within the FDU that are culturally important. The locations of these values are confidential, making the information sharing process vital for their protection. In addition to proposed harvesting locations and site plans, the Licencee commits to sharing information regarding identified wildlife habitat values, such as bear dens, large stick nests, and mineral licks.

The information sharing process is also important during post-harvest and silviculture assessments. The Kwadacha First Nation is generally opposed to use of herbicides and pesticides within their territory and the FDU. The Licencee commits to prioritizing the use of non-chemical vegetation management and silviculture activities in the FDU. Where these strategies are ineffective, the Licencee commits to sharing all pertinent information for areas with proposed use of fertilizers, herbicides, or pesticides within the FDU with the Kwadacha Nation for approval.

The Licencee commits to information sharing when proposed primary forestry activities overlap with First Nation's Traditional Territories or with Trapper, Guide and/or Range tenures holder areas by

following any requested protocols, sharing the information prior to submitting for a cutting permit, keeping a record of all comments/communication, incorporating feedback where feasible, and discussing compromises when it may not be feasible. The Licencee also commits to information sharing when wildlife habitat features are identified as well as during post-harvest activities resulting in proposed usage of herbicides, fertilizers, or pesticides.

Information Sharing and Engagement	
Legal Reference	Strategy
Not applicable to <i>FRPA</i> or <i>FPPR</i> . However, legal judgments have been made with regards to First Nations by the Supreme Court of Canada, and guidance by the Ministry of Forests has strengthened the obligations and commitments of forest Licencees to information sharing practices with First Nations and tenure holders such as Trappers, Guides, and Range tenure holders.	<p>When proposed primary forestry activities overlap with First Nations Traditional Territories or with Trapper, Guide and/or Range tenures in the FDU the Licencee will:</p> <ol style="list-style-type: none"> 1. Follow requested communication and information sharing protocols with interested parties; 2. Share information about planned harvesting and road building activities, as well as identified wildlife habitat features during the initial planning stages of a Cutting Permit; 3. Conduct Information sharing over a minimum of 60 days; 4. Keep a record of any comments received until such time cutblocks harvested under this FSP are removed from the Licensee's responsibility (typically once declared free to grow); 5. Within 30 days, evaluate the feedback and incorporate where feasible, communicate results to the person or group who provided the feedback; and 6. If deemed infeasible to incorporate the feedback into planning, the Licencee will document the reasons and work with affected parties to find a compromise. <p>When post-harvest and silviculture activities result in proposed use of herbicide, fertilizer, and/or pesticide within the FDU the Licencee will:</p> <ol style="list-style-type: none"> 1. Follow requested communication and information sharing protocols with Kwadacha First Nation; 2. Share information about proposed herbicide and/or pesticide use, as well as information pertaining to past treatments used within the harvested area; 3. Conduct information sharing over a minimum of 60 days; 4. Keep a record of any comments received until such time cutblocks harvested under this FSP are removed from the Licensee's responsibility (typically once declared free to grow); 5. Within 30 days, evaluate the feedback and incorporate into planned post-harvest and/or silviculture activities and, communicate results to the Kwadacha First Nation; <p>Where conditions exist that prevent the Licensee from meeting silviculture obligations as a result of rejected proposed use of herbicides, fertilizers, and/or pesticides by Kwadacha First Nation, the Licencee will continue to engage with Kwadacha First Nation and the District in an effort to come to resolution.</p>

Scale of Measurement:	N/A
Map Reference:	None
Monitoring (measures and verification):	
All records of information sharing protocols are kept and followed; this can be verified through a file or systems search. Information sharing requests will be documented (emails, journal notes) as will feedback received. This information will be available in block files for future reference. Results from Information Sharing will be verifiable at the site plan level.	

