K&K Forestry Operations Ltd.

FNWL #N2Z
Management Plan #1
March 1, 2018

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Contents

1.0 Management Plan

1.1 Introduction

The Management Plan is intended to incorporate the following:

- Integrated resource management
- Management goals and strategies
- Higher-level plans and applicable legislation governing forest stewardship on the area
- Methodologies used by the licensee holder to meet these objectives
- Opportunities and challenges within the First Nations Woodland Licence (FNWL) area.

As part of the First Nations Woodland Licence application process under Section 43.55 of the Forest Act, a First Nations Woodland Licence requires its holder to submit a Management Plan to the Regional Executive Director. Approval of a Management Plan represents approval in principle of management intent, but it does not give the authority to proceed with specific operational activities. Approval for operational activity within a FNWL area is covered under the Forest Stewardship Plan and Cutting/Road Permits.

This document is the proposed Management Plan for the Katzie-Kwantlen (K&K Forestry Operations Ltd.) First Nation Woodland Licence #N2Z (K&K FNWL #N2Z) application process.

Government's Objectives for First Nations Woodland Licences

On April 26, 2010 the provincial government introduced Bill 13 – The Forests and Range (First Nations Woodland Licence) Statutes Act to provide for a new forest tenure that is unique to First Nations. The FNWL is an area-based tenure and can include private and reserve land. The initial term of the licence will be set at 25 years. The Woodland Licence will only be available to First Nations that have an Interim Measures Agreement with government. First Nations with licences in their existing agreements will be able to convert some of them into a FNWL.

The intention of First Nations Woodland Licence is to expand First Nations participation in the forest sector and provide economic opportunities to First Nation Communities. The intent is to create more long-term, area-based forest tenures that are of an economically viable size, and create legislation for a First Nations Forest Tenure.

The Woodland Licence is unique because it provides exclusive rights to: harvest timber on Crown land; the right to harvest, manage and charge fees for botanical forest products; practice Aboriginal stewardship; and protect traditional use practices.

FNWL holders are required to: pay stumpage, prepare a Management Plan, and submit an Operational Plan to government for approval to ensure the environmental values and standards required by the Forest and Range Practices Act are upheld.

By providing First Nation Communities with greater flexibility to manage local forests, government seeks to:

- Provide long-term opportunities for achieving a range of community objectives, values and priorities;
- Diversify the use of and benefits derived from the First Nations Woodland Licence area;
- Provide social and economic benefits to British Columbia;
- Undertake local forestry consistent with sound principles of environmental stewardship that reflect a broad spectrum of values;
- Promote local involvement and participation;

- Promote communication and strengthen relationships between Aboriginal and non-Aboriginal communities and persons;
- Foster innovation; and
- Advocate forest worker safety.

1.2 K&K Special Resource Management Zones

1.21 Cultural Management Area

Management of Cultural Values is of the utmost importance to the Katzie and Kwantlen Communities. A 400ha Cultural Management Area (CMA) has been established near Alouette Lake (See Figure 2). The objective of the CMA is to provide an easily accessible, long term supply of Cultural Trees, Plants, and Sites for the Katzie and Kwantlen First Nation Communities, particularly for Elders. See section 5.7.2, 'Cultural Features Management' for specific management strategies associated with the CMA.

1.22 Blue Mountain Light Touch Area

The Blue Mountain Area, located in close proximity to a large, urban interface, receives significant use from a number of groups - hikers, dog walkers, field naturalists, mountain bikers, off-road vehicles, and equestrians. Because of the significant public use, K&K Forestry Operations Ltd. has created a 'Light Touch Area' on Blue Mountain (see Figure 2). The objective is to control the level of harvesting in the Light Touch Area to minimize impacts to these other uses of the area. See section 5.6 'Recreation Management' for specific management strategies associated with the Light Touch Area.

1.3 BC Timber Sales

K&K Forestry Operations Ltd. has entered into an agreement with BC Timber Sales (BCTS). The agreement incorporates BCTS Chart Area (East Alouette operating area) into the FNWL, opens up an additional operating area within the FNWL for BCTS, and sets a Reserve Volume of 5000m^3/yr. The agreement allows Katzie First Nation and Kwantlen First Nation to manage Forests in the heart of their respective traditional territories, while maintaining BCTS core objectives of setting Timber Pricing and Operating Costs benchmarks for the Province. While overall strategic management within the FNWL will be consistent with this Management Plan, it is recognized that BCTS must maintain consistency with its existing policies and procedures, including third-party certification, Standard Operating Procedures (SOP's) and Best Management Practices (BMP's). As per the agreement, where K&K – BCTS objectives are in conflict, the Parties will discuss and mutually agree to resolve these matters.

BC Timber Sales (BCTS) was founded in 2003 with a mandate to provide the cost and price benchmarks for timber harvested from public land in British Columbia. Through 12 Business Areas and an operational presence in 33 locations, BCTS manages some 20 percent of the provincial Crown allowable annual cut. The Goal of BC Timber Sales is to provide credible representative price and cost benchmark data for the Market Pricing System through auctions of timber harvested from public land in British Columbia.

BC Timber Sales also has a unique role as a 'Licensor' in that it develops and auctions timber to support the Market-based Pricing System. Once a Timber Sale Licence is issued, BCTS' role evolves to one of ensuring conformance with the plan(s) that compromise part of the auction and award process. Given that BCTS will be operating under FNWL #N2Z Management Plan and, by having K&K Forestry Operations Ltd. responsible for undertaking the related Forestry planning, the expectation is that the forest management aspirations of the Katzie and Kwantlen First Nation Communities will be embedded within the operational plans that have been prepared consistent with the relevant FSP.

See Appendix F: K&K – BC Timber Sales Co-operative Management Agreement for further information.

1.4 Legislation and Legal Orders Content Requirements

K&K FNWL #N2Z resource management on the FNWL area must meet government objectives, as defined in the current Legislation and Legal Orders.

Government Legislation and Legal Orders applicable to K&K FNWL #N2Z are expected to be amended over time. K&K FNWL #N2Z will be consistent with the legislation, regulations, and government orders that are in place at the time Forest Stewardship Plan (FSP) #643 is approved, or as enabled in legislation at a future date.

This Management Plan has been prepared in accordance with any directions of the Ministry of Forests, Lands and Natural Resource South Coast Region, Regional Executive Director or Chilliwack Natural Resources District, District Manager.

This Management Plan is consistent with the First Nations Woodland Licence (licence document) Agreement, current forestry legislation, the commitments made in the FNWL #N2Z application and licence package, and Legal Objectives made under the Forest and Range Practices Act of BC. Plans and legislative requirements affecting planning in the First Nations Woodland Licence are summarized in Appendix A: Legislation, Higher-Level Plans, Operational Guidance Documents for the Management Plan.

2.0 Area Description

2.1 Licence Area

The proposed K&K FNWL #N2Z is composed of:

Schedule A Land (Private Land)	0ha
Schedule B Land (Crown Land)	5854ha
Map Reference	92G.028, 92G.029, 92G.038, 92G.039, 92G.049
UTM (10N) Coordinates	5462571N 543046E

TABLE 1: Area and coordinates of proposed K&K FNWL #N2Z
***Note the Schedule B Land has removed 121ha designated as 'Non-Crown Land'**

2.2 General Location and Area Description

K&K FNWL #N2Z is located primarily (4751ha) within the Alouette Landscape Unit (LU). Approximately 772ha are within the Hatzic LU, and 452ha are within the Stave LU. All three LUs are located in the Maple Ridge/Mission area of British Columbia's Lower Mainland.

K&K FNWL #N2Z is comprised of three distinct polygons or Parcels: Stave Block 3 (761ha) is the northernmost unit, located between Stave Lake, Golden Ears Provincial Park, and Alouette Lake. Alouette Block 2 (4933ha) is located between Alouette Lake and TFL26 (District of Mission). Rolley Lake Block 1 (260ha) is the southernmost unit, located between Woodlots W0086/W0007 and TFL26.

The area of K&K FNWL #N2Z includes two separate BEC zones, the Coastal Western Hemlock (CWH) and Mountain Hemlock (MH). In these BEC zones there are a total of 4 distinct subzones/variants; CWHdm

(dry maritime), CWHvm1 (sub-montane very wet maritime), CWHvm2 (montane very wet maritime), and MHmm1 (windward moist maritime). The BEC label is derived from Government Base Data; note that K&K FNWL #N2Z plans to complete Terrestrial Ecosystem Mapping (TEM) moving forward.

BEC Label	Gross Area (ha)	NHLB Area (ha)	THLB Area (ha)	% THLB
CWHdm	**1593**	**190**	**1403**	**35**
CWHvm1	**1513**	**489**	**1024**	**25**
CWHvm2	**2211**	**719**	**1492**	**37**
MHmm1	**255**	**140**	**115**	**3**
TOTAL	**5573**	**1513**	**4060**	**100**

TABLE 2: Biogeoclimatic Subzone Distribution in K&K FNWL #N2Z

The proposed K&K FNWL #N2Z area spans elevations from 140m ASL to 1040m ASL.

Water resources within K&K FNWL #N2Z consist of streams, lakes, wetlands, and ponds. Major drainages within the FNWL include Kanaka Creek and the Kathryn Creek Community Watershed. There are also numerous unnamed streams which flow directly into Alouette and Stave Lake. Most of the western boundary of K&K FNWL #N2Z is adjacent to Alouette Lake, a large and important lake with high recreational use. A portion of the eastern boundary borders Stave Lake, another large and important recreational lake. Pine Lake is the largest lake located in the FNWL.

There are numerous fish-bearing streams located within the FNWL. Anadromous Bull Trout, Chinook Salmon, Chum Salmon, Coho Salmon, Cutthroat Trout, Dolly Varden, Kokanee, Lake Trout, Largescale Sucker, Longnose Sucker, Northern Pikeminnow, Peamouth Chub, Rainbow Trout, and Redside Shiner, Catfish and Brown Bullhead are all reported to inhabit Alouette Lake, Stave Lake and streams in the Blue Mountain Area.

K&K First Nations Woodlands Licence Unit Area in Hectares

K&K First Nations Woodland Licence Unit	Area (ha)
Stave Block 3	**761**
Alouette Block 2	**4933***
Rolley Lake Block 1	**260**
TOTAL	**5954**

TABLE 3: K&K FNWL #N2Z Operational Units

***Note that DL3209, located within FNWL#N2Z, has been removed from this total**

Figure 1 on the next page shows an overview map of the proposed K&K FNWL #N2Z area.

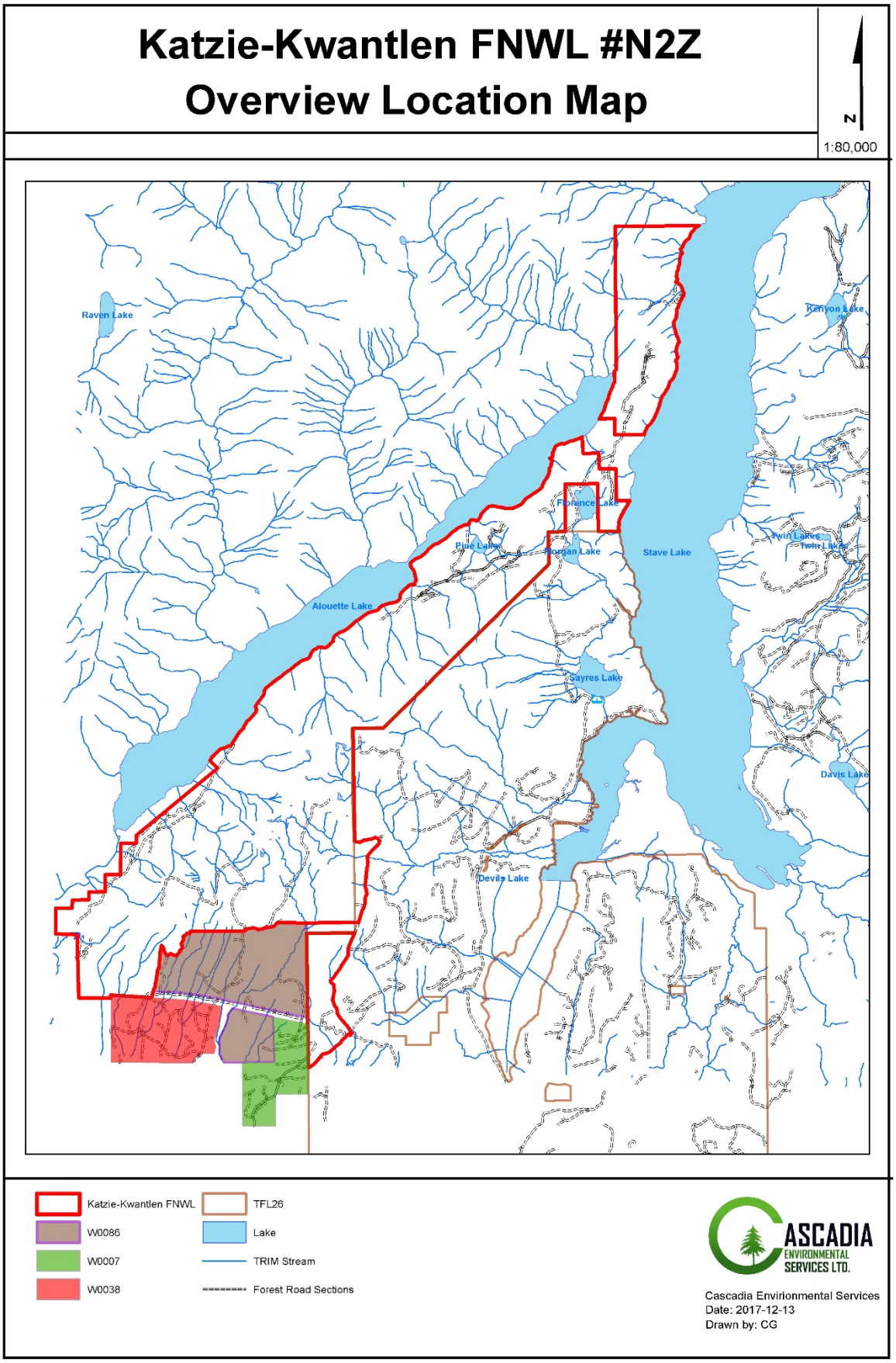

FIGURE 1: Katzie-Kwantlen FNWL #N2Z Overview Map

3.0 Resource Inventories

Resource Inventories are used in several phases of harvest planning, particularly in the Timber Supply Analysis (TSA) of the Management Plan, completed by Ecora Resource Group Ltd. Resource features included in Ecora's analysis include Timber Inventory, Ecosystems, Recreation Areas, Visual Landscape Inventory, Ungulate Winter Ranges (UWRs), Wildlife Habitat Areas (WHAs), Old Growth Management Areas (OGMAs), Operability, Blue Mountain Forest, and Cultural Management Area.

Figure 2 on the next page shows the Non-Timber Resources located within K&K FNWL #N2Z.

Resource inventories for K&K FNWL #N2Z are from BC government sources (MFLNRO, MOE, District of Chilliwack) and are generally on a 1: 20,000 landscape level scale. The inventories are described below.

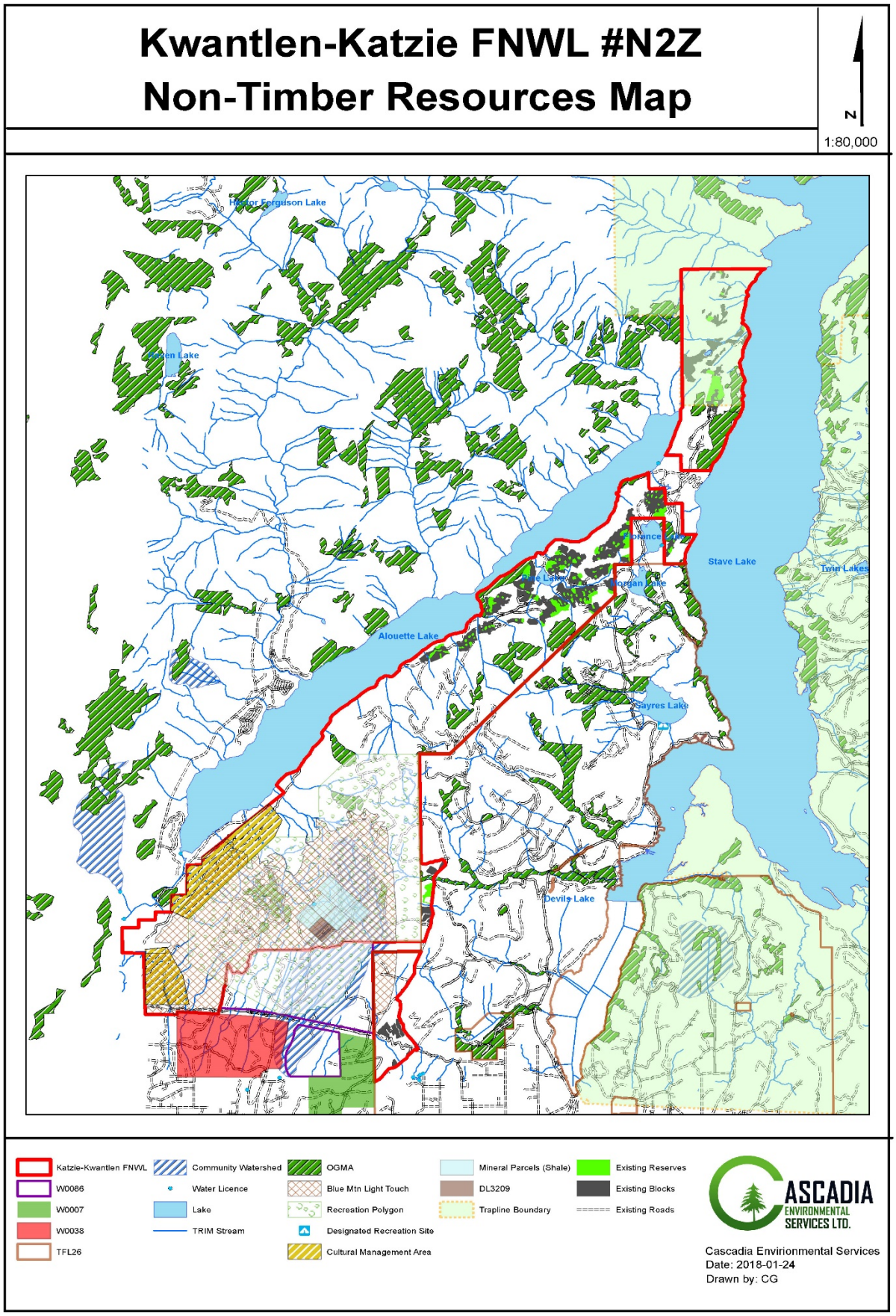

FIGURE 2: Katzie-Kwantlen FNWL #N2Z Non-Timber Resource Map

3.1 Timber Resource Inventory

A Timber Supply Analysis (TSA) was completed by Ecora Resource Group Ltd., for the purpose of determining the Annual Allowable Cut (AAC) for K&K FNWL #N2Z. Key results from the TSA are as follows:

- Timber Harvesting Landbase: 4060ha
- Leading Tree Species: Western Hemlock
- Average Site Index (THLB): 24.3m
- Age Class: 84% of Landbase <100 years old
- Area of Old Growth Forests (>250 yrs old) increases over the Planning Horizon

The TSA has calculated an Annual Allowable Cut (AAC) of **24,700m^3/yr,** based on a 250-yr planning horizon.

The full TSA report can be found in Appendix E.

3.2 Terrain Stability Inventory

Terrain stability mapping has not been completed for the FNWL at this time. Utilizing LiDAR data recently obtained for the FNWL, a slope classification map has been created, and areas with slopes over 60% will be classified as having potentially sensitive soils. Operational activities will be avoided in areas of sensitive soils where possible. Any proposed logging or road building activities within areas of sensitive soils will be reviewed by a qualified professional prior to the activity commencing.

3.3 Physical Operability

As part of K&K FNWL #N2Z Timber Supply Analysis, the land base was classified into two operability classes as follows:

Operable Areas include timber on productive, physically operable land that is harvestable by both conventional and non-conventional harvest systems (i.e. grapple, high-lead, hoe chuck, or long-line cable systems), and are included in the Total Harvestable Land Base (THLB). Areas that have been historically logged were all considered operable.

Inoperable Areas are not likely harvestable by any system. It is comprised of timber on productive land that is steep and/or rocky and it cannot be safely felled or yarded, or a significant proportion of the volume could not be obtained. Physically inoperable timber was excluded from the THLB.

See the TSA report in Appendix E for additional information.

3.4 Recreation and Trails

In 2005, a Government Action Regulation (GAR) order was established to identify designated recreation sites, trails and interpretive forest sites as resource features. A recreation inventory including all of the above sites has been obtained from BC government open data sources, as well as from cooperation with both the Blue Mountain Motorcycle Club (BMMC), Fraser Valley Mountain Biking Association, and the Haney Horseman. These groups build, maintain and map trails in the Blue Mountain area within K&K FNWL #N2Z and W0086. K&K FNWL #N2Z shall work with recreation groups on a long-term recreation strategy for the FNWL.

The Blue Mountain area receives significant recreational use by walkers and hikers, mountain bikers, off-road vehicle users (including BMMC), and equestrians. Because of the significant public use, and proximity to a large urban interface, K&K Forestry Operations Ltd. has created a 'Light Touch Area' on Blue Mountain (see Figure 2). This area is still part of the THLB (except those inoperable or non-productive areas which were netted down), in which a maximum of 3% of the area can be in a disturbed

state (defined as clearcut openings <5m Average Tree Height). Note that Selection Harvesting (maintaining >40% Basal Area of the Stand) or Retention Silviculture (No point of Opening is >2 Tree Lengths from a group of trees >0.25ha) will not contribute to the 3% Disturbance calculation.

A significant portion of Recreation Site REC0100 overlaps with K&K FNWL #N2Z (see Figure 2). There are no legally established objectives for REC0100. K&K FNWL #N2Z will abide by Section 16 of the Recreation Regulation and obtain authorization of the designated recreation officer prior to starting forest operations within REC0100.

Recreation will be a key value to be managed within K&K FNWL #N2Z. In addition to the existing recreation sites and trails, K&K Forest Operations Ltd. will also create and manage recreational sites within the FNWL, including (but not limited to) campsites and First Nations interpretive trails.

3.5 Caves and Karst

Karst is a unique topography that forms as a result of the dissolving action of water on carbonate bedrock (usually limestone, dolomite or marble). Karst features include fluted sharp rock surfaces, vertical shafts and sinkholes, sinking streams, springs, complex sub-surface drainage systems and caves. Karst inventory data for K&K FNWL #N2Z is sourced from the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) open data. MFLNRO's open data source identifies areas of Karst potential, Karst likelihood, and Karst development intensity. Karst systems are identified as resource features wherever they are found within the Chilliwack Forest District (DCK).

MFLNRO's data does not indicate that there is any Karst topography in the K&K FNWL #N2Z licence area. However, Karst may be present on the landscape at a finer scale.

The objective is to minimize the impact of forest management activities on cave and Karst features. Strategies include:

- Identification of cave and Karst features usually occurs during the primary forest engineering layout. Once a potentially affected feature is identified, an assessment may be completed and/or a qualified person consulted. This information is used to design harvesting and road construction activities that protect the Karst features.
- Agreement holders must satisfy the annual reporting requirements for Karst resource features as per Forest Planning and Practices Regulation (FPPR) s 86(3) (b), which states that: before June 1st of each year, an agreement holder must report to the District Manager the location of any resource feature or wildlife habitat feature in or contiguous to a cutblock or road of which feature the holder is aware during the reporting period if:
    i. the holder has not, in a previous reporting period, reported the resource feature or wildlife habitat feature, and
    ii. the order establishing the resource feature or wildlife habitat feature requires the location of the resource feature or wildlife habitat feature to be reported under this section.

3.6 Visual Resources

Visual Quality Objectives (VQOs) have been established for the Chilliwack Forest District (DCK), pursuant to sections 7 and 17 of the Government Action Regulation (GAR). These VQOs apply to the Scenic Areas identified as known in the DCK District Manager's letter dated October 17th, 2005 and the revision letter dated April 12th, 2013. These objectives apply to the Crown land portion of the DCK and to the private land within Woodlot Licences and Tree Farm Licences (TFLs).

Visual landscape inventory data was obtained from the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). The K&K FNWL #N2Z area is a small subset of this data and it contains the VQOs for the proposed K&K FNWL #N2Z; a summary of VQO polygons located within the FNWL are as follows:

- Retention VQO: 2,211ha (37%)
- Partial Retention: 1,555ha (26%)
- Modification: 380ha (6%)

When summed together, 69.45% of K&K FNWL #N2Z is within "scenic or visual areas." The Modification VQOs are generally in the Blue Mountain Recreational area. Retention VQOs make up the entire western boundary of K&K FNWL #N2Z along Alouette Lake. Partial retention VQOs are found in all three Parcels. The objective with visual quality is to reconcile where possible harvest operations with visual landscape values. A cutblock or road will be designed to blend with the landscape as much as possible to minimize the effects on visual quality. Single or grouped tree retention and screening are also strategies to minimize visual impacts. A Visual Impact Assessment (VIA) will be carried out for any planned harvest block within an established VQO polygon.

The map in Figure 3 on the next page shows the Visual Quality Objectives within K&K FNWL #N2Z.

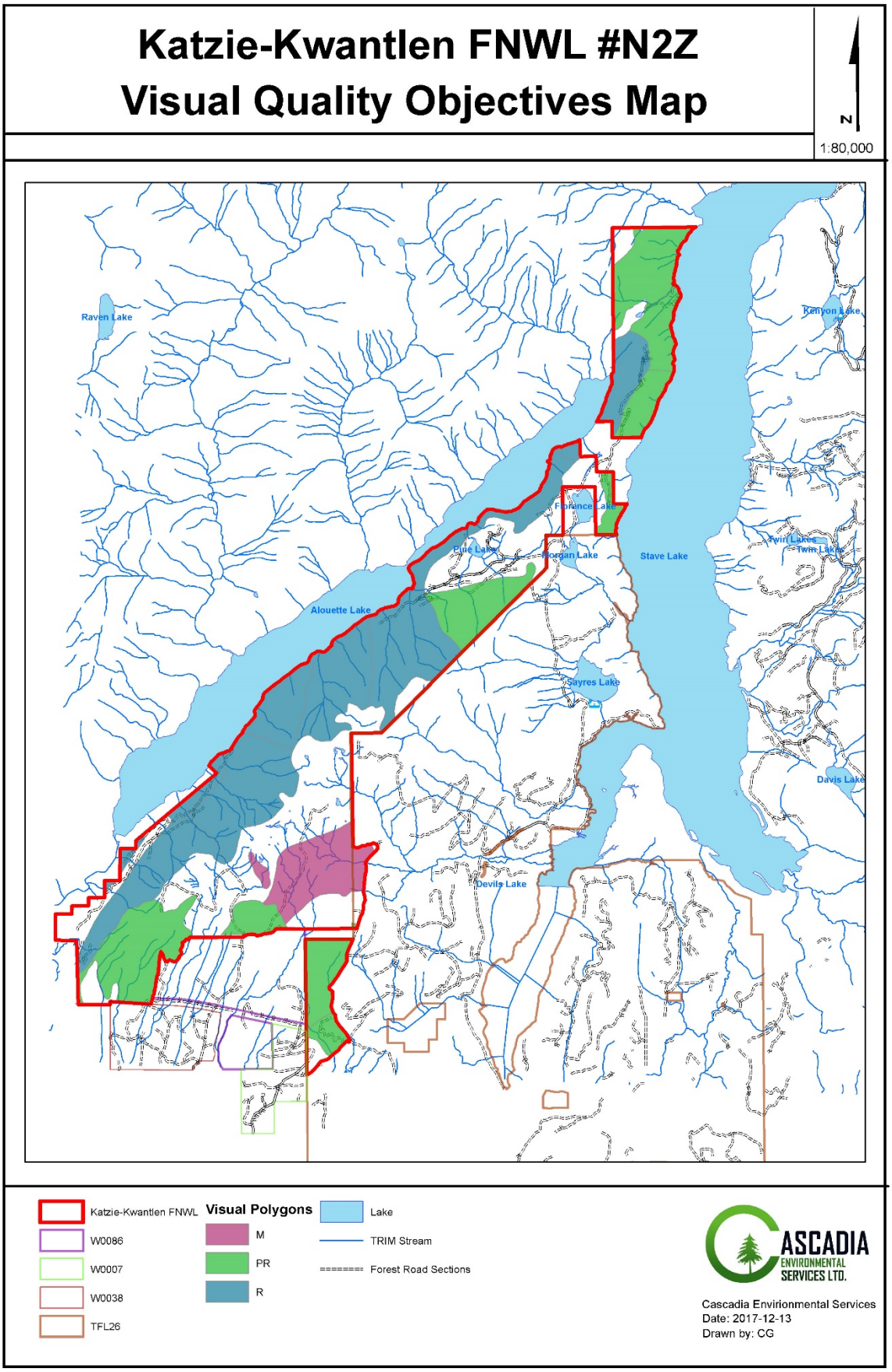

FIGURE 3: Katzie-Kwantlen FNWL #N2Z VQO Map

3.7 Wildlife/ Old Growth Management Areas (OGMAs)

Inventories of Wildlife Habitat Areas (WHAs), including Ungulate Winter Ranges (UWRs), are maintained by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). Spatial mapping data can be downloaded from their websites. There are no established WHA or UWR polygons within K&K FNWL #N2Z.

