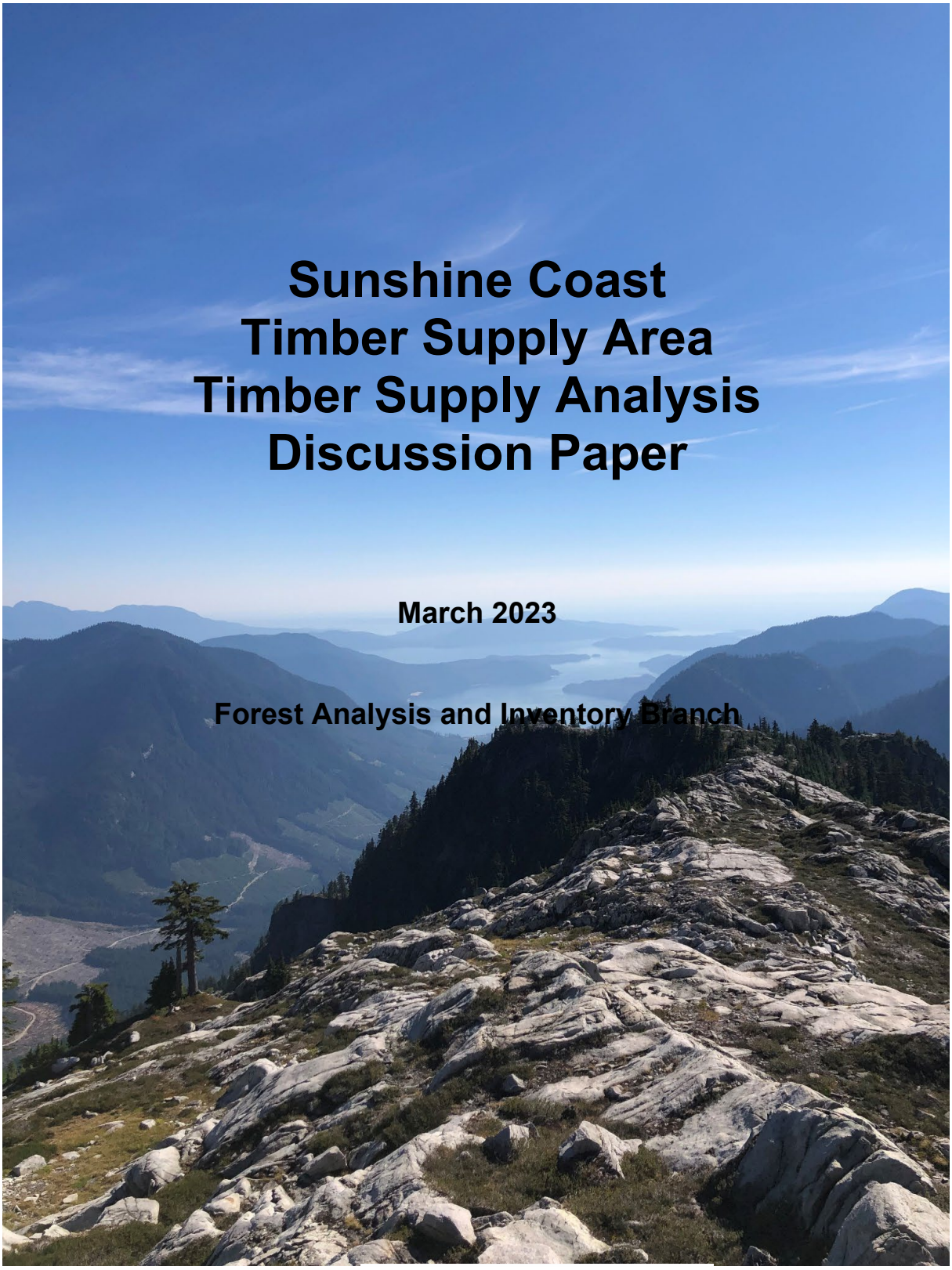

Sunshine Coast Timber Supply Area Timber Supply Analysis Discussion Paper

March 2023

Forest Analysis and Inventory Branch

BRITISH COLUMBIA | Ministry of Forests

Cover photograph of Rainy River Valley from Rainy Mountain
Courtesy of Leisha Myers

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Introduction

In accordance with Section 8 of the *Forest Act*, the chief forester must regularly review and set new allowable annual cuts (generally every 10 years) for all 37 timber supply areas[a] (TSAs) and 33 tree farm licences[b] (TFLs) in the Province of British Columbia (BC). The BC Ministry of Forests undertakes these reviews by examining the impacts of current legal requirements and demonstrated forest management practices on the timber supply[c], economy, environment and social conditions of the local area and Province.

The objectives of the timber supply review are to:

- examine relevant forest management practices, environmental, and social factors, and input received from First Nations, forest licensees and the public;
- set a new allowable annual cut[d] (AAC); and,
- identify information to be improved for future timber supply reviews.

This *Discussion Paper* summarizes the results of the timber supply analysis for the timber supply review of the Sunshine Coast TSA. Details on the data and assumptions used in the analysis were presented in a publicly available *Data Package*. Updates to the information used and technical details regarding the analysis are available on request from the Forest Analysis and Inventory Branch. The timber supply analysis should be viewed as a "work in progress". Prior to the chief forester's AAC determination for the TSA, further analysis may need to be completed and existing analysis reassessed because of input received over the review period for this *Discussion Paper*.

As specified in Section 8 of the *Forest Act*, timber supply reviews undertaken in support of AAC determinations are based on the current resource management objectives established by government in legislation and legal orders. For this timber supply review, forest management objectives are provided by:

- Provincial law, including: the *Forest and Range Practices Act* (FRPA), the Government Actions Regulation, and the *Land Act*.
- Fully implemented land use plans.
- Landscape Unit Orders and associated objectives.

[a] **Timber supply areas (TSAs)**
Timber supply areas are integrated resource management unit established in accordance with Section 7 of the Forest Act.

[b] **Tree farm licences (TFLs)**
Tree farm licences are tenures that grant exclusive rights to harvest timber and manage forests in a specific area; may include private land.

[c] **Timber supply**
Timber supply is the amount of timber available for harvesting over a specified period of time.

[d] **Allowable annual cut (AAC)**
Allowable annual cut is the maximum volume of timber available for harvesting each year from a specified area of land, usually expressed as cubic metres of wood.

In December 2021, a *Data Package* documenting the data and forest management assumptions to be used in this timber supply analysis was released for public review and to assist with ongoing First Nations engagement and consultation. This *Discussion Paper* was released for the same purpose by providing an overview of the timber supply review and highlighting the key findings of the timber supply analysis. Before setting a new AAC, the chief forester will review all relevant information, including the results of the timber supply analysis and input from government agencies, First Nations, the public, and forest licensees. Following this review, the chief forester's determination will be outlined in a publicly available *Rationale*. The actual AAC that is determined by the chief forester during this timber supply review may differ from the harvest projections presented in this *Discussion Paper* as the chief forester must consider a wide range of information, some of which is not quantifiable. Ultimately, the chief forester's AAC determination is an independent, professional judgment based on the legal requirements set out in Section 8(8) of the *Forest Act*.

Once the chief forester has determined a new AAC, the Minister of Forests will apportion the AAC to the various licence types and programs according to Section 10 of the *Forest Act*. Based on the minister's apportionment, the regional executive director will establish a disposition plan that identifies how the available timber volume is assigned to the existing forest licences and, where possible, to new opportunities.

Description of the Sunshine Coast TSA

The Sunshine Coast TSA is comprised of approximately 1.7 million hectares of land along the southwestern coast of British Columbia. It is located approximately one hundred kilometres north of the City of Vancouver, extending from Howe Sound in the south to the end of Bute Inlet in the north (Figure 1). The TSA is administered by the Sunshine Coast Natural Resource District from its office in Powell River. The TSA is bordered by the Fraser TSA to the south, the Soo TSA to the east, the Arrowsmith, North Island and Great Bear Rainforest South TSAs to the west, and Williams Lake TSA to the north. The Sunshine Coast Natural Resource District includes TFLs 39 and 43, as well as segments of the Pacific TSA adjacent to TFL 39.

The landscape is dominated by the Coast Mountains and several coastal fjords, most notably the Bute, Toba, and Jervis Inlets. The landscape ranges from nutrient rich, moist floodplains in the valley bottoms to alpine meadows at higher elevations. Approximately 25 percent of the land base of the TSA is productive forest land, of which approximately 43 percent is available for timber harvesting. About half of the forests on the timber harvesting land base[e] (THLB) are considered to have medium or good site productivity. Major tree species include Douglas-fir, western hemlock, and amabilis fir with lower proportions of western redcedar, spruce, pine, alder, and cottonwood. These forests have a long harvesting history and, as a result, there are rapidly maturing second-growth forests located on the lower elevation, more accessible, and higher productivity growing sites. Nearly 60 percent of the stands on the THLB are between 21 and 100 years of age.

[e]**Timber harvesting land base (THLB)**
The THLB is an estimate of the land where timber harvesting is considered both acceptable and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values and applicable technology. The THLB is derived from the data, forest management practices, and assumptions described in the data package. It is a theoretical, strategic-level estimate used for timber supply analysis and could include areas that may never be harvested or may exclude areas that will be harvested. The THLB is a subset of the CFMLB.

The biogeoclimatic ecosystem classification (BEC) system classifies land based on the vegetation communities that are supported by the area's climate. The broadest level of classification in this system is the BEC zone, of which there are six within the Sunshine Coast TSA: Coastal Western Hemlock, Mountain Hemlock, Engelmann Spruce-Subalpine Fir, Coastal Mountain-heather Alpine, and Interior Mountain-heather Alpine.

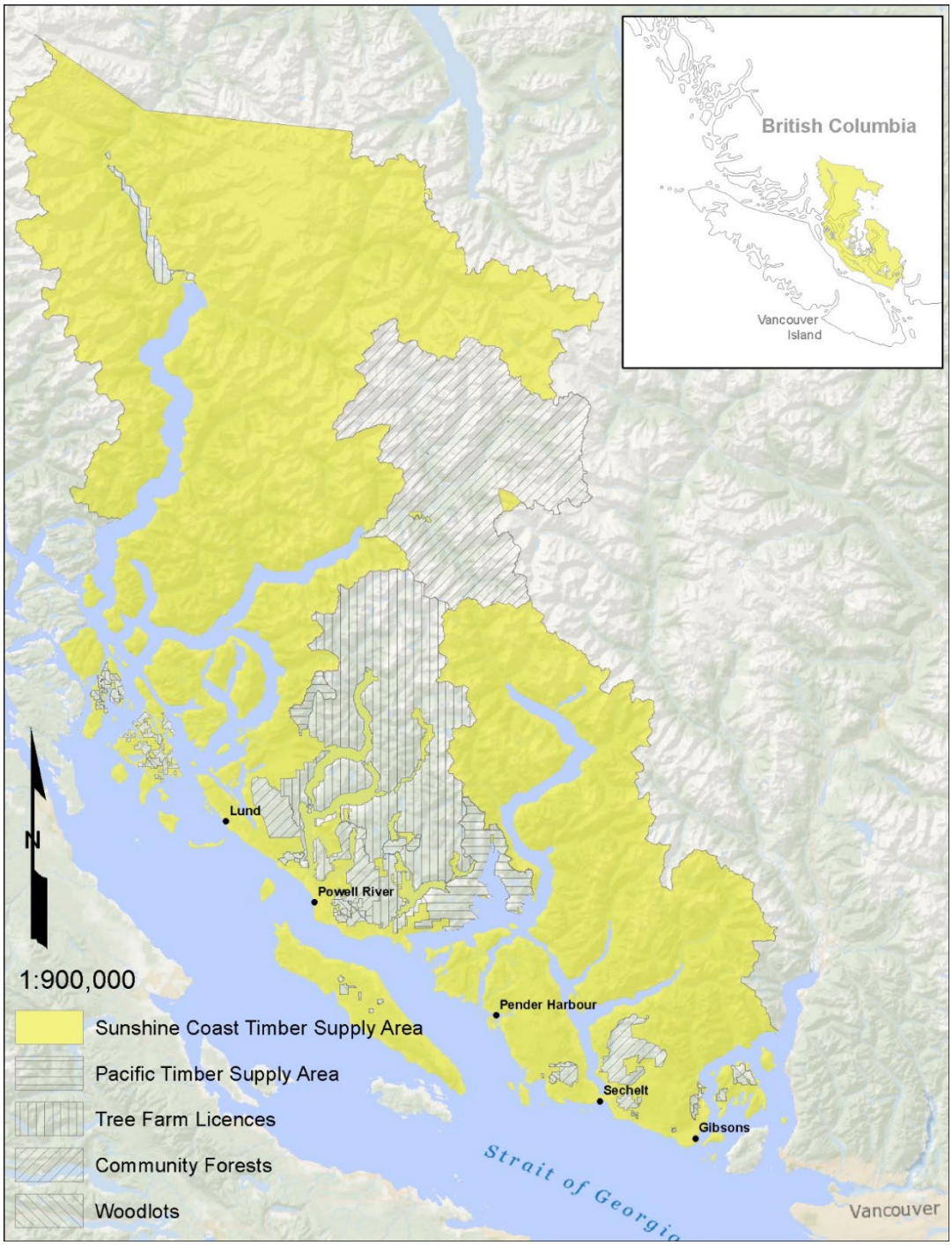

Figure 1. Overview map of the Sunshine Coast Timber Supply Area.

