

**BRITISH COLUMBIA
MINISTRY OF FORESTS**

Tree Farm Licence 53

held by
Dunkley Lumber Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective April 12, 2022

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Table of Contents

Objective of this document 1

Acknowledgement..... 1

Statutory Framework..... 1

Description of the Tree Farm Licence..... 1

History of the AAC 1

New AAC determination..... 2

The role of the base case 6

Base case for TFL 53 7

Consideration of factors as required by Section 8 of the *Forest Act*..... 8

 Land base contributing to timber harvesting 10

 - general comments 10

 - forest inventory and volume estimates for natural stands 11

 - non-merchantable forest types 11

 - riparian reserve and management zones for streams, wetlands, and lakeshores 12

 - cultural heritage resources 12

 - volume estimates for managed stands 13

 - operational adjustment factors 14

 - genetic gain..... 14

 - fertilization 15

 - timber utilization 15

 - low productivity sites and minimum harvestable criteria 16

 Integrated resource management objectives 17

 - higher level plan 17

 - landscape-level biodiversity 18

 - wildlife..... 21

 Other information 22

 - First Nations 22

 - cumulative effects..... 24

 - climate change 25

 - grade 4 credits..... 27

 - dead potential volume..... 28

 - public comments..... 28

 - alternative harvest projections 29

Reasons for Decision..... 30

Determination..... 31

Implementation 32
Appendix 1: Section 8 of the *Forest Act*..... 33
Appendix 2: Section 4 of the *Ministry of Forests and Range Act* 37
Appendix 3: Minister’s letter of October 30, 2017 38
Appendix 4: Information sources used in the AAC determination..... 41

List of Tables

Table 1. List of factors accepted as modelled..... 9

Objective of this document

This document provides an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 53. This document also identifies where new or better information is needed for incorporation in future determinations.

Acknowledgement

For preparation of the information I have considered in this determination, I thank the licensee and staff of the British Columbia (BC) Ministry of Forests (the “Ministry”) in the Prince George Natural Resource District and Forest Analysis and Inventory Branch. I am also grateful to First Nations, the public and staff from Dunkley Lumber Ltd. who have taken the time to make me aware of the issues unique to this TFL.

Statutory Framework

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for Timber Supply Areas (TSAs) and TFLs. Section 8 of the *Forest Act* is reproduced in full as Appendix 1 of this document. For the purposes of this AAC determination in accordance with Section 23(3) of the *Interpretation Act* the acting deputy chief forester is expressly authorized to carry out the functions of the chief forester (including those required under Section 8 of the *Forest Act*).

Description of the Tree Farm Licence

Naver Tree Farm Licence (TFL) 53, which is held by Dunkley Lumber Ltd. (“the licensee”), occupies a total area of 87 839 hectares. The TFL is located along Highway 97 between Prince George and Quesnel, near the community of Hixon. The TFL is encompassed by the traditional territories of the Lheidli T’enneh Nation, Lhtako Dene Nation, Nazko First Nation and Tsilhqot’in Nation.

The terrain in the TFL is undulating, with rolling hills dispersed around small lakes and minor drainages, primarily the Ahbau and Naver Creek watersheds. Most of TFL 53 (84 percent) is in the Sub-Boreal Spruce (SBS) biogeoclimatic zone, generally at elevations below 1200 metres. The remaining portion of the TFL (16 percent) is in the Englemann Spruce Sub-alpine Fir (ESSF) biogeoclimatic zone.

The TFL was heavily impacted by the mountain pine beetle epidemic that peaked in the mid-2000’s and the licensee promptly implemented a successful salvage program. Consequently, by 2010, pine was only a minor component of the remaining mature stands.

The licensee owns and operates a large sawmill south of Hixon with an estimated annual capacity of 528 million board feet of lumber. About 10 percent of the mill’s fibre requirement is provided by TFL 53.

The Prince George Natural Resource District administers the TFL from Prince George within the Omineca Region.

History of the AAC

Dunkley Lumber Ltd. has been operating in the area within and surrounding TFL 53 since the early 1950’s. In 1989, the licensee surrendered its replaceable forest licence (A18161) and was granted TFL 53. The initial AAC was set at 187 630 cubic metres. It was subsequently increased to 204 700 cubic metres and 239 500 cubic metres in 1994 and 1999, respectively. To provide for the management and salvage of mountain pine beetle-impacted stands, the

AAC was increased to 500 000 cubic metres in 2003 and to 880 000 cubic metres in 2005. In 2010, the AAC was set at the current level of 219 000 cubic metres.

New AAC determination

Effective April 12, 2022, the new AAC for TFL 53 is 240 000 cubic metres. The new AAC is 9.6 percent higher than the AAC in place prior to this determination.

This AAC will remain in effect until a new AAC is determined, which must take place within 10 years of this determination. If additional significant new information is made available to me, or major changes occur in the management assumptions on which I have predicated this decision, then I am prepared to revisit this determination sooner than the 10 years required by legislation.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester, in determining AACs, to consider biophysical, social and economic information. Most of the technical information used in determinations is in the form of a timber supply analysis and its inputs related to inventory, growth and yield, and management. The factors used as inputs to timber supply analysis have differing levels of uncertainty associated with them, due in part to variation in physical, biological, and social conditions.

Computer models cannot incorporate all the social, cultural, and economic factors that are relevant when making forest management decisions. Technical information and analysis, therefore, do not necessarily provide the complete answers or solutions to forest management issues that must be considered when making decisions such as AAC determinations. Such information does provide valuable insight into potential impacts of different uncertainties about or changes to resource information and management practices, and thus forms an important component of the information I must consider in AAC determinations.

In determining this AAC, I have considered the technical information provided, including any known limitations.

Guiding principles for AAC determinations

Given the large number of periodic AAC determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in addressing relevant factors associated with AAC determinations. In order to make my approach in these matters explicit, I have considered and adopted the following body of guiding principles, which have been developed over time by BC's chief foresters and deputy chief foresters. However, in any specific circumstance in a determination where I consider it necessary to deviate from these principles, I will explain my reasoning in detail.

When considering the factors required under Section 8, I am also aware of my obligation as a steward of the forests of British Columbia, of the mandate of the Ministry of Forests ("the Ministry") as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest Act*, *Forest and Range Practices Act* (FRPA), and *Professional Governance Act*, including the Forest Professionals Regulation.

AAC determinations should not be construed as limiting the Crown's obligations under court decisions in any way, and in this respect, it should be noted that AAC determinations do not prescribe a particular plan of harvesting activity within the management units. They are also independent of any decisions by the Minister of Forests with respect to subsequent allocation of wood supply.

These guiding principles focus on: responding to uncertainties; incorporating information related to First Nations' rights, titles and interests; and considering information related to integrated decision making, cumulative effects, and climate change.

Information uncertainty

Given the complex and dynamic nature of forest ecosystems coupled with changes in resource use patterns and social priorities there is always a degree of uncertainty in the information used in AAC determinations.

Two important ways of dealing with this uncertainty are:

- (i) managing risks by evaluating the significance of specific uncertainties associated with the current information and assessing the potential current and future social, economic, and environmental risks associated with a range of possible AACs; and,
- (ii) re-determining AACs regularly to ensure they incorporate current information and knowledge, and greater frequency in cases where projections of short-term timber supply are not stable and/or substantial changes in information and management are occurring.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, it is important to reflect those factors, as closely as possible, that are a reasonable extrapolation of current practices. It is not appropriate to base decisions on proposed or potential practices that could affect the timber supply but are not consistent with legislative requirements and not substantiated by demonstrated performance.

It is not appropriate to speculate on timber supply impacts that may eventually result from land-use designations not yet finalized by government. Where specific protected areas, conservancies, or similar areas have been designated by legislation or by order in council that prohibit timber harvesting, these areas are deducted from the timber harvesting land base (THLB) and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although they may contribute indirectly by providing forest cover that helps meet resource management objectives such as biodiversity.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyse and immediately account for the consequent timber supply impacts in an AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, further detailed planning or legislated designations such as those provided for under the *Land Act* and FRPA. In cases where government has been clear about the manner in which it intends land use decisions to be implemented, but the implementation details have yet to be finalized, I will consider information that is relevant to the decision in a manner that is appropriate to the circumstance. The requirement for regular AAC reviews will ensure that future determinations address on-going plan implementation decisions.

Where appropriate, information will be considered regarding the types and extent of planned and implemented silviculture practices as well as relevant scientific, empirical, and analytical evidence on the likely magnitude and timing of their timber supply effects.

I acknowledge the perspective that alternate strategies for dealing with information uncertainty may be to delay AAC determinations or to generally reduce AACs in the interest of caution. However, given that there will always be uncertainty in information, and due to the significant impacts that AAC determinations can have on communities, I believe that no responsible AAC determination can be made solely on the basis of a precautionary response to uncertainty with respect to a single value.

Nevertheless, in making a determination, allowances may need to be made to address risks that arise because of uncertainty by applying judgment as to how the available information is used. Where appropriate, the social and economic interests of the government, as articulated by the Minister of Forests, Lands, Natural Resource Operations and Rural Development, (now the Ministry of Forests) can assist in evaluating this uncertainty.

First Nations

The BC government has committed to true, lasting reconciliation with Indigenous Peoples, including fully adopting and implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Reconciliation and implementation of UNDRIP will likely require changes to policies, programs, and legislation, which will take time and involve engagement with Indigenous peoples. While this work is undertaken, BC is committed to fulfilling its legal obligations to consult and accommodate Aboriginal Interests consistent with the Constitution, case law, and relevant agreements between First Nations and the government of BC. Aboriginal Interests refers to Aboriginal rights and/or title or treaty rights.

Where First Nations and the Province are engaged in collaborative land and resource planning, the Province may make general commitments regarding stewardship and other aspects of resource management. Where such commitments have been made, I will consider them when determining AACs, within the scope of my statutory authority.

As is the case for land use and management planning in general, where land use zones or management objectives resulting from collaborative planning between First Nations and the Province have not been finalized, it is beyond the statutory authority of the chief forester to speculate on final outcomes. If the timber supply implications of final designations are substantial, application of the Allowable Annual Cut Administration Regulation to reduce a management unit AAC between Section 8 determinations, or a new AAC determination prior to the legislated deadline may be warranted.

Where the nature, scope and geographic extent of Aboriginal rights and title have not been established, the Crown has a constitutional obligation to consult with First Nations regarding their Aboriginal Interests in a manner proportional to the strength of those Interests and the degree to which they may be affected by the decision. The manner of consultation must also be consistent with commitments made in any agreements between First Nations and the Province. In this regard, full consideration will be given to:

- (i) the information provided to First Nations to explain the timber supply review process and analysis results;
- (ii) any information brought forward through consultation or engagement processes or generated during collaboration with First Nations with respect to Treaty rights or Aboriginal Interests, including how these rights or interests may be impacted;
- (iii) any operational plans and/or other information that describe how First Nations' Treaty rights or Aboriginal Interests are addressed through specific actions and forest practices; and,
- (iv) existing relevant agreements and policies between First Nations and the BC Government.

Treaty rights or Aboriginal Interests that may be impacted by AAC decisions will be addressed consistent with the scope of authority granted to the chief forester under Section 8 of the *Forest Act*. When information is brought forward that is outside of the chief forester's scope of statutory authority, this information will be forwarded to the appropriate decision makers for their consideration. Specific considerations identified by First Nations in

relation to their Aboriginal Interests that could have implications for the AAC determination are addressed in the various sections of this rationale where it is within the statutory scope of the determination.

Established Aboriginal title lands (meaning declared by a court or defined under an agreement) and other areas, such as Treaty Settlement Lands or Indian Reserves, are not provincial Crown land. Consequently, the timber on these lands does not contribute to the AAC of the timber supply area or tree farm licence with which they overlap. Prior to establishment of Aboriginal title, it is not appropriate for the chief forester to speculate on how potential establishment of Aboriginal title in an area, either by court declaration or by agreement, could affect timber supply, given uncertainties about the scope, nature, and geographic extent of title. Until land has been established as Aboriginal title land, it remains as provincial land managed by the Province, and will contribute to timber supply.

