

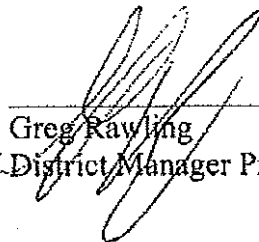
Prince George Timber Supply Area Timber Supply Review

Data Package

November 2008



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1. Introduction

This data package summarizes the basic information and assumptions required for the Prince George Timber Supply Area (PGTSA) timber supply analysis.

The completed data package contains those inputs that represent current performance for the TSA. For the purpose of the Timber Supply Review (TSR), "current performance" can be defined by:

- the current forest management regime — the productive forest land available for timber harvesting, the silviculture treatments, the harvesting systems and the integrated resource management practices used in the area;
- fully implemented land-use plans;
- land-use decisions approved by Cabinet;
- orders issued through the Government Actions Regulation of the *Forest and Range Practices Act (FRPA)* for ungulate winter range (UWR);
- the order establishing landscape biodiversity objectives for the PGTSA.

The primary purpose of the TSR program is to model "what is" not "what if". Changes in forest management objectives and data, when and if they occur, will be captured in future timber supply analyses.

Each section of this data package includes.

- 1) A short explanation of the data required.
- 2) A data table or lists of modeling assumptions;
- 3) A description of data sources and other comments.

The information in this data package represents the best available knowledge at the time of publication, but is subject to change. A public review period has been established to allow submission of comments and concerns about the data package to the Ministry of Forests and Range. Submissions and new information made available prior to the analysis may lead to changes in the data listed in this package. Until the timber harvesting land base (THLB) is determined, it is not possible to finalize the values shown in some of the tables in this document. Where the final value is not yet available, the applicable columns are shaded grey. In addition, should any major changes in management practices occur during the next few months, the timber supply analysis will attempt to capture them. The final timber supply analysis report will include a technical appendix that highlights any changes made to this data package.

The data in this package was prepared by a technical working group comprised of government (Ministry of Forests and Range, Integrated Land Management Bureau, Ministry of Environment) and licensee representatives. Group consensus was achieved on the majority of the issues; however, where there were uncertainties or disagreements, sensitivity analysis will be used to assess the level of risk.

2. Current Forest Management Considerations and Issues

2.1 Base case management assumptions

The assumptions described in this section reflect current performance with respect to the status of forest land, forest management practices and knowledge of timber growth and yield. The harvest forecast developed from these assumptions is termed the base case harvest forecast and is used as a reference when examining the effects of uncertainties. Section 7, “Sensitivity Analyses” identifies areas of uncertainty in the data and assumptions and outlines intended sensitivity analyses.

2.2 Statement of forest management considerations and issues

The following table lists major forest management issues and considerations. Where possible, the issues will be assessed directly in the timber supply analysis. If the issue does not fall within the definition of current management as described in Section 1, the related timber supply impacts will be assessed in a sensitivity analysis. There may be significant uncertainties in defining some current management issues. In such cases, sensitivity analysis can assist in assessing the potential timber supply implications and assigning degrees of risk to timber supply during the allowable annual cut (AAC) determination.

Table 1. *Forest management considerations*

| Consideration/issue | Description |
|--|---|
| Management of pine/non-pine resource and the need for a non-pine partition | <p>The efficacy of a partition to ensure non-pine leading stands are harvested at sustainable levels will be assessed during the analysis.</p> <p>Each forest district within the PGTSA has created a mid-term mitigation strategy, and a component of this strategy is a report card. This report card will indicate on the amount of pine/non-pine that is harvested within the district by year.</p> |
| Mountain Pine Beetle (MPB) impacts | <p>The British Columbia Mountain Pine Beetle (BCMPB) Version 5 model will be utilized to account for current pine mortality, as well as to predict future mortality. The mountain pine beetle epidemic has peaked for the Vanderhoof (VFD) and Prince George Forest Districts (PGFD), and for the Fort St. James Forest District (FSJFD). BCMPB v.5 predicts mortality levels culminating for mature pine (age 61+) at 70 percent for PGFD and 77 percent for the VFD. However, mortality has recently been observed at significantly higher levels. Mortality studies have been done by various research initiatives and will be compared with BCMPBv.5 predictions.</p> |

(continued)

2. Current Forest Management Considerations and Issues

Table 1. Forest management considerations

| Consideration/issue | Description |
|--|---|
| Mortality in immature pine stands | Mortality in immature pine stands (< 60 years old) was not modelled in the previous TSR. Data was collected in all three districts and will be used in the analysis. |
| Balsam decline in Fort St. James | Significant mortality in balsam-leading stands in the Fort St. James District will be explicitly accounted for in this TSR. |
| Order establishing landscape biodiversity objectives for the PGTSA | A new order was brought into force on October 20, 2004 and its requirements will be modelled in this TSR. |
| ICH management | New and ongoing developments since the previous TSR include: changes in policy, public interest and scientific research in forest management in the interior cedar hemlock (ICH) biogeoclimatic zone. |
| Visual landscape inventory | A new visual landscape inventory specifies conditions for the management of visually sensitive areas has been completed for inclusion in the base case. This TSR will follow recently developed procedures, incorporating slope classes for calculation of Plan to Perspective ratios (P2P) and Visually Effective Green-up (VEG). P2P ratios and VEG heights will be determined by 5% slope class increments in all scenic areas. These will then be applied in the analysis to adjust the percent allowable alteration by visual quality objective and slope class. |
| Wildlife management | New ungulate winter range (UWR) orders for mule deer, mountain caribou and northern caribou were established for the PGTSA. Order numbers U-5-001, U-7-002, 003, 011, 012, 013, and 015. New <i>Forest Act</i> , Section 7 orders were issued for UWR for northern caribou, mountain caribou and mountain goat and species at risk. |
| Stand-level biodiversity and riparian management | Stand-level retention will be modelled as a whole and will be comprised of wildlife tree patches (WTP), riparian reserves (lakeshore and stream), and reserves around archaeological features, etc. |
| Site productivity | Predictive Ecosystem Modelling (PEM) mapping completed for the PGTSA in conjunction with Site Index Biogeoclimatic Ecosystem Classification (SIBEC) will be used in identifying managed stand site productivity gains. |
| Economic operability | Economic operability will be assessed through a combination of stand value, harvest preference, and past practice. |

(continued)

2. Current Forest Management Considerations and Issues

Table 1. Forest management considerations

| Consideration/issue | Description |
|-----------------------------------|---|
| Deciduous utilization | In the last TSR, the chief forester partitioned 160 000 m ³ /year to deciduous forest types. There are two current deciduous licences with a combined AAC of 105 000 m ³ and BCTS is apportioned 40 000 m ³ . A community forest licence for 7000 m ³ /year of deciduous volume has been proposed. This leaves 8000 m ³ /year of the deciduous partition unapportioned. |
| Shelf-life | There is significant uncertainty regarding the length of time that a mountain pine beetle killed tree is usable as sawlog to make lumber (shelf-life). Some licensees in the PGTSA report that it is as little as 3 years while others suggest that sawlogs may be harvested from forests that have been dead for up to 40 years. There are several studies in progress that may clarify this issue. This information may allow the chief forester to establish a partition for dead pine, that the minister could apportion for bioenergy or other non-sawlog uses. To facilitate this, pine mortality and its contribution to the harvest flow will be tracked and reported through a year since death stratification of the contributing volume. |
| Regeneration in unsalvaged stands | Current research into stand dynamics during the MPB epidemic within the PGTSA will be utilized to model regeneration in unsalvaged pine-leading stands. |
| Recreation values | PGFD and FSJFD have legally established objectives for recreation sites and trails. VFD does not have legally established sites or objectives; however, sites will be managed as per current practice. |
| First Nations treaty negotiations | Both the Lheidli T'enneh First Nation and Yekooche First Nation have negotiated an agreement-in-principle, which identifies land that may be held by each First Nation at the time of final treaty or agreement with the governments of Canada and British Columbia. These agreements-in-principle identify land available in the provincial forest within the TSA and are subject to Part 13 Orders. These associated areas have been excluded from the THLB. |

(continued)

2. Current Forest Management Considerations and Issues

Table 1. Forest management considerations (concluded)

| Consideration/issue | Description |
|---|--|
| First Nations Forest Tenure partnerships | A large portion of the tenures held by First Nations are managed through partnership agreements or other contracted companies. This includes tenures offered by the Ministry of Forests and Range (MFR) as accommodation or interim treaty measures. In many cases, forestry involvement through partnerships is one of the very few avenues for First Nation communities to participate in the local economy of the TSA. In consideration of the previous, well-distributed forest tenures and harvesting, along with a sustainable rate of timber use is important for the maintenance of First Nations communities. |
| Cultural heritage resources and First Nations interests | First Nations have indicated that past and current aboriginal culture is closely associated with an elaborate network of trails, both ancient and modern. These trails were vital to the early fur trade, European settlement and modern economic development. For these reasons, heritage trails, along with the surrounding landscapes and features are a valued testament to the extensive history and culture within the TSA. |
| Wildlife in First Nations interests | The Ministry of Forests and Range will be gathering information on wildlife abundance, First Nations needs for wildlife, and impacts of harvesting on wildlife. The MFR will work with the Ministry of Environment in this process, and it is hoped that First Nations will contribute to help ensure the best information related to wildlife is available for use in the timber supply review. |
| Land and resource management plans | Each district within the TSA has a Cabinet-approved Land and Resource Management Plan (LRMP) (Vanderhoof 1997, Prince George and Fort St. James 1999); however, to date the plans are not approved as higher-level plans. Implemented forest practices designed to meet the objectives of the LRMP will be represented in the base case. |
| Crown land plan | A legal order, pursuant to section 93.4 of the <i>Land Act</i> , was established on November 21, 2006 for two of the zones identified within the Crown Land Plan. The order prohibits logging in Agriculture Development Areas (ADA) and Settlement Reserve Areas (SRA), except for environmental, safety and forest health purposes and will be accounted for in the TSR. |

3. Inventories

3.1 Background information

Inventories that will be used in identifying the timber harvesting land base and representing current forest management activities are listed in Table 2. Comments on how the information is being used in forest management are also provided.

Table 2. *Inventory information*

| Data | Inventory source | Vintage | Update |
|--|----------------------------|------------|--------|
| Vegetation Resource Inventory | Timberline Consultants/MFR | 2002-2007 | 2008 |
| Disturbance | MFR | 2007 | |
| Riparian features | MFR | 2002 | 2008 |
| Visual landscape inventory | MFR | 2007 | |
| Recreation features | MFR | 2002 | 2006 |
| Ungulate winter ranges | MOE | 2004, 2006 | 2007 |
| Land type classification | ILMB/MFR | 2008 | |
| Predictive ecosystem mapping | Timberline | 2003-2008 | |
| Landscape units | ILMB | 2004 | |
| Biogeoclimatic (BEC) units | MFR | 2006 | |
| Planning cells | MFR | 1999 | |
| PGTSA timber supply blocks and district boundaries | MFR | 2004 | |
| Transportation and transmission features | ILMB/MFR | 2008 | |
| BC MPB V5 Cumulative Mortality GRIDS | MFR | 2007 | |
| Physical operability | MFR | 1999 | 2007 |
| Balsam mortality grid | MFR | 2007 | |
| Terrain stability mapping | Licensee | 2002 | |
| Natural disturbance (merged BEC) units | ILMB | 2004 | 2007 |

Data sources and comments

Vegetation resource inventory (VRI)

The vegetation resource inventory is the current standard for vegetation inventories in the Province of British Columbia for all Crown-managed TSA and tree farm licence (TFL) lands.

The VRI consists of two key components: estimation of vegetation characteristics from aerial photographs (VRI photo-interpreted inventory), and statistically-based ground sampling (VRI ground sample inventory). The ground sample inventory is used to adjust the initial photo estimates.

3. Inventories

In 2000, stakeholders in the Vanderhoof Innovative Forestry Practices Agreement (IFPA) initiated a VRI project to update the local forest inventory for the (VFD). The project was completed in 2003. Concurrently, the PGTSA forest licensee group implemented a TSA-wide and integrated (VRI)/terrain mapping project between 2000 and 2005 for the FSJFD and PGFD. The phase 2 ground sampling and statistical adjustments were completed in the fall of 2007 and volume estimates were derived utilizing the newly released variable density yield projection (VDYP7) model.

Disturbance

A non-standard dataset of disturbance (harvesting, fire, windthrow) was developed to update and deplete the inventory to the summer of 2007. The disturbance dataset was compiled using recent openings submitted to the corporate database warehouse through the RESULTS silviculture obligation tracking system and remote sensing change detection analysis using 2007 Landsat 5 imagery.

BC Provincial Scale Mountain Pine Beetle Model mortality grids

The BC Provincial Scale Mountain Pine Beetle Model (BCMPB) was developed to assess the impacts of mountain pine beetle outbreak and management interactions across the entire province. The model uses forest cover data, the Provincial Aerial Overview of Forest Health and information from a stand-level mountain pine beetle (MPB) population model to estimate the current extent of pine mortality, and to project a possible course of the infestation into the future. For each of the past five years, updated versions have been developed to incorporate new infestation data and refine mortality projections. This TSR will utilize resultant data from the BCMPB v5 model. The model generates annual and cumulative mortality grids at a 16 hectares resolution. These grids are incorporated into the timber supply analysis to help define harvest flow projections.

Riparian areas

Streams, rivers, wetlands, and lakes are represented using TRIM2 data at 1:20,000 scale. Riparian reserve zones and lakeshore management zones have been buffered according to *Forest and Range Practices Act* (FRPA) default standards and subsequently merged into a non-standard dataset to facilitate analysis.

Visual landscape

The 2007 visual landscape inventory has been used to identify visually sensitive areas. The physiographic boundaries of visual landscape units are a standard dataset that resides in the Land and Resource Data Warehouse (LRDW).

3. Inventories

Recreation features

This dataset represents known recreation features across the PG TSA. The administrative boundaries of known recreation features within the TSA is a standard dataset that resides in the LRDW.

Ungulate winter ranges (UWRs)

An ungulate winter range (UWR) is defined as an area that contains habitat that is necessary to meet the winter habitat requirements of an ungulate species. UWR are based on our current understanding of ungulate habitat requirements in winter, as interpreted by the Ministry of Environment (MOE) regional staff from current scientific and management literature, local knowledge, and other expertise from the region. The physiographic boundaries of ungulate winter ranges within the PG TSA are a standard dataset that reside in the LRDW.

Land type classification

A non-standard land type classification dataset was developed specifically for this TSR utilizing updated information from a variety of sources including cadastral, tenure, and private land information available from the LRDW, the Integrated Land and Resource registry, and the Integrated Cadastral fabric. The various land types and data source are listed in the following table.

Table 3. *Land type classification*

| Code | Land type | Source |
|------|-----------------------------------|----------|
| WL | Woodlot | MFR/LRDW |
| ADA | Agricultural Development Area | MFR/ILMB |
| SRA | Settlement Reserve Area | MFR/ILMB |
| P | Park | MOE/LRDW |
| PA | Protected Area | MOE/LRDW |
| RA | Recreation Area | MOE/LRDW |
| ER | Ecological Reserve | MOE/LRDW |
| IR | Indian Reserve | MFR/LRDW |
| CF | Community Forest | MFR |
| TFL | Tree Farm Licence | MFR/LRDW |
| AIP | Agreement-in-Principle Lands | MFR |
| PL | Private Lands | ILMB |
| CTP | Christmas Tree Permit | MFR |
| CP | Community Pasture | MFR |
| CG | Crown Grant | MFR |
| FTAC | Federal Transfer of Admin Control | MFR |
| LPO | Lease with Purchase Option | MFR |
| ML | Miscellaneous Lease | MFR |

3. Inventories

Landscape unit boundaries

Landscape units are spatially identified areas of land and/or water used for long-term planning of resource management activities. Landscape units are important for designing strategies and objectives to maintain landscape-level biodiversity and for managing other forest resources. The physiographic boundaries of landscape units within the PGTSA are a standard dataset that reside in the LRDW.

Timber supply area and supply block boundaries

A timber supply area (TSA) is a designated area established by the Minister. TSAs were originally defined by an established pattern of wood flow from management units to the primary timber-using industries. They are the primary unit for allowable annual cut (AAC) determination. Timber supply blocks (TSBs) are subdivisions of the TSA for administrative purposes. The administrative boundaries of the PGTSA and its associated TSBs are a standard dataset that resides in the LRDW.

Planning cells

Planning cells are a sub-unit of a timber supply block. Planning cell boundaries are defined by physiographic and anthropomorphic features such as waterways, heights of land, and major roads. A non-standard dataset was derived utilizing TRIM2 base mapping layers.

Transportation and transmission

A non-standard dataset of transportation and transmission lines was developed utilizing a number of sources including a roads, trails and landings inventory project for the VFD completed by Timberline Forest Inventory Consultants Ltd. (Timberline) in 2008, as well as the digital road atlas and the as-built road dataset that resides within the LRDW. All road line work was aggregated and updated to the summer of 2007 using SPOT 5 imagery. Road buffering was based on field data collect in the roads, trails and landings inventory project for the VFD and further calibrated by District Engineering staff for the PGFD and FSJFD.