Environmental values

The varied topography and high annual precipitation experienced in the Sunshine Coast TSA encourages a diverse climate and forest ecology capable of supporting a wide variety of environmental values, such as fishery and wildlife habitat, and recreation and tourism.

Landscapes across the TSA range from rocky coastal shorelines, nutrient-rich floodplains in valley bottoms, alpine meadows at higher elevations, to rugged ice-capped mountains. Generally, lower to mid-elevation stands are characterized by the Coastal Western Hemlock (CWH) BEC zone, transitioning to Mountain Hemlock (MH) in the sub-alpine, and finally the Coastal Mountain-heather Alpine (CMA) zone. Most forested stands are within natural disturbance type (NDT) 1 or 2 that characterize ecosystems with rare or infrequent stand initiating events such as fires, wind, and insects that result in primarily uneven-aged stands.

These diverse forests provide critical habitat to a plethora of wildlife. Large mammals include grizzly and black bear, black-tailed deer, Roosevelt elk, mountain goat, cougar, and wolf, as well as isolated populations of moose. Small mammals are diverse and abundant. The nutrient-rich, protected waters of the various estuaries in the TSA provide shelter and food for many waterfowl species, from ducks, Canada geese and gulls to eagles and ospreys. Large wintering congregations of harlequin duck, bald eagle, trumpeter swan, and Barrow's golden eye duck also occur in coastal waters throughout the TSA. Several species of raptor are found within the TSA, including pygmy owl, saw-whet owl, barred owl, western screech owl, Cooper's hawk, red-tailed hawk, sharp-shinned hawk, merlin, and kestrel, as well as golden eagle in remote valleys. The Sunshine Coast TSA is also home to several identified species at risk such as the Marbled Murrelet, Northern Goshawk (*laingi* subspecies), two Vananda Creek stickleback species, coastal tailed frog, and great blue heron.

Protection and management of environmental values are addressed under provincial and federal legislation. The *Forest and Range Practices Act* (FRPA) is the primary provincial legislation regulating forestry practices. A regulation under this *Act*, the Forest Planning and Practices Regulation (FPPR), identifies objectives set by government for environmental values including fish, wildlife, biodiversity, soils, and water that are addressed within forest stewardship plans. Orders may also be established under the Government Actions Regulation or the Land Use Objectives Regulation for specific land uses such as ungulate winter ranges, wildlife habitat areas, critical habitat for fish, and old growth management areas.

There are 12 470 hectares of designated wildlife habitat area and 25 226 hectares of ungulate winter range in the TSA. The wildlife habitat areas were established to protect grizzly bear, marbled murrelet, northern goshawk, and Vananda Creek sticklebacks. Wildlife and their habitat are also partially protected by old growth management areas, recreation reserves, and riparian reserve zones. The ungulate winter ranges aim to protect the winter range of mountain goats in the TSA.

In addition to designated wildlife habitat, the Sunshine Coast TSA supports recreation and tourism values. There are 30 115 hectares of provincial parks, protected areas and ecological reserves within the TSA including: Desolation Sound Marine Park, Tetrahedron Provincial Park, and Bishop River Provincial Park. These parks, as well as recreation sites and trails, provide opportunities for numerous outdoor activities such as hiking, camping, skiing, mountain biking, horseback riding, mountaineering, angling, hunting, canoeing, and kayaking.

First Nations

While 23 First Nations have asserted traditional territory within the Sunshine Coast TSA (Table 1), five First Nations currently have occupied communities within its boundaries.

Table 1. Indigenous Peoples whose territories include portions of the Sunshine Coast TSA

First Nation	Reserve land	Traditional territory
shíshálh First Nation	No (shíshálh First Nation Band Lands, fee simple)	Yes
Tla'amin First Nation	No (Tla'amin Lands, fee simple)	Yes
Xwémalhkwu (Homalco) First Nation	Yes	Yes
Klahoose First Nation	Yes	Yes
Squamish First Nation	Yes	Yes
We Wai Kai First Nation	No	Yes
Wei Wai Kum First Nation	No	Yes
Da'naxda'xw/Awaetlala First Nation	No	Yes
Xwisten (Bridge River) First Nation	No	Yes
Kwiakah First Nation	No	Yes
Kwakiutl First Nation	No	Yes
Esk'etemc First Nation	No	Yes
Snaw‘Naw‘As First Nation	No	Yes
Qualicum First Nation	No	Yes
Líl‘wat Nation	No	Yes
K’omoks First Nation	No	Yes
Qualicum First Nation	No	Yes
Xeni Gwet‘in First Nations Government	No	Yes
Musqueam First Nation	No	Yes
Tsleil-Waututh First Nation	No	Yes
Tit’q’et First Nation	No	Yes
Tsal’alh First Nation	No	Yes
Ulkatcho First Nation	No	Yes

Most First Nations in the Sunshine Coast TSA have, or have had, forest consultation and revenue sharing agreements. These agreements help formalize how government to government engagement will take place for different decision types and recognizes that licensee-led information sharing can be a beneficial form of engagement. Of critical importance is the fact that these agreements provide Indigenous communities with a portion of stumpage revenue based on a formula that accounts for the timber harvested from within their territories. Consequently, First Nations communities now receive direct economic benefits from forest operations that take place in their traditional territory.

Many First Nations also hold forest tenures within the Sunshine Coast TSA that were direct awarded through forest tenure opportunity agreements. In accordance with the *Forest Act*, First Nations may be awarded forest tenures without competition as part of an interim measures agreement, treaty related measures agreement, or economic measures agreement, which are met through forest tenure opportunity agreements. Forest tenure opportunity agreements include language acknowledging that the direct award of the tenure supports the reconciliation of Indigenous rights and title and assists First Nations in meeting the goals and objectives of the Transformative Change Accord.

One treaty agreement is in effect within the TSA: the Tla’amin Final Agreement, which came into effect on April 5, 2016.

Regional economy

According to BC Statistics, the population of the Sunshine Coast TSA in 2020 was 52,947 people. More than half of the population lives in the communities of Powell River, Sechelt, and Gibsons. Other smaller communities include Halfmoon Bay, Pender Harbor and Lund, as well as communities on Texada and Cortes islands.

A significant timber processing sector is located within the TSA, including pulp mills, paper mills, lumber mills, and shake and shingle mills (Table 2).

Table 2. Major timber processing facilities in the Sunshine Coast TSA

Mill number	Mill type	Company	Capacity (yearly)	Location of mill
399	Shake and Shingles	Goat Lake Group of Companies	38 400 Squares	Powell River
399	Lumber	Goat Lake Group of Companies	3 800 000 Board Feet	Powell River
18	Chips	Terminal Forest Products Ltd.	337 000 BDUs	Gibsons
24	Lumber	Suncoast Industries Inc.	19 200 000 Board Feet	Sechelt
63	Log Homes	West Coast Log and Timber Homes	Unknown	Gibsons
484	Pulp	Howe Sound Pulp & Paper Corporation	371 560 Tonnes	Port Mellon
937	Chips	Pacific Fibre	119 950 BDUs	Port Mellon
1034	Shake and Shingle	Pacific Chalet Ltd.	2 400 Squares	Powell River

Land use planning

From the 25 landscape units in the TSA, 18 have landscape unit plans that legally establish spatial old growth management areas, and/or set stand-level retention targets. The remaining five landscape units have identified non-legal old growth management areas and two landscape units use non-spatial targets for maintaining landscape level ecological diversity over time.

The shíshálh Nation Strategic Land Use Plan is a high-level strategic plan developed in 2007 that expresses the land use interests of the shíshálh Nation. The plan establishes several land use zones for cultural heritage resources and provides general direction on how development should or should not occur within these areas. The plan designates eight conservation areas that cover approximately 70 491 hectares, 14 cultural emphasis areas that cover 140 212 hectares, and two community forests, with the remaining land base designated as a stewardship area. The plan has not been legally established through provincial legislation; however, work is underway by the Province and shíshálh on a modernized land use plan within the asserted territory (also referred to as the swiya) of the shíshálh Nation. An analysis was conducted in this timber supply review to examine the timber supply impact of implementing some preliminary outcomes from the shíshálh Nation Strategic Land Use Plan.

Timber harvesting land base

The THLB is an estimate of the land where timber harvesting is considered both acceptable and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values, and applicable technology. The THLB is derived from forest management practices and assumptions supported by data described in the *Data Package*. It is a strategic-level estimate to support timber supply analysis.

The total area within the TSA boundary covers 1 906 100 hectares, of which 25 percent, or 440 792 hectares, were part of the Crown forest management land base[f] (CFMLB). The CFMLB represents the forested area of the TSA that the provincial government manages for a variety of natural resource values. This excludes non-forested areas (i.e., water, rock, and ice), non-productive areas (i.e., alpine areas with very low productivity), and non-commercial forest outlined in Table 3. Parks, wildlife habitat, ungulate winter range, old growth management areas, archaeological areas, recreation values, research installations and permanent sample plots, retention areas for riparian management and wildlife trees, and unstable and inoperable terrain collectively represent 383 899 hectares of the CFMLB. About 43 percent of the CFMLB, or 11 percent of the total TSA area, is identified as the current THLB of 190 668 hectares.

[f]**Crown forest management land base**
The forested area of the TSA that the provincial government manages for a variety of natural resource values. This excludes non-forested areas (e.g., water, rock, and ice), non-productive forest (e.g., alpine areas, areas with very low productivity). Parks and other NHLB forested areas contribute to the accounting for biodiversity targets and are therefore included in the CFMLB. In this analysis, the CFMLB also excludes area-based tenures such as woodlots, community forests, tree farm licences and First Nations woodland licences.