Integrated decision making and cumulative effects

One of the responsibilities of the Ministry is to plan the use of forest and range resources such that the various natural resource values are coordinated and integrated. In addressing the factors outlined in Section 8 of the *Forest Act*, I will consider relevant available information on timber and non-timber resources in the management unit, including information on the interactions among those resources and the implication for timber supply.

With respect to cumulative effects, I must interpret related information according to my statutory authority. As emphasized above, the chief forester is authorized only to make decisions on allowable harvest levels, not to change or institute new management regimes for which other statutory decision makers have specific authority. However, cumulative effects information can highlight important issues and uncertainties in need of resolution through land-use planning, which I can note and pass to those responsible for such planning. Information on cumulative effects can also support considerations related to Aboriginal Interests.

Climate change

One key area of uncertainty relates to climate change. There is substantial scientific agreement that climate is changing and that the changes will affect forest ecosystems. Forest management practices will need to be adapted to the changes and can contribute to climate change mitigation by promoting carbon uptake and storage. Nevertheless, the potential rate and specific characteristics of climate change in different parts of the Province are uncertain. This uncertainty means that it is not possible to confidently predict the specific, quantitative impacts on timber supply.

When determining AACs, I consider available information on climate trends, potential impacts to forest ecosystems and communities that depend on forests and related values, and potential management responses. As research provides more definitive information on climate change and its effects, I will incorporate the new information in future AAC determinations. Where forest practices are implemented to mitigate or adapt to the potential effects of climate change on forest resources, or where monitoring information indicates definite trends in forest growth and other dynamics, I will consider that information in my determinations.

I note, however, that even with better information on climate change, in many cases there will be a range of reasonable management responses. For example, it is not clear if either increases or decreases to current harvest levels would be appropriate in addressing potential future increases in natural disturbance due to climate change, which now appears to be occurring in some areas. Hypothetically, focused harvests in at-risk forests could forestall

losses of timber and allow for planting of stands better adapted to future conditions. Conversely, lower harvest levels could provide buffers against uncertainty. The appropriate mix of timber supply management approaches is ultimately a social decision.

Deciding on the preferred management approach will involve consideration of established climate change strategies, and available adaptation and mitigation options together with social, economic, cultural, and environmental objectives. Analysis will be useful for exploring options and trade-offs. Any management decisions about the appropriate approach and associated practices will be incorporated into future AAC determinations. In general, the requirement for regular AAC reviews will allow for the incorporation of new information on climate change, on its effects on forests and timber supply, and on social decisions about appropriate responses as it emerges.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply projections provided to me through the work of the Timber Supply Review Program for TSAs and TFLs.

For most AAC determinations, a timber supply analysis is carried out using an information package including data and information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model, a series of timber supply projections can be produced to reflect different starting harvest levels, rates of decline or increase, and potential trade-offs between short- and long-term harvest levels.

From a range of possible harvest projections, one is chosen in which an attempt is made to avoid both excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the base case, and it forms the basis for comparison when assessing the effects of uncertainty on timber supply. The base case is designed to reflect current management practices.

Because it represents only one in several theoretical timber supply projections, and because it incorporates information about which there may be some uncertainty, the base case is not an AAC recommendation. Rather, it is one possible timber supply projection, whose validity - as with all the other projections provided - depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case are realistic and current, and the degree to which any adjustments to its timber supply projection must be made, if necessary, to more properly reflect the current situation.

These adjustments are made based on informed judgment using currently available information about forest management, and that information may well have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines, or plans.

Thus, in reviewing the considerations that lead to the AAC determination, it is important to remember that the AAC determination itself is not simply a calculation. Even though the timber supply analyses I am provided are integral to those considerations, the AAC determination is a synthesis of judgment and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case. Judgments that in part may be based

on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation would be gained by attempting a computer analysis of the combined considerations.

Base case for TFL 53

The timber supply analysis was conducted by the licensee with technical assistance from Industrial Forestry Services Ltd. using Remsoft's Woodstock model. Woodstock is an optimization model approved for use in timber supply reviews by Forest Analysis and Inventory Branch (FAIB). Optimization models are designed to find the best computational solution under the rules imposed during the model set up. Based on the review by FAIB staff, as well as my own experience reviewing results from this and similar models, I am satisfied that the Woodstock model can provide an appropriate projection of timber supply.

Notable changes in the timber supply analysis for TFL 53 since the last timber supply review include:

- use of a new forest inventory completed in 2012;
- adjustment of stand volumes to account for the fertilization of 12 225 hectares of natural and managed stands;
- application of the fill old seral forest requirements in all biogeoclimatic zone variants; and,
- application of a different base case harvest level transition strategy that increases short-term harvest levels while delaying the increase to the long-term harvest level.

The main objective for the base case was to achieve an even-harvest level for the first 50 years of the projection followed by a higher even harvest level for the remainder of the projection period. This was achieved by prioritizing the harvest of natural, unmanaged stands for the first 50 years, while gradually transitioning to the harvest of managed stands. After 50 years, when the long-term harvest level is achieved, approximately 90 percent of the annual harvest is expected to be sourced from managed stands. The model was required to achieve a relatively stable growing stock for the final 100 years of the 300-year projection.

The inventory used in the base case was updated for harvest, disturbance and silvicultural treatments and inventory attributes were projected for growth to August 2019. The base case begins in 2020 and the harvest levels are reported in 10-year increments for 300 years.

The base case shows that an initial harvest level of 257 700 cubic metres per year can be maintained for 50 years before increasing to a long-term harvest level of 297 900 cubic metres per year for the remainder of the projection period. The base case is net of non-recoverable losses.

In my determination, I have also considered several sensitivity analyses. A sensitivity analysis examines how changes in base case assumptions affect timber supply. These analyses have been helpful as I made specific considerations and reasoning in my determination as documented in the following sections. I am satisfied that the base case, and the other analyses as noted and described, represent the best information available to me respecting various aspects of the current projection of the timber supply in this TFL, and as such they are suitable for reference in my considerations in this determination.

Consideration of factors as required by Section 8 of the *Forest Act*

I have reviewed the information for all the factors required to be considered under Section 8 of the *Forest Act*. Where I have concluded that the modelling of a factor in the base case is a reasonable reflection of current legal requirements, demonstrated forest management and the best available information, and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are listed in Table 1.

For other factors, where more uncertainty exists, or where public or First Nations' input indicates contention regarding the information used, modelling, or some other aspect under consideration, this rationale incorporates an explanation of how I considered the essential issues raised and the reasoning that led to my conclusions.

Table 1. List of factors accepted as modelled

Forest Act section and description	Factors accepted as modelled
8(8)(a)(i) Composition of the forest and its expected rate of growth	<i>non-forest and non-commercial forest areas existing and future roads environmentally sensitive areas recreation sites terrain stability wildlife tree retention areas not-satisfactorily restocked areas volume estimates for natural stands site productivity estimates</i>
8(8)(a)(ii) - the expected time that it will take the forest to become re-established on the area following denudation	<i>regeneration assumptions</i>
8(8)(a)(iii) - silviculture treatments to be applied to the area	<i>silvicultural systems</i>
8(8)(a)(iv) - the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area	<i>decay, waste, and breakage deciduous volume</i>
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production	<i>stand level biodiversity maximum cutblock size and adjacency scenic areas and visual resources</i>
8(8)(a)(vi) Any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber	<i>unharvested volume carry-forward</i>
8(8)(d) the economic and social objectives of government, as expressed by the minister, for the area, for the general region and for British Columbia	<i>Minister's letter of October 30, 2017</i>
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	<i>non-recoverable losses</i>

Forest Act Section 8 (8)

In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area

Land base contributing to timber harvesting

- general comments

The timber harvesting land base (THLB) is an estimate of the land where timber harvesting is considered both available and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values and applicable technology. It is a strategic level estimate developed specifically for the timber supply analysis and, as such, could include some areas that may never be harvested or could exclude some areas that may be harvested.

The total TFL area is 87 839 hectares of which 80 690 or 92 percent are considered potentially productive Crown forest land base (CFLB). The remaining eight percent, or 7149 hectares, are composed of non-forest, non-commercial cover, and existing roads and landings. Of the total TFL area, 67 286 hectares are deemed to be currently available as THLB after deductions are applied for the factors noted in Table 1 above and in the factors discussed throughout this document. After accounting for the development of future roads and wildlife tree patches, the future THLB is 63 646 hectares.

The CFLB is dominated by spruce-leading stands (54 percent), lodgepole pine-leading stands (20 percent), and balsam fir-leading stands (18 percent). Less common are Douglas-fir leading stands (two percent) and deciduous-leading stands (six percent), the latter occur mostly along the western edge of the TFL. About 92 percent of the total timber volume within the CFLB is from spruce- and balsam-leading stands.

As part of the process used to define the THLB, a series of deductions was made from the forest management land base to account for various land classes that do not contribute to the TFL timber supply (e.g., non-forest areas, uneconomic areas). These deductions account for biophysical, economic, or ecological factors that reduce the forested area available for harvesting. In reviewing these deductions, I am aware that some areas may fall into more than one land class. For example, an area may be both uneconomic and in unstable terrain. To ensure accuracy in defining the THLB, care was taken to avoid double-counting areas with overlapping objectives. Hence, the deduction amount for a given factor stated in the analysis, or in this document does not necessarily reflect the total area within that land class, as some portion of it may have been deducted earlier under another land class.

Although stands outside of the THLB do not contribute directly to timber supply, they may affect the availability of timber within the THLB by contributing to the forest cover requirements for non-timber values in the TFL. To mimic the disturbance of stands outside of the THLB, these stands were assumed to regenerate naturally when they reached the maximum age criteria applied in the model. The maximum ages were based on a query of all stands in the Prince George Natural Resource District. Ten years was added to the maximum queried age for each leading species to derive the maximum ages used in the model. The resultant maximum ages were significantly older than the mean disturbance intervals in BC's *Biodiversity Guidebook*. FAIB staff reviewing the model outputs found there was no disturbance of stands outside of the THLB within the first 100 years of the projection and

indicate that although this could result in an overestimation of the TFL growing stock, it is unlikely to have a significant effect on the base case.

For this determination, I accept that the approach used to determine the THLB for the TFL 53 base case was appropriate. However, the maximum ages used to emulate natural disturbance are not reflective of the TFL and the licensee did not consider the effect of natural disturbance on the TFL growing stock. For the next timber supply review, I expect the licensee to revise the method used in the analysis to better reflect the effect of natural disturbance in stands outside of the THLB, as noted under '**Implementation**'.

As noted under '**Role and limitations of the technical information used**', several of the factors considered influence the size of the THLB. Where I have concluded that there was an overestimate or underestimate in the land base available for harvesting, I have described my reasoning and conclusion in the sections below.

- forest inventory and volume estimates for natural stands

The forest inventory used in the timber supply analysis was completed in 2011 based on aerial photography taken in 2009. This inventory was updated to account for timber harvesting, natural disturbance and silvicultural treatments and attribute growth was projected current to August 2019. The base case and associated harvest projections begin in 2020.

The results of an inventory statistical analysis completed in 2012 indicate natural stand volumes are overestimated by nine percent. A sensitivity analysis demonstrated that decreasing natural stand volumes by nine percent decreases the base case short-term harvest levels by 5.8 percent.

Based on my discussions with FAIB staff, I accept the forest inventory used in this timber supply analysis represents the best available information, and as such, is suitable for use in my determination. However, considering the results of the inventory audit and sensitivity analysis, I conclude that the base case short-term harvest level has been overestimated by 5.8 percent and I have accounted for this in my determination as discussed in '**Reasons for Decision**'.

