WESTERN FOREST PRODUCTS INC.

Tree Farm Licence 39

MANAGEMENT PLAN 9

April 2014

This Management Plan was prepared by and under the supervision of

REGISTERED PROFESSIONAL FORESTER
PROVINCE OF BRITISH COLUMBIA
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Shannon Janzen, R.P.F
Chief Forester

Indication of update since submission of TFL 39 Management Plan No. 9

On January 1, 2015 Block 4 was subdivided from TFL 39 and consolidated into TFL 6 as defined under Section 39(5)(a) of the *Forest Act*. Section 39 of the *Forest Act* allows the holder of a TFL to subdivide and consolidate their licence(s). In making the Section 39 subdivision-consolidation, the minister defined the Block 4 AAC at 202,000 cubic metres on January 1st, 2015 by instrument #175, thus reducing the TFL 39 AAC by 202,000 cubic metres to 1,683,980 cubic metres.

The Information Package and analysis information supporting the AAC Determination was completed prior to January 1, 2015. The area and timber supply contribution from Block 4 are included in the MP9.

The Block 4 area and timber supply was not considered in Determining the AAC for TFL 39

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1 Introduction

This is the first Management Plan (MP) prepared for Tree Farm Licence (TFL) 39 to meet the requirements of the *Tree Farm Licence Management Plan Regulation* (B.C. Reg. 280/2009). This regulation, enacted by the provincial government in November 2009 (with associated amendments to the *Forest Act*), includes content requirements, submission timing and public review requirements for TFL Management Plans. These content requirements (in regulation) replace the MP content requirements listed in the tree farm licence document and reduce the duplication of Forest Stewardship Plan matters (objectives and strategies). The content item of greatest interest is likely the timber supply analysis that will provide information to the Chief Forester of BC for the determination of the next Allowable Annual Cut (AAC) for TFL 39.

2 Description of TFL 39

TFL 39 is comprised of five separate supply blocks dispersed along the British Columbian coast (see Figure 1):

- Block 1 located on the Sunshine Coast near the City of Powell River;
- Block 2 located on Vancouver Island near the community of Sayward;
- Block 3 located on North Broughton Island within the Broughton Archipelago (north-east of Port McNeill);
- Block 4 located on Vancouver Island near the Town of Port McNeill; and
- Block 5 located on the mainland coast in the Phillips River watershed.

The total TFL area is 407,800 hectares and approximately 250,000 hectares is considered productive forest land. Of this, 170,796 hectares is estimated to be available for timber harvesting. The major tree species include western hemlock, western red cedar, balsam (amabilis fir), Douglas-fir and yellow cedar. The forests of TFL 39 predominantly lie within the Coastal Western Hemlock (CWH) biogeoclimatic zone. Annual precipitation levels reach 3,000 to 5,000 mm. At sea level the climate is characterized by short winters with intermittent wet snow storms; at the highest elevations a prolonged snow pack may persist. The summer period from July to September can be dry and warm.

The topography of TFL 39 is varied with mountainous, steep formations dominating the landscape on the mainland coast (Blocks 1 and 5) and more rolling gentle terrain on Vancouver and North Broughton Islands (Blocks 2, 3 and 4).

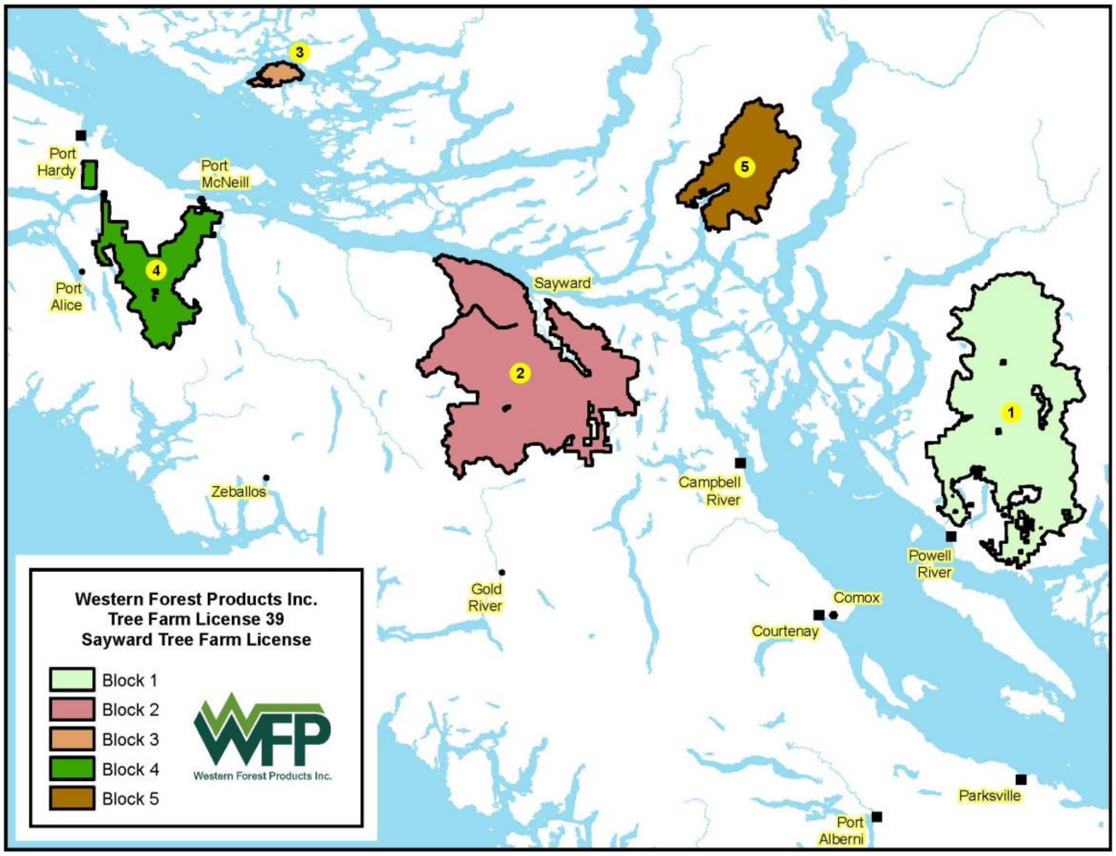

Figure 1 - TFL 39

Block 1, located on the Sunshine Coast near Powell River (see Figure 2), covers approximately 154,000 hectares of which roughly 69,000 hectares is considered productive forest. The timber harvesting land base (THLB) is estimated to be 48,033 hectares. The southern portion of the block is dominated by gentle terrain while the northern, inland portion is dominated by mountains and steep valleys. The climate is relatively dry with a significant portion falling within the dry maritime CWH biogeoclimatic subzone. There is a long history of logging in the area, with development dating back to the 1890's and the first pulp mill in the province was built nearby and began production of newsprint in 1912. The long history of logging, combined with a history of large forest fires (in late 1800's and during the 1920's and 1930's), results in significant areas of older second growth timber. The old forests are dominated by hemlock and balsam while the immature forests are mainly composed of Douglas-fir and hemlock.

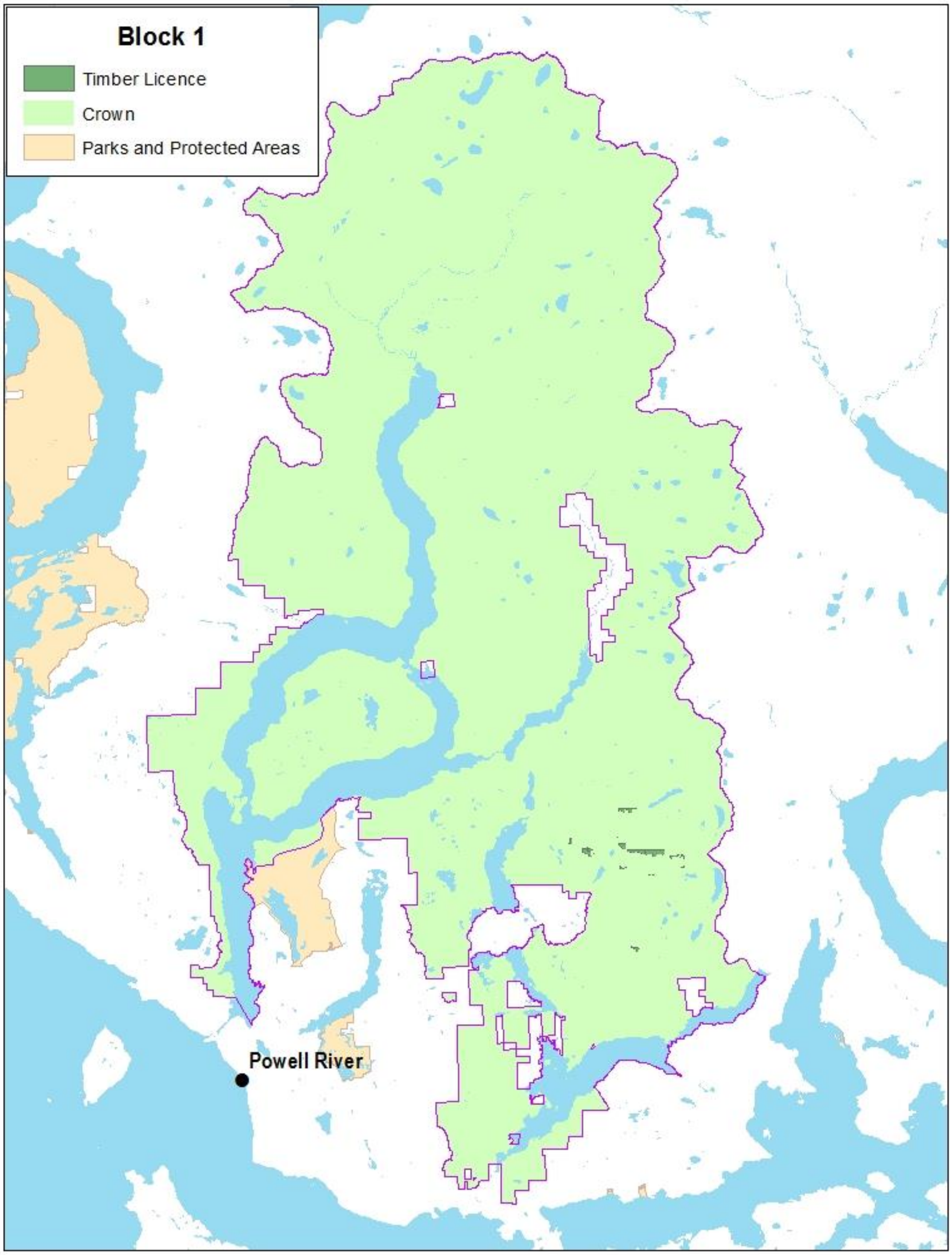

Figure 2 – Block 1

Block 2, located on Vancouver Island near the community of Sayward (see Figure 3), has a total area of a little more than 156,000 hectares. Nearly 128,000 hectares is considered productive forest, of which 91,666 hectares are estimated to be available for harvesting (i.e. THLB). The north-east half of the block is dominated by gentle coastal plains while the south-west half is dominated by mountainous terrain. Biogeoclimatic conditions range from the very dry maritime CWH subzone through very wet maritime CWH subzone to moist maritime Mountain Hemlock. Logging history dates back to the 1910's in the southern portion of the block. The forests are dominated by hemlock and balsam with a significant yellow cedar component at higher elevations and Douglas-fir in the low elevation immature forests. Management of this block is subject to the Vancouver Island Land Use Plan Higher Level Plan Order (VILUP HLP) effective December 1, 2000.

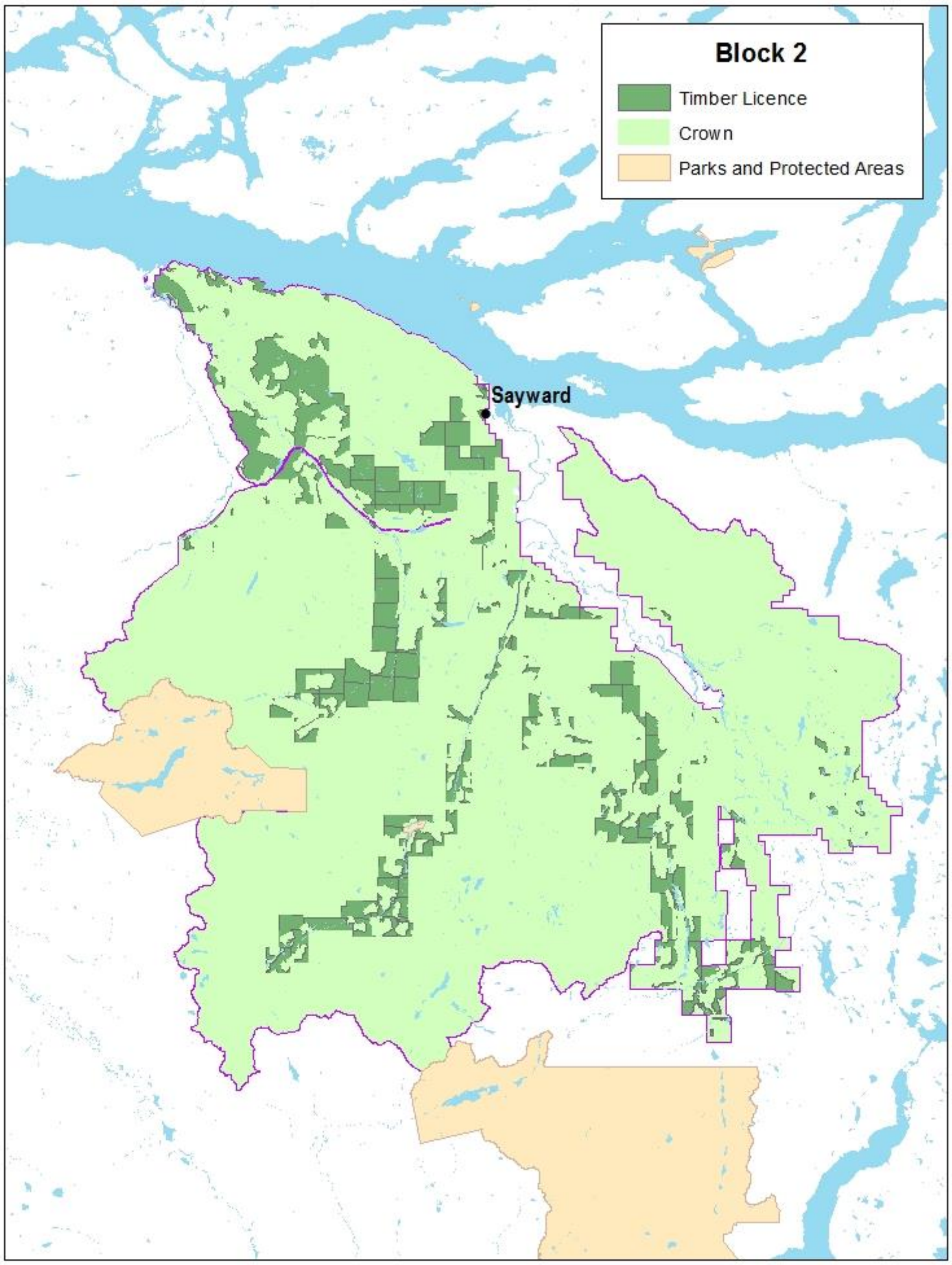

Figure 3 – Block 2

Block 3, on North Broughton Island (see Figure 4), has a total area of slightly less than 4,500 hectares, with approximately 4,100 hectares of that being productive forest. The THLB is estimated at 2,277 hectares. The terrain is rolling with no dominating features. The entire block is located in the very wet maritime CWH zone with hemlock and western red cedar being the dominant tree species. A significant portion of the block was harvested in the first half of the 20th century and then in the 1980's. Little old forest remains. This block is located within the area covered by the South Central Coast Order (SCCO).

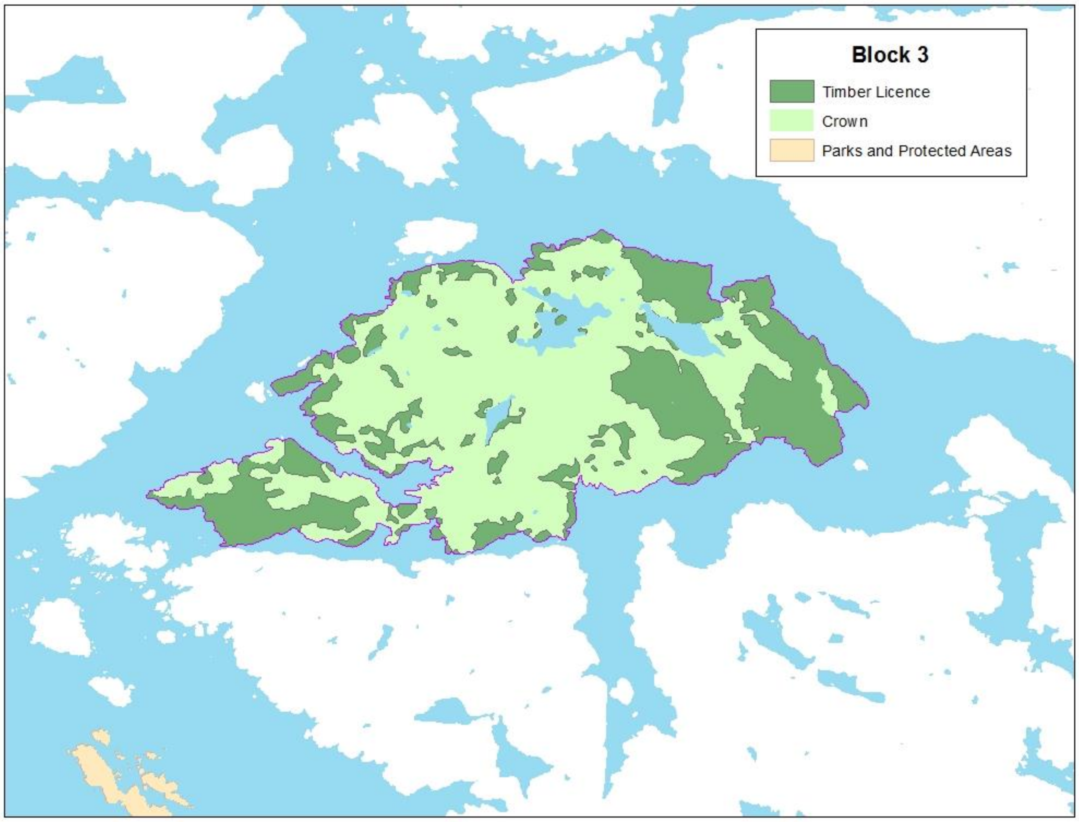

Figure 4 – Block 3

Block 4 is located on Vancouver Island between Port McNeill and Port Alice (see Figure 5). The total area is approximately 46,800 hectares, with 34,300 hectares of that being productive forest, and of that, 25,854 hectares are estimated to be available for harvesting (i.e. THLB). The northern portion of the block is gentle terrain whereas the southern portion is mostly mountainous. Nearly 90% of the land base is within the very wet maritime CWH zone with the rest being moist maritime Mountain Hemlock zone. Logging began in this area in the 1930's. The forests are dominated by hemlock with some balsam, western red cedar and Douglas-fir. Management of this block is subject to the VILUP HLP.

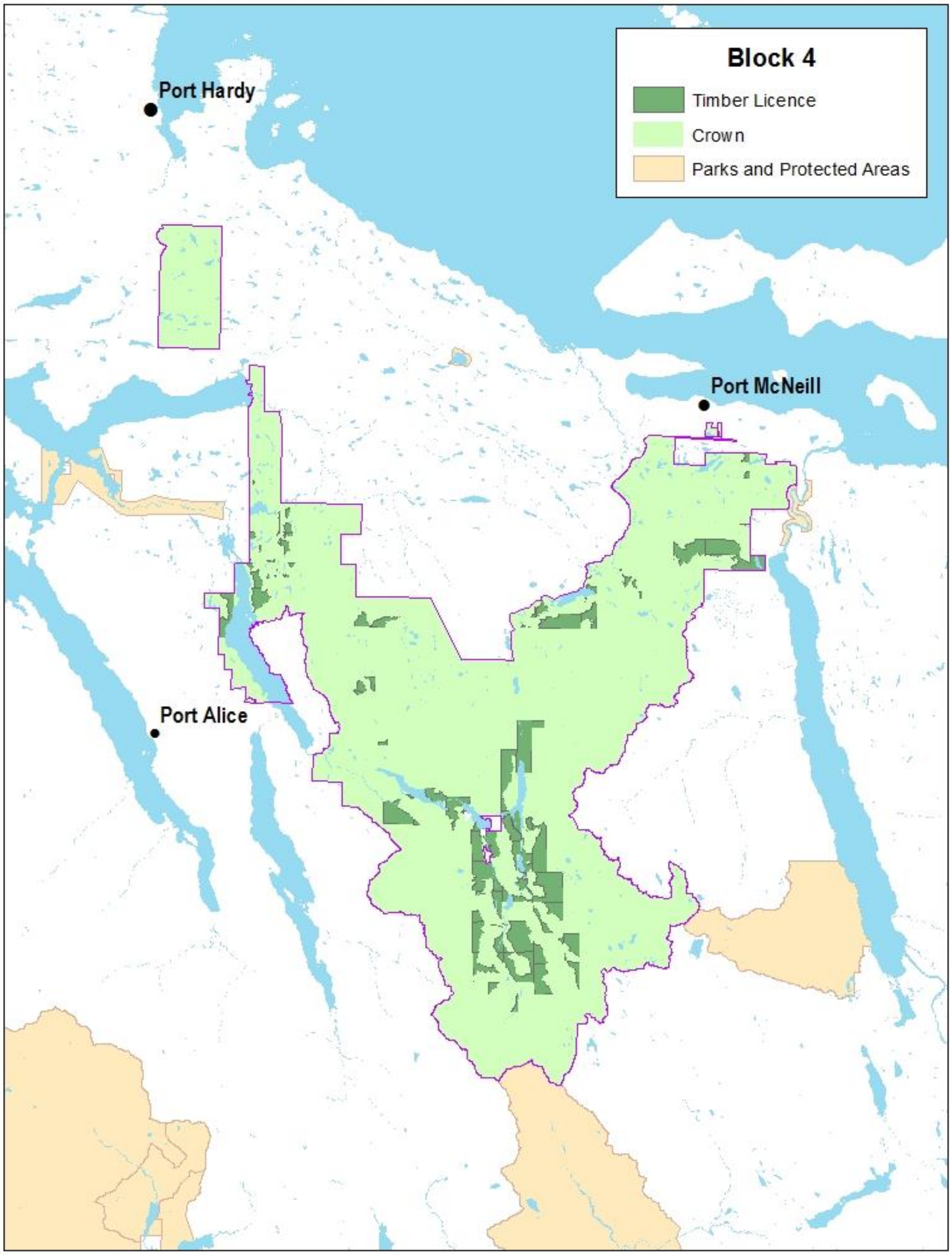

Figure 5 – Block 4

Block 5 is located on the mainland coast in the Phillips River watershed (see Figure 6) and is subject to the SCCO. The total area is approximately 46,400 hectares, with only 14,276 hectares considered productive forest. Due to the objectives in the SCCO, the THLB is estimated at only

3,313 hectares. The terrain is dominated by steep mountains and narrow valleys. The block is nearly split evenly between the very wet maritime CWH zone with the moist maritime Mountain Hemlock zone. Small scale logging started in the 1940's and significant activity occurred in the 1970's and 1980's. The forests are comprised mainly of hemlock, balsam and western red cedar.

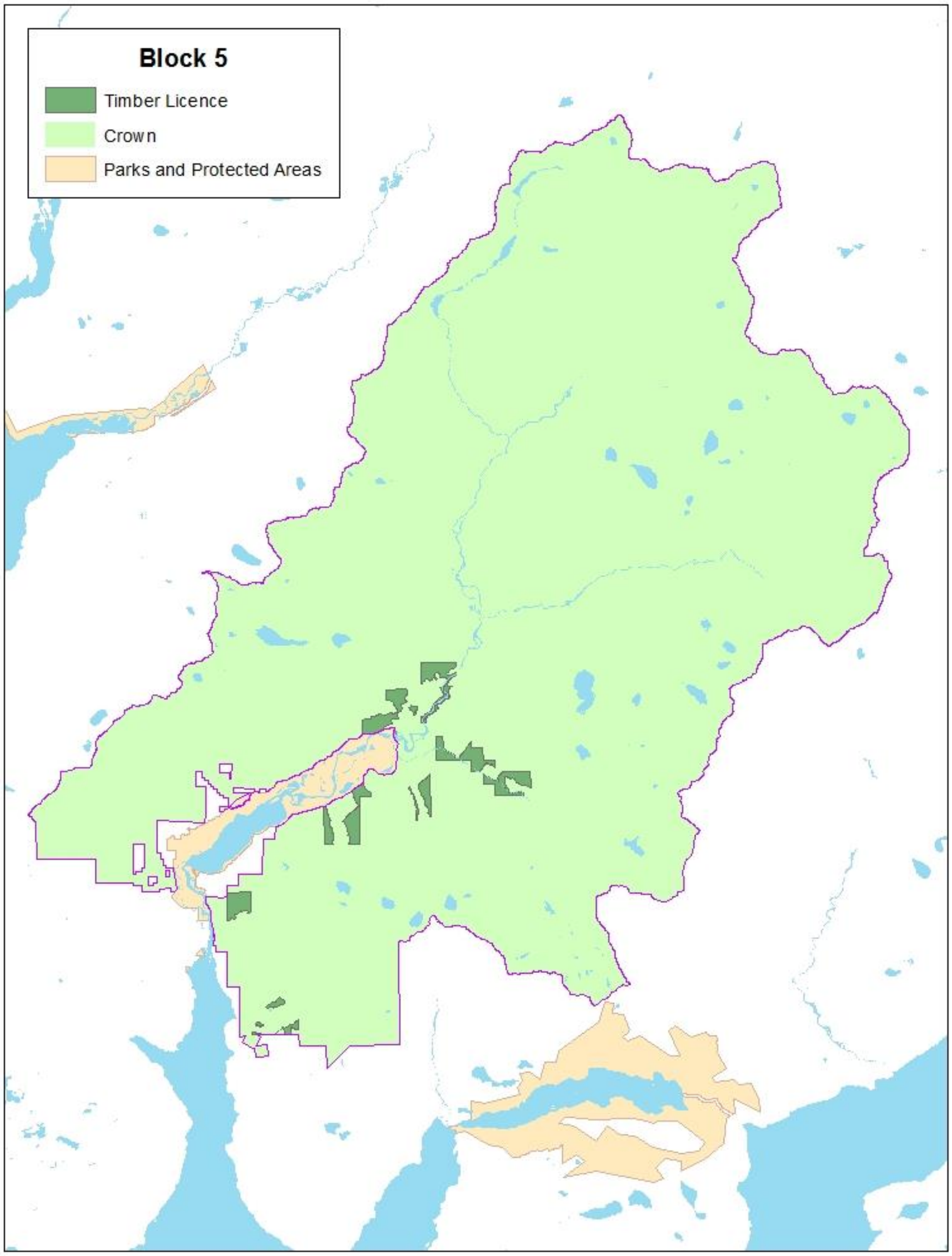

Figure 6 – Block 5

3 TFL 39 Licence Holder History

TFL 39 was originally granted to MacMillan Bloedel and Powell River Limited in 1961. The licence holder has changed over time with successive corporate name changes, acquisitions and mergers (see Table 1).

Table 1 - TFL 39 Licence Holders

Date listed company became licence holder	Licence Holder	Description
October 27, 1961	MacMillan Bloedel and Powell River Limited	Original TFL
May 10, 1966	MacMillan Bloedel Industries Limited	Corporate name change
December 31, 1981	MacMillan Bloedel Ltd.	Corporate name change
October 29, 1999	Weyerhaeuser Company Limited	Corporate Purchase
May 30, 2005	Cascadia Forest Products Ltd.	Corporate Purchase
May 1, 2006	Western Forest Products Inc.	Corporate Purchase

4 TFL 39 Consolidations and Subdivisions

The current TFL 39 is a legacy of the consolidation of the original TFL 39 and TFL 7 (Salmon River) in December 1987. Subsequently on January 15, 2010, TFL 39 was subdivided into two TFLs – TFL 39 and TFL 60 by deleting Block 6 (Haida Gwaii) from TFL 39. TFL 60 was eventually transferred to Taan Forest Inc. in June 2012. Refer to Table 2 for exact dates of these consolidations and subdivisions.

Table 2 - TFL 39 Consolidations and Subdivisions

Date	Boundary Change
December 31, 1987	Consolidation of TFL 39 and TFL 7
January 15, 2010	Subdivision of TFL 39 to create TFL 60 (deletion of Block 6 in Haida Gwaii)

5 Major TFL 39 Boundary Changes

Table 3 lists changes to the TFL area involving over 200 hectares and the date of those changes. This list may omit some boundary changes for which records have been lost or could not be found when preparing this document. There have been multiple minor (< 200 ha) area revisions since 1961 to accommodate other land uses such as gravel pits, hydro-electric generating stations and road right-of ways. There have also been multiple amendments transferring areas from “Schedule A” to “Schedule B” that had no effect on the TFL boundaries.

Table 3 - TFL 39 Major Boundary Changes

Date	Boundary Change
February 26, 1964	Amendment 35 – MacMillan, Bloedel and Powell River Limited acquired multiple properties near Port McNeill and added them to TFL 39 Block 4. Total area estimated at 738 ha.
October 26, 1977	Instrument 110 – Deletion of 6,230 ha from Block 2 to create Roderick Haig Brown Provincial Park (now known as Schoen Lake Park).
January 28, 1983	Instrument 125 – Deletion of approximately 221 ha from Block 2 to accommodate re-alignment of Highway 19.
March 14, 1983	Instrument 126 – Deletion of 220 ha from Block 4. An error in this instrument was later corrected via Instrument 131 on April 18, 1985.
October 30, 1986	Instrument 137 – Added 1,381 ha of land formerly covered by expired Timber Sales to Block 1.
December 17, 1987	Instrument 140 – Deletion of 446 ha from Block 2 to create Ecological Reserve near Robson Bight (Tsitika River).
November 28, 1989	Instrument 145 – Added approximately 53 ha to Block 2 along the Salmon River and 428 ha to Block 4 near Waukwaas Creek.
July 9, 2004	Instrument 167 – Deleted all private land from TFL 39 (17,483 ha).
July 14, 2006	Creation of Koeye Conservancy within Block 7 via *Park (Conservancy Enabling) Amendment Act, 2006*. Total area of 18,763 ha.
December 30, 1998	Order in Council No. 977 established several conservancies on Haida Gwaii that affected 26,512 ha within Block 6.
June 27, 2008	Creation of Namu Conservancy within Block 7 via *Protected Areas of British Columbia (Conservancies and Parks) Amendment Act, 2008*. Total area of 10,953 ha.
July 15, 2009	Instrument 170 – Deletion of areas due *to Forestry Revitalization Act* to form part of Pacific TSA. Block 1 – 26,526 ha Block 2 – 44,555 ha Block 3 – 11,039 ha Block 4 – 852 ha Block 5 – 0 ha Block 6 – 0 ha Block 7 – 26,560 ha
January 15, 2010	Instrument 173 – Delete all of Block 6 (196,856 ha) to create TFL 60.
January 19, 2010	Ministerial Order under the *Forestry Revitalization Act* to delete 1,319 ha from Block 4 to form part of the North Island Community Forest.
May 28, 2012	Instrument 174 – Deletion of approximately 3,600 ha from Block 1 to create a tenure opportunity for the Sliammon First Nation.