Biogeoclimatic ecosystem classification (BEC)

The Biogeoclimatic Ecosystem Classification (BEC) system forms the conceptual framework for natural resource management and scientific research in British Columbia. At a regional level (like the PGTSA) vegetation, soils, and topography are used to infer the climate and to identify geographic areas that have relatively uniform climatic conditions. These geographic areas are termed biogeoclimatic (BEC) units. These units are further subdivided into subzones and variants based on further refinements of climate (e.g., wetter, drier, snowier). The physiographic boundaries of BEC units within the PGTSA are a standard dataset that resides in the LRDW.

Natural disturbance (merged BEC) units

The PGTSA has been divided into nine natural disturbance units (NDUs). These units were felt to better separate areas based on differences in disturbance processes, stand development, and temporal and spatial landscape disturbance pattern. In drawing the boundaries of the NDUs, the subzone level of the zonal classification of the BEC classification was used to help delineate areas of relatively homogeneous macroclimate. BEC units had previously been shown to be linked closely to differences in natural disturbance rate and patch size. A non-standard dataset was produced by ILMB in 2003 based on merged BEC units.

3. Inventories

Predictive ecosystem mapping

Predictive ecosystem mapping (PEM) is a new and evolving inventory approach designed to use available spatial data and knowledge of ecological-landscape relationships to automate the computer generation of ecosystem maps based on the BEC classification system. PEM mapping typically involves the spatial overlay of mapped themes and the processing of the resultant attributes against a formalized knowledge base using automated inference methods. PEM mapping is used in concert with site index estimates by site series (SIBEC) to refine and improve estimates of managed stand site productivity and forest growth.

Predictive ecosystem mapping was completed by Timberline for the VFD in 2001 and for the FSJFD and PGFD in the spring of 2008.

Physical operability

Physical operability is a non-standard dataset consisting of a harvest-based classification of terrain within the PGTSA. The classification was derived through photo interpretation by MFR regional engineering staff. The dataset was originally developed in 1999 and updated in 2007 utilizing terrain stability data from the VRI/biophysical mapping for the FSJFD and PGFD.

Balsam mortality and young pine mortality grids

The balsam and young pine mortality grids are non-standard datasets derived from the mortality severity mapping projects conducted over the PGTSA during the summers of 2007 and 2008.

4. Division of the Area into Management Zones

4.1 Management zones, groups and multiple objectives

Management zones represent areas with a distinct management emphasis. For example, a zone may be based on a harvesting system, silviculture system, visual quality objective, or wildlife consideration. Sometimes one area of forest is subject to more than one management objective. For simulation modelling, a “group” function enables application of overlapping objectives or constraints. The timber supply analyst and operational staff will decide whether to put an objective into a group or a mutually exclusive management zone following data assessment. In the analysis, areas that are unavailable for timber harvesting (non-contributing) are included for consideration achieving forest cover objectives.

Table 4. Objectives to be tracked

| Objectives | Inventory definition | Function |
|----------------------------------|--|--|
| Mountain Pine Beetle infestation | British Columbia Mountain Pine Beetle (BCMPB) version 5 model. | To present the level of current MPB infestation and facilitate the projection of potential mortality. |
| Biodiversity | VRI constraints to maintain old forest, old interior forest, spatial OGMA, patch size retention. | To report all forms of retention, both stand-level (riparian, WTP) and landscape level. |
| Ungulate winter range (UWR) | Map layers showing UWRs, VRI constraints for UWRs as per section 7 notices and GAR orders. | To provide protection of sensitive habitat used by ungulates as per UWR orders including general wildlife measures. |
| Visual landscape inventory | 2001 standard map layer for VFD, 2005 standard map layer for PGFD and FSJFD. | Will use Plan to Perspective Ratios (P2P) and Visual Effective Green-up Heights (VEG) to adjust the percent allowable alteration for VQOs. |
| Deciduous management | 2007 VRI standard map layer. | Current partition for deciduous management within PGFD and FSJFD. This will be analyzed within the base case. |
| Supply block A | 2007 VRI standard map layer. | Existing partition for Supply Block A within the FSJFD will be analyzed within the base case. |
| Cedar/hemlock management | 2007 VRI standard map layer. | Existing partition will be analyzed within the base case. |
| Pine/non-pine management | 2007 VRI standard map layer. | The impact of pine salvage prioritization on the mid-term timber supply will be analyzed within the base case. |
| LRMP (RMZ) | LRDW standard corporate dataset. | To net out existing parks/protected areas as well as exclusion/netdown areas identified within the existing LRMP. |

4. Division of the Area into Management Zones

4.2 Analysis units

Analysis unit definition

Similar forest types are grouped into an analysis unit to simplify analysis and yield table generation. The predictive ecosystem mapping for the PG TSA will form the basis for defining analysis units for this TSR. Therefore, an analysis unit will exist for each forested BEC series within the TSA.

Unmanaged stands

Stands established prior to 1987 are considered to be “unmanaged”. For “unmanaged” stand analysis units, yield curves have been generated for each “unmanaged” inventory polygon using the inventory attributes and the Variable Density Yield Prediction (VDYP) model. An area weighted average yield curve will then be generated for each forested BEC site series.

There are approximately 30 forested BEC variants within the TSA. The proportion of the forest contained within each variant is depicted in Figure 1. For information purposes the site inventory index and species composition of the zonal site series are presented in Figures 2 and 3, respectively.

Managed stands

Existing managed stand yield curves will be generated from forest cover inventory information, where available, including site index and species composition. Establishment densities from the Ministry of Forest and Range (MFR) Reporting Silviculture Updates and Land-status Tracking System (RESULTS) will also be used.

In the case of future managed stands, RESULTS information will be used to determine appropriate species composition, establishment densities, and regeneration delays. The MFR SIBEC database will be used to provide site index estimates by site series. Where RESULTS information does not exist for a given site series, the zonal site series species composition, establishment densities, and regeneration delay information will be substituted. If the zonal site series does not exist for a particular variant the zonal site series information for the next ecologically-closest BEC variant will be substituted.

Table Interpolation Program for Stands Yields (TIPSY) will be used to generate the yield curves for all managed stands.

Operational adjustment factors (OAF)

At the time of writing, a project was underway to attempt to empirically derive OAFs for the TIPSY-generated yield curves. This project is utilizing low-level digital photography and image processing to estimate crown closure for older managed stands. The basic approach relies on the difference between TIPSY’s theoretical crown closure at a given age and the actual crown closure. If the project is unsuccessful, standard OAF1 and 2 values of 15% and 5%, respectively, will be used.

4. Division of the Area into Management Zones

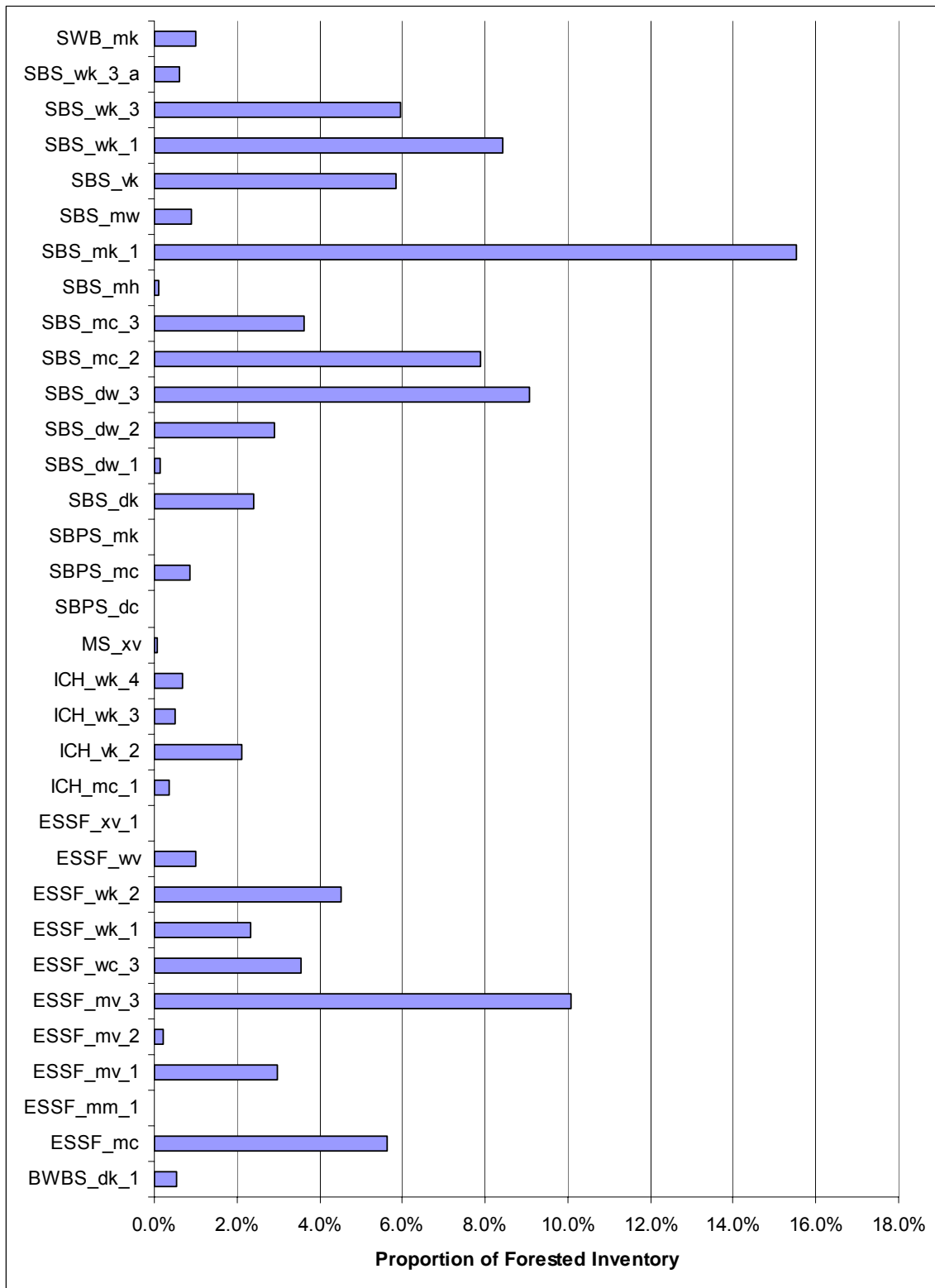


Figure 1. The proportion of the unmanaged forest contained within each BEC variant.

4. Division of the Area into Management Zones

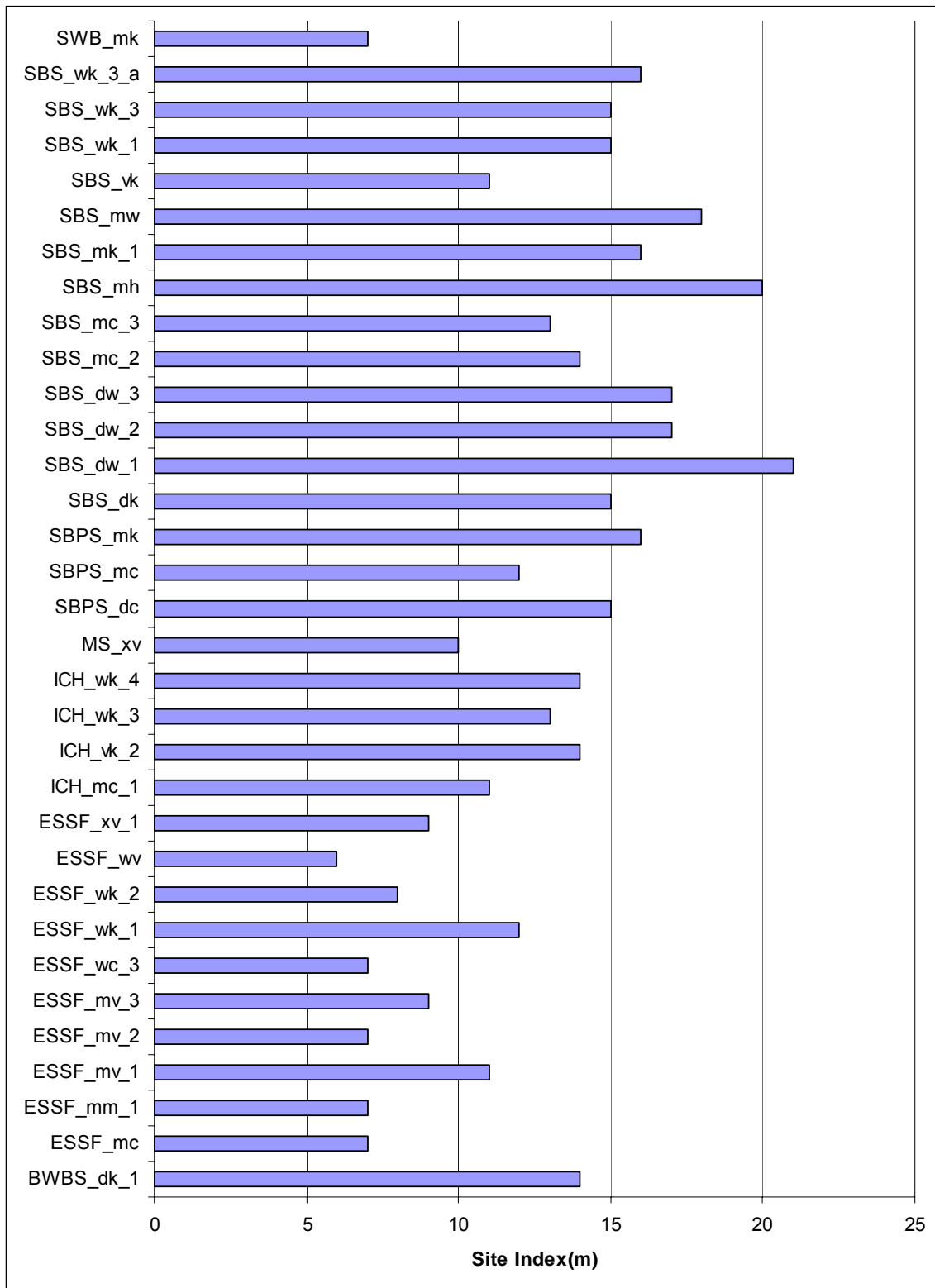


Figure 2. The weighted average site index for unmanaged stands within each BEC variant zonal site series within the PGTSA.

4. Division of the Area into Management Zones

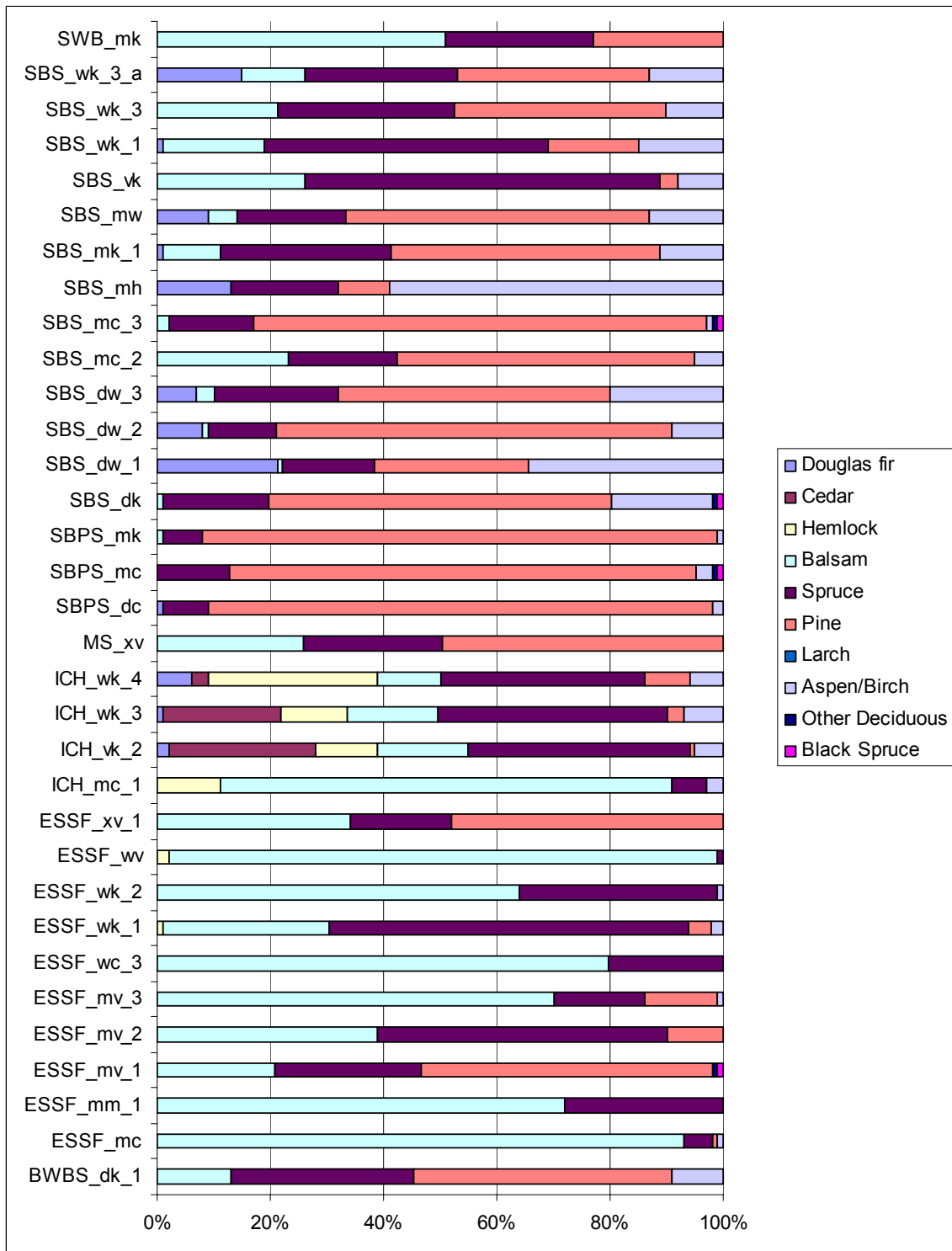


Figure 3. The weighted average species composition of unmanaged stands within each BEC variant zonal site series within the PGTSA.