Table 3. Land base classification - Sunshine Coast TSA

Factor	Total area (ha)	Effective area (ha)	% of total TSA	% of CFMLB
Total area	**1 906 100**			
less:				
Pacific TSA	26 017	26 017		
TFLs	145 597	145 597		
Total Sunshine Coast TSA		1 734 487	100.0%	
Managed Licence	199 566	199 166	11.5%	
Non-Crown from F_OWN	792 730	449 801	25.9%	
Non-FMLB from VRI	1 221 444	635 280	36.6%	
Non-VRI FWA Water	401 618	753	0.0%	
No Species Information	1 111 100	2 507	0.1%	
Roads and Utilities	16 064	6 187	0.4%	
Total CFMLB		**440 792**	**25.4%**	**100.0%**
Less spatial:	within CFMLB			
Parks	30 119	30 119	1.7%	6.8%
WHA	11 446	11 446	0.7%	2.6%
UWR	25 227	24 656	1.4%	5.6%
OGMA	46 744	28 102	1.6%	6.4%
FN Arch Buffer	261	155	0.0%	0.0%
Recreation Sites and Trails	791	226	0.0%	0.1%
Permanent Sample Plots	195	187	0.0%	0.0%
Research Installations	231	221	0.0%	0.1%
Potentially Unstable Terrain V/ES1	83 489	54 744	3.2%	12.4%
Environmentally Sensitive Areas	28 706	7 160	0.4%	1.6%
Inoperable	156 690	58 057	3.3%	13.2%
Low Volume	22 031	11 198	0.6%	2.5%
Riparian Buffers	15 135	8 802	0.5%	2.0%
Existing Wildlife Tree Retention	4 119	2 859	0.2%	0.6%
Less aspatial:				
THLB Aspatial Factor <30%	1	1	0.0%	0.0%
Terrain IV + ES2 (30%)		4 253	0.2%	1.0%
Slope >60% outside TSM (>32.3%)		4 817	0.3%	1.1%
Future WTRA (4-15%) 200m away from NHLB		3 112	0.2%	0.7%
Effective THLB		**190 668**	**11.0%**	**43.3%**

Current age class distribution

Figure 2 shows the current age class distribution for the CFMLB separated by THLB and the non-harvesting land base (NHLB). The concentration of young stands in the THLB reflects the relatively long history of harvesting in the Sunshine Coast TSA and the large amount of NHLB in older age classes reflect non-timber management objectives identified across the land base.

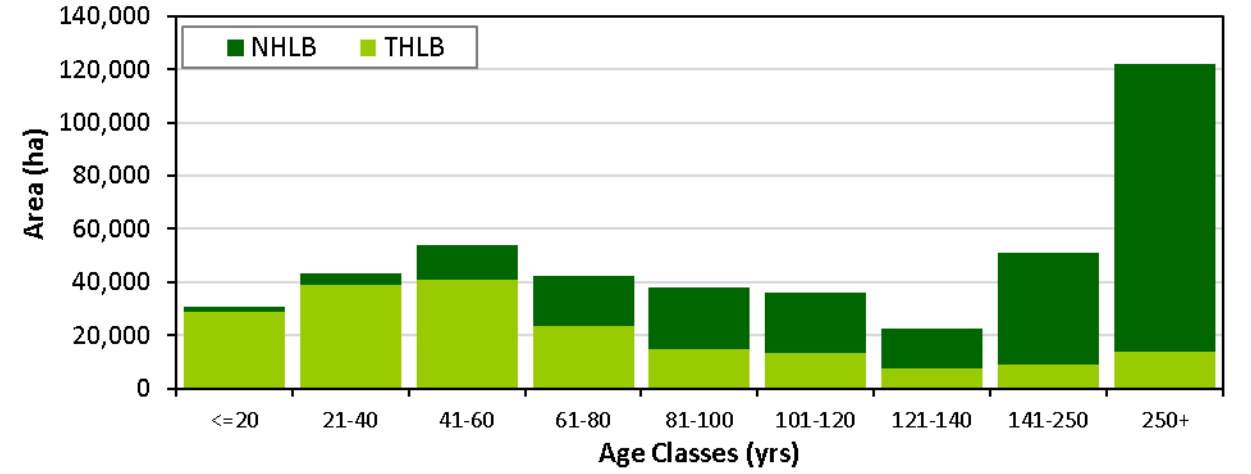

Figure 2. Current age class distribution for the Crown forest management land base (Established Scenario).

Current site index distribution

Site index is a measure of site productivity based on the top height (m) of a stand at breast-height age 50. Natural stand yields were prepared using site index estimates from the vegetation resources inventory (VRI), while managed stand yields were prepared using site index estimates from the provincial site productivity layer (PSPL). As expected, the PSPL reflects higher site index estimates for stands distributed across the entire land base than the site index estimates interpreted in the inventory (Figure 3).

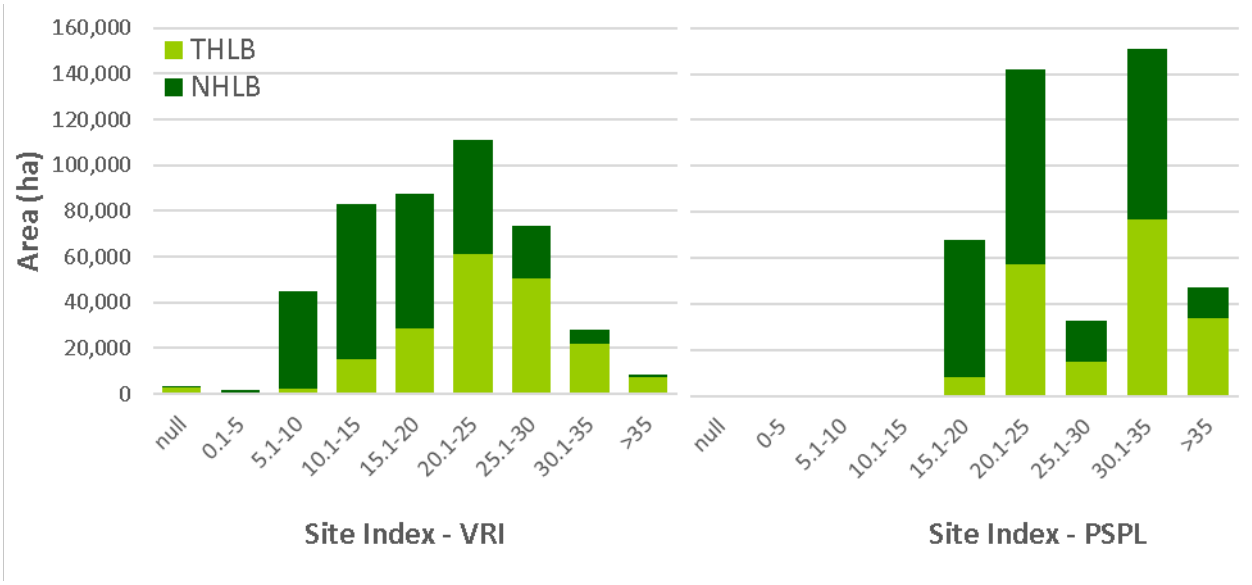

Figure 3. Current site index distribution from inventory (left) and the provincial site productivity layer (right) for the Crown forest management land base.

Leading tree species distribution

Stands within the THLB are dominated by leading tree species (Figure 4) comprised of western hemlock (Hw), balsam fir (Ba), Sitka spruce (Ss), and Douglas-fir (Fd). Western redcedar (Cw) and Yellow cypress (Yc) leading stands comprise less than eight percent of the area, while red alder (Dr) leading stands comprise less than five percent of the THLB area. The chart also shows that the leading species distribution for previously harvested, existing managed stands aligns closely with those for the unharvested, existing natural stands.

When total volume by species is considered instead of area by leading species, the relative proportion of Douglas-fir is slightly greater than that of the western hemlock, balsam fir, and Sitka spruce.

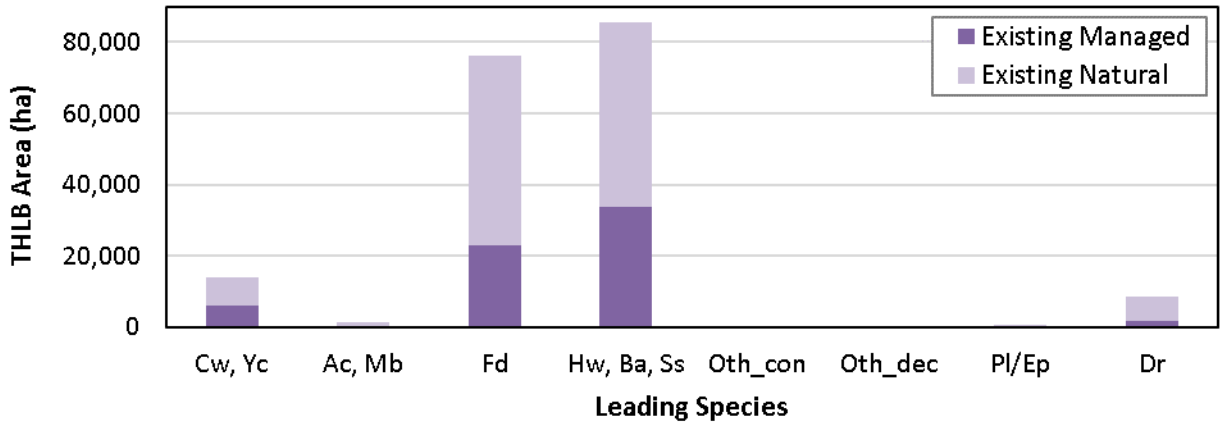

Figure 4. Leading tree species area on the timber harvesting land base by stand origin.

Changes since the last AAC determination

Several changes to forest management practices and to the TSA boundaries have occurred since the latest timber supply review was completed in 2012. These changes are reflected in the timber supply analysis:

- The transfer of lands that were previously part of TFL 10 to the Sunshine Coast TSA;
- The transfer of several islands from the Sunshine Coast TSA to the Arrowsmith TSA;
- The removal of two community forests and four woodlots from the TSA; and,
- The establishment of new measures to protect wildlife habitat.

Details on these changes are provided in the *Data Package* for this timber supply review.

History of the allowable annual cut

The Sunshine Coast TSA was established in 1986 with an AAC of 1 429 580 cubic metres (Table 4). The AAC was temporarily increased in 1989 by 16 000 cubic metres to facilitate harvesting of deciduous species in a Forest Licence that had been awarded for that purpose.

Effective January 1993, the AAC was reduced 24 percent to 1 100 000 cubic metres due primarily to a smaller THLB than estimated in the 1986 analysis, resulting from improved operability estimates and improved accounting for non-timber values, such as wildlife, habitat, visual aesthetics, fish habitat, and old growth retention.

In 1996, the chief forester determined the AAC to be 1 140 000 cubic metres, a 3.6 percent increase from the 1993 level. This AAC included a five percent reduction in the harvest level attributable to coniferous stands, and a 95 000 cubic metre partition attributed to red alder stands with a deciduous component greater than 50 percent. The AAC remained stable until 2007, when the chief forester increased the AAC by 54 949 cubic metres in 2007 to 1 197 949 cubic metres to account for land added to the TSA from TFL 10 by order under Section 3(2) of the *Forest Revitalization Act*. Since 2007, the AAC has remained relatively stable with a minor increase to the established 2013 cut as a small portion of TFL 39 was added and a Community Forest Agreement (CFA) area was removed from the TSA.

Table 4. History of the allowable annual cut – Sunshine Coast TSA

Year	Coniferous (m^3/year)	Deciduous (m^3/year)	Total (m^3/year)
1986			1 429 580
1989	1 429 580	16 000	1 445 580
1993			1 100 000
1996	1 045 000	95 000	1 140 000
2002	1 045 000	98 000	1 143 000
2007	1 099 000	98 000	1 197 949
2012	1 099 000	98 000	1 197 949
2013	1 106 800	98 000	1 204 808

Timber supply projection

To determine an AAC, the chief forester reviews many sources of information including a timber supply projection that models the development of the forest through time and its' response to harvesting while respecting the provincial government's many timber and non-timber objectives.

Base case

Timber supply analyses are carried out using three types of information: land base inventories, timber growth and yield, and management practices. By configuring this information in a computer model, a series of timber supply projections are produced to reflect different harvest flows and trade-offs between short- and long-term harvest levels. From a range of possible projections, a 'base case' harvest flow is developed that attempts to avoid both excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of the forest. The base case projection is designed to reflect legally established objectives and current management practices.