Figure 7 indicates the areas deleted from TFL 39 during the term of Management Plan #8.

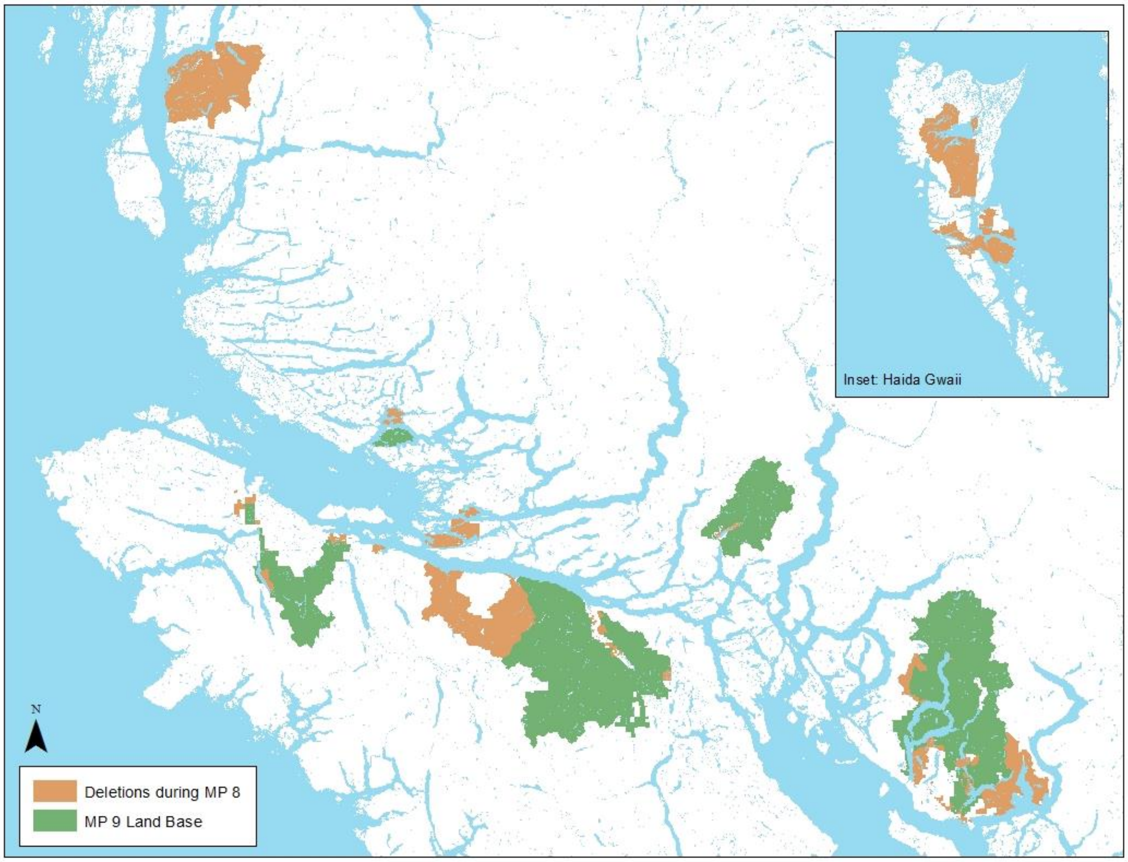

Figure 7 – Area Deletions during MP #8

6 TFL 39 Planning Documents

Table 4 indicates the publicly available planning documents used by WFP to guide forest management and operations within TFL 39:

Table 4 - TFL 39 Publicly Available Planning Documents

Plan Type	Plan Title	Description	Web link (as of April 2014)
Regional Land Use Plan	Vancouver Island Summary Land Use Plan (February 2000)	Provides the key components of strategic land and resource management decisions made by the provincial government for Vancouver Island.	http://ilmbwww.gov.bc.ca/slrp/lrmp/nanaimo/vancouver_island/index.html
Higher Level Plan	Vancouver Island Land Use Plan Higher Level Plan Order (effective December 1, 2000)	An order that established Resource Management Zones (RMZs) and Resource Management Zone Objectives within the area covered by the Vancouver Island Land Use Plan.	http://ilmbwww.gov.bc.ca/slrp/lrmp/nanaimo/vancouver_island/index.html
Land and Resource Management Plan	Central Coast Land and Resource Management Plan	Provides the key components of strategic land and resource management decisions made by the provincial government for the Central Coast portion of British Columbia.	http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/central_north_coast/index.html
Land Use Objectives	South Central Coast Order (July 2007; amended March 2009)	An order to establish Land Use Objectives to implement ecosystem-based management within the Central Coast area.	http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/objectives/index.html
Landscape Unit Plan	Bunster Landscape Unit Plan (September 2000)	Provides background information and processes used to select Old Growth Management Areas (OGMAs) and Wildlife Tree Retention Area (WTRA) requirements in the landscape unit. The OGMAs and WTRA requirements are incorporated into the orders establishing land use objectives for the applicable landscape unit.	http://www.ilmb.gov.bc.ca/slrp/srmp/coast/sunshine_coast/bunster.htm
	Lois Landscape Unit Plan (November 2002)		http://www.ilmb.gov.bc.ca/slrp/srmp/coast/sunshine_coast/lois.htm
	Powell Daniels Landscape Unit Plan (January 2002)		http://www.ilmb.gov.bc.ca/slrp/srmp/coast/sunshine_coast/powelldaniels.htm
	Powell Lake Landscape Unit Plan (November 2002)		http://www.ilmb.gov.bc.ca/slrp/srmp/coast/sunshine_coast/powelllake.htm

<table>
<tr><th>Plan Type</th><th>Plan Title</th><th>Description</th><th>Web link (as of April 2014)</th></tr>
<tr><td>Landscape Unit Plan</td><td>Sayward Landscape Unit Plan (February 2003)</td><td>Provides background information and processes used to select Old Growth Management Areas (OGMAs) and Wildlife Tree Retention Area (WTRA) requirements in the Sayward landscape unit. The OGMAs and WTRA requirements are incorporated into an order establishing land use objectives for the Sayward landscape unit. Objectives also established for:
providing spring forage around ungulate winter ranges,
visual cover for elk,
riparian management adjacent to identified critical stream reaches and S4 streams,
patch sizes,
riparian reserve zones and riparian management zones for lakes,
recreation trails, and
scenic areas and visual quality.</td><td>http://www.ilmb.gov.bc.ca/slrp/srmp/coast/campbell_river/sayward.htm</td></tr>
<tr><td rowspan="3">Forest Stewardship Plan (FSP)</td><td>Forest Stewardship Plan for the Mid Island, Stillwater, and Port Alberni Operations of Western Forest Products Inc. (FSP #69)</td><td rowspan="3">The FSPs specify results and strategies that have been deemed to be consistent with the Forest and Range Practices Act (FRPA) and the government objectives that apply to the landbase covered by the FSP. Forestry activities in turn must be consistent with the results and strategies specified in the FSP. This is the main planning document used to guide operations.</td><td>http://www.westernforest.com/sustainability/environmental-stewardship/planning-and-practices/our-forests/fsp-mid-island-stillwater-and-port-alberni-operations/</td></tr>
<tr><td>Forest Stewardship Plan for the North Vancouver Island Forest Operations of Western Forest Products Inc. (FSP #262)</td><td>http://www.westernforest.com/wp-content/uploads/plans/NVI_FSP_Extension_and_Minor_Amendment_signed_Jan2012.pdf</td></tr>
<tr><td>Mainland Coast Forest Stewardship Plan (FSP #245)</td><td>http://www.westernforest.com/sustainability/environmental-stewardship/planning-and-practices/our-forests/mainland-coast-forest-stewardship-plan/</td></tr>
<tr><td>Sustainable Forest Management Plan (SFMP)</td><td>Mid Island Forest Operation Sustainable Forest Management Plan</td><td>The SFMPs are in support of WFP's certification under the Canadian Standards Association (CSA) Sustainable Forest Management standard (CAN/CSA-Z809). They lists values, objectives, indicators and targets that are</td><td>http://www.miflag.org/html/sfm4.htm</td></tr>
</table>

Plan Type	Plan Title	Description	Web link (as of April 2014)
	Stillwater Forest Operation Sustainable Forest Management Plan	developed locally with the assistance of a community advisory group to address the criteria and critical elements for sustainable forest management listed in the CSA standard. The SFMPs also describes strategies employed by WFP to ensure operations are consistent with the SFMP.	http://cagstw.org/sustainable
	North Vancouver Island Sustainable Forest Management Plan		http://www.northislandpag.com

7 Public Review Strategy Summary

Opportunity to review and provide comments on the TFL 39 Draft Management Plan (MP) #9 was based on a strategy approved by the Regional Executive Director on November 22, 2010. The first phase was public review and First Nations' information-sharing of a draft timber supply analysis information package (IP). The second phase was public review and First Nations' information-sharing of a draft MP that included a revised IP and the timber supply analysis (TSA) results.

The public review, including information-sharing with First Nations, of MP #5 began in June 2012. On or about June 11, 2012 copies of the draft IP were provided to the following provincial government agencies:

Ministry of Forests, Lands and Natural Resource Operations (FLNRO) - Forest Analysis and Inventory Branch (FAIB)	FLNRO – Campbell River Resource District (CRRD)
FLNRO – North Island Central – Coast Resource District (NICCRD)	FLNRO – Sunshine Coast Resource District (SCRD)

Maps associated with the MP were sent to each FLNRO district office to assist review by FLNRO staff and the general public.

On or about June 11, 2012 copies of the draft IP (on CD) were provided to the following First Nations and First Nation organizations:

Nanwakolas Council (on behalf of K'omoks, Kwakiutl, Kwiakah, Tlowtsis, Wei Wai Kum (Campbell River) First Nations)	Dzawada'enuxw (Tsawatainuek) First Nation
Gwawaenuk Tribe	Xwemalhkwu (Homalco) First Nation
Klahoose First Nation	Namgis First Nation
Kwakiutl First Nation	Quatsino First Nation
Shishalh (Sechelt) First Nation	Sliammon First Nation
Wei Wai Kai (Cape Mudge) First Nation	

The CD contained the draft IP document and the associated maps. WFP offered to print the maps for First Nations if requested to do so (this was not requested).

Notification letters were sent to interested stakeholders (based on a contact list that included trappers, guide outfitters, local governments, and WFP's CSA advisory group). Ads were run in the *North Island Gazette* newspaper on June 7th and 14th, 2012 and in the *Campbell River Mirror* and *Powell River Peak* newspapers on June 8th and 15th, 2012. The ads stated that the draft IP was available for review and comment from June 11, 2012 until August 10, 2012 at the following locations:

- WFP Port McNeill office
- WFP Powell River office
- WFP Campbell River offices (2)

- FLNRO NICCRD office
- FLNRO SCRD office
- FLNRO CRRD office
- WFP internet site

and provided phone numbers, fax numbers and an email address for providing comments.

On July 26, 2012 a meeting was held at the Xwemalhkwu (Homalco) First Nation office in Campbell River during which the draft IP was discussed amongst WFP, FLNRO and Xwemalhkwu First Nation representatives. A follow-up comment letter dated August 13, 2012 was received from the Xwemalhkwu First Nation. Comments were also received from the Wei Wai Kum, Tlowtsis, K'omoks and Namgis First Nations, mainly regarding supply of cedar for cultural use and netdowns for cultural heritage resources.

A few comments were received from residents of Powell River, mainly regarding trails within Block 1. Presentations summarizing the contents of the IP were made to WFP's public advisory groups in Campbell River and Powell River on October 18th, 2012 and November 14th, 2012 respectively.

In an email dated August 11, 2012 FAIB accepted the IP subject to providing additional clarification or changes in assumptions as necessary. WFP provided additional clarification via a series of emails in August 2012. A revised IP and a response letter were submitted to FAIB on October 19th, 2012 that included revisions made due to comments received and corrected typographical errors. In an email dated November 2nd, 2012 FAIB acknowledged receiving the documents and requested that WFP continue to document further changes for inclusion with the analysis report.

On or about July 18, 2013 copies of the draft MP #10 (including the timber supply analysis results and an updated IP) were provided to the following provincial government agencies:

Ministry of Forests, Lands and Natural Resource Operations (FLNRO) - Forest Analysis and Inventory Branch (FAIB)	FLNRO – Campbell River Resource District (CRRD)
FLNRO – North Island Central – Coast Resource District (NICCRD)	FLNRO – Sunshine Coast Resource District (SCRD)

The maps provided with the draft IP were used as part of the review materials for the draft Management Plan.

On or about July 18th, 2013 copies of the draft MP #5 were provided to the following First Nations and First Nation organizations:

Gwawaenuk Tribe	Dzawada'enuxw (Tsawatainuek) First Nation
Klahoose First Nation	Xwemalhkwu (Homalco) First Nation
Kwakiutl First Nation	Namgis First Nation
Shishalh (Sechelt) First Nation	Quatsino First Nation
Sliammon First Nation	

At the request of the Nanwakolas Council, their referral was delayed until August 19th, 2013 to allow the Council time to complete discussions with the provincial government regarding shared-decision making as per the Nanwakolas Reconciliation Protocol.

WFP provided the draft MP #9 digitally (on CD). The CD contained the draft MP #9 document and the associated maps. WFP offered to print the maps for First Nations if requested to do so (this was not requested). Follow-up letters were sent on August 26th, 2013 to each of the First Nations who received the first referral on July 18th, 2013 reminding them of the opportunity to provide comments on the draft MP #9.

Notification letters were sent to interested stakeholders (based on an updated version of the contact list used in June 2012). Ads were run in the *North Island Gazette* newspaper on July 18th and 25th, 2013 and in the *Campbell River Mirror* and *Powell River Peak* newspapers on July 19th and 26th, 2013. The ads stated that the draft MP was available for review and comment from July 22, 2013 until September 20, 2013 at the following locations:

- WFP Port McNeill office
- WFP Powell River office
- WFP Campbell River offices (2)
- FLNRO NICCRD office
- FLNRO SCRD office
- FLNRO CRRD office
- WFP internet site

and provided phone numbers, fax numbers and an email address for providing comments.

On September 9th, 2013 the Kwiakah First Nation requested an extension to the review period as per the Nanwakolas Framework Agreement. The response period was subsequently extended until November 4th, 2013. Comments, focused on long-term cedar supply, were received from the following First Nations:

- Kwiakah
- Wei Wai Kai (Cape Mudge)
- Wei Wai Kum (Campbell River)
- K'omoks
- Tlowtsis
- Namgis
- Shishalh (Sechelt)
- Sliammon

Once again, a few comments were received from residents of Powell River, mainly regarding trails within Block 1. Presentations focusing on the results of the timber supply analysis were made to WFP's public advisory group in Powell River on April 10th and September 4th, 2013. A meeting was held on September 12th, 2013 with North Island MLA Claire Trevena during which the follwing items were reviewed:

- MP approval/AAC determination process
- MP content requirements
- IP content (using Block 2 as an example)
- Timber supply analysis results for Block 2

Education was the main goal of this meeting.

In emails dated November 29th and December 16th, 2013 FAIB requested additional information for the timber supply analysis results and clarification of a few items within the Information Package. FAIB also identified some typographical errors in the documents.

7.1 Summary of Revisions

As a result of the comments received the following revisions have been made:

1. Additional information was provided in the Timber Supply Analysis (Version 2). The revisions are summarized at the beginning of the analysis document (Appendix 1 to this document).
2. Additional information was provided in the Information Package (Version 3). The revisions are summarized at the beginning of the IP document (Appendix 2 to this document).
3. Altered AAC partition recommendations.

Other changes made include:

1. Updating document dates.
2. Correcting typographical errors throughout the documents.

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Appendix 1: Timber Supply Analysis

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Western Forest Products Inc.

Tree Farm Licence 39

Timber Supply Analysis

MANAGEMENT PLAN 9

Version 2

April 2014

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Revisions since Version 1

The following revisions were made to Version 1 (July 2013) of the Timber Supply Analysis to create this document.

Corrected typographical errors and formatting issues and updated date on title page and in page headers.
Corrected SLRD impact values in Table 1.
Inserted tables for most harvest schedule charts to ease interpretation.
Differentiated contribution from current old and current mature stands in Base Case harvest schedules (Tables 5, 9, 12, 15, 18; Figures 3, 10, 17, 24, 31).
Added Section 2.2 – Western Red Cedar Projections
Added "new" Appendix A with additional Base Case harvest schedule statistics.
Added footnote in Section 3.1 to explain difference between "current AAC" and "official AAC".
Revised proposed AAC partitions.

Executive Summary

This timber supply analysis examines timber supply projections for Tree Farm Licence 39 located on northern Vancouver Island, North Broughton Island and the mainland coast. Since the last analysis several land deletions have occurred, reducing the total area of the TFL from 801,400 hectares to 407,800 hectares. Total productive area is approximately 250,000 ha and the timber harvesting land base is estimated at 171,203 ha.

Woodstock, a pseudo-spatial harvest model, was used to model current management practices for protection and maintenance of ecological values and to estimate the timber supply potential through the year 2261. Several analyses were conducted to test the sensitivity of timber supply to assumptions used in the base analysis.

The results indicate that the timber supply in TFL 39 is robust. Sensitivities with downward pressure on timber supply can maintain the Base Case initial harvest level with little additional impact on mid-term harvest rates compared to alternative schedules where the initial harvest level was allowed to be reduced.

WFP recommends an AAC of 1,629,000 m^3/year, including partitions of 202,000 m^3/year from Block 4 and 45,000 m^3/year from Blocks 3 and 5 combined.

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1.0 Introduction

1.1 Background

Tree Farm Licence (TFL) 39 is comprised of 5 separate supply blocks dispersed along the British Columbian coast and is managed by Western Forest Products Inc. (WFP). Figure 1 indicates the current extent of TFL 39 for this analysis. Since the last analysis several land deletions have occurred (see the Information Package for further details):

- private lands were removed in 2004;
- between 2006 and 2008 several conservancies were removed;
- in 2009 portions were deleted due to the *Forest Revitalization* Act to form part of the Pacific Timber Supply Area;
- in 2010, the TFL was subdivided by deleting Block 6 on Haida Gwaii (Queen Charlotte Islands) to create TFL 60;
- in 2010, a portion of Block 4 was deleted to create a community forest on northern Vancouver Island; and finally,
- in 2012, a portion of Block 1 was deleted to create a tenure for the Sliammon First Nation.

The TFL encompasses 407,800 ha of which 171,203 ha (42%) is estimated to be available for timber production (timber harvesting land base (THLB)). The allowable annual cut (AAC) for this landbase is currently set at 1,885,980 m^3 per year.

1.2 Objective

The primary objective of this report is to estimate reasonably achievable timber flows for consideration by the Provincial Chief Forester in making the determination of the allowable annual cut for the term of Management Plan #9. More specifically:

1. The management of non-timber values such as fish and wildlife habitat, biodiversity, visual quality, and terrain stability is accounted for. Protection of non-timber values will be satisfied by land base reserves, rate-of-harvest constraints and/or by maintaining a percentage of the land base in older stands.
2. Timber flow is estimated by considering harvestable inventory, growth potential of present and future stands, silvicultural treatments, potential timber losses, and operational and legislative constraints.
3. Impacts of declining timber flow on community stability and employment are to be lessened by keeping rates of decline per decade as low as possible without inducing undue impacts on other values or long-term timber sustainability.

1.3 Timber Supply Model

Timber supply optimizations were completed with Woodstock software developed by Remsoft. Woodstock is a pseudo-spatial supply model and is described in more detail in the associated Information Package (IP) dated October 2012.

The inventory database was current to January 1, 2012 for harvesting depletion and silviculture treatments and assessments. The model was constructed using 50 5-year periods for a total optimization horizon of 250 years. Since AAC's are now effective for up to 10 years, the model was constructed such that harvest volumes over successive pairs of 5-year periods had to be equal (i.e. harvest levels in Periods 1 and 2 had to be equal; harvest levels in Periods 3 and 4 had to be equal; etc.). This report presents results by 10-year intervals.

Analysis units (grouping of forest stands) and associated timber volume yield curve parameters are described in more detail in the associated IP. Volumes were projected to 2014 (mid-year of first 5-year period) for the initial forest conditions to represent the average stand volume for the first 5-year period.

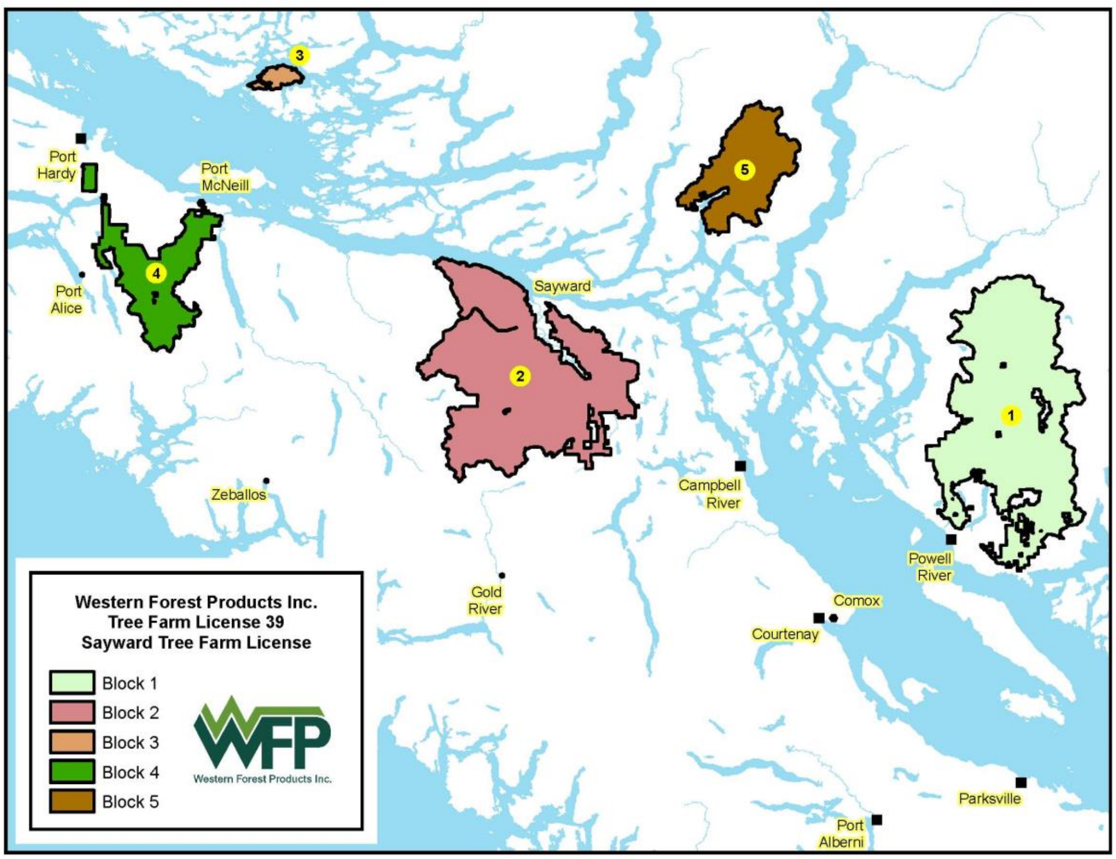

Figure 1 - TFL 39

2.0 Base Case (or Current Management Option)

The Base Case (or Current Management option) includes the following assumptions and modelling parameters that are described in more detail in the associated IP (October 2012):

- Contribution from the operable forested landbase accessible using conventional (ground-based and cable) and non-conventional (long-line and helicopter) systems.
- Exclusion of low volume/poor quality ("uneconomic") mature stands.
- Silviculture to meet free growing requirements is carried out on all regenerated stands. Known tree improvement gains are applied to existing stands < 15 years old and future regenerated stands.
- Visual quality objectives (VQOs) are modelled based on the VQOs established for the Campbell River Forest District on December 14, 2005; VQO's established for Block 1 on June 19, 2009; and recommended visual quality classes in the TFL 39 Block 4 Visual Landscape Inventory. Constraints were applied to individual VQO polygons within Blocks 3, 4 and 5. Due to the number of VQO polygons in Blocks 1 and 2, they were grouped by class within each watershed. Applying constraints to individual VQO polygons resulted in models taking days to solve while grouping allowed models to be solved generally in less than 3 hours. A solution was generated with the disturbance limits applied to individual VQO polygons rather than the aggregated polygons and there was no material difference in harvest volumes achieved. This indicates that the aggregation of the VQO polygons had no significant impact on timber supply results.
- Green-up heights for cutblock adjacency within Block 2 and 4 are assigned based on Resource Management Zones established in the *Vancouver Island Higher Level Plan*. Special and General zones have a 3m green-up requirement while Enhanced zones have a 1.3m green-up height. For all of Block 1, the height is 3m. Where the green-up height is 3m, polygons within 100 metres of cutblocks harvested within the past 5 years were "locked" in the model such that they were not available for scheduling in the first 10 years and polygons within 100 metres of cutblocks harvested 5 - 10 years ago were "locked" in the model such that they were not available for scheduling in the first 5 years.
- Future Wildlife Tree and other stand-level retention are accounted for by a percentage area reduction. Areas designated as stand retention for existing cutblocks were "locked" in the model such that they were unavailable for scheduling until they could be combined with previously harvested polygons to form at least 5 hectares of harvest area. The intention of this approach was to model that current stand-level retention will remain until the next rotation. This "lock" superseded the green-up "lock" where both could apply.
- Biodiversity and Landscape Units – Established and draft Old Growth Management Areas (OGMAs) are removed from the THLB. For landscape units with a Low BEO where the OGMAs have to some extent utilized the 2/3 drawdown permissible in the *Order Establishing Provincial Non-Spatial Old Growth Objectives* effective June 30, 2004 (NSOG), long-term old forest targets are modelled aspatially. Mature seral targets are incorporated for the Special Management Zone within Block 2.

- Established Ungulate Winter Ranges (UWRs) and Wildlife Habitat Areas (WHAs) are removed from the THLB. As per the accepted IP, no additional netdown is assumed for full implementation (potential future WHAs) of the *Identified Wildlife Management Strategy* (IWMS).
- Riparian management netdowns are based on FSP results/strategies and results of a review of riparian management zone retention for a sample of cutblocks harvested between 2000 and 2008.
- Relevant land use objectives from the *South Central Coast Order* (SCCO, March 2009) for Ecosystem Based Management (EBM) within Blocks 3 and 5 are modelled.
- Minimum harvest criteria that vary by harvest system are based on minimum volume per hectare and average stand diameter-at-breast-height (DBH). Both minimum diameter and minimum volume requirements had to be met before a stand could be harvested.
- Harvesting is a mix of old and second growth beginning in the first decade.
- Future harvest level decline is limited to 10% per decade.
- Woodstock was set up to maximize harvest volume over the entire 250-year analysis period subject to maintaining a relatively stable conventionally operable growing stock on the THLB over the final 100 years. This growing stock constraint was not applied to the non-conventional operable growing stock due to the harvest volume constraint applied to that portion of the landbase.

While conducting the analysis on Blocks 3 and 5, logic errors were identified in the database used to develop the THLB spatial data. In error, partial netdowns (e.g. netdowns for red and blue listed ecosystem and terrain stability) were not properly accounted for. This error cascaded through all values below red and blue listed ecosystems in the tables, mainly impacting the incremental impact of the Strategic Level Reserve Design (SLRD). This error resulted in a modest understatement of the THLB values for Blocks 3 and 5 in the Information Package.

Table 1, Table 2 and Table 3 provide updates to Table 6, Table 7, and Table 8 of the Information Package respectively. Block 3 THLB increased by 110 ha and 56,100 m^3 while Block 5 THLB increased by 297 ha and 130,900 m^3.

Table 1 – Corrected Land Base Netdown (ha)

Classification	Block 1	Block 2	Block 3	Block 4	Block 5	Total	% Total	% PFLB
Total Land Base	**153,918**	**156,205**	**4,464**	**46,772**	**46,441**	**407,800**	**100.0%**	
Less Non-forest	33,995	4,792	120	3,374	12,495	54,776	13.4%	
Less Existing Roads	1,407	4,393	161	1,337	263	7,561	1.9%	
Total Forested	**118,516**	**147,020**	**4,183**	**42,061**	**33,683**	**345,463**	**84.7%**	
Less Non-productive	49,412	19,079	67	7,739	19,407	95,704	23.5%	
Total Productive	**69,104**	**127,941**	**4,116**	**34,322**	**14,276**	**249,759**	**61.2%**	**100.0%**
Less Inoperable	3,646	5,693	47	372	1,736	11,494	2.8%	4.6%
Less Plutonic R/W	747	0	0	0	0	747	0.2%	0.3%
Total Operable	**64,711**	**122,248**	**4,069**	**33,950**	**12,540**	**237,518**	**58.2%**	**95.1%**
Reductions:								
Riparian Management	4,628	9,398	608	3,324	1,432	19,390	4.8%	7.8%
Ungulate Winter Ranges	848	4,313	0	358	832	6,351	1.6%	2.5%
Old Growth Management Areas (established)	4,977	8,120	0	889	0	13,986	3.4%	5.6%
Old Growth Management Areas (draft)	87	0	0	587	0	674	0.2%	0.2%
Wildlife Habitat Areas	70	1	0	0	6	77	0.0%	0.0%
High Value Bear Habitat	0	0	0	0	550	550	0.1%	0.2%
Uneconomic	609	989	145	409	851	3,003	0.7%	1.2%
Recreation	11	531	0	6	31	579	0.1%	0.2%
Red/Blue listed ecosystems	0	0	265	0	1,293	1,558	0.4%	0.6%
Terrain Stability	2,892	2,837	46	1,304	931	8,010	2.0%	3.2%
Avalanche Areas	87	26	0	19	8	140	0.0%	0.1%
Strategic Level Reserve Design	0	0	520	0	3,082	3,602	0.9%	1.4%
Total Operable Reductions	**14,209**	**26,217**	**1,584**	**6,896**	**9,016**	**57,922**	**14.2%**	**23.2%**
Reduced Land base	**50,501**	**96,031**	**2,485**	**27,054**	**3,524**	**179,596**	**44.0%**	**71.9%**
Less allowance for stand-level retention	2,468	4,365	149	1,200	211	8,393	2.1%	3.4%
Current THLB	**48,033**	**91,666**	**2,336**	**25,854**	**3,313**	**171,203**	**42.0%**	**68.5%**
Less future roads	214	1,521	59	72	12	1,879	0.5%	0.8%
Long-term Land base	**47,819**	**90,145**	**2,277**	**25,782**	**3,301**	**169,325**	**41.5%**	**67.8%**

Table 2 – Corrected Timber Volume[1] Netdown ('000 m^3)

Classification	Block 1	Block 2	Block 3	Block 4	Block 5	Total	% Total
Total Land Base	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Non-forest	0	0	0	0	0	0	0.0%
Less Existing Roads	0	0	0	0	0	0	0.0%
Total Forested	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Non-productive	0	0	0	0	0	0	0.0%
Total Productive	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Inoperable	2,455.8	3,599.0	20.1	264.2	1,125.0	7,460.0	7.1%
Less Plutonic R/W	265.5	0	0	0	0	266.8	0.3%
Total Operable	**29,815.4**	**47,303.7**	**1,560.7**	**11,944.0**	**5,825.1**	**96,642.9**	**92.6%**
Reductions:							
Riparian Management	2,144.0	4,211.9	301.5	1,320.2	598.9	8,596.8	8.2%
Ungulate Winter Ranges	652.6	3,166.6	0.0	234.5	594.5	4,652.5	4.5%
Old Growth Management Areas (established)	2,791.1	5,177.0	0.0	540.0	0.0	8,517.8	8.2%
Old Growth Management Areas (draft)	48.0	0	0.0	405.8	0.0	454.8	0.4%
Wildlife Habitat Areas	25.1	0.8	0.0	0	0.9	26.8	0.0%
High Value Bear Habitat	0	0	0.0	0	343.0	343.0	0.3%
Uneconomic	193.7	363.2	38.0	113.4	378.1	1,086.5	1.0%
Recreation	8.5	380.0	0.0	2.7	10.6	402.0	0.4%
Red/Blue listed ecosystems	0	0	152.9	0	990.8	1,143.7	1.1%
Terrain Stability	1,538.1	1,493.0	16.6	625.3	500.9	4,179.9	4.0%
Avalanche Areas	225.1	15.5	0.0	8.4	6.8	255.8	0.2%
Strategic Level Reserve Design	0	0	106.3	0	1,437.4	1,543.7	1.5%
Total Operable Reductions	**7,626.2**	**14,808.0**	**615.3**	**3,250.3**	**4,861.9**	**31,203.3**	**29.9%**
Reduced Land base	**22,189.2**	**32,495.7**	**945.4**	**8,693.7**	**907.4**	**65,439.6**	**62.7%**
Less allowance for stand-level retention	842.3	1,430.1	56.7	376.7	54.5	2,771.5	2.7%
Current THLB	**21,346.9**	**31,065.6**	**888.7**	**8,317.0**	**852.9**	**62,668.1**	**60.0%**

[1] Data updated to the December 31, 2011 for logging and ages; therefore, volumes listed represent estimates at the end of 2011.