OGMAs are a landscape-level biodiversity management initiative. OGMAs spatially define where minimum levels of old-growth habitat are reserved by landscape unit and BEC variant. Old growth characteristics can also be recruited from second growth stands. Established legal OGMAs already exist throughout the Alouette, Hatzic and Stave LUs, and within K&K FNWL #N2Z. The inventory is maintained by MFLNRO and spatial data has been downloaded from their website.

K&K FNWL #N2Z will maintain consistency with Legal Objectives established under Ministerial order: 'Lower Fraser SRMP Legal Order and Objectives' (February 4th, 2013).

The Timber Supply Analysis, completed by Ecora Resource Group Ltd., indicates that the total area of Old Growth (stands >250yrs Old) within the FNWL will increase over the planning horizon. This is due to harvest constraints associated with the Cultural Management Area, Blue Mountain Light Touch Area, and Retention Visual Polygons.

3.8 Riparian Management Area Classification

There are two sources of stream data for K&K FNWL #N2Z:

1. TRIM stream data has been downloaded from MFLNRO websites for the entire area of K&K FNWL #N2Z.
2. A Watershed model has been created for the entire K&K FNWL #N2Z (using LiDAR data obtained for the FNWL). The model predicts the likely location of streams and these streams can be further analyzed to assess potential stream classifications (based on stream width/gradient), as well as classifying Gully features.

Confirmation and assessment of mapped streams will be completed (at the cutblock level) as Forestry Planning develops at K&K FNWL #N2Z. Where required, streams will be assessed by a qualified professional (Terrain Stability, Fisheries Assessments). A stream inventory, including Riparian Management Area (RMA) Retention Tracking, will be kept for K&K FNWL #N2Z, and will be continually updated over time.

See Section 5.9 – Fisheries/Riparian Management for additional information.

3.9 Terrestrial Ecosystem Mapping

Ecosystem mapping is the stratification of a landscape into map units, according to a combination of ecological features; primarily climate, physiography, surficial material, bedrock geology, soils and vegetation. Common scales of ecological mapping are 1:20,000 to 1: 50,000, though larger scales such as 1:10,000 or 1: 5,000 may be used depending on project objectives.

Terrestrial Ecosystem Mapping (TEM) is a methodology which requires direct air photo interpretation of ecosystem attributes by a mapper. This approach is typically used at larger scales where more detailed information is required. The TEM mapping approach to mapping provides a framework that integrates the biotic and abiotic ecosystem components of the landscape, from which valuable management interpretations can be made (e.g. planning resource allocation).

TEM mapping has not been completed for the FNWL at this time, however, K&K FNWL #N2Z commits to completing TEM Mapping within the first Five Year Cut control period of the FNWL.

3.9.1 Sensitive Ecosystem Inventory

A Sensitive Ecosystems Inventory (SEI) systematically identifies and maps rare and fragile ecosystems in a given area. The information is derived from aerial photography, supported by selective field checking of the data. SEI mapping methodology is based on original air photo interpretation for SEI polygons or as an SEI theme based on TEM polygons. The purpose of the SEI project is to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the continued integrity of these ecosystems.

SEI mapping has not been completed for the FNWL at this time, however, K&K FNWL #N2Z commits to completing SEI Mapping within the first Five Year Cut control period of the FNWL.

4.0 Proposed Allowable Annual Cut (AAC)

The proposed allowable annual cut for this FNWL is:

Schedule A (Private) Lands	n/a
Schedule B (Crown) Lands	24,700 m^3
Schedule C (Prescribed Products)	n/a

The harvest level for the FNWL has been represented through a timber supply projection as part of the Timber Supply Analysis (TSA). The results of the TSA are projections of timber supply in support of determining or confirming proposed allowable annual cut (AAC). The TSA report is included in this document in Appendix E.

The base case timber supply flow includes:

- Timber Harvesting Land Base (THLB): 4,060ha
- Non-recoverable losses (NRLs) of 438 m^3/year as described in the TSA, Section 7.3.2 “Non-Recoverable Losses”;
- RMZs including community watersheds, visually sensitive areas, Blue Mountain, legal OGMAs, WTRs, IRMs, and CMA’s;
- Stand yield curves using TIPSY for managed stands and VDYP for natural stands; and
- A non-declining harvest flow and a sustainable long-term growing stock.

The gross area of K&K FNWL #N2Z is 5975ha with a Crown Forest Land Base (CFLB) of 5573ha (93% of gross) and a current THLB of 4060ha (68% of gross). The TSA planning horizon is a 250-year period. An average area of 24.8ha will be harvested annually to meet AAC. The average harvest age of stands varies over the 250-year period, but the average harvest age overall is 135 years. There is an increase in the amount of Old Growth Stands (>250yrs Old) over the Planning Horizon – from 427ha currently to 1449ha at the end of the Planning Horizon. This is due to harvest constraints associated in the Cultural Management Area, Blue Mountain Light Touch Area, and Retention Visual Polygons.

The Timber Supply Analysis can be found in Appendix E.

5.0 Management Objectives

General Strategic Objectives

The management objective for K&K FNWL #N2Z is to manage timber resources within the FNWL on a sustained yield basis, using sound forest management principles, while maintaining and enhancing the following:

- Cultural opportunities
- Non-timber values
- Non-timber forest products

Forest Management Principles

K&K Forestry Operations Ltd. will manage its forest resources under three guiding principles, which include:

1. Sustainability of all resource values
2. Financial sustainability of its forest resource business
3. Accountability to the Katzie and Kwantlen First Nation Communities

Additional Management Objectives

K&K FNWL #N2Z resource management objectives are as follows:

Short-Term Objectives

- Fulfill the cut control obligations of the FNWL, while maintaining consistency with applicable Legislation and Legal Orders
- Encourage cooperation among stakeholders
- Optimize operational efficiencies
- Manage forest health issues
- Balance timber extraction, Cultural opportunities, and non-timber values

Medium-Term Objectives

- Identify medium and long-term harvest priority areas to maximize benefits for K&K FNWL #N2Z and the Crown
- Analyze the age class and species composition of the FNWL to optimize timber flows and return on development investments
- Develop a comprehensive, long-term harvest strategy which optimizes capital investments while reflecting the diversity of Cultural and non-timber values found both within and adjacent to the FNWL
- Develop a long-term silviculture investment plan which will optimize the yields within the FNWL operating area to the benefit of our communities, the environment, and the Crown. Basic silviculture will be practiced in a prompt and focused manner with regeneration of any harvested areas implemented within one year or less after harvest completion. Incremental silviculture projects that will be considered during the term of this Management Plan include:
    - Backlog reforestation and/or planting of de-built roads
    - Pruning
    - Incremental spacing
    - Fertilization

  (Proposed treatments will depend on the availability of suitable candidate areas and on the availability of Land Based Investment Program (LBI) funding for such projects.)
- To improve ecosystem health and resiliency and improve stand vigor by controlling forest stocking levels

Long-Term Objectives

- Maximize the social and economic benefits to our communities and the province of BC by harvesting in a prudent manner that is sensitive to the needs of our communities and the environment
- Develop a sustainable economic foundation based on the use and extraction of forest resources that involves both primary extraction and secondary value-added activities for the benefit of the Katzie and Kwantlen Communities
- Management of both Forests and Fish Habitat to meet present needs without compromising the needs of future generations
- Encourage the development of new employment opportunities in Forest Resource Management as a means for Katzie/Kwantlen Community involvement in Forest Management
- Inform the Katzie and Kwantlen Communities, and the Communities at large, on forest management within the FNWL via ongoing dialogue and information sharing with these Communities
- Promote local employment and education of Katzie and Kwantlen youth with skills-training support

The full range of resources are considered within the BC Timber Sales Forest Stewardship Plan #643, to which K&K Forestry Operations Ltd. will be a signatory. Specific results and strategies for management of these resources are detailed within the FSP. The FSP was approved on December 1st, 2017; K&K will formally sign onto the FSP once FNWL #N2Z has been issued.

5.1 Timber Resources

5.1.1 Forest Products

The primary product that K&K FNWL #N2Z will produce will be old growth and second growth logs to sell into both the domestic and international log markets. The proposed landbase of K&K FNWL #N2Z contains a variety of timber species and age classes, which affords opportunities to match the business to the demands of the marketplace. The species profile has a significant Hemlock component. The over-mature age class Hemlock will yield a significant pulp component. The second growth Hemlock is generally of very good quality; however, domestic prices are marginal at this time. Many of the second growth areas will be ideal candidates for ground based mechanized falling and processing for increased efficiency. We will move this product to market using highway logging trucks.

Prior to the start of harvest operations, K&K will develop and implement a long-term timber sales and marketing strategy, and will consider a number of different scenarios, including (but not limited to):

- Advertising Yearly Timber Packages for bid
- Entering into a longer-term marketing and operations contract with a qualified timber broker
- Coordinating with BCTS or other licensees to combine timber volumes for sale

K&K Forestry Operations Ltd. will engage other licensees to discuss and examine these possible scenarios and will make a decision of timber disposition that it feels will maximize benefits to the Katzie and Kwantlen Communities.

Major Products:

- Sawlogs
- Veneer logs
- House logs
- Timber frame logs
- Poles

Minor Products:

- Shakes and shingles
- Fence posts and rails
- Small diameter poles
- Firewood
- Other value-added products

5.1.2 Cutting Priorities

The cutting priorities for K&K FNWL #N2Z are as follows, providing that these stands meet merchantability criteria and can be feasibly harvested given operational and economic constraints:

1. Blowdown timber
2. Harvest of diseased or insect attacked timber before volume losses to decay occurs
3. Burned timber, before volume losses to decay occurs

5.1.3 Utilization Standards and Coarse Woody Debris Management Strategies

The current coastal utilization standards will be followed. The FNWL #N2Z will manage to meet or exceed the BC Coastal Utilization Standards while targeting coarse woody debris requirements in the Forest and Range Practices Act that promote wildlife and soil productivity. Log salvage and firewood cutting will be explored where the tree quality and species mix makes this diverse utilization economically viable. Retention of coarse woody debris at levels in accordance with section 68 of FPPR shall apply: retain a minimum of 4 logs per ha, measured on the basis of an average per ha across a cutblock, each being a minimum of 5m in length and 30cm in diameter at one end. Sound and rotting logs and stumps that provide habitat for plants, animals and insects and are a source for organic matter for future soil development will be maintained through retention trees (Retention Patches, Wildlife Tree Retention Areas) and via the distribution of logging residue across the cutblock. The current allowable limit for post-harvest residue is $35m^3$/ha on old growth and $10m^3$/ha on second growth. Coarse woody debris will be maintained on-site provided it does not impede on achieving the Free Growing stocking standards and does not conflict with coastal utilization standards.

5.1.4 Harvesting

Cable yarding and hoe chucking (ground-based harvesting) will be the main harvesting systems used in K&K FNWL #N2Z. Helicopter yarding and long line yarding will be considered only in cases where there is no alternative and where these systems are operationally and economically feasible.

The objectives for harvesting on all parts of the Timber Harvesting Landbase (THLB) include:

- Harvesting will be done in compliance with the standards and regulations detailed in the Forest and Range Practices Act (FRPA) and associated regulations.
- Harvesting will not be carried out on soils deemed to be too sensitive for harvesting (saturated soils, High Terrain Stability Risk).
- Harvesting systems will be selected and designed to minimize soil disturbance and site degradation.
- Hoe chucking operations will use sufficient puncheon and brush mats to protect forest soils from detrimental soil disturbance.
- Harvesting operations will minimize damage to residual trees.

5.1.5 Stumpage

The stumpage rate for K&K FNWL #N2Z will be assessed based on the Market Pricing System (MPS) stumpage which will be determined once cutting permits are submitted for appraisal. The MPS rates are based on data from competitive Timber Sales Licences auctioned by BC Timber Sales within Coastal BC that have similar species and harvest parameters. The FNWL #N2Z stumpage shall be calculated in accordance with the Coast Appraisal Manual. The Coast Appraisal Manual Section 4.2

indicates the MPS sawlog stumpage rate ($/m^3) for each species and grade of coniferous timber and zone harvested under a cutting authority issued under a FNWL and associated road permits. Under the Coast Appraisal Manual Section 4.2.1, quarterly stumpage rate adjustments are done based on a three-month schedule of average log market values by species and log grades for old growth and second growth timber stumpage rate determinations.

5.2 Non-Timber Forest Products

5.2.1 Definitions and Context

The term non-timber forest products (NTFPs) refers to resources in the forest other than timber, which are harvested for Cultural, commercial or personal purposes. Botanical forest products make up a significant component of NTFPs; this includes, (but is not limited to):

- Medicinal Plants
- Floral Greenery
- Mushrooms
- Edible Plants
- Moss Picking
- Essential Oils

Other commercial NTFPs include animal products and even ecotourism.

Harvesting non-timber forest products has sustained the Katzie and Kwantlen Communities for thousands of years by providing items for Cultural and spiritual purposes including food, medicine, shelter and clothing.

Over 200 species of NTFPs are harvested from both public and private lands in British Columbia. While no formal management system exists for NTFPs, this in no way indicates that this is a new industry or that there have been no efforts to manage the commercial harvest.

The key for K&K FNWL #N2Z will be to identify and prioritize what NTFPs will be managed. K&K FNWL #N2Z provides the Katzie and Kwantlen First Nations with exclusive rights to harvest and manage NTFPs. At the present time there are no regulations in place to govern the harvesting of NTFPs and this will be developed with input from both the Katzie and Kwantlen First Nation Communities. Another key aspect to NTFP management that we must consider is community capacity. Who would benefit from investments in NTFPs? Who is interested and motivated to develop businesses? What about tenure and propriety, particularly with respect to traditionally-important NTFPs and current harvesting activities?

5.2.2 Management of NTFPs

There is no current inventory for NTFP's within K&K FNWL #N2Z. Presently there is some harvesting of NTFPs taking place within the FNWL area (cedar bark, mushrooms, salal, moss). However, it is often unknown who is collecting botanical forest products or exactly where they are being collected. This makes it difficult to plan specific protection measures for these resources. Unmonitored harvesting of NTFPs can result in over-harvesting and a reduction of supply, as well as damage and/or mortality to regenerating tree plantations. K&K FNWL #N2Z will integrate best practices silviculture management and innovative best practice criteria for botanical forest products into its developing NTFP management strategy as an aspect of operations to produce sustainable NTFPs. If damage and/or mortality to existing or regenerating forests becomes a problem, K&K FNWL #N2Z will work with the Compliance and Enforcement branch of the Ministry of Forests, Lands and Natural Resource Operations, Chilliwack Natural Resource District.

Management objectives with respect to NTFPs are:

1. To assess the NTFB resource base and design a non-timber forest products inventory with a focus on species with the greatest commercial potential and the greatest prominence.

2. To develop ecologically sustainable and economically viable NTFP activities that will enhance the long-term economic viability of the FNWL. This will be done by determining average commercial yields and developing sustainable harvesting strategies for selected species.
3. To develop policy and regulations to guide the management of NTFPs.
4. To do market research on potential product lines.

5.2.3 NTFPs Inventory Specifics

Sampling Design
Using a comprehensive list of potential NTFP plant species, we will develop a reconnaissance sampling plan to link NTFP species distribution and abundance to GPS points on the landscape.

Stratification and Data Analysis
Once we have identified a list of potential species, we will examine potential distribution and abundance across the K&K FNWL #N2Z landbase, by doing reconnaissance of the landbase together with visits to known gathering sites by Katzie and Kwantlen Community members. We will use GPS to map and record the locations of the sites.

Measures to Protect
K&K FNWL #N2Z will develop and implement a NTFP management strategy in cooperation with the Katzie/Kwantlen Community and other local stakeholders in the NTFP sector.

- The diversity of forest types, stand ages and silviculture systems, as well as the establishment of Forest Retention Areas (Wildlife Tree Retention Areas, Riparian Reserves, Cutblock Retention) will provide a variety of forest conditions within the FNWL and therefore a variety of sites where NTFPs may be produced.
- No other specific measures are proposed to protect botanical forest products during the term of this Management Plan.

5.3 Visual Landscape Management

Visual Quality Objectives (VQOs) have been established for the Chilliwack Forest District (DCK), pursuant to sections 7 and 17 of the Government Action Regulation (GAR). These VQOs apply to the Scenic Areas identified as known in the DCK District Manager's letter dated October 17th, 2005 and the revision letter dated April 12th, 2013. These objectives apply to the Crown land portion of the DCK and to the private land within Woodlot Licences and Tree Farm Licences (TFLs).

Visual landscape inventory data was obtained from the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). The K&K FNWL #N2Z area is a small subset of this data and it contains the VQOs for the proposed K&K FNWL #N2Z; a summary of VQO polygons located within the FNWL are as follows:

- Retention VQO: 2,211ha (37%)
- Partial Retention: 1,555ha (26%)
- Modification: 380ha (6%)

When summed together, 69.45% of K&K FNWL #N2Z is within "scenic or visual areas." The Modification VQOs are generally in the Blue Mountain Recreational area. Retention VQOs make up the entire western boundary of K&K FNWL #N2Z along Alouette Lake. Partial Retention VQOs are found in all three parcels. The objective with visual quality is to reconcile harvest operations with visual landscape values. A cutblock or road will be designed to blend with the landscape as much as possible to minimize the effects on visual quality. Single or grouped tree retention and screening are also strategies to minimize visual impacts. A Visual Impact Assessment (VIA) will be carried out for any planned harvest block within an established VQO polygon.

5.3.1 Visual Landscape Objectives:

- Mitigate the visual impact of harvesting and road building in scenic areas.

5.3.1.1 Strategies to Meet Objectives:

- Plan cutblock designs to meet the categories of alteration allowed in the visual polygons of the DCK Visual Landscape Inventory.
- Incorporate visual design characteristics and, wherever possible, use foreground topography and vegetation to screen cutblocks and roads.
- Minimize road density and widths.

The distribution of visual quality classes on the Timber Supply Analysis (TSA) THLB in K&K FNWL #N2Z can be found in the TSA report included in the Management Plan package and is shown on the Visual Quality Objectives Map in Figure 3.

5.4 Biological Diversity Objectives

The broad objective is to sustain healthy, biologically diverse forests and ecosystems. Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Biodiversity will be assessed and managed at both the landscape and stand levels.

5.4.1 Landscape Level Biodiversity

The proposed K&K FNWL #N2Z falls within the Alouette, Hatzic and Stave Landscape Units (LUs). The following objective has been set by government for biodiversity at the landscape level (Section 9 of the Forest Planning and Practices Regulation):

The objective set by government for wildlife and biodiversity at the landscape level is, without unduly reducing the supply of timber from British Columbia's forests and to the extent practicable, to design areas on which timber harvesting is to be carried out that resemble, both spatially and temporally, the patterns of natural disturbance that occur within the landscape.

Old Growth Management Areas (OGMAs) have been established within the Alouette, Hatzic and Stave LU's under Ministerial order 'Lower Fraser SRMP Legal Order and Objectives' (February 4th, 2013). The inventory is maintained by MFLNRO and the spatial data has been downloaded from their website.

K&K FNWL #N2Z will maintain consistency with Legal Objectives established under the Ministerial order.

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of opening sizes, seral stages and forest stand attributes and structures, across a variety of ecosystems and landscapes. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and properly located reserves of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

See Appendix A: Lower Fraser SRMP Legal Order and Objectives (February 4th, 2013).

The Timber Supply Analysis, completed by Ecora Resource Group Ltd., indicates that the total area of Old Growth (stands >250yrs Old) within the FNWL will increase over the planning horizon. This is due to harvest constraints associated with the Cultural Management Area, Blue Mountain Light Touch Area, and Retention Visual Polygons.

5.4.1.1 Strategies to Meet Objectives

- Ensure consistency with maximum cutblock size and adjacent stand green-up requirements under FRPA legislation.
- Establishment of additional Old Growth Management Areas (non-legal) within K&K FNWL #N2Z, as determined through Forestry Planning activities within the FNWL.

5.4.2 Stand Level Biodiversity

Stand level biodiversity objectives are attained through the retention of Riparian Management Areas (RMAs), Wildlife Tree Retention Areas (WTRAs) and in-block tree retention. Coarse Woody Debris (CWD) will be maintained on site, provided it does not impede on achieving the Free Growing stocking standards and does not conflict with coastal utilization standards.

5.4.2.1 Objectives

Retain structural variety in every cutblock through the preservation of wildlife trees, in-block tree retention and riparian areas.

5.4.2.2 Strategies to Meet Objectives

- Plan cutblocks using the retention silviculture system and place a portion of reserve areas in Riparian Management Areas. This will provide a biological legacy of old growth forest attributes within the stand.
- Reserve at least the legislated minimum level of retention in each cutblock for Wildlife Tree Retention Area (WTRA) in order to maintain stand level structural diversity (FPPR Section 66).
- Wherever practicable, in second growth stands with limited diversity in species and stand structure, plan for the WTRA to be located in an area with characteristics suitable for old growth recruitment. In this way, we will be planning for second growth forests to take on the characteristics of old growth forests.

5.4.3 Sensitive Ecosystems

5.4.3.1 Background Information

The purpose of the Sensitive Ecosystem Inventory (SEI) is to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the continued integrity of these ecosystems. SEI mapping has not been completed for the FNWL at this time, however, K&K FNWL #N2Z commits to completing SEI Mapping within the first Five Year Cut control period of the FNWL. See Interim Strategies below to identify Sensitive Ecosystems prior to the completion of SEI Mapping for the FNWL.

5.4.3.2 Objectives

As sensitive ecosystems are confirmed by ground truthing, develop conservation plans to preserve components of sensitive ecosystems based on the relative rarity of the ecosystem type and the probability of occupancy by Red Listed Species.

5.4.3.3 Strategies to Meet Objectives

- Review BC Species and Ecosystems Explorer (http://a100.gov.bc.ca/pub/eswp/) to derive a list of endangered ecosystems in the Chilliwack Forest District.
- Classify ecosystems within individual cutblocks (during SP Fieldwork Activities) to identify rare ecosystems and/or Red Listed Species.
- Design harvesting plans to retain and protect components of rare and endangered ecosystems.

5.5 Soil Conservation Objectives

The following objective has been set by government for soils under Section 5 of the Forest Planning and Practices Regulation (FPPR):

The objective set by government for soils, without unduly reducing the supply of timber from British Columbia's forests, to conserve the productivity and the hydrologic function of soils.

K&K FNWL #N2Z will adopt the results and strategies listed in sections 35 and 36 of the FPPR, which sets limits for soil disturbance and permanent access structures, and specifies the rehabilitation strategies that are to be used.

The overall objective is to maintain the productivity of the landbase. To protect forest soils from detrimental soil disturbance during ground-based harvesting, cable yarding or mechanical felling and site preparation activities by keeping disturbances to levels below those that may:

- be detrimental to long-term site productivity or
- contribute to erosion and sedimentation.

Background Information: Sensitive soils are defined as soils with fine texture, or with continuous or intermittent seepage, soils with imperfect to poor drainage, and shallow soils over bedrock.

5.5.1 Strategies to Meet Objectives

- Permanent and temporary access structures are planned to minimize the total amount of road required to safely and economically harvest the timber.
- Ground protection measures will be utilized as required to ensure that no detrimental impacts occur. Harvesting and site preparation operations will cease immediately should observable compaction and/or rutting occur. If required, rehabilitation will be scheduled once the soils are sufficiently well-drained.
- During grapple yarding, avoid excessive ground lead gouging where high surface erosion potential has been identified and ensure adequate deflection. Ground-based harvesting systems should only be used where indicated on a harvest plan map.
- Sensitive soils shall be highlighted on the harvest plan maps.
- Conduct terrain stability Field Assessments on high hazard sites to identify areas of potential slope failure.
- Retain forest cover on confirmed sensitive and unstable areas.
- Establish and follow wet weather shutdown guidelines.
- Match harvesting practices to soil sensitivity.
- Operators should be cautious that some sensitive soils may not be identified on the harvest plan map and therefore operators need to be made aware of signs of sensitive soils. Some of the signs of sensitive soils: ponds of standing water on the forest floor, seepage out of road cuts, black humus, vegetation such as skunk cabbage, sedge or devil's club and windthrown trees that have shallow root systems.
- Establish contingency plans for wet weather and inoperable soil conditions (e.g. move to another area, do alternative work or shut down).
- Prioritize higher-risk areas (wet areas or steep slopes) for dry weather operations.
- Avoid rutting and puddling of forest soils as it frequently results in stream siltation.

5.6 Recreation Management

In 2005 a Government Action Regulation (GAR) order was established to identify designated recreation sites, trails and interpretive forest sites as resource features. A recreation inventory including all of the above sites has been obtained from BC government open data sources, as well as from cooperation with the Blue Mountain Motorcycle Club (BMMC), Fraser Valley Mountain Biking Association and the Haney

Horseman. These groups build, maintain and map trails in the Blue Mountain area within K&K FNWL #N2Z and Woodlot W0086. K&K FNWL #N2Z shall continue to work with recreation groups on a long-term recreation strategy for the FNWL.

The Blue Mountain area receives significant recreational use by walkers and hikers, off-road vehicle users (including BMMC), and equestrians. Because of the significant public use, and proximity to a large urban interface, K&K has created a 'Light Touch Area' on Blue Mountain (see Figure 2). This area is still part of the THLB (except those inoperable or non-productive areas which were netted down), in which a maximum of 3% of the area can be in a disturbed state (defined as clearcut openings <5m Average Tree Height). Note that Selection Harvesting (maintaining >40% Basal Area of the Stand) or Retention Silviculture (No point of Opening is >2 Tree Lengths from a group of trees >0.25ha) will not contribute to the 3% Disturbance calculation.

A significant portion of Recreation Site REC0100 overlaps with K&K FNWL #N2Z (see Figure 2). There are no legally established objectives for REC0100. K&K FNWL #N2Z will abide by Section 16 of the Recreation Regulation and obtain authorization of the designated recreation officer prior to starting forest operations within REC0100.

Recreation will be a key value to be managed within K&K FNWL #N2Z; in addition to the existing recreation sites and trails, K&K Forest Operations Ltd. will also create and manage recreational sites within the FNWL, including (but not limited to) campsites and First Nations interpretive trails.

Harvest Plans (both long-term and short-term) shall be shared with local recreation groups when completed. These groups will also be informed when harvesting operations are to take place around their trails. Trails will be marked and rehabbed post-logging if any damage has been sustained by them during logging operations.

5.6.1 Objectives

The objectives for recreation are as follows:

1. To integrate forest management activities with recreation values
2. Maintain road and trail networks used for recreational activities
3. Mitigate visual impacts from cutblocks/roads on recreational landscapes
4. Establish/Manage recreational sites (campsites, trails) within the FNWL area, to be managed by K&K Forestry Operations Ltd.

5.6.2 Strategies to Meet Objectives

- Provide adequate signs/maps to assist the public in accessing the forest and using forest roads/trails safely
- Reactivation of existing trails impacted by timber harvesting activities
- Work with the MFLNRO and local residents to develop reasonable prescriptions for public access to specific areas. Issues include road deactivation (environmental risk), road maintenance and safety
- Complete Visual Impact Assessments from identified viewpoints (both government and project specific viewpoints)
- Complete a recreational Management Plan for K&K FNWL #N2Z within the first 5-year cut control period
- Work with adjacent Forest Tenure Holders (Woodlots, TFL26) and local groups on recreational management planning

5.7 Cultural Objectives

Section 10 of the Forest Planning and Practices Regulation identifies the objectives set by government for Cultural heritage resources:

The objective set by government for cultural heritage resources is to conserve, or, if necessary, protect cultural heritage resources that are

a) the focus of a traditional use by an Aboriginal people that is of continuing importance to that people, and
b) not regulated under the Heritage Conservation Act.

Katzie and Kwantlen First Nation's participation in resource management is based upon the respective Nations' Cultural values of good stewardship, sustainable use and sharing.

K&K Forestry Operations Ltd. is committed to carrying out forest practices in a manner that is unlikely to damage or harmfully alter Cultural heritage resources. The FNWL lies within the traditional territories of 10 First Nations, including the Katzie and Kwantlen First Nations. A list of these First Nations and their contact information is provided in Appendix B.