The base case projection is not an AAC recommendation. Rather, it is one of the many sources of information the chief forester considers when determining the AAC. This section highlights some of the important findings from the timber supply analysis, conducted using the PATCHWORKS™ forest estate model.

To support the chief forester in determining an AAC, this section summarizes harvest projections with an obvious focus on timber supply. However, it should also be clear that in the meantime every projection presented below first ensures that all non-timber objectives are achieved as described in the *Data Package*.

Two separate base case projections were developed in this analysis: 1) a scenario that reflects legally established forest management objectives, and 2) a scenario that reflects additional, non-legal, management practices currently being implemented. The following sections highlight key findings from the timber supply analysis as they relate to both the *'Established and Current Practice Scenarios*'.

Established scenario

The '*Established Scenario*' is intended to provide a baseline harvest flow that the chief forester can use as a reference to understand the timber supply dynamics given legally established forest management requirements and other assumptions. Like most timber supply reviews, the '*Established Scenario*' reflects a harvest flow that addresses all non-timber objectives, while maximizing the harvest level in the first period and over the long term and avoiding declines after the first period.

Current practice scenario

The '*Current Practice Scenario*' reflects additional management practices that are not legally established, but forest managers currently implement to address operational, economic, or First Nations values (Table 5). This harvest flow was also developed by addressing all non-timber objectives, while maximizing the first period and long term, with no deceases following the first period. Increasing the long term was not possible without reducing the growing stock.

Table 5. Differences between established and current practice scenarios

Factor	Established scenario	Current practice scenario
Strategic land use plan for the shíshálh Nation	No assumption	Exclude conservation areas from THLB
Age class 8 & 9 in shíshálh swiya	No assumption	Exclude from THLB
CDF in shíshálh swiya	No assumption	Exclude from THLB
Avoidance areas	No assumption	Exclude from THLB

The current THLB of 190 668 hectares described in Section 2.5 was derived under the assumptions supporting the '*Established Scenario*'. After excluding the land base components described in Table 5, the THLB for the '*Current Practice Scenario*' was reduced by approximately 16 percent to 159 996 hectares. For this modelling exercise, the excluded areas were simply reclassified as NHLB that continue to contribute towards meeting non-timber objectives.

Harvest flow

The harvest flow represents the volume harvested each year over the planning period. Within the confines of its inputs and objectives, the timber supply model can be configured to develop different harvest flow patterns. For this analysis, the established scenario and current practice scenario were selected as base cases for comparison to subsequent sensitivity analyses that explore the effect on timber supply of uncertainties with model inputs and assumptions. Both base case scenarios were configured to achieve a non-declining harvest level over the long term and to avoid large, short-term variation in harvest volumes.

While maintaining non-timber, spatial, and growing stock objectives applied in the model, both base case scenarios were configured to maximize the harvest level over the first period and then to develop the highest non-declining harvest levels thereafter. Over the first decade of the planning period (Figure 5), the established scenario achieved the harvest level of 1.557 million cubic metres per year. The current practice scenario, however, achieved an initial harvest level of 1.272 million cubic metres per year in the first decade.

The harvest flow in the established scenario immediately declines after the first period (i.e., after 10 years) to achieve a sustainable long-term harvest level of 1.463 million cubic metres per year. In comparison, the current practice scenario harvest level declines immediately after the first decade to a long-term sustained harvest flow of 1.224 million cubic metres per year. After the first period, the 15.8 percent difference between the two base case scenarios is maintained over the rest of the planning period (i.e., 29 decades). The difference in harvest level aligns with the relative change in the THLB between the two planning scenarios.

The 2011 timber supply review base case projection (red-dotted line) is included for comparison. Despite the smaller THLB resulting from land base changes, the harvest projections remain similar to the last TSR. This is due to differences in yield projections and site index information used in this TSR compared to 2011. Comparison of yield projections to ground sample data will be summarized for the chief forester determination.

The transition between the short- to long-term occurs by the end of the first decade when a long-term sustainable level is achieved. In both scenarios, the long-term harvest levels ensure a stable growing stock, while balancing the non-timber objectives with available supply of merchantable timber.

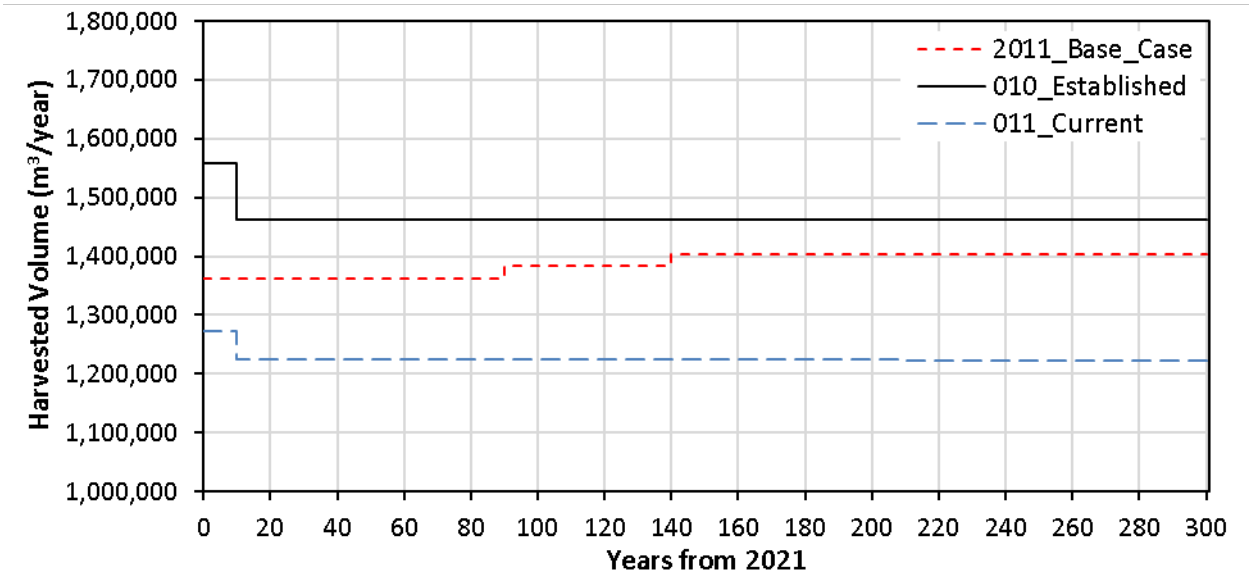

Figure 5. Base case projections – volume harvested by year.

Growing stock

Total growing stock represents the net volume of all trees on the THLB that meet the minimum size specified by the utilization standards (solid lines in Figure 6). With 16.1 percent less THLB (Section 3.1), the initial total growing stock for the current practice scenario is 20.6 percent less than the established scenario. The imbalance is explained by the relatively older high-volume stands being excluded from harvest under the current practice scenario.

In the established scenario, the initial total growing stock of 61 million cubic metres decreases then increases slightly over the first 60 years of the planning period, which reflects a highly constrained land base, relatively young forest, and infrequent stand-replacing events. After year 60, the total growing stock steadily decreases until it stabilizes at 52 million cubic metres over the final 100 years of the planning period.

With a maximized initial harvest level, the initial total growing stock of 48 million cubic metres in the current practice scenario decreases over the first 20 years of the planning period. The total growing stock then increases slightly over the next 50 years followed by a steady decline to the long-term stable level of 43 million cubic metres achieved over the last 100-years of the planning period.

The merchantable growing stock, or portion of the total growing stock in stands eligible for harvest (dashed lines in Figure 6), follows a typical trend for both scenarios. Initially, the merchantable growing stock declines and then it recovers before reaching stable levels over the last 100 years of the planning period when ultimately the rate of growth on the THLB offsets the rate of harvest.

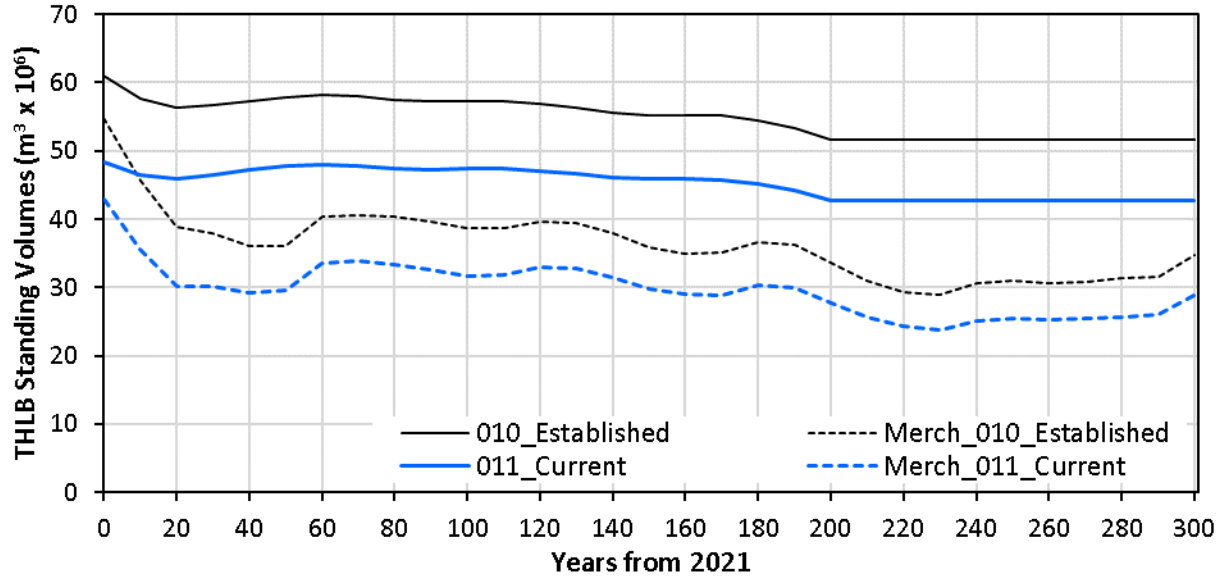

Figure 6. Base case total and merchantable growing stock on the timber harvesting land base by year.

Age class distribution

For both the established (Figure 7) and current practice (Figure 8) scenarios, changes in age class distribution across the CFMLB are relatively minor over the planning period. Notably, the area of stands 0 to 60 years increases over the planning period as older stands are harvested and transition to younger, faster-growing managed stands. The area of stands 81 to 140 years generally decreases across the planning period as they are harvested and converted to younger stands that are managed on a rotation that is generally shorter than 60 years. The area of stands greater than 140 years old is stable throughout the entire planning period, with minor decreases in stands greater than 250 that are mitigated with slight increases in stands aged 141 to 250 years.

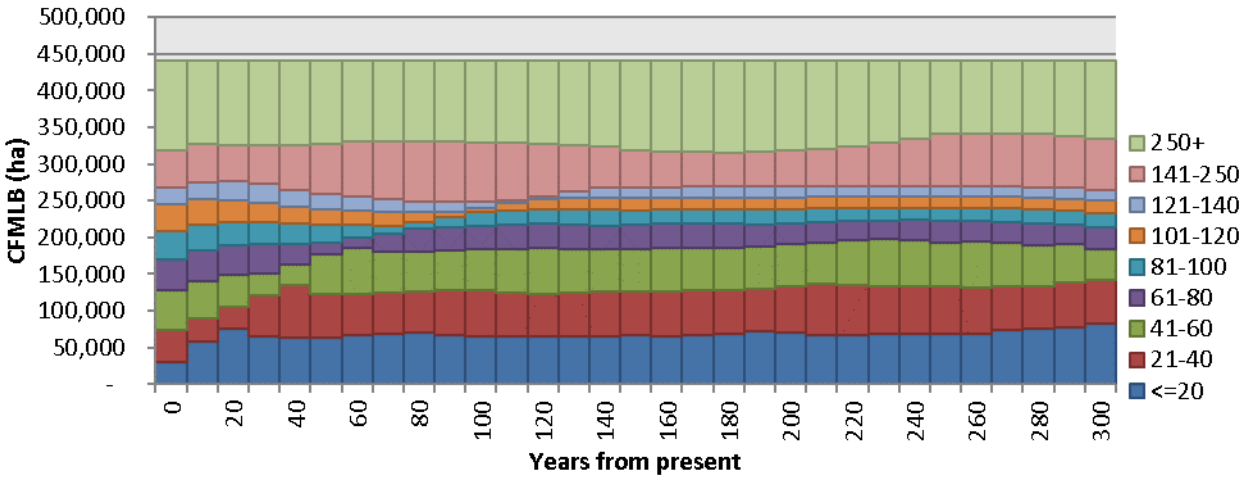

Figure 7. Established scenario case age class distribution on the crown forest management land base by year.