Table 3 – Corrected Timber Licence (Schedule A) / Crown (Schedule B) THLB Split

TFL Block	THLB (ha)		
	Schedule A	Schedule B	Total
Block 1	112	47,922	48,034
Block 2	12,011	79,655	91,666
Block 3	758	1,578	2,336
Block 4	2,645	23,209	25,854
Block 5	160	3,153	3,313
Total	**15,686**	**155,517**	**171,203**

The Base Case harvest flow is presented in Table 4 and Figure 2. All harvest volume figures are net of non-recoverable losses of one percent per year. Details by supply block follow in Section 2.1.

Table 4 - Base Case Harvest Levels

			Annual Harvest Volume (m^3)					
Period (Decade #)	Start Year	End Year	Block 1	Block 2	Block 4	Blocks 3 & 5	Total	% Change from Previous Period
1	2012	2021	435,300	864,300	197,000	41,300	1,537,900	-18.5 %
2	2022	2031	435,300	777,900	197,000	41,300	1,451,500	-5.6%
3 - 4	2032	2051	435,300	706,100	197,000	41,300	1,379,700	-4.9%
5	2052	2061	435,300	706,100	216,700	41,300	1,399,400	1.4%
6	2062	2071	435,300	756,100	237,300	41,300	1,470,000	5.0%
7	2072	2081	435,300	806,100	237,300	41,300	1,520,000	3.4%
8 - 10	2082	2111	435,300	833,700	237,300	45,000	1,551,300	2.1%
11 - 25	2112	2261	435,300	833,700	249,900	45,000	1,563,900	0.8%

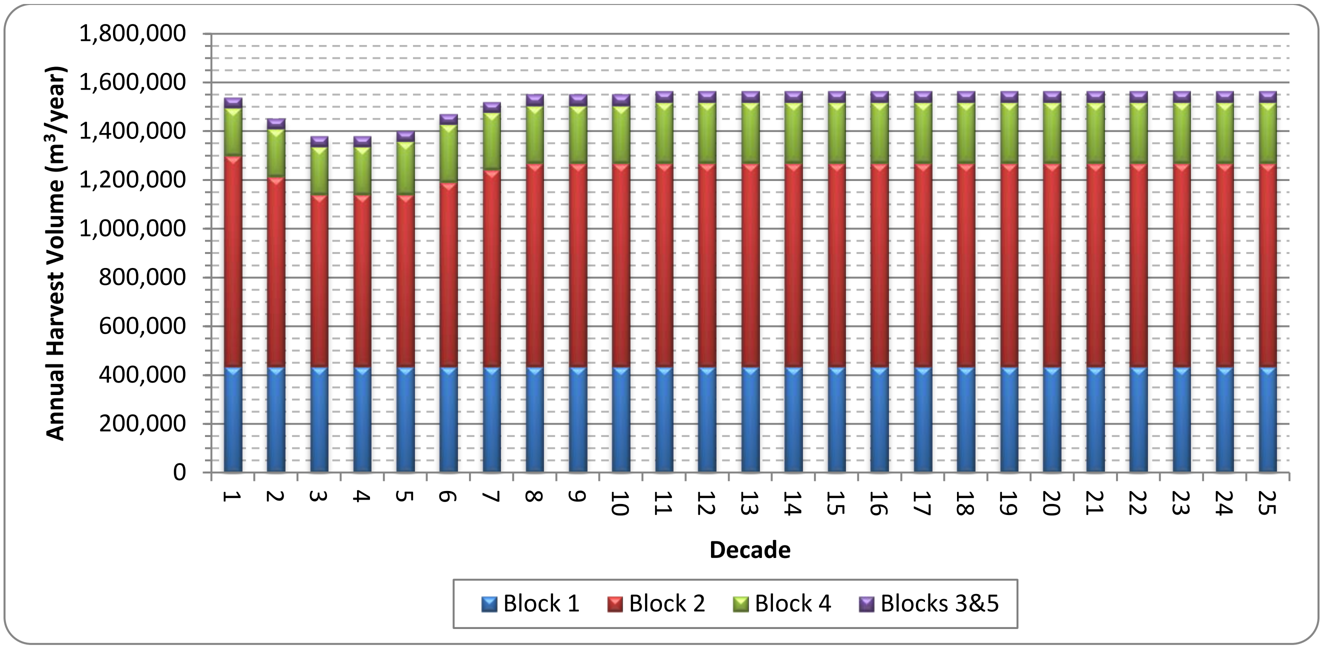

Figure 2 - Base Case Harvest Schedule

The results indicate that an initial harvest level of 1,537,900 m^3/year can be achieved when applying the assumptions and parameters discussed earlier. This is a reduction of 18.5% from the current AAC of 1,885,980 m^3/year. This decline is mainly attributable to EBM impacts within Blocks 3 and 5, limits applied to timber supply contribution from non-conventional operable landbase and reduced old forest availability due to additional landscape reserves (mainly OGMAs and WHAs). Approximately 35,500 m^3/year of the decline is attributable to areas that have been removed from TFL 39 but for which the AAC was not adjusted: Block 7, community forest in Block 4 and woodlots in Block 2.

The projected harvest schedule further declines approximately 10% over the next 20 years to a low of 1,379,700 m^3/year through to 2051 before gradually increasing to the current long-term harvest level (LTHL) estimate of 1,563,900 m^3/year. The mid-term timber supply “dip” occurs during the transition from natural (old and second growth) stands to managed stands with their higher volumes (mainly due to improved stocking and genetic gain values). The total volume harvested over the 250 years is roughly 382.5 million m^3. The schedule resulted in non-conventional harvest levels averaging about 117,000 m^3/year through the 250 years (ranging from 92,500 m^3/year to 131,000 m^3/year in any given decade) with the balance of the volume being conventional harvest.

Table 5 and Figure 3 indicate the contribution to the total harvest volume by period from each of the four stand establishment histories (with current old and current mature differentiated) used to define the analysis units:

- Current old growth defined as stands greater than 250 years old in 2012;
- Current mature defined as 141 - 250 years old in 2012;

- Natural second growth defined as 51 – 140 years old in 2012;
- Current managed second growth defined as 1 – 50 years old in 2012;
- Future stands defined as NSR in 2012 and all modelled future regeneration.

Table 5 - Stand Types' contribution to Base Case harvest

			Annual Harvest Volume (m^3)					
Period (Decade #)	Start Year	End Year	Current Old	Current Mature	Natural Second Growth	Current Managed	Future Stands	Total
1	2012	2021	774,600	98,000	662,900	2,400	0	1,537,900
2	2022	2031	613,600	15,300	682,500	140,100	0	1,451,500
3	2032	2041	249,100	7,300	610,800	512,500	0	1,379,700
4	2042	2051	128,600	700	550,100	698,000	2,300	1,379,700
5	2052	2061	199,700	200	248,400	935,900	15,200	1,399,400
6	2062	2071	109,800	3,300	132,100	1,101,000	123,800	1,470,000
7	2072	2081	120,700	1,900	158,300	912,400	326,700	1,520,000
8	2082	2091	92,400	300	38,300	590,900	829,400	1,551,300
9	2092	2101	68,000	0	15,700	312,300	1,155,30	1,551,300
10	2102	2111	41,000	0	34,700	353,800	1,121,80	1,551,300
11	2112	2121	4,300	0	29,200	206,000	1,324,40	1,563,900
12	2122	2131	14,100	0	38,800	156,200	1,354,80	1,563,900
13	2132	2141	8,900	0	15,700	50,000	1,489,30	1,563,900
14	2142	2151	3,400	0	12,200	22,100	1,526,20	1,563,900
15	2152	2161	5,700	0	18,600	26,600	1,513,00	1,563,900
16	2162	2171	7,400	0	70,700	270,200	1,215,60	1,563,900
17	2172	2181	3,300	0	49,900	27,400	1,483,30	1,563,900
18	2182	2191	3,600	0	9,900	15,500	1,534,90	1,563,900
19	2192	2201	3,400	0	6,900	15,400	1,538,20	1,563,900
20	2202	2211	4,300	0	4,200	11,900	1,543,50	1,563,900
21	2212	2221	800	0	5,100	2,400	1,555,60	1,563,900
22	2222	2231	1,300	0	2,900	7,200	1,552,50	1,563,900
23	2232	2241	600	0	3,400	6,200	1,553,70	1,563,900
24	2242	2251	200	0	2,300	1,400	1,560,00	1,563,900
25	2252	2261	10,800	0	2,700	9,700	1,540,70	1,563,900

Old stands contribute the greatest proportion of volume in the immediate future (first 10 years). In the subsequent 20 years natural second growth provides the largest proportion of the volume as contribution from mature stands declines. Beginning in the fourth decade (2042 – 2051) current managed stands provide the greatest volume and do so for forty years. During this time there is still some old timber harvested. During Decade 16 (2162-2171), approximately 17% of the total harvest is sourced from current managed second growth stands. This volume is mainly cable harvesting on poor sites within Block 2 and 4 that originates from stands that are less than 10 years old in 2012. The minimum harvest criteria make these stands unavailable until they are about 160 years old. Also in Decade 16, approximately two-thirds of the harvest in Blocks 3 and 5 is from cable harvesting within this stand type. This is a result of the model managing mid-seral constraints by site-series surrogate.

Future managed stands contribute some volume beginning in the fourth decade (2042 – 2051) and provide the majority of the harvest volume as of the eighth decade (2082 – 2091).

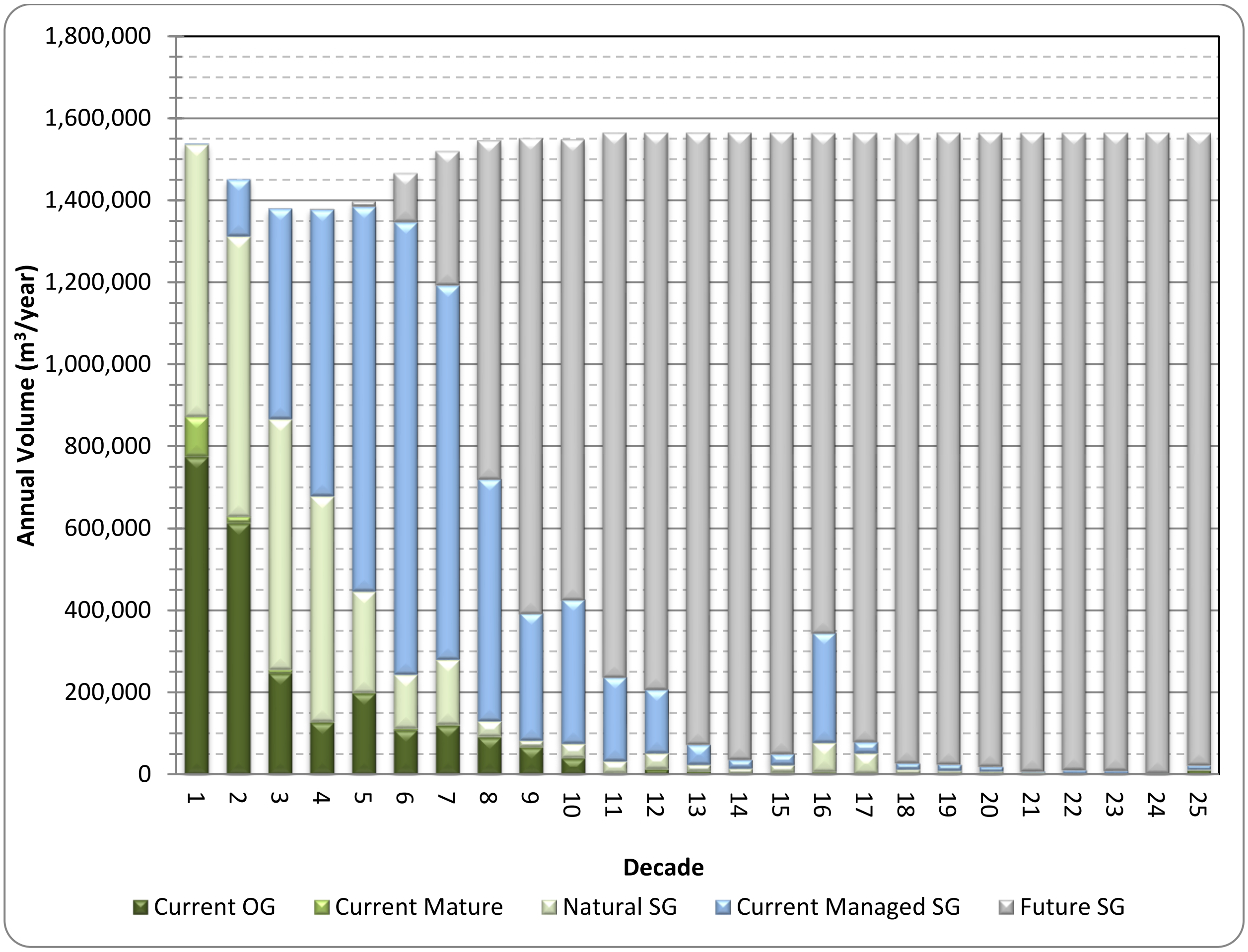

Figure 3 – Stand Types' contribution to Base Case harvest

Age class (as defined in Table 6) distributions over time based on the 5-year age groupings used in Woodstock are examined in Figure 4 and Figure 5. Age class "zero" only exists in the first time period (2012) due to the presence of NSR lands (and stands established in 2010 and 2011) whereas in future time periods the model "regenerates" harvested stands immediately (a 1-year regeneration delay is incorporated in the yield tables). Within the productive forest the oldest age class declines by slightly more than 40% and then increases to slightly more than the current amount as younger reserved timber ages into the old growth age class (see Figure 4). By the year 2262, the entire non-contributing landbase (i.e. all area outside of the THLB) is comprised of old forest as this is 250 years into the future.

Table 6 – Age Classes

Age Class	Age Range (years)
0	0 (NSR)
1	1 - 20
2	21 - 40
3	41 – 60
4	61 – 80
5	81 – 100
6	101 - 120
7	121 – 140
8	141 – 250
9	251+

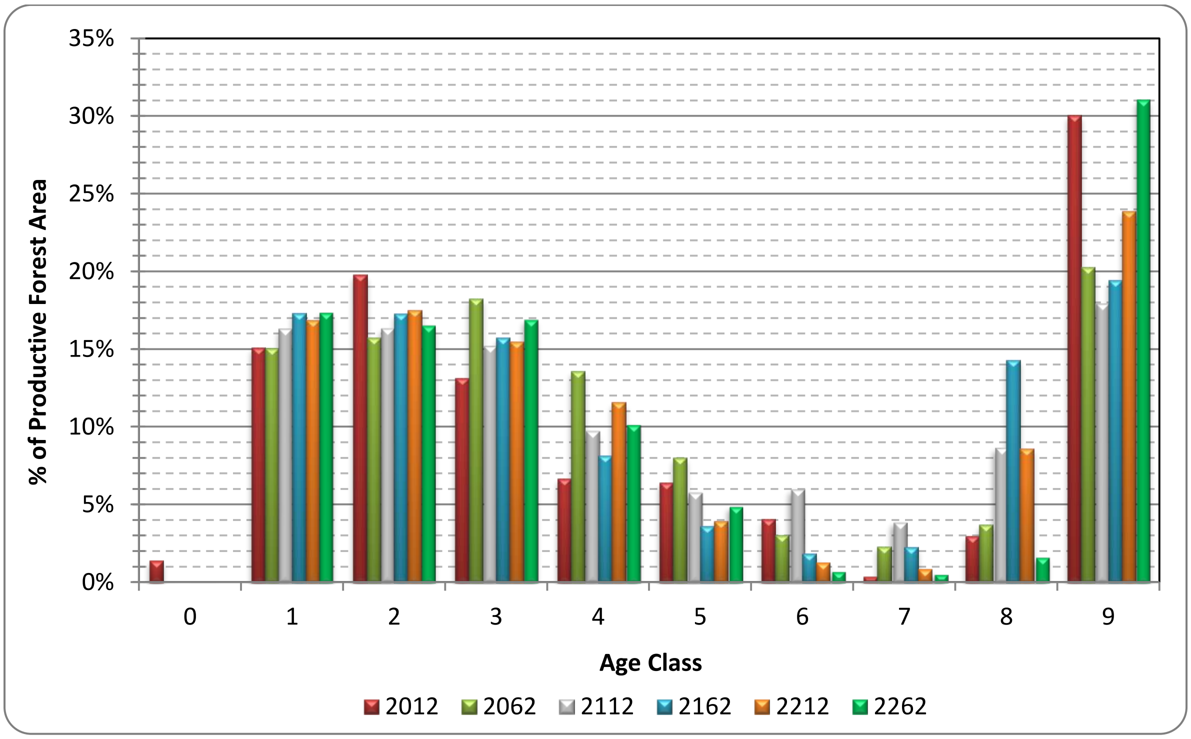

Figure 4 - Age class distribution of productive forest area

The total THLB area in Age Classes 1-4 increases initially until a relatively balanced age class distribution is achieved (refer to Figure 5).

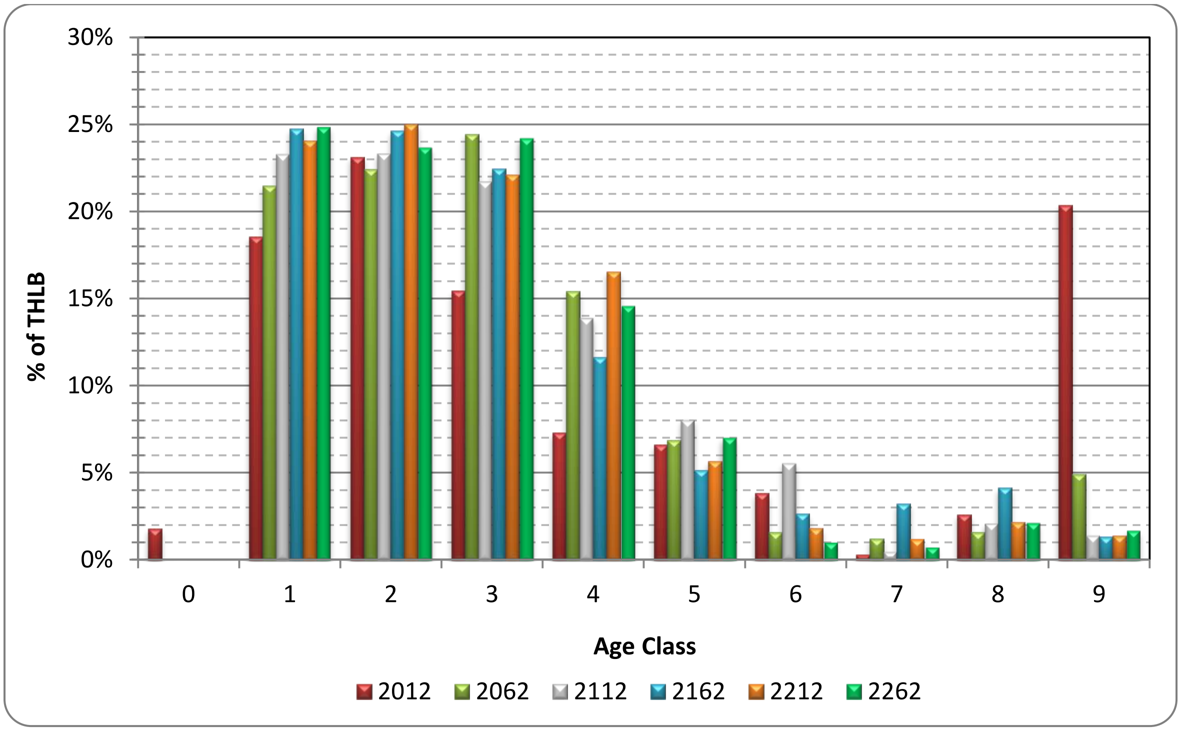

Figure 5 - Age class distribution of timber harvesting land base

Figure 6 illustrates harvestable (i.e. meets minimum harvest criteria) and total growing stock (including the ground-based / cable / non-conventional split) levels for the timber harvesting landbase at the beginning of each decade. Total THLB growing stock declines by about 8% until the transition to second growth harvesting is mostly completed (in third decade) and then returns to near current levels as future stands begin to acquire merchantable volume but harvesting is occurring mainly in existing stands (between fourth and seventh decade). Refer to Figure 3 for the contribution of each stand type to the total harvest level over time.

Once the transition to future stands is mostly completed, total THLB growing stock fluctuates between approximately 60.5 million m^3 and 64 million m^3. Total conventionally-operable growing stock follows a similar pattern, with the long-term growing stock varying between 48.2 million m^3 and 50.1 million m^3. The model constraint applied forced the amount of conventionally-operable growing stock at the end of the analysis period (i.e. start of Decade 26) to be greater than or equal to the amount at the start of Decade 16. More variability is found within the components of the conventionally-operable inventory, ground-based and cable. Non-conventional THLB growing stock declines by roughly 27% over the first 50 years as mainly old growth is harvested and second growth stands are relatively young and therefore not accumulating significant volume. Over the remaining 200 years non-conventional THLB growing stock increases as the rate of growth exceeds the rate of harvest due to the harvest constraint applied to that part of the landbase.

Harvestable volume declines significantly over the first 50 years as old growth and existing second growth stands are harvested and replaced with managed stands. Once the transition to future stands is complete, harvestable volume fluctuates between 20 and 23 million m^3.

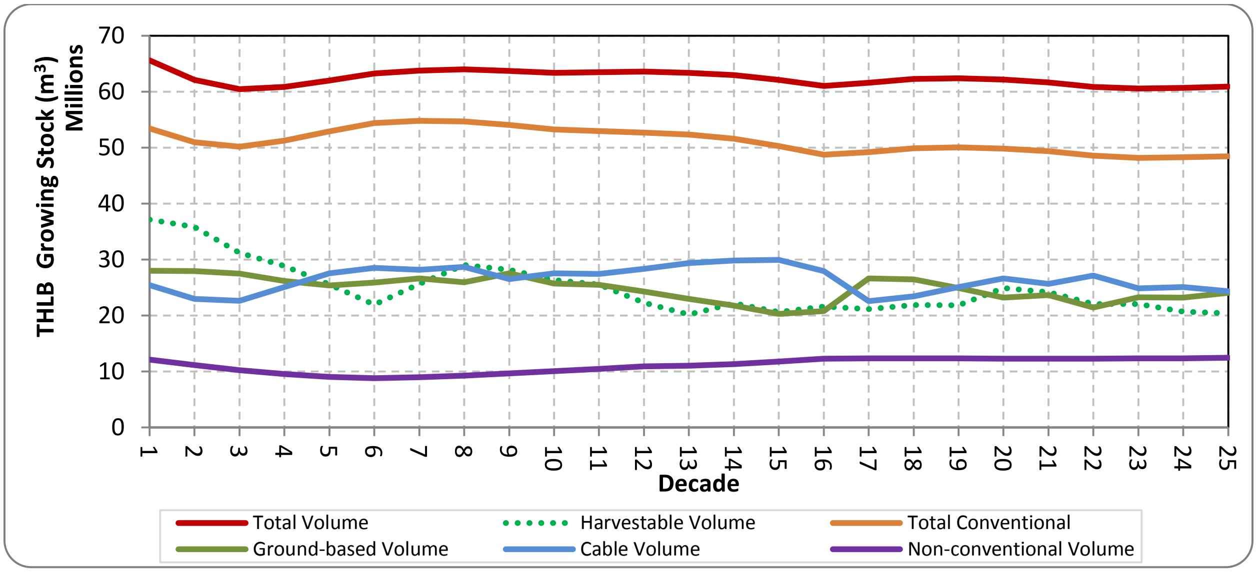

Figure 6 -THLB Growing stock

Figure 7 provides volume-weighted average statistics for timber harvested through the harvest projection. As expected, the mean age of stands harvested declines rapidly as the transition to harvesting of managed stands occurs, dropping from 216 years old in the first decade to 114 years old in the fourth decade (2042-2051). From Decade 5 (2052 – 2061) to Decade 14 (2142 – 2151), the average age slowly declines as the contribution from future managed stands gradually increases. Other than in Decade 16 (2162 – 2171), the average age of second growth (SG) harvested shows relatively little variation: ranging from a low of 75 years in Decade 14 to a high of 92 years in the tenth decade (2102 – 2111). The average age of second growth harvested in Decade 16 (2162 – 2171) is 113 years. This relatively older average is a result of the significant volume sourced from cable harvesting within current managed second growth stands discussed earlier.

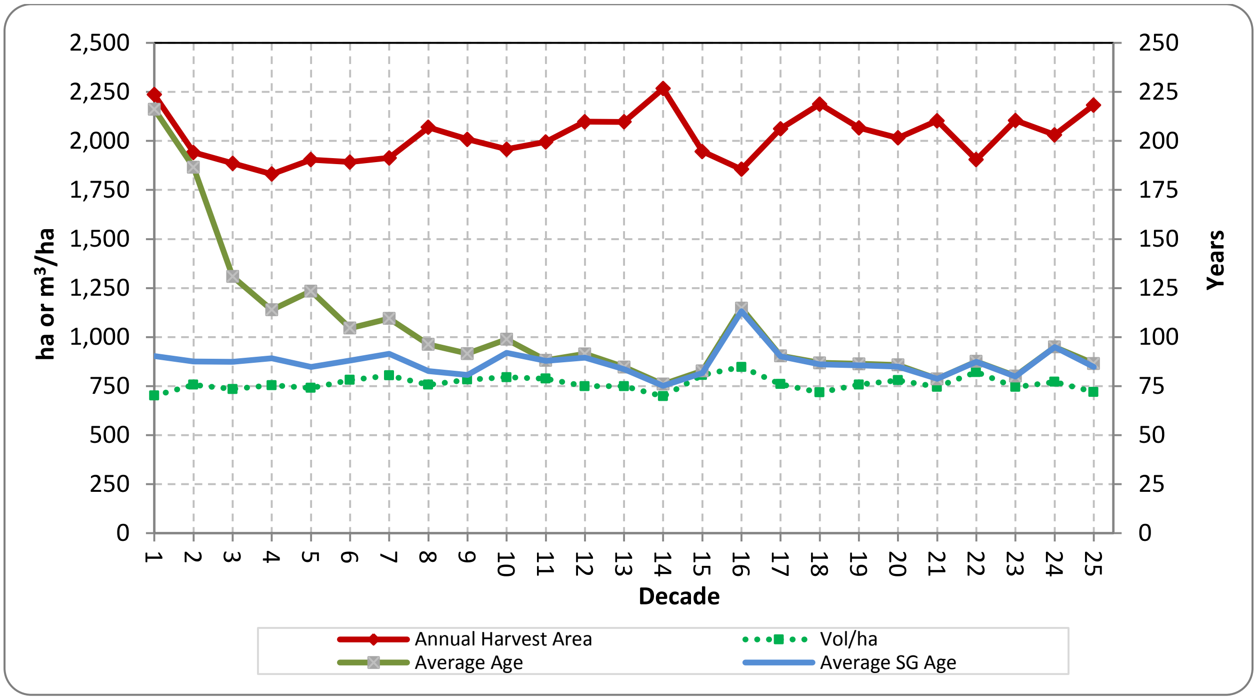

Figure 7 - Harvest Statistics

Annual area harvested declines from 2,236 to 1,831 hectares over the first four decades in conjunction with the decline in harvest volume and increase in the proportion of volume sourced from managed second growth. Once the transition to primarily managed second growth harvesting occurs (fifth decade), annual area harvested generally ranges between 1,900 and 2,200 hectares. Except in Decade 16, merchantable volume per hectare remains reasonably constant at about 750 ± 30 m^3/ha throughout the schedule. In Decade 16 the average volume harvested of 847 m^3/ha is a result of older aged stands being harvested as discussed earlier. The high merchantable volumes harvested in this decade result in a corresponding reduction in area harvested.

The minimum harvest age modelled for stands varied by harvesting system (see Section 11.3.1 of the IP). Figure 8 indicates the contribution by harvesting system to total annual harvest volume and average harvest age. Non-conventional harvest in the first 40 years is maximized at 131,000 m^3/year, is reduced through the mid-term due to a reduction in operable inventory (due to a shortage of older second growth), and in the long-term reaches similar levels as short-term harvest.