The proposed K&K FNWL #N2Z lands have been used by the Katzie and Kwantlen First Nations since time immemorial. The general area of K&K FNWL #N2Z is considered to have a high Cultural value to the Katzie and Kwantlen First Nations because of historical use which includes gathering sites, hunting and fishing areas, camps, meeting sites, archaeological and sacred sites.

K&K Forestry Operations Ltd. will report on a regular basis and provide annual reports to the Katzie First Nation Chief and Council, and the Kwantlen First Nation Chief and Council, representing their respective Communities.

5.7.1 Objectives

The objective for Cultural Resources is as follows:

- To identify and manage known sites of historic and Cultural significance

Management of Cultural resources will follow K&K Forestry Operations Ltd. principles of sustainability. Management of any identified Cultural heritage resources will be based on the applicable First Nations (as identified in Appendix B) having the opportunity to provide input on any proposed forest development activities.

5.7.1.1 Strategies to Meet Objectives

Strategies include:

- Planned roads and cutblocks will be referred to both the Katzie and Kwantlen Communities, as well as the applicable First Nations identified in Appendix B. This will provide an opportunity for review and comment, in order to help ensure that development does not impact traditional use activities or Cultural heritage resources.
- To ensure conservation and/or protection of important First Nations Cultural heritage sites, K&K Forestry Operations Ltd. will consider any First Nation's Cultural resources located within the proposed developments of K&K FNWL #N2Z and adopt a Management Plan they deem appropriate.
- K&K Forestry Operations Ltd. will regularly review established practices and procedures to monitor and report to the Katzie and Kwantlen First Nation Communities on Cultural heritage resource and environmental performance. This will constitute the appropriate internal consultation process.

- Archaeological Impact Assessments (AIAs) of Cultural heritage resources will be conducted in accordance with the Heritage Conservation Act and they shall be provided to the Katzie and Kwantlen Chief and Councils for review and comment, as well as to the applicable First Nations listed in Appendix B, upon request.
- Management of any identified Cultural heritage resources will be based on the Katzie and Kwantlen Communities having the opportunity to provide input.

5.7.2 Cultural Features Management

5.7.2.1 Definitions and Context

Cultural Features are those features integral to the Cultures of both Katzie First Nation and Kwantlen First Nation; these include (but are not limited to):

- Cultural Sites
- Cultural Trees
- Cultural Plants

Note that specific Cultural features will be identified during a future Cultural inventory project for K&K FNWL #N2Z (as described in 5.7.2.3 below).

5.7.2.2 Management of Cultural Features

Management of Cultural features will be an ongoing process at K&K FNWL #N2Z, and will continue to develop over time, throughout the entire licence area.

A Cultural Management Area (CMA), totaling 400ha, has been established near the east side of Alouette Lake (see Figure 2). This area contains a high proportion of Western Red Cedar (~30% of merchantable stand volume), much of it presently suitable for House Logs or Carving Material. The objectives of the CMA is to provide an easily accessible, long term supply of cultural trees, plants and spiritual refuge for the Katzie-Kwantlen Communities, particularly for the Elders. The management strategy for the CMA is as follows:

- Completion of Cultural Features Survey (as described in 5.7.2.3)
- Maximum 1% Timber Harvesting (4ha) per year. Harvesting will be for cultural use (i.e. House Logs or Carving Material) or to encourage regeneration of Western Red Cedar (or Yellow Cedar, where ecologically appropriate)
- Protection of Western Red Cedar trees, until needed for Cultural use (i.e. Bark Stripping, House/Pole Logs, Carving Logs)
- Maintaining/enhancing Cultural plants, as identified by the Katzie and Kwantlen Communities
- Maintaining/improving Cultural access for Katzie and Kwantlen Communities, particularly Elders
- Reforestation of primarily Western Red Cedar or Yellow Cedar, where it is ecologically appropriate to do so

5.7.2.3 Inventory Specifics

K&K FNWL #N2Z will develop a Cultural Features Identification and Inventory system. This will include (but not be limited to) the following:

- Identification of Cultural Management Objectives
- Definition of Cultural Feature Types
- Prescribed Management Strategies for Cultural Features
- Delineation of Cultural Reserves
- Cultural Features Survey Requirements/Standards (including Training for Katzie/Kwantlen Community Members)
- Creation/Maintenance of Cultural Features Database

5.8 Wildlife Objectives

Objectives for wildlife are as follows:

1. Minimize the impact of forest management activities on wildlife
2. Protect or improve wildlife habitat Features
3. Identify and manage habitat for Species at Risk
4. Ensure adequate corridors for wildlife travel/dispersal

5.8.1 Strategies to Meet Objectives

- Maintain wildlife and biodiversity attributes through reserves and retention strategies that are representative of the ecosystems to ensure that habitat potential exists for a large variety of wildlife species.
- Review BC Species and Ecosystems Explorer (http://a100.gov.bc.ca/pub/eswp/) to derive a list of Species at Risk in the Chilliwack Forest District. Provide this list (including pictures) to forestry field staff.
- Respect provincially designated OGMAs.
- Maintain functioning riparian areas including streams, lakes, bogs and wetlands.
- Maintain visual cover for ungulates where it is appropriate.
- High quality active or recently inactive bear dens shall be buffered and protected in a WTRA or a windfirm tree retention area. A minimum 20m Reserve shall be placed around the den, and a 20m Management Zone shall be established where windthrow potential is rated as 'High'. Inactive bear dens may be altered for safety reasons if there are other potential bear den trees in the vicinity.
- Maintain a continuous database of Wildlife Species/Habitat Features observed within the FNWL. The database shall include the following:
    - Species/Habitat Feature
    - GPS Location
    - Date/Time of Identification
    - Picture of Species
    - Management Strategies (where applicable)

5.9 Fisheries/Riparian Management

Aquatic habitat for fish within K&K FNWL #N2Z consist of streams, lakes, wetlands and ponds. Major drainages within K&K FNWL #N2Z include Kanaka Creek and the Kathryn Creek Community Watershed. There are also numerous unnamed streams which flow directly into Alouette and Stave Lake, significant lakes in the area. Pine Lake is the largest lake located in K&K FNWL #N2Z.

There are numerous fish-bearing streams located within the FNWL. Anadromous Bull Trout, Chinook Salmon, Chum Salmon, Coho Salmon, Cutthroat Trout, Dolly Varden, Kokanee, Lake Trout, Largescale Sucker, Longnose Sucker, Northern Pikeminnow, Peamouth Chub, Rainbow Trout, Redside Shiner, Catfish and Brown Bullhead are all reported to inhabit lakes and streams in the area.

Aquatic habitats in and around K&K FNWL #N2Z provide the following values:

- Habitat for both fish and amphibian species
- Riparian ecosystems supporting biodiversity
- Aesthetics and scenery
- Recreation uses such as camping, fishing, swimming and boating

5.9.1 Fisheries Objectives

Objectives for fisheries are as follows:

1. Manage and conserve water quality and riparian habitat
2. Minimize sedimentation and windthrow into riparian areas

3. Ensure harvesting in watersheds does not exceed prescribed thresholds
4. Improve/restore riparian habitat

The objective set by government for water, fish, wildlife and biodiversity within riparian areas is identified in section 8 of the Forest Planning and Practices Regulation (FPPR), as follows:

The objective set by government for water, fish, wildlife and biodiversity within riparian areas is, without unduly reducing the supply of timber from British Columbia's forests, to conserve, at the landscape level, the water quality, fish habitat, wildlife habitat and biodiversity associated with those riparian areas.

Specific measures to manage riparian areas will be as per Sections 47 to 51 and 52(2) and Schedule 1(2) of the FPPR, summarized below.

Riparian Class	Riparian Management Area (meters)	Riparian Reserve Zone (meters)	Riparian Management Zone (meters)
Fish Stream or Stream Within a Community Watershed			
S1-A	100	0	100
S1-B	70	50	20
S2	50	30	20
S3	40	20	20
S4	30	0	30
Non-Fish Stream or Stream Outside Community Watershed			
S5	30	0	30
S6	20	0	20
Lakes			
L1-A	0	0	0
L1-B	10	10	0
L2	30	10	20
L3	30	0	30
L4	30	0	30
Wetlands			
W1	50	10	40
W2	30	10	20
W3	30	0	30
W4	30	0	30
W5	50	10	40

TABLE 4: Riparian reserve zones and management zones to be retained in riparian areas

5.9.1.1 Strategies to Meet Objectives

K&K Forestry Operations Ltd. will determine, provide and implement, through recommendations offered by a qualified resource professional(s) to the Licensee, the amount and distribution of pre-harvest gross basal area retention levels, with specific regard, but not limited to:

- The need to buffer the riparian feature from the introduction of materials that are deleterious to water quality or fish habitat,
- The role played by trees and understory vegetation in conserving water quality, fish habitat, wildlife habitat and biodiversity,

- The role of the riparian management zone in maintaining stream bank and stream channel integrity and normally functioning drainage processes,
- The relative importance and sensitivity of the riparian feature/class in conserving water quality, fish habitat, wildlife habitat and biodiversity,
- The type, timing or intensity of forest practices that are proposed,
- The species composition and physical structure of the riparian management zone as it was prior to timber harvesting,
- The role of the riparian management zone, where applicable, in maintaining the integrity of the associated riparian reserve zone,
- The risk as determined by a windthrow hazard assessment,
- The risk, where applicable, as determined by a terrain stability field assessment, and
- The role of forest shading in controlling an increase in temperature within a temperature sensitive stream, if the increase might have a deleterious effect on fish or fish habitat.

In addition, K&K Forestry Operations Ltd. will utilize the following practices:

- Utilize Best Management Practices for erosion and sediment control – FPInnovations Operations Guide: Erosion and Sediment Control Practices for Forest Roads and Stream Crossings (2012).
- Restrict herbicide use within/adjacent to riparian areas.
- Respect Fisheries Timing Windows when constructing stream crossings.
- Maintain natural surface drainage patterns during and after the construction of roads, crossings and landings.
- Fully rehabilitate and plant temporary spur roads.
- Complete watershed assessments (completed by a qualified professional) and actively track harvesting/road building activities in the watershed.
- Identify streams for habitat restoration, and work with governments and local groups on funding and restoration work for streams.

6.0 Silviculture

6.1 Basic Silviculture

- Stocking standards will be consistent with the stocking standards identified in BCTS FSP #643.
- Planting will be the primary regeneration method. All harvested cutblocks prescribed for planting shall be reforested within one year after harvest completion. Cutblocks prescribed for Natural Regeneration (i.e. High Productivity Balsam sites) shall have a regeneration delay of 2-years.
- Larger stock types (e.g. 512/615) will be favored to improve survival and reduce free-growing and green-up periods.
- Plant seedlings with genetic gain of 5% or more. Currently there is genetic gain seed for Western Red Cedar, Yellow Cedar, Douglas-fir and Hemlock. This will help to grow trees faster and with better attributes.
- Every planted opening shall receive the first regeneration/survival assessment after one growing season and an over-winter period to determine if the opening has achieved the approved legal stocking standards and to confirm that the planted trees are firmly established and healthy.
- If there are areas from the survey that are not satisfactorily stocked, then we will map the problem areas and schedule the appropriate treatment(s) to ensure that the opening remains on track to achieve regeneration stocking standards and Free Growing status as quickly as possible.
- Multi-species planting mixes (at least 2 tree species) and genotypes will be managed for within

each opening, where ecologically suitable. Laminated root disease is rare in the K&K FNWL area, but for areas with a high incidence of Phellinus (laminated root disease); preferred species that are resistant to Phellinus (Cedar and White Pine) will be prescribed in conjunction with a stumping treatment where necessary.

- Planting of ecologically suitable conifer species other than Douglas-fir or Western Red Cedar including White Pine, Sitka Spruce and Yellow Cedar. These should be planted at levels that will not impact Free Growing Requirements.
- Acceptance of Broadleaf species within the opening, as a means to increase biodiversity, either through natural regeneration or planting. Ensure the establishment of Broadleaf species within the opening does not impact Free Growing Requirements.
- Utilize Silviculture Systems/Retention Strategies that maximize biodiversity, creates multi-layered forest canopies and minimizes brush competition.
- Brushing: Where brushing treatments are required, manual brushing shall be used. Herbicides shall not be used, except in cases where there is a Forest Health emergency. A detailed rationale and application plan for herbicide use shall be prepared and implemented by a qualified professional and discussed with the K&K Forestry Operations Ltd. Board prior to use.
- Climate Change: Climate change has the potential to render some species planted today unsuitable for future climate. K&K Forestry Operations Ltd. will utilize the MFLNRO document 'Updates to the Reference Guide for FDP Stocking Standards (2014): Climate-change related stocking standards' and will continue to review and consider the most up-to-date literature on the subject.

6.2 Incremental Silviculture

K&K Forestry Operations Ltd. intends to explore a number of incremental silviculture options and will begin to implement the most viable of these options after it has established a solid operational and economic foundation. Potential incremental silviculture projects that will be considered during the term of this Management Plan include:

- Pruning
- Pre-commercial thinning
- Commercial thinning
- Fertilization

These programs have the potential to provide good opportunities for local employment.

K&K Forestry Operations Ltd. is contemplating a strategic silviculture plan for the FNWL. The plan shall include (but is not limited to):

- Definitions of wood quality for various species.
- Wood quality objectives related to possible end-products.
- Possible treatments to achieve wood quality objectives.

Proposed treatments will depend on the availability of suitable candidate areas and on the availability of Land Based Investment Strategy (LBIS) funding for such projects.

6.3 Invasive Plants

K&K Forestry Operations Ltd. will maintain consistency with BC Timber Sales FSP #643 (CHC-3015) in order to prevent the introduction and spread of invasive plants that is likely the result of the licence holder's forest practices.

7.0 Forest Protection

7.1 Fire Prevention

The objective is to minimize the number of hectares burned due to accidental fires. To be prepared to safely and effectively respond to woodland fires or fires in a remote location, K&K Forestry Operations Ltd. and its contractors undertake fire prevention and management responsibilities that are consistent with the Forest and Range Practices Act, the Wildfire Act, the Wildfire Regulation, and the Occupational Health & Safety Regulation 26.19.

Under Section 4 of the Wildfire Regulation, before March 1st of each year, licensees under the Forest Act, including community forest agreement holders, are required to provide the local forest protection officer with a 24 hour/day contact telephone number if the licensee proposes to carry out an industrial activity on or after March 1st and before November 1st of that year. K&K FNWL #N2Z shall supply this information to the local forest protection officer each year.

Under Section 5 of the Wildfire Regulation, if there is a risk of a fire starting or spreading on an area that is forest land or grass land, or within 300m of forest land or grass land, a person who carries out an industrial activity at a site in that area must ensure that fire-fighting tools are available at that site in a combination and type to properly equip each person at the site with a minimum of one fire fighting hand tool.

In addition, K&K Forestry Operations Ltd. shall prepare an annually updated Fire Preparedness Plan, in combination with adjacent Forest Tenure Holders (Woodlots W0086, W0007, W0038). This plan will be distributed to all management staff, board members and all of our forestry contractors. This plan includes the emergency fire contact list, preparedness and suppression procedures, and identifies local contractor contact numbers and equipment that may be available for fire suppression on the licence area. As per section 6 of the Wildfire Regulation, the Fire Danger Class will be determined for each industrial activity and that activity will be carried out in accordance with the applicable restrictions and for the duration set out in Schedule 3 of the Wildfire Regulation for the Fire Danger Class. If there is a risk of fire starting or spreading, K&K FNWL #N2Z will keep at the activity site sufficient fire-fighting tools and an adequate fire suppression system.

Strategies to reduce fire hazards include disposing of landing and roadside logging debris as soon as practicable following harvest completion. A significant challenge in the western portion of the Chilliwack Forest District is the limited windows for an adequate venting index to legally burn waste piles. K&K Forestry Operations Ltd. will work with other forest licensees, MFLNRO and MoE to devise strategies to allow burning of waste piles. K&K will also examine alternatives to burning (i.e. chipping) where feasible.

7.2 Forest Health

The objectives of forest health stewardship are to:

- Acknowledge the ecological roles of endemic levels of forest pests and diseases.
- Protect timber resources from damaging forest pests and diseases.
- Avoid treatments that encourage the growth of pathogen populations.
- Maintain or restore natural ecosystem function and structure necessary to ensure long-term forest health.
- Conduct salvage harvesting in areas impacted by unacceptably high levels of insect or disease related mortality to recover timber values and, if feasible, to reduce pathogen size and/or rate of spread.

The forests of K&K FNWL #N2Z have been relatively free of major insect or disease infestations. There have been no major catastrophic outbreaks causing major unsalvaged mortality or volume losses in the FNWL area. Primary and/or potential diseases within the FNWL are as follows:

- Hemlock Dwarf Mistletoe
- Laminated Root Rot
- Swiss Needle Cast
- Douglas-fir Bark Beetle
- Sudden Oak Death

7.2.1 Pest Descriptions and Management Strategies

Hemlock Dwarf Mistletoe
Hemlock Dwarf Mistletoe is widespread throughout merchantable size stands. It is especially prevalent in mature to over-mature Western Hemlock stands. Sanitation treatments of advanced regeneration are sometimes required to prevent the spread in newly regenerated Western Hemlock stands.

K&K Forestry Operations Ltd. will employ the following strategies to manage Hemlock Dwarf Mistletoe:

- Regeneration of non-susceptible species along edges where the DMH hazard is high
- Removing or girdling infected trees
- Leaving a vegetative or rock barrier between high hazard trees and susceptible regeneration

Where appropriate, one or more strategies will be implemented before susceptible regeneration is 3m in height.

Swiss Needle Cast
Swiss Needle Cast, associated with Douglas-fir, has been identified within young forest stands (<20 years old) in the area around K&K FNWL #N2Z. The disease affects the needles of Douglas-fir, turning them yellow. While mortality is rare, site productivity losses can be significant. Climate change and heavy planting of Douglas-fir are thought to be contributing to the epidemic. MFLNRO has been conducting research and monitoring since 2012 into the cause, spread rates and impacts. K&K Forestry Operations Ltd. will employ the following strategies to manage Swiss Needle Cast:

- Planting higher levels of other conifer species – Cedar, White Pine, Sitka Spruce
- Accepting Broadleaf species within the openings, while ensuring these species do not impact Free to Grow requirements
- Working with MFLNRO and other licensees to monitor and study the disease

Laminated Root Rot (Phellinus weirii)
Laminated root rot is only scattered and at low endemic levels throughout the operating area, and it is associated with Douglas-fir of which there is a moderate component in K&K FNWL #N2Z. Root diseases sometimes result in small pockets of mortality. K&K Forestry Operations Ltd. will employ the following strategies to manage Laminated Root Rot:

- Reforestation of root rot pockets with less susceptible species (Cedar, White Pine)
- Removal of stumps, where economically feasible to do so

Douglas-fir Bark Beetle
A native insect that attacks primarily Douglas-fir; downed timber or trees that are significantly stressed are primary targets for attack. While not noted in the area around K&K FNWL #N2Z, it has been identified in the Chilliwack Forest District, most notably in the eastern half of the District. K&K Forestry Operations Ltd. will employ the following strategies to manage Douglas-fir Bark Beetle:

- Prompt removal of harvested Douglas-fir timber
- Ensuring Douglas-fir leave trees are windfirm

- Prompt salvage harvesting of downed Douglas-fir trees

Sudden Oak Death
While not yet identified within the Chilliwack Forest District, this disease was discovered in California and Oregon, and has recently been identified in Washington State. Based on this, it can be reasonably assumed that the disease will spread north into British Columbia soon. Sudden Oak Death is a water-borne mold called *Phytophthora ramorum*. It has been shown to impact the shoots of Douglas-fir trees in the Pacific Northwest. K&K Forestry Operations Ltd. will employ the following strategies to manage Sudden Oak Death:

- Early detection through Silviculture Surveys and general walkthroughs of the FNWL
- Working with Pest Specialists in MFLNRO, the Canadian Forest Service, Universities, and the US Forest Service (Pacific Northwest) on detection and mitigation strategies
- Creation/Implementation of Best Management Practices to mitigate the potential impacts from the disease

7.2.2 Abiotic Damage
The objective is to minimize losses from abiotic factors such as windthrow, snow press, drought and sunscald in a cost-effective manner.

Wind
Windthrow assessments shall be completed by the engineering field crew using windthrow field cards for all the edge/boundary segments. If it is determined that the level of expected windthrow is unacceptable, then prescriptions may include:

- Locating reserves and edges to reduce the risk of windthrow.
- Leaving large buffers and allowing natural feathering (with a plan to salvage windthrown trees).
- Using partial cutting systems to retain windfirm trees.
- Heli pruning treatment shall be prescribed for old growth timber or a topping treatment in second growth timber. Treatment will consist of pruning dominant and co-dominant conifers, removing 50% of the branches evenly distributed on the top 30-50% of the crown.
- Where significant areas of windthrow have occurred, salvage the merchantable timber in a timely manner (where it is practicable to do so) to ensure that further degradation of the timber resource or pest infestation does not occur.

7.2.3 Detection
Detection of insect and disease incidence normally happens during the site plan field work or during the collection of data during silviculture surveys. Silviculture instructions will include defined actions for dealing with insects or diseases noted. Any increased incidence of insect or disease activity observed during operational activity will be dealt with by a specific action plan.

K&K Forestry Operations Ltd. is also working on UAV (Drone) applications for pest/disease detection and will work with MFLRNO, post-secondary institutions and other licensees on development of these applications.

Where outbreaks are identified, K&K Forestry Operations Ltd. will seek assistance from specialists at the Canadian Forestry Service, MFLNRO, universities and consultants as required.

7.2.4 Minimize Loss
Losses due to insect or disease outbreaks will be minimized by:

- Implementing harvesting and sanitation activities in areas identified as disease centers subject to environmental and economic considerations
- Trapping insects where it is appropriate

- Use of insecticide treatments in areas/times of severe insect outbreaks
- Species selection and stand tending (pruning, spacing, thinning, etc.)
- Insecticides:
    - K&K Forestry Operations Ltd. will use insecticides only in cases of serious pest outbreaks.
    - A detailed rationale and insecticide application plan, as prescribed by a qualified professional, will be drafted and discussed with the K&K Forestry Operations Ltd. Board prior to its use.

7.2.5 Browse Damage to Seedlings

Deer browse on seedlings can be a significant damaging agent in some areas. Seedling shelters for browse protection are expensive. Red and Yellow Cedar seedlings are impacted the most because these species are most palatable to deer. K&K Forestry Operations Ltd. will employ the following strategies (either alone or in combination) to manage Deer Browse:

- Planting of Large Cedar Stock (615's), with high Monoterpene levels
- Use of liquid repellants (Plant Skydd)
- Use of Synocast Shelters
- Planting of non-susceptible species

8.0 Road Construction, Maintenance and Deactivation

8.1 Construction Maintenance and Deactivation

Road construction, maintenance, deactivation and rehabilitation operations will be conducted in accordance with the prevailing legislation and they shall be subject to rainfall shutdown criteria requirements. Rainfall shutdown criteria will be strictly adhered to. Best practices are to shut down if drainage systems are overflowing or if surface sediments are saturated. A significant portion of K&K FNWL #N2Z is already roaded so the primary focus will be on reactivation of old roads, eventual deactivation of those roads following completion of harvesting activities, new road construction and deactivation of roads that shall be removed from road permits.

K&K Forestry Operations Ltd. will utilize Best Management Practices for erosion and sediment control. FPInnovations Operations Guide: Erosion and Sediment Control Practices for Forest Roads and Stream Crossings (2012) will be used as a guidance document.

Regular inspections, both scheduled and during periods of extreme wet weather, will be completed and timely road repairs will be part of normal operations. The road network in K&K FNWL #N2Z will be actively tracked and updated on a yearly basis. Revegetation of road cut slopes to reduce soil erosion and mitigate sedimentation will be done where required to preserve water quality.

8.2 Maintenance Activities

Maintaining the road systems is essential to permit safe operation of logging trucks, to provide safe access to the public and to prevent environmental damage. This is achieved by completing the following activities as needed:

- Grading road surfaces
- Clearing ditches
- Cleaning culverts to ensure optimal water flow
- Inspecting and maintaining bridges and major culverts
- Removing slide and slough material
- Repairing tension cracks and stabilizing road banks

- Brushing roadsides to maintain good visibility
- Falling danger trees adjacent to roads
- Spot gravelling
- Sign maintenance

Regular inspections are completed on roads and the maintenance levels are somewhat dependent on the road use. For example, roadside brushing will be completed quite frequently on the main haul roads, but infrequently on the lesser used spur roads. Regular inspections shall be completed on roads following heavy rainfall or wind events, or in the spring at the higher elevation areas during snow melt to ensure that drainage structures are functioning properly.

8.3 Deactivation

K&K Forestry Operations Ltd. considers roads to be an investment in the land base and thus they will be protected and managed as with any other forest investment until the next entry.

The following definitions of deactivation categories are from the Forest Road Engineering Guidebook second edition produced by the MoFR in June 2002.

8.3.1 Temporary Deactivation

Temporary or seasonal deactivation is defined as roads that "may be used when regular use of the road is to be suspended for up to three years. The temporary deactivated road must be field inspected at a frequency commensurate with the risk to the user safety and forest resources. If inspections indicate inadequate deactivation or damage to deactivation work, repairs must be made to correct the deficiencies."

Typically culverts and drainage structures are left in place. Cross-ditches, waterbars and ditch blocks are utilized for water management. This type of deactivation will typically be done by K&K Forestry Operations Ltd. on each cutblock after harvesting is completed. For safety purposes, all required signs must be maintained/replaced as needed (e.g. warning signs, delineators, speed limits, power line clearances, and road names).

8.3.2 Semi-Permanent Deactivation

Semi-permanent deactivation is defined as placing "the road in a self-maintaining state that will result in minimal adverse impact on forest resources during the time that regular use of the road is suspended. Similar to temporary deactivation, regular inspections of semi-permanent deactivation works are required. Identification of deficiencies needs to be followed by any necessary corrective measures within a reasonable timeframe, considering the risk to the road, its users and the environment. Semi-permanent deactivation shall be used for roads that are to be deactivated beyond three years or as described above for roads in isolated areas. In addition to the range of measures commonly used in temporary deactivation, semi-permanent deactivation requires that greater attention should be placed on the risk to adjacent resources through more aggressive application of water management techniques and possibly road fill pullback."

With semi-permanent deactivation, culverts and drainage structures are removed. Cross-ditches, waterbars and ditch blocks are typically used for water management. Fill slope pullback and cut slope stabilization techniques may also be used for slope stabilization where required. For safety purposes, all required signs must be maintained/replaced as needed (e.g. warning signs, delineators, speed limits, power line clearances, and road names).

8.3.3 Waterbars

The purpose of a waterbar is to intercept surface water on the road and convey it across the road onto stable non-erodible slopes below the road.

8.3.4 Cross-Ditch and Ditch Block

The purpose of a cross-ditch is to intercept road surface and ditch line water and convey it across the road onto stable, non-erodible slopes below the road. A well-compacted ditch block should be installed immediately downslope of the cross-ditch inlet. For permanent or semi-permanent deactivation, the ditch block is usually higher than the road surface.

8.3.5 Permanent Deactivation or Rehabilitation (Deconstruction)

Permanent deactivation is defined as "placing the road in a self-maintaining state that will indefinitely protect adjacent resources that may be at risk. Permanent deactivation commonly involves a range of measures that are similar to semi-permanent deactivation, but are often more aggressively applied where roads traverse areas of steep terrain or erodible soils, especially in geographical areas that receive high levels of precipitation. Permanent deactivation is done with the expectation that the road will no longer be used. As such the road will receive no further inspections or maintenance. Permanent deactivation of mainline roads is seldom done since these higher-order roads provide access for future development. Permanent deactivation is therefore usually limited to in-block spur roads and cutblock access roads, where the road will not provide access in the future. Permanently deactivated/ rehabilitated roads will be fully reforested upon the completion of operations.

For safety at all times, when a road is being deactivated (removing culverts and bridges), a sign must be posted that warns of the deactivation. The sign can be removed once the work is completed. Barricading the road surface width to prevent access by regular motor vehicles is also necessary.

9.0 Community Awareness, Support & Plan Viewing

9.1 Public Review Process

K&K FNWL #N2Z has implemented a comprehensive strategy to ensure community awareness of the FNWL application, consisting of the following:

1. Advertising in the local papers (Maple Ridge/Mission) on two separate dates (See copy of advertisement in Appendices)
2. Direct outreach by email and public advertising to various agencies and community organizations (a referral list/record is attached in the Appendices)
3. Publishing of materials (documents and maps) on the Cascadia Environmental Services Ltd. website.

Opportunities for public participation and involvement in K&K FNWL #N2Z will be varied and ongoing. Public awareness will continue to increase and evolve once the licence is issued and K&K Forestry Operations Ltd. embarks on harvesting and road construction activities.