- non-merchantable forest types

Non-merchantable forest types contain trees that are currently not used for timber production due to species and/or low quality, small size, or low volume. These stands are excluded from the THLB.

Within TFL 53, all stands with a deciduous component that comprises greater than 50 percent of the stand basal area are considered non-merchantable forest types and were excluded from the THLB, unless these stands are within cutblocks harvested since 1998. The licensee indicated that deciduous trees within merchantable stands are either retained as wildlife trees or harvested and sold to a local pellet producer. Less than one percent of the total harvest from 2016 to 2020 was from deciduous species.

A net area of 2237 hectares, containing 513 125 cubic metres of timber, was excluded from the THLB to account for non-merchantable forest types.

I accept that the current utilization of non-merchantable forest types was modelled correctly in the base case and will make no adjustments on this account. I encourage the licensee to retain non-merchantable trees, including deciduous species, where it is safe and practicable to do so, as these trees contribute to a variety of non-timber values, including biodiversity and wildlife habitat.

- *riparian reserve and management zones for streams, wetlands, and lakeshores*

Riparian areas are transition zones between aquatic areas, such as streams, wetlands and lakes, and drier upland areas. Riparian areas provide habitat for various plant and animal species and provide habitat connectivity.

Riparian management objectives have been established to minimize or prevent impacts of forest and range practices on these aquatic resources. The Forest Planning and Practices Regulation (FPPR) requires the conservation of water quality, wildlife habitat and biodiversity associated with riparian areas. The FPPR defines riparian classes, based on stream width and the presence or absence of fish, and specifies minimum widths of reserve and management zones for streams, wetlands, and lakes.

For the analysis, stream classes were derived from a fish reconnaissance inventory for the TFL completed by the licensee and approved by the Ministry of Environment. Stream riparian reserve zones and riparian management zones were spatially identified around classified streams based on the widths specified in the FPPR. Using this approach, the total area of stream riparian zones in the CFLB is 5402 hectares. Of this amount, a net area of 4234 hectares was excluded from the THLB.

Wetland riparian classes were identified based on the Freshwater Atlas. Complex wetlands were identified using geographic information system analysis and the wetland riparian reserve zone and riparian management zone widths were assigned according to the widths specified in the FPPR. Using this approach, the total area of wetland riparian zones in the CFLB is 1495 hectares. Of this amount, a net area of 1134 hectares was excluded from the THLB.

Lakeshore management zones were established for the Prince George Natural Resource District under the *Forest Practices Code of BC Act* and grand-parented under the *Forest and Range Practices Act*. Management objectives have not been established for the lakeshore management zones. For the analysis, lake riparian reserve and riparian management zones were identified based on the minimum widths specified in the licensee's Forest Stewardship Plan (FSP). Tree retention within the riparian management zone was estimated by evaluating the forest cover inventory overlapping the zones. Using this approach, the total area of lakeshore riparian zones in the CFLB is 447 hectares. Of this amount, a net area of 254 hectares was excluded from the THLB.

Based on my review of the assumptions and methodology used, I conclude the base case correctly accounts for the riparian reserve and riparian management zones for streams, wetlands, and lakeshores. I note that the retention of these areas contributes to addressing aboriginal rights and interests, as they contribute to biodiversity, cultural heritage resources, wildlife habitat and connectivity.

- *cultural heritage resources*

Archaeological sites, including culturally modified trees that pre-date 1846, are protected under the *Heritage Conservation Act*. Companies and individuals engaged in natural resource extraction or development must take steps to identify any protected archaeological sites that will be directly or indirectly disturbed by operational activities.

The *Forest Act* defines a cultural heritage resource (CHR) to mean “an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an Aboriginal people”. Section 10 of the FPPR requires agreement holders to incorporate specific information with respect to CHRs within their FSP. The objective of Section 10 is to conserve or protect cultural heritage

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

The licensee's FSP - *Cultural Heritage Resources Results and Strategies* section indicates that prior to the harvest of a cutblock or construction of a road, an archaeological evaluation will be conducted by a qualified professional for areas that are identified as having a 'high potential' within an established archaeological predictive map or model for the area. In addition, the FSP specifies the steps that will be undertaken to record the location of a CHR, protect the CHR, and communicate with First Nations about the CHR.

The licensee's current practice is to send all proposed block developments to Norcan Consulting Ltd., which conducts a third-party assessment of these blocks. All blocks with "high" and some blocks with "moderate" ratings are ground surveyed. Most licensees, including Dunkley Lumber Ltd., avoid harvesting "high potential" areas. High potential areas may be protected through the establishment of wildlife tree retention areas, riparian reserves, and adjustments to cutblock layouts, where and when appropriate.

A total of 94 hectares of archaeological sites have been identified within TFL 53. Operationally these areas are protected through wildlife tree retention areas and riparian reserve areas, according to the archaeological assessment recommendations. No further reductions were applied in the base case to account for CHR.

For TFL 53, Lheidli T'enneh recommend the application of an aspatial reduction of 2000 – 3000 cubic metres per year to account for additional CHRs that Lheidli T'enneh anticipate will be identified during operations.

In other determinations, the need to account for unregistered and unknown archaeological sites and contemporary CHRs has led me to account for small overestimations of long-term harvest levels. However, given the high level of stand retention in TFL 53 – about 15 percent, of which about six percent are wildlife tree reserves – new CHRs will likely continue to be accommodated operationally through co-location with wildlife tree reserves and riparian reserves. On this basis, I conclude CHRs have been correctly accounted for in the base case. I expect the licensee to continue to track areas excluded from timber harvesting to protect CHRs and to incorporate this information in the next timber supply review. This instruction is described in '**Implementation**'.

- volume estimates for managed stands

Managed stands are those stands for which forest management treatments (e.g., planting, spacing) are implemented to improve stand regeneration and/or growth. In the analysis, stands younger than 47 years and all future regenerated stands were considered managed stands. In the base case, the transition from harvesting natural to managed stands occurs rapidly and is mostly complete by 2065.

The Ministry's Table Interpolation Program for Stand Yields (TIPSY 4.4) model was used to project the growth and yield of each individual managed stand. Stand yield projections are based on current species information, plantation density, regeneration delay and the genetic worth for the appropriate silvicultural era. The TIPSY model inputs were reviewed and accepted for use in the analysis by FAIB.

I accept that the volume estimates for managed stands used in the base case were developed using accepted procedures.

- operational adjustment factors

Operational adjustment factors (OAF) are used to adjust TIPSYS managed stand volume estimates to account for factors that affect the achievement of optimal growth.

OAF 1 is a constant percentage yield reduction that can be applied to account for decay, waste, and breakage and/or forest health losses that do not increase with stand age. The provincial OAF 1 default value is 15 percent. OAF 2 is applied after OAF 1 and increases linearly over time, from zero at age zero to the specified percentage at 100 years of age. The provincial OAF 2 default value is five percent.

For the base case, OAF 1 values were derived from a survey completed by the licensee while preparing TFL 53 Management Plan No. 3 using the procedures detailed in Ministry of Forests OAF 1 project reports (September 1997 and January 1998). Based on feedback received from the Ministry, the OAF values derived from the field survey were adjusted upwards to address stand productivity losses associated with pathogens (e.g., rust). The resultant OAF 1 values for pine-leading and spruce-leading stands were 10 percent and 12 percent, respectively. No field sample data was collected for Douglas-fir, balsam- or aspen-leading stands and the provincial OAF 1 value of 15 percent was used for these stands.

The OAF 1 values described above remain unchanged from TFL 53 Management Plan No. 3 (2000 – 2004). The FAIB growth and yield application specialist reviewing the OAF 1 rationale for this timber supply analysis confirmed that, although the survey methodology used had not become the standard procedure to estimate OAF 1, the resultant TFL 53 OAF 1 values used in base case are reasonable.

The provincial OAF 2 default value of five percent was used in the base case.

In a sensitivity analysis applying the provincial standard OAF 1 of 15 percent to all managed stands decreased the base case short-term harvest level by 1.5 percent and the long-term harvest level by four percent.

For this determination, I accept that the OAF values used to adjust the managed stand yields are reasonable and were correctly applied in the base case. However, as discussed in ‘*Climate change*’, current climate trends favour increases in forest pests and pathogens, frost damage and moisture stress, all factors that can reduce stand yields. In order to gain a better understanding of managed stand yields in the context of a changing climate, I expect the licensee to work with FAIB to establish young stand monitoring (YSM) plots in TFL 53. The YSM plot information can be utilized to refine the OAF values that will be applied to managed stand yields produced for subsequent timber supply reviews. This instruction is included under ‘**Implementation**’.

- genetic gain

Genetic gain is the percentage increase in certain traits, such as stem volume or pest resistance, from select seed over those grown from wild-stand seed. The genetic gains from the use of select seed have increased over time through the Ministry’s tree improvement program. The licensee has been planting seedlings grown from genetically improved select seed in TFL 53 since 1998.

For spruce, the weighted average genetic gain is nine percent for managed stands established from 1998 to 2007 and 20 percent for stands established from 2008 to 2019. For Douglas-fir, the weighted average genetic gain is less than one percent for stands established from 1998 to 2007 and 10 percent for stands established from 2008 to 2019. When the eras are combined to encompass all the managed stands established since 1998, the weighted average genetic gain is 18 percent for spruce and four percent for Douglas-fir.

In the base case, a genetic gain of 20 percent was applied to spruce and a genetic gain of seven percent was applied to Douglas-fir. These values exceed the weighted average genetic gains for existing stands and were selected to represent all, existing and future, stands in anticipation of continued higher gains.

Although there is some indication that future genetic gains may exceed the cumulative averages to date, I note that average genetic gains in spruce between 2008-2019 is influenced by a single year (2019), which substantially exceeds the previous gains for that era. For Douglas-fir, the seven percent genetic gain modelled is greater than previous gains since 2015. Based on this information I cannot accept the use of the anticipated genetic gains in the base case as they have yet to be substantiated through demonstrated performance.

Consequently, the genetic gain for spruce and Douglas-fir seedlings planted since 1998 has been overestimated by about two percent and three percent, respectively. FAIB staff indicate that this results in about a one percent overestimation in the base case mid-term harvest levels.

On this basis, I will account for a one percent overestimation of the base case harvest levels as discussed in '**Reasons for Decision**'.

- fertilization

Fertilization with nutrients such as nitrogen, sulphur, and boron can increase harvest volumes and reduce the time required for stands to reach merchantable condition. In TFL 53, about 3000 hectares of natural stands and 6300 hectares of managed stands have been fertilized. Of the fertilized stands, about 700 hectares of natural stands and 400 hectares of managed stands have been fertilized twice. A very small proportion of stands have been fertilized three times. Overall, about 14 percent of stands in the THLB have been fertilized at least once.

In the base case, stands that were fertilized and harvested are assumed to regenerate and receive the same sequence of fertilization treatments in the future. In a sensitivity analysis, eliminating future fertilization resulted in a long-term harvest level about one percent lower than in the base case.

Based on my review of the stand fertilization information and discussions with FAIB staff, I conclude the base case correctly reflects demonstrated stand management in the TFL. Given the small increase in timber supply attributable to stand fertilization, I encourage the licensee to work with Ministry growth and yield and stand fertilization specialists to establish young stand monitoring plots both within and outside of fertilized areas to better understand the potential gains of fertilization.

Section 8 (8) (a) (ii) the expected time that it will take the forest to become re-established on the area following denudation

No factors in this section required additional consideration or comment.

Section 8 (8) (a) (iii) silvicultural treatments to be applied to the area

No factors required under this section required additional comment.