Table 7 – Base Case Volume Contribution by Harvesting System

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age (years)	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
1	2012	2021	216	740,200	666,700	131,000	1,537,900
2	2022	2031	187	579,300	741,200	131,000	1,451,500
3	2032	2041	131	393,700	855,000	131,000	1,379,700
4	2042	2051	114	438,000	810,700	131,000	1,379,700
5	2052	2061	123	566,000	716,300	117,100	1,399,400
6	2062	2071	105	662,200	709,900	97,900	1,470,000
7	2072	2081	109	569,800	854,900	95,300	1,520,000
8	2082	2091	96	816,000	639,700	95,600	1,551,300
9	2092	2101	92	513,200	942,700	95,400	1,551,300
10	2102	2111	99	664,700	786,100	100,500	1,551,300
11	2112	2121	88	568,700	895,600	99,600	1,563,900
12	2122	2131	91	560,100	872,800	131,000	1,563,900
13	2132	2141	85	596,100	855,600	112,200	1,563,900
14	2142	2151	76	600,700	870,700	92,500	1,563,900
15	2152	2161	83	782,000	686,900	95,000	1,563,900
16	2162	2171	115	1,118,500	314,400	131,000	1,563,900
17	2172	2181	90	544,400	888,500	131,000	1,563,900
18	2182	2191	87	506,400	926,500	131,000	1,563,900
19	2192	2201	86	529,600	903,300	131,000	1,563,900
20	2202	2211	86	742,300	690,600	131,000	1,563,900
21	2212	2221	79	485,200	947,700	131,000	1,563,900
22	2222	2231	88	850,100	594,200	119,600	1,563,900
23	2232	2241	80	611,700	821,200	131,000	1,563,900
24	2242	2251	95	709,500	734,800	119,600	1,563,900
25	2252	2261	87	615,500	834,100	114,300	1,563,900

As would be expected, once the majority of the volume is sourced from managed stands there is generally a positive relation between the amount of cable harvesting and the average harvest age: as the cable contribution increases, so does the average harvest age. This is due to the substantially older harvest ages on cable-based areas compared to ground-based areas. Of course site quality of the stands harvested is also a factor in determining the average age. The significant cable volume in Decade 16 and the corresponding average harvest age discussed earlier is clearly evident.

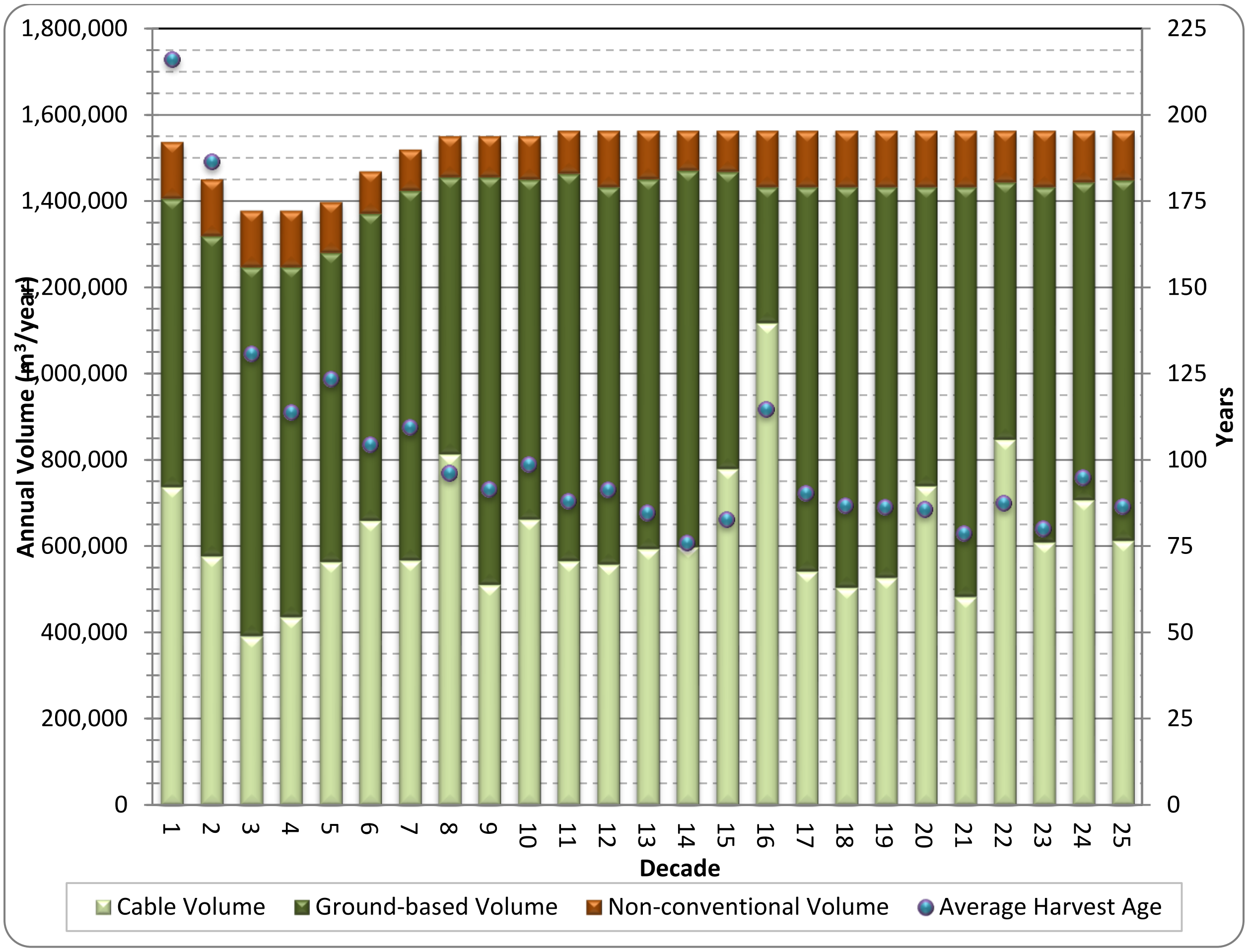

Figure 8 – Base Case Volume Contribution by Harvesting System

2.1 Individual Supply Block Base Case Details

This section provides the same Base Case statistics as in Section 2.0 but by supply block.

2.1.1 Block 1 Base Case Details

Block 1 is located on the Sunshine Coast near the City of Powell River. It includes 34% of the forested area of TFL 39 and 28% of the THLB. Harvesting in Block 1 dates back to the 1890's. That history combined with a history of large forest fires has created an extensive inventory of older second growth timber. As a result, the age class distribution within the block is fairly balanced, creating a stable timber supply (see Table 8 and Figure 9). The current AAC attributed to Block 1 is 408,019 m^3/year.

Table 8 – Block 1 Base Case Harvest Levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3/yr)	% Change from Previous Period
1 - 25	2012	2261	435,300	+ 6.7%

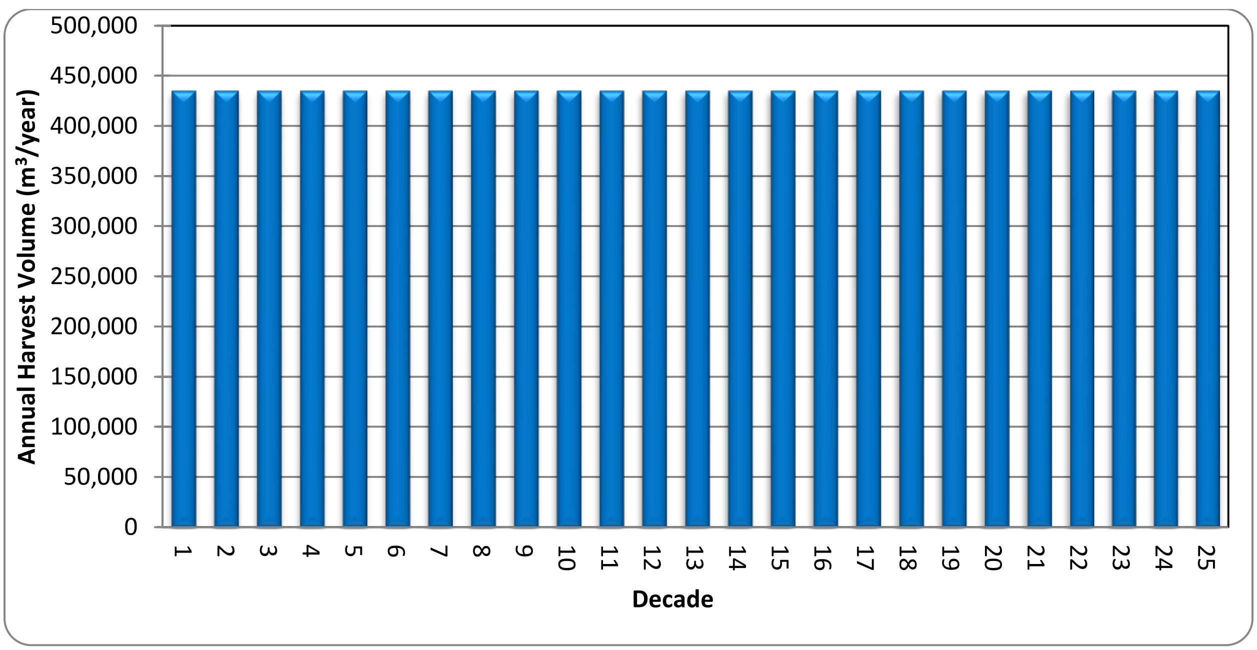

Figure 9 – Block 1 Base Case Harvest Schedule

The Base Case assumptions resulted in a non-declining even harvest flow of 435,300 m^3/year, with 385,300 m^3/year sourced from conventionally-operable landbase and 50,000 m^3/year from non-conventionally operable area (see Figure 15 for a breakdown by harvest system). This is an increase of 6.7% from the current AAC contribution.

Table 9 and Figure 10 indicate the contribution to the total harvest volume by period from each of the stand establishment histories used to define the analysis units. Natural second growth contributes the majority of volume for the first 40 years and significant volume for the next 30 years. Current managed second growth starts contributing in the third decade and provides the bulk of the volume in the fifth, sixth and seventh decades. Beginning in the eight decade, future stands contribute the most volume as the contribution from current managed second growth declines. Mature stand contribution is greatest (20%) in the first 10 years and never exceeds 16% in any other decade.

Table 9 - Stand Types' contribution to Block 1 Base Case harvest

				Annual Harvest Volume (m^3)				
Period (Decade #)	**Start Year**	**End Year**	**Current Old**	**Current Mature**	**Natural Second Growth**	**Current Managed**	**Future Stands**	**Total**
1	2012	2021	55,300	31,800	348,200	0	0	435,300
2	2022	2031	65,500	4,200	365,600	0	0	435,300
3	2032	2041	46,000	400	368,700	20,100	100	435,300
4	2042	2051	7,100	400	304,800	122,800	200	435,300
5	2052	2061	68,400	200	113,800	246,300	6,600	435,300
6	2062	2071	31,200	1,100	82,100	221,900	99,000	435,300
7	2072	2081	44,400	1,700	81,100	230,900	77,200	435,300
8	2082	2091	30,100	500	27,000	121,000	256,700	435,300
9	2092	2101	26,100	0	14,100	76,100	319,000	435,300
10	2102	2111	20,400	0	19,800	94,000	301,100	435,300
11	2112	2121	2,200	0	25,900	46,100	361,100	435,300
12	2122	2131	12,000	0	34,000	21,100	368,200	435,300
13	2132	2141	6,800	0	15,300	6,700	406,500	435,300
14	2142	2151	1,300	0	9,600	2,500	421,900	435,300
15	2152	2161	3,600	0	9,100	2,800	419,800	435,300
16	2162	2171	4,400	0	31,700	12,900	386,300	435,300
17	2172	2181	1,200	0	11,800	5,300	417,000	435,300
18	2182	2191	1,500	0	9,000	7,800	417,000	435,300
19	2192	2201	1,300	0	6,000	1,700	426,300	435,300
20	2202	2211	2,200	0	4,200	2,700	426,200	435,300
21	2212	2221	0	0	5,100	1,800	428,400	435,300
22	2222	2231	1,200	0	2,900	2,200	429,000	435,300
23	2232	2241	600	0	3,400	500	430,800	435,300
24	2242	2251	100	0	2,300	400	432,500	435,300
25	2252	2261	900	0	500	4,200	429,700	435,300

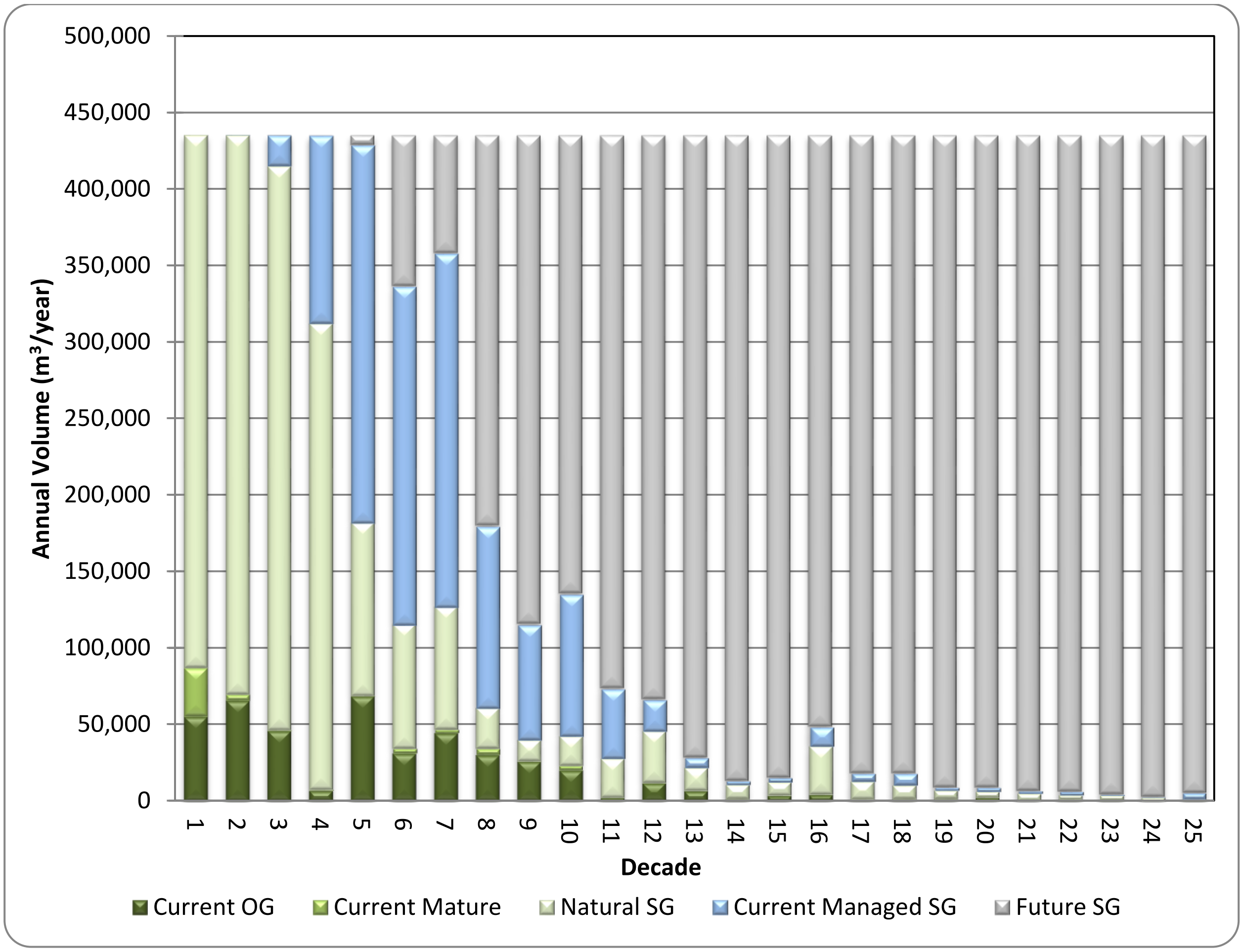

Figure 10 – Stand Types' contribution to Block 1 Base Case harvest

Age class (refer to Table 6) distributions over time based on the 5-year age groupings used in Woodstock are examined in Figure 11 and Figure 12. Age class "zero" only exists in the first time period (2012) due to the presence of NSR lands (and stands established in 2010 and 2011) whereas in future time periods the model "regenerates" harvested stands immediately (a 1-year regeneration delay is incorporated in the yield tables). Within the productive forest the total area in older age classes (5-9) declines by 19% over the first 50 years as old growth and older second growth is harvested. Subsequently the total area in older age classes fluctuates as younger reserved timber ages into the old growth age class and harvesting continues in these age classes (see Figure 11).

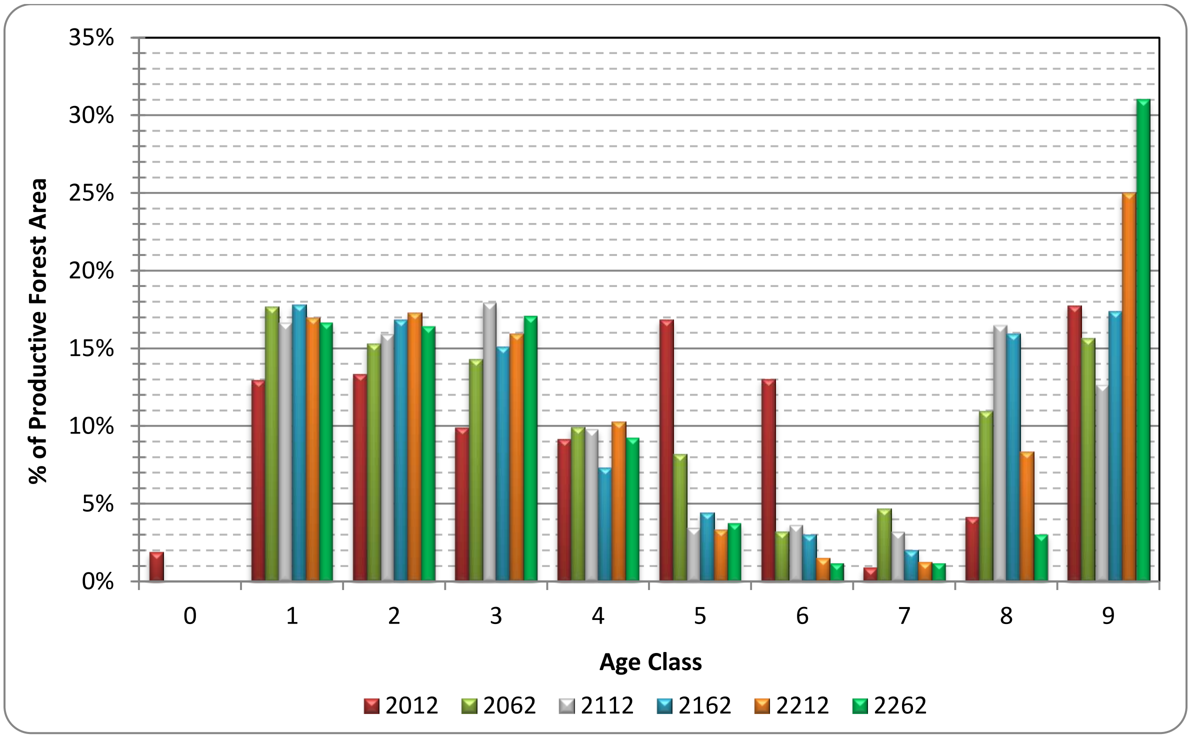

Figure 11 - Age class distribution of Block 1 productive forest area

The total THLB area in age classes 1-4 increases initially until a relatively balanced age class distribution is achieved (refer to Figure 12).

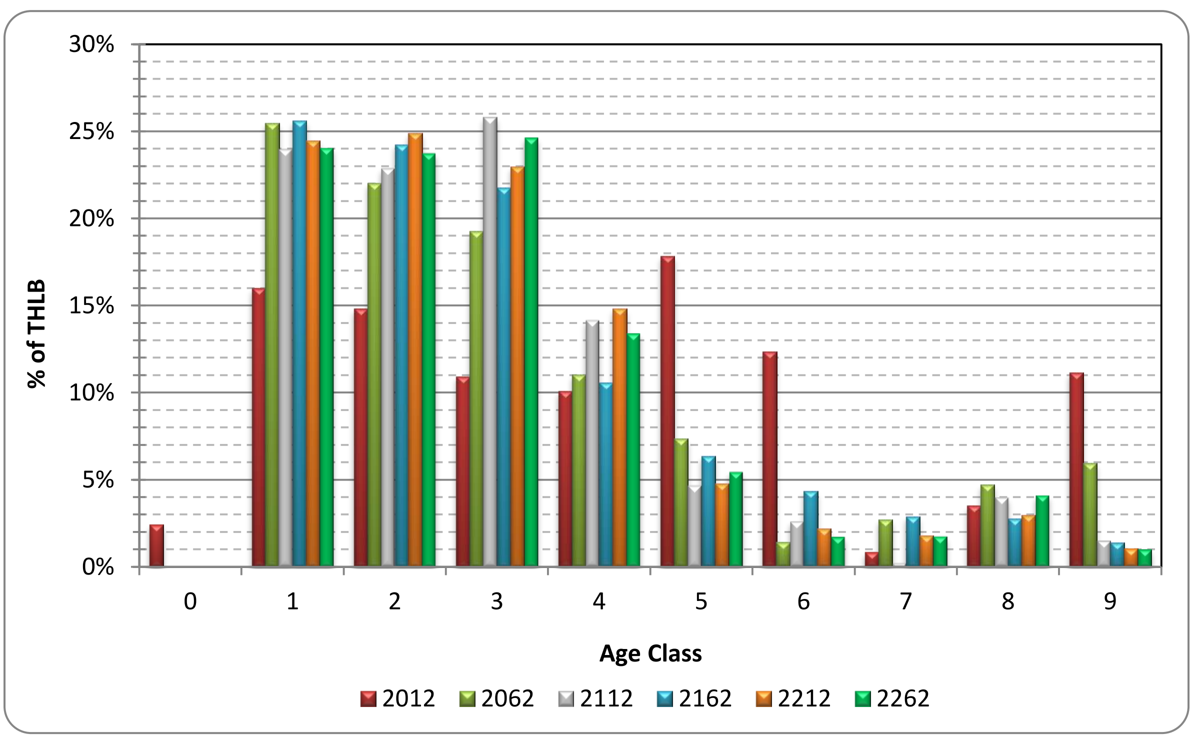

Figure 12 - Age class distribution of Block 1 THLB

Figure 13 illustrates harvestable (i.e. meets minimum harvest criteria) and total growing stock (including the ground-based / cable / non-conventional split) levels for the Block 1 timber harvesting landbase at the beginning of each decade. Total THLB growing stock declines by about 20% until the transition to harvesting future stands is mostly completed (in ninth decade) and then increases slightly due to volume accumulating within the non-conventionally operable landbase (due to the harvesting constraint applied to that portion of the THLB). Refer to Figure 10 for the contribution of each stand type to the total harvest level over time.

Once the transition to future stands is mostly completed, total THLB growing stock fluctuates between approximately 18.0 million m^3 and 18.7 million m^3. Total conventionally-operable growing stock follows a similar pattern, with the long-term growing stock varying between 12.2 million m^3 and 13.2 million m^3. The model constraint applied forced the amount of conventionally-operable growing stock at the end of the analysis period (i.e. start of Decade 26) to be greater than or equal to the amount at the start of Decade 16. More variability is found within the components of the conventionally-operable inventory, ground-based and cable. Non-conventional THLB growing stock declines by roughly 18% over the first 70 years as old, slow-growing stands are harvested and managed second growth stands are relatively young and therefore not accumulating significant volume. Over the balance of the schedule, non-conventional THLB growing stock increases as the rate of growth exceeds the rate of harvest due to the harvest constraint applied to that part of the landbase.

Harvestable volume declines significantly over the first 50 years as mature and existing second growth stands are harvested and replaced with managed stands. Once the transition to future stands is complete, harvestable volume fluctuates between 5 and 8 million m^3.

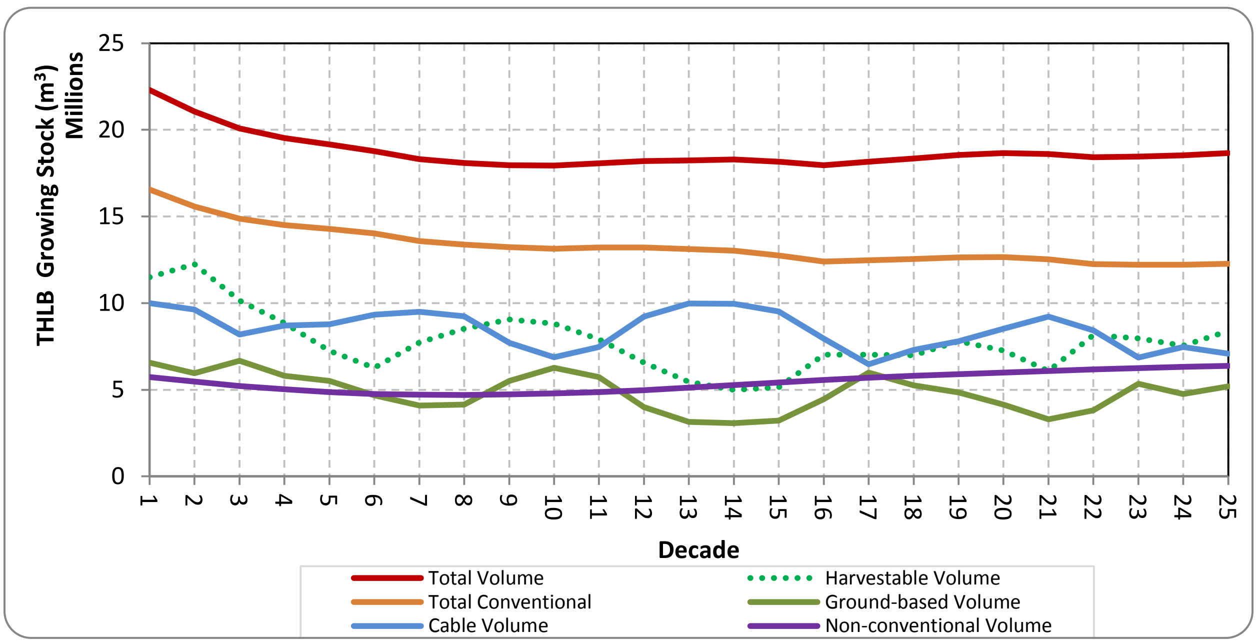

Figure 13 – Block 1 THLB Growing stock

Figure 14 provides area-weighted average statistics for timber harvested through the harvest projection. As expected, the mean age of stands harvested declines as the transition to harvesting of future managed stands occurs, dropping from 147 years old in the first decade to 98 years old in the ninth decade (2092-2101). Other than in Decade 16 (2162 – 2171), the average age of second growth (SG) harvested after the ninth decade shows moderate variation: ranging from a low of 71 years in Decade 14 (2142 – 2151) to a high of 91 years in the eighteenth decade (2182 – 2191). The average age of second growth harvested in Decade 16 (2162 – 2171) is 99 years. This relatively older average is a result of significant volume sourced from cable harvesting within natural second growth stands during that decade.

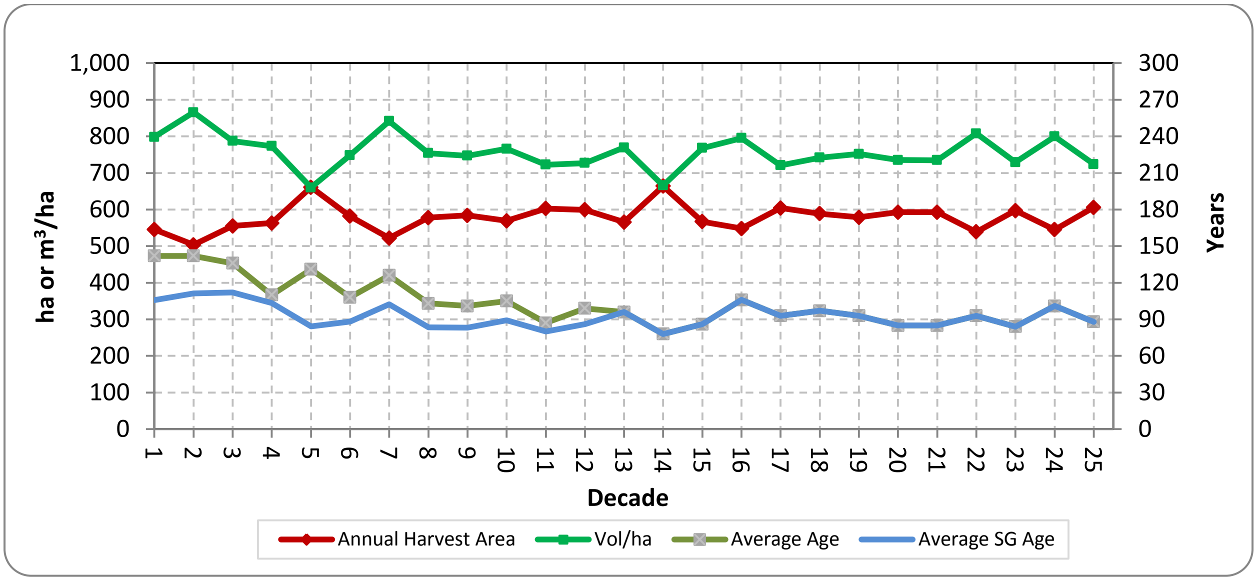

Figure 14 – Block 1 Harvest Statistics

With a constant harvest volume, annual area harvested and average volume per hectare are inversely correlated. Annual area harvested varies from 504 ha in the second decade (2022-2031) to 664 ha in the fourteenth decade. Average harvested volume per hectare ranges from 660 m^3 in the fifth decade to 865 m^3 in the second decade. .

Table 10 and Figure 15 indicate the contribution by harvesting system to total annual harvest volume and average harvest age. Non-conventional volume is constant at 50,000 m^3/year. As previously discussed in Section 2.0, once the majority of the volume is sourced from managed stands there is generally a positive relation between the amount of cable harvesting and the average harvest age. This is due to the substantially older harvest ages on cable-based areas compared to ground-based areas. Site quality of the stands harvested is also a factor in determining the average age.

More details and statistics for the Base Case harvest schedule are presented in Appendix A: Detailed Base Case Harvest Schedule Statistics.