7.0 Measures

7.1 Invasive Plants

Context

Invasive plants are species which are not native to British Columbia, can spread quickly, and may have economic or environmental impacts in areas in which they spread. These species have been unintentionally introduced into new ecosystems outside of their native habitat range. They often have no natural competitors, or diseases and are not typically a food source for animals, which means they can reproduce and outcompete native species easily.^{24,25}

The Licensee is legally obligated to prevent the introduction or spread of invasive plants which would be caused by their primary forest activities. Generally speaking, the concern is when soil is exposed it will allow invasive species to germinate quickly and outcompete native plants, including newly planted tree seedlings. Soil is most often exposed, and sometimes left unplanted, during road building activities. The Licensee commits to seeding exposed soil patches >0.25 ha in size when *Extremely Invasive* or *Very Invasive* plant species have been identified within 5 km of the exposed soil patch. The Licensee commits to preventing the spread of invasive species through thoroughly washing machines before leaving an infested area and by using a high quality seed source that will not contain plant species which themselves will become invasive. Any newly noted invasive species infestations will be reported to the Provincial Report a Weed Program.²⁶

Invasive Plants	
Legal Reference	Measures
<ul style="list-style-type: none"> FPPR Section 17 Invasive Plants Regulation (B.C. Reg. 18/2004 effective January 31, 2004) 	<p>The Licensee will take the following actions with regards to the introduction and/or spread of invasive plants as specified by the <i>Invasive Plants Regulation</i> (B.C. Reg. 18/2004 effective January 31, 2004) if such introduction or spread is likely the result of primary forest activities carried out under this FSP.</p> <p><u>Assessment:</u> Prior to conducting primary forest activities, the Licensee will:</p>

²⁴ Northwest Invasive Plant Council Strategic Plan (updated April 21, 2015). <http://nwipc.org/files/public/#>

²⁵ Northwest Invasive Plant Council Target Invasive Plant List (updated April 26, 2016). <http://nwipc.org/files/public/#>

²⁶ Report a weed program - www.gov.bc.ca/invasive-species

	<ul style="list-style-type: none"> a. Ensure staff and contractors are trained and knowledgeable in identifying and documenting invasive plant species; b. Identify and document known locations of invasive plants identified within the proposed block and road areas or within 5 km of the operating area; and c. Annually review known locations on the Invasive Alien Plant Program website. <p><u>Reporting:</u> Invasive plant infestations identified by the Licensee within proposed development areas will be reported as follows:</p> <ul style="list-style-type: none"> a. All new invasive plant infestations will be reported through the Report-A-Weed app or online (www.gov.bc.ca/invasive-species); and b. All new and existing invasive plant species information will be included in site plans and/or silviculture plans. <p><u>Prevention and Mitigation of Introduction and Spread:</u> If working directly in an area of identified invasive species then the Licensee will work with the Invasive Plant Council to identify measures to prevent spread of that species.</p> <p>For proposed development within 5 km of a known plant population which is considered to be <i>Extremely Invasive</i> or <i>Very Invasive</i> by the Northwest Invasive Plant Council, the Licensee will prevent the introduction and spread of invasive plants by:</p> <ul style="list-style-type: none"> a. Thoroughly washing machinery prior to moving machines from one site to another. b. Seeding exposed soil > 0.25 ha in size within 2 years of being disturbed to reduce the area of ground suitable for colonization by invasive plants, unless primary forest activities are ongoing in which case seeding will take place as soon as it is practical to do so where exposed soil: <ul style="list-style-type: none"> i. Was disturbed through road construction; ii. Will support the establishment and growth of vegetation; and iii. Will not be reforested. c. Seed used will meet or exceed Mackenzie Forest District recommended forage mix specifications to ensure that invasive species are not introduced through seeding activities. d. The Licensee will track seed stock used and the timing of seeding activities, and monitor seeded areas for 1 year to ensure successful establishment of the seeded and/or planted species. Successful establishment will be considered when 75% or more cover has been established within the 1 year time period. e. If the area is not successfully established within 1 year then the Licensee will assess and if necessary re-seed the area.
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Scale of Measurement:	N/A
Map Reference:	None
Monitoring (Measures and Verification):	
The Licensee has committed to adopting the measures above, which are verifiable at the site plan level where invasive species are documented when identified. Any seeding activities will also be documented. The Licensee will keep a record of correspondence with the Northwest Invasive Plant Council if and when rehabilitation plans are developed.	

7.2 Natural Range Barriers

Context

A Natural Range Barrier (NRB) is defined as a river, rock face, dense timber or any other naturally occurring feature that stops or significantly impedes livestock movement to and from an adjacent area. The Licensee understands the importance of these naturally occurring features, and that ranchers rely on NRBs to assist them with keeping livestock from moving into unsafe or unwanted areas.