Section 8 (8) (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area

- timber utilization

In the base case, the estimates of merchantable volume for natural stands of spruce, balsam, Douglas-fir, and aspen are based on the utilization of all trees which meet or exceed a

17.5-centimetre diameter measured at 1.3 metres above the ground (“diameter at breast height” or DBH), and between a maximum 30-centimetre stump and a minimum 10-centimetre top diameter (inside the bark). For natural and managed lodgepole pine stands, and all managed non-pine stands, a 12.5-centimetre DBH was used. The change in utilization criteria from a 17.5-centimetre DBH to a 12.5-centimetre DBH for managed non-pine stands is inconsistent with the *Provincial Logging Residue and Waste Measurement Procedures Manual*.

FAIB staff indicate the reduced DBH requirement for managed stands could result in a small, unquantified overestimation in the base case long-term harvest level, if the licensee does not implement these closer utilization criteria when it harvests managed stands. In the base case, managed stands are not projected to contribute to timber supply until 2050.

The volume attributable to trees, which meet or exceed the timber utilization specifications, left on site after harvesting (referred to as “residual waste”) is cut control accountable. For the past six years, approximately three percent of the total volume billed within the TFL was residual waste. District staff indicate logging residue, which could include residual waste, remains on site as unutilized merchantable volume.

Although I commend the licensee on its planned increase in timber utilization, as this increases the availability of wood fibre and reduces waste, I cannot accept the use of timber utilization criteria for managed stands in the base case that do not reflect current requirements and have yet to be substantiated through demonstrated performance. On this basis, I will account for a small, unquantified overestimation of the base case long-term harvest level, as noted in ‘**Reasons for Decision**’. In addition to the planned increase in timber utilization, I encourage the licensee to reduce or eliminate the burning of logging residue in waste piles as this practice releases carbon to the atmosphere that might otherwise be captured in wood products. Where appropriate, the retention of coarse woody debris and deciduous trees can also provide habitat for wildlife.

- low productivity sites and minimum harvestable criteria

Low productivity sites are areas that are unsuitable for timber harvesting due to their low growth potential or low stocking. In the base case, stands had to achieve a minimum volume of 140 cubic metres per hectare by age 250 years to be eligible for inclusion in the THLB. Previously harvested stands were assumed to be capable of achieving the harvestable volume criteria.

Minimum harvestable criteria refer to the minimum age or volume (minimum harvestable volume or MHV) that a stand must attain to be eligible for harvest in the timber supply model. Most stands are not harvested until well after the minimum criteria have been met because of the management objectives for other resource values that require the retention of older stands. The average harvest volume throughout the base case projection period is relatively stable at about 350 cubic metres per hectare.

In the base case, stands had to attain both a MHV of 163 cubic metres per year and an age that correspond to at least 95 percent of their peak productivity or culmination mean annual increment. The MHV value was obtained by overlaying an old inventory with mapping of cutblocks harvested since 2012 and comparing this information with the cruise data. The MHV values from the inventory and cruise data were 163 cubic metres per hectare and 176 cubic metres, respectively.

The licensee indicated that it does not harvest in stands with volumes between 140 cubic metres per hectare and 163 cubic metres per hectare. Given that stands with MHV less than 163 cubic metres per hectare are not eligible for harvest in the model, the inclusion of stands

with volumes between 140 cubic metres per hectare and 163 cubic metres per hectare results in a net THLB overestimation of 1348 hectares. FAIB staff indicate that since these stands are not harvested by the model, a THLB overestimation of this magnitude has little or no impact on timber supply. On this basis, I accept that the minimum harvestable criteria are a reasonable reflection of current management and will make no adjustment to the base case on this account.

Section 8 (8) (a) (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production

Integrated resource management objectives

The Ministry is required, under the *Ministry of Forests and Range Act* (see Appendix 2), to manage, protect and conserve the forest and range resources of the Crown; and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation, and other natural resource values are coordinated and integrated. The *Forest and Range Practices Act* (FRPA) and other legislation provide for, or enable, the legal protection and conservation of timber and non-timber values. Accordingly, the extent to which integrated resource management objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- higher level plan

The Prince George Land and Resource Management Plan (PGLRMP), which is intended to guide land use and resource development in the plan area, was approved by Cabinet on January 25, 1999.

The PGLRMP established landscape units, including one specifically for TFL 53. TFL 53 was identified as an “enhanced resource management zone” (ERMZ) and assigned a low biodiversity emphasis option during the land use planning process. The stated objectives for TFL 53 include: management of grizzly bear, marten, and moose habitat; maintenance of the Douglas-fir component in managed stands; and optimization of timber growth and implementation of silviculture strategies to produce a broad spectrum of forest products.

Following approval of the PGLRMP, the licensee voluntarily developed its own *Biodiversity Plan for TFL 53* (2000). The biodiversity plan outlines the strategies and approaches the licensee intends to use to achieve the PGLRMP objectives for the TFL 53 ERMZ.

In a letter sent to FAIB on April 12, 2021, (see ‘*First Nations*’), Lheidli T’enneh provided the following comments:

- recommend updating the plan as well as providing an analysis on habitat capability/suitability for key species, including grizzly bear, moose, and marten.
- management objectives for specific wildlife, watersheds, which were not considered in the past, landscape level biodiversity, and risk assessments (disturbance) should also be updated and completed.
- recommend a gap analysis for ecosystem representation.
- update the rare and endangered ecosystems inventory within the TFL and confirm they are protected within other protected areas like riparian that are netted out of the THLB.

- recommend a field review with Dunkley Lumber Ltd. staff to see road deactivation work, fertilization, and areas they currently herbicide spray to understand what the Ministry will need to change in stocking standards to support Lheidli T'enneh rights and interests.

I commend the licensee on its biodiversity plan for TFL 53. This plan, which represents a significant effort on the part of the licensee, identified the ecological status of the TFL at that time and outlined the licensee's approach to the management of both timber and non-timber values. Given the age of the biodiversity plan, and the recommendations received from the Lheidli T'enneh, I encourage the licensee to work with First Nations and stakeholders to update the plan and to consider a review of riparian habitat and road density as part of this update.

- landscape-level biodiversity

The 2004 *Order Establishing Provincial Non-Spatial Old Growth Objectives* (NSOGO) specifies the minimum old growth retention requirements by biodiversity emphasis option, natural disturbance type and biogeoclimatic zone (BEC) variant. For landscape units assigned a low biodiversity emphasis option, such as TFL 53, the NSOGO allows for a temporary reduction ('drawdown') of the old forest minimum retention requirements by up to two-thirds, to the extent necessary to address timber supply impacts.

According to the NSOGO Implementation Policy (2004), the old forest retention requirement will be reduced by two-thirds, "except where a timber supply analysis carried out in association with the timber supply review process has determined that conserving more than one-third will not cause timber supply impacts." The NSOGO Implementation Policy also references the 1999 *Landscape Unit Planning Guide* (LUPG), which defines 'drawdown' as "the reduction of the old growth percentage [...], due to probable economic and social consequences of halting timber harvesting."

Guidance pre-dating the LUPG – *Incorporating Biodiversity and Landscape Units in the TSR* (1997) indicates that there is "no impact on timber supply" when the 'drawdown' scenario results in the same timber supply projections as the 'no drawdown' scenario.

There are six BEC variants in TFL 53, including the Englemann Spruce Sub-alpine fir (ESSF) wk1 and wc3; and the Sub Boreal Spruce (SBS) wk1, dw1, mk1, and mw. The NSOGO specifies for the ESSF wk1 at least 19 percent of the area must consist of stands 250 years of age or older. For the ESSF wc3 and SBS wk1 at least nine percent of the area must consist of stands 250 years of age or older. For the SBS dw1, mk1 and mw at least 11 percent of the area must consist of stands 140 years of age or older.

The licensee's biodiversity plan used ecosystem mapping prepared in 1998 to assess the status of biodiversity indicators for each of the BEC variants in the TFL. Using this information, a strategy was developed to meet old growth requirements through the retention of mature forests with suitable stand structure. This strategy is reflected in the licensee's approved FSP.

In previous timber supply analyses, old growth retention requirements were reduced by two-thirds for all BEC variants, and the model was configured to meet the full requirements within 140 years. The age criterion was used as a proxy for stand structural stage. For this timber supply analysis, FAIB staff asked the licensee to apply the full old forest retention requirements at the beginning of the base case. This request was made because the base case initial harvest level is higher than the current AAC. Consequently, staff maintain the two-thirds reduction in old growth retention requirements does not 'impact timber supply' and the allowance provided in the NSOGO does not apply.

The base case results show that initially, the SBS mk1 is the only BEC variant where the amount of old forest is above the full old forest requirement. For all other BEC variants, the amount of old forest does not meet the full old forest retention requirement until 2060.

The licensee does not agree with the application of the full old growth retention requirements at the beginning of the base case for three reasons. Firstly, the current AAC was set conservatively using a “post-MPB epidemic” forest inventory that overestimated pine mortality. Secondly, there is insufficient old forest outside of the THLB but within the CFLB to meet the old forest requirements; therefore, stands in the THLB must be reserved from harvest to achieve the full old growth requirements in the short term. And finally, conserving more than one-third of the old growth requirement decreases the supply of large trees required for its sawmill.

The licensee notes that in the neighbouring Prince George TSA, the age requirement for old stands is 140 years instead of 250 years in the ESSF wk 1 and SBS wk 1. In “biodiversity old age target” sensitivity analysis decreasing the age requirements for these two BEC variants to 140 years resulted in a short-term harvest level 6.4 percent higher than in the base case. FAIB staff do not support the use of the lower age definitions as the required minimum old forest retention for these BEC variants are significantly higher in the TSA than in the TFL.

In a “biodiversity percent old target” sensitivity analysis, using the allowance to reduce the minimum old seral requirements by two-thirds in the short term and configuring the model to meet the full required amount over 115 years increased the short-term harvest level by 6.0 percent. Compared to the base case, the full old forest retention requirements are achieved in 110 years instead of 40 years.

The base case initial harvest level (257 700 cubic metres per year) with no drawdown applied is lower than the initial harvest level of both sensitivity analyses, and the harvest levels for all these scenarios are higher than the current AAC of 219 000 cubic metres.

Following the submission of Management Plan No. 5, the licensee submitted an addendum that includes a request to set the new AAC at the current level of 219 000 cubic metres and to manage the old forest retention requirements to a level reduced by two-thirds. The addendum included an alternative harvest projection (see “alternative rates of harvest”).

Lheidli T’enneh provided the following comments:

- It is unclear how the natural young stand patch size objectives identified in the Order [Order establishing Non-Spatial Landscape Biodiversity Objectives for the Prince George TSA] are being managed or considered.
- No other protected areas are defined to meet landscape-level biodiversity objectives than the “netdown” area identified in the [timber supply analysis] report.
- While age is one criterion of old forest and easier to model, “stand structure” is also a critical component and is more important but should be assessed by a qualified professional. It is unclear if this type of analysis was done to inform the Management Plan.
- Research and scientific literature established since the creation of the *Provincial Non-Spatial Old Growth Order* indicate that some of the Order’s thresholds are now considered very high risk to biodiversity for the BEC subzones within the TFL. This is supported by updated natural disturbance analysis within the Prince George TSA.

- Work with Ministry of Forests, Lands and Natural Resource Operations and Rural Development staff to update the minimum thresholds for retention and management of landscape-level biodiversity working with the other affected First Nations.
- Lheidli T'enneh will need the Province and/or the licensee to clarify the current state of landscape-level biodiversity within the TFL area and the adjacent PG TSA within their territory to understand risk to biodiversity, current habitat suitability for key species, and how that current state relates to their ability to exercise their rights; including how their [the licensee's] proposed 'drawdown' strategy relates to this state.