9.1.1 Adjacent Tenure Holders, Licenses

Adjacent forest tenure holders have been sent a copy of the Management Plan for review and comment, including:

- Woodlot W0007
- Woodlot W0038
- TFL 26

Other licences and/or tenure holders in the area that have been sent a copy of the Management Plan include:

- DL3209 (Crown Grant located within the FNWL
- Mineral Tenures (Blue Mountain Explorations Ltd.)
- Water Licenses (Multiple Licenses in the area)
- Trapline TR0208T008

A detailed Referral List is located in Appendix G.

9.1.2 Documents

BCTS Forest Stewardship Plan #643, which includes K&K Forestry Operations Ltd. as a planned signatory, was advertised for review and comment by BCTS from July 26th, 2017 to September 26th, 2017.

The Management Plan and the Application documents for a First Nations Woodland Licence were tabled for viewing during the K&K FNWL #N2Z review and comment period. K&K Forestry Operations Ltd. invited the public to review and comment on the proposed FNWL Management Plan, application documents, and maps from December 5th, 2017 to February 5th, 2018 via the following methods:

1. In person, at the office of Cascadia Environmental Services Ltd. located at 33738 Fore Road, Abbotsford, BC. To set up a viewing time, public were invited to call or email Chris Gruenwald: 604-302-9927 / chris@cascadiaenvironmental.ca
2. Email request of documents to Chris Gruenwald: chris@cascadiaenvironmental.ca
3. Download documents via Cascadia Environmental Services Ltd. website: www.cascadiaenvironmental.ca

The Ministry of Forests, Lands, and Natural Resource Operations, Chilliwack Natural Resource District, is completing First Nations Consultation for K&K FNWL #N2Z.

9.1.3 Website

K&K Forestry Operations Ltd. made the Management Plan, application documents, and maps available for viewing on the Cascadia Environmental Services Ltd. website: www.cascadiaenvironmental.ca. K&K Forestry Operations Ltd. will introduce its own website in 2018.

9.2 Letters of Support

Letters of support have been provided by local Forest Tenure Holders and Harvesting Contractors. The formal letters of support are included for review in Appendix H: Letters of Support.

Ongoing stakeholder involvement will occur through email, phone calls, and the creation of a website for K&K FNWL #N2Z.

9.3 Digital Communication

To ensure that K&K FNWL #N2Z maintains good communication links with the community, a website for the FNWL shall be created/maintained. The Annual Report produced for the Katzie and Kwantlen Chiefs and Councils will be available on the website, as will Harvest Plans. When various plans are approved, the approved versions will be posted to the website. The website will provide an opportunity for direct feedback and information to the management team and the Board of Directors.

10.0 Administrative Authority and Structure

10.1 Management Structure

K&K FNWL #N2Z will be held and operated by K&K Forestry Operations Ltd., which is a partnership comprised of a limited company, between Katzie First Nation and Kwantlen First Nations. The mailing address is:

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

Below is a summary of the corporate information of the two partners of K&K Forestry Operations Ltd.

COMPANY NAME: K&K FORESTRY OPERATIONS LTD.	
INCORPORATION DATE	October 5, 2016
INCORPORATION #	BC1092046
BOARDS OF DIRECTORS	
NAME	TITLE
DEBBIE MILLER	PRESIDENT
TUMIA KNOTT	SECRETARY
SHAREHOLDERS	
K&K FORESTRY OPERATIONS LTD., KWANTLEN AND KATZIE CITIZENS	

TABLE 5: K&K Forestry Operations Ltd. Corporate Information

10.2 Mission Statement for the Intended FNWL Holder

To sustainably manage K&K FNWL #N2Z in a safe, effective and environmentally sensitive manner while promoting local employment of Katzie and Kwantlen youth as well as the general Katzie and Kwantlen First Nation Communities at large, with skills-training support. We will practice stewardship in a manner consistent with our traditional laws. We will ensure that the environmental values and standards required by the Forest and Range Practices Act are upheld.

K&K Forestry Operations Ltd. is an organization that cares about protecting the air, water, wildlife and soils on the lands they manage. We will:

- Define the impacts our operations have on the Katzie and Kwantlen values and environment.
- Promote and train our employees and contractors in good environmental practices.
- Comply with all relevant legislation and regulations to which we subscribe.
- Implement standards which complement our safety and quality objectives.
- Continually improve our results.

To achieve our goal, we will set targets for our environmental objectives and review our performance annually.

10.3 Overview of the History of the Intended Holders of K&K FNWL

K&K FNWL #N27 is a partnership between Katzie First Nation and Kwantlen First Nation.

Katzie First Nation has been pursuing an area-based tenure in the proposed FNWL area since 2000. Katzie has worked extensively with the Province, local governments, local groups and concerned citizens on management strategies for the area. A result of this work is the proposed Blue Mountain Light Touch

Management Area identified in this Management Plan. This area shall have no greater than 3% of the total area in a Disturbed state (defined as clearcut openings with average Tree Heights </= 5m).

Kwantlen First Nation was awarded Woodlot W0086 in 2008. In 2012, Kwantlen began active forestry operations at the Woodlot, and has harvested ~60,000m^3 from the Woodlot to date. Kwantlen has extensive experience dealing with the various challenges of Forest Management in the Blue Mountain Area, including:

- Working adjacent to a large urban interface
- High recreational values
- Concerns raised by local environmental organizations
- Visual constraints
- Low Value Timber/High Development Costs

This experience will be beneficial to K&K Forestry Operations Ltd. in managing the FNWL.

In 2015, Katzie First Nation and Kwantlen First Nation concluded an agreement on a partnership to obtain a FNWL in the heart of their Traditional Territories. The area identified for the FNWL is similar to the area-based tenure that Katzie has pursued since 2000. As a result of these discussions, K&K Forestry Operations Ltd. was incorporated in October 2016.

K&K Forestry Operations Ltd. looks forward to this opportunity to manage long-term, area-based tenure in the form of FNWL #N2Z, which will provide numerous benefits to our communities, and allow Katzie First Nation and Kwantlen First Nation to manage Forest Lands in the heart of their Traditional Territories.

General K&K Forestry Operations Ltd. Principles:

- Promote sustainability of all resources.
- Ensure a long-term supply of Cultural Features for the Katzie and Kwantlen First Nation Communities
- Utilize best practices Watershed and Riparian Management.
- Ensure Prompt Reforestation of Harvest Blocks, and monitor areas to ensure Free to Grow Obligations will be met
- Maintain Communication with other groups that utilize the FNWL area

K&K Forestry Operations Ltd. operates as a good corporate citizen by being a responsible employer and operating with integrity and fairness with suppliers, contractors and employees. Sustainable management of financial resources is practiced for the long-term viability of the Company.

K&K Forestry Operations Ltd. looks forward to managing a long-term tenure.

10.4 Intended Administrative Governance Structure and Philosophy

K&K Forestry Operations Ltd. shall be managed and directed in a manner that reflects the principles of integrity, open communication within the organization, teamwork, continuous pursuit of corporate excellence and adherence to the Company's Code of Conduct.

10.5 Proposed Processes for Decision-Making for Operation & Management of the FNWL

The existing Management structure is as follows:

K&K FNWL #N2Z will be held and operated by K&K Forestry Operations Ltd., which is a partnership comprised of a limited company, between Katzie First Nation and Kwantlen First Nations. The mailing address is:

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

See Table 5 for a summary of the corporate information of K&K Forestry Operations Ltd.

BCTS has prepared the Forest Stewardship Plan (FSP) to the BCTS FSP #643, of which K&K Forestry Operations Ltd. is a planned signatory. K&K Forestry Operations Ltd. has prepared the Management Plan for FNWL #N2Z and will prepare 5-yr and 10-yr harvest plans, as well as the annual harvest plans. The K&K Forestry Operations Ltd. Board shall review and approve all FNWL harvest plans.

10.6 Processes for Monitoring and Reporting

Monitoring Process
K&K Forestry Operations Ltd. will be responsible for monitoring all operational activities. In doing so, it will ensure that compliance is being achieved with all requirements and/or targets outlined in the following documents:

1. Forest Act
2. Forest and Range Practices Act
3. Forest Planning and Practices Regulation
5. K&K FNWL Forest Stewardship Plan (BCTS FPS #643)
6. K&K FNWL Management Plan
7. BCTS Chinook 5-Year Business Plan
8. BC Forest Safety Council's approved Safe Work Procedures
9. K&K Forestry Operations Ltd. Environmental Management System (EMS): SOPs, training, discussion records, incident tracking, Pre-Work discussions, Emergency Response Procedures
10. Cutting Permit documents
11. Workplace safety plan for each operational phase by cutblock number
12. Contractor agreements
13. Fire Protection Strategy
14. Environmental Shutdown Procedures

Monitoring will take place as follows:

1. Regular field inspections using the EMS inspection forms for road construction, falling, yarding and loading, deactivation, salvage harvest and forestry activities
2. K&K will have its own Phoenix database for long-term forestry planning, as well as road and silviculture liabilities
3. EMS Pre-Work sign-off meeting and checklist with contractors for each operational phase
4. EMS Post-Harvest Assessment
5. Annual and periodic discussion with BC Timber Sales
6. Waste and Residue Assessments
7. Planting Quality Assessments
8. Various silviculture surveys during the life of a stand: a formal regeneration/survival on planted trees scheduled one growing season and an over-winter period after establishment to obtain data to declare regeneration milestone as met; stand maintenance assessment to confirm stocking levels and the progress toward achieving Free Growing status; a Free Growing assessment to confirm the Free Growing stocking status required to declare the Free Growing milestone as met
9. Regular comparison of financial targets with financial results

Reporting Process
K&K Forestry Operations Ltd. will also be responsible for the reporting of all monitored information. Compliance checklists covering legal requirements and workplace safety issues will be documented and filed for all operations. Any issues of significant non-compliance will be reported to the Board of Directors and other appropriate bodies (i.e. BC Forest Safety Council, Ministry of Forests, Lands and Natural Resource Operations, District of Chilliwack, Compliance and Enforcement, electronic scale reports to the MFLNRO harvest billing system, Ministry of Environment, Ministry of Tourism, Culture and the Arts - Archaeology Branch). Quarterly financial reports will be prepared for the Board of Directors.

K&K Forestry Operations Ltd. will also be responsible for filing an Annual Report which will detail the following:

1. Degree of success achieved in implementing specific directives or recommendations put forward by the Board of Directors;
2. Statistical data on planning, road building, harvesting and silviculture operations;
3. Complete financial reports; and
4. Planned activities and strategic goals for the following year.

The company will file an Annual Report detailing all relevant financial and other information related to the company during the previous fiscal year.

Auditing Process
K&K Forestry Operations Ltd. will hire an auditor each year to substantiate its financial statements and to make necessary changes to ensure adherence to the Canadian Accounting Standards for Private Enterprise (ASPE).

Auditing for BCTS Operations is required and will occur under their Environmental Management System (EMS) and Sustainable Forestry Initiative (SFI) commitments.

K&K Forestry Operations Ltd. will use its monitoring and reporting results to prepare a comprehensive annual audit of all its operations. The audit will track non-compliance trends and make recommendations for improvement.

Environmental Management System (EMS)
To aid K&K Forestry Operations Ltd. in securing the highest financial return over the longest possible timeframe and to ensure it is done in accordance with the Katzie and Kwantlen principals of sustainability, K&K Forestry Operations Ltd. will examine obtaining third-party certification, once satisfied that the benefits from certification justifies the expense.

There are four types of certification that K&K may consider:

- ISO 14001 – the international environmental certification standard
- SFI: Sustainable Forestry Initiative – ensures planning is sound
- CSA Z809 – ensures a focus on public involvement
- FSC – Certification system that provides internationally recognized standard-setting, trademark assurance and accreditation services to companies, organizations and communities interested in responsible forestry.

10.7 Processes for Conflict Resolution Regarding Implementation of the FNWL

A clearly defined conflict resolution policy will help our organization move more quickly toward a resolution. An organization with the capacity to resolve differences will increase its long-term sustainability. A three-step conflict resolution process is proposed:

Step 1 – Dialogue and Negotiation
The first step in conflict resolution is through dialogue in which the parties seek to understand the "why" beneath the conflict. The major goal in such negotiations is not to personalize the conflict but to focus on the issue rather than on the individuals. Negotiation shall be designed to make trade-offs and thus find an outcome that all parties can live with. People shall be encouraged to practice consensus decision making to balance the values of community members. In practice we can say "Can everyone live with the decision?" Consensus does not mean everyone likes or prefers the decision, but that they can live with it. A decision forged through consensus is more likely to be long-lasting because it meets the main concerns of the parties and the participants agree that they can accept it.

Step 2 – Mediation
If efforts at resolution are unsuccessful, the next step shall be to seek mediation. The mediation process involves an independent third party (a mediator) with no decision-making power who attempts to obtain a mutually acceptable settlement between disputing participants. An agreement or consensus reached in mediation must be voluntary. The responsibility for the outcome of mediation rests with the participants themselves. In mediation, the participants must agree to make a serious attempt at resolving the dispute by identifying underlying interests, isolating points of agreement and disagreement, exploring alternative solutions and considering compromises and accommodations.

Step 3 – Arbitration
If mediation is unsuccessful in conflict resolution, either the FNWL or the contractor should be entitled to seek arbitration. Arbitration is a legal alternative to the courts, whereby the parties in conflict agree to submit their respective positions (through agreement or hearing) to a neutral third party for resolution.

10.8 Proposed Roles of K&K FNWL Holder, Key Personnel & Qualifications
At present, the directors of the Company are:

Name	**Title**
Debbie Miller	President
Tumia Knott	Secretary

The Directors must act honestly and in good faith and in the best interests of the Company. Every company must have a President and Secretary who, except in the case of a company with only one member, must be different persons.

11.0 Business Notes

11.1 Disclosure Statement
K&K Forestry Operations Ltd. has thoroughly considered the financial risks involved with operating the proposed First Nations Woodland Licence.

The Management Plan implications have been factored into an internal Business Plan and, if this Business Plan is implemented, it will provide the applicant with an excellent chance of operating a successful forestry business.

Every cutblock will be scrutinized for viability as the planning is undertaken. The start of harvest operations will not be approved unless a cutblock or a group of cutblocks is expected to be profitable.

11.2 Executive Summary

Business Description
The provincial government has extended an invitation to Katzie and Kwantlen First Nations to apply for a First Nations Woodland Licence (FNWL). The licence will provide for an operational area for the annual harvest of 24,700m^3 of mixed species timber to be sold on the open market.

The area is shown outlined by a red boundary in Figure 1. Attached to this plan are 1:80,000 scale maps of the proposed K&K FNWL #N2Z units, including forest cover. K&K FNWL #N2Z is comprised of three distinct polygons or parcels: Stave Block 3 (761ha) is the northernmost unit, located between Stave Lake, Golden Ears Provincial Park, and Alouette Lake. Alouette Block 2 (4933ha) is located between Alouette Lake and TFL26 (District of Mission). Rolley Lake Block 1 (260ha) is the southernmost unit, located between Woodlots W0086/W0007 and TFL26.

11.3 Governance Structure

11.3.1 The Board of Directors
See Table 5 for a summary of the corporate information of K&K Forestry Operations Ltd.

K&K Forestry Operations Ltd. shall review and/or approve FNWL Annual Harvest Plans.

K&K Forestry Operations Ltd. shall be accountable through ongoing reporting to the respective Katzie and Kwantlen Communities.

The officers of the Company are appointed by the Directors, with their duties defined in the articles of the Company. At present, there are no appointed officers of the Company.

11.4 Human Resources
The challenge of ensuring effective management will fall to the K&K Forestry Operations Ltd. Board of Directors.

Human resources for K&K FNWL #N2Z will be composed of:
- the K&K Forestry Operations Ltd. Board of Directors,
- the Management team, and
- Forestry Services of Cascadia Environmental Services Ltd.

The long-term goal of K&K Forestry Operations Ltd. is to build internal capacity from the Katzie and Kwantlen Communities to manage the FNWL.

11.5 Not for Public Disclosure
K&K Forestry Operations Ltd. requests that the names of individuals who provided comments on this application are not disclosed, to protect their privacy. It is our understanding that this information is exempted from disclosure under the *Freedom of Information Privacy Act*.

Appendices

Appendix A: Legislation, Higher-Level Plans, Operational Guidance Documents for the Management Plan

The Management Plan is required to be consistent with Higher Level Plans, Landscape Unit Plans, and Forest Stewardship Plans to provide direction for management in K&K FNWL #N2Z.

Forest Stewardship Plan
The BCTS DCK Forest Stewardship Plan #643 (FSP) has added K&K FNWL #N2Z as a signatory and is expected to be approved by early 2018. The FSP amendment will address objectives and corresponding results and strategies for forest areas in the FNWL #N2Z. As set out by FRPA, the FSP addresses objectives for Cultural heritage resources, biodiversity, soils, fish, timber, forage and associated plant communities, community watersheds, water, timber, wildlife, recreation resources, resource features and visual quality.

This Management Plan will take the lead from the FSP for the objectives covered by the FSP. If there is any inconsistency between the MP and the FSP, then the FSP takes precedence.

A.2 Forest and Range Practices Act

Under FRPA, objectives for resource management have been proposed by government. Strategies to achieve objectives and expected measurable results for relevant forest and non-forest resources are outlined by each licensee in their Forest Stewardship Plan (FSP).

"Result" means a description of (a) measurable or verifiable outcomes with respect of a particular established objective, and (b) the situations or circumstances that determine where in a forest development unit (FDU) the outcomes under paragraph (a) will be applied.

"Strategy" means a description of (a) measurable or verifiable steps or practices that will be carried out in order to meet a particular established objective, and (b) the situations or circumstances that determine where in an FDU the steps or practices will be applied.

Under FRPA and the FSP, the Licensee must propose results and strategies that address objectives set by government (OSBG). OSBG includes objectives prescribed in the *Forest Planning and Practices Regulation* (FPPR) and ones established under the *Land Act.* The OSBG in the FPPR are limited to the following subjects:

a) Soils
b) Visual quality
c) Timber
d) Cultural heritage resources
e) Forage and associated plant communities
f) Water
g) Fish
h) Wildlife
i) Biodiversity
j) Recreation resources
k) Resource features

The Management Plan must be consistent with the acts, regulations and standards in effect at the time the plan was prepared. Thus, the Management Plan and any additional proposed objectives must be consistent with FRPA and with the OSBG. The timber supply analysis (TSA) included with the Management Plan must take into account net-downs resulting from proposed FSP results and strategies to address OSBG and practice requirements (strategies) legislated in the FRPA.

For K&K FNWL #N2Z, the Management Plan objectives and the results and strategies to achieve objectives provide the terms of reference for the TSA and the resulting AAC determination.

A.3 FPPR Practice Requirements

The FPPR practice requirements are strategies to achieve outcomes outside of the FSP that must be followed by the licensee (unless an exemption is granted).

Practice requirements are predetermined steps to take to achieve OSBG. For example, FPPR s.36 requires that "an Agreement holder must ensure that the area in a cutblock that is occupied by permanent access structures built by the licence holder or used by the holder does not exceed 7% of the cutblock." This practice requirement is aimed to achieve an OSBG to "conserve the productivity and the hydrologic function of soils."

K&K FNWL #N2Z Management Plan AAC calculation must take into account any practice requirements that will reduce the available Timber Harvesting Land Base (THLB).

A.4 First Nations Woodland Licence Agreement

On April 26th, 2010 the provincial government introduced Bill 13 - The Forests and Range (First Nations Woodland Licence) Statutes Act to provide for a new forest tenure that is unique to First Nations.

The intention of First Nations Woodland Licences (FNWLs) is to expand First Nations Participation in the forest sector and provide new economic opportunities to First Nation Communities. The intent is to create more long-term, area-based Crown forest land tenures that are of an economically viable size. First Nations Woodland Licence Agreements can include private and reserve land. The initial term of the licence will be set at 25 years. The new Woodland Licence will only be available to First Nations that have an interim measures agreement with government. First Nations with licences in their existing agreements will be able to convert some of them to a First Nations Woodland Licence.

The First Nations Woodland Licence Agreements are unique because they provide exclusive rights to harvest timber on Crown land, the right to harvest, manage and charge fees for botanical forest products, practice Aboriginal stewardship and protect traditional use practices.

As stewards of the local forests, we will work to sustain biodiversity, protect watersheds, protect Cultural heritage resources and visual quality, and to enhance recreational and other non-timber values.

Appendix B: First Nations with Traditional Territories in FNWL #N2Z

Katzie First Nation
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

Kwantlen First Nation
P.O. Box 108
23684 Gabriel Lane
Fort Langley, BC V1M 2S4

Leq'a:mel First Nation
43101 Leq'a:mel Way
Deroche, BC V0M 1G0

Matsqui First Nation
P.O. Box 10
Matsqui, BC V4X 3R2

Musqueam Indian Band
6735 Salish Drive
Vancouver, BC V6N 4C4

PRRO
People of the River Referrals Office
10-7201 Vedder Road
Chilliwack, BC V2R 4G5

Seabird Island Indian Band
P.O. Box 650
2895 Chowat Road
Agassiz, BC V0M 1A0

Semiahmoo First Nation
16049 Beach Road
Surrey, BC V3S 9R6

Skawahlook First Nation
58611-A Lougheed Highway
Agassiz, BC V0M 1A2

Stó:lō Nation
10 - 7201 Vedder Road
Chilliwack, BC V2R 4G5

Sto:lo Tribal Council
P.O. Box 440
2855 Chowat Road
Agassiz, BC V0M 1A2

Appendix C: Agreement Holder Legal Entity Information

K&K FNWL #N2Z will be held and operated by K&K Forestry Operations Ltd., which is a partnership comprised of a limited company, between Katzie First Nation and Kwantlen First Nations. The mailing address is:

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

Below is a summary of the corporate information of the two partners of K&K Forestry Operations Ltd.

COMPANY NAME: K&K FORESTRY OPERATIONS LTD.	
INCORPORATION DATE	October 5, 2016
INCORPORATION #	BC1092046
BOARDS OF DIRECTORS	
NAME	TITLE
DEBBIE MILLER	PRESIDENT
TUMIA KNOTT	SECRETARY
SHAREHOLDERS	
K&K FORESTRY OPERATIONS LTD., KWANTLEN AND KATZIE CITIZENS	

Appendix D: Endorsement Letter

Appendix D

November 27, 2017

Attention: Allan Johnsrude
Regional Executive Director
Ministry of Forests Lands, and Natural Resource Operations
South Coast Region

Re: Endorsement of K&K Forestry Operations Ltd. to represent Katzie/Kwantlen First Nation interests for proposed First Nations Woodland Licence #N2Z

Katzie First Nation and Kwantlen First Nation endorses K&K Forestry Operations Ltd. to represent Katzie/Kwantlen interests for the proposed First Nation Woodlands Licence #N2Z, with Annual Allowable Cut of 25,000m3.

The First Nations Woodland Licence #N2Z will be held and operated by K&K Forestry Operations Ltd., and is comprised of the following:

K&K Forestry Operations Ltd. is an equal partnership comprised of Katzie First Nation and Kwantlen First Nations. The incorporation number is BC1092046. K&K Forestry Operations is a wholly owned subsidiary that represents Katzie First Nation and Kwantlen First Nation citizens in the partnership.

The mailing address is as follows:
K&K Forestry Limited Partnership
10946 Katzie Road
Pitt Meadows, BC
V3Y 2G6

K&K Forestry Operations Ltd. was incorporated as a limited company on October 5, 2016 to pursue forest based business opportunities.

Sincerely

KATZIE FIRST NATION

Chief Susan Miller

KWANTLEN FIRST NATION

Chief Marilyn Gabriel

Appendix E: Timber Supply Analysis

Appendix E

TIMBER SUPPLY ANALYSIS
K & K FORESTRY OPERATIONS LTD.
FIRST NATIONS WOODLAND LICENCE N2Z

Prepared for:

Katzie First Nation
&
Kwantlen First Nation

Prepared by:

Ecora

Resource Group Ltd.

579 Lawrence Avenue
Kelowna, BC, V1Y 6L8

February 2018

February 2018

Katzie First Nation
Kwantlen First Nation

Subject: Timber Supply Analysis for Katzie First Nation & Kwantlen First Nation

Please find enclosed the timber supply analysis report in support of the proposed First Nation Woodland License application for Katzie First Nation and Kwantlen First Nation. Please do not hesitate to call with any questions.

Yours Truly,

Jerry Miehm, RPF
Senior Resource Analyst

Ecora

Ecora Resource Group Ltd.
601 West Broadway, U14
Ph: 250.469.9757 ext. 1031
Cell: 250.778.5625

EXECUTIVE SUMMARY

Katzie First Nation and Kwantlen First Nation – through their joint business venture K & K Forestry Operations Ltd. – are interested in acquiring a First Nations Woodland License (FNWL) in their traditional territories. Ecora Resource Group (Ecora) has been contracted to identify a suitable area, and to find a sustainable harvest level using timber supply analysis.

The original analysis and report were completed in early 2015. Changes were subsequently made to the boundary of the area being proposed – this analysis and report reflects those changes. Adjustments have also been made to reflect recent changes, such as updating the vegetation resource inventory (VRI) to January 2016 and accounting for harvesting disturbances to the end of 2016. The 2003 Timber Supply Review (TSR) for the Fraser TSA was the latest Analysis Report that had been completed when this process started and was used for guidance. The 2013 Timber Supply Review Data Package had been published, so that netdown approach was used to establish the timber harvesting land base (THLB).

The analysis procedure involves:

1. Receiving and reviewing the priority area of interest to be considered in the FNWL;
2. Locating and collating all necessary data sets needed for the timber supply analysis;
3. Assembling the data set to be used in the analysis;
4. Using growth and yield information for managed stands and natural stands consistent with TSR;
5. Creating FPS-Atlas analysis files;
6. Running the forest estate model to find a sustainable harvest level; and
7. Reporting on all assumptions and results.

The land base classification (or netdown) was completed using 2013 TSR assumptions. This determines the “productive forest”, which is the area included in the analysis, and the timber harvest land base (THLB), which is the area available for harvest operations.

The analysis includes a 1,773 ha of highly contentious area referred to as Blue Mountain, an area under public pressure making conventional harvesting unlikely. Katzie-Kwantlen are considering an alternative management regime which considers this area available for light harvest, similar to the constraints applied to retention visual quality areas where the maximum allowable disturbance is three percent. Two areas of significant cultural value (which slightly overlap the Blue Mountain area) have also been identified. A one percent annual rate of cut constraint has been applied.

Under these assumptions, the proposed FNWL has a THLB of 4,060 ha and can sustain 24,700 m^3/year as shown in Figure 1.1 and Figure 1.2.