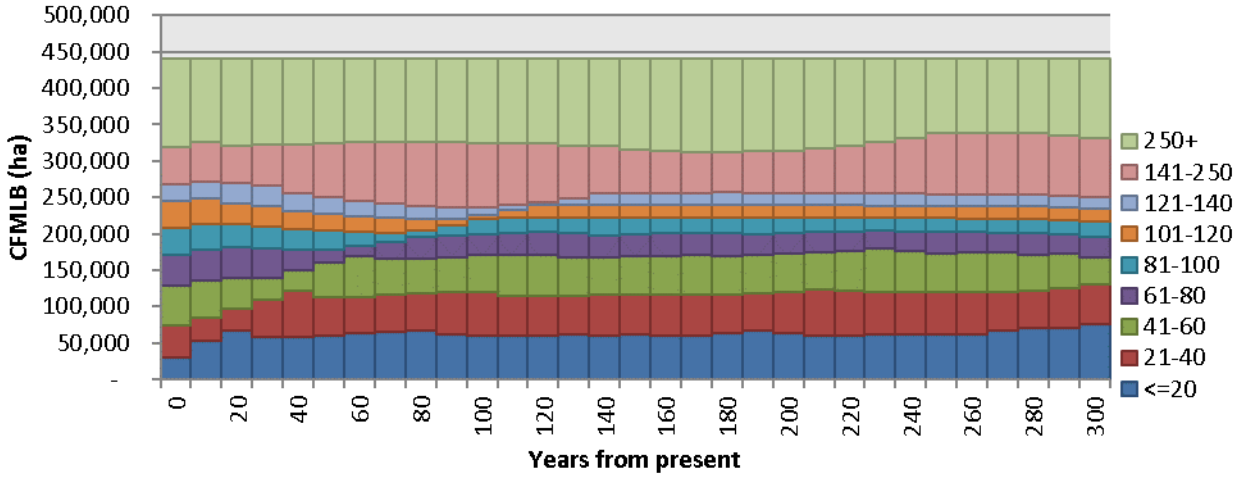

Figure 8 Current practice scenario case age class distribution on the crown forest management land base by year.

Harvest attributes

Volume harvested

Figure 9 and Figure 10 show the harvest volume by age class for the established and current practice scenarios, respectively. In both scenarios, the harvest shifts from existing, typically older, natural stands to younger, managed stands that are relatively more productive and able to achieve the minimum harvest criteria sooner.

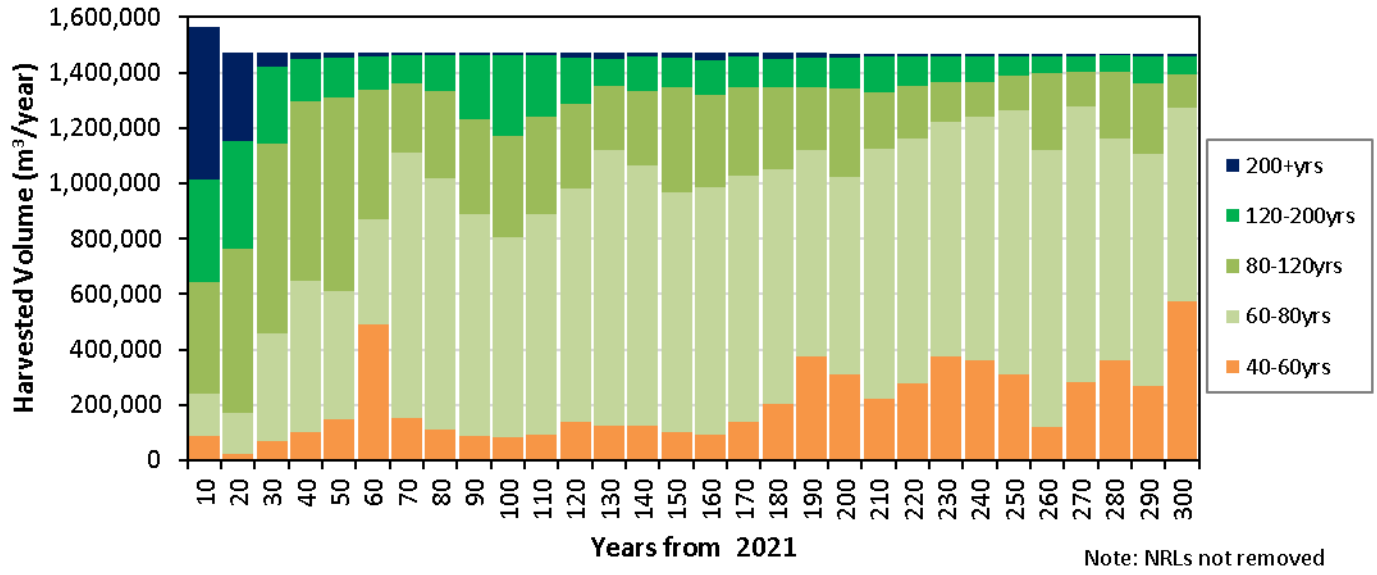

Figure 9. Established scenario base case harvested volume by age class and year.

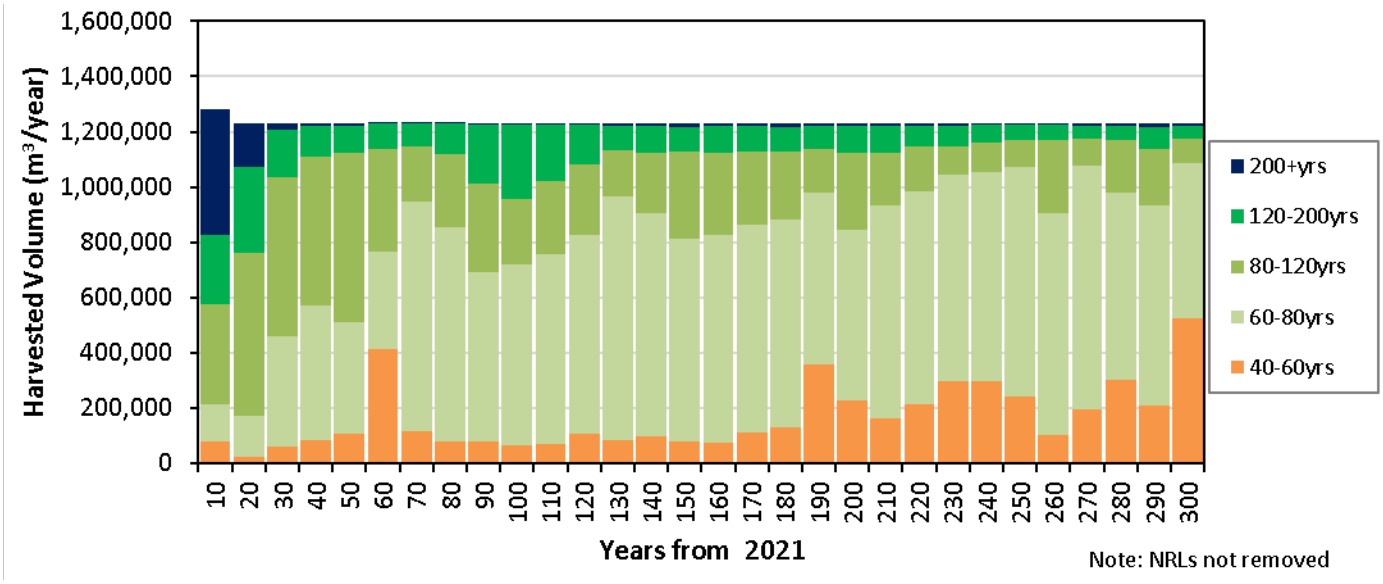

Figure 1. Current practice scenario base case harvested volume by age class and year.

Species harvested

As expected, the individual species composition of harvested volume changes over the planning period (Figure 11 and Figure 12). This shift in composition reflects the transition from predominately existing natural stands to future managed stands. By year 70, as most of the harvest comes from managed stands, the harvested species profile across the land base becomes relatively stable.

In both scenarios, the proportion of harvested Douglas-fir volume more than doubles in the first seven decades of the planning period. While Douglas-fir is the primary species planted in managed stands, western redcedar is commonly planted as a secondary species with substantial amounts of hemlock ingress. In particular, the decreasing trend shown in harvested cedar is not likely appropriate as the yield tables for managed stands were developed in the Tree and Stand Simulator (TASS-II). This version of TASS does not model complex stand dynamics and structures with multiple-species and age cohorts. Shade tolerant cedar tends to establish in the understory of post-harvest regenerating forests but still produces more volume than the TASS-II projections.

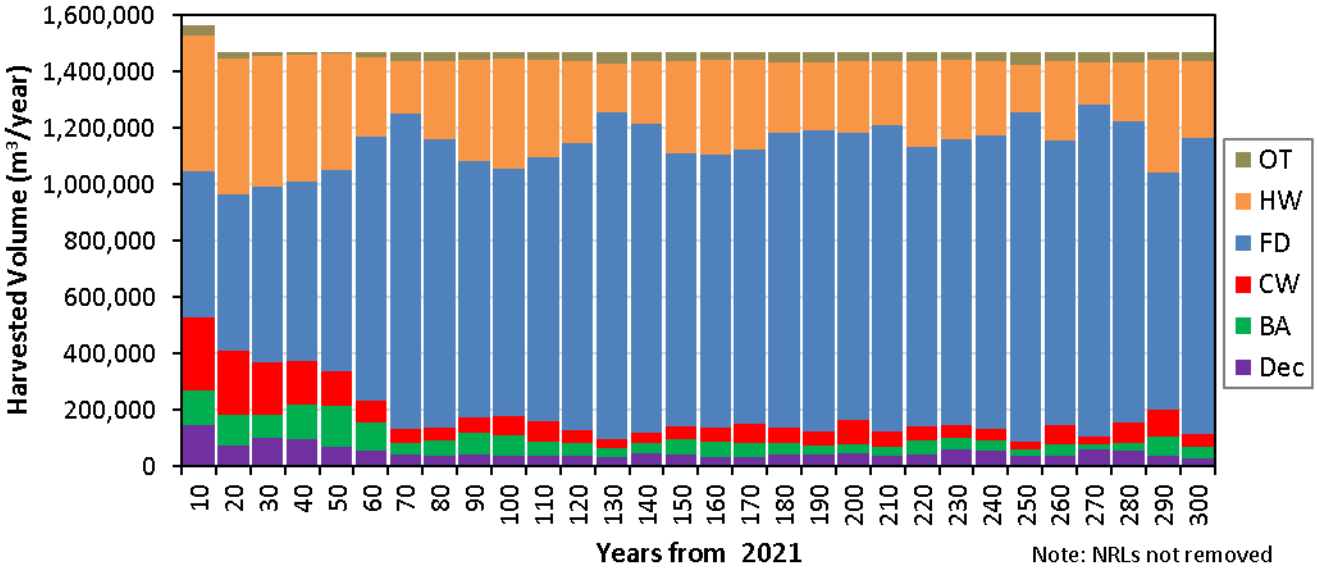

Figure 11. Established scenario harvested volume by individual tree species groups.