In response, Ministry staff note:

- the Order establishing Non-Spatial Landscape Biodiversity Objectives for the Prince George TSA does not apply to TFL 53, consequently no natural young stand patch size objectives have been established for the TFL.
- the NSOGO requires the licensee to track the amount of old forest in each landscape unit/BEC variant; however, it does not require the licensee to spatially locate areas to be retained as old forest. Consequently, the old forest retention requirements were applied aspatially in the timber supply analysis, rather than area-based netdowns.
- The licensee's biodiversity plan, which is based on terrestrial ecosystem mapping attempted to identify areas for retention based on stand structure instead of age. However, the licensee has not conducted any assessments to validate the use of this approach.

A member of the public agrees with the licensee that stands will start to show old-growth attributes much younger than 250 years and that the way stands are managed, rather than absolute age, is more important.

I have considered the information provided by the licensee and Ministry staff and have reasoned as follows. The NSOGO provides for a "potential reduction" in old forest retention in low biodiversity emphasis areas by up to two-thirds, "to the extent necessary to address impacts on timber supply". The NSOGO Implementation Policy elaborates on this provision, indicating that the old forest retention requirement will be reduced to one-third of the full requirement "except where a timber supply analysis carried out in association with the timber supply review process has determined that conserving more than one-third will not cause timber supply impacts." Given that the full old forest requirements were applied in the base case and the base case harvest levels exceed the current AAC, I conclude that the application of these requirements does not impact timber supply. On this basis, I accept the NSOGO requirements for TFL 53 were modelled correctly in the base case. With respect to the guidance provided in the *Incorporating Biodiversity and Landscape Units in the TSR* (1997) and *Landscape Unit Planning Guide* (1999), I note that these policy documents pre-date the legal requirements established in the NSOGO.

I commend the licensee on its development of an old forest management strategy that considers the importance of stand attributes. However, I agree with the Lheidli T'enneh, that continued use of this approach needs to be reassessed and supported by the results of effectiveness monitoring. In the interim, the licensee needs to meet the full NSOGO requirements, as modelled in the base case.

With respect to Lheidli T'enneh concerns about the NSOGO, and the minimum thresholds for retention and management of landscape-level biodiversity, I note that the Province is currently engaging with First Nations across the province about how recommendations from

A New Future for Old Forests: A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems will be implemented within the context of a Provincial Old Growth Strategy. As elements of this strategy come into effect any necessary changes to the TFL 53 AAC will be addressed and incorporated in subsequent timber supply reviews.

- *wildlife*

Wildlife habitat areas (WHA) and ungulate winter ranges (UWR) are established through the issuance of Government Actions Regulation (GAR) orders to provide habitat for identified wildlife species that are at risk or are of regional importance and include objectives that may limit or prevent timber harvesting. No WHAs or UWRs have been established in TFL 53.

In its *Timber Supply Analysis Report in Support of Management Plan No. 5 for TFL 53* (April 2020), the licensee indicates, “wildlife habitat protection in the TFL occurs through the exclusion of riparian reserves around streams, river and lakes, the maintenance of old growth stands, the distribution of cutblocks, green-up adjacency delays, excluded forest areas, which include unmerchantable forest stands and environmentally sensitive areas, and the establishment of wildlife tree patches in harvested areas.”

No area reductions were applied in the base case for identified wildlife. Existing wildlife tree patches that occur in existing cutblocks identified in the RESULTS data base were excluded from the THLB. There are 3260 hectares of existing wildlife tree patches in the TFL. Future wildlife tree patches were accounted for by reducing the projected yields of each natural stand and pre-1998 managed stand by six percent.

Lheidli T’enneh commented the [land base] netdowns do not include UWR areas within the TFL. This is correct, as no UWRs have been established in the TFL.

A member of the public noted the presence of mapped caribou habitat near the TFL and asked how caribou habitat was modelled. The licensee responded that there is no identified caribou habitat overlapping the TFL, consequently none was modelled. The respondent also noted that fisher was now a “red-listed” species and is of the opinion that although the measures described in the timber supply analysis report are expected to work for most species, they may not work for fisher, which prefer unfragmented habitat. The licensee responded that in addition to the retention of large trees (e.g., Douglas-fir and cottonwood), its road rehabilitation program benefits fisher by reducing road access. The licensee noted that given the long history of harvesting on the TFL there are no longer large undisturbed areas available for fisher; however, as managed stands mature, they will provide increased forest cover.

A member of the public expressed concern for moose habitat and the number of moose in and around the TFL and listed several factors affecting the species, including the availability of old forest cover, forest connectivity, and browse. The respondent recommended the licensee improve moose browse through the management of red osier dogwood and balsam, and the retention of deciduous trees.

In response, the licensee explained the legal requirement to maintain old forest and how hiding cover conditions recover over time as stands mature. The licensee noted that the TFL is nearing the end of natural stand harvest and that although old forest is not extensive anymore, moose are being seen in older second-growth stands. The licensee indicated that it is retaining mature deciduous trees and that standard practice is to retain a deciduous stand component of up to five percent. The licensee also noted the presence of “wet draws” and brushy areas in stands of spruce that typically have lower stocking, even in high density plantations.

Based on my review of this information and discussions with staff, I conclude wildlife habitat was correctly modelled in the base case. I commend the licensee on its road deactivation and rehabilitation program, which reduces the overall risk to wildlife, such as grizzly and moose, by reducing human access and interactions. As indicated in ‘*non-merchantable forest types*’, I encourage the licensee to retain deciduous trees to provide for a variety of non-timber values, including wildlife

Section 8 (8) (a) (vi) any other information that, in the chief forester’s opinion, relates to the capability of the area to produce timber

Other information

- First Nations

The Crown maintains a duty to consult with and accommodate, as necessary, those First Nations for whom it has knowledge of claimed Aboriginal Interests that may be impacted by a proposed decision, including strategic-level decisions such as AAC determinations. The AAC determination is a strategic decision that sets the stage for other decisions such as AAC apportionment and disposition, leading to issuance of cutting authorities. AAC determinations do not determine particular harvesting areas or patterns, and as a result do not relate directly to the manner in which timber is utilized or managed on the ground. The relationship to claims of Aboriginal title is not a direct one. The AAC considers the sustainable harvest level from a geographic area which may include lands claimed as Aboriginal title lands but not yet declared by a court to be such. While under claim, such lands remain Crown lands and are part of the harvestable land base. Whether timber is ultimately harvested from those lands is an issue that is subject to allocation decisions, and the AAC determination does not determine that matter.

The AAC can affect various resource values and therefore the ability of Aboriginal Peoples to meaningfully exercise their Aboriginal rights. Information gained through consultation with potentially affected First Nations about Aboriginal Interests has been considered in the development of this determination.

Four First Nations have consultative areas that overlap with TFL 53: Lheidli T’enneh Nation, Lhatako Dene Nation, Nazko First Nation, and Tsilhqot’in Nation – Engagement Zone ‘A’.

The level of consultation undertaken is consistent with the signed agreements held by the affected First Nations and the *Updated Procedures for Meeting Legal Obligations When Consulting First Nations and Haida Principles*.

As per recent case law and current government direction, a review of available information for the First Nations was conducted to assess the level of consultation given the strength of claims made by First Nations and the degree of impact the AAC determination may have on those claims. A general review of available information was conducted for each First Nation. The information reviewed included the available ethno-historic reports, traditional use studies, archaeological records, wildlife assessments and notes from related consultation processes. The initial level of consultation was derived by the Ministry based on this information, the degree of overlap with the TFL, or on the levels specified in the relevant agreements.

The review of information suggests that the First Nations associated with TFL 53 have exercised their Aboriginal Interests within their asserted traditional territory and could likely support an Aboriginal rights claim in any portion of those areas in regard to hunting, fishing, use of wood for both domestic and ceremonial purposes, and gathering. The practice of some of these activities is ongoing.

An initial assessment of the available information and potential impact the AAC decision may have on First Nations' Aboriginal Interests indicated a 'normal' level of consultation was reasonable given the location and level of overlap of the individual asserted territory boundaries in relation to the TFL.

District staff led the consultation process for the current TFL 53 timber supply review process. Initial engagement letters providing an overview of the referral phases and estimated timelines were sent to all First Nations on September 9, 2019.

The licensee shared the *TFL 53 Information Package* with all First Nations on October 8, 2019. Formal consultation letters regarding the *Information Package* were sent by the district staff to all First Nations on November 8, 2019, and consultation for this phase closed on January 8, 2020.

Dunkley Lumber Ltd. shared the *Draft Management Plan* for TFL 53 with all First Nations on May 5, 2020. Formal consultation letters regarding the *Draft Management Plan* were sent to all First Nations on May 22, 2020, and consultation for this phase closed on July 22, 2020.

No responses were received from the Lhtako Dene Nation, Nazko First Nation, and Tsilhqot'in Nation.

On July 24, 2020, Lheidli T'enneh requested funding to support their technical review of the TSR process to date. From July 28, 2020, to March 31, 2021, extensive efforts were made to provide the requested funding to support Lheidli T'enneh participation in the TFL 53 TSR process via funding through the Indigenous Funding Program. Lheidli T'enneh did not support an aspect of the original or proposed agreement template letter. A funding agreement was not reached prior to the end of the 2020/2021 fiscal year.

On April 12, 2021, the Lheidli T'enneh provided a document entitled *Review of Dunkley Lumber Ltd. TFL #53 Management Plan #5 and Supporting Timber Supply Analysis Report*. A response to this report was provided by FAIB staff on May 20, 2021. Given the concerns and recommendations about landscape-level biodiversity objectives, watershed resiliency, the *Biodiversity Plan for TFL 53* and about the protection of cultural heritage resources in the TFL, a copy of the May 20th letter was provided to the Prince George Natural Resource District Stewardship Officer and Omineca Natural Resource Region Land base Stewardship Section Head.

The information and recommendations in the Lheidli T'enneh report and other comments received during the consultation process and the responses provided by district, FAIB and licensee staff that have not been included under other sections of this document are discussed below:

- Lheidli T'enneh commented that the overall timber supply analysis has a lot of assumptions, but it is unclear where they all come from as they are not included in Dunkley's TFL 53 Management Plan No. 5 or most other documents. The management plan does not provide any substantial forest management direction, or practices, that are not legally required or additional assumptions that provided guidance to the analysis report for the draft AAC determination.
- It is not clear if the Sustainable Forest Initiative (SFI) requires anything additional to the current legislative and policy requirements outlined in the TFL 53 Forest Stewardship Plan.

As indicated in the May 20th letter from FAIB, the Tree Farm Management Plan Regulation requires the licensee to include a description of the TFL and its history, the title and description of publicly available planning documents, the public review strategy used, and a

timber supply analysis. There is no legal requirement for the management plan to describe practices or management regimes that are not required by the regulation or that vary from those currently in place for the area.

The timber supply analysis includes an information package, which describes the data and assumptions proposed for use in the timber supply analysis, and a timber supply analysis report. The timber supply analysis report describes the methods and results of the modelling undertaken to project the timber supply for the area under current management, which includes the legal objectives established for TFL 53. The current legal management objectives for TFL 53 are specified in the *Order Establishing Provincial Non-Spatial Old Growth Objectives*, the *Forest and Range Practices Act*, and the *Forest Planning and Practices Regulation*. Although the licensee has achieved voluntary certification under the Sustainable Forestry Initiative (SFI), this certification does not establish any additional legal objectives.

In reviewing the First Nations consultation process with district staff, I conclude that the First Nations whose territories overlap TFL 53 were consulted in accordance with current provincial guidance, applicable case law, and the signed agreements held by the affected First Nations. I am satisfied that these consultations have been carried out in good faith and the Crown's process of seeking to understand potentially outstanding issues and impacts was reasonable. I also accept the district staff conclusion that any potentially adverse impacts on the Aboriginal Interests of the relevant First Nations stemming from forest development activities that occur subsequent to the AAC determination can be appropriately mitigated through existing legislation and regulation, planning documents, and meaningful engagement at the operational level.

- cumulative effects

Cumulative effects are changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities, and natural processes. The provincial cumulative effects team is developing policies and procedures for assessing cumulative effects on high priority values and implementing cumulative effects assessments across the province.