With specific respect to NRB, the Licensee will endeavor to collaborate with range tenure holders on the location of NRBs as well as take the following actions:

- Referral of proposed (planned) roads and cutblock development will occur with all overlapping range tenure holders (refer to Section 6.4 - Information Sharing);
- Work with range tenure holders to identify NRBs and plan activities in a manner that does not remove an NRB or render it ineffective; and
- If the NRB must be disturbed, then the agreement holder will work with the range tenure holder(s) to identify reasonable mitigation measures, and implement those measures by an agreed upon date.

Natural Range Barriers	
Legal Reference	Measures
<ul style="list-style-type: none"> FPPR Section 18 	<p>The Licensee will take the following actions with regards to natural range barriers (NRB):</p> <ol style="list-style-type: none"> Each year under the term of this FSP, the areas within the FDU that are occupied by or adjacent to range tenures will be updated from information gathered from district range staff, or regional experts. While conducting information sharing with range tenure holders (refer Section 6.4), they will be asked to provide information specific to the nature and location of NRBs necessary for control of their livestock. The Licensee will plan and carry out activities in a manner that does not remove an identified NRB or render it ineffective, with the exception of clause 4 below. In the event that proposed primary forest activities require the removal or alteration of an identified NRB (rendering it ineffective), the Licensee will work with the range tenure holder to identify reasonable mitigation measures prior to carrying out

	operations, and implement those measures as soon as necessary afterward. Reasonable measures include the installation of cattle guards and drift fences.
Scale of Measurement:	N/A
Map Reference:	None
Monitoring (Measures and Verification):	
All records of information sharing protocols will be kept and followed; this can be verified through a file or systems search. Information sharing requests are documented (e.g. emails, journal notes) and kept on file as is feedback received. This information is available in block files for future reference. Results from Information Sharing and or mitigation planning will be verifiable at the site plan level.	

8.0 Stocking Requirements

8.1 Stocking Standards

Context

The intentions of these stocking standards are to establish a healthy free growing stand of commercially valuable species that:

- Addresses long-term health issues;
- Meets the timber supply analysis and forest management assumptions that apply to the area covered by the plan on the Submission Date;
- Meets the land and resource management objectives in the Mackenzie LRMP; and
- Provides alternate fibre sources given uncertainty in forest health, climate change impacts, forest fires, and commercial market trends.

The Licensee believes that these proposed stocking standards are in addition to the provincial base conifer stocking methods, supported by government policy and science and developed by forestry professional knowledge and experience. The standards are intended to contribute to increased forest resilience and adaptability by establishing an ecologically appropriate diversity of tree species. In this way, these standards are a reasonable approach that addresses both species diversity and site occupancy while accounting for potential risks and uncertainty.

Stocking Standards	
Legal Reference	Result and Strategy
<ul style="list-style-type: none"> FPPR Section 16, and 44(1) FRPA Section 29(2) 	<p>The stocking standards in Appendix 4 Tables 1-3 will be applied under this FSP for all stands being managed as conifer leading.</p> <p>The deciduous stocking standards in Table 3 apply to all standard units being managed as even-aged, deciduous stands where aspen and/or birch are 50% or greater basal area in the stand.</p> <p>Additional considerations for all standards are outlined in Section 8.2.</p>

Monitoring (Measures and Verification):

Verifiable from field surveys, including pre-development assessments, free growing surveys and other silviculture surveys.

References:

1. Chief Forester's Reference Guide for Forest Development Stocking Standards (XLSX) – updated March 2019. <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/stocking-standards>
2. Establishment to Free Growing Guidebook: Prince George Forest Region, Appendix 6 (Boreal broadleaf stocking guidelines). <https://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/FREE/EFG-PG-print.pdf>.
3. Fire Management Stocking Standards Guidance. March 2016. https://www.for.gov.bc.ca/hfp/silviculture/stocking_stds.htm.
4. Fort St. John Pilot Project Mixedwood Management Guidelines 2010. http://www.fsipilotproject.com/documents/Appendix_10_Mixedwood_Mgt_Guidelines_2010_05_07.pdf
5. Mackenzie Land and Resource Management Plan (November 2000). <https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/omineca/mackenzie-lrmp>
6. Chief Forester memo on the Incorporation of mixedwood and broadleaves into Forest Stewardship Plan stocking standards, SP amendments, and TSR regeneration assumptions (2008). https://www.for.gov.bc.ca/hfp/silviculture/stocking_stds.htm