Table 10 – Block 1 Base Case Volume Contribution by Harvesting System

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age (years)	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
1	2012	2021	142	208,700	176,600	50,000	435,300
2	2022	2031	142	317,400	67,900	50,000	435,300
3	2032	2041	136	147,900	237,400	50,000	435,300
4	2042	2051	110	209,200	176,100	50,000	435,300
5	2052	2061	131	164,700	220,600	50,000	435,300
6	2062	2071	108	197,400	187,900	50,000	435,300
7	2072	2081	126	231,400	153,900	50,000	435,300
8	2082	2091	103	337,800	47,500	50,000	435,300
9	2092	2101	101	271,500	113,800	50,000	435,300
10	2102	2111	105	166,400	218,900	50,000	435,300
11	2112	2121	87	79,200	306,100	50,000	435,300
12	2122	2131	99	177,800	207,500	50,000	435,300
13	2132	2141	96	225,300	160,000	50,000	435,300
14	2142	2151	78	238,100	147,200	50,000	435,300
15	2152	2161	86	333,200	52,100	50,000	435,300
16	2162	2171	106	335,600	49,700	50,000	435,300
17	2172	2181	93	140,000	245,300	50,000	435,300
18	2182	2191	97	199,200	186,100	50,000	435,300
19	2192	2201	93	168,800	216,500	50,000	435,300
20	2202	2211	85	158,400	226,900	50,000	435,300
21	2212	2221	85	283,100	102,200	50,000	435,300
22	2222	2231	93	346,300	39,000	50,000	435,300
23	2232	2241	84	152,300	233,000	50,000	435,300
24	2242	2251	101	266,600	118,700	50,000	435,300
25	2252	2261	88	159,000	226,300	50,000	435,300

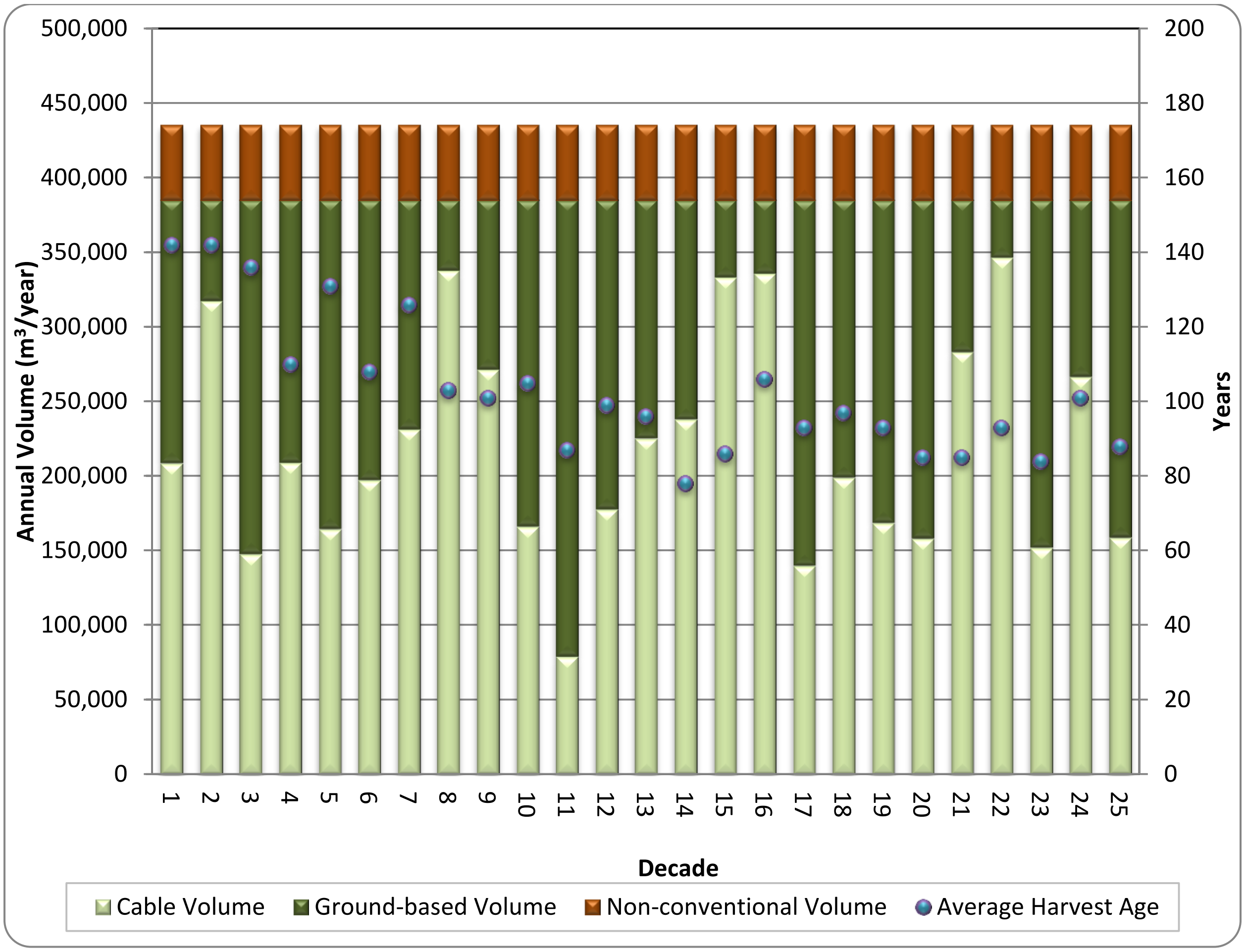

Figure 15 – Block 1 Volume Contribution by Harvesting System

2.1.2 Block 2 Base Case Details

Block 2, located northwest of the City of Campbell River on Vancouver Island, is the largest block in TFL 39: it includes 43% of the forested area of the TFL and 54% of the THLB. It contributes the largest timber supply of all blocks due to its good growing sites and high proportion of THLB operable with ground-based equipment. The current AAC attributed to this block is 1,073,271 m^3/year. Table 11 and Figure 16 present the Base Case harvest schedule for Block 2.

Table 11 – Block 2 Base Case Harvest Levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3/yr)	% Change from Previous Period
1	2012	2021	864,300	-19.5%
2	2022	2031	777,900	-10.0%
3 - 5	2032	2061	706,100	-9.2%
6	2062	2071	756,100	7.1%
7	2072	2081	806,100	6.6%
8 - 25	2082	2261	833,700	3.4%

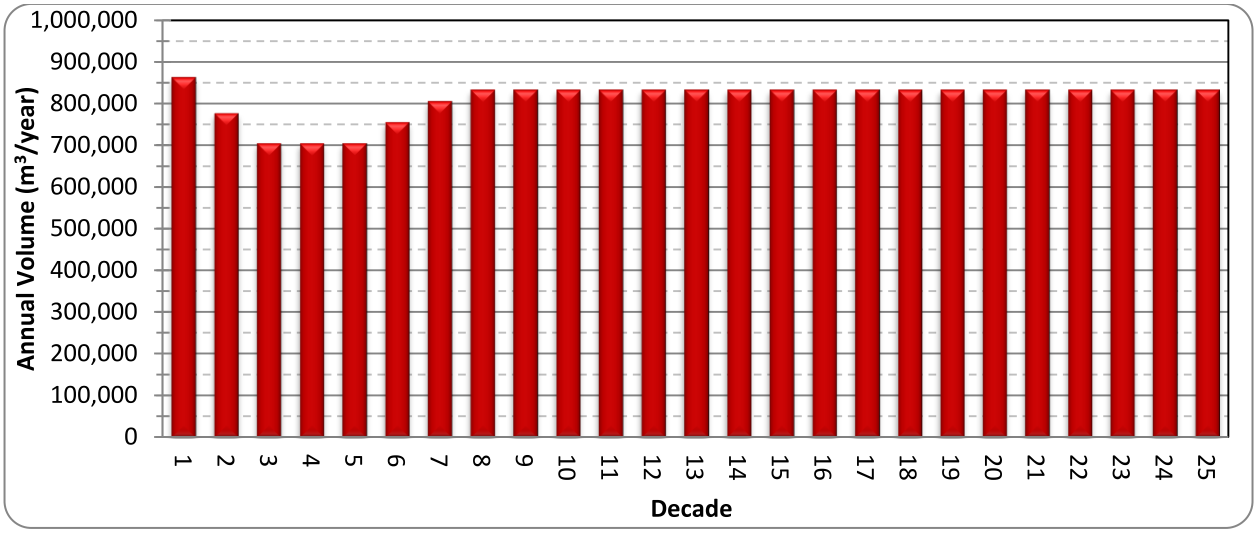

Figure 16 – Block 2 Base Case Harvest Schedule

The Base Case assumptions result in the harvest level for Block 2 declining by approximately 34% (from the current AAC contribution) over the next 30 years. Limiting future declines to 10% per decade requires an initial decline to 864,300 m^3/year. This significant decline can be attributed to several factors:

- The MP #8 analysis (done in 2000) indicated that the harvest level would have declined by 7.6%, or about 82,000 m^3/year, by now.
- New (since the MP #8 analysis) landscape-level reserves (e.g. OGMAs and WHAs) have significantly reduced available old forest, thereby reducing THLB and the volume of timber available in the short-term.
- Tenure reallocation through the *Forestry Revitalization Act*. The area removed from Block 2 contained higher than average forest inventory; therefore the AAC adjustment, done on a THLB area basis, underestimated the AAC impact.
- The constraint placed on timber supply contribution from the non-conventional landbase.
- Accounting for area removed in January 2008 to create two woodlots for which no AAC adjustment has yet been made. The area removed was estimated to provide an AAC of 4,478 m^3/year.

The harvest level declines to a low of 706,100 m^3/year in the third decade (2032 – 2041) and remains at that amount for 30 years. As harvest transitions to future stands beginning in the sixth decade (2062 – 2071), the harvest level can increase over a period of 20 years until it reaches the current estimated long-term harvest level (LTHL) of 833,700 m^3/year in 2082 (Decade 8).

Table 12 and Figure 17 indicate the contribution to the total harvest volume by period from each of the stand establishment histories. Old stands contribute the greatest volume in the first 20 years and declines significantly to become a minor component of the harvest volume in the following 80 years. Natural second growth provides approximately one-quarter of the volume in the first 40 years and then declines to less than 1% by Decade 8 (2082 – 2091). Current managed second growth contributes the majority of volume beginning in Decade 3 (2032 – 2041) and does so for 50 years. Beginning in the eight decade, future stands contribute the most volume as the contribution from current managed second growth declines. During Decade 16 and 17 (i.e. 2162 - 2181) both natural and current managed second growth contribute to timber supply. The natural second growth contribution results from a large share of these stands having reached old seral age (i.e. at least 251 years old) and thus can contribute to the OGMA targets for the end of the second rotation (see Section 11.2.4 in the Information Package for details). In order to meet the second rotation OGMA targets, some of the older natural second growth stands within the THLB must not be harvested until sufficient old forest exists within the non-contributing landbase. This occurs in Decade 16 and 17, thus creating harvest opportunity within the natural second growth stands. The contribution of current managed second growth stands is from stands that are less than 10 years old in 2012 growing on poor sites and operable by cable systems. The minimum harvest criteria applied dictates that such stands are not available for harvest until this time period.

Table 12 - Stand Types' contribution to Block 2 Base Case harvest

			Annual Harvest Volume (m^3)					
Period (Decade #)	**Start Year**	**End Year**	**Current Old**	**Current Mature**	**Natural Second Growth**	**Current Managed Second**	**Future Stands**	**Total**
1	2012	2021	566,300	46,800	249,900	1,300	0	864,300
2	2022	2031	444,900	9,100	215,600	108,300	0	777,900
3	2032	2041	152,000	6,800	173,300	374,000	0	706,100
4	2042	2051	78,900	300	172,000	454,900	0	706,100
5	2052	2061	79,200	0	99,700	520,200	7,000	706,100
6	2062	2071	64,700	2,500	47,000	621,300	20,600	756,100
7	2072	2081	67,200	0	48,300	450,300	240,300	806,100
8	2082	2091	54,700	0	7,200	261,700	510,100	833,700
9	2092	2101	40,000	0	300	109,500	683,900	833,700
10	2102	2111	20,700	0	12,900	182,900	617,200	833,700
11	2112	2121	2,100	0	3,400	118,900	709,300	833,700
12	2122	2131	2,100	0	4,800	106,300	720,500	833,700
13	2132	2141	2,100	0	400	37,400	793,800	833,700
14	2142	2151	2,100	0	2,600	10,900	818,100	833,700
15	2152	2161	2,100	0	8,700	6,100	816,800	833,700
16	2162	2171	2,100	0	35,500	173,800	622,300	833,700
17	2172	2181	2,100	0	38,000	14,800	778,800	833,700
18	2182	2191	2,100	0	900	3,600	827,100	833,700
19	2192	2201	2,100	0	1,000	11,000	819,600	833,700
20	2202	2211	2,100	0	0	3,500	828,100	833,700
21	2212	2221	800	0	0	600	832,300	833,700
22	2222	2231	100	0	0	1,600	832,000	833,700
23	2232	2241	100	0	0	1,200	832,400	833,700
24	2242	2251	100	0	0	600	833,000	833,700
25	2252	2261	100	0	0	500	833,100	833,700

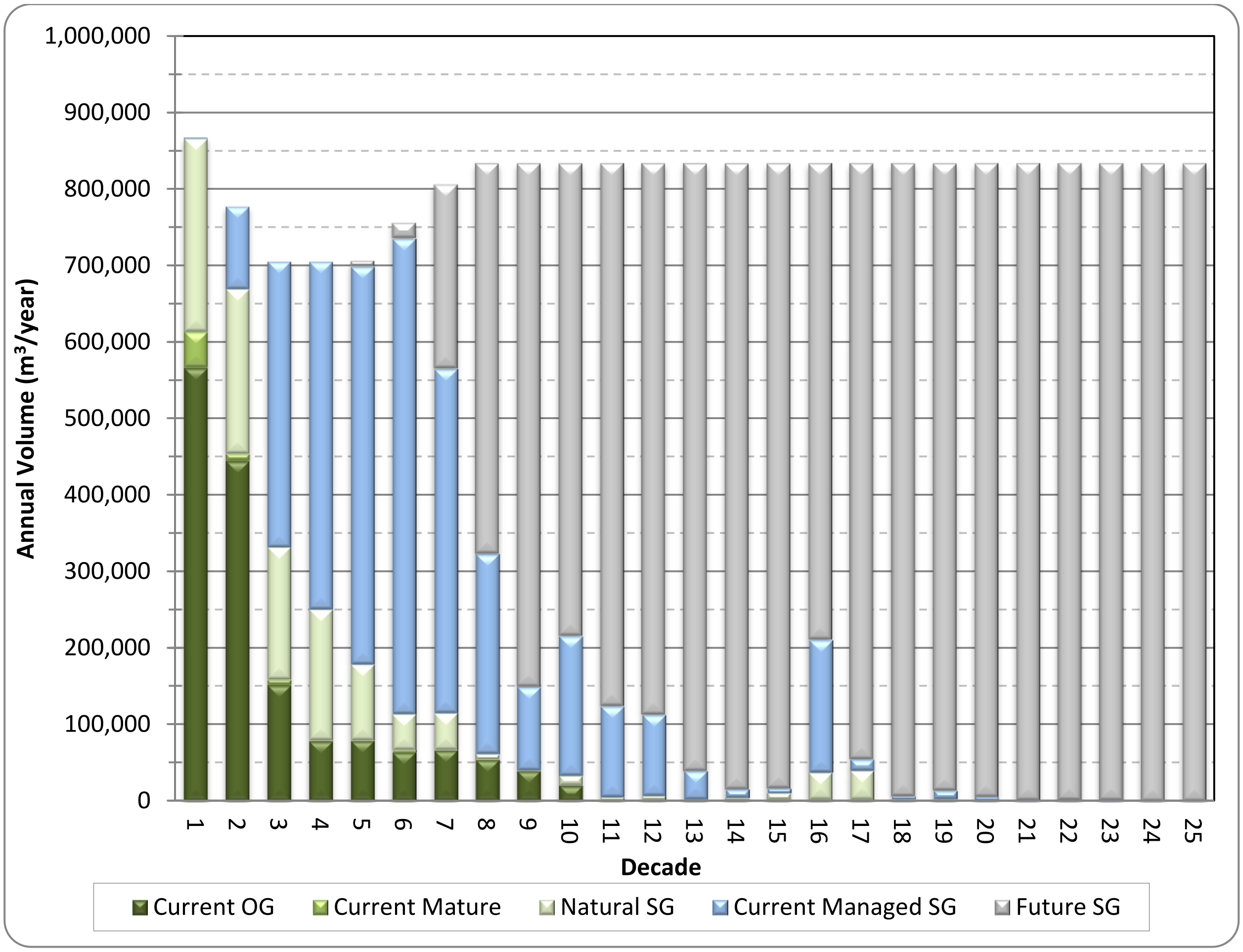

Figure 17 – Stand Types' contribution to Block 2 Base Case harvest

Age class (refer to Table 6) distributions over time based on the 5-year age groupings used in Woodstock are examined in Figure 18 and Figure 19. Age class "zero" only exists in the first time period (2012) due to the presence of NSR lands (and stands established in 2010 and 2011) whereas in future time periods the model "regenerates" harvested stands immediately (a 1-year regeneration delay is incorporated in the yield tables). Within the productive forest the total area in the oldest age class declines by 45% over the first 100 years as old growth is harvested. Subsequently the total area of old forest increases as younger reserved timber ages into the old growth age class (see Figure 18).

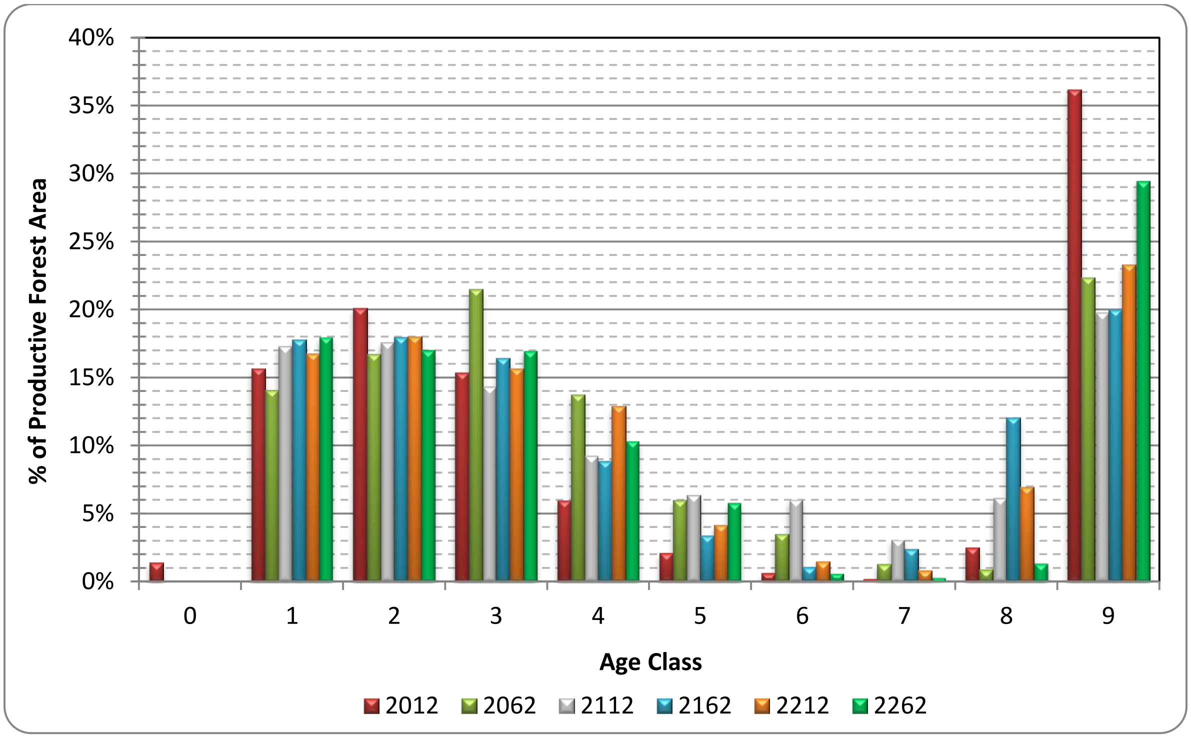

Figure 18 - Age class distribution of Block 2 productive forest area

The total THLB area in age classes 1-4 increases initially until a relatively balanced age class distribution is achieved (refer to Figure 19).

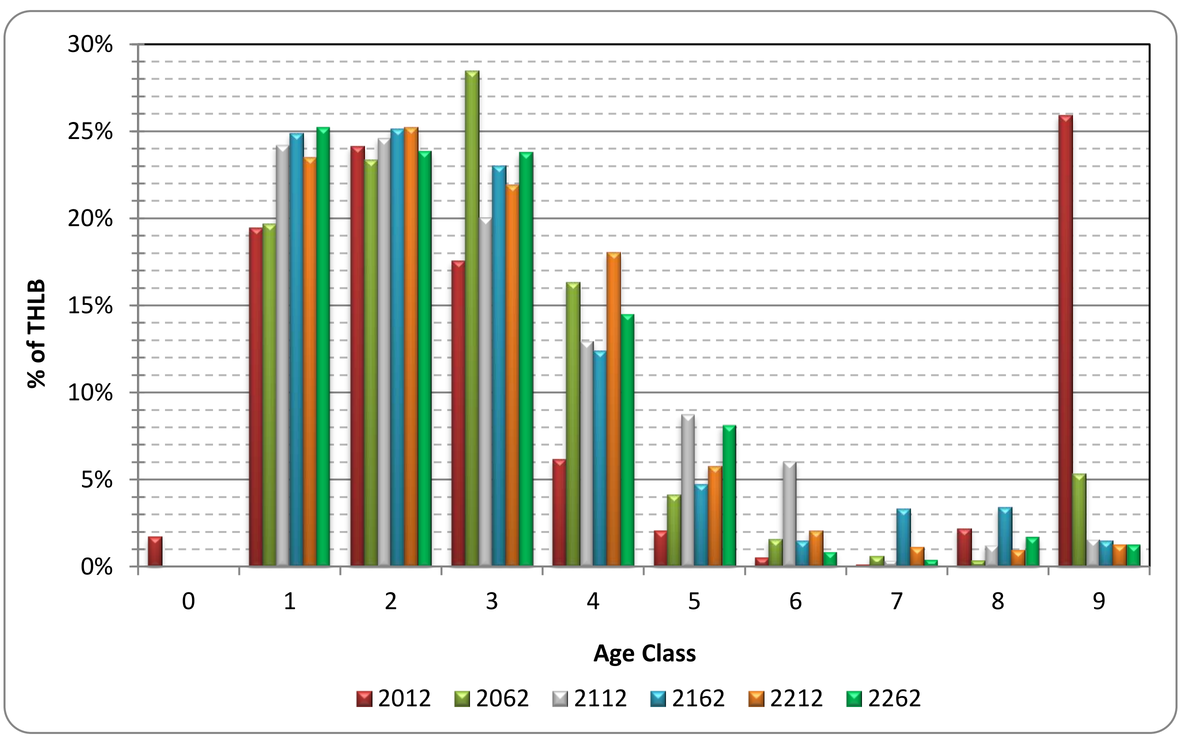

Figure 19 - Age class distribution of Block 2 THLB

Figure 20 illustrates harvestable (i.e. meets minimum harvest criteria) and total growing stock (including the ground-based / cable / non-conventional split) levels for the Block 2 timber harvesting landbase at the beginning of each decade. Total THLB growing stock declines by about 11% over the first 20 years until the transition to second growth harvesting is mostly completed and then returns to near current levels as future stands begin to acquire merchantable volume but harvesting is occurring mainly in existing stands. Refer to Figure 17 for the contribution of each stand type to the total harvest level over time.

Once the transition to future stands is mostly completed, total THLB growing stock fluctuates between approximately 30.7 million m^3 and 32.0 million m^3. Total conventionally-operable growing stock follows a similar pattern, with the long-term growing stock varying between 26.5 million m^3 and 29.0 million m^3. The model constraint applied forced the amount of conventionally-operable growing stock at the end of the analysis period (i.e. start of Decade 26) to be greater than or equal to the amount at the start of Decade 16. Greater variability is found within the ground-based and cable components of the conventionally-operable inventory. Non-conventional THLB growing stock declines by roughly 26% over the first 60 years as old stands are harvested and managed second growth stands are relatively young and therefore not accumulating significant volume. Over the remaining 190 years of the schedule, non-conventional THLB growing stock increases as growth exceeds harvest due to the harvest constraint applied to that part of the landbase.

Harvestable volume declines significantly over the first 50 years as old growth and existing second growth stands are harvested and replaced with managed stands. Once the transition to future stands is complete, harvestable volume fluctuates between 8 and 14 million m^3.

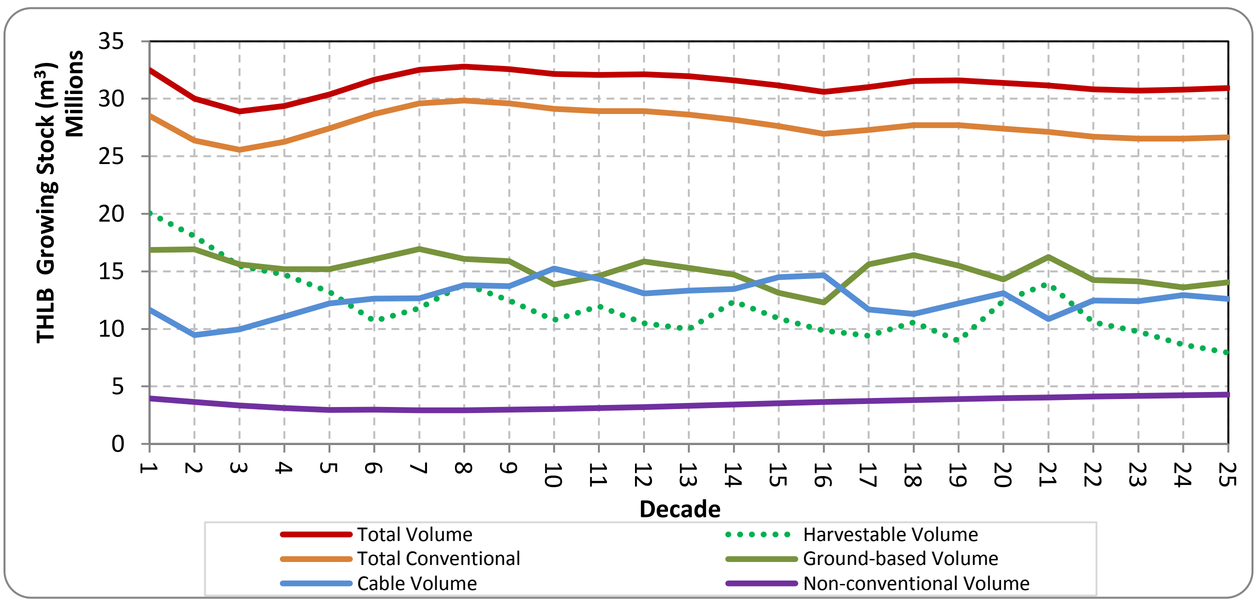

Figure 20 – Block 2 THLB Growing stock

Figure 21 provides area-weighted average statistics for timber harvested through the harvest projection. As expected, the mean age of stands harvested declines as the contribution of managed stands increases, dropping from 242 years old in the first decade to 88 years old in the ninth decade (2092-2101). Other than in Decade 16 (2162 – 2171), the average age of second growth (SG) harvested shows moderate variation: ranging from a low of 75 years in Decade 3 (2032 – 2041) to a high of 98 years in the Decade 24 (2242 – 2251) and averaging 84 years. The average age of second growth harvested in Decade 16 (2162 – 2171) is 120 years. This relatively older average is a result of significant volume sourced from cable harvesting within current managed second growth stands during that decade.

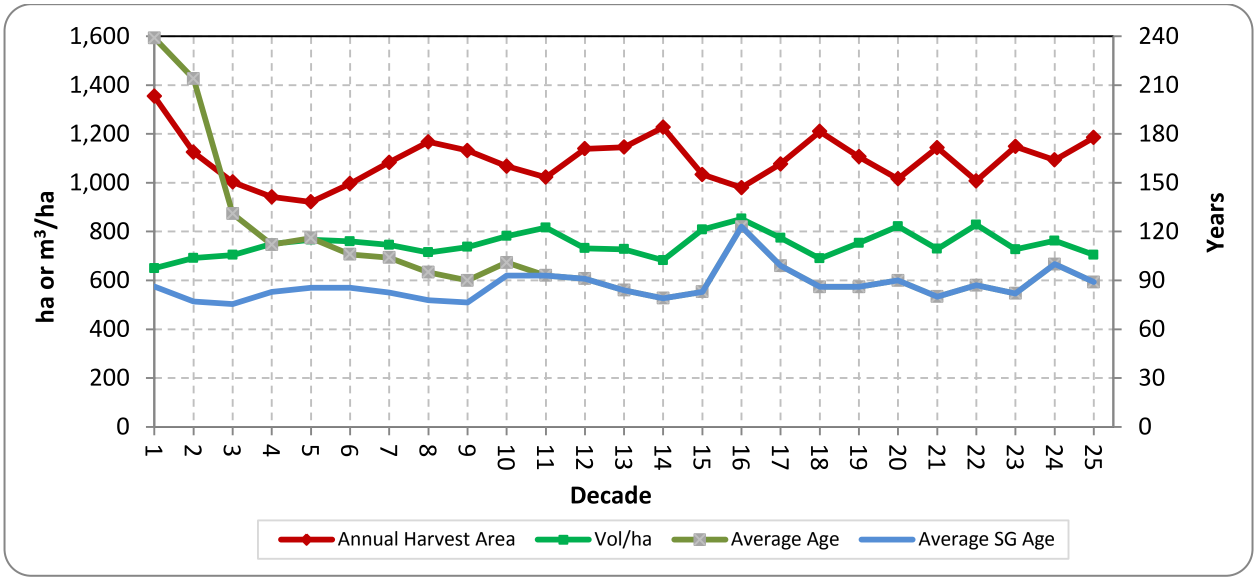

Figure 21 – Block 2 Harvest Statistics

Annual area harvested declines from 1,354 ha to 921 ha over the first 50 years as the harvest level declines. Meanwhile over the same timeframe, average volume harvested increases from 649 m^3/ha to 767 m^3/ha as harvesting transitions to managed stands. As the harvest level increases between the fifth and eight decade, annual area harvested increases from 921 ha to 1,167 ha. After that, the annual harvest area generally fluctuates between 1,000 ha and 1,200 ha while average harvested volume per hectare ranges from 680 m^3 to 850 m^3.

Table 13 and Figure 22 indicate the contribution by harvesting system to total annual harvest volume and average harvest age. Except for Decade 5 when it decreases to 28,900 m^3/year, the non-conventional contribution is consistently 40,000 m^3/year. Once again there is generally a direct relation between the amount of cable harvesting and the average harvest age once the majority of the volume is sourced from managed stands. This is due to the substantially older harvest ages on cable-based areas compared to ground-based areas. Site quality of the stands harvested is also a factor in determining the average age. The significant cable volume in Decade 16 and the corresponding average harvest age discussed earlier (associated with natural and current managed second growth contribution) is evident.

More details and statistics for the Base Case harvest schedule are presented in Appendix A: Detailed Base Case Harvest Schedule Statistics.