5. Timber Harvesting Land Base Definition

5.1 Identification of the Crown forest and timber harvesting land base

This section outlines the steps used to identify the Crown forest land base and the timber harvesting land base (THLB), i.e., that portion of the Crown forest land base that is available for timber harvesting.

The Crown forest land base consists of Crown land with forest cover within the TSA, excluding TFLs, community forests, woodlots and private lands.

The THLB is that portion of the Crown forest land base that does not include:

- protected areas;
- areas deemed uneconomic for the protection and conservation of other forest values, such as wildlife, habitat, biodiversity, recreation, etc.; and
- areas with unstable terrain, roads, etc.

Land that is currently unavailable for harvesting or is not producing timber may be included in the THLB by management activities that improve productivity or operability (e.g., planting land currently classified as “non-commercial brush” with commercial tree species).

Once areas that do not contribute to the THLB have been identified, any remaining areas are considered to be the current THLB.

5.2 Details on land base classification

5.2.1 Land classified as non-forest

Non-forest includes areas classified as “non-treed and vegetated” as well as alpine, lake, rock, and cultivated fields and roads. In the PG TSA, land with stands of trees that have a crown closure less than 10% are also considered to be non-forest. These areas are excluded from the THLB. Land classified as non-forest does not contribute to other management objectives such as old growth for biodiversity (see Section 6.7.1).

5.2.2 Land not administered by the Ministry of Forests and Range for timber supply purposes

Land not administered by the Ministry of Forests and Range for timber supply purposes within the TSA includes private land, municipal land, Indian Reserves, parks, protected areas, tree farm licences, community forest agreement areas, and woodlot licences.

These areas do not contribute to the THLB. A spatial dataset has been developed that identifies these areas using information from the Crown Land Registry and Integrated Cadastral Information Society.

5. Timber Harvesting Land Base Definition

5.2.3 Physically inoperable forest stands

Physical operability types or harvesting systems are spatially represented using slope classes and soil/parent material types as listed below in Table 5. The inoperable area assumptions used in the previous TSR will be used in this analysis. Inoperable areas will be excluded from the THLB.

Table 5. Description of physical operability types

| Operability type | Slope (%) | Parent material | Operability code |
|---------------------------------------|-----------|---|------------------|
| Conventional (ground) | 0-30 | Lacustrine | A |
| Conventional (ground) | 0-40 | Moraine | A |
| Cable | > 30-80 | Lacustrine | C |
| Cable | > 40-100 | Moraine | C |
| Mixed conventional/cable ^a | Broken | All materials, polygon too small to differentiate | M |
| Inoperable | > 80 | Lacustrine | I |
| Inoperable | > 100 | Moraine | I |

(a) Mixed conventional/cable harvesting types are areas of broken terrain that are too small to type out as a single operability type.

Data source and comments

Slope classes are derived using the Topographic Resource Inventory Mapping (TRIM) inventory and reflect harvest equipment capability and environmental suitability. Safety guidelines for machine operability have been incorporated. Soil/parent material types have been categorized according to their sensitivity to disturbance. Generally, fine-textured aeolian, alluvial/fluvial, and lacustrine parent materials are considered to be more sensitive soil types.

Physically inoperable stands are defined as:

- (1) terrain stability class V and “U”;
- (2) environmentally sensitive areas (ESA) inventory class “S1” (highly sensitive soils) will be used where terrain stability information is not available, i.e., all of VFD, 40% PGFD and FSJFD;
- (3) Physical operability class “I” in Table 5.

5. Timber Harvesting Land Base Definition

5.2.4 Economically inoperable

At the time of this data package release, three approaches to identify economically inoperable stands are being explored, including:

1. Economic operability mapping – FIA Timberline project

This study was commissioned by the operability task group and funded by Forest Investment Account (FIA). It is based on deriving a “value index” for each forest cover polygon as follows:

$$\text{Value Index } (\$/\text{m}^3) = \text{Product Value} - \text{Operating Costs}$$

Where:

Product Value includes value derived from lumber and chips (based on species, lumber recovery factors [LRF], piece size)

Operating Costs include development, tree to truck (harvesting), log transportation (cycle time and off/on Highway Haul), manufacturing costs, and silviculture costs.

Value indices are assigned to forested polygons and then overlaid with a logging block coverage. Value indices of previous harvesting blocks are examined to determine appropriate value index cut-off.

2. ECAS (E-Commerce appraisal application)

This approach uses a statistical analysis of licensee cutting permits (CP) issued during the past 10 years to determine current practice in terms of operating cost and volume. Operating cost and volume were chosen as they are more stable over time than Value Index. Preliminary estimates suggest that in those areas of the TSA where log transportation is solely by road, harvesting has not occurred in stands less than 190 cubic metres per hectare (m³/ha) nor in stands with estimated operating costs exceeding \$114 per cubic metre in 2002 dollars. In areas of the TSA where log transportation involves a rail component those figures are 246 m³/ha and \$123 per cubic metre.

3. Economics and Trade Branch provincial THLB trial

This approach is similar to the FIA project above except that it will use the current (past five years) BCTS market pricing (MPS) data. Based on the MPS data this project will attempt to define the metrics of harvested blocks and correlate this to inventory attributes.

All three of the above methodologies focus on mature stands. For immature stands, previously harvested areas that are not encumbered by other values that preclude harvesting, will be included in the THLB. Other immature stands will be projected to maturity and then stand attributes compared to economical operable criteria.

The final methodology for determining economic operability will be documented in the analysis report.

5. Timber Harvesting Land Base Definition

5.2.5 Problem forest types

Problem forest types (PFT) are stands that are physically operable and exceed low site criteria that are not currently utilized or have marginal merchantability and are considered uneconomic. PFTs are excluded from the THLB.

Table 6. *Problem forest types excluded from the THLB*

| Leading species | Inventory type group | Reduction (%) |
|-----------------|----------------------|---|
| Hemlock | 12 – 17 | 100 |
| Deciduous | 35 to 42 | 100% in Vanderhoof Forest District only |
| Cedar | 9 to 11 | 100% for Cable (C) operability |

5.3 Wildlife and fish management

Biological diversity (or biodiversity) is the diversity of plants, animals and other living organisms in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, as well as the evolutionary and functional processes that link them. First Nations have indicated that wildlife and fish are critically important to them.

Current wildlife management consists of a combination of management strategies for specific species (caribou, mule deer) and an ecosystem management approach that provides suitable habitat conditions for all native species. This has been implemented through the PGTSA old-growth order, and FRPA requirements for stand-level, riparian, and coarse woody debris retention.

With respect to timber supply modelling, this approach replaces previously used wildlife habitat netdowns (ESA W1 and W2).

5. Timber Harvesting Land Base Definition

Table 7. Selected regionally valued wildlife species within the TSA

| Type | Species | District | Management approach | IWMS (3) Species | Sensitive Species (CDC) (4) Listing | Species at Risk (COSEWIC) (5) Listing |
|----------|-------------------------------------|----------|---|------------------|-------------------------------------|---------------------------------------|
| Ungulate | Woodland Caribou (Northern Ecotype) | All | UWR order, Biodiversity order, FPPR (2) | ✓ | Blue | T/SC |
| | Woodland Caribou (Mountain Ecotype) | DPG | UWR order, Biodiversity order, FPPR (2) | ✓ | Red | T |
| | Mule Deer | All | UWR order, Biodiversity order, FPPR (2) | | | |
| | White-Tailed Deer | All | UWR order, Biodiversity order, FPPR (2) | | | |
| | Elk | All | UWR order, Biodiversity order, FPPR (2) | | | |
| | Moose | All | UWR order, Biodiversity order, FPPR (2) | | | |
| | Mountain Goat | All | UWR order, Biodiversity order, FPPR (2) | | | |
| | Bighorn Sheep | DPG | UWR order, Biodiversity order, FPPR (2) | ✓ | Blue | |

(continued)

5. Timber Harvesting Land Base Definition

Table 7. Selected regionally valued wildlife species within the TSA

| Type | Species | District | Management approach | IWMS (3) species | Sensitive species (CDC) (4) listing | Species at risk (COSEWIC) (5) listing |
|------------|--------------|----------|-----------------------------------|------------------|-------------------------------------|---------------------------------------|
| Omnivores | Grizzly Bear | All | Biodiversity order, FPPR (2) | | Blue | SC |
| Omnivores | Black Bear | All | Biodiversity order, FPPR (2) | | | |
| Furbearers | Muskrat | All | Biodiversity order, (1), FPPR (2) | | | |
| | Beaver | All | Biodiversity order, (1), FPPR (2) | | | |
| | Mink | All | Biodiversity order, (1), FPPR (2) | | | |
| | Marten | All | Biodiversity order, (1), FPPR (2) | | | |
| | Fisher | All | Biodiversity order, (1), FPPR(2) | ✓ | Blue | |
| | Weasel | All | Biodiversity order, (1), FPPR (2) | | | |
| | Wolverine | All | Biodiversity order, (1), FPPR (2) | ✓ | Blue | SC |
| | Otter | All | Biodiversity order, (1), FPPR (2) | | | |
| | Bobcat | All | Biodiversity order, (1), FPPR(2) | | | |
| | Lynx | All | Biodiversity order, (1), FPPR(2) | | | |
| | Fox | All | Biodiversity order, (1), FPPR (2) | | | |
| | Coyote | All | Biodiversity order, (1), FPPR (2) | | | |
| | Wolf | All | Biodiversity order, (1), FPPR (2) | | | |

(continued)

5. Timber Harvesting Land Base Definition

Table 7. Selected regionally valued wildlife species within the TSA

| Type | Species | District | Management approach | IWMS species | Sensitive species (CDC) listing | Species at risk (COSEWIC) listing |
|---------------|---------------------------|----------|-----------------------------------|--------------|---------------------------------|-----------------------------------|
| Other mammals | Snowshoe Hare | All | Biodiversity order, (1), FPPR (2) | | | |
| | Columbian Ground Squirrel | All | Biodiversity order, (1), FPPR (2) | | | |
| Other mammals | Marmot | All | Biodiversity order, (1), FPPR(2) | | | |
| Upland Birds | Grouse species | All | Biodiversity order FPPR (2) | | | |
| Waterfowl | Ducks, Geese, Swans | All | Biodiversity order FPPR (2) | | | |
| Raptor | Goshawk | All | Biodiversity order FPPR (2) | | ✓ | |
| Other bird | Raven | All | Biodiversity order FPPR(2) | | | |
| | American White Pelican | DPG | Biodiversity order FPPR (2) | ✓ | Red | NAR |
| | Sandhill Crane | All | Biodiversity order FPPR (2) | ✓ | Blue | NAR |
| Fish | Chinook Salmon | All | FPPR – riparian | | | |
| | Sockeye Salmon | All | FPPR – riparian | | | |
| | Kokanee | All | FPPR – riparian | | | |
| | Rainbow Trout | All | FPPR – riparian | | | |
| | Steelhead | All | FPPR – riparian | | | |
| | Lake Trout | All | FPPR – riparian | | | |
| | Bull Trout | All | FPPR – riparian | ✓ | Blue | |
| | Dolly Varden | All | FPPR – riparian | | Blue | |
| | Sturgeon | All | FPPR – riparian | | Red | E |
| | Arctic Grayling | DJA | FPPR – riparian | | Red | |
| | Whitefish | All | FPPR – riparian | | | |

(continued)

5. Timber Harvesting Land Base Definition

Table 7. Selected regionally valued wildlife species within the TSA (concluded)

- (1) Management Guidelines for Furbearers in B.C.
- (2) FPPR objectives for:
 - o Wildlife
 - o Water, fish, and wildlife biodiversity in riparian areas
 - o Wildlife and biodiversity – landscape-level
 - o Wildlife and biodiversity – stand-level
 - o Protection of fish and fish habitat
 - o Steam riparian
 - o Wetland riparian
 - o Lake riparian
- (3) Identified Wildlife Management Strategy (IWMS) is an initiative of the Ministry of Environment in partnership with the Ministry of Forests and Range and carried out in consultation with other resource ministries, stakeholders and the public. Statutory authority is provided for the Ministry of Environment to carry out this strategy under provisions of the *Forest and Range Practices Act* and previously under the *Forest Practices Code Act*.
- (4) Conservation Data Centre (CDC) was established in 1991 as a joint project of the Ministry of Environment, the Nature Trust of B.C., the Nature Conservancy of Canada and the Nature Conservancy (US).
 - a. Red List – List of ecological communities, and indigenous species and subspecies that are extirpated, endangered or threatened in British Columbia. Red-listed species and sub-species may be legally designated as, or may be considered candidates for legal designation, as ‘extirpated, endangered or threatened’ under the *Wildlife Act*.
 - b. Blue List – List of ecological communities, and indigenous species and subspecies of ‘special concern’ (formerly ‘vulnerable’) in British Columbia.
- (5) COSEWIC (Committee on the Status of Endangered Wildlife in Canada) is a committee of experts that assesses and designates wildlife species are in some danger of disappearing from Canada. COSEWIC was established in 1977 to provide Canadians with a single, scientifically-sound classification of wildlife species at risk of extinction. COSEWIC began its assessments in 1978 and has met each year since then to assess species. COSEWIC uses a process based on science, Aboriginal Traditional Knowledge and community knowledge to assess the risk of extinction for species. Species that have been designated by COSEWIC may then qualify for legal protection and recovery under the Federal *Species at Risk Act* (SARA).
 - a. T = Threatened, likely to become endangered if limiting factors are not reversed.
 - b. SC = Special Concern, a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
 - c. E = Endangered, facing imminent extirpation or extinction.
 - d. NAR = Not at Risk, a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

5.3.1 Ungulate winter range

Ungulate winter range (UWR) management has been ongoing for over 20 years in some portions of the PGTSA. Formal legal establishment of UWRs and associated objectives began under the *Forest Practices Code Act* and continue under the *Forest and Range Practices Act* (FRPA).

UWRs contain both constraints to THLB and netdowns to the THLB. The complete netdowns are identified in the following tables. Constraints are identified in Section 6.12.

Table 8. Mule Deer winter range order U-7-002 Fort St. James Forest District

| Mule Deer habitat type | Habitat units | Must do management | Constraint |
|------------------------|---------------|---------------------------------|--------------|
| No harvest | 19 | No commercial forest harvesting | 100% netdown |

5. Timber Harvesting Land Base Definition

Table 9 *Caribou ungulate winter range order U-7-003 Fort St. James Forest District*

| Caribou habitat type | Habitat units | Total area (ha) | Required management | Constraint |
|----------------------|--|-----------------|--|-------------------------------|
| High | P-002, P-003, P-006, P-007, P-008, P-010, P-011, P-012, P-014, P-015, P-019, P-020, P-021, P-022, P-023, P-024, P-025, P-030, P-031, P-032, P-033, P-034, P-035, P-036, P-037, P-038, P-040, P-041, P-043, P-045, P-048, P-049, P-053, P-054, P-055, P-056, P-057, P-058, P-060, P-064, P-065, P-066, P-067, P-068, P-069, P-072, P-074, P-075, T-003, T-006, T-014, T-016 | 565 679 | Caribou 'high' habitat No harvesting or road building | No harvest 100% netdown |

Table 10. *Mule Deer winter range order U-7-011 Vanderhoof Forest District*

| Mule Deer habitat type | Habitat units | Required management | Constraint |
|------------------------|---------------|---------------------------------|--------------|
| No harvest | VD-03, VD-07 | No commercial forest harvesting | 100% netdown |

Table 11. *Caribou ungulate winter range order U-7-012 Vanderhoof Forest District*

| Mule Deer habitat type | Habitat units | Required management | Constraint |
|------------------------|------------------------------|----------------------|--------------|
| No harvest | HE-1-001, HE-3-001, HE-4-001 | No forest harvesting | 100% netdown |

5. Timber Harvesting Land Base Definition

Table 12. Mule Deer winter range order U-7-013 Prince George Forest District

| Mule Deer habitat type | Habitat units | Required management | Constraint |
|------------------------|---------------|--------------------------|--------------|
| No harvest | PGD-005,006 | No commercial harvesting | 100% netdown |

5.4 Wildlife habitat areas

Wildlife habitat areas (WHA) are designated areas that are necessary to meet the habitat requirements of an identified wildlife species. WHAs designate critical habitat in which activities are managed to limit impact on identified wildlife element. The purpose of WHAs is to conserve those habitats considered most limiting for an identified wildlife species.