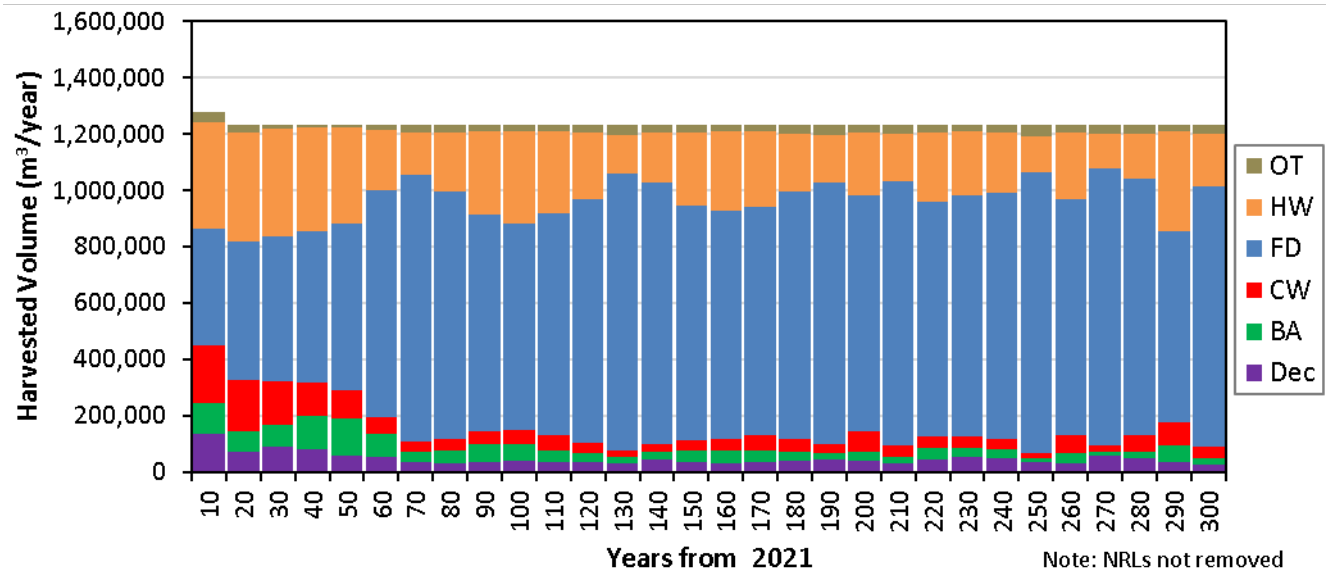

Figure 12. Current practice scenario harvested volume by individual tree species groups.

Mean age, volume, and area harvested

Figure 13 and Figure 14 present the changes over time in mean volume per hectare, total area harvested, and mean harvest age in each period for the established and current practice scenarios, respectively. In both scenarios, the area harvested declines as the amount of harvested volume coming from managed stands increases. This is because managed stands can produce more volume per hectare than natural stands and require less harvest area to produce the same volume.

In the established scenario, the mean harvest volume increases from 426 cubic metres per hectare to values that fluctuate between 515 and 640 cubic metres per hectare after the first decade of the planning period. Conversely, the area harvested per year declines sharply from over 3600 hectares per year to between 2300 and 2800 hectares per year beyond the first decade of the planning period. The mean harvest age averages 143 years over the first two periods and then declines to an average of 76 years over

the rest of the planning period.

In the current practice scenario, the mean harvest volume of 425 cubic metres per hectare in the first period immediately increases to a relatively stable mean harvest of 590 cubic metres per year across the rest of the planning period. The initial area harvest is just over 3000 hectares per year in the first period and then declines substantially to a relatively stable level of 2127 hectares per year. The mean harvest age averages 131 years over the first two periods and then declines to an average of 76 years afterwards.

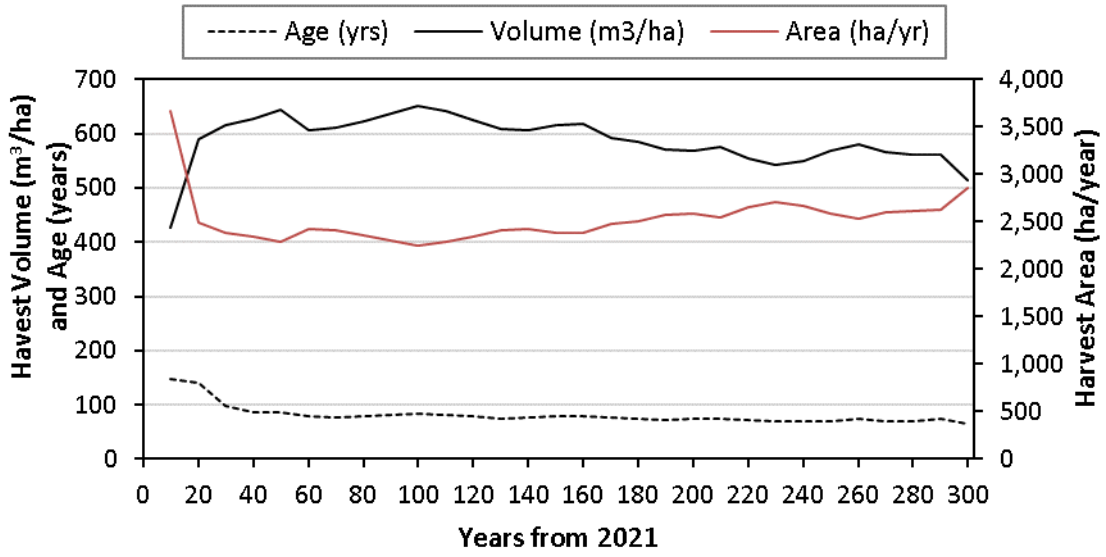

Figure 2 Established scenario base case volume, area, and average age harvested per year.

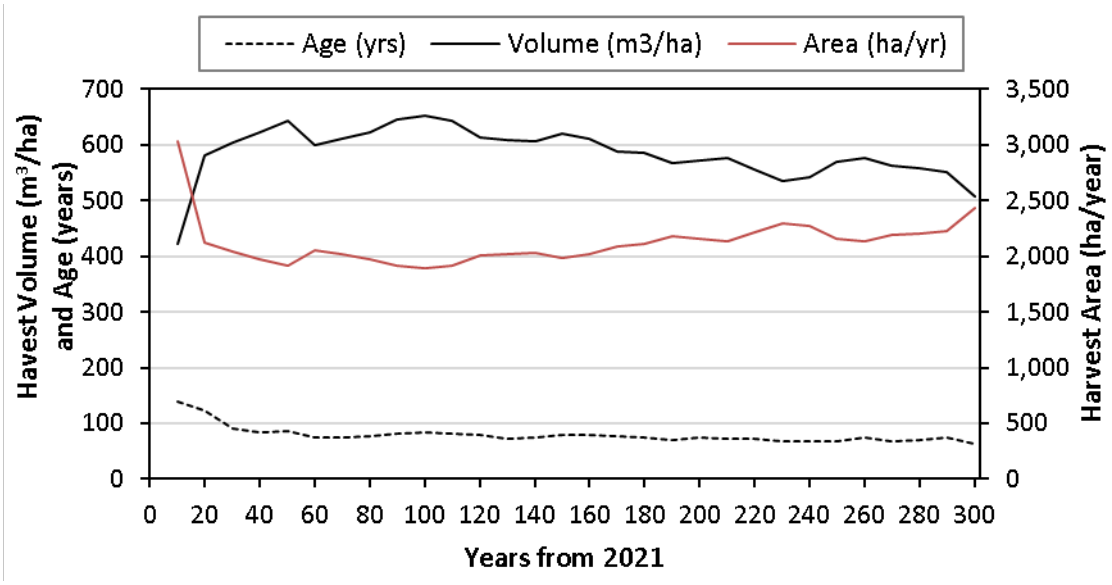

Figure 14. Current practice scenario base case volume, area, and average area harvested per year.

Alternative harvest flows

Figure 15 shows several alternative harvest flows prepared to inform and support the two base case (established and current practice) scenarios discussed in Section 3.1.

The long run sustained yield (LRSY) (calculated as the sum of the culmination of mean annual increment of future managed stands multiplied by the THLB area) is 1.576 million cubic metres per year and 1.318 million cubic metres per year for the established and current practice scenarios, respectively. This serves as general guidance for the upper limit for an average harvest level without considering forest cover requirements and key modelling parameters.

An even-flow harvest pattern was developed to achieve all non-timber objectives, while seeking the highest harvest level without increasing or decreasing across the entire planning period (i.e., flat line). This pattern is typically limited by the period with the lowest merchantable growing stock available, which occurred in the 23rd period when there is 20 years of available timber to harvest.

The maximum yield harvest flow addresses the same non-timber objectives and seeks to maintain the highest possible harvest level in each period. This approach results in lowest merchantable volume in the 23rd decade in both scenarios. With this harvest flow resulting in only 15 years of available timber to harvest in that period, there is slightly less planning flexibility than the even-flow.

The harvest flow that initially begins with the current AAC and then aims to achieve a non-declining yield (AACndy) reflects a reasonable balance between maintaining the current AAC and then achieving a sustainable long-term harvest level, while addressing the non-timber objectives.

Finally, a no harvest scenario (not shown) was run to explore how indicators for non-timber objectives respond when only natural disturbance is implemented, and all harvest targets are dropped. Across the planning period, the model 'disturbed' an average of 32 760 cubic metres per year across the CFMLB, while the total growing stock increases from 61 million cubic metres to a maximum of 136 million cubic metres at the end of the planning period.

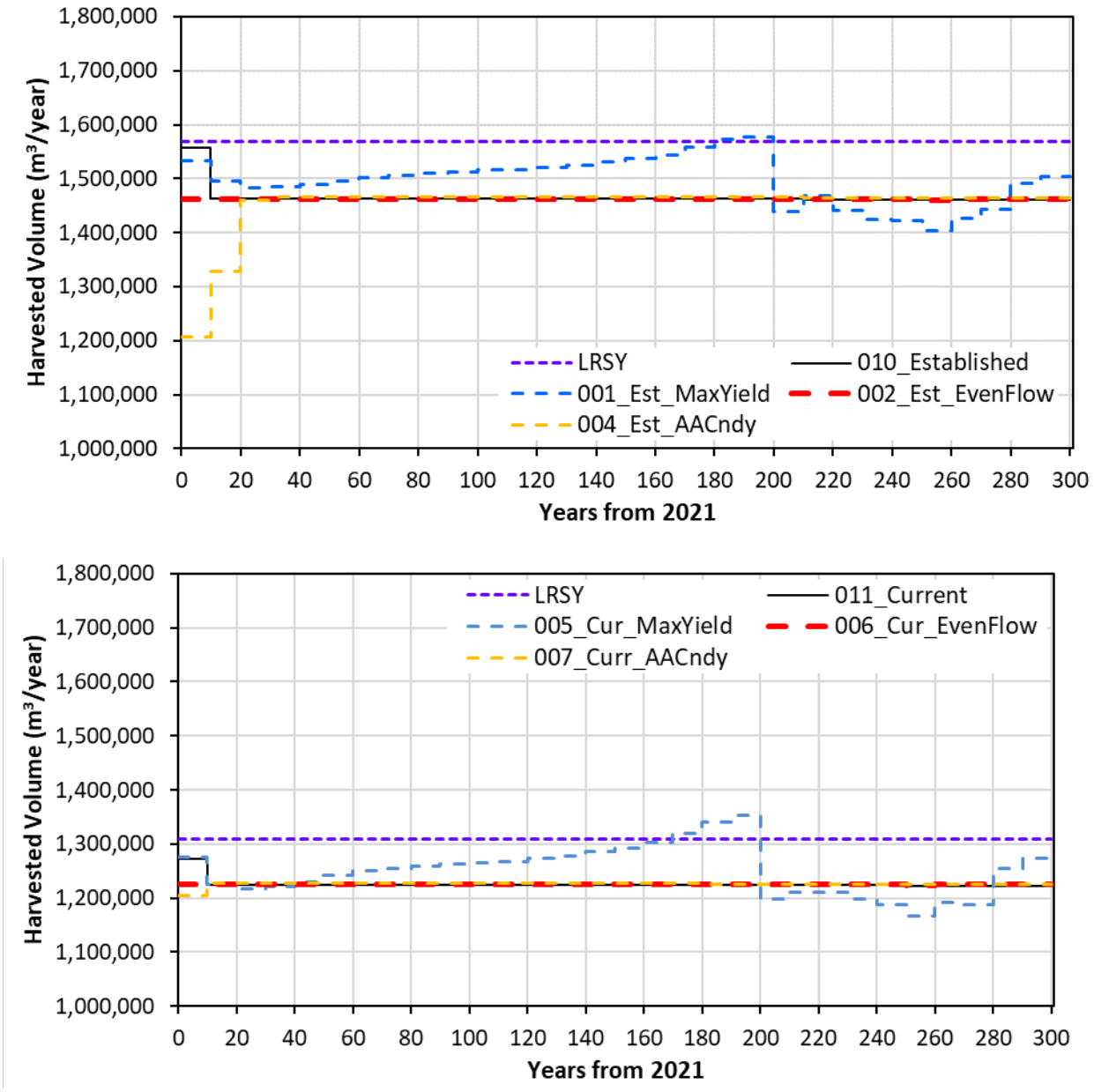

Figure 15. Comparing alternative harvest flows for established (top) and current practice (bottom) scenarios.