Table 13 – Block 2 Base Case Volume Contribution by Harvesting System

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
1	2012	2021	239	428,200	396,100	40,000	864,300
2	2022	2031	214	187,700	550,200	40,000	777,900
3	2032	2041	131	185,800	480,300	40,000	706,100
4	2042	2051	112	206,000	460,100	40,000	706,100
5	2052	2061	116	265,200	412,000	28,900	706,100
6	2062	2071	106	299,600	416,500	40,000	756,100
7	2072	2081	104	194,800	571,300	40,000	806,100
8	2082	2091	95	311,100	482,600	40,000	833,700
9	2092	2101	90	155,800	637,900	40,000	833,700
10	2102	2111	101	393,400	400,300	40,000	833,700
11	2112	2121	93	399,600	394,100	40,000	833,700
12	2122	2131	91	252,300	541,400	40,000	833,700
13	2132	2141	84	280,600	513,100	40,000	833,700
14	2142	2151	79	201,700	592,000	40,000	833,700
15	2152	2161	83	286,200	507,500	40,000	833,700
16	2162	2171	123	582,000	211,700	40,000	833,700
17	2172	2181	99	323,200	470,500	40,000	833,700
18	2182	2191	86	204,300	589,400	40,000	833,700
19	2192	2201	86	218,300	575,400	40,000	833,700
20	2202	2211	90	514,300	279,400	40,000	833,700
21	2212	2221	80	137,200	656,500	40,000	833,700
22	2222	2231	87	322,400	471,300	40,000	833,700
23	2232	2241	82	258,700	535,000	40,000	833,700
24	2242	2251	100	334,300	459,400	40,000	833,700
25	2252	2261	89	322,200	471,500	40,000	833,700

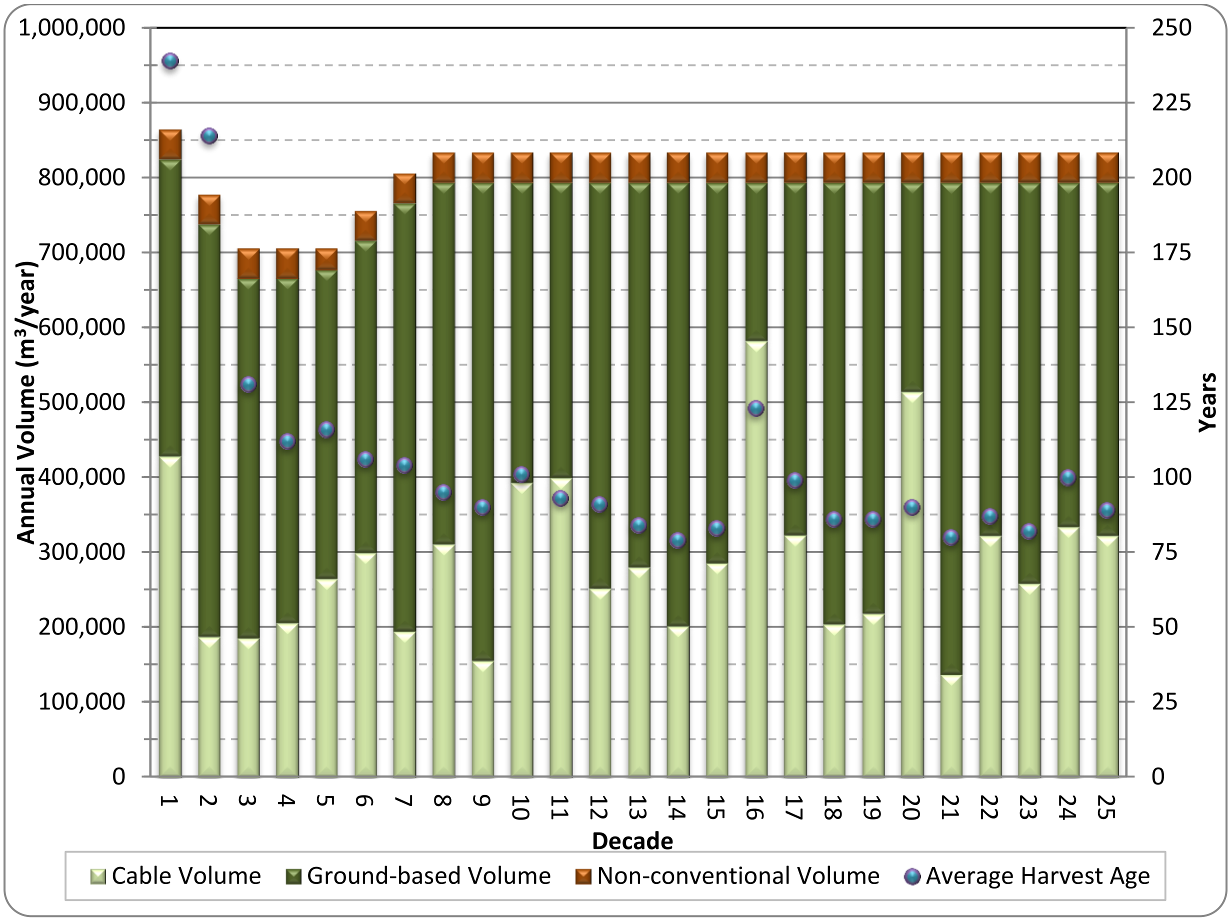

Figure 22 – Block 2 Volume Contribution by Harvesting System

2.1.3 Block 4 Base Case Details

Block 4 is located southwest of the Town of Port McNeill on Vancouver Island. It includes about 12% of the forested area of TFL 39 and 15% of the THLB. The land base within Block 4 is the least constrained of the five supply blocks within TFL 39; the THLB is slightly more than 75% of the productive forest area. In MP #8, Block 3 and 4 were modeled as a single unit and the current AAC contribution attributed to these blocks is 288,690 m^3/year. Allocating this AAC based on THLB results in an AAC for Block 4 of roughly 258,690 m^3/year. Table 14 and Figure 23 present the Base Case harvest schedule for Block 4.

Table 14 – Block 4 Base Case Harvest Levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3/yr)	% Change from Previous Period
1 - 4	2012	2051	197,000	-23.8%
5	2052	2061	216,700	10.0%
6 - 10	2062	2111	237,300	9.5%
11 - 25	2112	2261	249,900	5.3%

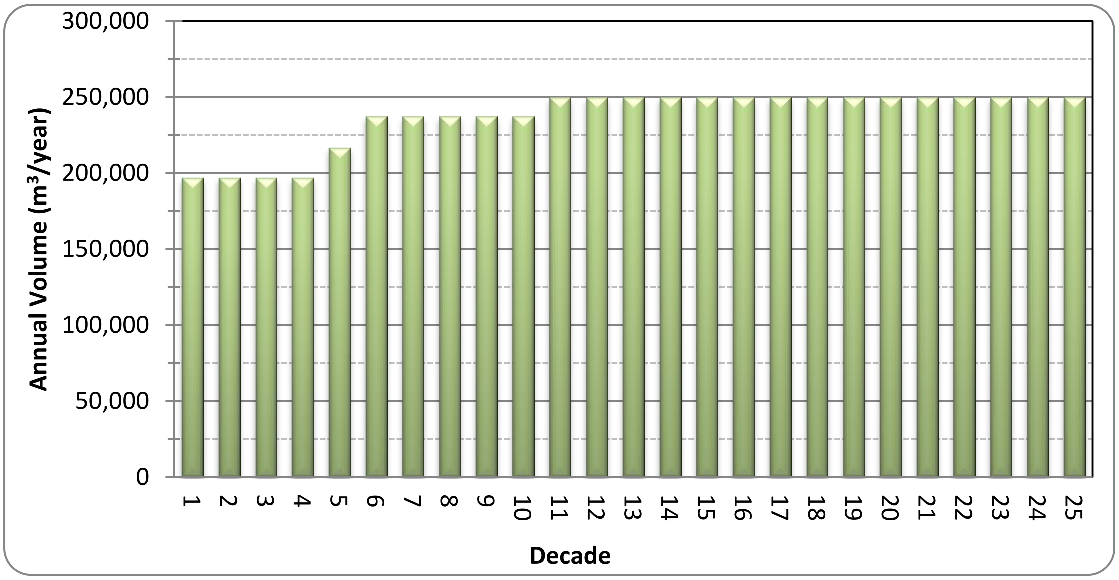

Figure 23 – Block 4 Base Case Harvest Schedule

The Base Case assumptions indicate an initial harvest level for Block 4 of 197,000 m^3/year; a decline of nearly 24%. This significant decline can be attributed to several factors:

- New (since the MP #8 analysis) landscape-level reserves (e.g. OGMAs and WHAs) have significantly reduced available old forest, thereby reducing THLB and the volume of timber available in the short-term.
- The constraint placed on timber supply contribution from the non-conventional.
- Accounting for area removed in January 2010 to create a community forest for which no AAC adjustment has yet been made. The area removed was estimated to provide an AAC of 10,000 m^3/year.
- As mentioned earlier, in MP #8 Blocks 3 and 4 were analyzed as a single unit. The age class distributions of these two blocks lent themselves to this, with Block 3 having significant THLB area and volume in old and natural second growth age classes while the Block 4 THLB was split between old and young stands. Since Block 3 has been greatly reduced in size due to the *Forestry Revitalization* Act and is now subject to the requirements of the *South Central Coast Order*, it is combined with Block 5 (also subject to the *SCCO*) in this analysis. With additional old forest reserved, the Block 4 THLB is heavily skewed to young forest (see Figure 26 below).

The harvest level remains at 197,000 m^3/year for 40 years before increasing to 237,300 m^3/year over a period of 20 years as timber supply transitions from natural stands to managed stands. It remains at that level for 50 years and then increases (in the eleventh decade (2112 – 2121)) to the current estimated long-term harvest level (LTHL) of 249,900 m^3/year.

Table 15 and Figure 24 indicate the contribution to the total harvest volume by period from each of the stand establishment histories. Old stands contribute the greatest volume in the first 20 years, declines significantly to become a minor component of the harvest volume in the following 40 years and, except for the last 10 years when 4% of the harvest is old timber harvested via non-conventional, immaterial volume thereafter. Natural second growth provides approximately one-third of the volume in the first 20 years and then about 15% during the next 50 years. For the rest of the schedule, these stands never provide more than 1% of total timber supply in any decade. Current managed second growth contributes the majority of volume beginning in Decade 3 (2032 – 2041) and does so for 60 years. Beginning in the ninth decade (2092 – 2101), future stands contribute the most volume as the contribution from current managed second growth declines. During Decade 16 (2162 - 2171), as in Block 2, current managed second growth contributes substantial volume. This contribution is from stands that are less than 10 years old in 2012 growing on poor sites and operable by cable systems. The minimum harvest criteria applied dictates that such stands are not available for harvest until this time period.

Table 15 - Stand Types' contribution to Block 4 Base Case harvest

			Annual Harvest Volume (m^3)					
Period (Decade #)	**Start Year**	**End Year**	**Current Old**	**Current Mature**	**Natural Second Growth**	**Current Managed**	**Future Stands**	**Total**
1	2012	2021	120,800	14,100	61,200	900	0	197,000
2	2022	2031	97,600	2,000	69,000	28,400	0	197,000
3	2032	2041	45,900	200	41,300	109,600	0	197,000
4	2042	2051	37,100	0	48,700	109,100	2,100	197,000
5	2052	2061	47,400	0	33,300	135,900	100	216,700
6	2062	2071	9,500	0	2,800	224,300	700	237,300
7	2072	2081	3,400	0	28,400	204,400	1,100	237,300
8	2082	2091	2,400	0	3,800	187,000	44,100	237,300
9	2092	2101	0	0	0	95,000	142,300	237,300
10	2102	2111	0	0	2,100	40,800	194,400	237,300
11	2112	2121	0	0	0	29,300	220,600	249,900
12	2122	2131	0	0	0	21,900	228,000	249,900
13	2132	2141	0	0	0	400	249,500	249,900
14	2142	2151	0	0	0	6,600	243,300	249,900
15	2152	2161	0	0	800	1,500	247,600	249,900
16	2162	2171	900	0	2,000	54,000	193,000	249,900
17	2172	2181	100	0	0	1,700	248,100	249,900
18	2182	2191	0	0	0	3,600	246,300	249,900
19	2192	2201	0	0	0	2,400	247,500	249,900
20	2202	2211	0	0	0	5,600	244,300	249,900
21	2212	2221	0	0	0	0	249,900	249,900
22	2222	2231	0	0	0	3,200	246,700	249,900
23	2232	2241	0	0	0	4,200	245,700	249,900
24	2242	2251	0	0	0	300	249,600	249,900
25	2252	2261	9,800	0	2,200	4,800	233,100	249,900

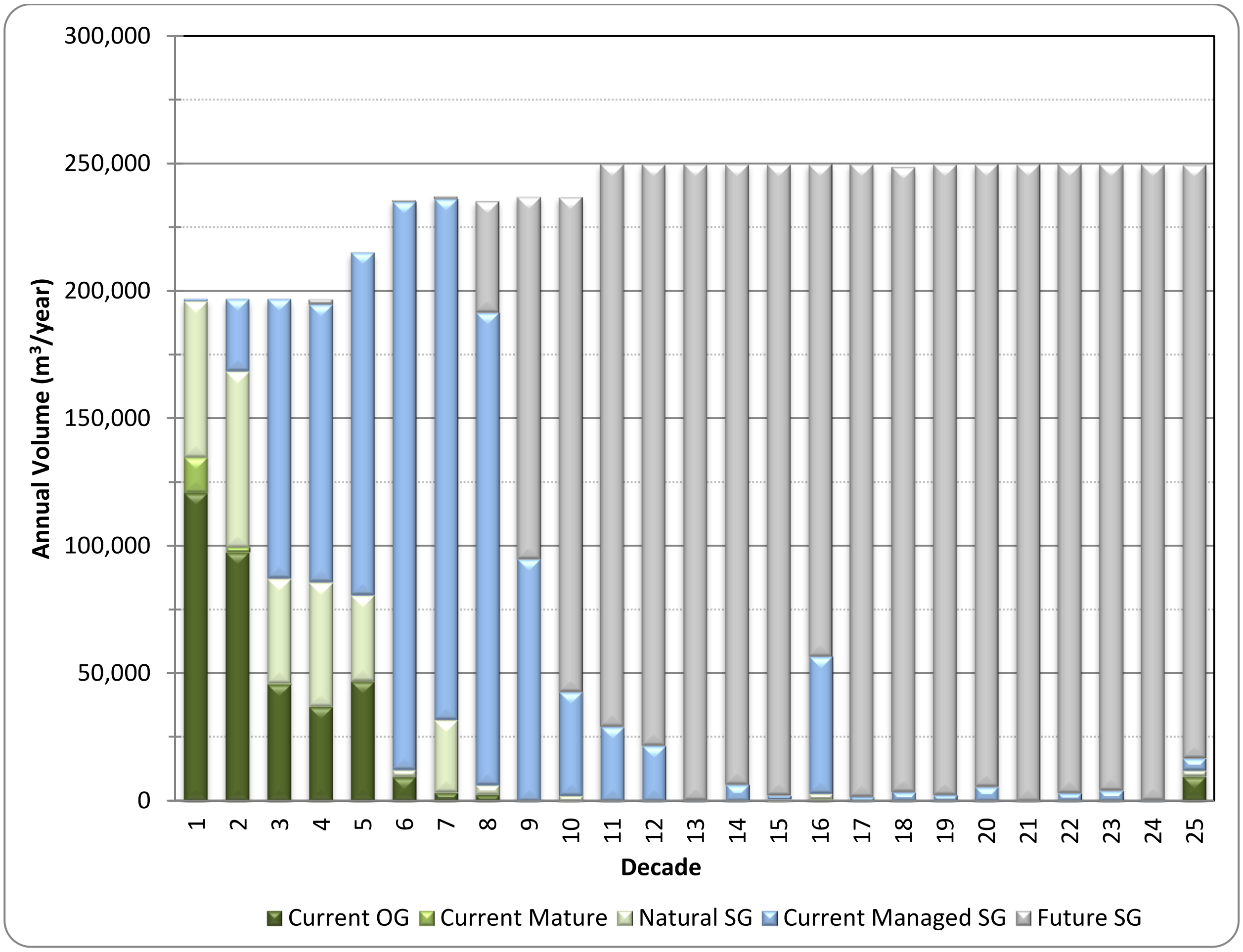

Figure 24 – Stand Types' contribution to Block 4 Base Case harvest

Age class (refer to Table 6) distributions over time based on the 5-year age groupings used in Woodstock are examined in Figure 25 and Figure 26. Age class "zero" only exists in the first time period (2012) due to the presence of NSR lands (and stands established in 2010 and 2011) whereas in future time periods the model "regenerates" harvested stands immediately (a 1-year regeneration delay is incorporated in the yield tables). Within the productive forest the total area in the oldest age class declines by more than 50% over the first 100 years as old growth is harvested. Subsequently the total area of old forest increases as younger reserved timber ages into the old growth age class (see Figure 25).

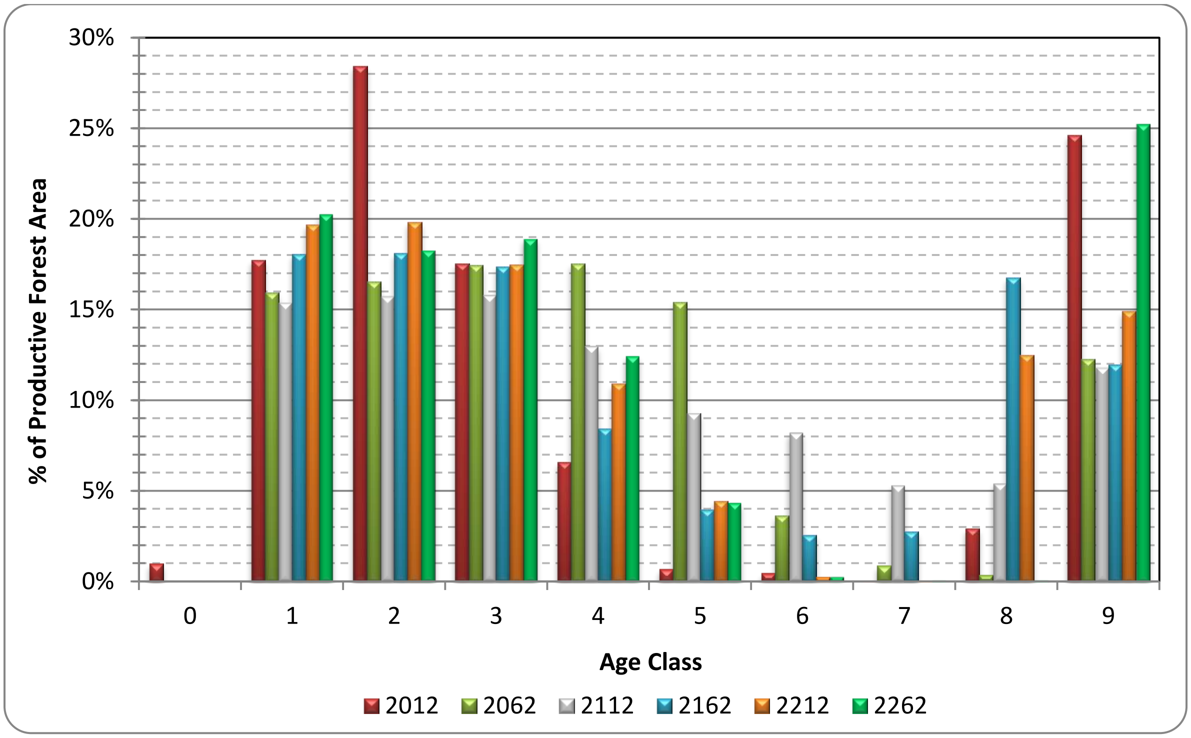

Figure 25 - Age class distribution of Block 4 productive forest area

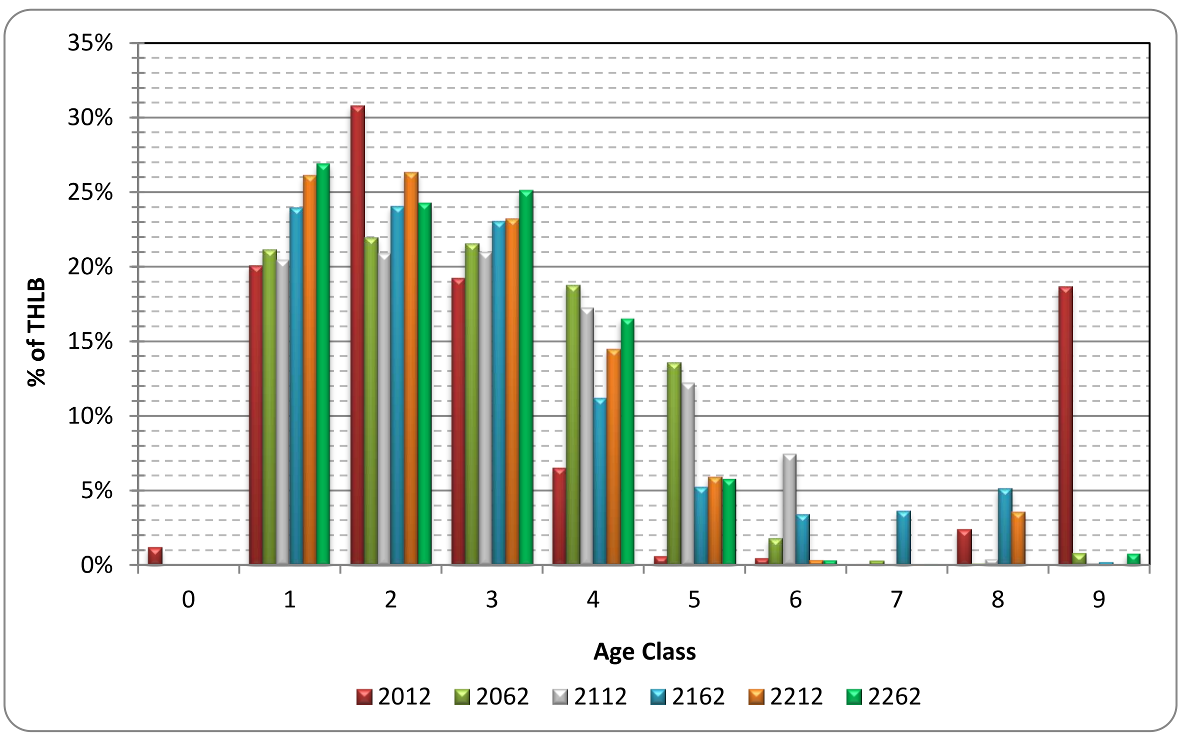

Figure 26 - Age class distribution of Block 4 THLB

The uneven THLB age class distribution is evident in Figure 26 (refer to 2012 values) with over

50% of the THLB area comprised of stands younger than 41 years old (i.e. less than age class 3) and negligible area between 81 and 140 years old (i.e. in age class 5, 6 or 7). As a result, short-term timber supply is highly dependent on old forest and second growth minimum harvest criteria. The dependence on old forest is indicated by the reduction in age class 8 and 9 within the THLB between 2012 and 2062. The lack of older second growth restricts mid-term timber supply.

Figure 27 illustrates harvestable (i.e. meets minimum harvest criteria) and total growing stock (including the ground-based / cable / non-conventional split) levels for the Block 4 timber harvesting land base at the beginning of each decade. Total THLB growing stock increases by about 25% over the first eleven decades as volume is initially accumulating within the conventionally operable THLB and later in the non-conventional operable THLB. Over the remaining 140 years, the THLB growing stock slowly declines by nearly 2 million m^3.

Total conventionally-operable growing stock follows a similar pattern, peaking at 9.9 million m^3 to start the sixth decade (2062 – 2071). It then declines to 7.9 million m^3 to start the sixteenth decade (2162 – 2171) with little variation after that. The model constraint applied forced the amount of conventionally-operable growing stock at the end of the analysis period (i.e. start of Decade 26) to be greater than or equal to the amount at the start of Decade 16. Greater variability is found within the ground-based and cable components of the conventionally-operable inventory. Cable-operable THLB growing stock increases by more than 2 million m^3 over the first 50 years as growth occurs within young stands yet to reach the minimum harvest criteria. Ground-based volume increases by 48%, peaking at 5.7 million m^3 to start the ninth decade (2092 – 2101), before returning to the present amount to start the twelfth decade (2102 – 2121) and fluctuating between 3.0 and 4.5 million m^3 thereafter.

Non-conventional THLB growing stock declines by roughly 60% over the first 60 years as old stands are harvested and managed second growth stands are relatively young and therefore not accumulating significant volume. During the next 100 years of the schedule, non-conventional THLB growing stock increases as growth exceeds harvest due to few stands meeting the minimum harvest criteria (note the low level of non-conventional harvest during this period in Figure 29). Over the final 90 years of the schedule, non-conventional THLB growing stock declines by 50% as harvesting resumes. Recall that no constraint is applied to the non-conventional THLB growing stock.

Harvestable volume closely follows the ground-based THLB growing stock pattern. Once the transition to future stands is complete, harvestable volume fluctuates between 2.8 and 4.3 million m^3.

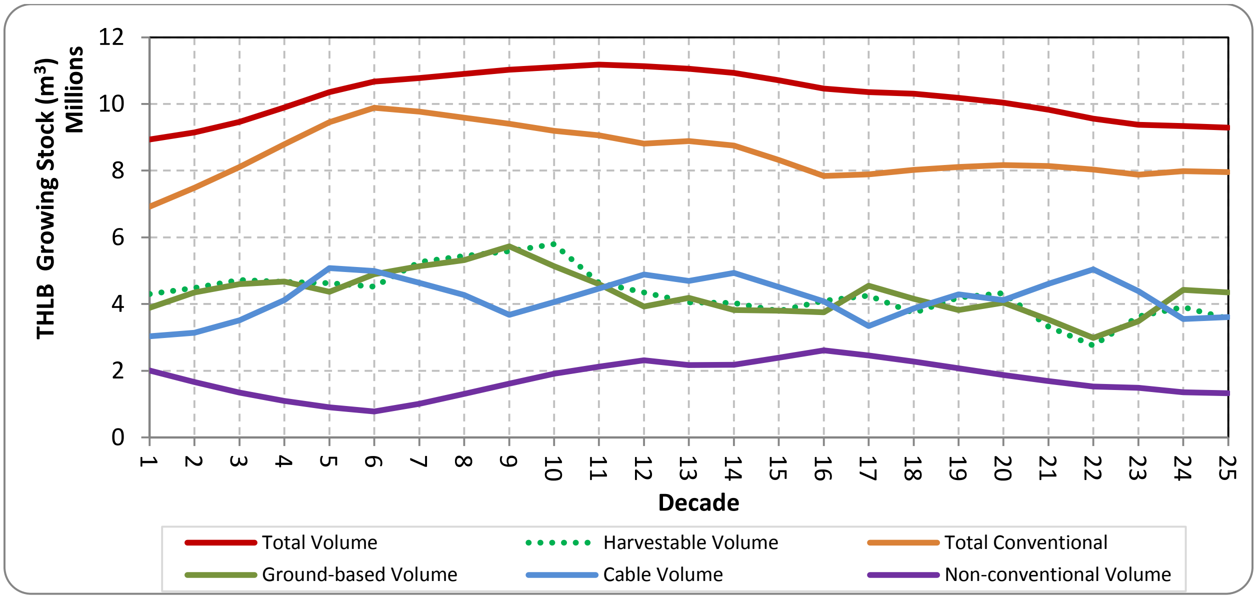

Figure 27 – Block 4 THLB Growing stock

Figure 28 provides area-weighted average statistics for timber harvested through the harvest projection. As expected, the mean age of stands harvested declines as the contribution of managed stands increases, dropping from 242 years old in the first decade to 89 years old in the ninth decade (2092-2101). Other than in Decade 16 (2162 – 2171), once managed stands provide the bulk of the harvest, the average age of second growth (SG) harvested shows moderate variation: ranging from a low of 76 years in Decade 15 (2152 – 2161) to a high of 100 years in the Decade 12 (2122 – 2131) and averaging 90 years. The average age of second growth harvested in Decade 16 (2162 – 2171) is 108 years. This relatively older average is a result of significant volume sourced from cable harvesting within current managed second growth stands during that decade.

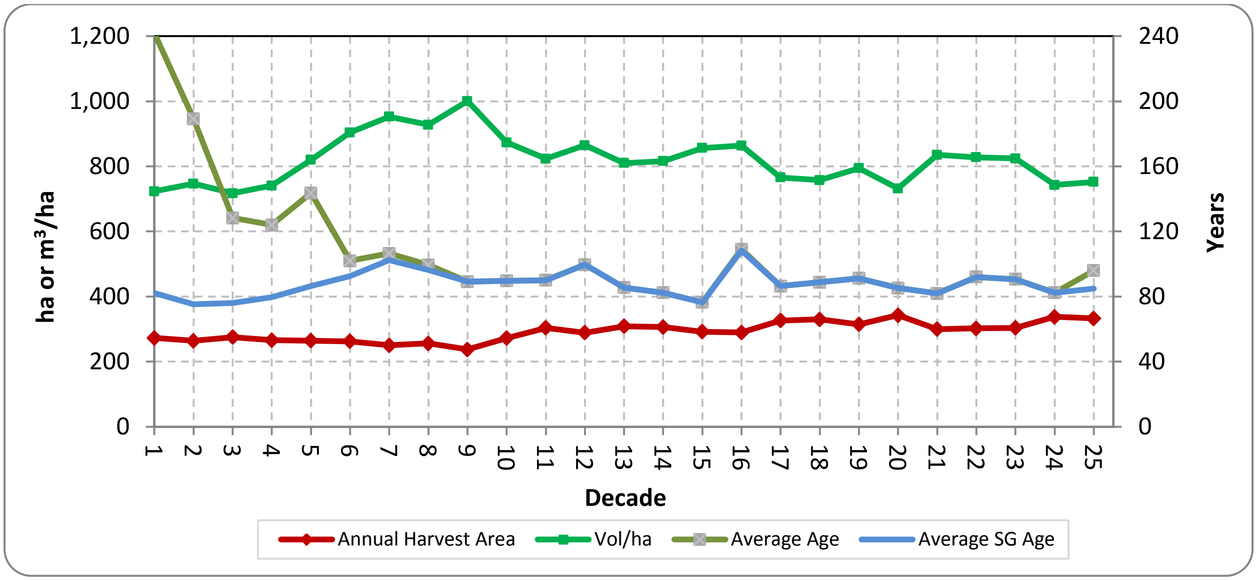

Figure 28 – Block 4 Harvest Statistics

Annual area harvested declines slightly from 273 ha to 237 ha over the first 90 years as the harvest shifts to future managed stands. Meanwhile over the same timeframe, average volume harvested increases from 723 m^3/ha to 1000 m^3/ha. The average volume per hectare reaches such high figures due to the large proportion of young forest currently in the THLB. As these stands reach merchantable ages over a relatively short time frame, a significant portion of them are harvested at ages much older than the minimum ages and thus are forecast to contain significant merchantable volume (based on the managed-stand yield tables detailed in the Information Package). With the harvest level increase in the eleventh decade (2112 – 2121), annual area harvested increases and generally fluctuates between 300 ha and 330 ha while average harvested volume per hectare gradually declines as the forest becomes more "normalized" (i.e. more evenly balanced THLB age class distribution).

Table 16 and Figure 29 indicate the contribution by harvesting system to total annual harvest volume and average harvest age. Non-conventional volume is steady at 36,000 m3/year for the first 40 years and then declines to nearly zero as non-conventional operable inventory is heavily depleted. As inventory levels recover as managed stands age, non-conventional volume contribution to timber supply returns to previous levels.

As was seen in Blocks 1 and 2, there is generally a direct relation between the amount of cable harvesting and the average harvest age once the majority of the volume is sourced from managed stands. The significant cable volume in Decade 16 and the corresponding average harvest age discussed earlier (associated with current managed second growth contribution) is noticeable.

More details and statistics for the Base Case harvest schedule are presented in Appendix A: Detailed Base Case Harvest Schedule Statistics.