Table 13. Wildlife habitat areas

| WHA number | District | Species | Date of order | Area (ha) | Constraint | Exclusion |
|------------|---------------|------------------|-------------------|-----------|---------------|-----------|
| 7-003 | Prince George | Mountain Caribou | December 13, 2005 | 175 | No harvesting | 100% |

5.5 Recreation and cultural heritage resources

In previous TSRs, recreation sites/reserves were accounted for within environmentally sensitive areas (ESA). ESA categories were labelled R1 for recreation high sensitivity and R2 for recreation-moderate sensitivity. Different percent reductions were applied depending on which recreation sensitivity class the feature was found in, and depending on which district within the PGTSA the recreation site/reserve was located.

For this TSR, recreation sites/reserves are being accounted for in a new way. For the PGFD and the FSJFD only maintained recreation sites/reserves will be excluded from the THLB. Minor amounts of MPB-infested lodgepole pine have been removed from a few sites for public safety. To account for recreation sites/reserves, 1576 ha and 172 ha have been excluded from the THLB for the PGFD and FSJFD, respectively.

In the Vanderhoof Forest District (VFD), recreation sites/reserves in which at least 50% of the forest cover is pine, harvesting of the pine-component of the stand will be considered available for harvesting. All sites with less than 50% will be completely excluded from the THLB. The total area exclusion for recreation sites/reserves for the VFD is 1171 ha. The same approach will be used to account for 5 trails within the VFD. Each trail will have a 100-m wide buffer on either side. The pine-component of stands with 50% or more pine in the buffers will be available for harvest, while all stands with less than 50% pine will be completely excluded from the THLB.

5. Timber Harvesting Land Base Definition

There are five legally established trails within the FSJFD and current practice allows harvesting to the trail bed, and therefore no netdowns will be applied.

In previous TSRs, reserves for Use, Recreation, Enjoyment of the Public (UREPs) were excluded from the timber harvesting land base. These UREPs were set aside for potential recreation activities; however, over time, they became redundant and will not be removed from the timber harvesting land base for this analysis.

5.5.1 Cultural heritage resources and First Nations interests

A cultural heritage resource is an object, site, or location of a traditional societal practice that is of historical, cultural or archaeological significance to the province, a community, or an aboriginal people. Cultural heritage resources include archaeological sites, structural features, heritage landscape features and traditional use sites. Features associated with past and current human use, including aboriginal use are found throughout the PGTSA.

First Nations have expressed the importance of managing for cultural heritage resources that they have relied on for generations. Traditional diets, based on numerous plant foods and animals have sustained First Nations. In addition, plants, fungi and animals have provided a wide range of important material resources for fuel, tools, medicine, and transportation. First Nations' belief systems, art, songs and ceremonies are also reliant on the biodiversity of the landscape.

The *Heritage Conservation Act* provides for the protection and conservation of certain types of cultural heritage resources by prohibiting any disturbance, alteration or destruction. In consultation with First Nations, appropriate protection or management measures regarding cultural heritage resources that are not automatically protected under the *Heritage Conservation Act* are developed.

Past and current aboriginal culture is closely associated with the elaborate network of ancient to contemporary trails in the area. The existing inventory of known aboriginal trails was expanded during the development of the TSR data package from information provided by First Nations about the trail locations. A wide range of methods are applied in managing the values associated with heritage trail corridors.

A small percentage of trails are managed through permanent timber reserves, while the majority are managed through mitigating operational designs, silviculture systems, and operational timing. For the trails that currently have management buffers applied to either side of the trail beds, net downs will be applied within the buffers.

Cultural heritage sites are often located within established recreational areas throughout the PGTSA. In the FSJFD and PGFD, maintained recreational sites/reserves will be excluded from the THLB. In the VFD, the pine component of recreational sites/reserves that have more than 50% pine will be available for harvesting and all other sites with less than 50% pine will be fully excluded from the THLB.

Cultural heritage resources are also accounted within other sections of this data package, including existing resource management zones, protected areas, wildlife and fish habitat areas, riparian, scenic areas, and visual preservation zones also.

5. Timber Harvesting Land Base Definition

Table 14. Recreation sites/reserves and trails netdown

| District | Trail names | Netdowns | # of sites | Total area of rec sites/reserves (ha) | Total forested area of rec sites/reserves (ha) | Netdown percentage | UREPs |
|----------------|---|--|------------|---------------------------------------|--|--|------------|
| Vanderhoof | Ormineca Trail (DVA only) Cheslatta Trail Fraser Lake-Stuart Lake Pack Trail (DVA only) Ormond Creek Trail (from Ormond Lake Road to the South end of Ormond Lake) Messue Wagon Road (from the Blue Road to Euchiniko Lakes) Dan Miner Nyan Wheti (Fraser/Stuart Lake) | 200 m buffer. Allow harvesting within this buffer where there is > 50% Pl. | 86 | 3775 | 2520 | Allow pine within sites that have > 50% pine to be harvested | No netdown |
| Fort St. James | Island Lake Kazchek Lake Shass Mountain Tulle Lake | No netdowns | 24 | 750 | 172 | 100% | No netdown |
| Prince George | Nuxalk-Carrier Grease Trail (Alexander Mackenzie Trail (PG and Vanderhoof)) | 200m buffer with 100% netdown | 73 | 2359 | 1576 | 100% | No netdown |

5.6 Roads, trails, and landings

Separate estimates are made to reflect the area of Crown forest land excluded from the THLB to account for existing and future roads, trails and landings. A disturbance dataset was developed this TSR to account for existing and future roads, trails, railway and transmission lines, by utilizing corporate data, satellite image interpretation and systematic ground sampling. The following table summarizes the area occupied by various categories of existing roads within the PG TSA

5. Timber Harvesting Land Base Definition

Table 15. Road summary

| Road category | Average width (metres) | Area within the Prince George Forest District (hectares) | Area within the Fort St. James Forest District (hectares) | Area within the Vanderhoof Forest District (hectares) |
|------------------------------------|------------------------|--|---|---|
| Public | 40 | 6413 | 1508 | 2313 |
| Mainline (FSR) | 30 | 7795 | 2832 | 4006 |
| Operational road | 15 | 18 138 | 5877 | 6000 |
| Operational road (within cutblock) | 12 | 2851 | 2415 | 3532 |
| Cutblock road | 6 | 7118 | 1717 | 5359 |
| Trail | 4.5 | | | 1548 |
| Totals | | 42 315 | 14 348 | 22 758 |

Estimates of the area associated with future access requirements to be excluded from the THLB are presented in Table 16. These estimates are the area-weighted average of permanent access structures (PAS) contained within cutblocks in the PG TSA, combined with a projected estimate of future mainline/operational road development into unroaded portions of the TSA for the past eight years. The percent reduction will be applied to each unharvested stand following initial harvest within the model. The area occupied by future roads, trails and landings will provide harvest volume on the first entry but not on subsequent entries.

Table 16. Future roads, trails and landings summary

| District | PAS % | Mainline add-on % | THLB netdown factor % |
|----------|-------|-------------------|-----------------------|
| DPG | 2.7 | 0.1 | 2.8 |
| DVA | 3.0 | 0.3 | 3.3 |
| DJA | 3.4 | 0.2 | 3.6 |

5. Timber Harvesting Land Base Definition

5.7 Retention

5.7.1 Spatial landscape retention

An order establishing landscape biodiversity objectives for the PGTSA was brought into force on October 20, 2004. This order will be discussed further in Section 6.8.1. Further to this order, specific areas have been designated as old-growth reserves in three landscape units in the Interior Cedar Hemlock (ICH) biogeoclimatic zone. These areas are reserved from harvesting and contribute to the overall aspatial old forest retention requirements documented in the table below. The following orders establish the three old-growth reserves:

- *Order to Establish Dome and Slim Landscape Units and Objectives (October 31, 2002)* — 6035 hectares of THLB (TSR2);
- *Order to Establish Humbug Landscape Unit and Objectives (August 1, 2003)* — 3100 hectares of THLB (TSR2).

5.7.2 Stand-level retention

Stand-level retention refers to those features retained across the Crown forest land base as a function of forest management practices. In previous TSRs, THLB netdowns for riparian and wildlife tree patch retention were derived based on legislated targets or best management practices. In this TSR, an analysis of historical retention practices derived from existing harvested and unharvested cutting permits (CP) over the past decade has been utilized to develop total retention estimates for each district within the TSA. It is believed that this empirical approach more accurately depicts current practice and future trends within the TSA. The total retention estimate includes areas occupied by riparian retention, wildlife tree patch retention, retention for the protection of forest values including archaeological features, site specific habitat features, and blue-listed species.

Table 17. Percent stand-level retention by forest district

| District | Retention percentage |
|----------------|----------------------|
| Vanderhoof | 10.55 |
| Fort St. James | 12.59 |
| Prince George | 11.86 |

5.7.3 Riparian

To avoid double-counting, riparian reserve areas have not specifically been identified for exclusion from the THLB because these areas are captured within the total retention estimate for each district.

5. Timber Harvesting Land Base Definition

5.8 Crown land plans

Crown land plans are a unique type of plan in the northern interior of B.C. that cover rural settlement and agricultural areas around the major communities. There are four Crown land plans within the TSA: Prince George, Robson Valley (portion), Vanderhoof, and Fort St. James.

The plans have historically been implemented as policy and have guided land use in these areas for many years. The mountain pine beetle epidemic; however, created some uncertainty around intended land use and a legal order, pursuant to section 93.4 of the *Land Act*, was established for two of the zones on November 21, 2006. This order prohibits logging in Agriculture Development Areas (ADA) and Settlement Reserve Areas (SRA), except for environmental/safety and forest health purposes.

Table 18. CLP zone and modelling assumptions

| Designation in CLP | Source | Assumption for this TSR base case | Modelling assumption for sensitivity |
|--|----------------------|-----------------------------------|--------------------------------------|
| ADA Agriculture Development Area | CLP files / Tantalus | 100% netdown | N/A |
| SRA Settlement Reserve Area | CLP files / Tantalus | 100% netdown | N/A |
| Community Pasture Areas | CLP files | One pass | N/A |

5.8.1 Land and resource management plans

The Vanderhoof, Fort St. James, and Prince George Land and Resource Management Plan (LRMP) processes began in 1992 and 1993. The planning processes provided an opportunity for the public, interest groups, and government to make recommendations for integrated resource management that reflects a local vision for how the public land base should be managed. All three plans were agreed to by consensus, and were approved by Cabinet as policy plans in 1997 (Vanderhoof) and 1999 (Prince George and Fort St. James).

Between 2004 and 2006, the Integrated Land Management Bureau (ILMB) initiated risk assessment projects, under the mandate of the Provincial Mountain Pine Beetle Action Plan and Task Force, for the three LRMPs. The purpose was to determine the level of impact or risk, if any, to all values identified in the LRMPs due to the mountain pine beetle epidemic and subsequent management activities. Risk assessments have been completed for all three LRMPs and it is not expected that the outcomes of those assessments will have any impact to the timber supply, thus they will not be modelled.

Modelling assumptions for all three LRMPs

Resource management zones

For the base case, resource management zones (RMZ) not listed in Table 19 will be 100% included in the THLB subject to all other constraints.

5. Timber Harvesting Land Base Definition

Protected area resource management zones

During the development of the Vanderhoof, Fort St. James, and Prince George LRMPs, areas were identified as Protected Area RMZs for proposed protection from industrial development, including timber harvesting. Since the approval of the three LRMPs by government, all Protected Areas RMZs identified in the three LRMPs have been legally protected and are thus excluded from the THLB. This is the same modelling assumption that was applied in the previous TSR and the expedited TSR.

Modelling assumptions for the Vanderhoof LRMP

Resource management zones

For Vanderhoof Special RMZs and Multi-value Emphasis RMZs identified for special management, TSR2 modelling assumptions for cutblock adjacency and green-up will not be applied. Rather, the base case for this TSR will reflect retention management requirements of old forest, interior old forest, and young forest patch size distribution through the implementation and modelling of the *Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area (October 12, 2004)*. This precludes the need to model for adjacency and green-up constraints in any time period.

Euchiniko Sidehills proposed sensitive site

The 800-ha Euchiniko Sidehills area was proposed as a sensitive area in the Vanderhoof LRMP. The Sidehills are a unique 14 km park-like stretch of land along the Euchiniko River, characterized by steep, south-facing grassland scattered with pine, spruce and aspen. In combination with groves of mature coniferous cover along the river bottom, the Euchiniko Sidehills provide excellent wildlife shelter and habitat. Because the open grasslands of the Sidehills are by nature sparsely timbered, harvesting has not been a current practice within the area. Thus, the Euchiniko Sidehills will be excluded from the THLB in the base case.

Modelling assumptions for the Prince George LRMP

Herrick Creek resource management zones

The Herrick Local Resource Use Plan (LRUP) was initiated in 1991 as a result of direction from the Provincial Old Growth Forest Strategy, and approved in November 1994. In March of 1999, the Prince George LRMP incorporated management objectives from those plans and designated a significant portion of the Herrick Landscape unit as the Herrick Creek Old Growth Reserves (RMZ # 39). The management objectives for these reserves are to maintain the integrity of viable old-growth forest ecosystems in their natural state, as well as to maintain wildlife habitat and recreation values. These old-growth areas are currently reserved from harvesting and so will be modelled as 100% netdown in the base case.

Modelling assumptions for the Fort St. James LRMP

Lower Sustut visual preservation zone

The Fort St James LRMP endorsed a visually sensitive preservation zone around the Sustut and Bear rivers, a zone that was originally proposed in the draft Sustut Local Resource Use Plan (1994). This area was identified for its high scenic, wildlife, and water quality values, remoteness, and exceptional recreational values. The area was excluded from the base case in TSR2, and will also be excluded in the base case for this TSR.

5. Timber Harvesting Land Base Definition

Table 19. LRMP-related THLB netdowns

| Objective | TSR management strategy/modelling assumptions | Resource management zone | | |
|---|---|---|---|--|
| | | Vanderhoof LRMP ¹ | Fort St. James LRMP | Prince George LRMP ² |
| Land and Resource Management Plans (LRMP) – Parks and Protected Areas | 100% netdown - exclusion from timber harvesting land base | Stuart River; Sutherland River; Francois South; Nechako Canyon; Finger-Tatuk; Entiako | Stuart River; Mt. Pope; Fleming ³ ; Mudzenchoot; Blanchet; Nation; Omineca; Upper Sustut-Thumb ⁴ ; Damdochax; Small (Goal 2) Protected Areas ⁵ | Crooked River Provincial Park Addition; Carp Lake Provincial Park Addition; Stuart River; Eskers Provincial Park Addition; Fort George Canyon; Dahl Lake Provincial Park Additions; Bobtail Mountain; Fraser River; Three Sisters Lake; Purden Lake Provincial Park Addition; Giscome Portage Trail; Arctic/Pacific Lakes; Fang Mountain ⁶ ; Close to the Edge; Monkman Provincial Park Addition; Kakwa Recreation Area; Kakwa South Addition; Grand Canyon of the Fraser ⁷ ; Sugarbowl/Grizzly Creek ⁸ ; Bowron Provincial Park Addition – Wolverine River; Ptarmigan Creek; Erg Mountain; Slim Creek; Whiskers Point Provincial Park Addition |

(continued)

5. Timber Harvesting Land Base Definition

Table 19. LRMP-related THLB netdowns (concluded)

| Objective | TSR management strategy/modelling assumptions | Resource management zones | | |
|------------------------------------|---|--|--------------------------------------|---|
| | | Vanderhoof LRMP | Fort St. James LRMP | Prince George LRMP ² |
| Herrick Creek Old Growth Reserves | 100% netdown | N/A | N/A | Prince George LRMP Herrick Creek Old Growth Reserve (RMZ #39) |
| Sustut Visual Preservation Zone | 100% netdown | N/A | Fort St. James LRMP Lower Sustut RMZ | N/A |
| Euchiniko Sidehills Sensitive Area | 100% netdown | 800 hectare area within Vanderhoof LRMP Kluskus Resource Management Zone (RMZ #14) | N/A | N/A |

1 Vanderhoof RMZ # 2, 3, 7, 11, 13, 20.

2 Prince George RMZ # 7,8,12, 13, 16, 18, 19, 23, 26, 29, 32,34, 36, 37, 38, 42, 43, 44, 45, 48, 49, 50, 51, 54. Missing Fort St. James.