The Omineca Environmental Stewardship Initiative (ESI) Demonstration Project is currently the primary cumulative effects project in the Omineca region. This project is being undertaken in partnership with Carrier Sekani First Nations and aims to assess the current state and cumulative effects of natural and development-related disturbance on moose, old forest, and grizzly bear. An assessment of the current condition for grizzly bear was completed in 2019.

Lheidli T'enneh commented that the recent Omineca ESI grizzly bear risk assessment shows grizzly bears are at high risk due to high road density and recommend road density be maintained below the lower threshold of 0.6 kilometres per square kilometre in conservation areas, below higher [risk] thresholds for long-term sustainability, and should be considered by sub-watershed or watershed for ease of tracking.

Lheidli T'enneh commented there was no consideration of watershed objectives, especially for equivalent clearcut area (ECA) and/or road density thresholds. Lheidli T'enneh recommend updating the ECA analysis within the TFL.

Ministry staff indicate the licensee actively manages road density through its road rehabilitation program. They also note that although there are no designated watershed objectives for TFL 53, riparian habitat is managed through the retention of buffer areas.

I have considered the information on cumulative effects, including the recommendations provided by Lheidli T'enneh, and conclude that the base case reflects current management, the status of the effects of past and present industrial activity on the land base, and the legal objectives established by government for various non-timber values. I will not make any adjustments to the base case on this account.

With respect to the recommendations regarding road density and ECA analysis, these concerns are best addressed through land use planning and operationally at the district and regional level. As indicated in *'higher level plans'*, I encourage the licensee to work with First Nations to update its biodiversity plan and to consider a review of riparian habitat and road density as part of this update.

- climate change

Climate change is expected to impact forest ecosystems in several ways, including: a general increase in temperatures; change in precipitation patterns; an increase in the frequency and severity of wildfires, floods, and landslides; and the occurrence of insects and disease above endemic levels. While the trends are generally consistent, the specific magnitude of these changes, and their spatial and temporal distribution are uncertain.

The consideration of climate change impacts in AAC determinations aligns with the Ministry's Climate Change Strategy to incorporate this important factor into decision making. Recognizing that projections of future climate are highly uncertain, and can only indicate trends in climate variables, climate monitoring for 1942 to 2012 and projections based on results from a combination of climate models for the period 2041 to 2070 for the region, including TFL 53, show the following results and trends:

- Mean annual precipitation is unchanged; however, winter precipitation has declined by 22.6 percent and spring precipitation has increased by 18.8 percent. During the period 2041 to 2070, the model results show minor increases in precipitation. Spring may see the largest increase and summer may be drier.
- During the period 1942 to 2012, mean annual temperature has increased by 1.5°C, with a 2.9°C increase in winter and 1.1 °C increases in spring and summer. Mean annual temperature is projected to increase by an additional 3.1°C, with temperatures increasing in all seasons, particularly in winter.
- Extreme annual maximum and minimum temperatures may increase by 3.4°C and 5.9 C, respectively. Seasonal mean maximum temperatures may increase most in the summer (3.3°C) and least in the fall (2.9°C).
- Although summer precipitation may not decrease significantly, the large increases in temperature, particularly in summer maximum temperature are concerning for wildfire and drought risk.
- Growing degree days and frost-free periods may both increase; however, so will the demand for moisture as indicated by a 43.2 mm change in climate moisture deficit.

Potential impacts to forests inferred from these climate trends include:

- Current climate trends of warmer winters are more conducive to the overwinter survival of forest pests, especially bark beetles. Warmer conditions overall can mean some insects can reproduce more quickly, resulting in larger populations.
- Wet and warm conditions in the spring can be a risk for increasing pathogens, for example lodgepole pine stem rusts.

- Current potential declines in snow and a shortened snow season can increase the risk of frost damage, as snow cover insulates trees from cold temperatures. A reduced snow season will likely also mean less soil moisture storage available for the growing season.
- The model projections indicate it is likely moisture demands from evaporation will increase, given the change particularly in the summer, and increase the risk of impacts or mortality to a variety of tree species from drought.
- Increases in growing degree days and frost-free period may mean some vegetation will see enhanced growth; however, decreases in moisture availability may limit that potential.
- The potential for stressed trees due to hot dry conditions in the summer months will also limit natural defenses from other disturbances such as pests and wildfire, of which the climate projections are favourable for these to increase as well.
- Perhaps increases in spring precipitation will offset the drought risk somewhat; however, the large increases in summer temperature may mean any additional precipitation received in the spring will not last the growing season due to the elevated evaporative demand.

Lheidli T'enneh commented that the *Omineca Climate Change Report* forecasts changes in temperature and precipitation by 2055. Major ecosystem shifts, and threats of fire/drought are likely to occur in that time frame, so a better understanding of potential unrecoverable losses, [and] the importance of specific ecosystems in transition zones should be considered in the sensitivity analysis using the Ministry's research climatologist's work during the next analysis at a minimum.

A member of the public asked the licensee how it is planning to adapt its management to make TFL 53 more resilient to climate change. The licensee indicated that its adaptive management practices include mixed-species planting, following the chief forester's guidelines and staying informed of new research. It also noted that revisions in Sustainable Forest Initiative (SFI) certification will expand its climate change responsibilities. In addition, the licensee responded that different climate change models show different futures and that it is difficult to plant trees adapted to new conditions when these changes have yet to occur.

Given the potential impacts of climate change on the health and productivity of managed stands, I anticipate the licensee will continue to follow provincial reforestation guidelines, including the use of Climate-Based Seed Transfer. As discussed under '*Volume estimates for managed stands*'; and '**Implementation**', there is also a need to gain a better understanding of managed stand yields through the establishment of a Young Stand Monitoring program.

While projected climate change will likely affect forest productivity and growth, the dynamics of natural disturbances, forest pests and hydrological balances (e.g., drought stress) the extent and timing of these impacts is uncertain. I accept that the best approach in the short term is to monitor for changes to enable timely adaptive responses and to undertake analysis to increase our understanding over time. In general, the requirement for regular AAC reviews will allow for the incorporation of new information on climate change and its effects on forests and timber. Ongoing observations, data collection, analysis and discussions through various collaborative teams will play a critical role in ensuring we are able to respond to predicted implications for timber supply.

- harvest performance

The current TFL 53 AAC is 219 000 cubic metres. Of this volume, 188 687 cubic metres per year (86 percent) is apportioned to Dunkley. Of the remaining volume, 28 260 cubic metres per year is allocated to BC Timber Sales (BCTS) and 1693 cubic metres per year is reserved under the *Forestry Revitalization Act*. To date, none of the reserved volume has been harvested.

Although licensees are billed, i.e., pay stumpage, for all timber volume harvested under their licence, grade 6 (undersize logs) and grade Z (firm wood reject) volumes do not count towards the licence AAC. Consequently, cut control volumes may be lower than billed volumes.

Information from the Ministry's Harvest Billing System (HBS) shows that for the 2010 to 2019 period, the combined billed volume for Dunkley and BCTS averaged 237 805 cubic metres per year or 109 percent of the AAC. Of this volume, 97 percent was attributable to Dunkley. For the 2010 – 2014 and 2015 – 2019 cut control periods, Dunkley's cut control accountable volumes were 103 percent and 102 percent of its licence AAC, respectively. For the period from January 2010 to December 2020, 74 percent of the BCTS apportioned volume was harvested.

I have reviewed the harvest performance information and conclude the volume harvested within TFL 53 between January 2010 and December 2020 exceeds the AAC by an average of nine percent. Although this is within the legal bounds provided in the *Forest Act*, timber supply sustainability could become an issue in TFL 53 if the licensee continues to harvest a disproportionate amount of the TFL 53 AAC and BCTS harvests its full volume allocation. Consequently, as indicated in '**Implementation**', I expect Ministry staff to work with the licensee and BCTS to ensure that, in combination, the harvested volumes do not exceed the AAC.

- grade 4 credits

AACs reflect the merchantable volume understood to be available using the information contained in the forest inventory, research plots and projected by growth and yield models.

Operationally, the harvest within a TFL is monitored through the billing of harvest to the licensee. However, Section 17 (6) of the Cut Control Regulation allows licensees to apply to have grade 4 logs (non-sawlog) that are delivered to a non-lumber or veneer processing facility not count towards the AAC volume attributed to their licence (referred to as "grade 4 credits"). This allows the licensee to harvest an additional cubic metre of timber for each cubic metre approved under Section 17(6). Grade 4 credits is a tool that was developed to provide an incentive for the salvage of dead pine or harvest of low-quality logs and to promote higher levels of fibre utilization.

A review of the cut control information from January 2010 to December 2020, shows that a total of 625 091 cubic metres of grade 4 volume was billed to Dunkley. This volume represents 26 percent of the total volume harvested within the TFL. Of the grade 4 volume harvested during this period, 30 percent was balsam, 23 percent was pine and 41 percent was spruce. Given the licensee's successful mountain pine beetle salvage program and low incidence of spruce beetle in the TFL, it is likely most of the grade 4 volume is attributable to trees live at the time of harvest.

Dunkley requested, and received, a total grade 4 credits for 173 380 cubic metres, or 28 percent of the total grade 4 volume.

In 2014 the *Forest Act* and the Cut Control Regulation were amended to allow the minister to set a maximum volume limit on grade 4 timber that may be credited in a TFL or TSA in situations where sustainability of the timber supply is a concern.

For the 2010 – 2014 cut control period, the use of grade 4 credits decreased the licensee's gross cut control accountable volume from 117 percent to 108 percent of its licence AAC. For the 2015 – 2019 cut control period, the use of grade 4 credits decreased the licensee's gross cut control accountable volume from 108 percent to 100 percent of its licence AAC.

The use of grade 4 credits can result in harvesting above the level of the AAC, as is the case in TFL 53, where after accounting for all volume harvested within the TFL, including all grade 4 volume, about 109 percent of the TFL 53 AAC has been harvested since 2010. I am concerned that if the application of grade 4 credits continues, harvesting could continue to exceed the AAC, thereby jeopardizing timber supply sustainability.

I am mindful of the opportunity to improve the utilization of timber and encourage forest sector diversity using grade 4 credits, and the need to ensure timber supply sustainability. It is my expectation that the total annual harvest (including grade 4 credits) will not exceed the AAC set by this determination. I will therefore make no adjustment to the base case to account for grade 4 credits. However, if the use of grade 4 volume credits continues to result in a harvest level that exceeds the AAC for TFL 53, I will either petition the minister to limit the grade 4 credit volume for TFL 53 or assess the need to redetermine the AAC sooner than the 10 years required by legislation. Consequently, as discussed under '**Implementation**', I expect Ministry staff to monitor the overall harvest level in TFL 53 and the use of grade 4 credits and report any concerns to the chief forester.

- dead potential volume

Prior to April 1, 2006, grade 3 endemic (the 'normal' mortality observed in a mature stand) and grade 5 (dead trees with greater than 50 percent firmwood) were not charged to the AAC if harvested.

In April 2006, changes were made to the Interior log grades to enable logs previously considered grade 3 endemic or grade 5 to be charged to the AAC. Estimates of timber volume in the base case do not include the logs from trees dead at the time of harvest that could potentially be used as sawlogs ('dead potential'). Possible sources of data about dead potential volumes include inventory audit plots, Vegetation Resources Inventory phase II ground samples, permanent sample plots, and temporary sample plots.

For TFL 53, only inventory audit plot data are available. The data from 40 of these plots indicate dead potential volume represents about 2.7 percent of the net merchantable volume for stands older than 60 years within the forested land base of the TFL. FAIB staff note that the sampling error for dead potential volume is higher than 15 percent, consequently the exact magnitude of the dead potential estimate is difficult to quantify. In addition, estimates of dead potential volume do not consider the actual utilization of this volume.