Table 16 – Block 4 Base Case Volume Contribution by Harvesting System

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
1	2012	2021	231	81,000	80,000	36,000	197,000
2	2022	2031	194	63,400	97,600	36,000	197,000
3	2032	2041	135	49,500	111,500	36,000	197,000
4	2042	2051	129	17,600	143,400	36,000	197,000
5	2052	2061	145	115,300	68,200	33,200	216,700
6	2062	2071	102	128,000	105,400	3,900	237,300
7	2072	2081	108	124,800	112,200	300	237,300
8	2082	2091	100	147,100	89,600	600	237,300
9	2092	2101	89	55,700	181,200	400	237,300
10	2102	2111	91	65,200	164,300	7,800	237,300
11	2112	2121	92	67,400	176,300	6,200	249,900
12	2122	2131	101	121,200	92,700	36,000	249,900
13	2132	2141	88	75,200	156,700	18,000	249,900
14	2142	2151	84	131,800	118,100	0	249,900
15	2152	2161	77	126,400	123,500	0	249,900
16	2162	2171	112	161,000	52,900	36,000	249,900
17	2172	2181	90	45,700	168,200	36,000	249,900
18	2182	2191	93	66,500	147,400	36,000	249,900
19	2192	2201	96	124,400	89,500	36,000	249,900
20	2202	2211	91	54,000	159,900	36,000	249,900
21	2212	2221	86	57,800	156,100	36,000	249,900
22	2222	2231	96	158,500	66,800	24,600	249,900
23	2232	2241	94	165,700	48,200	36,000	249,900
24	2242	2251	85	82,500	142,800	24,600	249,900
25	2252	2261	99	101,300	129,300	19,300	249,900

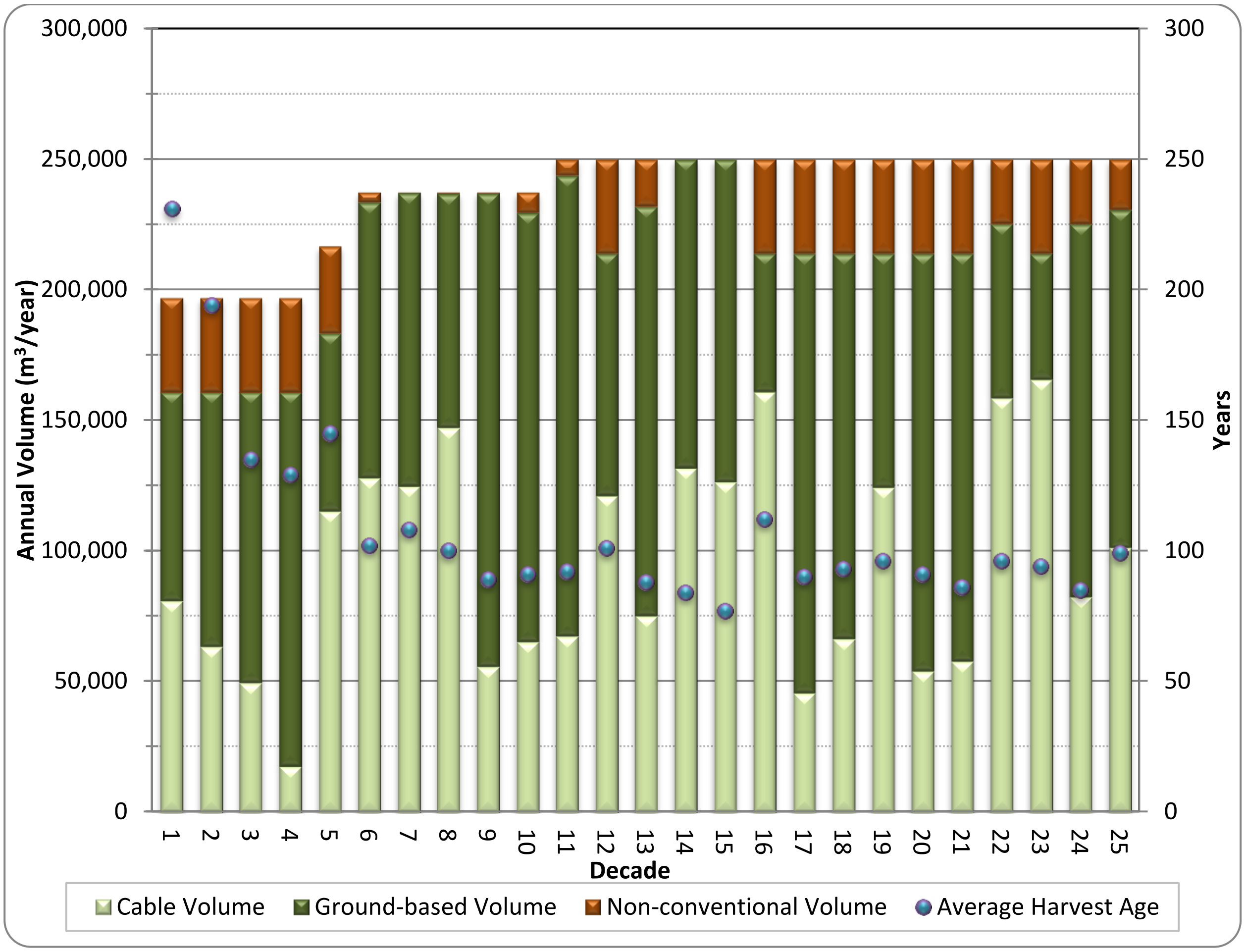

Figure 29 – Block 4 Volume Contribution by Harvesting System

2.1.4 Blocks 3 & 5 Base Case Details

Block 3 is located on North Broughton Island within the Broughton Archipelago (north-east of Port McNeill). It is the smallest of the five supply blocks within TFL 39, comprising about 1.2% of the forested area of TFL 39 and 1.4% of the THLB. Block 5 is located on the mainland coast in the Phillips River watershed, between Knight and Bute Inlets. It contains about 10% of the forested area but only 1.9% of the THLB of TFL 39. Both these blocks are subject to the *South Central Coast Order*. This order implemented Ecosystem-Based Management (EBM) within the southern portion of the area subject to the Central Coast Land Use Decision (2006). There is a similar order for the northern portion; however no portions of TFL 39 fall within that area.

Blocks 3 and 5 are combined for this analysis because they are subject to the same land use objectives and the relatively small timber harvesting land base for each suggests that operationally they will be managed as one supply unit. In MP #8, Block 3 was modeled with Block 4 while Block 5 was modeled on its own. Allocating the current AAC for the combination of Blocks 3 and 4 based on THLB results in an AAC for Block 3 of roughly 30,000 m^3/year. The current AAC contribution for Block 5 is 95,000 m^3/year. Table 17 and Figure 30 present the Base Case harvest schedule for Blocks 3 and 5 combined.

Table 17 – Blocks 3&5 Base Case Harvest Levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3/yr)	% Change from Previous Period
1 - 7	2012	2081	41,300	-67%
8 - 25	2082	2261	45,000	9.0%

Figure 30 – Blocks 3&5 Base Case Harvest Schedule

The Base Case assumptions result in the harvest level for Blocks 3 and 5 declining to 41,300 m^3/year; a reduction of nearly 67% from the current AAC contribution of 125,000 m^3/year. Factors contributing to timber supply decline include:

- New (since the MP #8 analysis) landscape-level reserves and larger riparian management areas to address EBM requirements (refer to Section 7 of the Information Package for details) have significantly reduced available old forest, thereby reducing THLB and the volume of timber available in the short-term.
- Various stand-level retention objectives within the SCCO also reduce the THLB.
- The constraint placed on timber supply contribution from the non-conventional landbase.

The harvest level remains at 41,300 m^3/year for 70 years before increasing to the current estimated long-term harvest level of 45,000 m^3/year. Figure 30 also indicates the harvest split between Block 3 and 5. Over the 250 years, the total harvest is divided between the blocks along the THLB proportions.

Table 18 and Figure 31 indicate the contribution from each of the stand establishment histories to the total harvest volume by period. Old stands contribute 77% of the volume in the first decade, declines significantly to become a minor component of the harvest volume in the following 80 years after which no further current old stands are harvested. In Section 11.3.2 of the Information Package, it was proposed to have immature stands provide one-half of the initial harvest; however, due to the age class distribution of the THLB, this requirement was not enacted.

Table 18 - Stand Types' contribution to Block 3&5 Base Case harvest

			Annual Harvest Volume (m^3)					
Period (Decade #)	Start Year	End Year	Current Old	Current Mature	Natural Second Growth	Current Managed	Future Stands	Total
1	2012	2021	31,700	5,500	4,100	0	0	41,300
2	2022	2031	5,700	0	32,200	3,400	0	41,300
3	2032	2041	5,200	0	27,400	8,700	0	41,300
4	2042	2051	5,400	0	24,500	11,400	0	41,300
5	2052	2061	5,100	0	1,200	35,000	0	41,300
6	2062	2071	4,400	0	600	36,300	0	41,300
7	2072	2081	5,700	300	600	27,200	7,500	41,300
8	2082	2091	5,200	0	500	24,400	14,900	45,000
9	2092	2101	1,900	0	1,200	31,800	10,100	45,000
10	2102	2111	0	0	0	36,600	8,400	45,000
11	2112	2121	0	0	0	11,700	33,300	45,000
12	2122	2131	0	0	0	7,000	38,000	45,000
13	2132	2141	100	0	0	5,500	39,400	45,000
14	2142	2151	0	0	0	2,100	42,900	45,000
15	2152	2161	0	0	0	16,200	28,800	45,000
16	2162	2171	0	0	1,500	29,500	14,000	45,000
17	2172	2181	0	0	0	5,600	39,400	45,000
18	2182	2191	0	0	0	400	44,600	45,000
19	2192	2201	0	0	0	200	44,800	45,000
20	2202	2211	0	0	0	100	44,900	45,000
21	2212	2221	0	0	0	0	45,000	45,000
22	2222	2231	0	0	0	200	44,800	45,000
23	2232	2241	0	0	0	300	44,700	45,000
24	2242	2251	0	0	0	100	44,900	45,000
25	2252	2261	0	0	0	100	44,900	45,000

Natural second growth provides 10% of the volume in the first decade and then about 70% during the next 3 decades. For the rest of the schedule, these stands never provide more than 3% of total timber supply in any decade. Due to the age class distributions within these two blocks, there is very little natural second growth in Block 5 (see the age class distributions in Appendix B of the Information Package); therefore the majority of natural second growth is harvested from Block 3. Current managed second growth contributes the majority of volume beginning in Decade 5 (2052 – 2061) and does so for 60 years. Beginning in the eleventh decade (2112 – 2121), future stands contribute the most volume as the contribution from current managed second growth declines. As in Block 2 and 4, current managed second growth contributes substantial volume during Decade 16 (2162 - 2171). This contribution is from stands that are less than 10 years old in 2012 growing on poor sites and operable by cable systems. The minimum harvest criteria applied dictates that such stands are not available for harvest until this time period.

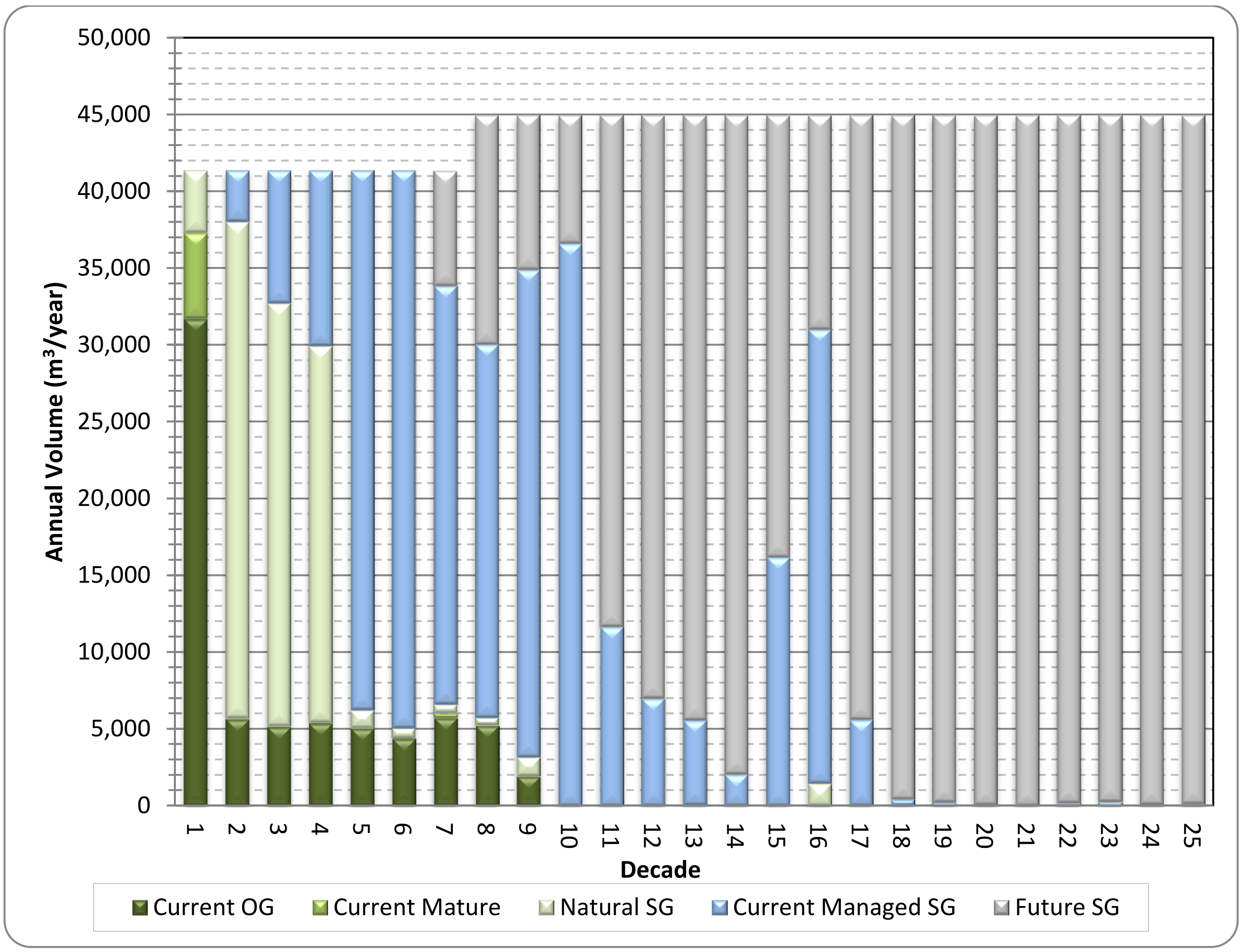

Figure 31 – Stand Types' contribution to Blocks 3&5 Base Case harvest

Age class (refer to Table 6) distributions over time based on the 5-year age groupings used in Woodstock are examined in Figure 32 and Figure 33. Within the productive forest the total area in the oldest age class declines by only 6% over the first 100 years as the small amount of available old growth is harvested. Subsequently the total area of old forest increases as younger reserved timber ages into the old growth age class, reaching 70% of the productive forest area (see Figure 32).

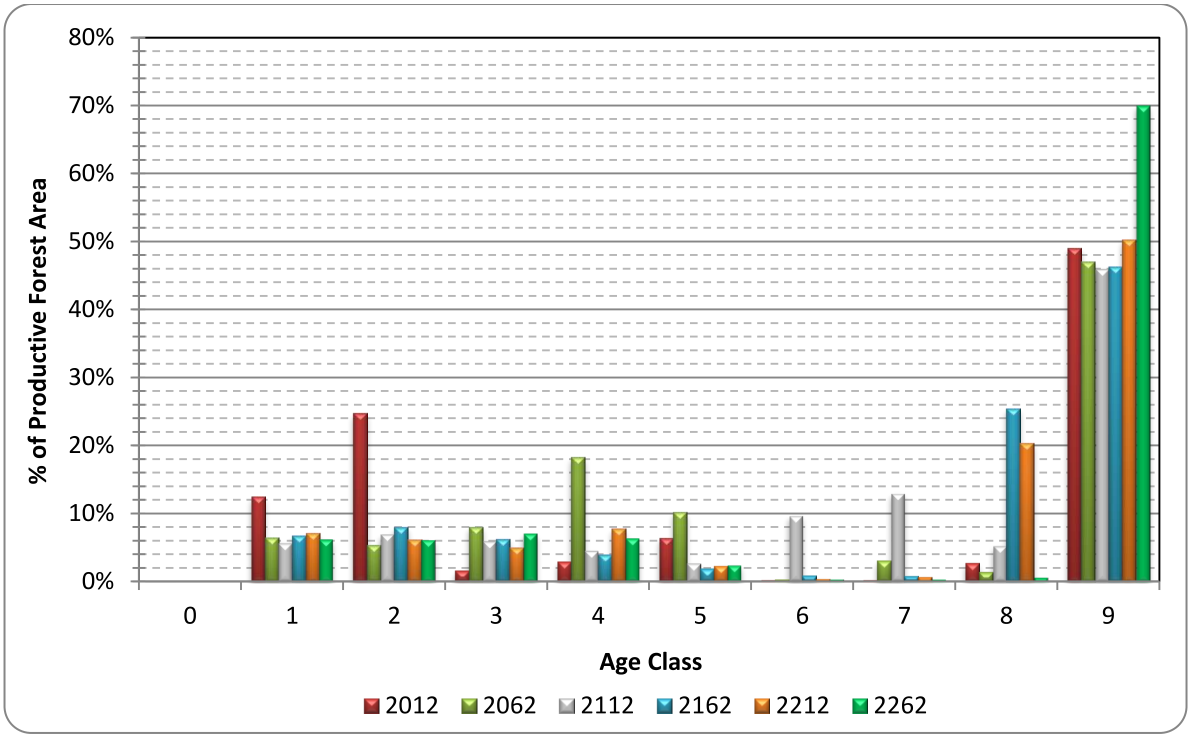

Figure 32 - Age class distribution of Blocks 3&5 productive forest area

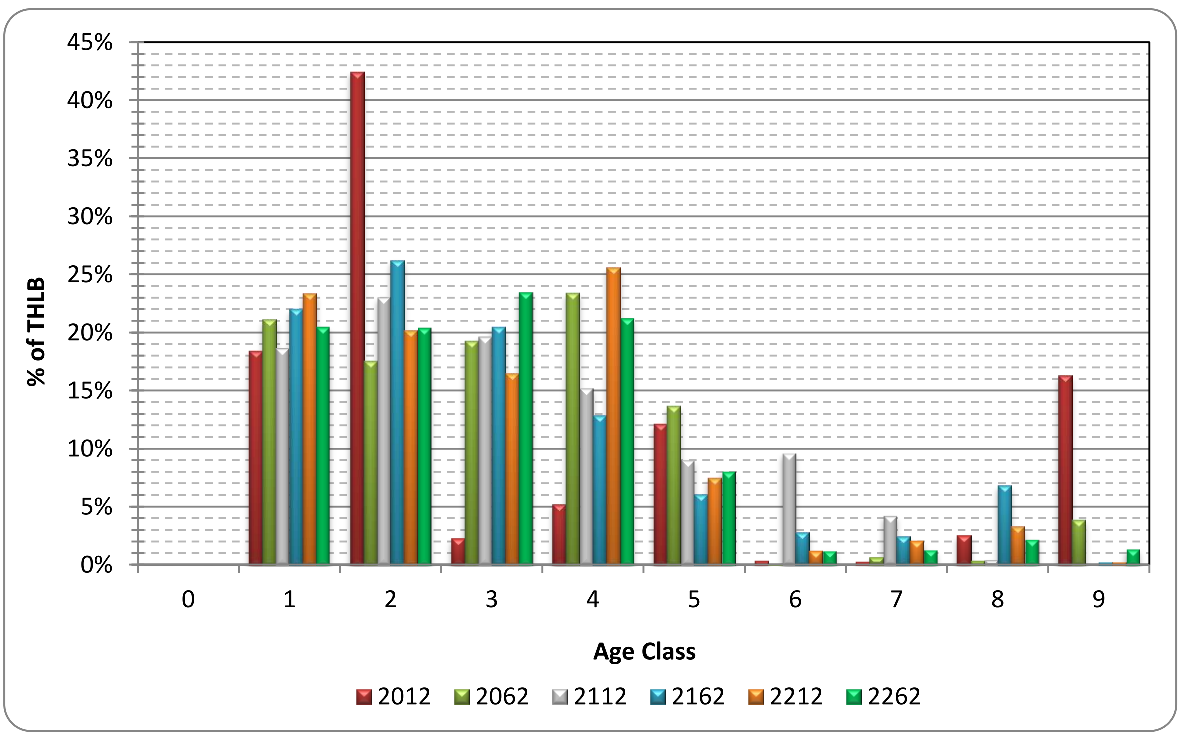

Figure 33 - Age class distribution of Blocks 3&5 THLB

The uneven THLB age class distribution is evident in Figure 33 (refer to 2012 values) with over 60% of the THLB area comprised of stands younger than 41 years old (i.e. less than age class 3). As a result, short-term timber supply is highly dependent on old forest and second growth minimum harvest criteria. The dependence on old forest is indicated by the reduction in age class 8 and 9 within the THLB between 2012 and 2062.

Figure 34 illustrates harvestable (i.e. meets minimum harvest criteria) and total growing stock (including the ground-based / cable / non-conventional split) levels for the combined Block 3 and 5 timber harvesting land base at the beginning of each decade. Total THLB growing stock increases by about 17.5% over the first eight decades as volume is accumulating within the young cable operable stands. Over the remaining 170 years, the THLB growing stock varies between 2 and 2.2 million m^3.

Total conventionally-operable growing stock follows a similar pattern, peaking at 1.9 million m^3 to start the eighth decade (2082 – 2091). It then declines to 1.55 million m^3 to start the sixteenth decade (2162 – 2171) with little variation after that. The model constraint applied forced the amount of conventionally-operable growing stock at the end of the analysis period (i.e. start of Decade 26) to be greater than or equal to the amount at the start of Decade 16. Greater variability is found within the ground-based and cable components of the conventionally-operable inventory. Cable-operable THLB growing stock doubles over the first 60 years as harvesting is concentrated in the ground-based THLB due to its smaller DBH criteria and the large extent of young forest within the THLB discussed earlier. Ground-based volume decreases by 60%, hitting a low of 295,000 m^3 to start the sixth decade (2062 – 2071) and thereafter fluctuating between 180,000 m^3 to start Decade 15 (2152 – 2161) and 800,000 m^3 to start Decade 19 (2192 – 2201)

Non-conventional THLB growing stock declines by roughly 25% over the first 60 years as old stands are harvested and managed second growth stands are relatively young and therefore not accumulating significant volume. During the next 90 years of the schedule, non-conventional THLB growing stock increases as growth exceeds harvest due to the harvest constraint applied to that part of the landbase. Over the final 100 years of the schedule, non-conventional THLB growing stock remains fairly consistent at about 475,000 m^3.

Harvestable volume declines significantly over the first 50 years, creating a timber supply “pinch-point” in Decade 5 and 6 (i.e. 2052 – 2071). After that harvestable volume increases greatly as managed stands reach merchantable size. Once the transition to future stands is complete, harvestable volume fluctuates between 500,000 and 1 million m^3.

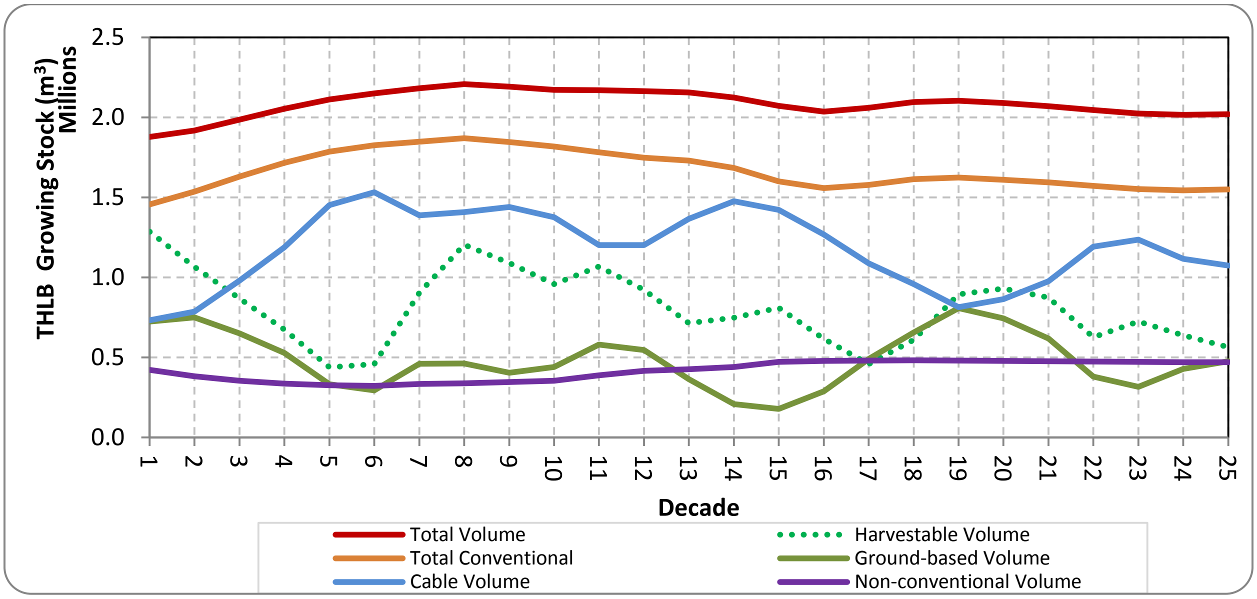

Figure 34 – Blocks 3&5 THLB Growing stock

Figure 35 provides area-weighted average statistics for timber harvested through the harvest projection. As expected, the mean age of stands harvested initially declines rapidly as the contribution of old growth decreases, dropping from 283 years in the first decade to 130 years in the second decade (2022-2031). The average age then gradually declines, reaching a low of 80 years in Decade 14 (2142 – 2151), as harvest transitions to future managed stands. The average age between Decade 15 (2152 – 2161) and Decade 17 (2172 – 2781) breaks the downward trend as harvest during these 30 years is mainly cable-yarding with significant volume sourced from current managed stands. After this period, harvest is almost entirely sourced from future stands and the harvest age averages 96 years.

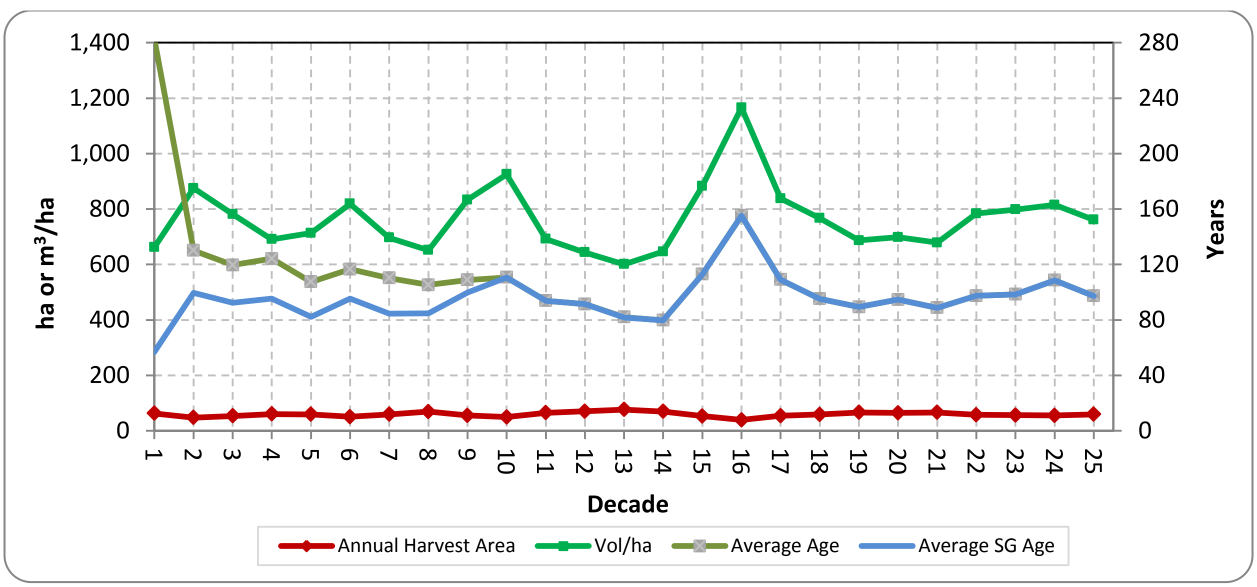

Figure 35 – Blocks 3&5 Harvest Statistics

In absolute terms, annual area harvested varies relatively little; ranging from a low of 39 ha in Decade 16 (2162 – 2171) to a high of 76 ha in Decade 13 (2132 – 2141). In relative terms, this variation is substantial and is due to variability in average volume per hectare harvested. Average volume ranges between 601 m^3/ha in Decade 13 and 1,166 m^3/ha in Decade 16. The peaks in average volume occur when the majority of harvesting is cable-based within current managed stands: Decades 9, 10, 15, 16 and 17. The stands harvested in these decades are comparatively older and therefore have reached high volumes. As the model balances all constraints applicable to the land base, especially the mid-seral and important fisheries watersheds limits, several stands are not harvested until they are 150 years or older. By this age the estimated volume can be well over 1000 m^3/ha based on the managed-stand yield tables detailed in the Information Package. Once harvesting is entirely within future managed stands (Decade 18 and beyond) average area harvested and average volume are 60 ha and 750 m^3/ha respectively.

Table 19 and Figure 36 indicate the contribution by harvesting system to total annual harvest volume and average harvest age. Other than in Decades 6, 10, 11, 13 and 14, non-conventional is maximized at 5,000 m^3/year. As was seen in the other blocks, there is generally a direct relation between the amount of cable harvesting and the average harvest age once the majority of the volume is sourced from managed stands. The significantly older age in Decade 16 discussed earlier is evident.

More details and statistics for the Base Case harvest schedule are presented in Appendix A: Detailed Base Case Harvest Schedule Statistics.