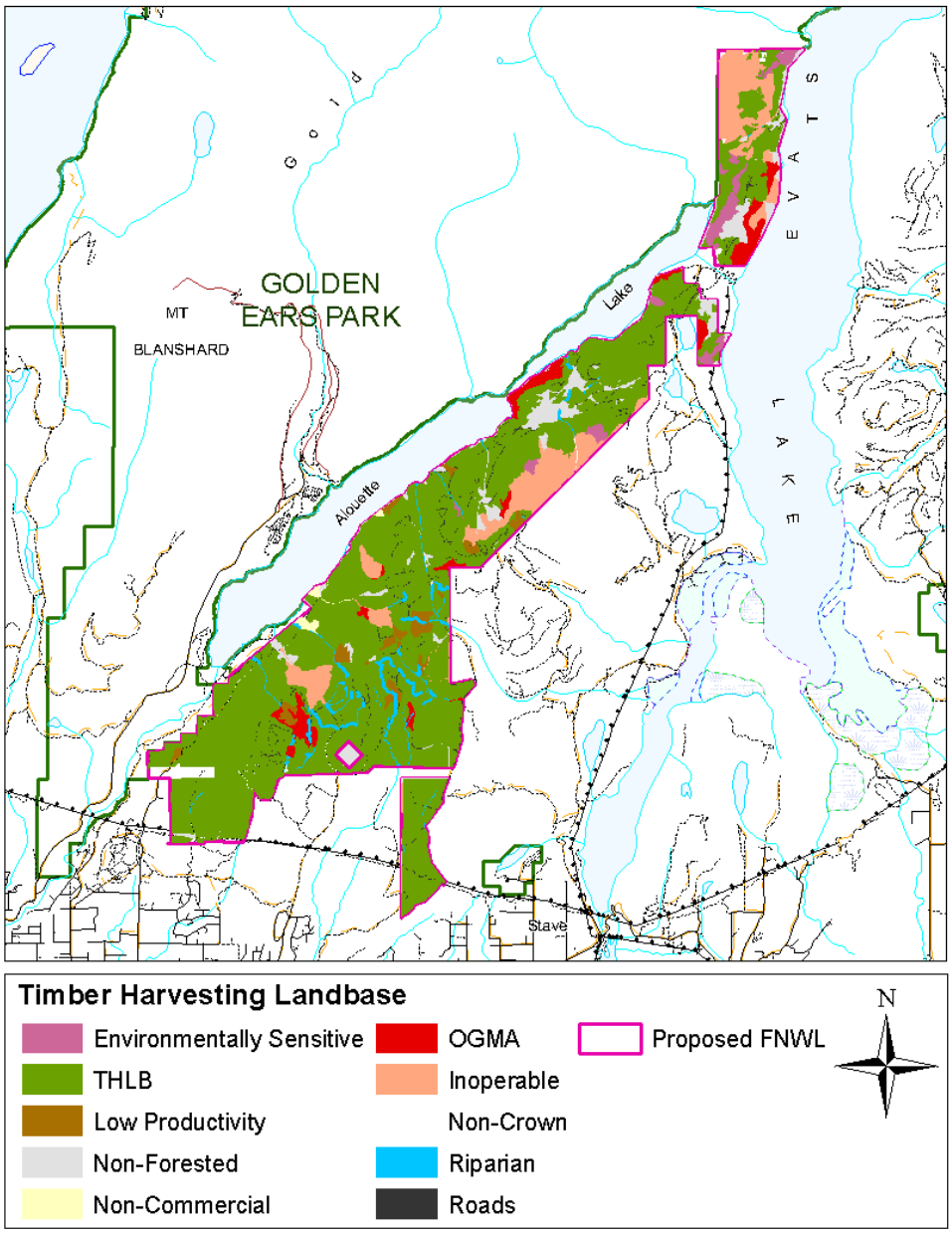

Figure 1.1: Proposed FNWL Timber Harvesting Land Base

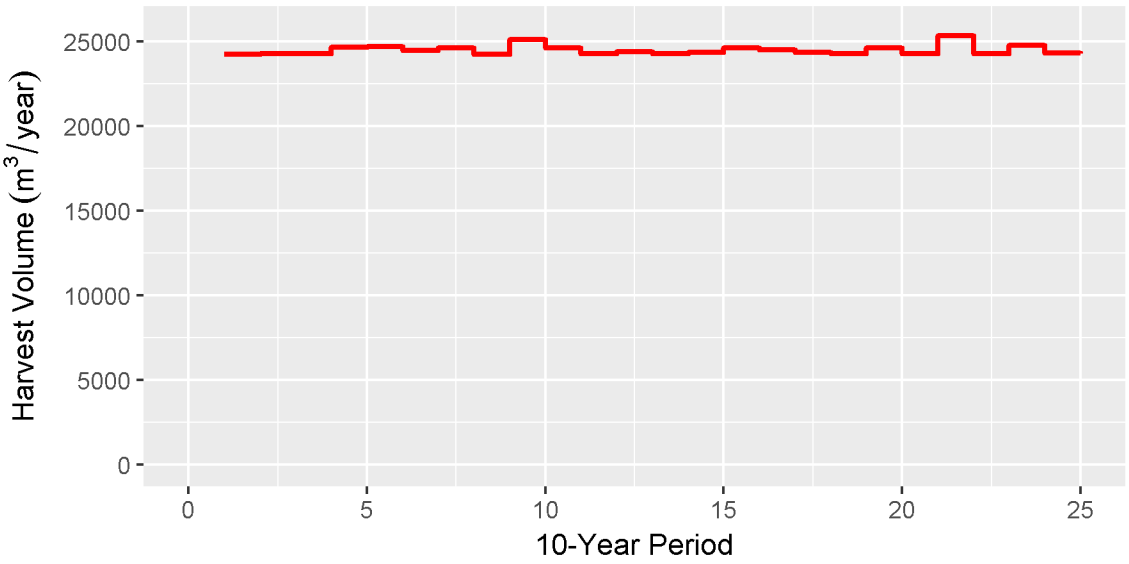

Figure 1.2: Proposed FNWL Harvest Level

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1 INTRODUCTION

Katzie First Nation and Kwantlen First Nation – through their joint business venture K & K Forestry Operations Ltd. – are interested in acquiring a First Nations Woodland License (FNWL) in their respective traditional territories. Ecora Resource Group (Ecora) has been contracted to identify a suitable area, and to find a harvest level using timber supply analysis.

The 2003 Timber Supply Review (TSR) for the Fraser TSA was the latest Analysis Report that had been completed when this process started and was used for guidance. The 2013 Timber Supply Review Data Package had been published, so that netdown approach was used to establish the timber harvesting land base (THLB). Adjustments have been made to reflect recent changes, such as updating the vegetation resource inventory (VRI) to 2016 and accounting for harvesting disturbances to the end of 2016.

K & K Forestry Operations have identified an area to be considered in the analysis within their traditional territories.

The analysis procedure involves:

1. Receiving and reviewing the area of interest to be considered in the FNWL;
2. Locating and collating all necessary data sets needed for the timber supply analysis;
3. Assembling the data set to be used in the analysis;
4. Using growth and yield information for managed stands and natural stands consistent with TSR;
5. Creating FPS-Atlas analysis files;
6. Running analysis in step-wise fashion to determine area; and
7. Reporting on all assumptions and results.

This report presents the results of this analysis in a format similar to that of a TSR and has an abbreviated Information Package as an Appendix.

2 General Description of Area

K & K Forestry Operations Ltd. has identified an area to the east of Alouette Lake, including Blue Mountain Provincial Forest, as a potential area for their proposed FNWL. The proposed K&K FNWL #N2Z lies within the Fraser Timber Supply Area (TSA) and the Fraser Valley Regional District. The Chilliwack Natural Resource District is responsible for forest management on Crown land in the area. Figure 2.1 shows the general location of the FNWL.

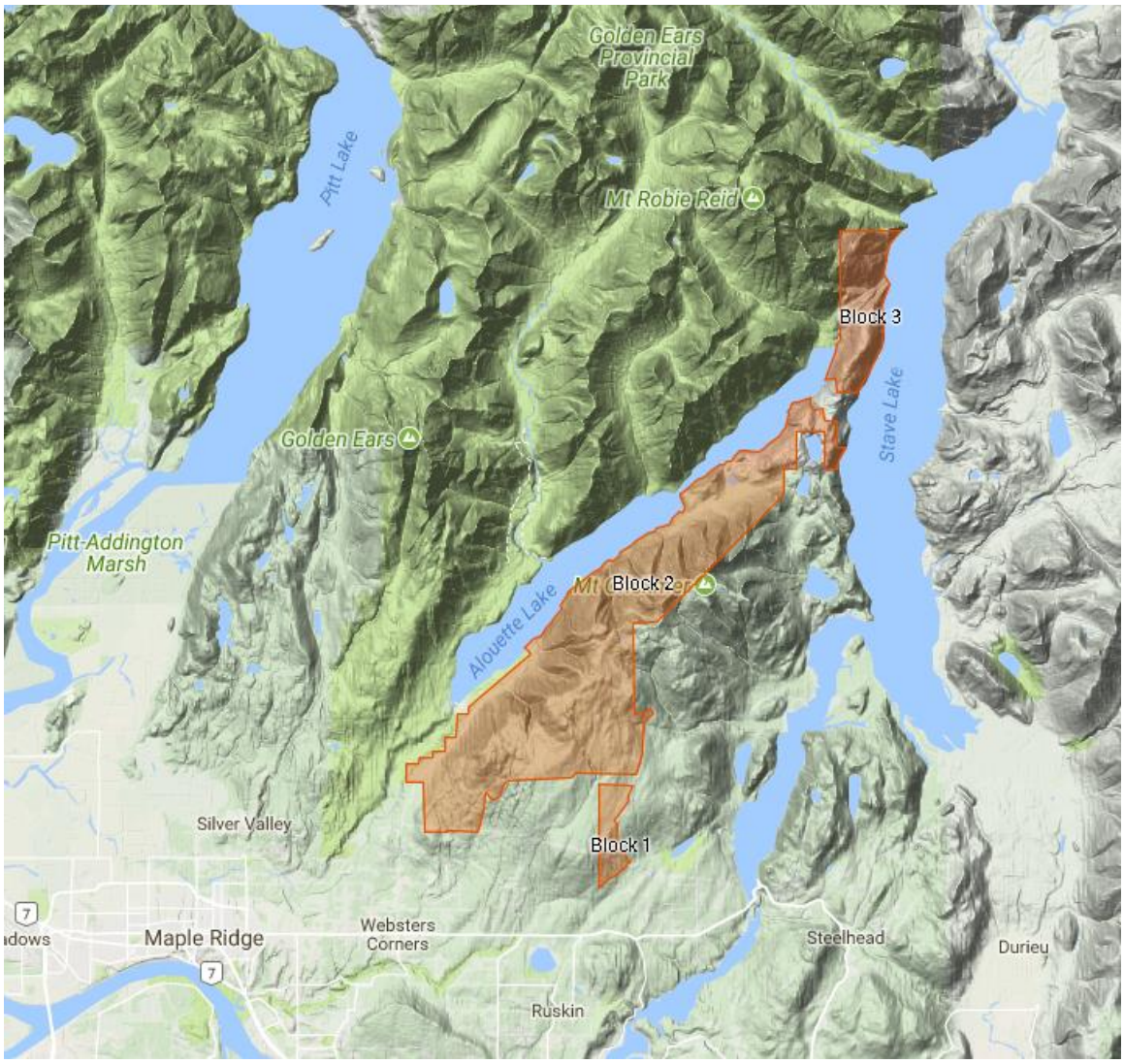


Figure 2.1: Location of Proposed FNWL

The FNWL is composed of three distinct Blocks: Stave (Block 3 in Figure 2.1) is the northernmost unit, located between Stave Lake, Golden Ears Provincial Park, and Alouette Lake. Alouette (Block 2) is the largest of the three blocks and is located

between Alouette Lake and TFL 26 (District of Mission). Rolley Lake (Block 1) is the southernmost unit, located between Woodlots W0086/W0007 and TFL 26.

The Rolley Lake Block was not included in the 2013 Fraser TSA timber supply analysis as it belonged to TFL 26 at that time. For this analysis the District of Mission provided forest inventory, harvest history and road information.

3 LANDBASE DESCRIPTION

3.1 Netdown

The netdown process starts with the gross area of a given land base and removes area in a stepwise fashion according to classification criteria. The netdown reduces areas that are classified as non-crown, and areas that are unable to grow viable timber to arrive at the total productive area. This productive land base is further classified into areas that are likely to be harvested (THLB) and areas that are unlikely to be harvested (non-THLB). Table 3.1 shows this step-wise classification of the land base that was applied for the netdown. This netdown closely follows the process used the 2013 TSR Data Package.

For more details, refer to the description of each netdown step in Appendix A.

Table 3.1: Netdown Classification

	Area (ha)
Total Area	**5,975**
Non-crown land	121
Non-productive and non-forest	282
Productive Forest	**5,573**
Inoperable areas	605
Non-merchantable	23
Low productivity	123
Environmentally sensitive areas	128
Old growth management areas	211
Riparian	145
Roads	72
Total Productive Reductions	**1,307**
Harvestable Land Base	**4,266**
Wildlife tree retention*	206
Timber Harvest Land Base	**4,060**

*WTR removed last as an aspatial netdown

The Fraser TSA netdown also dealt with mapped Cultural Heritage Resources, experimental and permanent sample plots, recreation sites and trails, karst topography, both ungulate winter range (UWR) and wildlife habitat area (WHA) for which a 'no-harvest' prescription applies, spotted owl habitat, and sites with sufficient productivity that will not likely produced a harvestable stand. None of these issues were pertinent to the proposed FNWL area.

The Fraser TSA analysis also had to deal with Timber Licence (TL) areas that will revert to the TSA. No TL's overlap the FNWL area.

Areas of the Fraser TSA are currently undeveloped so allowance needs to be made for future roads in that timber supply analysis. The FNWL area is well roaded; new road construction is expected to be temporary and will be deactivated after use.

Figure 3.1 shows the spatial location by netdown classification including the timber harvesting land base.

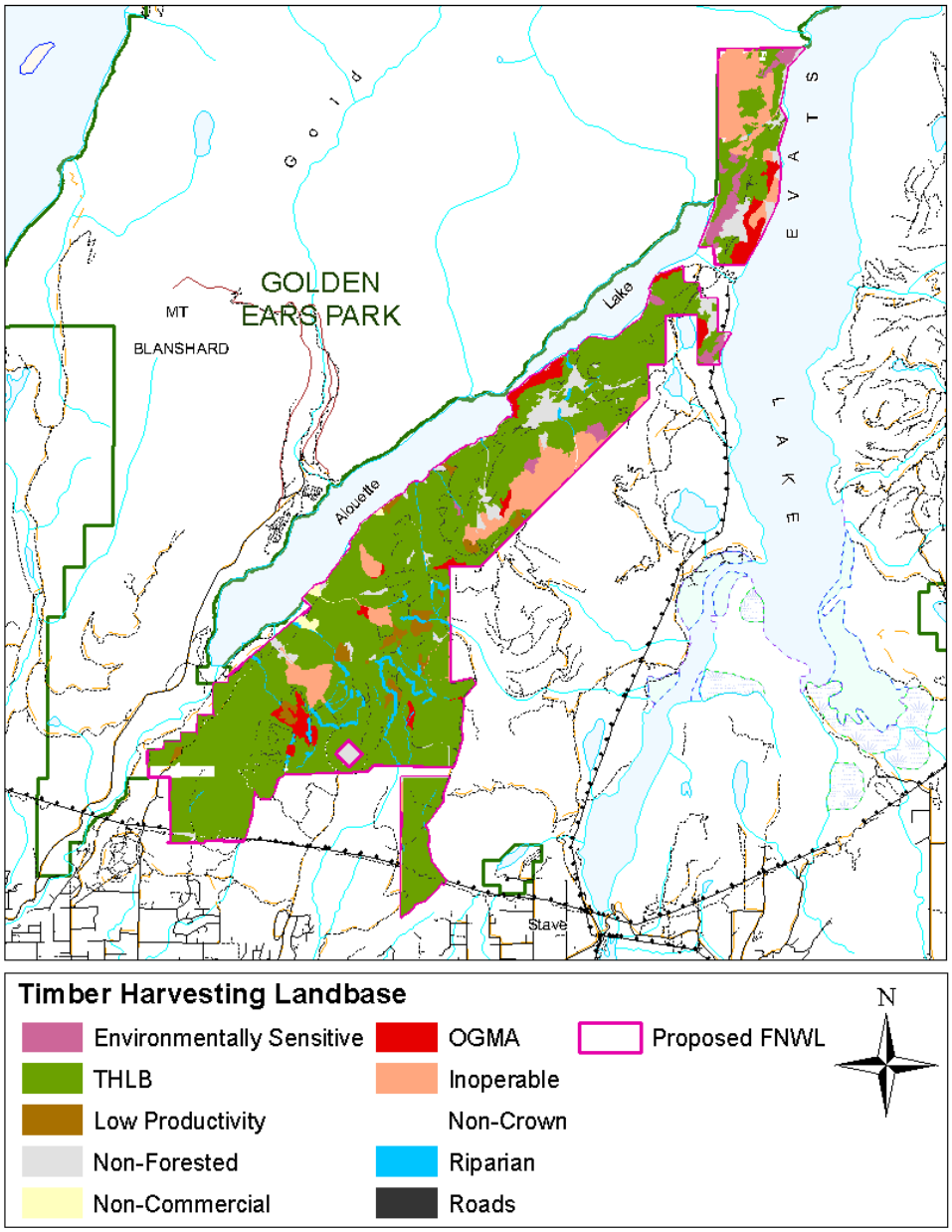


Figure 3.1: Netdown Classification

3.2 Area Summaries

Figure 3.2 summarizes the THLB, non-THLB and non-productive land base for the proposed FNWL. More than half of the land base is within the THLB (68%), and a large area classified as productive forest land that is not available for harvesting (24%).

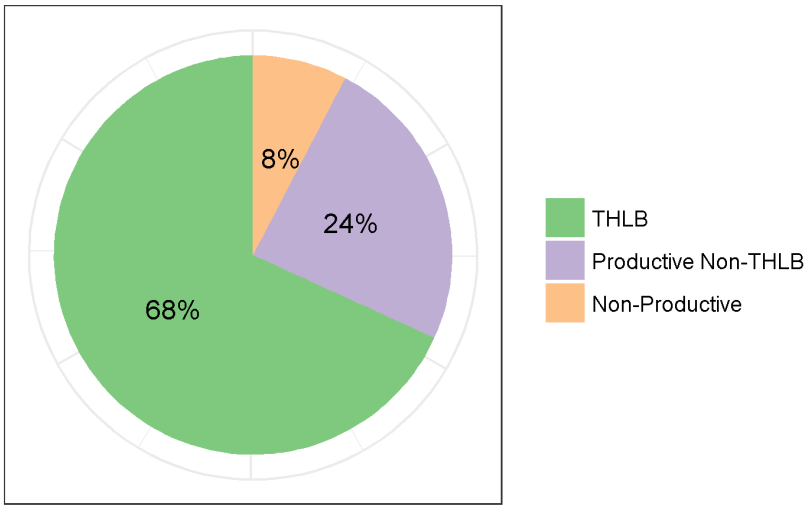


Figure 3.2: Proposed FNWL Area Summary

3.3 Forest Characteristics

This section summarizes important forest characteristics for the proposed FNWL. The following land base characteristics are summarized:

- Biogeoclimatic zone (BEC);
- Leading species;
- Site index; and
- Age distribution.

3.3.1 Biogeoclimatic Zone

Figure 3.3 shows the THLB and non-THLB productive area in each BEC zone. The most common BEC zone with 40% of the THLB is CWHvm2, closely followed by CWHdm and CWHvm1 with 29% and 27% of the THLB respectively.

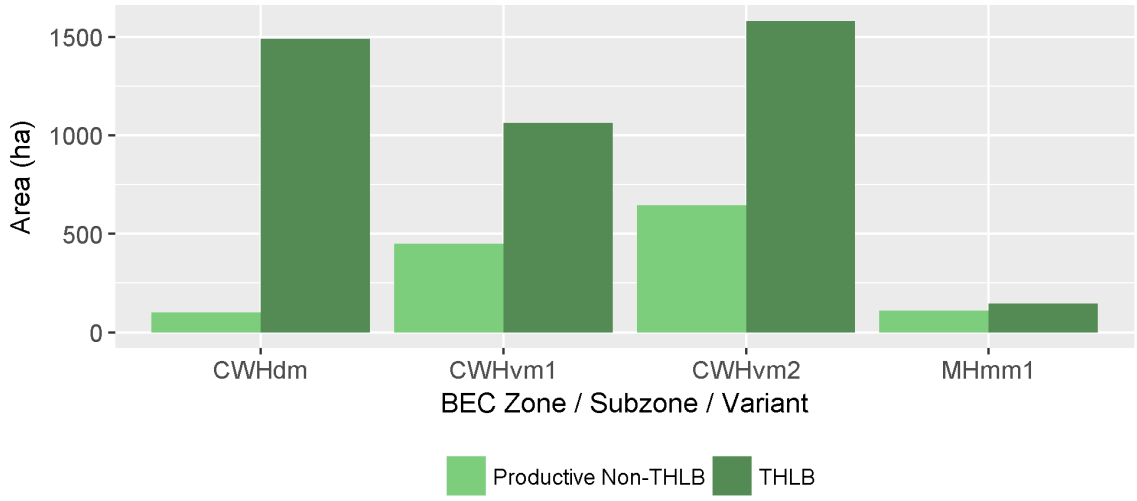


Figure 3.3: BEC Summary

3.3.2 Leading Species

Figure 3.4 shows the proposed FNWL by leading species. The THLB is 59% hemlock leading, 14% Douglas-fir leading and 12% cedar leading.

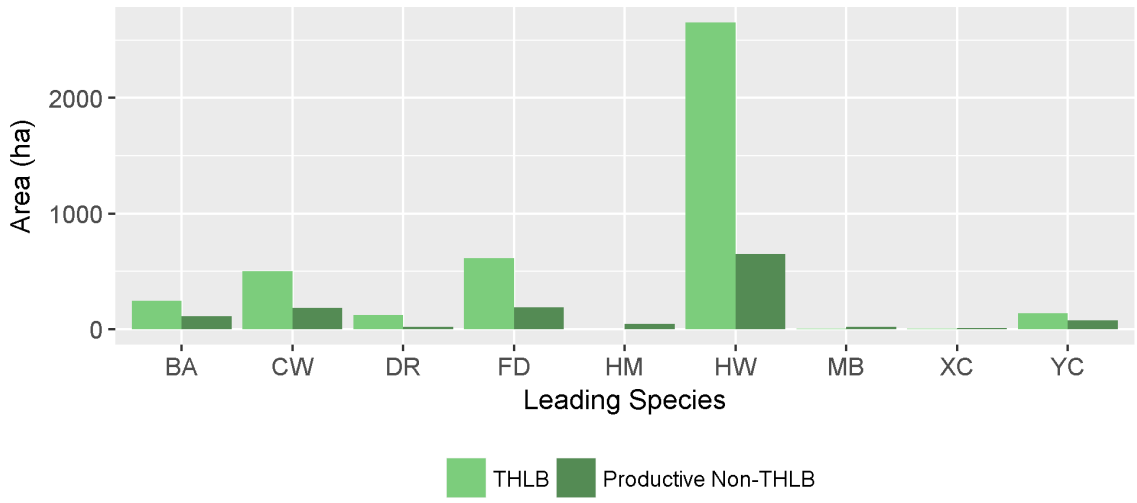


Figure 3.4: Leading Species Summary

3.3.3 Site Index

Figure 3.5 shows the FNWL by site index class (inventory site index rounded to the nearest 5m). The area weighted average site index is 22.7 m. The average site index for the THLB is 24.3 m.

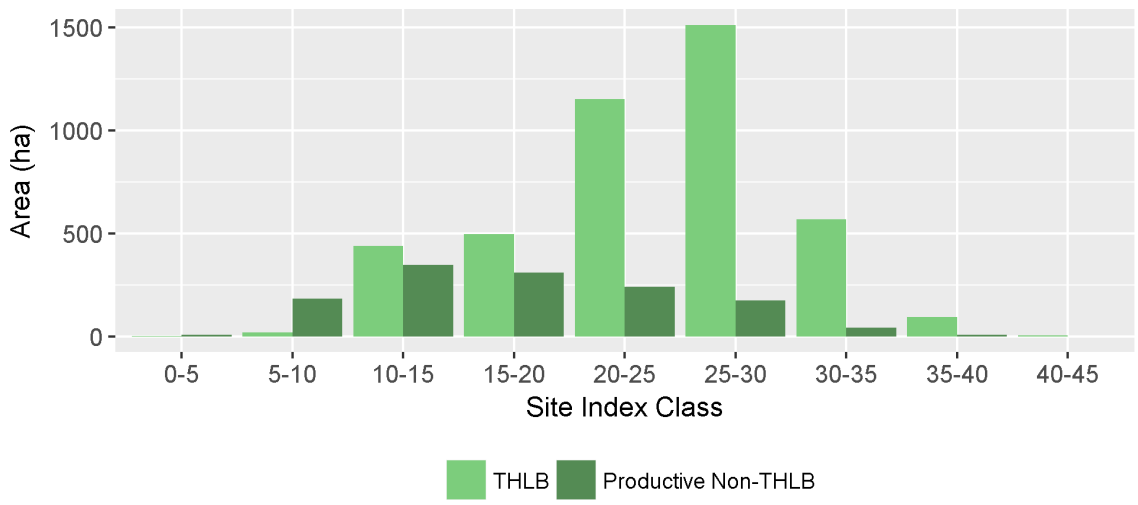


Figure 3.5: Site Index Summary

3.3.4 Age Distribution

Figure 3.6 shows the proposed FNWL by age class. The majority of the land base (84%) is less than 100 years old, and 30% is less than 50 years old.

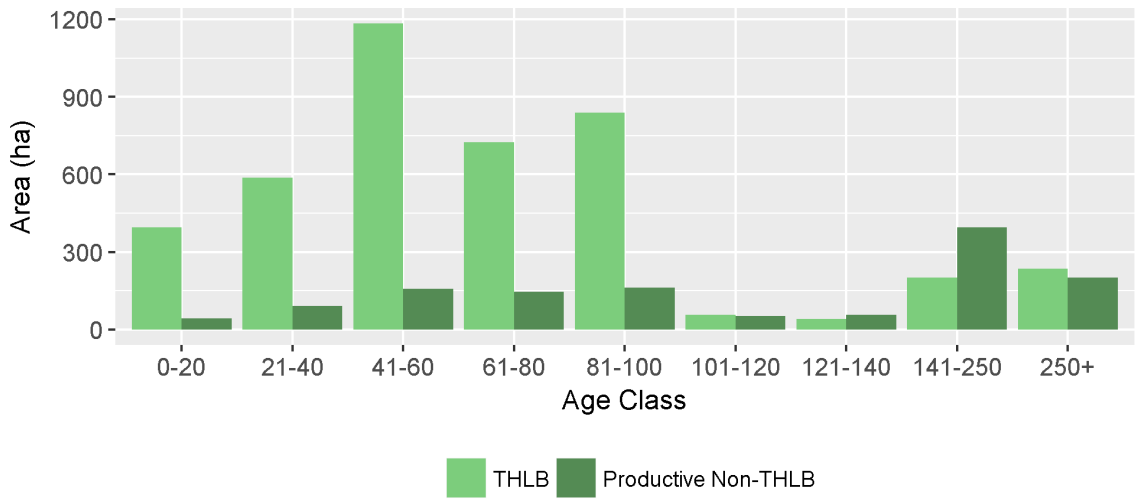


Figure 3.6: Age Distribution Summary

3.4 Resource Management Zones

Resource management zones (RMZs) are grouped areas that support non-timber resource requirements. Each RMZ has forest cover objectives (either retention or disturbance requirements) which are applied to sub-sets of the land base. They are often

overlapping and therefore not additive in area. For detailed modelling information on the RMZs, see Appendix C. The following RMZs occur within the proposed FNWL:

- Integrated resource management (IRM) areas for cutblock adjacency;
- Community watersheds;
- Visual quality objectives (VQOs); and
- Additional Blue Mountain modified harvest area.

OGMAs are removed during the netdown classification and therefore did not require further modeling as an RMZ. WTRs are applied – during the netdown classification – as a 7% aspatial netdown to those stands within the THLB that do not have their WTR requirement met by nearby mature non-THLB stands.

The analysis includes the highly contentious area referred to as Blue Mountain Provincial Forest, an area under public pressure making conventional harvesting in the area unlikely. Katzie-Kwantlen considered an alternative management regime which includes this area as a resource management zone. This constrains harvesting in the area to a maximum allowable disturbance of 3%, where a disturbance is defined as a stand less than 5 metres in height. . At no point in time can more that 3% of the productive area have a stand height of less than 5 metres.

Two areas of significant cultural value (which slightly overlap the Blue Mountain area) have also been identified. A one percent annual rate of cut constraint has been applied.

An integrated resource management (IRM) constraint has been applied to stands not subject to any other disturbance constraint. This is applied by landscape unit. The majority of the proposed FNWL area is in the Alouette landscape unit, but also includes some area within the Stave and Hatzic landscape units.

The community watershed Kathryn Creek is within the proposed FNWL boundary. Table 3.2 and Figure 3.7 show the area by RMZ in the proposed FNWL. No more than 10% of the productive area can be logged in each 10-year planning period.