3 Established January 25, 2001 as Rubyrock Provincial Park.

4 Established in 2001 as Sustut Provincial Park and Protected Area.

5 A grouping of thirteen small Protected Areas incorporated into Stuart Lake Marine Provincial Park, Trembleur Lake Provincial Park, Takla Lake Marine Provincial Park, and Nation Lakes Provincial Park.

6 Established June 29, 2000 as Evanoff Provincial Park.

7 Incorporated into Sugarbowl-Grizzly Den Provincial Park and Protected Area.

8 Established June 29, 2000 as Sugarbowl-Grizzly Den Provincial Park and Protected Area.

6. Current Forest Management Assumptions

6.1 Utilization standards

Utilization standards define species, dimensions, and quality of trees that must be harvested and removed from an area during harvesting operations. The standards applied in the PGTSA are shown in the Table 20.

Table 20. Utilization levels

| Species | Minimum dsh outside bark (cm) | Maximum stump height (cm) | Minimum to diameter inside bark (cm) |
|------------------------------|-------------------------------|---------------------------|--------------------------------------|
| Pine | 15 | 30 | 10 |
| Cedar older than 141 years | 20 | 30 | 15 |
| All other species | 20 | 30 | 10 |
| Small pine in supply block D | 10 | 15 | 10 |

6.2 Decay, waste, and breakage

The VDYP model used to project volumes for natural stands incorporates estimates of the volumes of wood lost to decay, waste, and breakage. Decay losses are built into the volume estimates, while standard waste and breakage factors are applied to the analysis in the development of VDYP yield curves. These estimates of losses have been developed for different areas of the province based on field samples. For regenerated stands, an operational adjustment factor (OAF2) is applied to account for anticipated decay, waste, and breakage, and the value applied for OAF2 in the Prince George analyses increases from zero through to five percent by the time forest stands reach 100 years of age.

6.3 Harvest scheduling priorities

Harvest queue

Using both the inventory and MFR Revenue Branch databases a queue will be devised to mimic (as close as possible) harvest preferences that have been observed over the past 10 years. At this time this analysis is incomplete. However, the general idea is that there will be a higher preference to harvest high volume stands close to town than lower volume stands further away.

6.4 Silviculture systems

Clearcut with reserves is the predominant silvicultural system in use in the PGTSA.

6. Current Forest Management Assumptions

6.5 Unsalvaged losses

Mountain pine beetle modelling

The BCMPB v. 5 model will be used to calculate existing and future mortality of pine in stands greater than 60 years of age. Unsalvaged losses due to mountain pine beetle are dependant on the potential shelf-life of the pine to produce various forest products and the amount of merchantable volume attributed to the affected land base. Shelf-life is discussed in further detail in Section 6.7.

Table 21 summarizes the BCMPB v5 projected cumulative mortality for each forest district within the TSA assuming no management activities (i.e. salvage of dead pine) were to occur.

Table 21. BCMPBv.5 volume attacked in cubic metres

| Forest district | 2007 annual attack (m ³) | 2007 cumulative attack (m ³) | 2008 projected attack (m ³) | 2008 projected cumulative attack (m ³) | 2024 projected cumulative attack (m ³) |
|-----------------|--------------------------------------|--|---|--|--|
| DVA | 3 899 664 | 70 714 288 | 1 997 744 | 72 712 032 | 75 010 352 |
| DPG | 7 715 568 | 45 981 280 | 3 260 272 | 49 241 552 | 54 775 024 |
| DJA | 14 684 752 | 45 001 488 | 10 770 672 | 55 772, 60 | 91 103 760 |

Sub-alpine fir decline within the Fort St. James Forest District

Sub-alpine fir (*Abies lasiocarpa*) decline has been a serious forest health concern of forest managers in the FSJFD since the early 1990s. Ongoing outbreaks of western balsam bark beetle (*Dryocoetes confuses*) and two-cycle spruce budworm (*Choristoneura biennis*) over the past decade, coupled with various heart rot diseases common to over-mature sub-alpine fir-leading stands, have contributed to extensive stand mortality and significant loss of merchantable volume.

In the summer of 2007 the FSJFD conducted a two-phase reconnaissance of Supply Blocks A and B to quantify the extent of the mortality. Overview aerial sketch mapping was used to stratify sub-alpine fir-leading stands by mortality severity classes within the study area. Ground plots were then established to derive an average level of stand mortality within each severity class. Tables 22 and 23 summarize the findings of the study.

Table 22. Sub-alpine fir in Fort St. James

| Supply block A | Area (hectares) |
|-------------------------------|-----------------|
| Total land base | 950,000 |
| sub-alpine fir-leading stands | 640,000 |
| Supply block B | Area (hectares) |
| Total land base | 1,280,000 |
| sub-alpine fir-leading stands | 520,000 |

6. Current Forest Management Assumptions

Table 23. Stand mortality by severity class

| Severity class | Total impacted area (hectares) | Supply block A (hectares) | Supply block B (hectares) | Weighted mean (% mortality) reduction to stand volume |
|----------------|--------------------------------|---------------------------|---------------------------|---|
| Low | 730 000 | 440 000 | 290 000 | 24 |
| Moderate | 220 000 | 120 000 | 100 000 | 37 |
| High | 35 000 | 10 000 | 25 000 | 38 |

The weighted mean reduction to stand volume will be applied to the merchantable volume within the study area as a spatially explicit operational adjustment factor during the modelling process.

Other insects, fire and wind losses

Damaging agent losses have been annualized from the provincial overview detection mapping for the period of 1999 to 2007 (district specific estimates for windthrow losses were used for the VFD). Only damaging agents impacting mature forests were summarized. These include balsam bark beetle (IBB), Douglas-fir bark beetle (IBD), spruce beetle (IBS), windthrow, and fire. Mountain pine beetle (MPB) losses for mature and managed stands within the TSA and balsam decline in the FSJFD were previously addressed. With the exception of MPB induced mortality in young pine stands, the impacts of damaging agents affecting managed stands are assumed to be captured in OAF2 reduction factors for TIPSy volume estimates.

Using the following 5 steps, an annualized volume loss for each agent was estimated:

1. A netdown factor for each agent for each year derived from the mid-point value of each agent's severity classes weighted by the affected area for a given year within each district.
2. A weighted average volume per hectare within the 2002 definition of THLB within each district. It is assumed that the current mature weighted average represents the long-term weighted average for the district.
3. A weighted average species ratio for host species within the 2002 definition of THLB within each district. Losses are estimated from stands where the host species comprises more than 40% of the species composition.
4. Impacted merchantable volume by agent = total area of severity classes * weighted severity factor * weighted host species ratio * weighted district volume per ha * THLB factor.
5. PGTSA estimate = sum of district estimates.

Unsalvaged volume estimates are based on district averages from two periods: estimated annual non-MPB related unsalvaged losses during the period of the epidemic (2002-2015) and the estimated annual losses post-MPB (2016+). The period of the epidemic is based on projections of maximum annual and cumulative mortality derived from the BCMPB v.4 model. Loss estimates are based on the assumption that salvage activities during this period focus primarily on MPB-induced mortality with only incidental salvage of non-MPB related losses. Loss estimates for the period following the epidemic are derived from the pre-epidemic salvage estimates utilized in TSR2.

6. Current Forest Management Assumptions

Table 24. Summary of annual losses estimated for the PGTSA

| District | Insects (m ³) | Fire (m ³) | Wind (m ³) | Total (m ³) |
|----------------|---------------------------|------------------------|------------------------|-------------------------|
| Prince George | | | | |
| 2008 – 2015 | 450 000 | 36 000 | 4000 | 490 000 |
| 2016 + | 210 000 | 15 000 | 470 | 230 000 |
| Fort St. James | | | | |
| 2008 – 2015 | 110 000 | 13 000 | 38 000 | 130 000 |
| 2016 + | 67 000 | 7000 | 1300 | 75 000 |
| Vanderhoof | | | | |
| 2008 – 2015 | 36 000 | 150 000 | 20 000 | 200 000 |
| 2016 + | 1500 | 89 000 | 1900 | 92 000 |
| PGTSA | | | | |
| 2008 – 2015 | 596 000 | 199 000 | 62 000 | 820 000 |
| 2016 + | 278 500 | 111 000 | 3670 | 397 000 |

6.7 Young pine mortality

This section summarizes recent Ministry of Forests and Range efforts to assess MPB mortality in young stands in the PGTSA.

When calculating mortality due to MPB the BCMPBv5 model only considers stands greater than 60 years old. In the last TSR (2004), documents summarized the volume of pine greater than 60 years old killed up to 2003 and the projected volume using the same age criteria up to 2010. Up until the time of the last TSR, very little beetle attack in young pine stands had been observed. The situation began to change; however, in VFD and PGFD in 2005 and in the FSJFD in 2007.

Regional entomologists and district staff started seeing beetle attack in young stands in 2005. Spaced stands seemed to be the first hit, probably because they had larger stem diameters. Research projects, including those by Southern Interior Forest Region (SIR) entomologist Lorraine MacLauchlan and University of Northern BC (UNBC's) Chris Hawkins, began investigating attack in young stands. They found that stems less than 10 cm diameter at breast height (DBH) were attacked, and observed that mortality in stems down to 12 cm DBH and brood development and success in stems as low as 17 cm DBH.

The vegetation resource inventory was queried for the area of pine-leading stands > 15 years old and < 60 year old (Crown Forest Land Base – Parks not included):

| | |
|--------------------------------|------------------|
| Fort St. James Forest District | 58 534 hectares |
| Vanderhoof Forest District | 109 354 hectares |
| Prince George Forest District | 113 331 hectares |
| Total TSA | 281 219 hectares |

6. Current Forest Management Assumptions

Attack estimates

Landscape units in Table 25 represent those that were sampled. Other landscape units have no attack at this time or have little area that has susceptible pine. The mortality estimates apply to all pine-leading stands within each identified age class within each surveyed landscape unit.

Table 25. Attack estimates within the PGTSA by district and landscape unit

| DJA | Age Class | Total Area (ha) | Area Surveyed (ha) | Total % Attack | DPG | Age Class | Total Area (ha) | Area Surveyed (ha) | Total % Attack | DVA | Age Class | Total Area (ha) | Area Surveyed (ha) | Total % Attack |
|-----------|-----------|-----------------|--------------------|----------------|---------|-----------|-----------------|--------------------|----------------|------------|-----------|-----------------|--------------------|----------------|
| Pinchi | 1 | 1842 | 391 | 5 | Bill's | 2 | 1098 | 729 | 67 | Blackwater | 3 | 3771 | 82 | 0 |
| Pinchi | 2 | 3160 | 5401 | 14 | Bowron | 2 | 2463 | 759 | 38 | Chilako | 2 | 8524 | 234 | 18 |
| Pinchi | 3 | 803 | 581 | 2 | Captain | 2 | 437 | 391 | 70 | Chilako | 3 | 2901 | 272 | 17 |
| Salmon | 1 | 3528 | 201 | 8 | Crooked | 2 | 751 | 289 | 37 | Cluculz | 2 | 8380 | 365 | 53 |
| Salmon | 2 | 5268 | 6816 | 14 | Crooked | 3 | 330 | 95 | 75 | Cluculz | 3 | 585 | 29 | 29 |
| Salmon | 3 | 2674 | 397 | 27 | Gleason | 2 | 334 | 62 | 65 | Endako | 2 | 2708 | 6 | 0 |
| Stuart | 1 | 75 | 121 | 42 | Gregg | 1 | 2278 | 169 | 0 | Endako | 3 | 284 | 7 | 53 |
| Stuart | 2 | 785 | 275 | 4 | Gregg | 2 | 4632 | 2510 | 58 | Entiako | 3 | 1988 | 270 | 9.6 |
| Tezzeron | 2 | 4193 | 1679 | 1 | Grizzly | 2 | 1731 | 566 | 33 | Halett | 2 | 3853 | 38 | 60 |
| Tezzeron | 3 | 1707 | 114 | 24 | Haggen | 2 | 596 | 304 | 17 | Halett | 3 | 2575 | 308 | 35 |
| Whitefish | 1 | 476 | 58 | 0.5 | Mollie | 2 | 3317 | 1523 | 27 | Kluskus | 2 | 3128 | 133 | 0 |
| Whitefish | 2 | 3916 | 5300 | 6 | Mud | 2 | 6672 | 3485 | 37 | Lucas | 2 | 915 | 70 | 44 |
| Whitefish | 3 | 504 | 29 | 0.3 | Mud | 3 | 2836 | 937 | 60 | Lucas | 3 | 154 | 22 | 54.5 |
| | | | | | Nechako | 2 | 4278 | 2442 | 58 | Nechako | 2 | 2480 | 96 | 53 |
| | | | | | Nechako | 3 | 452 | 125 | 60 | Nithi | 2 | 3792 | 7 | 0 |
| | | | | | Prince | 2 | 1734 | 120 | 40 | Nithi | 3 | 1583 | 244 | 4.2 |
| | | | | | Punchaw | 2 | 3411 | 1400 | 35 | Stuart | 2 | 5051 | 133 | 59 |
| | | | | | Punchaw | 3 | 2249 | 494 | 5 | Sutherland | 2 | 1441 | 31 | 0 |
| | | | | | Purden | 2 | 2612 | 1238 | 52 | Tachick | 2 | 4212 | 23 | 89 |
| | | | | | Purden | 3 | 5559 | 1200 | 8 | Tachick | 3 | 1155 | 15 | 0 |
| | | | | | Slender | 2 | 4648 | 2474 | 54 | Tatekuz | 3 | 4083 | 454 | 15.6 |
| | | | | | Slender | 3 | 1148 | 350 | 90 | | | | | |
| | | | | | Stony | 2 | 747 | 111 | 28 | | | | | |
| | | | | | Willow | 2 | 1942 | 553 | 58 | | | | | |
| | | | | | Willow | 3 | 5379 | 2020 | 60 | | | | | |

6.6 Shelf-life

There is significant uncertainty regarding the length of time that a MPB-killed tree is usable as a sawlog to make lumber. Some licensees in the PGTSA report that it is as short as 3 years while others suggest that sawlogs may be harvested from forests that have been dead for up to 40 years. There are several studies that are ongoing that may provide clarity.

Traditionally the chief forester's allowable annual cut (AAC) has been set for sawlogs, with lumber being the end product. New initiatives have seen interest in non-sawlog fibre based end products increasing. This includes the production of bio-energy from waste-wood.

The methodology that will be employed for shelf-life in this TSR will allow the chief forester the flexibility to determine an AAC that considers all of the standing dead pine.

6. Current Forest Management Assumptions

This TSR will employ the Spatially Explicit Landscape Event Simulator (SELES) model to forecast harvest flows for the PGTSA. SELES allows the reporting of the time since death for MPB-killed pine. The forecast produced by the model will indicate how much of the timber supply is dependent on 1 to 3, 4 to 5, 6 to 10 and 10 to 15 “years since death” stands. The latter categories are only used as a possible example and may be refined based on further comment. Although there is a general consensus that once pine trees have fallen over they no longer contribute to timber supply, there is still uncertainty with respect to when attacked trees actually begin to fall over, which is believed to be closely related to local soil moisture conditions. Recent studies indicate that on average MPB-killed trees fall over approximately 15 year after death. In wetter sites around the PGFD some MPB-killed trees have already begun to fall (only 5 years after attack), while in dry areas in the Chilcotin, which experienced a MPB-epidemic in the mid-1980s, many trees have yet to fall. The base case assumption will be that trees begin to fall over 15 years after initial attack and a sensitivity analysis will examine the implications of using 20 years to falldown.

6.7 Silviculture and regeneration activities

The RESULTS database, in conjunction with predictive ecosystem mapping for the PGTSA, has been used to develop the silviculture assumptions and managed stand analysis units (AU) for this TSR. The AUs for managed stands have initially been divided into 3 series:

1. The 3000 series: post-1997 managed stands and model generated cutblocks. The 3000 series utilizes SIBEC site index estimates.
2. The 4000 series: post-1987 to pre-1997 stands. The 4000 series utilized area weighted site series from RESULTS.
3. The 5000 series: the deciduous and cedar partitions.

All site series with sufficient representation (> 250 hectares) utilize RESULTS data for species distribution, stocking, and regeneration delay. All stocking values are rounded to the nearest 100 stems per hectare. All values are based on an area weighted average by site series.

Variants and site series that lack sufficient RESULTS representation to define species composition utilize the preferred species designated in the chief forester’s stocking standards for that site series. Site series without sufficient RESULTS representation also utilize zonal stocking and regeneration delay values. Variants without sufficient RESULTS representation utilize ecological surrogates for stocking and regeneration delay values as per the Regional Ecologist direction.

The deciduous partition analysis units metrics are borrowed from the approved stocking standards set out in the deciduous partition licence A71015 for the PGFD. The ICH partition analysis unit metrics were established by the ICH working group and are consistent with current practice within cedar-leading stands in the PGFD.