The quantity of dead potential volume that could potentially be utilized is uncertain. Since dead potential volume was not accounted for in the base case I will consider this an unquantified underestimation in the short-term timber supply.

- public comments

In accordance with the Tree Farm Licence Management Plan Regulation, Dunkley Lumber Ltd. obtained approval from the Regional Executive Director – Omineca Natural Resource Region of a public review strategy. The draft *Information Package (IP)* was made available for review from October 8, 2019, to December 5, 2019. The draft *Management Plan (MP)*,

including the *Timber Supply Analysis Report*, was made available for review from May 11, 2020, to July 11, 2020.

Letters, including a copy of the IP and MP, were sent to potentially interested stakeholders, including trappers, guides, range users and the community of Hixon. Newspaper advertisements were placed in the Quesnel Cariboo Observer and the Prince George Citizen.

No responses were received from the public on the draft IP; however, comments were received on the draft MP. I have reviewed all the comments and concerns received, and any responses provided by the licensee or Ministry staff. My considerations of these are discussed under the relevant sections of this document.

Based on my discussions with district staff, I am satisfied suitable opportunities were provided to the public to comment on the timber supply review for TFL 53.

Section 8 (8) (b) the short and long-term implications to British Columbia of alternative rates of timber harvesting from the area

Alternative rates of harvesting

- alternative harvest projections

In the base case, an initial harvest level of 257 700 cubic metres per year was maintained for 50 years before increasing to the long-term harvest level of 298 000 cubic metres per year.

In the first of four alternative harvest projections, the model was run for 800 years instead of 300 years. This resulted in an initial harvest level of 274 000 cubic metres per year (6.4 percent higher than in the base case) and a long-term harvest level of 283 200 cubic metres per year (4.95 percent lower than in the base case).

In the second, prepared to determine the maximum even-flow harvest level, a harvest level of 284 000 cubic metres per year could be maintained for the entire forecast period. This level is 4.7 percent higher than the base case short-term harvest level and 4.6 percent lower than the base case long-term harvest level.

In the third, transitioning earlier to the long-term harvest level after 25 years instead of after 50 years, as in the base case, required a 13 percent reduction in the initial harvest level, and a negligible (0.1 percent) reduction in the long-term harvest level.

In the fourth, delaying the transition to the long-term harvest level to occur at 75 years increased the initial harvest level by 4.4 percent. The long-term harvest level was unchanged.

On November 16, 2020, Dunkley Lumber Ltd. submitted an addendum to *Management Plan No. 5*. This addendum includes a request to maintain the AAC at the current level of 219 000 cubic metres and to manage the old forest retention requirements to a level reduced by two-thirds. The licensee believes immediate implementation of the full old forest retention requirements, (see '*landscape-level biodiversity*') as modelled in the base case, would reduce the supply of large diameter trees needed to supplement the supply of large logs it purchases for its mill.

The addendum included the licensee's "preferred harvest scenario", in which the initial harvest is set at the level of the current AAC for one decade. In addition, the old forest requirements are varied from those specified in the NSOGO as follows: the age for the ESSF wk1, ESSF wc3 and SBS wk1 was reduced to 140 years; the SBS dw1 and SBS mw1 were combined; and the percent old forest retention was reduced by two-thirds. The model

was not required to meet the full old forest retention requirements until the end of the third rotation.

In the “preferred harvest scenario” the initial harvest level is set at 219 000 cubic metres per year – 18 percent lower than in the base case. After 10 years, the harvest increases to a level about six percent higher than in the base case. The long-term harvest level is unchanged. In this scenario, the transition from natural stands to managed stands occurs slightly later than in the base case and attainment of the full old forest requirement for all BEC variants is delayed from 40 years to 120 years.

I have considered these alternative harvest forecasts, including the licensee’s “preferred harvest scenario”, as described in ‘**Reasons for Decision**’.

Section 8 (8) (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities

This section of the *Forest Act* has been repealed [2003-31-2 (B.C. Reg. 401/2003)]

Section 8 (8) (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia

I am satisfied that this determination accords with the objectives of government articulated in the Minister’s October 30, 2017, letter and have no additional comments in this regard.

Section 8 (8) (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area

The factors under this section were accepted as modelled and required no additional comments.

Reasons for Decision

In reaching my AAC determination for TFL 53, I have considered all the factors required under Section 8 of the *Forest Act* and I have reasoned as follows.

The base case shows that an initial harvest level of 257 700 cubic metres per year can be maintained for 50 years before increasing to a long-term level of 297 900 cubic metres per year.

I am satisfied that the assumptions applied in the base case, for most of the factors applicable to TFL 53, were appropriate including those detailed in Table 1 or as described in my considerations previously discussed in this rationale. However, I have identified some factors, which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Some of these factors can be readily quantified and their impact on harvest projections assessed with reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at this time.

I have identified the following factors that indicate a potential overestimation in the base case timber supply:

- *Forest inventory* – an inventory statistical analysis report indicates mature volume may be overestimated by nine percent. The nine percent overestimation of mature stand volume results in a 5.8 percent overestimation in the short-term timber supply.

- *Genetic gains* –the overestimation of the genetic worth for spruce and Douglas-fir seedlings planted between 1998 and 2019 by two percent and three percent, respectively, results in a one percent overestimation in the mid-term timber supply.
- *Timber utilization* – the use of timber utilization specifications for managed stands that do not reflect the current requirements, and have yet to be substantiated through demonstrated performance, may result in a small, unquantified overestimation in the long-term timber supply.

I identified the following factor that results in a higher timber supply than projected in the base case by an amount that cannot be quantified at this time:

- *Dead potential volume* – the volume from dead trees that could potentially be used as sawlogs but not accounted for in the model results in the base case underestimating the short-term timber supply by an unquantified amount.

Of the above factors that can be quantified, it is those factors that affect the short-term period of the projection that are most relevant to my AAC determination. The combined reductions for the overestimation of mature stands and genetic gains and unquantified underestimation for dead potential volume result in a total downward pressure of 6.8 percent, when applied to the base case, indicate an annual harvest of 240 000 cubic metres per year would be appropriate.

As indicated in ‘*landscape-level biodiversity*’, the NSOGO provides for a “potential reduction” in old forest retention in low biodiversity emphasis areas by up to two-thirds, “to the extent necessary to address impacts on timber supply”. The NSOGO Implementation Policy elaborates on this provision, indicating that the old forest retention requirement will be reduced to one-third of the full requirement “except where a timber supply analysis carried out in association with the timber supply review process has determined that conserving more than one-third will not cause timber supply impacts.” Given that the full old forest requirements were applied in the base case and the base case harvest levels exceed the current AAC, I concluded that the application of these requirements does not impact timber supply. On this basis, I accepted the NSOGO requirements for TFL 53 were modelled correctly in the base case.

Throughout this determination, I have been mindful of the comments and recommendations provided by the Lheidli T’enneh and have described my consideration of both the input received and responses provided by the licensee and Ministry staff under the relevant factors in this document.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in TFL 53 by establishing an AAC of 240 000 cubic metres. This is 9.6 percent higher than the AAC in place prior to this determination.

This determination is effective April 12, 2022 and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which this decision is predicated, then I am prepared to revisit this determination sooner than the 10 years required by legislation.

Implementation

In the period following this decision and leading to the subsequent determination, I expect Ministry staff and licensee staff to undertake or support the tasks and studies noted below, the benefits of which are described in relevant sections of this rationale document. I recognize that the ability of all parties to undertake or support these projects is dependent on provincial priorities and available resources, including funding. However, these projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in TFL 53. Prior to the next AAC determination:

1. *land base contributing to timber harvesting* – I expect the licensee to revise the methodology used to model natural disturbance in stands outside of the THLB to an approach this is consistent with the age criteria and return interval described in the biodiversity guidebook.
2. *cultural heritage resources* – I expect the licensee to continue to track the areas excluded from timber harvesting to protect CHRs and incorporate this information in the next timber supply review.
3. *managed stand yields and operational adjustment factors*– I expect the licensee to work with FAIB to establish young stand monitoring plots (YSM) in TFL 53 within a time frame that facilitates their remeasurement, analysis incorporation into the next timber supply review. The YSM information can be used to refine the OAF values and to gain a better understanding of managed stand yields in the context of a changing climate.
4. *harvest performance* – I expect Ministry staff to work with the licensee and BCTS to ensure that, in combination, the harvested volumes do not exceed the AAC.
5. *Grade 4 credits* – I expect Ministry staff to monitor and report the volume billed, the use of grade 4 volume credits, and the total volume harvested within TFL 53 annually to the chief forester in order to assess if harvesting is occurring above the level of the AAC.
6. *Climate Change* – I expect the licence holder to complete carbon modelling and/or a climate vulnerability assessment for the next TSR.



Albert Nussbaum, RPF
Acting Deputy Chief Forester
RPF No. 2053

April 12, 2022

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (current to March 30, 2022), reads as follows:

Allowable annual cut

8 (1)The chief forester must determine an allowable annual cut at least once every 10 years after the date of the last determination, for

(a)the Crown land in each timber supply area, excluding the Crown land in the following areas:

- (i)tree farm licence areas;
- (ii)community forest agreement areas;
- (iii)first nations woodland licence areas;
- (iv)woodlot licence areas, and

(b)each tree farm licence area.

(2)If the minister

(a)makes an order under section 7 (b) respecting a timber supply area, or

(b)amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),

the chief forester must make an allowable annual cut determination under subsection

(1) for the timber supply area or tree farm licence area

(c)within 10 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d)after the determination under paragraph (c), at least once every 10 years after the date of the last determination.

(3)If

(a)the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b)the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 10 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1)If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was

determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 15 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In respect of an allowable annual cut determined under subsection (1), the chief forester may, at any time, specify that portions of the allowable annual cut are attributable to one or more of the following:

(a) different types of timber or terrain in different parts of Crown land within a timber supply area or tree farm licence area;

(a.1) different areas of Crown land within a timber supply area or tree farm licence area;

(b) different types of timber or terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(5.1) The chief forester may, at any time, amend or cancel a specification made under subsection (5).

(6) The minister must determine an allowable annual cut for each woodlot licence area in accordance with the woodlot licence for that area.

(7) The minister must determine an allowable annual cut for

(a) each community forest agreement area in accordance with the community forest agreement for that area, and

(b)each first nations woodland licence area in accordance with the first nations woodland licence for that area.

(8)In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a)the rate of timber production that may be sustained on the area, taking into account

(i)the composition of the forest and its expected rate of growth on the area,

(ii)the expected time that it will take the forest to become re-established on the area following denudation,

(iii)silviculture treatments to be applied to the area,

(iv)the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v)the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi)any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b)the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c)[Repealed 2003-31-2.]

(d)the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e)abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

(9)Subsections (1) to (4) of this section do not apply in respect of the management area, as defined in section 1 (1) of the **Haida Gwaii Reconciliation Act**.

(10)Within one year after the chief forester receives notice under section 5 (4) (a) of the **Haida Gwaii Reconciliation Act**, the chief forester must determine, in accordance with this section, the allowable annual cut for

(a)the Crown land in each timber supply area, except the areas excluded under subsection (1) (a) of this section, and

(b)each tree farm licence area

in the management area, as defined in section 1 (1) of the **Haida Gwaii Reconciliation Act**.

(11)The aggregate of the allowable annual cuts determined under subsections (6), (7) and (10) that apply in the management area, as defined in section 1 (1) of the **Haida Gwaii Reconciliation Act**, must not exceed the amount set out in a notice to the chief forester under section 5 (4) (a) of that Act.