Table 3.2: RMZ Area Summary

RMZ	Area (ha)		
	THLB	Non-THLB Productive	Total Productive
Visually Sensitive Areas - Retention	1,176	422	1,598
Visually Sensitive Areas - Partial Retention	1,335	599	1934
Visually Sensitive Areas - Modification	302	84	386
Blue Mountain Light Touch	1407	329	1736
Cultural Management Zone	333	33	366
Integrated Resource Management - Alouette	3387	167	3554
Integrated Resource Management - Hatzic	526	31	556
Integrated Resource Management - Stave	163	10	172
Community Watershed - Kathryn Creek	251	66	317

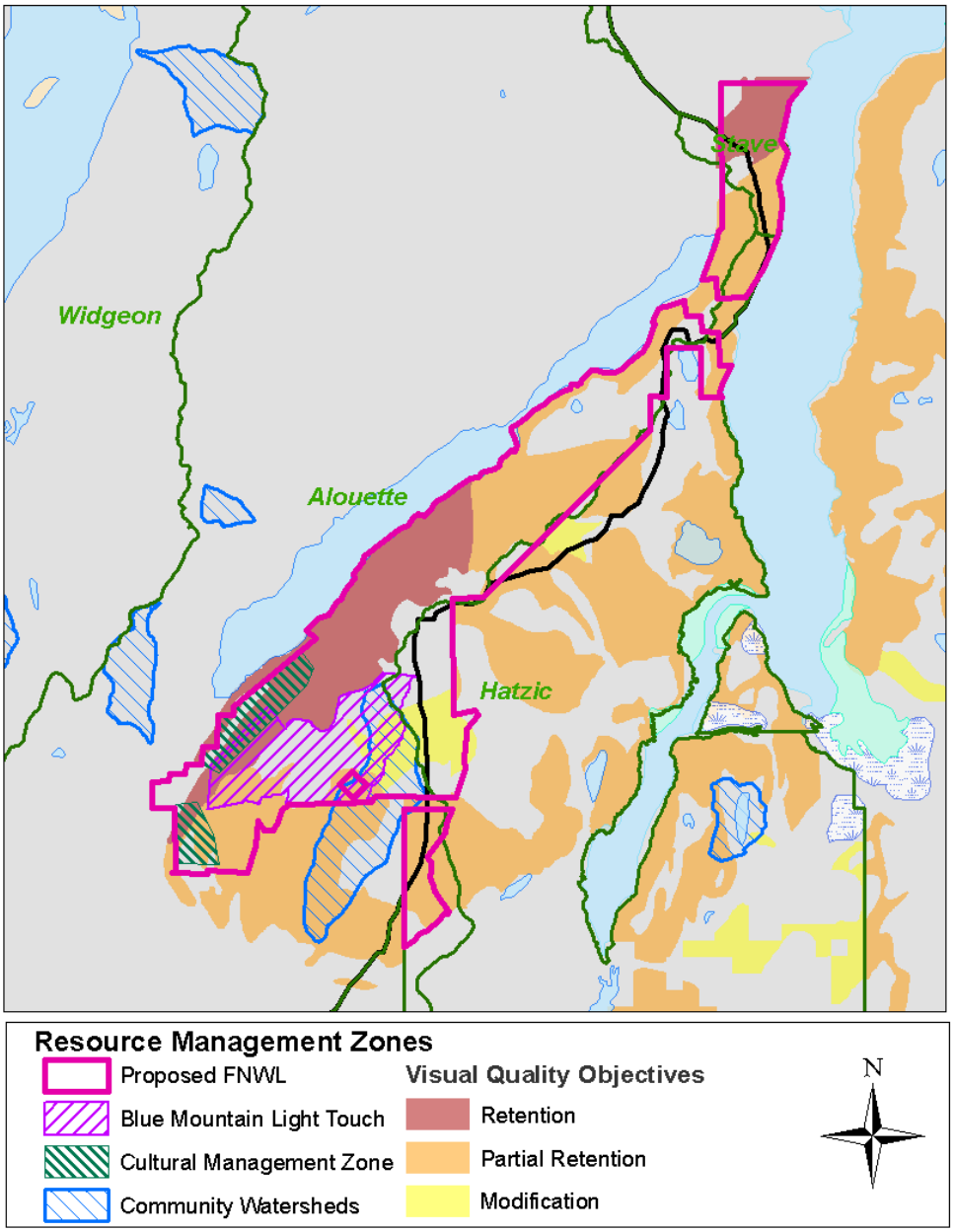


Figure 3.7: Resource Management Zones

4 TIMBER SUPPLY ANALYSIS

4.1 Base Case

The base case timber supply flow includes:

- A THLB of 4,060 ha as described in Section 3 “Landbase Description”;
- Non-recoverable losses (NRLs) of 438 m^3/year as described in Section 7.3.2 “Non-Recoverable Losses”;
- RMZs including: community watersheds, visually sensitive areas, Blue Mountain light touch area, Cultural Management Zones, legal OGMAs, WTRs, and IRMs;
- Stand yield curves using TIPSY for managed stands and VDYP for natural stands; and
- A non-declining harvest flow and a sustainable long term growing stock.

This section presents the results of the base case timber supply analysis. Harvest levels were found to the nearest 100 m^3/year and are shown net of non-recoverable losses (NRLs). The base case can sustain a harvest level of 24,700 m^3/year (after adjusting for 400 m^3/year in unsalvaged losses). Figure 4.1 shows the THLB harvest level. A 250 year planning horizon was chosen in order to find a stable long-term growing stock level, as shown in Figure 4.2.

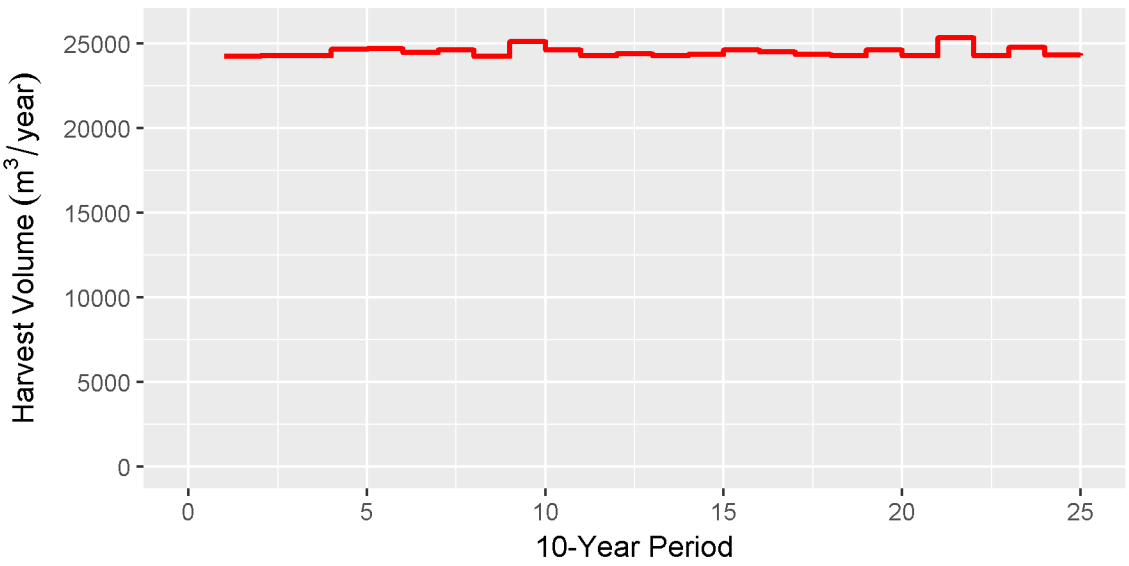


Figure 4.1: Base Case Harvest Level

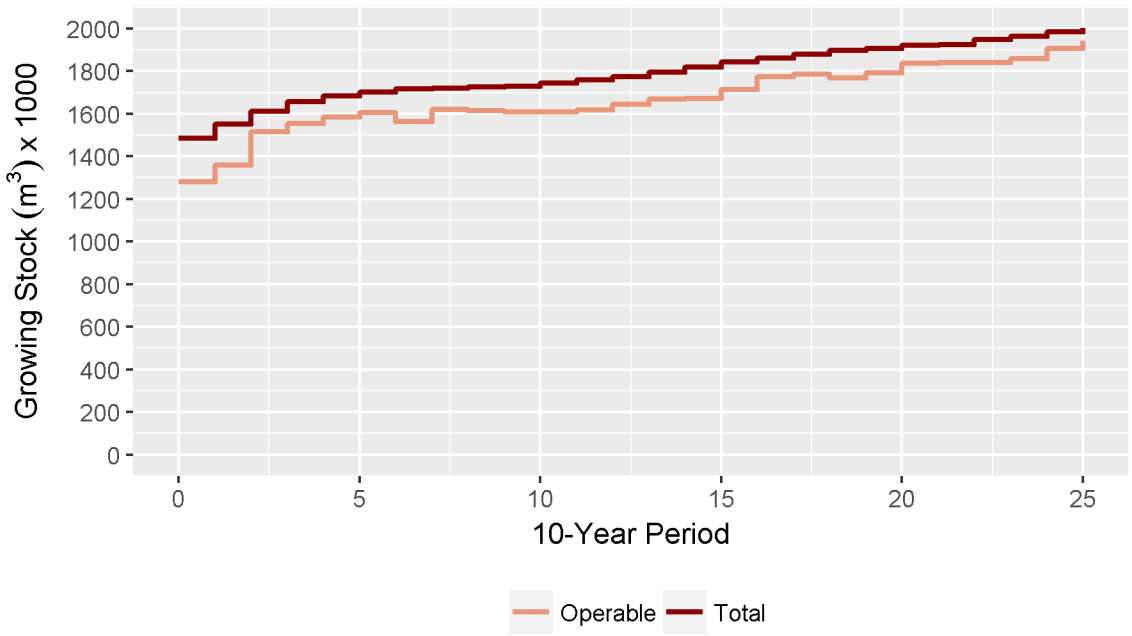


Figure 4.2: Base Case Growing Stock

4.1.1 Average Harvest Age, Volume and Area

Figure 4.3 shows the average annual area harvested over the planning horizon. An average of 24.8 ha/year is logged. Harvesting in the first ten years is focused on lower-volume old growth stands, resulting in a higher annual area harvested of 40.6 hectares.

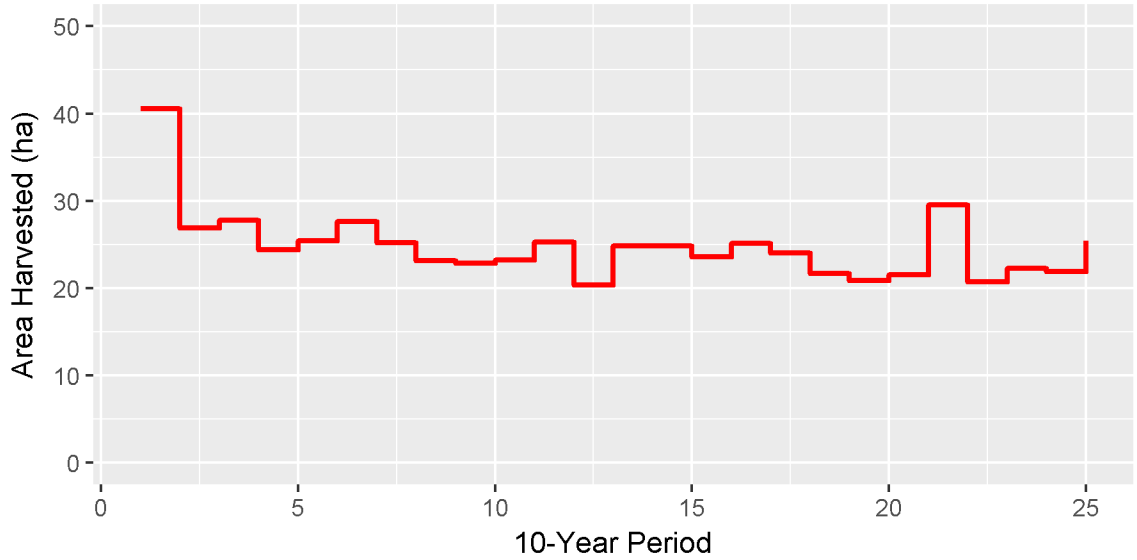


Figure 4.3: Average Harvest Area

Figure 4.4 shows the average volume per hectare harvested throughout the planning horizon. The average volume per hectare harvested is 1027 m^3/ha and it varies between 609 and 1220 m^3/ha.

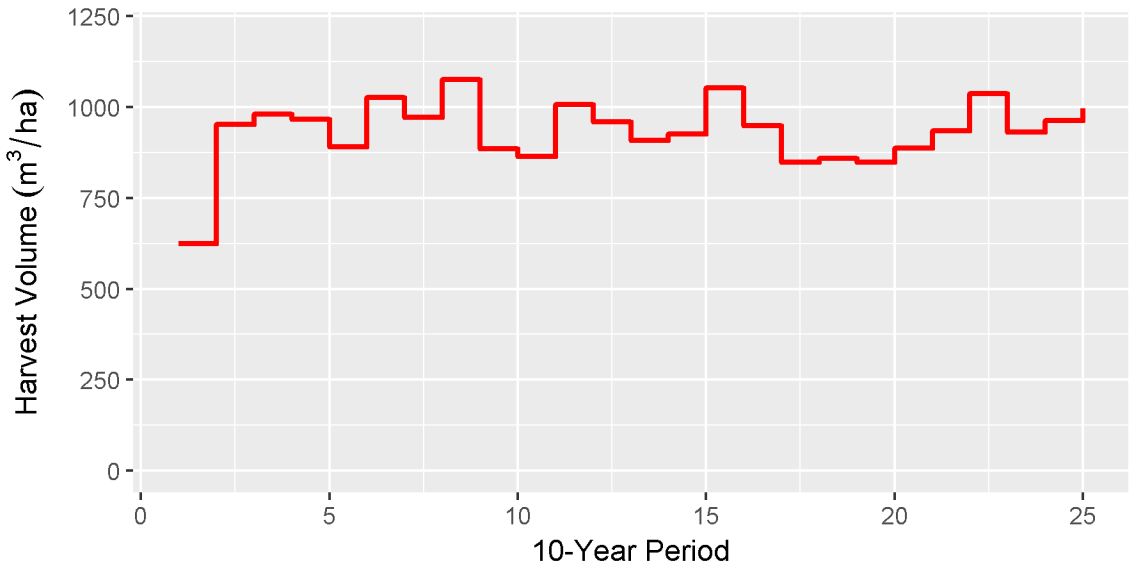


Figure 4.4: Average Harvest Volume per Hectare

Figure 4.5 show how the average harvest age varies over the planning horizon. The average age at harvest is higher (218 years) in the first decade, but averaged 135years for the remainder of the planning horizon.

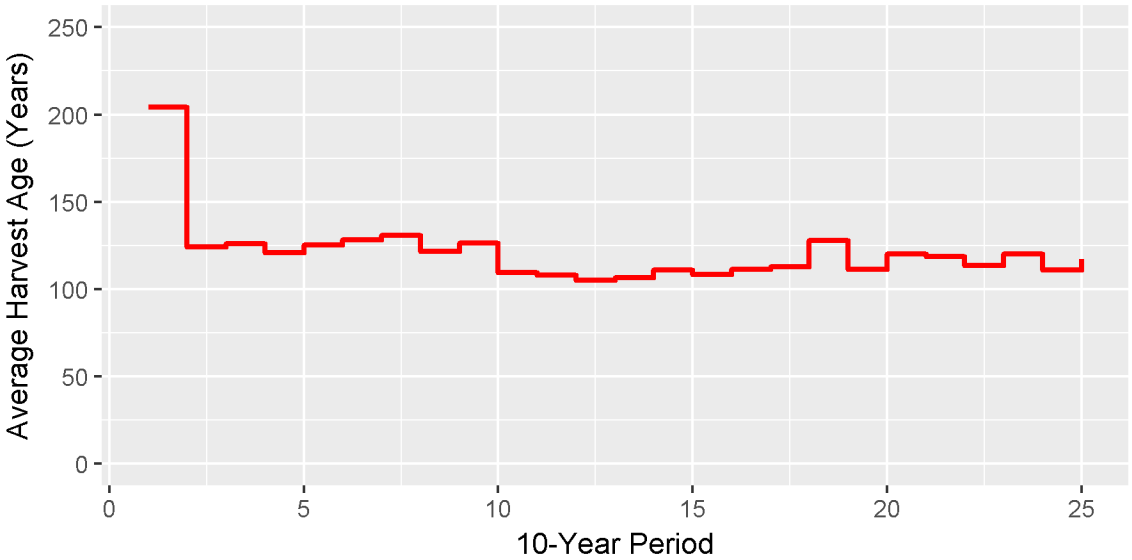


Figure 4.5: Average Harvest Age

Figure 4.6 shows the harvest volume that comes from natural and managed stands. Most of the area currently in natural stands is harvested over the first 120 years. Some

natural stands on the THLB persist until the end of the planning horizon due to rate-of-cut constraints associated with the Blue Mountain area, cultural management zones and with 'Retention' visual quality objectives.

Figure 4.6: Natural to Managed Transition

The Fraser TSA timber supply analysis applied a quota to the harvesting of second growth stands. For the first two decades, at least 50 percent of the harvest will be had to come from stands younger than 121 years old. No such quota was applied for this analysis, but Table 4.1 demonstrates that that objective has been met.

Table 4.1: Mature / Immature Harvest

	First Decade	Second Decade	Total
Older than 120 Years	82.5%	14.8%	48.7%
120 Years or Less	17.5%	85.2%	51.3%

Figure 4.7 show the split between harvesting in mature and immature stand over the entire planning horizon.

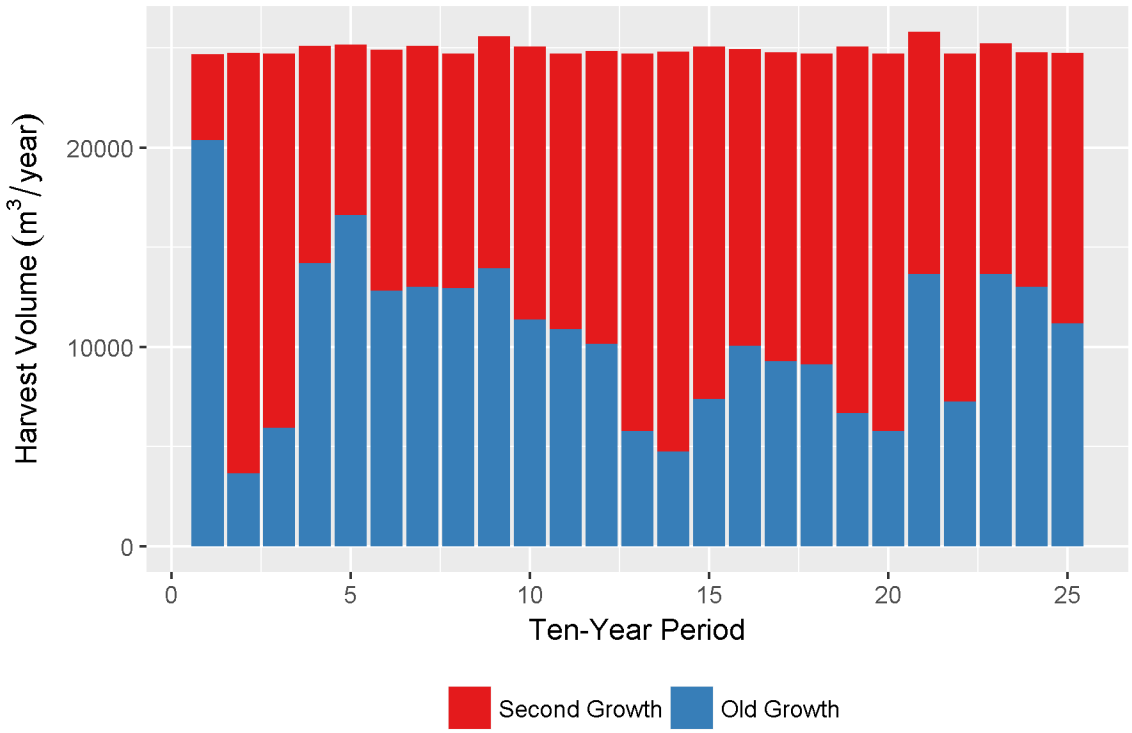


Figure 4.7: Mature / Immature Harvest Levels

4.2 Sensitivity Analysis

This timber supply analysis has, for the most part, attempted to remain consistent with the methods and assumptions used for the 2013 Fraser TSA timber supply review. Two departures in management assumptions where made:

1) A disturbance constraint was applied to the Blue Mountain Area: no more than 3% of the productive area can be disturbed. A 'disturbed' stand is defined as having a height of less than five metres.
2) A disturbance constraint was applied to two areas of high cultural significance: No more than one percent of the productive area can be harvested in a single year. For modelling purposes, this was implemented as ten percent over ten years.

Two sensitivity analysis model runs were completed. For the first run, the rate-of-cut constraint in the Blue Mountain area was turned off. The sustainable harvest level increased to 27,000 m^3/year (net of non-recoverable losses of 400 m^3/year). For the second sensitivity analysis, the disturbance constraint that had been applied to the Cultural Management Zone was disabled. The harvest level increased to 25,000 m^3/year.

Table 4.2 shows the resulting harvest levels and compares them to the base case.

Table 4.2: Sensitivity Analyses

	Harvest Level (m3/year)	% of Base Case
Base Case	24,700	100%
No Blue Mountain Constraint	27,700	112%
No Cultural Management Constraint	25,400	103%

4.3 AAC Request

The forest estate model run has shown that the proposed FNWL can sustain an annual harvest level of 24,700 cubic metres. No higher harvest level can be maintained for the entire 250-year planning horizon. Any attempt to increase harvesting results in a shortfall after the fourth decade.

The modeling and management assumptions closely followed the 2013 Fraser TSA TSR Data Package. The VRI data for the Fraser TSA was the source of forest inventory information for the northern two blocks. The southernmost – Rolley Lake – block was, until recently, part of TFL 26. Mission Tree Farm provided forest cover and recent harvest blocks for that area. All forest cover data was update for deletions.

One of the key metrics in judging the sustainability is growing stock patterns across the planning horizon. Growing stock levels are stable at the end of planning horizon (actually slightly rising) which indicates that the proposed harvest level could be sustained indefinitely – and perhaps even increased in the long term.

Another way to assess the harvest level is to examine how certain characteristics of the harvested stands change over time. Annual area harvested and average volume per hectare harvested are two key indicators. Both are stable in the long term (and after the first decade): area harvested varies between 22 and 28 hectares per year and the harvest volume ranges between 900 and 1100 m^3/hectare.

Average harvest age in each ten-year planning period has also been presented. It is high for the first decade as a significant portion of the remaining old growth is harvested. After that it stays close to the long-term average of 135 years. This is well above the calculated minimum harvest age for most stands, and is due in part to the fact that some existing natural stands are carried for 200 year (due to disturbance limits) before they are harvested. The amount of old growth on the land base actually increases slightly between the beginning and end of the planning horizon.

The Fraser TSA TSR identified community watersheds and visual quality concerns within the proposed FNLW area. The modeling approach to those issues is consistent with the methods used for the TSA TSR. In addition to those concerns, the proponent is also concerned that harvesting in the Blue Mountain area be realistically accounted for. In spite of the fact that the area support high-value stands of older second growth Douglas-fir, and that logging costs would be relatively low, little recent harvesting has occurred in this area due to past public concern. In the forest estate model a rate-of-cut

constraint was applied to limit the proportion of this area than can be disturbed at any one time.

Parts of the proposed area have significant cultural heritage value, and have been designated as Cultural Management Zones. While the best way to manage these CMZ's is still under consideration, it is prudent to limit harvesting in these areas until those decisions are made so as not to foreclose future options. This has been enforced with a rate-of cut constraint.

In order to gauge the impact of these additional (i.e. not modeled in the Fraser TSA TSR) constraints, two sensitivity analyses were run. If the Blue Mountain constraint is removed, the harvest level increases by 12%. When the CMZ constraint is removed, the harvest level rises by 3%.

This analysis, as summarized in the preceding paragraphs, provides justification for setting the AAC for the new FNWL at the base case harvest level of 24,700 m^3/year for the next ten years. As K & K Forestry Operations gains experience with and understanding of the land base that they are managing, they may wish to alter some of the assumptions on which this analysis has been based. Should that happen, they will conduct a new timber supply analysis and present a request for a new AAC to the Ministry.

5 REFERENCES

MOE. 2009. Order – Ungulate Winter Range # U-2-006. Signed by Doug Konkin, Deputy Minister. 14pp.

MOF. 1995. Biodiversity Guidebook. Forest Practices Code of British Columbia Act. Strategic Planning Regulations Operational Planning Regulation.http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm.

MOFR. 2013. Fraser Timber Supply Area Timber Supply Review Data Package. October 2013. 38pp.

MOFR. 2003. Fraser Timber Supply Area Analysis Report. December 2003. 93pp.

MOFR. 1998. Procedures for Factoring Visual Resources into Timber Supply Analysis. Forestry Division Services Branch.

6 APPENDIX I: DATA SOURCES AND NETDOWN

6.1 Data Sources

Table 6.1 lists relevant information about the input data for the netdown classification process and the timber supply analysis. Most of the data is from the Fraser TSA, however RESULTS openings was included in the analysis to account for recent harvesting disturbances. RESULTS openings were applied as an age update to the inventory if stand age > 50 years old.

Table 6.1: Data Sources

Data	Source	Vintage	Date of Compilation
Fraser TSA administrative boundary and timber supply blocks	FLNR Forest Tenures Branch (FTB)	2013	2013
Woodlots and community forest agreement areas	FTB	2013	2013
Tree Farm Licences	FTB	2013	2013
Parks and protected areas	FLNR Crown Registry and Geographic's Base Branch (CRGB)	2013	2013
Ownership and land administration	FLNR Forest Analysis and Inventory Branch (FAIB) and Chilliwack Natural Resource District (DCK)	2012	2013
Vegetation Resources Inventory (VRI) – forest cover	FAIB	Projected to 2016	2016
Harvest depletion mapping	FAIB	2012	2013
Operability mapping	DCK	1996	1996
Registered archaeological sites	Remote Access to Archaeological Data (RAAD)	2013	2013
Approved old-growth management areas	FLNR	2013	2013
Cultural Management Zones	Katzie FN	2017	2017
Landscape unit boundaries	FLNR Resource Management Objectives Branch (RMOB)	2012	2013
Visual landscape inventory and visual quality objectives and scenic areas (updated 2013)	FLNR	1996	2005, 2013
Community watersheds	Ministry of the Environment (MOE)	1997	N/A
Roads, trails and landings	FLNR	2013	2013
Powerlines, hydrolines, transmission lines	Tantalis	2013	2013
Environmentally sensitive areas	FLNR	1978	1978
Riparian management area	FAIB	2000	2013

6.2 Logging History

The logging history was defined from multiple Ministry sources:

- RESULTS openings (RSLT_OPNGS_polygon) disturbance end date (DST_END_DT); and
- Harvest date from the vegetation resource inventory (VRI).

This logging history was used to exclude certain criteria from the netdown process- e.g. non-forested, and was also applied as an age update to the inventory in the analysis database if stand age > 50 years old and the disturbance was recent (since the year 2000).

6.3 Netdown Item Descriptions

6.3.1 Non-Crown

Non-crown items include any private land, woodlots or other forest tenures overlapping with the proposed FNWL. These lands were identified using the Ministry's ownership layer and removed from the THLB (see Table 6.2). Community forests (CF) and woodlots were further identified as any license starting with 'K' or 'W' in the DataBC forest tenure layer. District Lot 3209 was also excluded at this stage.

Table 6.2: Non-Crown Ownership

Ownership Code	Description
40 or 41	Private Crown Grant
50	Federal Reserve
52	Indian Reserve
53	Military Reserve
60	Ecological Reserve
61	Use, Recreation and Enjoyment of the Public (UREP) Reserves
63	Provincial Park Class A
67	Provincial Park or Reserve
72	Schedule "A" and "B" lands in a TFL
74	Private and Provincial in a Watershed
77	Crown and Private Woodlot Licence
79 or 'K' or 'W'	Community Forest
99	Crown Misc. Lease

6.3.2 Non-Productive and Non-Forest

This netdown reduces the land base by areas that are non-treed such as rock, water and vegetated but will not sustain trees.

Non-productive areas were identified were the non-productive descriptor from the VRI was not blank and there was no logging history. Non-forested areas were identified using the British Columbia Land Classification System (BCLCS) Level 1 and 2 codes (from the VRI) were there was no harvest history:

- BCLCS 1 is non-vegetated ('N') or unreported ('U'); or
- BCLCS 1 is vegetated ('V') and BCLCS 2 is non-treed ('N'), land ('L'), or water ('W').

6.3.3 Inoperable

Operability codes describe the presence of physical barriers to harvesting. Consistent with the 2013 TSR Data Package, the code 'I' and 'N' for inoperable were used to identify areas to remove from the harvestable land base. Areas that had a harvest history were not removed in this step.

6.3.4 Non-Merchantable

Non-merchantable stands are those which are physically operable and exceed the minimum merchantable volume criteria but are currently not utilized commercially. The forest types that are considered non-merchantable include stands with leading species Cottonwood, Aspen, Birch or Maple (species code = 'Ac', 'Act', 'At', 'Ax', 'E', 'Ea', 'Ep', 'Ew', 'M', 'Mb', 'Mv') and have no logging history.

6.3.5 Low Productivity

Consistent with the last TSR, stands were classified as low productivity by evaluating growth and yield projections at 150 years. If stands with low site index did not reach the minimum volume criteria listed in Table 6.3 and had no harvest history they were removed from the harvestable land base. This is the same approach described in the 2013 Fraser TSA TSR Data Package.