A further analysis unit delineating advanced regeneration stocking in unsalvaged pine-leading stands is currently in development and will be detailed in the information report once analysis is complete.

The Tables 26 through 28 detail the analysis units for each zonal site within the PGTSA. The tables also include projected volumes for each unit at ages 60, 80 and 100 years respectively.

6. Current Forest Management Assumptions

Table 26. Managed stand analysis units

| Analysis Unit | BEC Zone | Stems per ha. | Regen. Delay | Spc1 | Pct1 | Spc2 | Pct2 | Spc3 | Pct3 | Spc4 | Pct4 | Spc5 | Pct5 | Regen. Method | Utilization | OAF1 | OAF2 | Site Index | Vol/ha at 60yrs | Vol/ha at 80yrs | Vol/ha at 100yrs |
|---------------|--------------|---------------|--------------|------|------|------|------|------|------|------|------|------|------|---------------|-------------|------|------|------------|-----------------|-----------------|------------------|
| 3000 | BWBS_dk_1_01 | 1200 | 1 | PL | 82 | SW | 18 | | | | | | | P | 12.5 | 0.85 | 0.95 | 15.4 | 138 | 215 | 274 |
| 4000 | BWBS_dk_1_01 | 1100 | 2 | PL | 70 | SW | 27 | BL | 3 | | | | | P | 12.5 | 0.85 | 0.95 | 19 | 221 | 320 | 384 |
| 3011 | ESSF_mc_01 | 1100 | 1 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 13.8 | 60 | 170 | 260 |
| 4011 | ESSF_mc_01 | 1100 | 2 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 85 | 202 | 304 |
| 3021 | ESSF_mm_1_01 | 1100 | 1 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 91 | 207 | 308 |
| 4021 | ESSF_mm_1_01 | 1100 | 2 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 85 | 202 | 304 |
| 3026 | ESSF_mv_1_01 | 1100 | 1 | PL | 72 | SW | 25 | BL | 3 | | | | | P | 12.5 | 0.85 | 0.95 | 15 | 121 | 199 | 260 |
| 4026 | ESSF_mv_1_01 | 1100 | 3 | PL | 65 | SW | 29 | BL | 6 | | | | | P | 12.5 | 0.85 | 0.95 | 17 | 162 | 253 | 325 |
| 3031 | ESSF_mv_2_01 | 1100 | 1 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 12 | 24 | 111 | 197 |
| 4031 | ESSF_mv_2_01 | 1100 | 2 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 85 | 202 | 304 |
| 3036 | ESSF_mv_3_01 | 1100 | 1 | SW | 48 | PL | 38 | BL | 14 | | | | | P | 17.5 | 0.85 | 0.95 | 12 | 39 | 121 | 194 |
| 4036 | ESSF_mv_3_01 | 1100 | 3 | SW | 56 | PL | 34 | BL | 10 | | | | | P | 17.5 | 0.85 | 0.95 | 17 | 153 | 268 | 357 |
| 3043 | ESSF_wc_3_01 | 1200 | 1 | SW | 98 | BL | 2 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 96 | 217 | 326 |
| 4043 | ESSF_wc_3_01 | 1100 | 2 | SW | 78 | BL | 13 | PL | 9 | | | | | P | 17.5 | 0.85 | 0.95 | 16 | 118 | 239 | 344 |
| 3046 | ESSF_wk_1_01 | 1300 | 1 | SW | 82 | PL | 12 | BL | 6 | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 101 | 218 | 319 |
| 4046 | ESSF_wk_1_01 | 1100 | 2 | SW | 81 | PL | 12 | BL | 7 | | | | | P | 17.5 | 0.85 | 0.95 | 17 | 151 | 276 | 375 |
| 3053 | ESSF_wk_2_01 | 1400 | 1 | SW | 94 | BL | 3 | PL | 3 | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 97 | 220 | 327 |
| 4053 | ESSF_wk_2_01 | 1100 | 3 | SW | 94 | BL | 5 | PL | 1 | | | | | P | 17.5 | 0.85 | 0.95 | 17 | 139 | 271 | 380 |
| 3058 | ESSF_wv_01 | 1100 | 1 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 11.8 | 21 | 104 | 190 |
| 4058 | ESSF_wv_01 | 1100 | 2 | BL | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 85 | 202 | 304 |
| 3067 | ESSF_xv_1_01 | 1100 | 1 | PL | 50 | SW | 50 | | | | | | | P | 12.5 | 0.85 | 0.95 | 15 | 114 | 201 | 273 |
| 4067 | ESSF_xv_1_01 | 1100 | 2 | PL | 50 | SW | 50 | | | | | | | P | 12.5 | 0.85 | 0.95 | 15 | 110 | 197 | 269 |
| 3074 | ICH_mc_1_01 | 1200 | 1 | BL | 34 | HW | 33 | SW | 33 | | | | | P | 17.5 | 0.85 | 0.95 | 19.4 | 234 | 385 | 484 |
| 4074 | ICH_mc_1_01 | 1200 | 2 | BL | 34 | HW | 33 | SW | 33 | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 215 | 364 | 467 |
| 3080 | ICH_vk_2_01 | 1200 | 1 | SW | 78 | FD | 10 | CW | 6 | PL | 4 | BL | 2 | P | 17.5 | 0.85 | 0.95 | 21 | 269 | 408 | 485 |
| 4080 | ICH_vk_2_01 | 1000 | 2 | SW | 82 | PL | 18 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 203 | 338 | 421 |
| 5103 | ICH_vk_2_01 | 1200 | 1 | Cw | 40 | Sw | 40 | Fd | 10 | Pl | 10 | | | P | 17.5 | 0.85 | 0.95 | 18 | 103 | 236 | 343 |
| 3087 | ICH_wk_3_01 | 1200 | 1 | SW | 58 | PL | 19 | CW | 11 | FD | 11 | BL | 1 | P | 17.5 | 0.85 | 0.95 | 22 | 308 | 439 | 517 |
| 4087 | ICH_wk_3_01 | 1100 | 2 | SW | 79 | PL | 15 | BL | 3 | CW | 3 | | | P | 17.5 | 0.85 | 0.95 | 20 | 238 | 379 | 457 |
| 5104 | ICH_wk_3_01 | 1200 | 1 | Cw | 41 | Sw | 41 | Fd | 11 | Pl | 11 | | | P | 17.5 | 0.85 | 0.95 | 18 | 103 | 236 | 343 |
| 3096 | ICH_wk_4_01 | 1300 | 1 | SW | 79 | PL | 11 | FD | 10 | | | | | P | 17.5 | 0.85 | 0.95 | 21 | 269 | 402 | 472 |
| 4096 | ICH_wk_4_01 | 1200 | 2 | SW | 53 | PL | 38 | HW | 5 | FD | 4 | | | P | 17.5 | 0.85 | 0.95 | 18 | 189 | 308 | 388 |
| 5106 | ICH_wk_4_01 | 1300 | 1 | Cw | 43 | Sw | 43 | Fd | 13 | Pl | 13 | | | P | 17.5 | 0.85 | 0.95 | 18 | 106 | 242 | 349 |
| 3103 | MS_xv_01 | 1200 | 1 | PL | 96 | SW | 3 | BL | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 18 | 213 | 295 | 343 |
| 4103 | MS_xv_01 | 1100 | 2 | PL | 85 | SW | 15 | | | | | | | P | 12.5 | 0.85 | 0.95 | 21 | 287 | 379 | 442 |

6. Current Forest Management Assumptions

Table 27. Managed stand analysis units

| Analysis Unit | BEC Zone | Stems per Ha. | Regen. Delay | Spc1 | Pct1 | Spc2 | Pct2 | Spc3 | Pct3 | Spc4 | Pct4 | Spc5 | Pct5 | Regen. Method | Utilization | OAF1 | OAF2 | Site Index | Vol/ha at 60yrs | Vol/ha at 80yrs | Vol/ha at 100yrs |
|---------------|-------------|---------------|--------------|------|------|------|------|------|------|------|------|------|------|---------------|-------------|------|------|------------|-----------------|-----------------|------------------|
| 3110 | SBPS_dc_01 | 1200 | 1 | PL | 65 | SW | 34 | FD | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 18 | 204 | 301 | 363 |
| 4110 | SBPS_dc_01 | 1200 | 1 | SW | 72 | PL | 28 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 108 | 217 | 310 |
| 3116 | SBPS_mc_01 | 1100 | 1 | PL | 95 | SW | 5 | | | | | | | P | 12.5 | 0.85 | 0.95 | 12 | 60 | 114 | 157 |
| 4116 | SBPS_mc_01 | 1100 | 2 | PL | 85 | SW | 15 | | | | | | | P | 12.5 | 0.85 | 0.95 | 16 | 148 | 225 | 286 |
| 3123 | SBPS_mk_01 | 1200 | 1 | SW | 74 | PL | 26 | | | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 107 | 217 | 312 |
| 4123 | SBPS_mk_01 | 1200 | 1 | PL | 85 | SW | 15 | | | | | | | P | 12.5 | 0.85 | 0.95 | 21 | 298 | 387 | 446 |
| 3125 | SBS_dk_01 | 1100 | 1 | PL | 75 | SW | 23 | BL | 1 | FD | 1 | | | P | 12.5 | 0.85 | 0.95 | 19.5 | 243 | 337 | 399 |
| 4125 | SBS_dk_01 | 1200 | 3 | PL | 78 | SW | 21 | BL | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 20 | 252 | 349 | 412 |
| 3135 | SBS_dw_1_01 | 1200 | 1 | PL | 49 | SW | 35 | FD | 15 | BL | 1 | | | P | 12.5 | 0.85 | 0.95 | 21.8 | 303 | 409 | 474 |
| 4135 | SBS_dw_1_01 | 1100 | 2 | PL | 47 | SW | 24 | FD | 21 | BL | 8 | | | P | 12.5 | 0.85 | 0.95 | 20 | 236 | 337 | 405 |
| 5000 | SBS_dw_1_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3142 | SBS_dw_2_01 | 1200 | 1 | PL | 68 | SW | 22 | FD | 10 | | | | | P | 12.5 | 0.85 | 0.95 | 19.6 | 246 | 339 | 401 |
| 4142 | SBS_dw_2_01 | 1200 | 3 | PL | 78 | SW | 12 | FD | 10 | | | | | P | 12.5 | 0.85 | 0.95 | 20 | 249 | 339 | 402 |
| 5007 | SBS_dw_2_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3153 | SBS_dw_3_01 | 1200 | 1 | PL | 62 | SW | 29 | FD | 9 | | | | | P | 12.5 | 0.85 | 0.95 | 21.5 | 301 | 401 | 465 |
| 4153 | SBS_dw_3_01 | 1100 | 3 | PL | 69 | SW | 23 | FD | 6 | BL | 2 | | | P | 12.5 | 0.85 | 0.95 | 20 | 242 | 341 | 407 |
| 5016 | SBS_dw_3_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3163 | SBS_mc_2_01 | 1100 | 1 | PL | 74 | SW | 25 | BL | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 17.9 | 199 | 291 | 351 |
| 4163 | SBS_mc_2_01 | 1100 | 3 | PL | 80 | SW | 17 | BL | 3 | | | | | P | 12.5 | 0.85 | 0.95 | 19 | 219 | 314 | 375 |
| 5025 | SBS_mc_2_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3175 | SBS_mc_3_01 | 1100 | 1 | PL | 88 | SW | 12 | | | | | | | P | 12.5 | 0.85 | 0.95 | 18 | 206 | 291 | 344 |
| 4175 | SBS_mc_3_01 | 1200 | 3 | PL | 87 | SW | 12 | BL | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 17 | 174 | 257 | 317 |
| 5037 | SBS_mc_3_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3184 | SBS_mh_01 | 1300 | 1 | FD | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 21 | 242 | 363 | 439 |
| 4184 | SBS_mh_01 | 1300 | 2 | FD | 50 | SW | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 180 | 298 | 377 |
| 5046 | SBS_mh_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3191 | SBS_mk_1_01 | 1300 | 1 | PL | 50 | SW | 47 | FD | 2 | BL | 1 | | | P | 12.5 | 0.85 | 0.95 | 20.1 | 264 | 373 | 434 |
| 4191 | SBS_mk_1_01 | 1100 | 3 | PL | 52 | SW | 44 | BL | 3 | FD | 1 | | | P | 12.5 | 0.85 | 0.95 | 20 | 239 | 352 | 422 |
| 5053 | SBS_mk_1_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3201 | SBS_mw_01 | 1200 | 1 | PL | 59 | SW | 33 | FD | 8 | | | | | P | 12.5 | 0.85 | 0.95 | 22.4 | 327 | 430 | 489 |
| 4201 | SBS_mw_01 | 1200 | 3 | PL | 65 | SW | 22 | FD | 10 | BL | 3 | | | P | 12.5 | 0.85 | 0.95 | 20 | 245 | 343 | 408 |
| 5062 | SBS_mw_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3210 | SBS_vk_01 | 1300 | 1 | SW | 93 | PL | 5 | BL | 2 | | | | | P | 17.5 | 0.85 | 0.95 | 19.7 | 235 | 381 | 455 |
| 4210 | SBS_vk_01 | 1000 | 2 | SW | 89 | PL | 6 | BL | 4 | FD | 1 | | | P | 17.5 | 0.85 | 0.95 | 18 | 170 | 305 | 398 |
| 5070 | SBS_vk_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |

6. Current Forest Management Assumptions

Table 28. *Managed stand analysis units*

| Analysis Unit | BEC Zone | Stems per Ha. | Regen. Delay | Spc1 | Pct1 | Spc2 | Pct2 | Spc3 | Pct3 | Spc4 | Pct4 | Spc5 | Pct5 | Regen. Method | Utilization | OAF1 | OAF2 | Site Index | Vol/ha at 60yrs | Vol/ha at 80yrs | Vol/ha at 100yrs |
|---------------|---------------|---------------|--------------|------|------|------|------|------|------|------|------|------|------|---------------|-------------|------|------|------------|-----------------|-----------------|------------------|
| 3220 | SBS_wk_1_01 | 1200 | 1 | SW | 64 | PL | 33 | FD | 2 | BL | 1 | | | P | 17.5 | 0.85 | 0.95 | 21.1 | 283 | 406 | 474 |
| 4220 | SBS_wk_1_01 | 1100 | 2 | SW | 60 | PL | 35 | BL | 3 | FD | 2 | | | P | 17.5 | 0.85 | 0.95 | 19 | 214 | 338 | 414 |
| 5077 | SBS_wk_1_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3232 | SBS_wk_3_01 | 1200 | 1 | PL | 60 | SW | 39 | BL | 1 | | | | | P | 12.5 | 0.85 | 0.95 | 20.6 | 279 | 383 | 445 |
| 4232 | SBS_wk_3_01 | 1100 | 2 | PL | 54 | SW | 43 | BL | 3 | | | | | P | 12.5 | 0.85 | 0.95 | 20 | 246 | 356 | 424 |
| 5087 | SBS_wk_3_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3240 | SBS_wk_3_a_01 | 1200 | 1 | SW | 49 | PL | 44 | FD | 6 | BL | 1 | | | P | 17.5 | 0.85 | 0.95 | 16.8 | 164 | 269 | 346 |
| 4240 | SBS_wk_3_a_01 | 1000 | 4 | PL | 67 | SW | 24 | FD | 5 | BL | 4 | | | P | 12.5 | 0.85 | 0.95 | 19 | 199 | 298 | 365 |
| 5095 | SBS_wk_3_a_01 | 2000 | 1 | At | 50 | Ep | 50 | | | | | | | P | 17.5 | 0.85 | 0.95 | 19 | 163 | 295 | 394 |
| 3248 | SWB_mk_01 | 1100 | 1 | SW | 48 | PL | 38 | BL | 14 | | | | | P | 17.5 | 0.85 | 0.95 | 12 | 39 | 121 | 194 |
| 4248 | SWB_mk_01 | 1100 | 2 | SW | 48 | PL | 38 | BL | 14 | | | | | P | 17.5 | 0.85 | 0.95 | 15 | 106 | 209 | 294 |

Table 29. *Summary of hectares of NSR in the Prince George TSA from RESULTS*

| | Prince George Forest District | Vanderhoof Forest District | Fort St. James Forest District | Prince George TSA |
|--------------|-------------------------------|----------------------------|--------------------------------|-------------------|
| NAT sum | 5554.1 | 687.8 | 77.1 | 6319.0 |
| NPL Sum | 3238.0 | 1745.0 | 1871.8 | 6854.8 |
| PL Sum | 31835.6 | 22854.6 | 11852.0 | 68491.1 |
| Total | 40627.7 | 25287.4 | 13800.9 | 81664.9 |

RESULTS code definition for stocking status code:

NAT = Natural regeneration (regenerated using natural regeneration tables VDYP);

NPL = non-plantable ground (excluded from the THLB);

PL = plantable (regenerated on managed stand yield tables).