8.2 Additional Stocking Standard Management Strategies

In addition to Appendix 4, the Licensee commits to the following management strategies which will be employed in the FDU for the term of this FSP with regards to stocking standard options and assessments of whether stocking standards have been met and free growing achieved.

8.2.1 Mackenzie Rust Management Strategy

Context

Pine stem rusts generally infest younger pine stands. They may cause mortality, and also can affect the growth of the tree and potentially lower wood quality. As a natural process, pine stem rusts can thin out dense stands, thereby maximizing longer term growing space for trees that survive. In addition, stem rusts which affect pine species can be minimized in mixed stands where more than one species, including deciduous, are growing in the same stand.

In stands where >20% of the stand has pine stem rust the Licensee will manage the stand consistent with the Mackenzie District Rust Management Strategy (2007) and the Rust Management Strategy, Omineca Region Draft (2013).^{27,28} Specifically, the stand will be exempt from the maximum density requirements (up to 20,000 stems per hectare) of the General Stocking Standards for pine. Additionally, deciduous species will not be considered deleterious competition for pine trees at the time of free growing assessments.

²⁷ Mackenzie District Rust Management Strategy (2007).

<https://www.for.gov.bc.ca/dmk/publications/RMS%20Version%201.1%20April%2017%202007.pdf>.

²⁸ Rust Management Strategy, Omineca Region Draft (2013).

[ftp://ftp.for.gov.bc.ca/TPG/external/publish/Forest_Stewardship_Plans/PG-FSP/Approved%20FSP/Support%20Documents/7.2.15/1_ORMS_Version_1_May%2029_2013_MRWG%20\(3\).pdf](ftp://ftp.for.gov.bc.ca/TPG/external/publish/Forest_Stewardship_Plans/PG-FSP/Approved%20FSP/Support%20Documents/7.2.15/1_ORMS_Version_1_May%2029_2013_MRWG%20(3).pdf)

Mackenzie Rust Management Strategy

The Mackenzie Forest District's strategy for high density pine planting in areas with high incidences of rust will be implemented as follows:

1. In pine- leading standard units where a Qualified Registered Professional identifies greater than 20% incidence of pine rust within the regenerating stand:
 - a. The stand will be exempt from maximum conifer density criteria in 8.2.4, and
 - b. Deciduous trees will be considered non-deleterious as specified in 8.2.5.2.

Monitoring (Measures and Verification):

Verifiable from field surveys, including pre-development assessments, free growing surveys and other silviculture surveys.

8.2.2 Minimum Inter-Tree Distance**Context**

The Minimum Inter-Tree Distance is the minimum distance that must exist between trees in order to have sufficient growing space and access to resources (sunlight, water, nutrients, etc.) for healthy and vigorous growth. If trees are too closely spaced, competition will impact individual tree growth and potentially future timber supply as well as the overall health of the stand.

Minimum Inter-Tree Distance Strategy:

The standard minimum inter-tree distance (MITD) for well-spaced or free growing trees will be 2.0 m unless otherwise specified by this FSP.

MITD may be reduced from 2.0 to 1.6 meters in situations where deemed suitable by a Qualified Registered Professional. Circumstances where the MITD will be reduced may include:

1. Hygric or wetter sites;
2. Soils containing greater than 25% coarse fragments (particles > 2mm in diameter);
3. Slopes greater than 25% where seedling establishment is dependent on microsites where seedling are protected from snow press;
4. Sites with a minimum of 40 dispersed wildlife trees per hectare;
5. Riparian areas with a residual component of greater than or equal to the target minimum (preferred and acceptable) (see 8.2.6 regarding Riparian Competition);
6. Sites where a stump avoidance strategy is employed to manage root rot;
7. Cluster planting (when used as a best management practice to accommodate management strategies for such things as grizzly bear and wildland-urban interface zones); and/or
8. Partial cut areas with an abundance of residual regeneration as identified by a Qualified Registered Professional.