Table 6.3: Low Productivity Criteria

Species	Criteria	Area (ha)
Fir/ Balsam	Existing volume < 350 m^3/ha and site index < 16 Heli-log areas: existing volume < 400 m^3/ha and site index < 18	34
Cedar	Existing volume < 350 m^3/ha and site index < 13 Heli-log areas: existing volume < 400 m^3/ha and site index < 15	5
Hemlock	Existing volume < 350 m^3/ha and site index < 11 Heli-log areas: existing volume < 400 m^3/ha and site index < 15	66
White Spruce	Existing volume < 300 m^3/ha and site index < 11 All heli-log areas	0
Sitka Spruce	Existing volume < 350 m^3/ha and site index < 11 Heli-log areas: existing volume < 400 m^3/ha and site index < 13	0
Pine	Existing volume < 300 m^3/ha and site index < 13 All heli-log areas	0
Alder	Existing volume < 150 m^3/ha	17

6.3.6 Environmentally Sensitive Areas

Consistent with the last TSR, environmentally sensitive areas (ESA) were identified from a Ministry-provided ESA layer with sensitive areas classified as either very sensitive (E1) or moderately sensitive (E2) to disturbances. Where ESA code was 'S1' highly sensitive soils or 'P1' severe regeneration problems, a 100% reduction was applied if there was no harvest history.

6.3.7 Wildlife Habitat Areas

Consistent with the last TSR, wildlife habitat areas (WHAs) were identified in the Ministry's approved WHA layer and removed from the THLB where there was no harvest history. There were no WHA within the traditional territories that required removal from the land base during this step.

6.3.8 Old Growth Management Areas

Old growth management areas (OGMAs) are identified using the most current OGMA data layer from DataBC and completely removed from the harvestable land base.

6.3.9 Riparian

Riparian management zones are areas that are immediately adjacent to streams, lakes, swamps and wetlands and are managed to restrict or exclude harvesting. To be consistent with the current TSR underway in the Fraser TSA, a buffered riparian layer was provided by the Ministry. Riparian management areas (RMA) were removed from the harvestable land base where RMA was '100'.

6.3.10 Roads

To be consistent with the current TSR underway way in the Fraser TSA, a buffered road layer was provided by the Ministry. Existing roads were identified where road was '1' and removed from the land base. The FNWL area is well roaded; new road construction is expected to be temporary and will be deactivated after use. No allowance has been made for future roads.

6.3.11 Wildlife Tree Retention

Objectives for stand level biodiversity were achieved through the establishment of wildlife trees. Wildlife tree retention (WTR) was modeled as a partial netdown that reduces the THLB were WTR must occur. This was done by establishing a 200 m buffer around mature (> 80 years), productive forested stands that are not within the THLB. It was assumed that this buffer meets all requirements for WTR in those areas.

Wildlife Tree Retention (WTR) values have been developed for each LU-BEC variant from approved legal orders for the majority of landscape units. Landscape units without existing WTR objectives are given a default value of 7%, consistent with the *Forest Planning and Practices Regulation*. To account for WTR within the THLB, a 7% retention constraint was applied to all landscape unit-BEC variants (Table 6.4) and removed from the THLB.

Table 6.4: Wildlife Tree Retention Percent

Landscape Unit	BEC	WTR %
Alouette	CWHdm	7
	CWHvm	
	MHmm	
Fraser Valley South	CWHdm	
Hatzic	CWHvm	
	MHmm	
Pitt	CWHdm	
	CWHvm	
	MHmm	
Stave	CWHvm	

7 APPENDIX II: GROWTH AND YIELD

This section documents the growth and yield information used in this analysis, all information is consistent with the 2013 TSR Data Package and the 2003 TSR Analysis where information from the most recent data package was insufficient.

7.1 Analysis Unit Aggregation

Analysis units (AU) are aggregation of stands with similar species composition and growing potential and are important in an analysis to reduce complexity without obscuring information. This analysis assumes that stands are applied to a managed stand yield curve at different ages based on species. The cut-off age is shown in Table 7.1. Any stands older than the defined age criteria are considered natural. Analysis unit groupings are consistent with the methodology from the last TSR.

7.1.1 Natural Analysis Units

Consistent with TSR, natural stand AUs are defined according to leading species and productivity as follows:

- Leading species;
- Inventory site index (rounded to the nearest 3 m); and
- Age of stand (stand is mature if > 120 years).

Yield projections for natural stands are produced using the MFLNRO's Variable Density Yield Prediction model version 7 (VDYP7). Productivity estimates for natural stands are sourced directly from the VRI via VDYP using age, height and species. A yield curve is generated for each stand and then these yield curves are area-weighted to produce one yield curve for each AU.

7.1.2 Managed Analysis Units

Managed stands are grouped into AUs (Table 7.1) based on criteria consistent with the 2013 TSR Data Package (see Table 19 in that document). Managed stand AUs were defined according to leading species and productivity. These are assigned to stands that are currently managed and also to natural stands for modeling their growth after harvesting.

Table 7.1: Managed Stand AU Definitions

AU #	Leading species	Average SI	Age	SI Range
101	Cedar	19.5	< 26	All
103	Fir	18.9	< 46	< 24
104	Fir	25.6	< 46	24 - 30
105	Fir	33.7	< 46	30+
106	Balsam	11.6	< 36	< 14
107	Balsam	17.2	< 36	14 - 21
108	Balsam	26.1	< 36	21 +
109	Pine/Larch	13.3	< 26	All
110	Spruce			All
111	Deciduous	23.5	< 26	All

7.2 Yields

Table Interpolation Program for Stand Yields Version 4.3 (TIPSY4.3) is used to model the growth and yield for managed stand AUs. Productivity estimates for managed stand yields are sourced from the MFLNRO's provincial site productivity layer version 1. For more information on this layer, see the MFLNRO website at:
https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory/site-productivity/provincial-site-productivity-layer

Management practices such as species and planting densities are based on the Fraser TSA TSR Data Package, where they were assigned using a combination of past practice and a review of current practice. Table 7.2 shows the managed stand assumptions by AU (taken from the 2013 Data Package). Other assumptions that are constant include for all analysis units are:

- Operational adjustment factors (OAFs) consistent with TSR: OAF1 of 15% and OAF2 of 5%; and
- Genetic gains estimates from the current TSR Data Package: Douglas-fir on good sites 4.5%, Douglas-fir on poor sites 2.8% and all spruce 1.3%.

Table 7.2: Managed Stand Input Assumptions

AU	Leading Species	SI	Stems	Sp1	Sp1 %	Sp1 GG	Sp2	Sp2 %	Sp3	Sp3 %	Sp4	Sp4 %	Sp5	Sp5 %	Planted/ Natural	Regen Delay	OAF1	OAF2
101	Cedar	19.5	1240	Cw	35		Fd	30	Hw	30	Ba	5			P	1	0.85	0.95
103	Fir	18.9	1260	Fd	54	3	Cw	18	Hw	16	Ba	12			P	1	0.85	0.95
104	Fir	25.6	1200	Fd	75	3	Cw	25							P	1	0.85	0.95
105	Fir	33.7	1170	Fd	76	5	Cw	24	Hw	1					P	1	0.85	0.95
106	Balsam	11.6	1140	Ba	70		Sx	30							P	1	0.85	0.95
107	Balsam	17.2	1100	Ba	60		Sx	20	Hw	10	Cw	10			P	1	0.85	0.95
108	Balsam	26.1	2800	Ba	30		Hw	20	Fd	20	Cw	20	Sw	10	N	2	0.85	0.95
109	Pine/Larch	13.3	1200	Sw	50	1	Fd	40	Pl	10					P	1	0.85	0.95
110	Spruce		1200	Sw	90	1	Fd	10							N	1	0.85	0.95
111	Alder	23.5	1200	Fd	75	3	Dr	25							N	1	0.85	0.95

7.3 Additional Yield Information

7.3.1 Utilization Level

Utilization levels from TSR have been used based on leading species and age:

- Pine and larch: minimum DBH (cm) of 12.5;
- All other species < 121 years: minimum DBH (cm) of 12.5; and
- All other species ≥ 121 years: minimum DBH (cm) of 17.5.

7.3.2 Non-Recoverable Losses

The calculation of NRLs used the TSR TSA-level estimates and pro-rated them for land base area. The NRL estimate used is shown below in Table 7.3.

Table 7.3: NRL Estimates

Area	THLB Area	% of TSA	m^3/ year			
			Fire	Insects	Wind	Total
Fraser TSA	265,555	19	16,500	8,100	2,340	26,940
Proposed FNWL	4,060	1.6	269	132	38	438

7.3.3 Minimum Harvest Age

Minimum harvest age (MHA) is an estimation of the lowest age a stand is able to be harvested. MHA is calculated as the age that a stand achieves 95% of the culmination maximum mean annual increment (CMAI). The estimated age at which a stand is predicted to reach a required minimum volume varies by species. To be eligible for harvesting a stand must meet both of these criteria. Table 7.4 shows the calculated MHA for each AU.

Table 7.4: Minimum Harvest Age

AU	Age	QMD (cm)	Height (m)	Volume (m3/ha)	Stems(1/ha)	MAI (m3/ha/year)
101	76	28	28	617	1021	8.1
103	83	26	26	460	1036	5.5
104	65	29	29	561	965	8.6
105	56	33	34	786	901	14.0
106	143	26	25	439	1039	3.1
107	98	28	27	538	996	5.5
108	74	29	32	746	1043	10.1
109	54	26	26	418	1013	7.7
111	73	27	27	462	990	6.3

7.3.4 Harvest Systems

A harvest system characterizes the type of harvesting expected to occur on a stand and in the Fraser TSA, clear cut harvesting was modeled.

7.3.5 Forest Estate Model

The timber supply model "Forest Planning Studio" is used in this analysis. FPS is the most recent version of the timber supply model previously known as ATLAS (A Tactical Landscape Analysis Software). FPS was developed at the University of British Columbia by a team headed by Dr. John Nelson. FPS is a commonly used and accepted forest simulation model in BC. It is a spatially explicit harvest simulation model that is designed to schedule timber harvesting while considering a wide variety of spatial and temporal objectives.

7.3.6 Planning Horizon

A 250 year planning horizon is used in this analysis to ensure the long term sustainability of the harvest level and allow the analysis to reach a stable and non-declining growing stock.

7.3.7 Harvest Priority

The order of harvest will be determined by using the FPS default oldest first harvest priority rule.

7.3.8 Disturbing the non-THLB

In the timber supply model, the productive area that is not part of the THLB (non-THLB) will continuously age throughout the planning horizon because harvesting is traditionally the only form of disturbance modeled. This causes concern because eventually, in the model, all the non-THLB becomes old whereas in reality, there will be some level of natural disturbance within the non-THLB. This is addressed by modeling disturbances in the non-THLB for the traditional territories.

This section describes the process of disturbing the non-THLB used for this analysis. The intentions are to achieve the early, mature and old seral percentages for each BEC zone in accordance with the natural range of variation defined in the Biodiversity Guidebook (MOF, 1995). The method used for this analysis is for each BEC zone to:

1. Impose an annual disturbance to the non-THLB of each BEC zone. The size of the disturbance will be determined from the disturbance frequency in the Biodiversity Guidebook; and
2. A retention requirement on the non-THLB of each BEC variant is applied, which will force the non-THLB to achieve a seral zone distribution similar to the natural rate of variation (NROV) from the Biodiversity Guidebook.

The area in each BEC zone is summarized and the NDT and disturbance return interval are found from the Biodiversity Guidebook (MOF 1995). This information allows the annual disturbance to be calculated by BEC. The annual disturbance is 1% the disturbance interval and the annual disturbance area is this percentage * non-THLB area (as shown in Table 7.5).

Table 7.5: Non-THLB Annual Disturbance

BEC Label	NDT	Disturbance Interval	% Disturbed Annually	Total Non-THLB Area (ha)	Annual Disturbance (ha)
CWHdm	2	200	0.005	190	1.0
CWHvm1	1	250	0.004	489	2.0
CWHvm2	1	250	0.004	720	2.9
MHmm1	1	350	0.003	115	0.3

The seral stage distribution is estimated using the negative exponential equation from Appendix 4 of the Biodiversity Guidebook (MOF 1995). The negative exponential equation uses the disturbance return interval and gives the percent older than the input age from the equation:

Percent older then specified age = exp (-[age/return interval])

Table 7.6 shows the retention requirements placed on each BEC zone in order to achieve the desired NROV.

Table 7.6: Retention Requirements for the non-THLB

BEC Label	NDT	Mature Requirements		Old Requirements	
		Minimum Age (years)	Minimum %	Minimum Age (years)	Minimum %
CWHdm	2	80	67	250	29
CWHvm1	1	80	73	250	37
CWHvm2	1	80	73	250	37
MHmm1	1	120	71	250	49

8 APPENDIX III: RESOURCE MANAGEMENT ZONES

The sources of information and modeling assumptions for each RMZ are documented in the sections below. For spatial reference of each RMZ see Figure 3.7.

8.1 Landscape Level Biodiversity

Landscape level biodiversity requirements are achieved through the establishment of old growth management areas (OGMA). In the potential area all landscape units have approved OGMAs that are assumed to satisfy all old-seral biodiversity requirements. These areas were removed during the land base classification and were not modelled as a RMZ.

8.2 Visually Sensitive Areas

The visual landscape inventory (VLI) delineates areas of visual sensitivity near communities or adjacent to travel corridors. Restrictions on the acceptable limits of visual change are applied by visual polygon and modeled by a combination of visual quality objective (VQO) and visual absorption capability (VAC). VQOs include retention, partial retention, and modification, and VACs include low, medium, and high.

Visual resource management will be modeled according to the *Procedures for Factoring Visual Resources into Timber Supply Analyses* (MOFR 1998). The VAC % denudation range was used to apply the maximum disturbance requirement in the timber supply analysis based on the upper % denudation. Visual requirements are consistent with the established VQO and applied by visual polygon by the maximum percent denudation for a medium VAC, as shown inTable 8.1. This approach is the same as that documented in the Fraser TSA 2013 Data Package.

Table 8.1: Maximum Allowable Disturbance % by VQO

Visual Quality Objective	Maximum Allowable Disturbance %			Green-up Height or Age	Area of Application
	VAC Low	VAC Medium	VAC High		
Retention (R)	1.1	3	5	5 m	Forested area in a visual polygon
Partial Retention (PR)	5.1	10	15	5 m	
Modification (M)	15.1	20	25	5 m	

8.3 Blue Mountain

There is 2,632 ha within Blue Mountain Provincial Forest that is highly contentious with the public in regards to conventional harvesting practices. Part of this forest (1,773 ha) overlaps the proposed FNWL. Rather than allowing clearcut harvesting to occur, Katzie has considered modifying harvesting practices in this area to allow for some timber removal while maintaining socio-ecological values. As such, this area was modelled similar to the retention visual quality objective, where a 3% maximum disturbance is

allowed annually until the green-up height of 5 m is achieved. At no point in time can more that 3% of the productive area have a stand height of less than 5 metres.

8.4 Cultural Management Zones

Two contiguous areas within the FNWL have been identified as having significant cultural value. A one percent annual rate of cut constraint has been applied.

8.5 Integrated Resource Management

Integrated Resource Management (IRM) zone objectives for cutblock adjacency were applied in each landscape unit (LU): Alouette, Stave and Hatzic. A maximum of 25% of stands in the THLB may be less than 3 m in height in each LU outside of visual areas.

8.6 Riparian Management Zones

A pre-buffered spatial layer for riparian management was provided by the Ministry so that this analysis could be benchmarked to last TSR. Therefore, RMZs were modeled by removing all riparian areas during the netdown phase.

8.7 Community Watersheds

One existing community watershed (CWS) boundary falls within the priority area, Kathryn Creek. Forest cover constraints were applied that limit the rate of harvest to ten percent of the productive forest area over a ten-year period to be consistent with the 2013 Fraser TSA timber supply analysis.

Appendix F: K&K – BC Timber Sales Co-operative Management Agreement

Appendix F: K&K - BCTS Cooperative Management Agreement (Signed copy to be attached when completed)

Cooperative Management Agreement Clauses

(The "Agreement")

Between

[K&K Forestry Operations Ltd.]

("K&K")

And

Her Majesty the Queen in right of the Province of British Columbia as represented by the Minister of Forests, Lands, and Natural Resource Operations, BC Timber Sales

("BCTS")

(Collectively the "Parties")

Whereas

A. On **[DATE]**, K&K was issued a **FNWL N2Z** (the "Licence") by the Province of British Columbia.

B. K&K has the following goals:

i) Sustainability of all resource values

ii) Financial sustainability of its forest resource business

iii) Accountability to the Katzie and Kwantlen First Nation Communities

iv) Maintenance/Enhancement of Cultural Values and Opportunities

C. The goal of BCTS is to provide credible representative price and cost benchmark data for the Market Pricing System through auctions of timber harvested from public land in British Columbia; BCTS' objectives in supporting this goal are to:

i) Sell the full BCTS allowable annual cut (AAC) over the business cycle, consistent with sustainable forest management;

ii) Generate net direct revenue and indirect provincial government revenue over the business cycle; and

iii) Pursue continuous business improvement within BCTS, across government and with third party partners and customers. Enable BCTS to effectively deliver on its legal consultation and accommodation requirements; and

iv) Result in business agreements that support the achievement of mutual goals and increased First Nations capacity and participation in the forest sector.

D. The Parties believe there is sufficient alignment between their respective objectives to warrant entering into a mutually beneficial business agreement within the Area of Interest (AOI).

E. The Parties recognize that their respective operations must comply with applicable legislation.

NOW THEREFORE, the Parties agree as follows:

1. Definitions

1.1 "**AAC Apportionment**" means the distribution of the Allowable Annual Cut (AAC) for a timber supply area among timber tenures by the minister in accordance with Section 10 of the *Forest Act.*

1.2 "**Area of Interest**" or "**AOI**" means the areas of timber harvesting land base within the boundary shown in "Schedule A" to this agreement within which the Parties' respective timber volumes are found.

1.3 "**BC Timber Sales Timber Harvest Apportionment**" or "**BCTS THA**" means that volume of timber specified in the First Nation Woodland Licence (FNWL N2Z) Licence Document as follows:

1.3.1 **5000m3/year; subject to section 6.18**

1.4 "**BCTS Disposition Agreement**" means a British Columbia Timber Sales (BCTS) disposition agreement entered into pursuant to section 22.2 of the *Forest Act*.

1.5 "**BCTS Licence**" means a Timber Sale Licence (TSL) or BCTS forestry licence to cut issued by the Timber Sales Manager (TSM) which grants rights to harvest Crown timber within the AOI or that are released to BCTS under a BCTS Disposition Agreement entered into with the Licence Holder.

1.6 "**BCTS Reservation Volume**" means a specified volume of timber (m^3/year) in an area based non-BCTS licence that is reserved and available for disposition by the TSM as a BCTS licence for the term of the non-BCTS licence and is not attributed to the cut control of that licence.

1.7 "**Business Cycle**" means the five (5) year period, based upon a calendar year, starting with the first year that the Cooperative Management Agreement (CMA) is signed. This business cycle may be adjusted to be consistent with the related cut control provisions assigned to the licence area.

1.8 "**Equal Opportunity**" means the fair distribution of the timber profile across the AOI by species, size, value and logging chance.

1.9 "**Forest Stewardship Plan**" or "**FSP**" means a forest stewardship plan under the *Forest and Range Practices Act*.

1.10 **"Management Plan"** means K&K**'s** management plan under the *Forest Act* that is associated with the Licence.

1.11 "**Monetary Consideration**" means the value of the potential consideration to K&K for the temporary release of rights to harvest Crown timber under its licence, as outlined in Schedule B.

1.12 "**Rate of Cut**" means the total volume of timber that may be harvested on an annual or periodic basis by either Party.

1.12.1 The Parties' rate of cut may be negotiated by the Parties and must be agreed to by the Parties.

1.13 "**Scale-Based TSL**" means a TSL in which the stumpage, bonus, and waste and residue fees payable by a TSL licensee are based on a scale of timber harvested from the cutting authority area in accordance with Part 6 of the *Forest Act.*

1.14 "**Strategic Management**" means the overarching planning activities that guide the sustainable development of forest cutblocks and related infrastructure while ensuring that other resource values and objectives are achieved.

1.15 "**Tenure Obligation Costs**" means costs directly attributable to the management of the forest, as determined in accordance with the Coast Appraisal Manual, as amended from time to time.

1.16 "**Third Party Certification**" means the voluntary participation in an independent forestry certification scheme.

1.17 "**Timber Sale Licence**" or "**TSL**" means a tenure issued in accordance with Section 20 of the *Forest Act*.

1.18 "**Timber Sales Manager**" or "**TSM**" means the Timber Sales Manager under the *Forest Act* for the BC Timber Sales business area in which the Licence is situated.

1.19 "**Volume Allocation**" means the timber volume held by a given Party as described and authorized under the *Forest Act*.

1.20 "**Waste Assessment**" means an assessment, for determining the volumes of merchantable timber and waste left on a harvested area, conducted in accordance with the procedures set out in the publication of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development, Provincial Logging Residue and Waste Measurement Procedures Manual, as amended from time to time.

2. Objectives

2.1 The purposes of this Agreement are:

2.1.1 to foster a long-term mutually beneficial business arrangement and relationship between the Parties; and,

2.1.2 to establish a coordinated forest planning process within the AOI, to determine and assign harvest cut blocks which will be harvested by the Parties.

2.1.3 to ensure management of FNWL N2Z is based on principles of sustainability and maintenance/enhancement of Cultural Values important to the Katzie and Kwantlen First Nation Communities

2.1.4 Foster enhanced relationships between the Government of British Columbia and the Kwantlen and Katzie First Nations

2.1.5 To provide ongoing opportunities for BCTS to meet its corporate objectives with the FNWL

3. Terms of Agreement

3.1 The Parties agree that K&K will seek approval from the Minister, under the *Forest and Range Practices Act*, to add K&K as a party to BCTS' FSP that applies to the AOI. Where such approval is granted, pursuant to section 106.3 of the *Forest Planning and Practices Regulation*, a Party will not be responsible for ensuring that results and strategies in the FSP are achieved to the extent that the result or strategy applies to an area that is subject to a cutting permit or road permit of the other Party or a TSL or road permit issued by the TSM, as applicable., pursuant to Section 106.3 of the *Forest Planning and Practices Regulation*.

3.1.1 BCTS will work under the direction of K&K's management plan, provided that, in the opinion of BCTS, it would not jeopardize BCTS' third party certification; and

3.1.2 pursuant to section 106.3 of the *Forest Planning and Practices Regulation*, a Party will not be responsible for ensuring that results and strategies in the FSP are achieved to the extent that the result or strategy applies to an area that is subject to a cutting permit or road permit of the other Party or a TSL or road permit issued by the TSM, as applicable.

3.2 The Parties will meet quarterly (or as determined by the Parties) to develop and schedule the disposition or harvest of their respective timber volumes, including BCTS reservation volume, in the AOI, and develop longer term plans for timber harvest within the AOI, including a mutually agreeable profile of timber species, size, value, and logging chance.

3.3 K&K acknowledges that information shared with BCTS about the locations of culturally sensitive areas may be subject to the *Freedom of Information and Protection of Privacy Act* and released to the public, unless otherwise agreed to in a Confidentiality Agreement between the Parties

3.4 The Parties agree to meet twice a year (or as determined by the Parties) to review this Agreement and make any agreed upon amendments.

4. Strategic Management

4.1 K&K will provide the overall strategic management direction within the AOI with input from BCTS.

4.2 The Parties will develop and approve an annual works plan and budgets for all activities and costs associated with relevant BCTS and Licence Holder operations within the AOI, including

4.1.1 Five-year harvesting plan;

4.1.2 Road access management plan; and,

4.1.3 Review of equal opportunity.

4.3 If K&K requests BCTS to withhold harvesting for a period of time:

4.3.1 K&K agrees that BCTS can make up for the unharvested volume within the same business cycle or a future business cycle based upon mutual agreement.

4.3.2 BCTS may agree to forego any unharvested volumes through negotiations with K&K.

4.4 This provision is only intended to bind BC Timber Sales, and is not intended to limit the actions of other ministries or other offices and branches within the Ministry of Forests, Lands and Natural Resources Operations. The Parties agree that, for forest management purposes within the AOI, BCTS will not use any of the following, unless otherwise agreed to by the Parties.

4.4.1 Herbicides;

4.4.2 Insecticides;

4.4.3 Biological control (e.g. Cyphocleonus achates beetles for the control of knap weed);

4.4.4 Organic products (e.g. plantskydd).

4.5 The Parties agree that the division of any reduction in timber volume, either due to management decisions by K&K or due to circumstances beyond the control of either Party, will be mutually agreed to and supported by a timber supply review where required.

4.6 The Parties agree to share the liabilities in the occurrence of a natural event, which is not caused by either Party's actions, that impacts the AOI (i.e. wind throw, fire, invasive species) and will cooperatively work to mitigate and manage the risk and share in the costs of the damage or loss equal to their percentage of total allocated volume within the boundaries of the AOI.

4.7 BCTS agrees to assist in developing the capacity of K&K through mutually agreed upon measures consistent with government policy (as in Schedule '**[C]**').

5. Certification

5.1 BCTS operations will be monitored for compliance with BCTS ISO 14001 Environmental Management System (EMS) certification and Sustainable Forestry Initiative (SFI) standards applicable to BCTS' Chinook Business Area operations.

5.1.1 Monitoring and evaluation of forest management activities will be carried out by BCTS.

5.2 The Parties will be registered with Work Safe BC and Safe Certified by the BC Forest Safety Council.

5.3 BCTS agrees to work with K&K to assist them in obtaining Third Party certification, where they desire, through mutually agreed upon measures consistent with government policy.

6. Operational Management

6.1 The Parties agree to develop and implement a mutually agreed upon joint five-year Forest Development Plan ("FDP") that shows the location and year of activity for block engineering, road development, block harvesting, reforestation, and road deactivation and maintenance.

6.2 The Parties agree to develop and implement a mutually agreed upon annual works plan that will identify:

6.2.1 An annual schedule of proposed forest development;

6.2.2 Assignment of forest development to each Party;

6.2.3 Planned road construction, maintenance and deactivation;

6.2.4 Any silviculture activities, including, for clarity, activities that may be undertaken by either Party for the AOI; and,

6.2.5 Activity cost estimates where the Parties have agreed to share costs.

6.3 Should the Parties enter into purchase agreements or service agreements in the future, to purchase or deliver works and services approved in the annual works plan, the Parties will negotiate contract rates as and when required. Development costs must meet the test of competitive benchmarking and will not exceed experienced costs for similar activities, based on comparable BCTS contracts tendered within the preceding 5 years in the Chinook Business Area, wherever available.

6.4 Service agreements between the Parties may be directly awarded to K&K subject to the procurement laws and consistent with all applicable policies of the Province.

6.4.1 Where BCTS is purchasing a product or asset from K&K, BCTS reserves the right to undertake monitoring and evaluation of any phase of product or asset development, and input from BCTS must be considered and addressed prior to the final purchase of the product or asset.

6.5 K&K will carry out block engineering.

6.5.1 BCTS may buy fully developed TSL's from K&K to meet the Crown objectives;

6.5.1.1 Subject to an event precipitating BCTS needing to layout some portions of their volume to support the Market-based Pricing System

6.5.1.1.1 The Parties shall review and discuss requests from BCTS to complete a portion of block layout for MPS considerations, prior to such development occurring

6.5.2 All works provided by K&K must, at a minimum, meet the related multi-phase 'Standards' as provided in the service agreement documents and outlined in Appendix "A" of this Agreement. Multi-phase 'Standards' provided in Appendix "A" of this Agreement may be changed from time to time to account for new business requirements

6.6 Each Party will undertake road construction, maintenance and deactivation of roads (i.e. in-block roads, roads needed for connecting blocks with main roads for hauling) according to the specific timelines consistent with the annual works plan.

6.6.1 Road construction, maintenance and deactivation responsibilities may be transferred between Parties when there is mutual agreement.

6.6.2 The Parties agree to work towards joint provision of infrastructure by negotiating a mutually beneficial agreement on the sharing of costs pertaining to road construction and infrastructure maintenance, upgrading and replacement within the AOI.

6.6.3 K&K may require BCTS licence holders to enter into Road Maintenance Agreements to share maintenance costs in accordance with Section 22.3 of the *Forest and Range Practices Act.*

6.7 The Parties will jointly complete an equitability analysis every five (5) years and/or consistent with any cut control provisions that may exist in the AOI to ensure there is equal opportunity between the Parties.

6.7.1 If the analysis concludes that the profile harvested is inequitable, the Parties will develop a corrective action plan to ensure equitability is achieved by the end of the next annual works plan.

6.8 Where K&K provides fully developed TSLs to BCTS for its apportionment within the AOI, the volume of timber provided must be economically viable.

6.8.1 Economic viability pursuant to section 6.7 will be assessed on a block by block basis.

6.8.2 The volume of fully developed TSLs provided to BCTS may vary from year to year, with the goal that BCTS will be able to achieve its volume target over the five (5) year business cycle.