6.9 Integrated resource management

Specific objectives and modelling assumptions follow:

6.9.1 Landscape-level retention

The following analysis assumptions are drawn from the:

- *Order Establishing Landscape Biodiversity objectives for the Prince George Timber Supply Area, October 20, 2004* (PGTSA order), found at: http://ilmbwww.gov.bc.ca/lup/srmp/northern/prince_george_tsa/index.html
Order to establish the Humbug Landscape Unit and Objectives, April 2003 and
- *Order to Establish the Dome and Slim Landscape Units and Objectives, October 31, 2002.* found at: http://ilmbwww.gov.bc.ca/lup/srmp/northern/prince_george/index.html

6. Current Forest Management Assumptions

Base case

Old forest retention

The PGTSA landscape biodiversity order specifies objectives for old forest retention, old interior forest retention, and young forest patch size distribution objectives to be applied at the merged biogeoclimatic unit (mBEC) level. mBECs are a combination of natural disturbance sub-units and biogeoclimatic subzones as defined by Craig DeLong.¹ In the PGTSA old forest is generally considered to be stands older than 140 years of age for the more mountainous areas and 120 years old for the lower elevation areas where disturbance tends to be more frequent (such as in the VFD).

Stand age is as indicated in forest inventory attributes found in the vegetation resource inventory file. Because of the current MPB epidemic the PGTSA order allows for old MPB-killed stands to contribute to old forest objectives in the form of “natural forest areas”. The order does not specify how long these old dead forests can reasonably contribute to the old forest requirements. Current direction from Integrated Land Management Bureau, Ministry of Agriculture and Lands, is that these natural forest areas will contribute until they regenerate into mature second growth natural forests and are harvested (possibly 100 years from initial death). In mBECs relying on significant amounts of natural forest areas to provide old-growth objectives not all of the old forest can be achieved through natural forest areas.

The implementation policy specifies a minimum amount of Crown forest land base (CFLB) that must be retained as old non-pine leading stands. Table 30 lists the mBEC units and their corresponding minimum requirements for aspatial old growth. Old forest in parks and protected areas will contribute to old forest retention targets. Although the Old Growth Order does not specify the minimum percentage of the CFLB to be retained as old non-pine leading forest for all mBEC units, section D.3 (*Epidemic or Catastrophic Events*) of the order does state that “licensees and BC Timber Sales must ensure that a representative portion of stands that have not been affected by the epidemic (e.g., non-pine forest) are used to meet the Old Forest Retention objectives”. The middle section of Table 30 shows those mBECs where the ‘minimum % of the CFLB retained as old non-pine’ was not specified in the original order.

¹ DeLong, S.C. 2002. *Natural Disturbance Units of the Prince George Forest Region: Guidance for Sustainable Forest Management*. Unpublished Report. Ministry of Forests, Prince George, B.C.

6. Current Forest Management Assumptions

Spatial old-growth objectives for the Slim, Dome and Humbug landscape units

Specific areas have been designated as old-growth reserves in three landscape units in the Interior Cedar Hemlock (ICH) biogeoclimatic zones. These areas are reserved from harvesting and contribute to the overall aspatial old forest retention requirements documented in Table 30.

Table 30. Summary of aspatial old forest retention requirements

| Source of old growth | Minimum % of the CFLB retained as old forest or "natural forest area" | Minimum % of the CFLB retained as old non-pine leading forest | Minimum age of old forest | Merged biogeoclimatic subzone (mBEC) unit label (as per Prince George TSA biodiversity order) | | |
|---|---|---|---------------------------|---|-------------------------------|--------------------------------|
| | | | | Vanderhoof Forest District | Prince George Forest District | Fort St. James Forest District |
| mBEC units where there are specific requirements for old forest retention from non-pine leading forests outlined in Tables 8 to 10 of the implementation policy in the Prince George TSA old growth order | 12 | 1 | 120 | | A8 | |
| | 12 | 2 | 120 | D4, D7 | A11 | |
| | 12 | 3 | 120 | D6 | A9 | |
| | 12 | 4 | 120 | | A12 | E4 |
| | 12 | 6 | 120 | | A13 | E5 |
| | 17 | 3 | 120 | D2 | | |
| | 17 | 5 | 120 | D3, D5 | | |
| | 17 | 10 | 120 | | | E3 |
| | 17 | 13 | 120 | | | E2 |
| | 17 | 14 | 120 | | A7, A10 | |
| | 29 | 12 | 140 | | A5 | |
| | 29 | 16 | 140 | D1 | | |
| | 29 | 28 | 140 | | A6 | |
| | 41 | 33 | 140 | | | E1 |
| mBEC units where the retention from non-pine leading forests is unspecified in the order but where pine makes up a significant portion of the old forest ² . | 12 | 9 | 120 | | A3 | |
| | 16 | 9 | 120 | | | E12 |
| | 16 | 10 | 120 | | | E14, E16 |
| | 16 | 12 | 120 | | | E17 |
| | 16 | 13 | 120 | | | E15 |
| | 26 | 23 | 140 | | A4 | |
| | 30 | 27 | 140 | | A24 | |

(continued)

² Data for non-pine leading old forest is from the same 2004 forest inventory file used to derive the tables in the original 2004 PG TSA Old Growth Order.

6. Current Forest Management Assumptions

Table 30. Summary of aspatial old forest retention requirements (concluded)

| Source of old growth | Minimum % of the CFLB retained as old forest or “natural forest area” | Minimum % of the CFLB retained as old non-pine leading forest | Minimum age of old forest | Merged biogeoclimatic subzone (mBEC) unit label (as per Prince George TSA biodiversity order) | Source of old growth | Minimum % of the CFLB retained as old forest or “natural forest area” |
|--|---|---|---------------------------|---|----------------------|---|
| mBEC units where no significant quantity of old pine leading forests exists. In these units utilization of any or all of the old dead (MPB-killed) pine does not constitute a risk to the intent of the old-growth order and its implementation. | 23 | | 140 | | | E13 |
| | 26 | | 140 | | A2, A16 | E8 |
| | 33 | | 140 | | A1 | |
| | 37 | | 140 | | | E6, E7 |
| | 41 | | 140 | | | E10, E11 |
| | 46 | | 140 | | A25 | |
| | 48 | | 140 | | A19, A21 | |
| | 50 | | 140 | | A14, A17 | |
| | 53 | | 140 | | A22, A23 | |
| | 58 | | 140 | | | E9 |
| | 80 | | 140 | | A18, A20 | |
| | 84 | | 140 | | A15 | |

Old interior forest retention

The PGTSA order also specifies the minimum percentage of the old forest that must be old interior forest. This is forest that is buffered from young forest or disturbance (logging or roads). Timber supply modelling techniques currently employed do not allow for direct modelling of this objective. Instead, at certain time intervals the output of the model will be examined and interior old forest will be quantified and reported. Old dead pine forests (natural forest areas) are assumed to contribute as old interior forest where adequately buffered from disturbance. Time intervals proposed are initial (time 0), 5, 10, 20, 30 and 40 years from now.

Young forest patch size distribution objectives

The PGTSA Order (Part C) requires that there is a “demonstrated trend toward the young forest patch size distribution by natural disturbance sub-unit”. For the purposes of the base case this objective will be handled in a similar manner to the old interior forest retention objective. Area in each patch size category (> 1000 hectares, 101 to 1000 hectares, 51 to 100 hectares, and less than 50 hectares) will be reported at regular time intervals. Dead pine leading forests (natural forest areas) are not assumed to contribute to an early seral patch. Suggested time intervals are: initial (time 0), 10, 20, 50 years from now and 100 years from now.

6. Current Forest Management Assumptions

6.9.2 Disturbance of the non-timber harvesting land base

As described in this data package, management objectives for forest values such as biodiversity and wildlife will be modelled in the timber supply analysis. Often these objectives are to retain a specified amount of area in old forest condition (e.g., 12% of the management zone older than 120 years for old-growth order in unit A8 in the PGFD – see Table 29). Objectives to address these values apply to the entire Crown forest area (both THLB and non-THLB). The non-THLB includes forested areas of uneconomic timber, parks, caribou high habitat, ungulate winter range, and other Crown-managed areas. As a result, non-THLB areas must also be factored into the analysis. Various modelling assumptions have been used in the past to simulate the role of natural disturbance in altering non-THLB forest conditions. In this analysis the non-THLB land base is assumed to be frozen in time. This means that whatever the age distribution of the non-THLB is today represents the overall average over time. These stands are not permitted to age further. The inherent shortcoming in this assumption is that protection efforts will continue as they are today and that our current condition, where much of the non-THLB forest is old, will continue into the immediate future.

6.10 Scenic areas and visual quality objectives (VQOs)

Recently developed procedures will be used to model scenic areas and VQOs. Plan to Perspective (P2P) ratios and Visually Effective Green-up (VEG) heights will be determined for 5% slope class increments for each individual scenic area polygon. The P2P ratios will then be applied in the analysis to adjust the percent allowable alteration by visual quality objective. VEG tree heights will be modelled for each scenic area polygon individually as opposed to using an average for the entire district or TSA as it was done in previous TSRs.

Three documents which explain modelling processes are included in Appendix Z. They are:

- *Procedures for Factoring Visual Resources into Timber Supply Analyses* (March 17, 1998);
- *Procedures for Carrying out Visually Effective Green-up (VEG) Tree Height Assessment in Scenic Areas, Northern Interior Forest Region* (November, 2007); and
- *Bulletin-Modelling Visuals in TSR III* (December 12, 2003).

Table 31 indicates the P2P ratios and VEG heights by slope class that will be applied in the analysis. This table has been recently refined from the procedural documents in order to combine the two different slope classes used for P2P and VEG.

6. Current Forest Management Assumptions

Table 31. P2P ratios and VEG heights

| Modified visual unit slope classes for plan-to-perspective ratios (P2P) and visually effective green-up (VEG) tree height input into TSRs ¹ | | | | | | | | | | | | | | | |
|--|------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| Slope % | 0-5 | 5.1-10 | 10.1-15 | 15.1-20 | 20.1-25 | 25.1-30 | 30.1-35 | 35.1-40 | 40.1-45 | 45.1-50 | 50.1-55 | 55.1-60 | 60.1-65 | 65.1-70 | 70.1+ |
| P2P ratios ² | 4.68 | 4.23 | 3.77 | 3.41 | 3.04 | 2.75 | 2.45 | 2.22 | 1.98 | 1.79 | 1.6 | 1.45 | 1.29 | 1.17 | 1.04 |
| VEG tree height (m) | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 8.5 | 8.5 |

¹ Adapted from Procedures for Factoring Visual Resources into Timber Supply Analysis manual (1998) and Modelling Visuals in TSR III Bulletin (2003) in Preparation for TSR4 (by Luc Roberge, Visual Resources Specialist, MFR-December 2007).

² A recent study shows a first approximation of the predicted P2P ratios for absolute slope classes in 10% increments. Although P2P ratios and slope classes did not show a linear relationship, the median value was used in this table to determine the ratios for slope classes in 5% increments.

Table 32 identifies the percent allowable alteration in perspective view by Visual Quality Objective (VQO).

Table 32. Predicting VQO objectives based on percent alterations

| VQO | Permissible % alteration in perspective view | Proposed % alteration in perspective view for this TSR (mid-point of range) |
|----------------------|--|---|
| Preservation | 0 | 0 |
| Retention | 0 - 1.5 | 0.8 |
| Partial retention | 1.6 - 7.0 | 4.3 |
| Modification | 7.1 - 18.0 | 12.6 |
| Maximum modification | 18.1 - 30.0 | 24.1 |

Note: These percentages apply to the visible treed portion of the landscape in perspective view. Rock, snow and ice patches are excluded from the calculation.

To determine available denudation in plan view for an individual visual unit, the perspective percent alteration number must be converted by a P2P ratio for the average slope class of that unit. For example, assume a partial retention (PR) visual unit is managed in the field at the mid-range of the permissible % alteration in perspective view, 4.3%, and has an average slope of 20% resulting in a P2P ratio of 3.41. The corresponding percent denudation value in plan view would be: 4.3% x 3.41=14.7%. Therefore, if this PR visual unit is 5000 hectares (THLB) in size and has no prior harvesting, or any past harvesting has reached VEG, 735 hectares is available for harvesting (5000 hectares x 14.7%) and this is the number that would be used for modelling.

6. Current Forest Management Assumptions

6.11 Land and resource management plans (LRMPs)

Table 33 lists the land use objectives as defined in the Prince George LRMP that factor into THLB constraints. Zones or objectives resulting in 100% netdown are located in Section 5.

Table 33. Land use objectives to be tracked in base case

| Objective | This TSR management strategy/ modelling assumptions | Resource management zone |
|--|---|---|
| Herrick Creek Old Growth Forest Management Areas (Forest Ecosystem Networks) | Harvest constraint: 25% <u>minimum</u> retained area must be greater than 120 years; AND, only 25% <u>maximum</u> allowable disturbance area may be less than 3 metres tall | Prince George LRMP Herrick Creek Old Growth Forest Management Areas (RMZ #40) |

6.12 Ungulate winter ranges

Tables 34 to 40 identify constraints to the THLB associated with mule deer and caribou ungulate winter ranges. UWR objectives resulting in 100% netdown to the THLB are found in Section 5.3.1.

Table 34. Summary of all UWR orders

| UWR ID | UWR name | # of UWR units within plan | Total UWR area (ha) | Forest district(s) | Gross area – no harvest | Gross area – modified harvest |
|---------|--|----------------------------|---------------------|--------------------|-------------------------|-------------------------------|
| | PG Mule Deer (Blackwater River – Unit dqu_14) | | | | 0 | 5185 |
| U-5-001 | | 1 | 5185 | Prince George | | |
| U-7-002 | Fort St. James Mule Deer | 19 | 3657.2 | Fort St. James | 176 | 8664 |
| | Omineca Mt. Caribou (PGTSA portion only – includes SARCO incremental habitat proposal) | | | | 565 679 | 90 114 |
| U-7-003 | | 102 | 655 793 | All | | |
| U-7-011 | Vanderhoof Mule Deer | 7 | 2327 | Vanderhoof | 514 | 1813 |
| U-7-012 | Vanderhoof Caribou | 11 | 48 696 | Vanderhoof | 22 629 | 26 067 |
| U-7-013 | Prince George Mule Deer | 66 | 10 062 | Prince George | 323 | 9739 |
| | Fort St. James PLWR | | | | 0 | 52 606 |
| U-7-015 | Northern Caribou | 19 | 52 606 | Fort St. James | | |
| U-7-016 | Additional – Vanderhoof Mule Deer | | | Vanderhoof | | |
| U-7-022 | Additional Prince George Mule Deer | | | Prince George | | |
| | See U-5-001 – Blackwater | | | | | |
| U-7-023 | CCLUP Mule Deer | | | Prince George | | |

6. Current Forest Management Assumptions

Table 35. Mule deer winter range order U-7-002 Fort St. James Forest District

| Mule deer habitat type | Habitat units | Habitat strategy | Constraint |
|------------------------|---------------|---|-------------------------------------|
| Modified harvest | 1-5,11,12,14 | Minimum of 40% of winter range area in age class 8 (> 140 years) or greater at all times with a crown closure of > 56% (Douglas-fir, Spruce) Minimum of 50% species composition of Douglas-fir | ≥ 40% ≥ 140 years Regen ≥ 50% Fd |
| Mule deer habitat type | Habitat units | Habitat strategy | Constraint |
| Modified harvest | 6-8,13 | Minimum of 50% species composition of Douglas-fir | Regen ≥ 50% Fd |
| Modified harvest | 9,10,15-18 | Minimum of 50% of stand in age class 8 (> 140 years) or greater at all times with a crown closure of > 66% (Douglas-Fir, Spruce) Minimum of 50% species composition of Douglas-fir | ≥ 50% ≥ 140 years Regen ≥ 50% Fd |

Table 36. Caribou ungulate winter range order U-7-003

| Caribou habitat type | Habitat units | Total area (hectares) | Habitat strategy | Constraint |
|----------------------|--|-----------------------|---|--|
| Medium | T-001, T-002, T-004, T-007, T-008, T-011, T-013, T-015, T-017, T-018, T-019 | 21 406 | Caribou medium habitat Harvest < 30% volume removal on a cutblock area every 80 years, opening sizes do not exceed 1.0 ha, with a mean opening size of < 0.5 ha | Modified harvest ≥ 30% ≥ 160 years old ≤ 30% < 80 years old |
| Corridor | P-001, P-004, P-005, P-009, P-013, P-017, P-018, P-026, P-028, P-029, P-039, P-042, P-044, P-046, P-047, P-050, P-051, P-052, P-059, P-061, P-062, P-063, P-070, P-073, T-005, T-009, T-010, T-012 | 68 708 | Caribou travel corridors Harvesting will result in a minimum of 20% of the forest within each unit as 100+ years of age in corridor with no more than 20% of the productive forest area of the unit being less than 3 metres green-up condition | Modified harvest ≥ 20% of the forest ≥ 100years ≤ 20% ≤ 3 metres |