Monitoring (Measures and Verification):

A rationale for reducing minimum inter-tree distance will be documented in the site plan.

8.2.3 Milestone Dates

Context

The regeneration date is the latest date at which time the site is considered to be fully regenerated (as determined by a regeneration survey).

Early and late free growing dates are the earliest and latest time, respectively, at which free growing can be assessed.

Regeneration Date:

Regeneration, early free growing and late free growing dates are specified in Appendix 4.

Monitoring (Measures and Verification):

A rationale for changes to the dates will be documented as an amendment to the Site plan, and submitted to the appropriate government personnel if necessary.

8.2.4 Maximum Density

Context

Maximum density is the maximum tree density of the site, above which the Licensee will be responsible for reducing tree density through spacing.

Density Strategy

The maximum density for total conifer and broadleaves will be:

1. 10,000 stems per hectare. Maximum density may exceed 10,000 within a standard unit if, as a result of forest health or stand damage considerations, it is determined that a higher density is appropriate to maintain stocking levels beyond 20 years. A rationale as per *FRPA* Section 97.1 supporting an increase in maximum density will be documented within the free growing declaration.
2. Consistent with the rust strategies in 8.2.1 above, 20,000 stems per hectare (SPH) in stands dominated by a minimum of 80% pine at the time of harvest.

Monitoring (Measures and Verification):

The maximum density and associated rationale will be documented in the Site plan or a Site plan Amendment as required.

8.2.5 Competition

8.2.5.1 Riparian Areas

Context

Riparian areas are naturally buffered by streamside vegetation. This natural vegetation protects the stream and land adjoining a waterway by keeping native soils intact and maintaining the streamside land and stream banks. These buffers also regulate stream temperature through shading which is important for many fish species that may reside in the lower tributaries of a smaller stream. Riparian vegetation also helps encourage infiltration of rainfall and runoff, and provides absorption for high stream flows. The vegetative community provides habitat for many species of plants and animals. The riparian management zone (RMZ) can be used or managed in such a way as to protect water quality,

the hydrologic regime of the waterway, and stream structure. The naturally vegetated buffer filters out pollutants, captures sediment, regulates stream water temperature, and processes many contaminants through vegetative uptake. Riparian buffers therefore should be kept intact or restored wherever possible.

Riparian Areas Assessment Strategy:

In consideration of increased protection to riparian values, trembling aspen (At), paper birch (Ep), black cottonwood (Act) and willow (*Salix spp.*) will not be considered deleterious competition when conducting a free growing survey in all riparian management zones (RMZs).

Monitoring (Measures and Verification):

Verifiable from field surveys, including free growing surveys, and other silviculture surveys.

8.2.5.2 Rust Management

Context

On sites where rust management is required due to the incidence of rust being > 20% of the pine leading stand, deciduous species will be considered to be non-competitive to the crop conifer trees. On these sites, the deciduous trees will lead to greater overall site productivity and also increase crown closure at the stand level. It is assumed that increased crown closure will slow down the spread of the rust from the tree's crown to the lower stem (Mackenzie District Rust Management Strategy (2007).

Rust Assessment Strategy:

On pine leading sites where rust incidence exceeds 20%, Aspen (At), paper birch (Ep), black cottonwood (Act) and willow (*Salix spp.*) will not be considered deleterious competition unless deciduous and shrub species are vigorously competing with crop trees. Deciduous competition is considered "vigorous" when present in more than 2 quadrants of a fixed radius plot.

Monitoring (Measures and Verification):

Verifiable from field surveys, including free growing surveys and other silviculture surveys.

8.2.6 Deciduous Forest Health Free Growing Damage Criteria

Context

As with conifers, deciduous tree species are also susceptible to many forest health factors which can impact the timber quality of the tree over the long term. In order to ensure these species have the potential for economic value in the future, they will be evaluated against the criteria below to be considered free growing. This statement applies to deciduous trees that will be considered a crop tree at the time of free growing where > 50% of the stand is deciduous leading.

Strategy for Assessing Deciduous Health at Free Growing:

This section applies only to those stands being managed as deciduous leading where > 50% of the stand is deciduous and follows Table 3 in Appendix 4.