Sensitivity analyses

Datasets and assumptions applied to develop the base case scenarios attempted to reflect current land use objectives and forest management practices, but they are imperfect. Sensitivity analyses help to quantify and provide further understanding of the uncertainty associated with the specific data and assumptions. These analyses explore potential areas of uncertainty and assess the relative impact of different forest management activities to timber supply, as well as non-timber values.

Table 6 lists the sensitivity analyses that were completed for both the established and current practice scenarios. It summarizes changes in long-term THLB, as well as impacts to the short-, mid-, and long-term harvest levels. Table values showing changes greater than five percent relative to the respective base case scenario are highlighted dark red to indicate relative decreases and dark green to indicate relative increases. Lighter shades highlight similar changes between one and five percent. The following subsections briefly describe the results of the sensitivity analyses compared to each base case scenario.

Table 6. Sensitivity analyses results

Issue tested	Sensitivity level	Percent change from base case			
		Long-term THLB (ha)	Average harvest level (m^3/year)		
			year 1-20	year 21-50	year 51-300
Established Practice					
Base case	N/A	0.0%	0.0%	0.0%	0.0%
Timber harvesting land base	+10%	10.0%	8.1%	8.6%	8.6%
	-10%	-10.0%	-7.9%	-9.0%	-9.0%
	Exclude avoidance areas	-3.9%	-4.1%	-4.2%	-4.2%
	Increase low volume harvest criteria	-6.3%	-3.8%	-5.5%	-5.5%
	Exclude slope >70% (no harvest info)	-2.7%	-2.7%	-2.2%	-2.2%
Stand yields	+10% natural stand volumes	0.0%	2.8%	0.5%	0.4%
	-10% natural stand volumes	0.0%	-5.1%	-2.7%	-0.5%
	+10% managed stand volumes	0.0%	5.3%	8.5%	9.2%
	-10% managed stand volumes	0.0%	-7.6%	-9.7%	-9.7%
	Reduce harvest criteria from 95% to 90% CMAI	0.0%	1.0%	-0.1%	-0.1%
	Adjust MHA of problem yields from 40 to 85 years	0.0%	-2.4%	-0.4%	-0.4%
Biodiversity	Replace NSOGO with licensee OGMAs	-0.1%	0.1%	-0.1%	-0.1%
	No natural disturbances on NHLB	0.0%	0.4%	0.2%	0.2%
	Apply very early seral patches by LU	0.0%	0.0%	-2.2%	-0.1%
Wildlife	Exclude proposed WHAs for Goshawk	-0.2%	-0.6%	-0.3%	-0.3%
	Exclude draft DWR within shíshálh territory	-0.8%	-0.7%	-0.8%	-0.8%
	Manage MAMU habitat	0.0%	-4.0%	-2.4%	-2.4%
Visual objectives	Replace established with proposed VQOs	0.0%	-5.7%	-2.8%	-2.7%
Forest health	Apply CW dieback removals and regen	0.0%	0.0%	0.0%	0.0%
Operational	Limit harvest of stands over 120 years in age	0.0%	-0.6%	0.0%	0.0%
	Add total accumulated volume to initial level	0.0%	4.9%	-1.3%	-0.6%
	Add committed accumulated volume to initial level	0.0%	0.4%	0.0%	0.0%
Current Practice					
Base case	Compared to established base case	-16.1%	-16.8%	-15.8%	-15.8%
Timber harvesting land base	10%	10.0%	8.2%	8.7%	8.7%
	-10%	-10.0%	-8.3%	-9.0%	-9.0%
	Increase low volume harvest criteria	-6.0%	-3.5%	-5.1%	-5.1%
	Exclude slope>70% (no harvest info)	-2.2%	-2.3%	-1.7%	-1.7%
Stand yields	+10% natural stand volumes	0.0%	4.0%	0.4%	0.4%
	-10% natural stand volumes	0.0%	-5.9%	-3.9%	-0.3%
	+10% managed stand volumes	0.0%	4.4%	6.8%	9.6%
	-10% managed stand volumes	0.0%	-6.4%	-9.6%	-9.6%
	Reduce harvest criteria from 95% to 90% CMAI	0.0%	0.8%	-0.1%	-0.1%
	Adjust MHA of problem yields from 40 to 85 years	0.0%	-3.3%	-1.1%	-0.3%
Biodiversity	Replace NSOGO with licensee OGMAs	-0.1%	-0.1%	0.0%	0.0%
	No natural disturbances on NHLB	0.0%	0.2%	0.3%	0.3%
	Apply very early seral patches by LU	0.0%	0.5%	-3.0%	0.1%
Wildlife	Exclude proposed WHAs for Goshawk	-0.3%	-0.3%	-0.1%	-0.1%
	Exclude draft DWR within shíshálh territory	-0.6%	-0.5%	-0.5%	-0.4%
	Manage MAMU habitat	0.0%	-3.7%	-1.8%	-1.8%
Visual objectives	Replace established with proposed VQOs	0.0%	-6.2%	-3.3%	-2.7%
Forest health	Apply CW dieback removals and regen	0.0%	0.1%	0.1%	0.1%
Operational	Limit harvest of stand over 120 years in age	0.0%	-0.4%	0.0%	0.0%
	Add total accumulated volume to initial level	0.0%	4.4%	-4.4%	-2.4%
	Add committed accumulated volume to initial level	0.0%	0.4%	-0.1%	-0.1%

Modelling parameters

The modelling parameters described below examine the relative impacts associated with changes in specific assumptions used to configure the model while all other modelling assumptions remained identical.

Timber harvesting land base area

For these sensitivity analyses the area of the THLB was increased and decreased by 10 percent. In both the established and current practice scenarios, the harvest levels showed large changes over the entire planning period. Specifically, increasing the THLB by 10 percent increased the long-term harvest levels by over eight percent. Decreasing the THLB area by 10 percent reduced long-term harvest levels by nine percent.

Natural stand volumes

For these sensitivity analyses all natural stand volume projections were increased and decreased by 10 percent. This produces a corresponding change of +/- 9 percent in THLB standing volumes at the start of each projection. The relative differences between volume projections and starting volumes (10 *versus* 9 percent) reflect managed stand volumes in the THLB that were not adjusted.

Decreasing natural stand yields produced significant decreases over the short term in the established scenario and both short- and mid-terms in the current practice scenario. Here the forest estate model converted natural stands to higher productivity future managed stands two years sooner, on average. Meanwhile, increasing natural stand volumes did not result in a significant impact on average harvest levels for any term of the planning period. Instead, the forest estate model delayed the harvest of existing natural stands by up three years on average.

Managed stand volumes

For these sensitivity analyses all managed stand volume projections were increased and decreased by 10 percent. This produces a corresponding change of +/- one percent in THLB standing volumes at the start of each projection.

Decreasing managed stand volumes produced significant decreases of nearly 10 percent over the mid- and long-terms for both the established and current practice scenarios. Meanwhile, increasing managed stand volumes increased the mid-term harvest levels by six to seven percent and increased the long-term harvest level by nearly 10 percent.

These results may seem more intuitive that those in Section 4.1.2. Here, managed stands are not scheduled to be harvested until the mid- and long-terms, where the forest estate model seeks to maximize harvest levels after addressing all requirements for non-forest objectives.

Minimum harvestable criteria

In the base case, minimum harvestable criteria were set at 40 years for natural stands and required 95 percent of culmination mean annual increment (CMAI) and a minimum volume for managed stands (300, 400 and 250 cubic metres per hectare for conventional access, helicopter access, and deciduous, respectively).

One sensitivity analysis explores the effects of altering one the minimum harvestable criteria for stands from 95 to 90 percent of CMAI.

The results indicate little to no changes to the harvest level when explored in both base case scenarios, although the average volume at harvest was slightly lower (nearly one percent) and, consequently, the harvest area was slightly higher (nearly one percent). The wider range of merchantability provided by altering the CMAI minimum harvestable criteria did not meaningfully influence the forest estate model.

With the base case minimum harvest age set at 40 years for existing natural stands, approximately 1.2 percent of the short-term harvest came from younger, existing natural stands that were previously logged (2282 hectares). Incorrect stand attributes – particularly crown closure – led to relatively poor yields for these stands. The model then interpreted these areas to be good candidates for harvesting and rehabilitation to establish better managed stand yields. In addition, there was no requirement for younger natural stands to meet the CMAI or minimum volume criteria required for the managed stands. This allowed the potential for any natural stand over 40 years to be immediately available for harvest in the model, which may not align with current practice.

Using a different approach to identify when existing natural stands are available to harvest in the model, a new sensitivity analysis was developed by altering the minimum harvest criteria accordingly: a) applied 95 percent CMAI and minimum volume criteria to all natural stand yields and, b) revised the minimum harvest age previously logged natural stands with problem yields from 40 to 85 years. Results demonstrated decreased short-term harvest levels of 2.4 and 3.3 percent in the established and current practice scenarios, respectively. These reductions are overstated as the natural yields projected for these stands remain unacceptably low. The 95 percent of CMAI requirement affects the availability of younger natural stands, while the minimum volume requirement affects the availability of older, lower productivity stands.

Increase low volume harvest criteria

In the base case scenarios, low volume stands that are unable to achieve the minimum harvestable volume criteria were removed from the THLB. Conifer-leading stands were considered low volume if they could not achieve a target volume at 150 years of age. The minimum harvestable volume threshold was 300 cubic metres per hectare for areas requiring ground or cable harvest systems and 400 cubic metres per hectare for areas that can only be accessed through helicopter harvesting. This sensitivity analysis examines the impact of changing the target volume to 400 cubic metres per hectare for ground and cable harvesting and 600 cubic metres per hectare for helicopter harvesting.

This sensitivity showed the long-term THLB decreased by 6.3 percent in the established scenario and 6.0 percent in the current practice scenario. Natural disturbance events were thus modelled across a larger NHLB area.

Over the first 20 years, both scenarios exhibited harvest level reductions approaching four percent, while mid- and long-term harvest levels dropped to over five percent compared to both the established and current practice scenarios.