6. Current Forest Management Assumptions

Table 37. Mule deer winter range order U-7-011

| Mule deer habitat type | Habitat units | Must do management | Constraint |
|------------------------|----------------|---|-------------------------------------|
| Modified harvest | VD-01,02,05,06 | Minimum of 50% of stand in age class 8 (> 140 years) or greater at all times with a crown closure of >66% (Douglas-fir, Spruce) Maintain 30 to 40% deciduous shrub component Minimum of 50% species composition of Douglas-fir | ≥ 50% ≥ 140 years Regen ≥ 50% Fd |
| Modified harvest | VD-04 | Minimum of 40% of winter range area in age class 8 (> 140 years) or greater at all times with a crown closure of > 56% (Douglas-fir, spruce) Maintain 30 to 40% deciduous shrub component Minimum of 50% species composition of Douglas-fir | ≥ 40% ≥ 140 years Regen ≥ 50% Fd |

Table 38. Caribou ungulate winter range order U-7-012 Vanderhoof Forest District

| Caribou habitat type | Habitat units | Habitat strategy | Constraint |
|----------------------|--|---|----------------------|
| Modified harvest | LE-1-001 – LE-1-009 LE-2-001 LE-2-011 – LE-2-015 LE-2- 017, 018 LE-4-001 | Manage the defined Non-terrestrial Lichen Habitat and Terrestrial Lichen Habitat through a two-pass, 140 year rotation Within each pass, harvest 50% +/- 20% of the total area Primary forest activities initiated at the start of a rotation are to be completed within 20 years, areas not harvested during that 20-year period will be locked into the 140 year rotation | ≤ 50% < 70 years old |

6. Current Forest Management Assumptions

Table 39. Mule deer winter range order U-7-013 Prince George Forest District

| Mule deer habitat type | Habitat units | Habitat strategy | Constraint |
|------------------------|---|--|-------------------------------------|
| Modified harvest | PGD-001,002,012,014 PGD-019-022, 035,054,066 | Minimum of 50% of stand in age class 8 (> 140 years) or greater Maintain 30 to 40% deciduous shrub component Minimum of 50% species composition of Douglas-fir | ≥ 50% ≥ 140 years Regen ≥ 50% Fd |
| Modified harvest | PGD-004,008, 010,011,013,015, 023,026-029, 031,038,040-052, 055,063-065 | Minimum of 40% of winter range area in age class 8 (> 140 years) or greater Maintain 30 to 40% deciduous shrub component Minimum of 50% species composition of Douglas-fir | ≥ 40% ≥ 140 years Regen ≥ 50% Fd |

Table 40. Northern Caribou winter range order U-7-015 Fort St. James Forest District

| Caribou habitat type | Habitat units | Habitat strategy | Constraint |
|----------------------|--|---|----------------------|
| Modified harvest | 9a-001, 9b-001, 9c-001, 10-001, 9a-002-9a-007, 9b-002, 9c-002, 9c-003, 10-002, 10-004 | Manage the defined Non-terrestrial Lichen habitat and Terrestrial Lichen habitat through a two-pass, 140 year rotation Within each pass, harvest 50% +/- 20% of the total area | ≤ 50% < 70 years old |

6. Current Forest Management Assumptions

Table 41. Mule deer winter range order U-5-001 Prince George Forest District

| Mule Deer habitat type | Habitat units | Habitat strategy | Constraint | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|---|---|-------------------------------|---|-----|----|----------|----|------|----|---------------------|-----------------------|---------------|--------------------|---|-----|----|----|-----|---|-----|----|----|-----|---|------|----|----|-----|---|---------------|-------------|--------------|-------------|------------|--------------|--------------|--------------|------|--------------|--------------|--------------|--|
| Modified harvest | DQU-14 | <p>Primary forest activities will result in the protection of existing Douglas-fir regeneration and retention of Douglas-fir in juvenile spacing treatments</p> <p>First pass selection is to be applied when the stand basal area is $\geq 45 \text{ m}^2$ in the Interior Cedar Hemlock or $\geq 40 \text{ m}^2$ in other biogeoclimatic zones</p> <p>Forest activities planned for each cutblock area must result in a condition where the 0 – 40 year category</p> <p><u>Table 1</u></p> <table border="1"> <thead> <tr> <th>Stand structure habitat Class</th> <th>Max % cutblock area in age class 0-40 years</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>33</td> </tr> <tr> <td>Moderate</td> <td>25</td> </tr> <tr> <td>High</td> <td>20</td> </tr> </tbody> </table> <p>Primary forest activities in stands of trees, where the group selection silviculture system is to be employed, will result in the harvest proportions and cutting cycles for each stand structure habitat class</p> <p><u>Table 2</u></p> <table border="1"> <thead> <tr> <th>Stand habitat class</th> <th>Area harvest per pass</th> <th>Min cut cycle</th> <th>Effective rotation</th> <th># of different aged patches after full rotation</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>33</td> <td>40</td> <td>120</td> <td>3</td> </tr> <tr> <td>Mod</td> <td>35</td> <td>40</td> <td>160</td> <td>4</td> </tr> <tr> <td>High</td> <td>20</td> <td>40</td> <td>200</td> <td>5</td> </tr> </tbody> </table> <p>9 (a) Primary forest activities on sites ecologically capable of growing Douglas-fir must achieve at least an additional 20% in post-harvest Douglas-fir composition as compared to the pre-harvest Douglas-fir composition</p> <p>Despite 9 (a), no further increase in post-harvest Douglas-fir composition is required beyond 60% for sites in the following biogeoclimatic zones: ICH, SBSwk, SBSmc, SBSmw</p> <p>Despite 9 (a), no further increase in post-harvest Douglas-fir composition is required beyond 80% for sites in all biogeoclimatic zones</p> <p>Primary forest activities will result in a range of opening sizes and an average opening size consistent with the specifications for the types of forest sites</p> <p><u>Table 3</u></p> <table border="1"> <thead> <tr> <th>Snowpack zone</th> <th>Warm aspect</th> <th>Opening size</th> <th>Frost prone</th> </tr> </thead> <tbody> <tr> <td>Transition</td> <td>0.1-0.4(0.3)</td> <td>0.1-0.7(0.4)</td> <td>0.1-0.3(0.2)</td> </tr> <tr> <td>Deep</td> <td>0.1-0.4(0.3)</td> <td>0.1-1.0(0.6)</td> <td>0.1-0.4(0.3)</td> </tr> </tbody> </table> | Stand structure habitat Class | Max % cutblock area in age class 0-40 years | Low | 33 | Moderate | 25 | High | 20 | Stand habitat class | Area harvest per pass | Min cut cycle | Effective rotation | # of different aged patches after full rotation | Low | 33 | 40 | 120 | 3 | Mod | 35 | 40 | 160 | 4 | High | 20 | 40 | 200 | 5 | Snowpack zone | Warm aspect | Opening size | Frost prone | Transition | 0.1-0.4(0.3) | 0.1-0.7(0.4) | 0.1-0.3(0.2) | Deep | 0.1-0.4(0.3) | 0.1-1.0(0.6) | 0.1-0.4(0.3) | <p>$\leq 20\% < \text{years old}$</p> <p>$\geq \text{retention over 200 year rotation}$</p> <p>Regen $\geq 50\%$</p> <p>Fd</p> |
| Stand structure habitat Class | Max % cutblock area in age class 0-40 years | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Moderate | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stand habitat class | Area harvest per pass | Min cut cycle | Effective rotation | # of different aged patches after full rotation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low | 33 | 40 | 120 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mod | 35 | 40 | 160 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High | 20 | 40 | 200 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Snowpack zone | Warm aspect | Opening size | Frost prone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Transition | 0.1-0.4(0.3) | 0.1-0.7(0.4) | 0.1-0.3(0.2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deep | 0.1-0.4(0.3) | 0.1-1.0(0.6) | 0.1-0.4(0.3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(continued)

6. Current Forest Management Assumptions

Table 41. Mule deer winter range order U-5-001 Prince George Forest District (concluded)

| Mule Deer habitat type | Habitat units | Habitat strategy | Constraint |
|------------------------|---------------|---|------------|
| | | <p>Primary forest activities must not result in the construction of roads or landings within:</p> <ul style="list-style-type: none"> • Topographic buffers identified along major topographic features or 100 m of minor ridges or minor topographic breaks identified in the field; • Primary forest activities must not result in the construction of roads within old growth management areas; • Primary forest activities for the purpose of Douglas-fir bark beetle sanitation to remove currently infested stems will result in: <ul style="list-style-type: none"> • Volume of non-target, non-infested stems greater than 27.5 cm DBH being less than 10% of the total volume of infested stems removed; • No harvesting of green uninfested Douglas-fir trees that are > 37.5 cm DBH; • No salvage of dead trees within old growth management area or wildlife tree patches; • In stands with > 40% lodgepole pine where greater than 50% of the pine component is dead or at high risk of mountain pine beetle mortality, primary forest activities will result in: <ul style="list-style-type: none"> • No harvest or damage to Douglas-fir trees that exceeds: – 15% for stems 22.5 to 37.5 cm DBH and 5% for stems > 37.5 cm DBH; • No cutting of Douglas-fir stems > 22.5 cm DBH to access lodgepole pine located in patches less than 0.1 ha; • Protection of established Douglas-fir regeneration where regeneration is of good form and likely to produce a timber resource of good value; • Use wildlife tree patches to maintain and recruit snags; • Timber harvesting practices that employ thinning-from below for stems from 12.5 to 37.5 cm DBH will result in: <ul style="list-style-type: none"> • Harvest or damage to Douglas-fir stems > 37.5 cm DBH that does not exceed 10% of the pre-harvest basal area of the Douglas-fir trees > 37.5 cm DBH; • Retention of a minimum residual basal area of 75% of the pre-harvest conifer basal area (counting stems > 12.5 cm DBH); • Harvesting priority on species other than Douglas-fir in mixed-species stand. | |

7. Sensitivity Analyses

Sensitivity analysis provides a perspective on the timber supply impact of uncertainty in management assumptions and/or data. By developing and testing a number of sensitivity analyses, it is possible to determine which variables most influence the results.

Sensitivity analyses will not be conducted for shelf-life, the progression of the mountain pine beetle epidemic and harvest activity in dead pine. In the timber supply analysis, the contribution of 'time since death' classes to total harvest levels will be presented in place of shelf-life sensitivity analysis. For further details refer to Section 6.6. Uncertainty regarding the progression of the mountain pine beetle epidemic is minor as it has peaked in all three forest districts and is well past peak in two of those districts. Finally, rather than conducting sensitivity analyses regarding the amount of dead pine salvaged, the efficacy of a number of different partition scenarios will be assessed assuming standard economic behaviour within each partition.

Table 42 includes some standard sensitivity analyses as well as some aimed at exploring issues particular to the PGTSA.

Table 42. Sensitivity analysis

| Issues to be tested | Sensitivity levels | Data source/comments |
|---|--|--|
| Wildlife habitat management areas and wildlife habitat emphasis areas | 100% netdown | |
| Recreation and conservation management areas | 100% netdown | |
| Recreation sites/reserves in the VFD | Allow harvesting of merchantable timber | |
| Natural environment areas | 100% netdown | |
| Fish and wildlife reserves | 100% netdown | |
| Temporary conservation areas (Scenario 1) | Remove 89 504 ha from THLB | |
| Temporary conservation areas (Scenario 2) | Remove 35 556 from THLB | |
| Visuals for the VFD | Assess proposed changes to VQO classes and scenic area boundaries | Application of proposed Recommended Visual Quality Classes (RVQCs) |
| ICH OGMA 1 | 57 ha to be removed from the THLB | 57 ha being advertised for spatial OGMA |
| ICH OGMA 2 | 4700 ha to be removed from the THLB | 4700 ha of guidance OGMA |
| Dead pine contribution to old-growth objectives | Contributes to old for 20 and 30 years after death | |
| Biodiversity and old forest requirement | Remove non-pine objective for units where non--pine proportion is unspecified | PG biodiversity order |
| Biodiversity and old forest requirement | Allow 20% of the old forest requirement to be met by stands up to 20 years younger than the minimum age specified. | PG biodiversity order |

(continued)

7. Sensitivity Analyses

Table 42. Sensitivity analysis (concluded)

| Issues to be tested | Sensitivity levels | Data source/comments |
|---|---|--|
| Biodiversity and old forest requirement | Remove forest district divisions of merged BECs | PG biodiversity order |
| Crown land plan(CLP) | Remove specified CLP designations from THLB | Designations to remove are: NEA, RCMA, WHMA, WHE |
| Ungulate winter range | Remove U-7-016,19,and 22 from THLB | Ungulate winter range order |
| VQO | No VQO requirements in PI leading areas (PI > 50%) | |
| VQO | No VQO requirements for whole TSA | |
| VQO | Drop (relax) VQOs by one class across the TSA. Maximum modification (lowest class) stays as maximum modification. | |
| VQO | Cap off VEG tree height to 5 metres for scenic areas with slope greater than 25.1% | |
| ESAp1 and ESAp2 Wildlife | 100% netdown Remove identified Mountain goat range from THLB | |

8. Acronyms

| | |
|---|--|
| <p>ADA – Agriculture Development Area</p> <p>BCTS – British Columbia Timber Sales</p> <p>CFLB – Crown Forest Land Base</p> <p>DJA – Fort St. James Forest District</p> <p>DVA – District of Vanderhoof</p> <p>ESA – Environmentally Sensitive Area</p> <p>FPC – Forest Practices Code</p> <p>FTEN – Forest Tenures Title</p> <p>IBB – Balsam Bark Beetle</p> <p>IBM – Mountain Pine Beetle</p> <p>IFMA – Integrated Forest Management Area</p> <p>ILMB – Integrated Land Management Bureau</p> <p>INRA – Industrial Reserve Area</p> <p>LRF – Lumber Recovery Factor</p> <p>LRUP – Land and Resource Use Plan</p> <p>MBEC – Merged Biogeoclimatic Ecosystem Classification Unit</p> <p>MOE – Ministry of Environment</p> <p>MFR – Ministry of Forests and Range</p> <p>MPB – Mountain Pine Beetle</p> <p>MTSA – Ministry of Tourism, Sports and Arts</p> <p>NEA – Natural Environment Area</p> <p>NPL – Non-plantable Ground</p> <p>OGC – Oil and Gas Commission</p> <p>PA – Pulpwood Agreement</p> <p>PEM – Predictive Ecosystem Modelling</p> <p>PL – Plantable Ground</p> <p>RESULTS – Reporting Silviculture Updates and Landstatus Tracking System</p> <p>RMZ – Resource Management Zone</p> <p>SAR – Species-at-risk</p> <p>SIBEC – Site Index Biogeoclimatic Ecosystem Classification</p> <p>SRA – Settlement Reserve Areas</p> <p>THLB – Timber Harvesting Land Base</p> <p>TRIM – Topographic Resource Inventory Mapping</p> <p>TSR – TSR</p> <p>UREP – Reserves for Use, Recreation, Enjoyment of the Public</p> <p>VDYP – Variable Density Yield Predictor</p> <p>VQO – Visual Quality Objective</p> <p>WHE – Wildlife Habitat Emphasis</p> <p>WTP – Wildlife Tree Patch</p> <p>NRL – Non-recoverable losses</p> | <p>BCMPB – British Columbia Mountain Pine Beetle Model</p> <p>CCLUP – Caribou – Chilcotin Land Use Plan</p> <p>DBH – Diameter at Breast Height</p> <p>DPG – District of Prince George</p> <p>ECAS – E-Commerce Appraisal System</p> <p>FIA – Forest Investment Account</p> <p>FRPA – Forest and Range Practices Act</p> <p>GAR – Government Actions Regulation</p> <p>IBD – Douglas-fir Bark Beetle</p> <p>IBS – Spruce Beetle</p> <p>IFPS – Important Fish Productive Stream</p> <p>ILRR – Integrated Land Resource Registry</p> <p>LRDW – Land and Resource Data Warehouse</p> <p>LRMP – Land and Resource Management Plan</p> <p>MAL – Ministry of Agriculture and Lands</p> <p>MEM – Ministry of Energy and Mines</p> <p>MOE – Ministry of Environment</p> <p>MOU – Memorandum of Understanding</p> <p>MPS – Market Pricing System</p> <p>NAT – Natural Regeneration</p> <p>NIR – Northern Interior Region</p> <p>OAF – Operating Adjustment Factor</p> <p>OGMA – Old Growth Management Area</p> <p>P2P – Plan to Perspective</p> <p>PFT – Problem Forest Type</p> <p>RCMA – Recreational Conservation Management Area</p> <p>RIC – Resource Inventory Committee</p> <p>RVQC – Recommended Visual Quality Class</p> <p>SGR – Sand and Gravel Reserves</p> <p>SIR – Southern Interior Region</p> <p>TFL – Tree Farm Licence</p> <p>TIPSY – Table Interpolation Program for Stand Yields</p> <p>TSA – Timber Supply Area</p> <p>UNBC – University of Northern BC</p> <p>UWR – Ungulate Winter Range</p> <p>VEG – Visually Effective Green-up</p> <p>VRI – Vegetation Resource Inventory</p> <p>WHMA – Wildlife Habitat Management Area</p> |
|---|--|