A well-spaced, free growing deciduous crop tree must not have the following (Silviculture Surveys Procedures Manual 2018):

1. Stems originating from the sides or cut surface of a stump;
2. At least one major dead branch in the live crown;
3. A torn branch from the point of attachment to the main stem;
4. A broken main stem;
5. A wound which occupies more than 10% of the circumference of the stem, or is longer than 15 cm;
6. Cankers or fungal infections or insect damage;
7. Animal damage such as repeated browsing of the main stem, abrasions or claw marks greater than 50 cm in length and covering over half the circumference of the stem;
8. A sweep where the stem is displaced more than 30 cm from the center of the root crown pith within 1 m of the ground; and
9. Two or more leaders with no dominance expressed.

Monitoring (Measures and Verification):

Verifiable from free growing surveys.

9.0 Signatures of Personnel Required to Prepare the Plan

OBO Forest Management Limited Partnership
497 3rd Avenue
Prince George, BC V2L 3C1

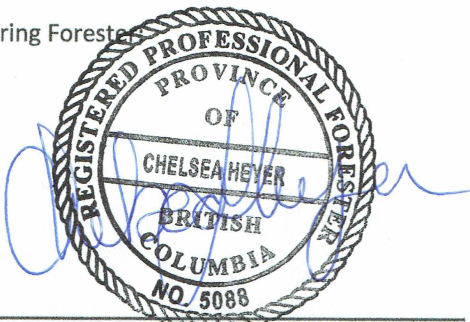


Chief Donny Van Somer
Kwadacha Nation Representative



Glen Worthington – Executive Director
OBO Forest Management Limited Partnership

Preparing Forester



Chelsea Heyer RPF – #5088
Planning Forester, Forsite Consultants Ltd.

Appendix 1 – Overview Map of the Forest Development Unit

Appendix 2 – Forest Stewardship Plan Content Maps

Appendix 3 – Additional Information Maps

1. Biogeoclimatic/Natural Disturbance Types
2. FSP Overview Map – Stakeholders

Appendix 4 – OBO Forest Management FSP Stocking Standards

Footnotes for all Tables

With the exception of a late free growing date of 20 years, all conifer leading (Tables 1 and 2) stocking tables are consistent with the BC Government Reference Guide to Forest Development Stocking Standards.²⁹

For all pine leading stands with > 20% of pine stem rust, **Section 8.2.1 Mackenzie Rust Management Strategy** applies as does **8.2.5.2** regarding non-deleterious competition.

Minimum Inter-Tree Distance is specified in **Section 8.2.2**.

Milestone Dates for Regeneration Delay, Early Free Growing, and Late Free Growing are set out in **Section 8.2.3**.

Maximum Densities are found in **Section 8.2.4**.

For stands in riparian management zones (RMZs) as specified in 6.3.3 Objectives Set by Government for Water, Fish, Wildlife and Biodiversity in Riparian Areas, **Section 8.2.5.1** regarding non-deleterious competition also applies.

For standard units which are deciduous leading (see Table 3), **Section 8.2.6 Deciduous Forest Health Free Growing Damage Criteria** also applies.

²⁹ <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/stocking-standards>

Table 1 of 3. BWBS dk1

BGC			Species					Regeneration and Free Growing Criteria				
Zone / Subzone / Variant	Series	Standards ID	Species		Stocking			Regen Delay	FG Assessment (Yrs)		FG Minimum Ht. (m)	
			Preferred	Acceptable	Target	Min p+a ²	Min p	Years	Early	Latest	PI	Sw, Sb, BI
BWBS dk1	101	1043873	PI Sw ³²	BI	1200	700	600	7	12	20	1.6	0.8
	102	1043874	PI	Sb Sw	1000	500	400	7	12	20	1.2	0.6
	103	1043875	PI Sw ²⁸	BI	1200	700	600	7	12	20	1.6	0.8
	104	1043876	PI ¹ Sb ¹ Sw ^{1,32}		1200	700	600	7	12	20	1.6	0.8
	05	81004	Sw PI	BI	1200	700	600	7	12	20	1.6	0.8
	06	81005	Sw ³² PI	BI	1200	700	600	7	12	20	1.6	0.8
	07	81006	PI ¹ Sb ¹ Sw ^{1,32}		1200	700	600	7	12	20	1.6	0.8
	08	81007	PI ¹ Sw ^{1,32}	Sb	1000	500	400	4	9	20	1.2	0.6
	09	81008	PI ¹ Sb ¹ Sw ^{1,32}		400	200	200	4	9	20	1.2	0.6
	110	1043877	Sw ^{1,32} PI ¹	Sb	1000	500	400	4	9	20	1.2	0.6
	111	1043878	Sw ^{1,32} PI ¹	Sb	1000	500	400	4	9	20	1.2	0.6