Natural disturbance in the non-harvestable land base[g] (NHLB)

In both base case scenarios, natural disturbances are simulated across the NHLB areas. To estimate their relative contribution, this sensitivity analysis examined the impact of permitting stands in the NHLB to age over time without applying additional natural disturbances. Although this sensitivity analysis increased the area of older stands in the NHLB that would now, in theory, contribute to non-timber objectives, the harvest levels were not significantly changed compared to both the established and current practice scenarios. This demonstrates that the current NHLB represents a large enough forested area to address non-timber objectives regardless of applying random wildfire events.

[g]**Non-harvestable land base (NHLB)**
The NHLB is that portion of the CFMLB that is not available or economic for timber harvesting (i.e., CFMLB that is not THLB).

Potential forest management changes

The potential forest management changes described below examine the relative impacts to timber supply associated with modifying either spatial or other modelling constraints that are undergoing legislative change during the time of the timber supply review. These are examined one at a time while all other modelling assumptions remained unchanged.

Proposed goshawk wildlife habitat areas

The Province has proposed seven new wildlife habitat areas for northern goshawk. Since these areas are not yet legally established, they were maintained in the THLB for both base case scenarios. This sensitivity analysis examines the timber supply impact of removing these areas from the THLB. Compared to the established and current practice base case scenarios, this sensitivity analysis showed the 0.2 and 0.3 percent reductions in THLB matched the marginal reductions in mid- and long-term harvest levels. Since this sensitivity was prepared, a Ministerial Order in October 2022 established six of these seven new northern goshawk areas.

Draft deer winter range areas

The Province has identified areas for draft black-tailed deer winter ranges. In the base case scenarios, these areas were included in the THLB. This sensitivity analysis accounts for these candidate areas by removing the candidate black-tailed deer winter ranges from the THLB within the shíshálh First Nation swiya. No additional forest cover requirements were modelled outside swiya because the draft UWR areas within the swiya (1452 hectares) already exceed the budget allocated for deer UWR from the latest Section 7 Notice (928 hectares).

Removing these draft deer winter range areas decreased the long-term THLB by 0.8 percent relative to the established scenario and 0.6 percent relative to the current practice scenario. Only minor changes were observed in the first 20 years. However, the long-term harvest levels were reduced by 0.8 percent and 0.6 percent lower, aligning with the decreases in the THLB.

Marbled murrelet habitat

This sensitivity analysis applied forest cover targets for marbled murrelet (MAMU) habitat that maintained at least minimum 80 percent of the CFMLB area to be older than 140 years, within the designated suitable habitat zone for each aggregated landscape unit. A total CFMLB area of 24 432 hectares is required to meet these targets. Since this sensitivity was prepared, a Ministerial Order for the recovery of Marbled Murrelet was approved in November 2021.

Over the long term, neither sensitivity analysis achieved the objective due to the high target levels and the modelled natural disturbance events that accumulated over time across the NHLB (averaging 69 hectares per year across these reporting units). This effectively locks out timber harvesting from the designated suitable habitat zones over the entire planning period which reduces the mid- and long-term harvest levels by 2.4 and 1.8 percent compared to the established and current practice scenarios, respectively.

Proposed changes to visual quality objectives

This sensitivity analysis replaced the existing visual landscape inventory and associated visual quality objectives with a new set of proposed visually sensitive areas. The maximum disturbance levels were calculated for each existing and proposed visual area given average slope and plan-to-perspective view factors.

Within the proposed visual areas, the CFMLB and THLB areas increased by 20 and 23 percent, respectively. As a result, the CFLMB area across all visual polygons with maximum disturbance limits increased by 13.5 percent. The proposed visual areas were successfully met, although some units were relatively constrained. The model responded to this change by reducing the initial harvest level by approximately six percent in both the established and current practice scenarios. Over the mid- and long- terms, the harvest level declines by roughly three percent compared to each base case scenario.

In the time since the data was prepared, new visual polygons have been approved, with some differences from the proposed visual areas used for this sensitivity analysis. These differences will be summarized for the chief forester to consider in the AAC determination.

Western redcedar dieback

Drier ecosystems within the Sunshine Coast TSA exhibit a significant amount of western redcedar mortality. This sensitivity analysis examines the impact on timber supply from this dieback trend. Based on the Forest Health Officer's recommendations, this analysis used the analysis unit stratification described in Section 6.4.1 of the *Data Package* to remove all western redcedar trees on existing stands for warm/warm sub-montane BEC variants and medium to poor productivity sites (refer to Table 35 of the *Data Package*). In addition, half of the redcedar was removed on existing stands for the remaining dry and zonal sites of the subzones referenced above. In the regenerated future stands, on these subzones, Cw was replaced by other acceptable species for the site.

The THLB area impacted by these changes amounted to 4.8 and 5.3 percent compared to the established and current practice scenarios, respectively. For both sensitivity scenarios, only minor changes were observed in the harvest level throughout the entire planning period.

Licensee OGMAs

This sensitivity analysis removed the NSOGO objectives from specific landscape units where draft old growth management areas (OGMA) provided by forest licensees. These draft OGMAs were removed from the THLB to meet the old-seral biodiversity objectives.

Compared to both the established and current practice scenarios, the removal of licensee draft OGMAs has a very minor impact on the long-term THLB, as well as harvest levels across the planning period. This is not surprising as the draft OGMAs aim to address the same objectives as the NSOGO.

Avoidance areas

This sensitivity analysis removed specific areas where harvesting is avoided for various reasons identified by First Nations and forest operators. Among others, these areas are already removed in the current practice scenario, so this sensitivity analysis was only compared to the established scenario.

The result from removing these avoidance areas was reducing THLB area and long-term harvest level by 3.9 and 4.2 percent, respectively. The harvest level change was slightly higher as these avoidance areas shifted to the NHLB and increased the area disturbed naturally in the forest estate model that was considered in meeting non-timber objectives.

Very early seral patch size targets

This sensitivity analysis implemented very early (up to 20 years) patch size targets for each landscape unit in alignment with operational practice (Table 7). Given that patch size targets are identical for both applicable natural disturbance types (NDT), there is no separation between NDTs.

Table 7. Very early patch size objectives

NDT	0-40 ha	41-80 ha	80-250 ha	>250 ha
1	30-40%	30-40%	20-40%	0%
2	30-40%	30-40%	20-40%	0%
5	N/A	N/A	N/A	N/A

Note: patches within 200 metres of each other are grouped.

Results for this sensitivity analysis showed minor changes to the short- and long-term harvest levels compared to the two base case scenarios. However, mid-term harvest level decreases of 2.2 and 3.0 percent were observed compared to the established and current practice scenarios, respectively. This suggests that the harvest flow is sensitive to changes in the harvest pattern and sequence.

Unstable terrain

Given the uncertainty with the age and source of terrain stability mapping information throughout the Sunshine Coast TSA, this sensitivity analysis removed stands from the THLB that were not previously logged, did not overlap with existing terrain mapping, and were identified with slopes greater than 70 percent.

Overall, these stands removed 2.7 and 2.2 percent of the THLB compared to the established and current practice scenarios, respectively. Harvest levels were reduced throughout the planning period, including reductions of 2.2 and 1.7 percent over the long term.

Incremental silviculture

Incremental silviculture treatments, such as juvenile spacing and fertilization, are activities beyond those required to meet basic silviculture obligations. A sensitivity analysis was planned to explore the timber supply contribution of incremental silviculture activities within existing managed stands. Approximately 2.2 percent of the THLB received some level of incremental silviculture. Nearly half of these stands were both juvenile spaced and fertilized – where any losses from juvenile spacing were likely recovered via fertilization.

While we can assume that there would be a positive gain from incremental silviculture activities, the treated area was too small to warrant changes to yield curves and model for undertaking this sensitivity analysis.

Harvest performance

This sensitivity analysis attempted to approximate the harvest performance over the past decade where 34 percent of harvest came from older, and presumably natural, forests. Accordingly, the model was configured with a new objective to maintain up to 34 percent of the harvest from stands greater than 120 years in age.

The results for this sensitivity analysis showed only a small change to the short-term harvest level compared to the base case scenarios.

Accumulated volume

Records show that the current total of accumulated volume recorded since 2013 is 1 745 846 cubic metres (669 353 cubic metres conifer and 1 076 493 cubic metres deciduous). This represents 0.6 years and 11 years of harvest under the current AAC and partitions for conifer and deciduous, respectively. The portion of this accumulated volume that has been committed to various tenures and licensees amounts to 117 812 cubic metres.

Two sensitivity analyses examined the timber supply impact from assuming the committed and total accumulated volumes will be harvested concurrently with the base case projection over the first period of the harvest flow, according to the conifer and deciduous split described above. Compared to the established base case scenario, the committed accumulated volume had no significant impact on the harvest flow, while applying the total accumulated volume resulted in significant harvest flow reductions over the short- and mid-term and very little impact over the long term. Similar results were observed with the current practice scenario except the long-term harvest level had a greater reduction of 2.4 percent. This unusual impact was due to the additional harvest pressure in the short term combined with the harvest flow configuration for a non-declining yield after the initial period. The model was not permitted to harvest the accumulating and higher growing stock beyond the 12th decade.

Conclusion

Both base case projections were configured to develop the highest non-declining harvest level, while seeking to maximize the harvest level in the first period. When applying only legally established objectives, the established scenario achieved an initial annual harvest level of 1.557 million cubic metres and then dropped 6.5 percent to a stable rate of 1.463 million cubic metres over the rest of the 300-year planning period. In contrast, the current practice scenario that implements current practices described by forest operators and First Nations to address operational, economic, and cultural requirements, achieved an initial annual harvest level of 1.273 million cubic metres and then dropped 4.0 percent to a stable level of 1.223 million cubic metres over the rest of the planning period.

While the timber supply analysis summarized above is a significant source of information provided to the chief forester for consideration, the chief forester's AAC determination is not a calculation solely based on this strategic level analysis. The AAC determination of the chief forester is an independent judgment based on professional experience and consideration of the broad range of social, economic, and environmental factors required under Section 8 of the *Forest Act* in addition to the timber supply analysis.

Acronyms

AAC – Allowable Annual Cut
BC – British Columbia
BEC – Biogeoclimatic Ecosystem Classification
CFA – Community Forest Agreement
CDF – Coastal Douglas-fir
CFMLB – Crown Forest Management Land Base
CMA – Coastal Mountain Alpine
CMAI – Cumulative Mean Annual Increment
CWH – Coastal Western Hemlock
EM – Existing Managed
EN – Existing Natural
FM – Future Managed
FPPR – Forest Planning and Practices Regulation
FRPA – Forest and Range Practices Act
FWA – Fresh Water Atlas
MAMU - Marbled Murrelet
MH – Mountain Hemlock
NDT – Natural Disturbance Type
NHLB – Non-Harvesting Land Base
NSOGO – Non-Spatial Old Growth Order
OGMA – Old Growth Management Area
TFL - Tree Farm Licence
THLB - Timber Harvesting Land Base
TSA - Timber Supply Area
UWR – Ungulate Winter Range
VQO – Visual Quality Objective
VRI – Vegetation Resource Inventory
WHA – Wildlife Habitat Area
WTRA – Wildlife Tree Retention Area

Your input is needed

Public input is a vital part of establishing the allowable annual cut. Feedback is welcomed on any aspect of this *Discussion Paper*, or any other issue related to the timber supply review for the Sunshine Coast TSA.

Ministry staff would be pleased to answer questions to help you prepare your response. Please send your comments to the Resource Manager at the address below.

Your comments will be accepted until May 1, 2023, for consideration with respect to the *Discussion Paper*.

You may identify yourself on the response if you wish. If you do, you are reminded that responses will be subject to the *Freedom of Information and Protection of Privacy Act* and may be made public. If the responses are made public, personal identifiers will be removed before the responses are released.

For more information or to send your comments, contact:

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For information on the Timber Supply Review visit the Timber Supply Review and Allowable Annual Cut web site at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/timber-supply-review-and-allowable-annual-cut

Further information regarding the technical details of the timber supply review process and timber supply analysis is available on request by contacting ForestAnalysisBranchOffice@gov.bc.ca