Appendix 2: Section 4 of the *Ministry of Forests and Range Act*

Section 4 of the *Ministry of Forests and Range Act* (current to March 30, 2022) reads as follows:

Purposes and functions of ministry

4 The purposes and functions of the ministry are, under the direction of the minister, to do the following:

- (a) encourage maximum productivity of the forest and range resources in British Columbia;
- (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;
- (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;
- (d) encourage a vigorous, efficient and world competitive
 - (i) timber processing industry, and
 - (ii) ranching sectorin British Columbia;
- (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Appendix 3: Minister's letter of October 30, 2017



Reference: 230810

October 30, 2017

Diane Nicholls, Chief Forester and Assistant Deputy Minister
Ministry of Forests, Lands, Natural Resource Operations
and Rural Development
Victoria, British Columbia
V8W 2H1

Dear Diane

The British Columbia *Forest Act* conveys the responsibility to determine an Allowable Annual Cut (AAC) to the Chief Forester of the Province of BC for each timber supply area and tree farm licence in the province. It also specifies considerations that must be brought to bear during the course of such determinations including, among others, the economic and social objectives of the government.

This letter is intended to provide you with guidance regarding the objectives of the British Columbia (BC) government that require your consideration when determining an AAC.

Your office implements a rigorous Timber Supply Review Process to help ensure that each AAC you determine responds to a broad array of objectives and aligns with land use and management decisions established by provincial statutes and regulations. The objectives identified below are to be considered and as part of the review process to ensure that AAC determinations, and the timber harvest rates they enable, continue to support government goals.

This letter replaces two letters previously issued by the Minister of Forests and Range to the chief forester, dated July 4, 2006 and October 27, 2010. It is intended to be used in concert with direction provided by the Minister of Forests, Lands and Natural Resource Operations to the chief forester in a letter dated April 12, 2013, concerning objectives outlined in the Shared Decision Making Process pursuant to the Nanwakolas Reconciliation Protocol.

The BC government has committed to building a strong, sustainable, innovative economy and creating well paid jobs in the province. The health of the forest sector, and its ability to respond to an array of short and long term social, economic and environmental interests, is a key to delivering on this commitment. As such, Government has identified specific objectives for the management of BC's forests and Crown lands. Those relevant to AAC determinations include:

Page 1 of 3

Ministry of Forests, Lands,
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and Rural Development

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Diane Nicholls, Chief Forester and Assistant Deputy Minister

- modernizing land-use planning to effectively and sustainably manage BC's ecosystems, rivers, lakes, watersheds, forests and old growth forests
- expanding investments in reforestation; and
- collaborating to develop strategies to manage wildlife resources and habitat

Strategies for delivering on these objectives will be developed in collaboration with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, relevant Natural Resource Ministries, indigenous partners and industry. Once approved by government, I ask that you ensure such strategies are integrated into the Timber Supply Review Process to support AAC determinations.

The BC government has committed to full and lasting reconciliation with Indigenous peoples. As chief forester, your responsibility includes continuing to ensure that AAC determinations take into consideration relevant agreements between First Nations and the Government of BC, court decisions that define Aboriginal title and rights as well as moving forward on reviewing policies, programs, and legislation to determine how to bring the principles of the United Nations Declaration on the Rights of Indigenous Peoples into action for AAC determinations. You also have a responsibility to continue to carefully consider traditional knowledge and other input from BC First Nation communities and organizations in the course of AAC determinations as they pertain to the AAC determination.

The *Forest Act* requires that the chief forester consider a range of forest health issues as part of AAC determinations, including the impacts of circumstances such as infestations, devastations and salvage programs. This is particularly relevant as BC's forest sector emerges from a period of significant, compounding challenges. The infestation of the Mountain Pine Beetle that peaked in the late 2000s has largely subsided but with continuing effects to the size and composition of the forest inventory. Currently, the north area is experiencing Spruce Beetle infestations which also pose impacts. Recently, the Province has experienced record levels of wildfires that have impacted timber supply, community stability and multiple forest values.

In response to these challenges, it is a government objective to focus on planning and sustainable resource management in a way that supports robust forest recovery and timely and effective responses to emerging threats. Please consider how your AAC determinations can support these objectives while promoting forest health and values. In some cases AAC determinations may encourage management practices that avert another infestation in the province's forests. In certain regions, they will need to reflect the reality of a lower timber supply. Some regions will require expanded investment in reforestation and/or an increased focus on timber utilization and recovery. In the wake of extensive natural disasters, the extent of damage in certain areas may also warrant re-determining AACs earlier than scheduled.

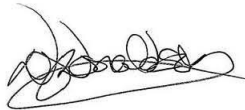
In order to ensure that AAC determinations align with government objectives to modernize land-use planning and sustainably manage B.C.'s ecosystems, rivers, lakes, watersheds, forests and old growth forests, the Timber Supply Review process should incorporate the best available information on climate change and the cumulative effects of multiple activities on the land base. Management options that align with established climate change strategies, adaptation and mitigation practices should be explored. Where the cumulative effects of timber harvesting and other land based activities indicate a risk to natural resource values, the process should identify those risks for consideration in land-use planning.

Diane Nicholls, Chief Forester and Assistant Deputy Minister

This government recognises that the forest sector is of critical importance to BC. The needs of rural communities and forest based industries are evolving in response to a number of the factors mentioned above. To support BC's forest-dependent communities, I ask that your AAC determinations consider the environmental, social and economic needs of local communities as expressed by the public during Timber Supply Review processes, including strategies that contribute to community economic stability, and the jobs that the forest sector creates in communities, where these are consistent with the government's broader objectives. I also ask that when faced with necessary reductions in AAC's, that those reductions be no larger than necessary to avoid significant longer term impacts.

Thank you Diane, for your continued service and considerable efforts in these regards.

Sincerely,

A handwritten signature in black ink, appearing to read 'Doug Donaldson', with a horizontal line underneath.

Doug Donaldson
Minister

Appendix 4: Information sources used in the AAC determination

The information sources considered in determining the AAC for TFL 53 include the following:

Legislation

Province of British Columbia. 2003. *Forestry Revitalization Act*. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03017_01. Current to March 30, 2022.

Province of British Columbia. 2004. Cut Control Regulation. Victoria, BC. http://www.bclaws.ca/Recon/document/ID/freeside/17_578_2004. Current to April 5, 2022.

Province of British Columbia. 2004. *Forest Act*. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96157_00. Current to March 30, 2022.

Province of British Columbia. 2004. *Forest and Range Practices Act*. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/02069_01 Current to March 30, 2022.

Province of British Columbia. 2004. Forest Planning and Practices Regulation. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/14_2004. Current to April 5, 2022.

Province of British Columbia. 2004. Government Actions Regulation. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/582_2004. Current to April 5, 2022.

Province of British Columbia. RSBC 1996. *Heritage Conservation Act*. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96187_01. Current to March 30, 2022.

Province of British Columbia. RSBC 1996. *Land Act*. Victoria, BC. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96245_01. Current to March 30, 2022.

Province of British Columbia. RSBC 1996. *Ministry of Forests and Range Act*. Section 4 – Purposes and functions of Ministry. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96300_01#section4. Current to March 30, 2022.

TFL holder Plans and Timber Supply Review Documents

AAC Determination Binder for TFL 53 - including input received from First Nations through the consultation process and comprehensive discussions with Ministry staff, including the AAC determination meeting held in online on November 4, 2021.

Dunkley Lumber Ltd. 2019. Tree Farm Licence 53 Management Plan No. 5. Referral and Public Review Strategy.

Dunkley Lumber Ltd. 2020. Tree Farm Licence 53 Management Plan No. 5. Information Package. Prepared with technical assistance from Industrial Forestry Service Ltd.

Dunkley Lumber Ltd. 2020. Tree Farm Licence 53 Management Plan No. 5. Timber Supply Analysis Report. Prepared by Industrial Forestry Service Ltd.

Dunkley Lumber Ltd. 2020. Tree Farm Licence 53 Management Plan No. 5.

Dunkley Lumber Ltd. 2020. Tree Farm Licence 53 Management Plan No. 5. Timber Supply Analysis Report Addendum.

Dunkley Lumber Ltd. 2018. Tree Farm Licence #53 Naver FSP. Forest Stewardship Plan 2018 – 2023.

Land Use, Forest Practices and other Documents

Letter from the Minister of Forests, Lands, Natural Resource Operations and Rural Development to the chief forester stating the economic and social objectives of the Crown, BC Government October 30, 2017.

Ministry of Sustainable Resource Management. 2004. Order Establishing Provincial Non-Spatial Old Growth Objectives. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/policies-guides/old_growth_order_may18th_final.pdf

Ministry of Sustainable Resource Management. 2004. Order Establishing Provincial Non-Spatial Old Growth Objectives. Implementation Policy for the Order Establishing Provincial Non-Spatial Old Growth Objectives.

B.C. Ministry of Forests, Lands and Natural Resource Operations. Undated. Biogeoclimatic Ecosystem Classification Program. <https://www.for.gov.bc.ca/hre/becweb/program/climate%20change/index.html>

B.C. Ministry of Forests, Lands and Natural Resource Operations and Rural Development. 2017. Tree Farm Licence 53 Naver. <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-tenures/tree-farm-licence/licences/tfl-53-lic-04-september-01-2017.pdf>

B.C. Ministry of Forests, Lands and Natural Resource Operations and Rural Development. 2021. Provincial Timber Management Goals, Objectives & Targets - Management Unit Targets - TFL 53 Naver.

B.C. Ministry of Forests, Lands and Natural Resource Operations and Rural Development. 2018. Policy Regarding the Administration of Unharvested Volumes, Uncommitted Volumes and Unused BCTS Volumes. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-tenures/timber-tenure-bulletins-policies-procedure/policy_regarding_the_administration_of_unharvested_volumes_uncommitted_volumes_and_unused_bcts_volumes.pdf

B.C. Ministry of Forests. 2005. Provincial Logging & Waste Measurement Procedures Manual, as amended from time to time. [Provincial Logging Residue and Waste Measurements Procedure Manual - Province of British Columbia \(gov.bc.ca\)](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/forest-analysis-inventory/ground-sample-inventories/vri-audits/tfl53_vri_analysis.pdf)

Foord, V. 2021. TFL 53 Climate Change Analysis.

Forest Analysis Ltd. 2012. Documentation of Vegetation Resources Inventory Statistical Analysis for TFL 53. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/forest-analysis-inventory/ground-sample-inventories/vri-audits/tfl53_vri_analysis.pdf

Ministry of Forests, Lands, Natural Resource Operations and Rural Development. 2020. Chief Forester's Standards for Seed Use.

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use>

Province of BC. 1999. *Landscape Unit Planning Guide*.

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/policies-guides/lup_guide.pdf

First Nations

- Letter (via email) from Lheidli T'enneh Natural Resource Department to Ministry of Forests, Lands and Natural Resource Operations and Rural Development. March 30, 2020. Regarding review of Dunkley Lumber Ltd. TFL#53 Management Plan #5 and supporting timber supply analysis report.
- Letter (via email) from Jim W. Brown (FAIB) to Lheidli T'enneh. Response to March 30, 2020, letter.
- Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511, 2004 SCC 73.
- Ministry of Forests, Lands, Natural Resource Operations and Rural Development. 2021. First Nations Consultation Report for TFL 53 TSR 2019-2021. [https://nrm.sp.gov.bc.ca/sites/CRTS/CRTS/Consultation_Centre/Ongoing_Consultation/Omineca_Ongoing/2019 - 2021 TEN TFL 53 Timber Supply Review - Dunkley Lumber.xml](https://nrm.sp.gov.bc.ca/sites/CRTS/CRTS/Consultation_Centre/Ongoing_Consultation/Omineca_Ongoing/2019-2021_TEN_TFL_53_Timber_Supply_Review_-_Dunkley_Lumber.xml)
- Province of British Columbia. 2010. Updated Procedures for Meeting Legal Obligations when Consulting First Nations. <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations>
- Tsilhqot'in Nation v. British Columbia, 2014 SCC 44, [2014] 2 S.C.R.
- United Nations. 2007. United Nations Declaration on the Rights of Indigenous Peoples. <https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html>