¹ suitable on elevated microsites

² "p" is preferred species, "a" is acceptable species

²⁸ limited by moisture deficit

³² limited by growing-season frosts

Table 2 of 3. ESSF mv4

BGC			Species					Regeneration and Free Growing Criteria				
Zone / Subzone / Variant	Series	Standards ID	Species		Stocking			Regen Delay	FG Assessment (Yrs)		FG Minimum Ht. (m)	
			Preferred	Acceptable	Target	Min p+a ²	Min p	Years	Early	Latest	PI	Bl, Se
ESSF mv4	01	81086	Bl, Se	PI	1200	700	600	4	12	20	1.6	0.8
	02	81087	Bl ²⁸ PI Se ²⁸		1000	500	400	4	12	20	1.2	0.6
	03	81088	Bl, PI, Se		1000	500	400	4	12	20	1.2	0.6
	04	81089	Bl ^{1,32} PI ¹ Se ^{1,32}		1200	700	600	4	12	20	1.6	0.8
	05	81090	Bl ^{1,32} Se ^{1,32}	PI ¹	400	200	200	4	12	20	1.2	0.6

¹ suitable on elevated microsites

² "p" is preferred species, "a" is acceptable species

²⁸ limited by moisture deficit

³² limited by growing-season frosts

Table 3 of 3. Deciduous

BGC			Species					Regeneration and Free Growing Criteria					
Zone / Subzone / Variant	Site conditions	Standards ID	Species		Stocking			Regen Delay	FG Assessment (Yrs)		FG Minimum Ht. (m)		
			Preferred	Acceptable	Target	Min p+a²	Min p	Years	Early	Latest	PI	Sx, Bl, Fd	At, Ep, Ac
All×	Submesic to mesic sites		At Ep Ac	Sx Pl Bl Fd	2000	1200	1000	4	9	20	2.0	1.0	2.0
	All other moisture regimes		At Ep Ac	Sx Pl Bl Fd	1400	800	600	4	12	20	1.6	0.8	2.0

* These standards may be applied in stands with >= 50% deciduous basal area. See 8.1 Stocking Standards. Section 8.2.7 Deciduous Forest Health Free Growing Damage Criteria also applies.

² "p" is preferred species, "a" is acceptable species

Appendix 5 – Details of Advertisement and Public Review

The public review period started July 19, 2019. The FSP and content maps were hosted in a *Dropbox* folder that was made available to the public; a link to the files was provided with all communications.

A5.1 Advertisements

The FSP was published in the *Prince George Citizen* (July 19 to July 25, 2019). (At the time of advertisement, Mackenzie did not have a newspaper in which to run an ad). The FSP was posted on line and links provided to the First Nations, and Tenure holders listed below.

A5.2 Information Sharing

Letters and emails regarding the FSP were sent to the following First Nations, Range Tenure holders and Guide Outfitters:

First Nations

Kwadacha
Doig River
West Moberly First Nation
Halfway River

Guide/Range/Trapper Tenure

701231	RAN074996	TR0741T007
701163	RAN075591	TR0740T004
701176	RAN075951	TR0740T002
701139	RAN076324	TR0740T003
700633		TR0741T006
		TR0741T005
		TR0741T004
		TR0741T003
		TR0741T002

Copies of the newspaper advertisement as well as the letters and maps that were sent to each First Nation and tenure holder are kept on file. To date (September 9, 2019) there has been no feedback regarding the FSP and its content maps. OBO Forestry will continue to information share at the development stage and will work to address future input/concerns.