6.9 The Parties agree to manage waste associated with their respective Volume Allocations, and carry out waste assessments, where required, in accordance with the Provincial Logging Residue and Waste Measurement Procedures Manual, as amended or replace from time to time.

6.9.1 If alternate uses of waste by secondary fibre utilizers can be achieved, the Parties agree to allow this enhanced utilization to occur as long as it does not impact other legal obligations.

6.9.2 If avoidable waste is found in the waste assessment, the Party in control of harvesting the cut block where the avoidable waste was found will be responsible for payment in accordance with the Provincial Logging Residue and Waste Measurement Procedures Manual, as amended or replaced from time to time.

6.10 The Parties will have access to timber volume in the entire AOI, as established in the annual works plans.

6.11 BCTS will be responsible for:

6.11.1 The advertising, issuance and administration of TSLs and related tenures issued in accordance with this Agreement;

6.11.2 Silviculture obligations related to TSLs;

6.11.3 Data entry into government systems (i.e. appraisal module); and,

6.11.4 Data entry into Trimble – Land Resource Manager.

6.12 K&K will be responsible for:

6.12.1 The preparation of TSL tender packages within the AOI;

6.12.2 Works related to silviculture obligations in respect to TSLs, subject to a direct award contract to carry out BCTS silviculture activities; and,

6.12.3 Data entry into Trimble – Land Resource Manager.

6.13 The Rate of Cut in the AOI will be based upon K&K's approved Management Plan and the Parties will be allotted an agreed upon annual volume within the AOI.

6.14 If K&K choses to follow a Rate of Cut in the AOI lower than that which is derived from the approved Management Plan:

6.14.1 BCTS may harvest their reservation volume of timber at a reduced Rate of Cut as agreed to with K&K, subject to mutual agreement between the Parties.

6.15 If K&K choses to harvest their full AAC apportionment, K&K will not request that BCTS reduce the Rate of Cut unless K&K has a reason that is expressed and mutually agreed upon by the Parties.

6.16 The Parties agree to calculate the annual and periodic Rates of Cut subject to Timber Supply Review requirements, as required by legislation or agreed to by the Parties.

6.17 When harvesting activities occur in a scale-based TSL, the Parties agree to reconcile cruise estimates to actual harvested amounts, including normal production and avoidable waste, on a cutting authority basis.

6.18 The Parties agree to enter into discussions concerning any volume uplifts that are identified through a timber supply review process. As agreed to between the Parties, BCTS will acquire any uplift volume until such time as BCTS achieves a rate of cut equivalent to the volume contribution of the BCTS operating areas added to the AOI, subject to any timber supply processes.

6.19 The Parties agree that efforts will be placed on not bringing a third party into the AOI without the consent of the Parties.

7. Information Management

7.1 BCTS will maintain a ledger of blocks offered by K&K to BCTS, and accepted by the TSM for tender as a TSL. Blocks remaining unsold in BCTS inventory after five (5) years will be re-evaluated for viability, choosing one of the options as follows:

7.1.1 If BCTS decides to keep the block in the inventory, then it would be considered as a new block, and the associated volume would be counted as new volume.

7.1.2 If BCTS returns the block in the inventory to K&K after five (5) years, then, K&K may purchase the block from BCTS at a cost equal to the cost paid by BCTS for the block or K&K will substitute a different block of comparable value at no additional charge.

7.1.3 If neither Party decides to keep the block, then the block will be discarded without any compensation to BCTS for the block purchasing cost.

7.1.4 If K&K decides to harvest the block discarded in option 7.1.3, then, option 7.1.2 will apply and K&K must pay original sale price minus the cost of re-development to bring it up to current standard.

7.2 BCTS will maintain site level spatial and tabular data records of all timber harvest and related activities in its Information Management System.

8. Financial Management

8.1 Subject to applicable BC Government procurement policies and procedures, K&K will identify, track and invoice costs incurred by K&K related to the planning, management and development of BCTS TSLs in the AOI in accordance with BCTS cost accounting requirements, as detailed in the purchase or service contracts.

8.2 The Parties will be responsible for a percentage of all Tenure Obligation Costs equal to their percentage of Total Allocated Volume within the boundaries of the AOI, pursuant to section 109(3) of the *Forest Act*.

8.3 Unless this agreement states otherwise, each Party will bear its own costs for all matters conducted under this agreement. Neither Party may cause the other Party to enter into contracts or incur expenses without the other Party's express written consent.

8.4 K&K agrees to suspend road use charges ("trespass fees"), if any, to BCTS licensees using roads for industrial purposes within **FNWL N2Z**.

8.5 The Parties may agree to enter into a BCTS Disposition Agreement pursuant to section 22.2 of the *Forest Act*, which must:

8.5.1 Describe the rights that the holder of the non-BCTS licence is releasing to the government, including identifying the non-BCTS licence under which those rights are held, and;

8.5.2 Specify the consideration to be provided by the government to the holder of the non-BCTS licence for the value of the rights released to the government.

8.5.3 The consideration provided for the release of harvest rights may fluctuate based on the risk assumed by BCTS.

9. Communication/Referrals

9.1 Any notice or other communication that is required to be given, or that a Party wishes to give to the other Party with respect to this Agreement, will be in writing. The Parties agree to allow for fifteen (15) business days for notice to engage in consultation or amendments to the management of the licence.

9.2 The Parties will jointly participate in communications with other interested parties, including addressing concerns raised by the public, stakeholders, First Nations, or audit entities.

9.2.1 The Primary contact for communication will be agreed upon by the Parties on a case-by-case basis.

9.2.2 The Parties will have input if there is a difference of opinion in terms of any response from the Primary Contact.

9.2.3 The TSM maintains responsibility for consultation with First Nations whose aboriginal interests may be impacted by BCTS activities within the AOI.

9.2.4 Consultation and engagement activities with other interested parties within the AOI will be consistent with the approved Management Plan.

9.2.5 The Parties agree to share information on a monthly basis about communication and consultation concerning any other parties in the AOI.

9.2.5.1 The Parties may meet more frequently as required, or postpone a meeting if there is no information to share about communications and consultation.

9.2.5.2 Within 90 days of signing this Agreement, the Parties agree to determine a format of communication that is consistent with both Parties' tracking systems.

10. Dispute Resolution

10.1 If a dispute arises between the Parties concerning any matter governed by this Agreement, the disputing Party shall promptly advise the other Party, in writing, and the Parties together shall undertake all reasonable efforts to resolve the disputes informally.

10.2 If the Parties are unable to resolve the dispute informally within fifteen (15) working days, the disputing Party shall then give notice, within fifteen (15) working days of the complaint to the other Party, which shall include the following particulars:

10.2.1 A detailed description of the nature of the complaint;

10.2.2 A list of relevant provisions of the agreement; and,

10.2.3 An evaluation by the disputing Party of the matters in dispute.

10.3 The Party shall, within 30 working days of receipt of the written complaint, give the disputing Party a decision, in writing of one of the following.

10.3.1 That the Party accepts the position of the disputing Party. Or,

10.3.2 That the Party rejects the position of the disputing Party.

10.4 If the Party accepts the position of the disputing Party, the Parties shall enter into an Amending Document to reflect the Agreement.

10.5 If the Party rejects the position of the disputing Party, the Parties shall proceed to mediation with a mutually agreed upon third Party. If the dispute is not resolved within 90 days of the appointment of the mediator, the Parties may, if they agree, proceed to termination of this agreement.

10.5.1 The Parties will each pay fifty (50) percent of the related costs invoiced by the mediator.

11. Term and Amendment

11.1 This Agreement will take effect once the Parties have signed the Agreement and will remain in effect until it is terminated as per Section 12.1.

11.2 Either Party may request a review of the effectiveness of this Agreement annually to consider amendments to this Agreement.

11.3 Any proposed amendments made to the terms of this Agreement will be made in writing by one of the Parties, and will come into effect when the Parties sign the amended Agreement.

12. Termination of Agreement

12.1 This Agreement will remain in effect until:

12.1.1 It is terminated by either Party on giving 30 days' notice to the other Party in writing. Or,

12.1.2 The date on which the Parties mutually agree to terminate this Agreement.

12.2 The termination of this Agreement under 12.1 does not affect the obligation of a Party to pay any amounts due under invoices issued for work completed prior to the date of termination or the obligation of a Party to complete any work for which payment has already been made.

12.3 A Party may give notice to the other Party that it is their belief that the actions of the other Party are either negatively impacting the Agreement or the AOI. In such cases, the Parties agree to meaningful discussions to resolve the perceived concerns.

13. Miscellaneous

13.1 Nothing in, under or arising out of this agreement either abrogates or derogates from any aboriginal rights, aboriginal title or treaty rights of any applicable First Nation, nor relieves the Province of any obligation to consult with any applicable First Nation.

13.2 Nothing in this Agreement is intended to alter the legislative authority of either Party or fetter the discretion of any government statutory decision-maker.

13.3 The schedules and appendices to this Agreement form part of the Agreement.

13.4 The parties, through mutual agreement, will provide assets to the partnership that will enhance the relationship between the parties, and, benefit the overall sustainable forest management of the AOI. These assets may be provided solely by one party or cost shared by the parties at a mutually agreed to ratio based upon a pro-rated allowable annual cut.

13.5 From time to time the parties may exchange digital data; e.g., LiDAR data. This agreement recognizes that any data provided to the other party may only be used for the purpose facilitating forest management activities within AOI unless otherwise agreed to by the party providing the data.

Signed on behalf of K&K:

_____ _____

[Representative] Date
[Title]
[First Nation]

Signed on behalf of Her Majesty the Queen in right of the Province of British Columbia as represented by the Minister of Forests, Lands and Natural Resource Operations, BC Timber Sales:

_____ _____

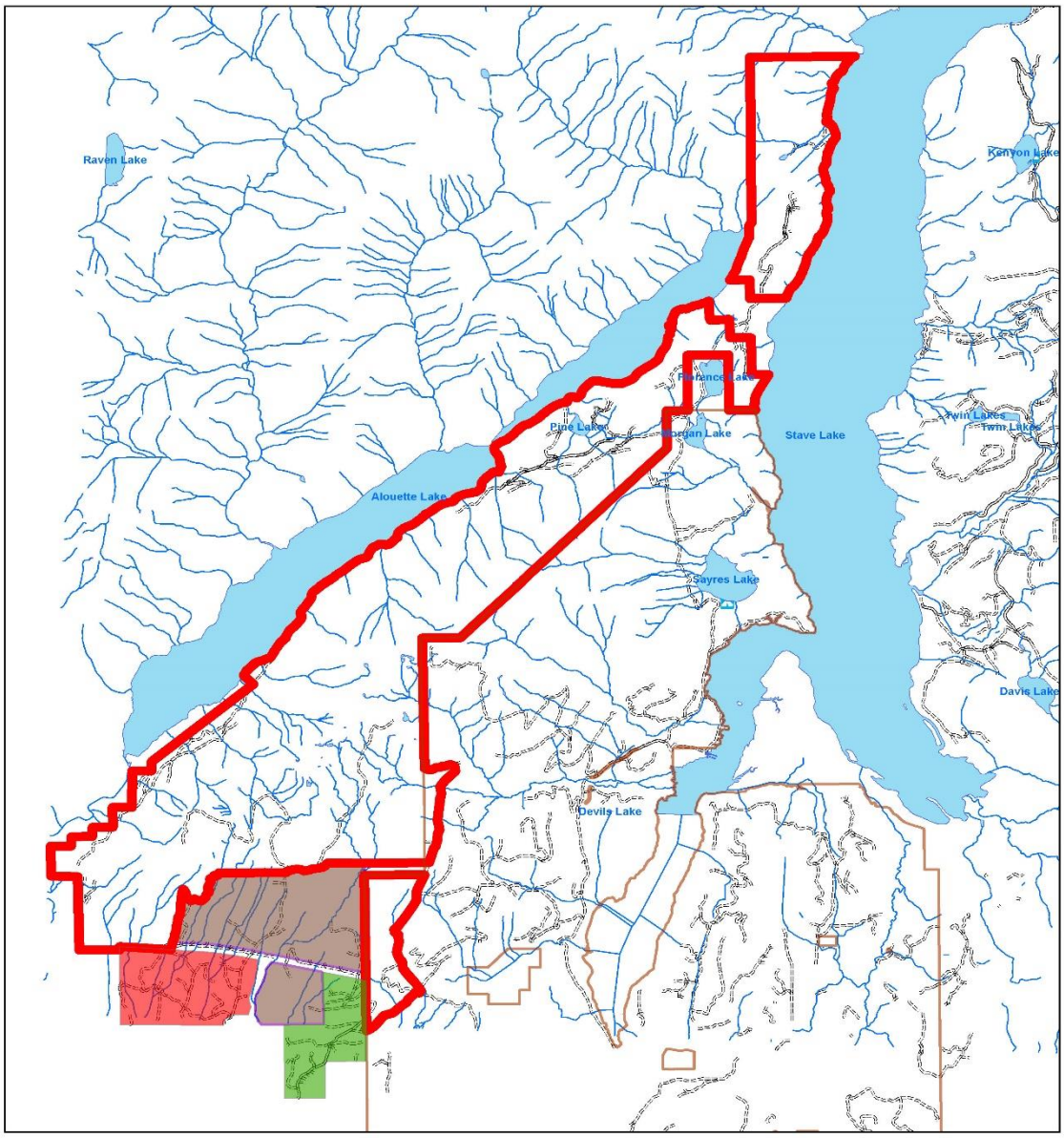
Kerry Grozier Date
Timber Sales Manager
Chinook Business Area

Schedule A – AOI Boundary Map

Kwantlen-Katzie FNWL #N2Z
Overview Location Map

N

1:80,000



KatzieKwantlenFNWL
W0086 Boundary
W0007
W0038
TFL26 Boundary
Lake
TRIM Stream
Forest Road Sections

CASCADIA ENVIRONMENTAL SERVICES LTD.

Cascadia Envirionmental Services
Date: 2017-11-24
Drawn by: CG

Schedule B – BCTS Disposition Agreements

Monetary Consideration for the temporary reduction in the AAC for the Licence (as referenced in 1.11 above):

If required, the Monetary Consideration Formula will be discussed and agreed to by the Parties.

Schedule C – Capacity Development Measures

As referenced in 4.7 above.

BC Timber Sales will invite K&K to participate in joint training sessions, where the training will help build capacity for the Katzie and Kwantlen First Nation communities. Examples of types of training may include (but not limited to):

a. SFI
b. EMS
c. SAR
d. Invasive Plants

Schedule D – Potential Clauses that May be Entered into a Purchase Agreements/Service Agreements

Including the following clauses in the PA/SA where necessary:

1. Purchase and Service Agreements
   1.1. The Parties may enter into purchase agreements or service agreements or both, to purchase or deliver works and services approved in the annual works plan, including but not limited to:
      1.1.1. Road and block engineering, surveys, assessments, cruising and appraisal data compilations;
      1.1.2. Road construction, maintenance, and deactivation;
      1.1.3. Site plans;
      1.1.4. Silviculture obligations;
      1.1.5. Consultation and information sharing;
      1.1.6. Timber sale package preparation.
2. Purchase or service agreements between the Parties may be directly awarded to K&K subject to the government procurement policy and consistent with all applicable policy of the Province.
   2.1. K&K will assume all legal and financial liabilities associated with the work completed under a service provision agreement with BCTS.
   2.2. K&K may choose to sub-contract directly awarded service provisions provided that K&K assumes all legal and financial liabilities associated with the work completed by the sub-contractor.
   2.3. 'Standards' provided by BCTS may be changed from time to time to account for new business requirements.
3. Purchase or service agreements between the Parties
   3.1. K&K will assume all legal and financial liabilities associated with the work completed under a service provision agreement with BCTS.
   3.2. K&K may choose to sub-contract directly awarded service provisions provided that K&K assumes all legal and financial liabilities associated with the work completed by the sub-contractor.
   3.3. Should K&K fail to sufficiently develop the work specified in a service provision, K&K will compensate BCTS to an equivalent monetary value required to bring the work to the necessary standards or by successfully completing the work at no additional charge to BCTS.
   3.4. Where K&K continues to fail to provide works that meet the necessary 'Standards,' as provided by BCTS Chinook, BCTS retains the right to assume all related activities.
      3.4.1. 'Standards' provided by BCTS may be changed from time to time to account for new business requirements.
   3.5. Purchase Agreements
      3.5.1. Where BCTS is purchasing a product or asset from K&K, BCTS reserves the right to undertake monitoring and evaluation of any phase of product or asset development, and, input from BCTS must be considered and/or addressed prior to the final purchase of the product or asset.
   3.6. Block Engineering
      3.6.1. K&K will carry out block engineering.
         3.6.1.1. BCTS may buy fully developed TSL's from K&K to meet the Crown objectives;
         3.6.1.2. All works provided by K&K must, at a minimum, meet the related 'Standards' as provided in the service agreement documents.

Appendix A – Multi-Phase Standards (to be attached in full – 40 pages)

1. Professional Reliance
2. Block Planning
3. Professional Assessments
4. Block Layout
5. Block and Road Site Plans
6. Appraisals
7. Timber Cruising
8. Mapping
9. Road Data Collection, Inspections, Prescriptions
10. Road Layout and Design
11. Tender Package Submissions
12. Helipad Construction
13. Invasive Plants
14. Species at Risk
15. Windthrow Assessments
16. Detailed Project Management Plan
17. Sustainable Forestry Initiative
18. Total Resource Planning

Appendix G: Public Consultation

First Nations
First Nations Relations FLNRORD, Chilliwack BC

Forest Licensees
District of Mission TFL26
Woodlot W0007 – BCIT Forest Society (Blue Mountain)
Woodlot W0038 (Blue Mountain Woodlot Ltd.)
Woodlot W0086 (Blue Mountain)

General Public
Mission City Record: Newspaper ad published December 8th, 2017 and January 5th, 2018
Maple Ridge News: Newspaper ad published December 8th, 2017 and January 5th, 2018

Government
City of Maple Ridge
Golden Ears Provincial Park (Operated by Alouette Park Management Ltd.)
Kanaka Creek Regional Park
Ministry of Forests
BC Timber Sales

User Groups
Alouette Field Naturalists – Maple Ridge & Pitt Meadows
Alouette River Management Society (ARMS)
Blue Mountain Motorcycle Club (BMMC)
Fraser Valley Mountain Bikers Association (FVMBA)
Haney Horseman
Kanaka Education and Environmental Partnership Society (KEEPS)

Water Licences
Community Watershed Intake (PD43917)
Cooper Creek Water Licence (PD43919)
Cooper Creek Water Licence (PD43956)
McFadden Creek Water Licence (PD43950)
Pinoche Brook Water Licence (PD43947)

Additional Active Water Licences
Kenneth Raymond Anderson
BC Hydro and Power Authority
Clean Balance Power Inc.
Fisheries and Oceans Canada
Parks and Protected Areas (BC Parks)
Guang Wang & Lu Hengzhu

Traplines
TR0208T008

Additional Groups
Blue Mountain Conservation Society
Blue Mountain Explorations – Shale Deposit
District Lot 3209
Metro Vancouver

Appendix H: Letters of Support

Appendix H

DISTRICT OF Mission ON THE FRASER

FORESTRY DEPARTMENT

November 6, 2017

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6
Attention: Debbie Miller, Tumia Knott

Dear Debbie and Tumia

RE: TFL26 Support for K&K Forestry Operations Ltd. First Nations Woodland Licence Application

Tree Farm Licence No. 26 (TFL26) fully supports the application by K&K Forestry Operations Ltd. for a First Nations Woodland Licence (FNWL) to the Ministry of Forests, Lands, and Natural Resource Operations Regional Executive Director. TFL26 has worked closely with K&K on a Forestry land exchange that provides benefits to both K&K and the District of Mission for our respective Forest Tenures. On March 6, 2017, our Mayor and Council provided a support letter for the proposed land exchange and the establishment of a FNWL.

We look forward to continuing our collaborative working relationship with K&K and wish them every success as they move forward on managing the FNWL, and providing numerous benefits for their respective communities.

Yours truly

Bob O'Neal, RPF
Director of Forestry

cc Mike Peters, District Manager, FLNRO
Dave Heyes

P.O. Box 20, 33835 Dewdney Trunk Road, Mission, B.C. V2V 4L9
Phone: 604-820-3764 Fax: 604-826-8633 Web Site: www.mission.ca E-mail: dheyes@mission.ca

The District of Mission Forestry Department Is SAFE Company Certified as of December 2006

As a leader in protecting the environment, a comprehensive Environmental Management System is used for Mission Tree Farm Licence 26 operations

Appendix H

BCIT Forest Society – Woodlot 0007
28101 Dewdney Trunk Road
Maple Ridge BC V2W 1M1

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

27 October 2017

Attention: Debbie Miller, Tumia Knott

RE: K&K Forestry Operations Ltd. First Nations Woodland Licence Application

Dear Debbie and Tumia

BCIT Forest Society – Woodlot 0007 fully supports the K&K Forestry Operations Ltd application for a First Nations Woodland Licence (FNWL) to the Ministry of Forests, Lands, and Natural Resource Operations. We wish you every success with your application and know that it will provide numerous benefits to both Katzie and Kwantlen communities.

We look forward to a long and positive working relationship with K&K Forestry Operations Ltd. as we work collaboratively for the long term and sustainable management of forest lands on Blue Mountain.

Yours Truly

Jonathan Smyth
President
BCIT Forest Society

Appendix H

BLUE MOUNTAIN WOODLOT LTD.
1101 – 409 Granville Street
Vancouver, B.C.
V6C 2S6

November 7, 2017

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

Attention: Debbie Miller, Tumia Knott

RE: K&K Forestry Operations Ltd.'s First Nations Woodland Licence Application

Dear Debbie and Tumia

Blue Mountain Woodlot Ltd. supports the application for a First Nations Woodland Licence (FNWL) by K&K Forestry Operations Ltd. to the Ministry of Forests, Lands, and Natural Resource Operations Regional Executive Director.

Blue Mountain Woodlot and our associated companies have a positive and productive working relationship with Kwantlen First Nation at Woodlot W0086, and we look forward to a similar working relationship with K&K moving forward on the FNWL.

We wish K&K every success as they move forward on managing the FNWL, providing numerous benefits to their respective communities.

Yours Truly

BLUE MOUNTAIN
WOODLOT LTD.

Ron Andersen
President

Appendix H

Taseko Timber Ltd.
Ste 203-7385, Duncan Str.
Powell River, BC V8A 1W6

K&K Forestry Operations Ltd.
10946 Katzie Road
Pitt Meadows, BC V3Y 2G6

Attention: Debbie Miller, Tumia Knott

RE: K&K Forestry Operations Ltd. First Nations Woodland Licence Application

Dear Debbie and Tumia

Teseko Timber Ltd. fully supports the application by K&K Forestry Operations Ltd. for a First Nations Woodland Licence (FNWL) to the Ministry of Forests, Lands, and Natural Resource Operations Regional Executive Director. Teseko Timber has had a productive working relationship with Kwantlen First Nation at Woodlot W0086, and we look forward to a positive working relationship with K&K moving forward on the FNWL. We wish K&K Forestry Operations Ltd. every success as they move forward on managing the FNWL, providing numerous benefits to their respective communities.

Yours Truly

Howie McKamey
Teseko Timber Ltd.

Appendix I: Glossary of Terms

AAC	Allowable annual cut
ASPE	Accounting Standards for Private Enterprise
CWHvm1	Coastal Western Hemlock sub-montane very wet - maritime
Co-dominants	Trees whose crowns form the main canopy of a forest
CWHvm2	Coastal Western Hemlock Montane very wet maritime
CWHdm	Coastal Western Hemlock dry maritime
FLNRO	Ministry of Forests, Lands and Natural Resource Operations
FNWL	First Nations Woodland Licence
FPPR	Forest Planning and Practices Regulation
FRPA	Forest and Range Practices Act
FSP	Forest Stewardship Plan
Geographic Information System (GIS)	A geographic information system, also known as a geographical information system or geospatial information system, is a system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to the Earth.
Green-up	The time needed after harvesting for a stand of trees to reach a desired condition (usually expressed as a specific height) - to ensure maintenance of water quality, wildlife habitat, soil stability, or aesthetics - before harvesting is permitted in adjacent areas.
Growing stock	The volume estimate for all standing timber at a particular time.
Inoperable areas	Areas defined as unavailable for timber harvest for terrain related or economic reasons. Operability can change over time as a function of changing harvesting technology and economics.
Integrated Resource Management (IRM)	The identification and consideration of all resource values, including social, economic and environmental needs in resource planning and decision-making.
Karst features	Karst is a distinctive topography that develops as a result of the dissolving action of water on carbonate bedrock (usually limestone, dolomite or marble). Karst features include fluted rock surfaces, vertical shafts, sinkholes, sinking streams, springs, complex sub-surface drainage systems and caves.
Landscape-level biodiversity	The Landscape Unit Planning Guide and the Order Establishing Provincial Non-Spatial Old Growth Objectives provide objectives for maintaining biodiversity at the landscape level and stand level. At the landscape level, objectives are provided for the maintenance of old growth.
Landscape units	Long-term planning areas, ranging in size from 5,000-100,000 hectares; used to integrate resource development and conservation activities by enabling understanding of ecological processes, landscape management visioning, and implementation of biodiversity strategies.
Long-term harvest level	A harvest level that can be maintained indefinitely given a particular forest management regime (which defines the timber harvesting land base, and objectives and guidelines for non-timber values) and estimates of timber growth and yield.
m^3	Cubic meter
MAI	Mean annual increment

Management assumptions	Approximations of management objectives, priorities, constraints and other conditions needed to represent forest management actions in a forest planning model. These include, for example, the criteria for determining the timber harvesting land base, the specifications for minimum harvestable ages, utilization levels, and integrated resource management and silviculture and pest management programs.
MHmm1	Mountain Hemlock windward moist maritime
Model	An abstraction and simplification of reality constructed to help understand an actual system. Forest managers and planners have made extensive use of models, such as maps, classification systems and yield projections, to help management activities.
MOE	Ministry of Environment
MOFR	Ministry of Forestry and Range
Natural disturbance type (NOT)	An area that is characterized by a natural disturbance regime, such as wildfires and wind, which affects the natural distribution of seral stages. For example, areas subject to less frequent stand-initiating disturbances usually have more old forests.
Non-recoverable losses	The volume of timber killed or damaged annually by natural causes (e.g. fire, wind, insects and disease) that is not harvested.
NTFPs	Non-timber forest products
NTR	Non-timber resources
OGMAs	Old growth management areas
Operability	Classification of an area considered available for timber harvesting. Operability is determined using the terrain characteristics of the area as well as the quality and quantity of timber on the area.
Riparian area	Areas of land adjacent to wetlands or bodies of water such as swamps, streams, rivers or lakes.
Riparian habitat	The stream bank and flood plain area adjacent to streams or water bodies.
RMZ (stream context)	Riparian Management Zone. That portion of the riparian management area that is outside of any riparian reserve zone or if there is no riparian zone, that area located adjacent to a stream, wetland or lake of a width determined in the Forest Planning and Practices Regulation.
RMZ (under VILUP)	Resource Management Zones
Sensitivity analysis	A process used to examine how uncertainties about data and management practices could affect timber supply. Inputs to an analysis are changed and the results are compared to a baseline or the base case.
Site index	A measure of site productivity. The indices are reported as the average height, in meters, that the tallest trees in a stand are expected to achieve at 50 years (age is measured at 1.3 meters above the ground).
Site Index by Biogeoclimatic Ecosystem Classification site series (SIBEC)	Site index estimates for tree species according to site units of the Biogeoclimatic Ecosystem Classification system of British Columbia.
SMZ	Special Management Zones

Stocking	The proportion of an area occupied by trees, measured by the degree to which the crowns of adjacent trees touch, and the number of trees per hectare.
THLB	Timber Harvesting Land base
TIPSY (Table Interpolation Program for Stand Yields)	A BC Forest Service computer program used to generate yield projections for managed stands based on interpolating from yield tables of a model (TASS) that simulates the growth of individual trees based on internal growth processes, crown competition, environmental factors and silvicultural practices.
Timber Harvesting Land Base (THLB)	Forest land within the HFNCFAI timber harvesting is considered both acceptable and economically feasible, given objectives for all relevant forest values, existing timber quality, market values and harvesting technology.
Timber supply	The amount of timber that is forecast to be available for harvesting over a specified time period, under a particular management regime.
Tree Farm Licence (TFL)	Provides rights to harvest timber, and outlines responsibilities for forest management, in a particular area.
TSA	Timber Supply Analysis
Ungulate	A hoofed herbivore, such as a deer.
Volume estimates (yield projections)	Estimates of yields from forest stands over time. Yield projections can be developed for stand volume, stand diameter or specific products.
Watershed	An area drained by a stream or river. A large watershed may contain several smaller watersheds (basins).
Wildlife tree	A standing live or dead tree with special characteristics that provide valuable habitat for wildlife.