Table 19 – Block 3&5 Base Case Volume Contribution by Harvesting System

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
1	2012	2021	279	22,300	14,000	5,000	41,300
2	2022	2031	132	10,700	25,600	5,000	41,300
3	2032	2041	128	10,500	25,800	5,000	41,300
4	2042	2051	132	5,200	31,200	5,000	41,400
5	2052	2061	116	20,800	15,500	5,000	41,300
6	2062	2071	118	37,100	200	4,000	41,300
7	2072	2081	119	18,700	17,600	5,000	41,300
8	2082	2091	118	20,000	20,000	5,000	45,000
9	2092	2101	116	30,100	9,900	5,000	45,000
10	2102	2111	113	39,700	2,600	2,700	45,000
11	2112	2121	98	22,400	19,300	3,300	45,000
12	2122	2131	94	8,800	31,200	5,000	45,000
13	2132	2141	89	14,900	25,900	4,200	45,000
14	2142	2151	85	29,100	13,400	2,500	45,000
15	2152	2161	120	36,300	3,700	5,000	45,000
16	2162	2171	163	40,000	0	5,000	45,000
17	2172	2181	114	35,500	4,500	5,000	45,000
18	2182	2191	98	36,400	3,600	5,000	45,000
19	2192	2201	94	18,100	21,900	5,000	45,000
20	2202	2211	100	15,600	24,400	5,000	45,000

				Annual Harvest Volume (m^3)			
Period (Decade #)	Start Year	End Year	Average Harvest Age	Cable Harvesting	Ground-based Harvesting	Non-conventional Harvesting	Total
21	2212	2221	94	7,100	32,900	5,000	45,000
22	2222	2231	101	22,900	17,100	5,000	45,000
23	2232	2241	102	35,100	4,900	5,000	45,000
24	2242	2251	112	26,100	13,900	5,000	45,000
25	2252	2261	100	32,900	7,100	5,000	45,000

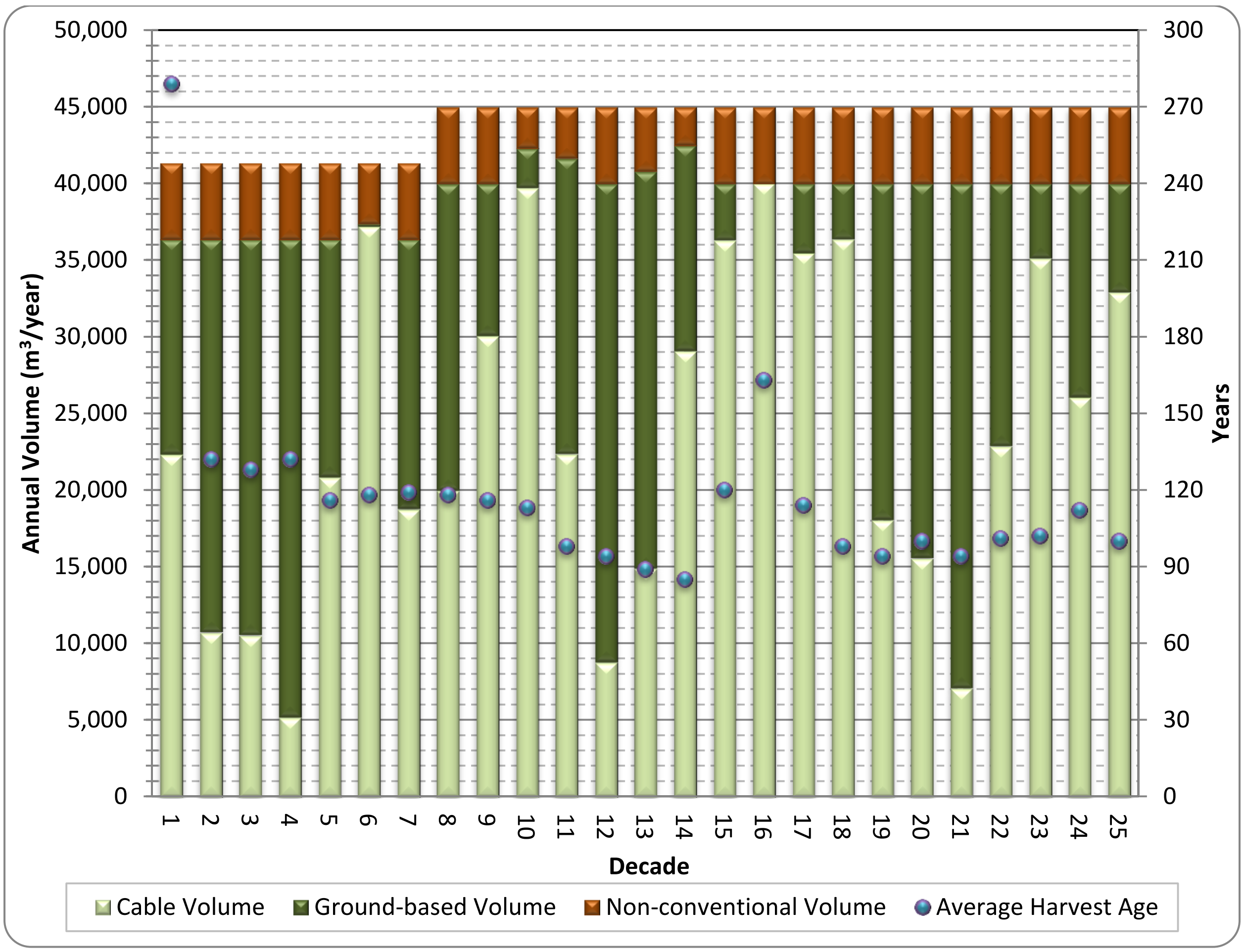

Figure 36 – Blocks 3&5 Volume Contribution by Harvesting System

2.2 Western Red Cedar Projections

Traditional and cultural uses of cedar are important to First Nations. Opportunities for accessing and managing cedar have been increased through the granting of tenures to First Nations and treaty processes. Within TFL 39 there is a significant volume of cedar. Table 20 - Table 25 and Figure 37 - Figure 42 indicate the estimated volume of cedar by supply block and overall. Blocks 3 and 5 are shown separately due to different overlapping first nation territories. Volumes are differentiated by land base description (THLB and non-contributing) and, in the tables, by three broad age-classes (less than 140 years old, 140-250 years old, greater than 250 years old). These broad age-classes are meant to reflect the general likelihood of stands containing large cultural cedar: stands less than 140 years old will have a low probability of containing large cultural cedar while stands greater than 250 years old have a high probability of containing large cultural cedar.

The figures only indicate the total cedar volume and the total volume within the THLB. The volume within the non-contributing land base is the amount of volume “above” the line representing the THLB volume.

Table 20 – Block 1 Base Case cedar volume (m^3) estimates over time

	THLB				Non-Contributing Land Base				Total			
Decade	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	628,794	117,848	2,105,661	2,852,303	730,096	87,900	860,007	1,678,003	1,358,890	205,747	2,965,669	4,530,306
2	594,827	27,852	2,178,401	2,801,080	797,878	28,012	1,002,480	1,828,370	1,392,704	55,864	3,180,882	4,629,450
3	514,942	32,928	2,171,537	2,719,407	797,878	63,072	1,122,036	1,982,985	1,312,819	96,000	3,293,573	4,702,392
4	416,969	74,579	2,157,159	2,648,707	802,031	163,820	1,165,809	2,131,661	1,219,000	238,400	3,322,968	4,780,367
5	397,144	187,176	2,127,699	2,712,020	802,031	452,063	1,012,672	2,266,767	1,199,175	639,239	3,140,372	4,978,786
6	308,723	261,740	2,242,730	2,813,192	806,277	692,408	888,300	2,386,984	1,115,000	954,147	3,131,029	5,200,176
7	274,245	298,906	2,263,382	2,836,533	811,608	834,034	845,415	2,491,057	1,085,853	1,132,940	3,108,798	5,327,590
8	197,676	240,167	2,351,729	2,789,572	811,608	947,456	821,392	2,580,456	1,009,284	1,187,623	3,173,121	5,370,028
9	149,164	230,123	2,329,540	2,708,827	811,734	1,104,442	742,265	2,658,441	960,898	1,334,565	3,071,805	5,367,268
10	96,701	248,114	2,334,259	2,679,074	811,861	1,243,569	670,970	2,726,399	908,562	1,491,683	3,005,228	5,405,473
11	78,138	229,520	2,327,021	2,634,679	813,647	1,359,727	609,901	2,783,276	891,785	1,589,247	2,936,923	5,417,955
12	75,261	200,717	2,332,861	2,608,838	817,996	1,597,046	415,262	2,830,304	893,257	1,797,763	2,748,123	5,439,143
13	59,507	166,447	2,431,074	2,657,028	826,881	1,776,193	266,784	2,869,858	886,388	1,942,640	2,697,859	5,526,886
14	54,894	179,987	2,504,177	2,739,058	867,340	1,930,680	105,543	2,903,563	922,234	2,110,667	2,609,720	5,642,621
15	66,684	195,072	2,368,161	2,629,917	987,836	1,913,696	29,974	2,931,506	1,054,520	2,108,768	2,398,135	5,561,423
16	89,849	172,742	2,245,897	2,508,488	1,310,194	1,643,753	0	2,953,947	1,400,043	1,816,495	2,245,897	5,462,435
17	90,816	127,443	2,312,717	2,530,975	1,572,873	1,398,073	0	2,970,946	1,663,688	1,525,517	2,312,717	5,501,921
18	83,147	140,381	2,317,225	2,540,754	1,718,245	1,264,102	0	2,982,347	1,801,392	1,404,484	2,317,225	5,523,101
19	77,044	167,998	2,443,941	2,688,984	1,825,141	1,163,917	0	2,989,058	1,902,185	1,331,915	2,443,941	5,678,042
20	68,048	183,426	2,508,731	2,760,205	1,986,033	1,006,638	0	2,992,671	2,054,081	1,190,064	2,508,731	5,752,876
21	62,366	203,469	2,487,315	2,753,150	2,122,879	871,716	0	2,994,595	2,185,245	1,075,185	2,487,315	5,747,745
22	53,830	210,741	2,352,486	2,617,057	2,234,861	761,032	0	2,995,893	2,288,691	971,774	2,352,486	5,612,951
23	49,348	250,400	2,319,450	2,619,198	2,491,296	505,649	0	2,996,945	2,540,645	756,049	2,319,450	5,616,143
24	44,983	277,001	2,247,803	2,569,786	2,683,345	314,451	0	2,997,796	2,728,328	591,452	2,247,803	5,567,583
25	51,922	275,126	2,307,309	2,634,357	2,880,107	118,170	0	2,998,277	2,932,030	393,295	2,307,309	5,632,634

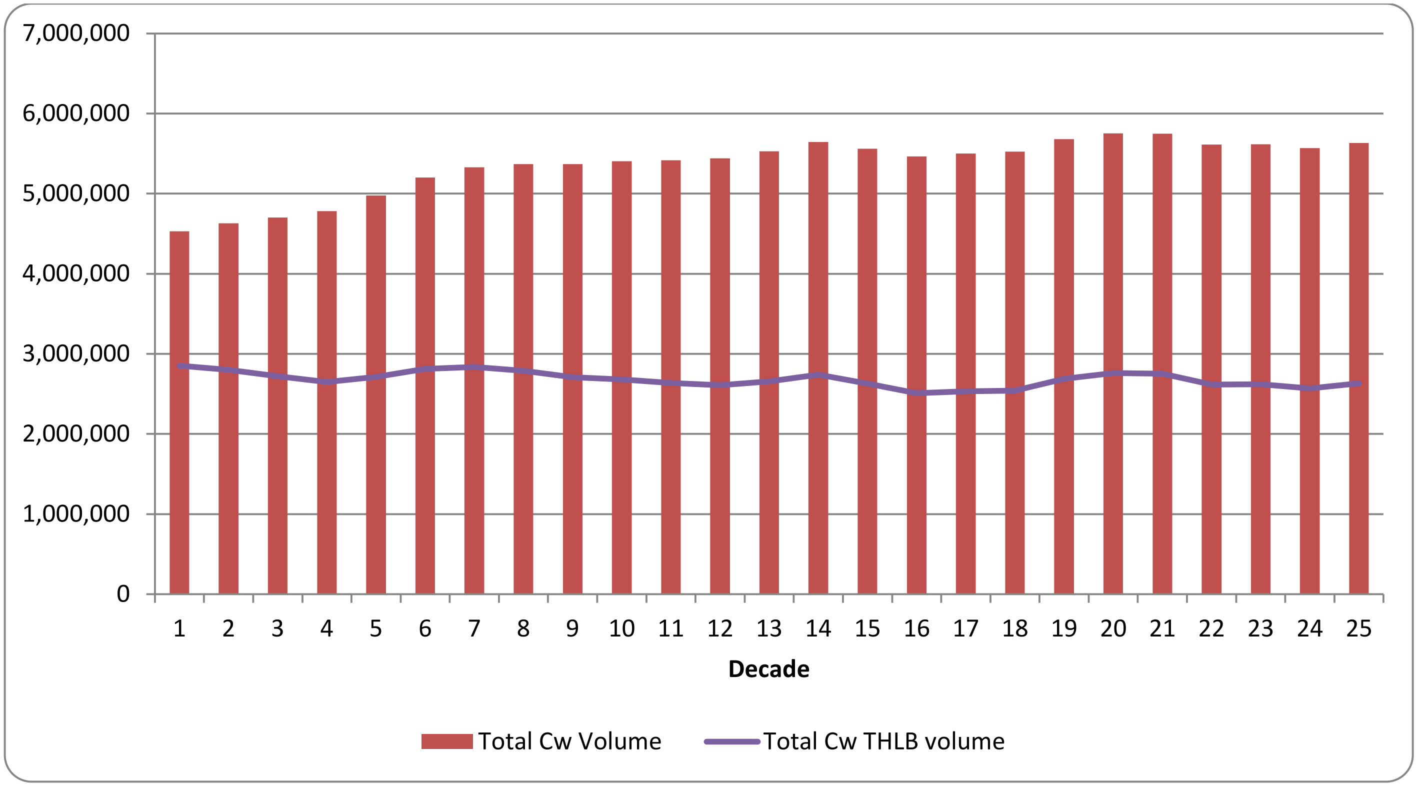

Figure 37 - Block 1 Base Case cedar volume (m^3) estimates over time

Within Block 1, the total cedar volume on the THLB varies little, but the age class distribution shifts towards the younger classes. Total cedar volume increases over time as the cedar within the non-contributing land base ages and accumulates volume.

Table 21 – Block 2 Base Case cedar volume (m^3) estimates over time

Decade	THLB				Non-Contributing Land Base				Total			
	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	1,072,523	103,125	614,685	1,790,333	1,356,131	81,956	144,283	1,582,369	2,428,654	185,081	758,967	3,372,702
2	733,171	27,565	805,501	1,566,237	1,402,640	38,182	198,346	1,639,168	2,135,811	65,747	1,003,847	3,205,405
3	534,572	22,613	991,791	1,548,976	1,402,640	38,818	260,952	1,702,411	1,937,212	61,431	1,252,743	3,251,386
4	500,868	14,932	1,054,524	1,570,324	1,424,277	21,121	324,173	1,769,572	1,925,145	36,053	1,378,698	3,339,896
5	462,260	15,744	1,251,359	1,729,364	1,424,277	26,057	383,291	1,833,625	1,886,537	41,801	1,634,650	3,562,989
6	403,746	13,002	1,296,918	1,713,667	1,431,713	24,791	435,758	1,892,262	1,835,459	37,793	1,732,676	3,605,929
7	374,867	24,824	1,323,361	1,723,052	1,438,087	42,255	465,124	1,945,466	1,812,954	67,079	1,788,485	3,668,518
8	326,562	21,505	1,408,569	1,756,636	1,438,087	65,690	489,672	1,993,449	1,764,649	87,195	1,898,241	3,750,085
9	306,927	26,919	1,529,206	1,863,052	1,438,087	117,181	480,904	2,036,172	1,745,013	144,100	2,010,110	3,899,224
10	295,141	38,757	1,484,562	1,818,460	1,438,087	183,290	452,531	2,073,908	1,733,228	222,047	1,937,093	3,892,368
11	290,557	39,104	1,450,874	1,780,536	1,438,087	305,995	362,669	2,106,751	1,728,644	345,099	1,813,544	3,887,287
12	290,036	43,846	1,296,411	1,630,293	1,438,087	416,275	280,258	2,134,619	1,728,122	460,121	1,576,669	3,764,912
13	288,770	41,762	1,218,308	1,548,841	1,441,468	532,531	183,573	2,157,571	1,730,238	574,292	1,401,881	3,706,412
14	286,899	63,044	1,164,433	1,514,376	1,442,139	607,279	127,587	2,177,005	1,729,038	670,323	1,292,020	3,691,381
15	287,185	181,055	1,097,229	1,565,469	1,446,915	740,318	6,130	2,193,363	1,734,100	921,372	1,103,359	3,758,832
16	287,072	179,996	1,078,413	1,545,481	1,452,766	755,048	0	2,207,814	1,739,838	935,044	1,078,413	3,753,295
17	290,396	50,048	1,204,909	1,545,353	1,459,743	761,032	0	2,220,776	1,750,140	811,080	1,204,909	3,766,129
18	281,777	27,626	1,212,369	1,521,772	1,488,842	743,046	0	2,231,888	1,770,619	770,673	1,212,369	3,753,660
19	277,213	27,382	1,203,860	1,508,455	1,517,260	724,076	0	2,241,337	1,794,473	751,459	1,203,860	3,749,792
20	272,484	21,126	1,096,750	1,390,360	1,578,647	670,915	0	2,249,562	1,851,131	692,041	1,096,750	3,639,922
21	269,342	23,566	1,067,263	1,360,172	1,657,613	599,125	0	2,256,738	1,926,956	622,691	1,067,263	3,616,910
22	266,954	27,799	1,200,194	1,494,948	1,795,287	467,221	0	2,262,508	2,062,240	495,021	1,200,194	3,757,456
23	266,845	32,024	1,164,273	1,463,142	1,913,635	353,420	0	2,267,055	2,180,480	385,444	1,164,273	3,730,197
24	266,658	36,053	1,228,203	1,530,913	2,040,180	229,812	0	2,269,992	2,306,838	265,865	1,228,203	3,800,905
25	266,999	39,135	1,192,819	1,498,952	2,117,942	153,748	0	2,271,689	2,384,941	192,883	1,192,819	3,770,642

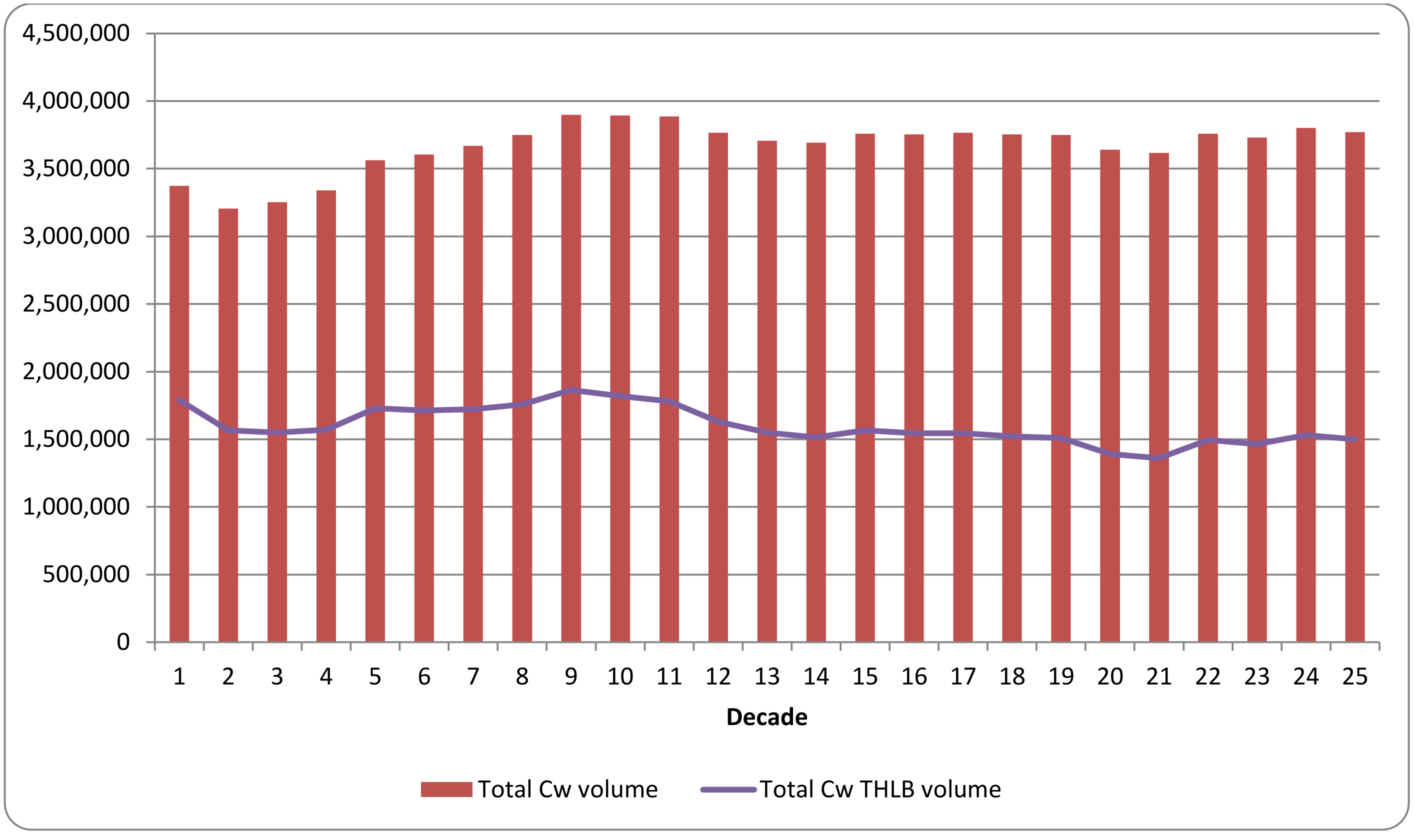

Figure 38 - Block 2 Base Case cedar volume (m^3) estimates over time

Within Block 2, the total amount of cedar is forecast to initially decline by roughly 5% but then to increase to nearly 4 million m^3 (15% more than current estimates). The amount of cedar within the THLB is forecast to fluctuate between 1.45 million m^3 and 1.8 million m^3 but shift to the younger age class. Within the non-contributing land base the amount of old cedar is projected to increase by more than 50%, to over 2 million m^3.

Table 22 – Block 3 Base Case cedar volume (m^3) estimates over time

	THLB				Non-Contributing Land Base				Total			
Decade	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	103,238	658	164,284	268,180	132,821	40	96,810	229,671	236,059	698	261,094	497,851
2	4,949	0	228,775	233,724	132,861	0	135,717	268,577	137,810	0	364,492	502,302
3	3,381	0	289,965	293,346	132,861	0	177,688	310,548	136,241	0	467,653	603,894
4	2,950	0	315,795	318,745	132,861	54	218,941	351,856	135,811	54	534,735	670,601
5	552	0	279,807	280,359	132,861	3,563	253,750	390,173	133,413	3,563	533,557	670,532
6	552	0	263,862	264,414	132,861	10,494	281,456	424,811	133,413	10,494	545,318	689,225
7	552	2,642	351,209	354,403	132,861	63,509	260,082	456,452	133,413	66,151	611,291	810,855
8	137	5,387	405,135	410,659	132,861	124,381	228,532	485,773	132,998	129,768	633,667	896,433
9	0	5,823	412,107	417,930	132,861	134,048	245,893	512,802	132,861	139,870	658,001	930,732
10	0	3,445	422,570	426,015	132,861	142,606	261,568	537,034	132,861	146,051	684,137	963,049
11	0	3,594	458,525	462,118	132,861	156,439	268,167	557,468	132,861	160,033	726,692	1,019,586
12	0	3,734	394,024	397,758	132,861	309,504	132,228	574,593	132,861	313,238	526,252	972,350
13	0	104,460	199,028	303,488	132,861	440,371	16,834	590,066	132,861	544,831	215,862	893,553
14	0	111,487	145,082	256,569	132,861	460,003	12,017	604,881	132,861	571,490	157,099	861,450
15	0	131,143	162,807	293,950	132,926	484,978	0	617,904	132,926	616,121	162,807	911,854
16	0	54,293	230,384	284,677	137,287	492,002	0	629,288	137,287	546,295	230,384	913,965
17	0	16,512	316,552	333,064	145,431	493,628	0	639,059	145,431	510,140	316,552	972,123
18	0	17,091	403,886	420,977	211,969	435,764	0	647,734	211,969	452,856	403,886	1,068,711
19	0	16,800	440,483	457,282	285,614	370,353	0	655,967	285,614	387,153	440,483	1,113,250
20	0	17,218	406,695	423,913	291,804	372,315	0	664,119	291,804	389,534	406,695	1,088,033
21	0	17,219	280,075	297,294	296,727	374,730	0	671,456	296,727	391,949	280,075	968,750
22	0	17,220	199,320	216,540	309,612	368,732	0	678,344	309,612	385,952	199,320	894,884
23	0	17,220	218,732	235,953	506,102	178,264	0	684,366	506,102	195,484	218,732	920,319
24	34	17,187	280,159	297,380	668,193	21,579	0	689,773	668,227	38,766	280,159	987,153
25	34	17,187	331,439	348,660	679,771	14,374	0	694,145	679,805	31,561	331,439	1,042,805

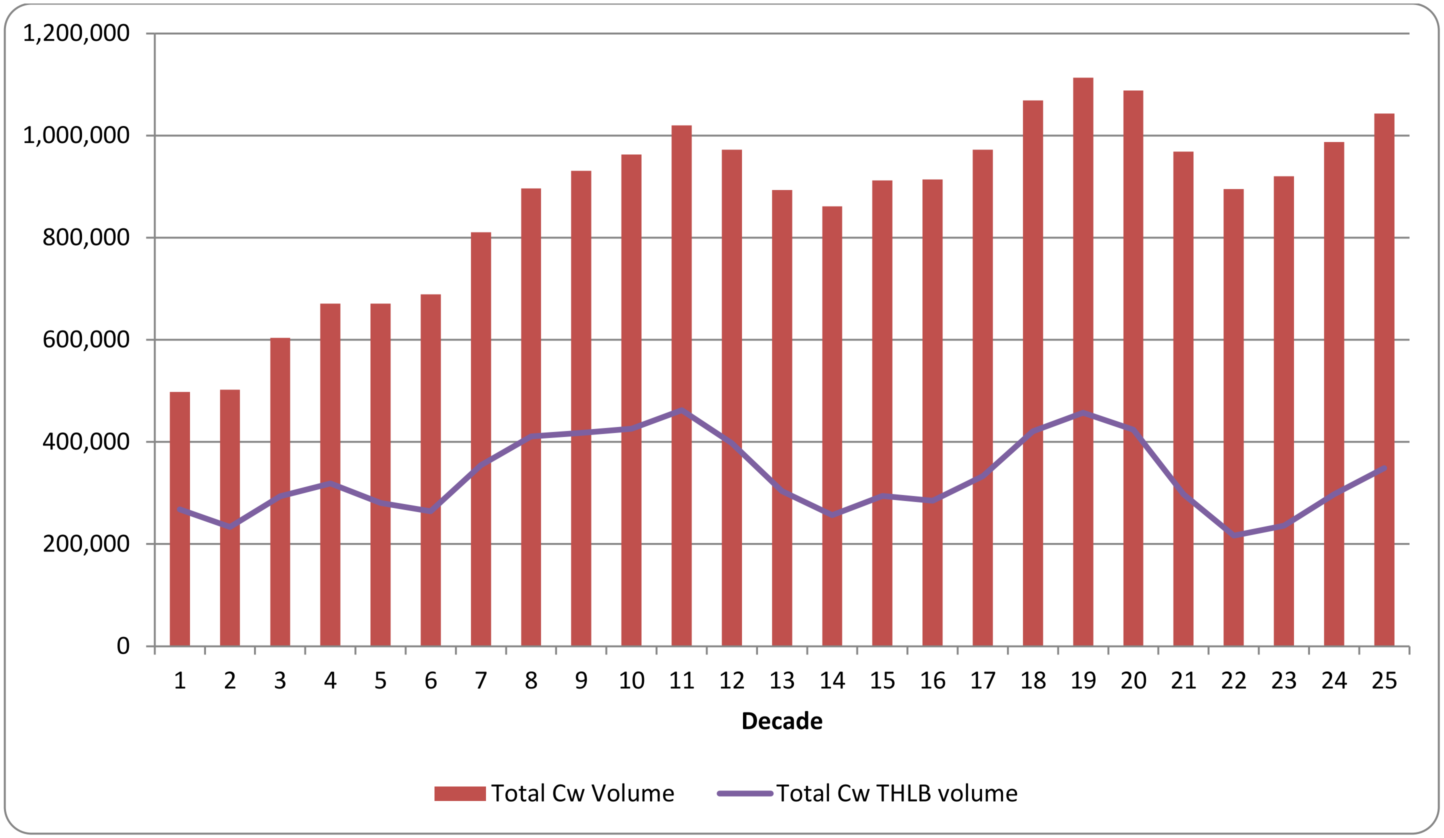

Figure 39 - Block 3 Base Case cedar volume (m^3) estimates over time

With the SCCO objectives constraining a significant portion of the forested area, the amount of cedar within the non-contributing land base is expected to increase greatly over time; however, the amount of old cedar does not increase until 160 years from now due to the generally young forest found within Block 3. The amount of cedar within the THLB fluctuates as contribution to the Base Case harvest schedule fluctuates between Block 3 and Block 5.

Table 23 – Block 4 Base Case cedar volume (m^3) estimates over time

Decade	THLB				Non-Contributing Land Base				Total			
	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	346,467	45,762	385,965	778,194	273,167	28,826	86,187	388,180	619,634	74,588	472,152	1,166,374
2	139,464	790	598,856	739,111	300,383	1,610	134,838	436,831	439,847	2,400	733,695	1,175,942
3	85,106	355	807,816	893,277	300,383	1,615	187,815	489,813	385,489	1,970	995,630	1,383,090
4	58,595	362	882,808	941,764	300,625	1,384	241,265	543,274	359,219	1,746	1,124,073	1,485,038
5	52,509	452	980,644	1,033,605	300,625	1,918	291,274	593,816	353,134	2,370	1,271,918	1,627,421
6	8,561	246	1,106,850	1,115,656	301,276	3,842	334,655	639,772	309,837	4,087	1,441,505	1,755,429
7	2,814	214	1,177,818	1,180,845	301,448	4,461	375,093	681,002	304,262	4,674	1,552,910	1,861,847
8	2,814	3,470	1,258,440	1,264,723	301,448	8,156	408,201	717,806	304,262	11,626	1,666,641	1,982,529
9	2,814	10,074	1,359,755	1,372,642	301,800	28,849	419,671	750,320	304,614	38,923	1,779,426	2,122,963
10	2,813	15,028	1,676,310	1,694,152	301,800	97,978	379,723	779,501	304,614	113,007	2,056,033	2,473,653
11	1,790	15,644	1,736,052	1,753,486	301,800	167,768	335,767	805,336	303,590	183,412	2,071,820	2,558,822
12	1,790	16,321	1,677,273	1,695,383	301,992	294,259	232,049	828,301	303,782	310,580	1,909,322	2,523,684
13	1,855	16,892	1,611,996	1,630,743	301,993	413,258	133,649	848,899	303,848	430,150	1,745,645	2,479,643
14	1,855	35,070	1,481,402	1,518,327	301,999	514,622	50,987	867,609	303,854	549,693	1,532,389	2,385,936
15	1,868	119,075	1,351,315	1,472,258	302,012	576,628	6,130	884,770	303,879	695,703	1,357,445	2,357,028
16	1,868	119,848	1,441,933	1,563,649	302,646	597,250	0	899,895	304,513	717,098	1,441,933	2,463,545
17	1,803	64,551	1,495,722	1,562,075	305,667	606,210	0	911,877	307,470	670,761	1,495,722	2,473,952
18	1,530	56,152	1,464,250	1,521,933	306,466	613,900	0	920,367	307,997	670,052	1,464,250	2,442,299
19	25	68,914	1,422,870	1,491,809	310,842	614,693	0	925,535	310,867	683,607	1,422,870	2,417,344
20	33	79,790	1,363,563	1,443,385	336,447	591,208	0	927,655	336,479	670,998	1,363,563	2,371,040
21	92	61,042	1,328,401	1,389,536	419,550	508,385	0	927,935	419,642	569,428	1,328,401	2,317,471
22	92	39,238	1,505,584	1,544,915	494,600	433,450	0	928,050	494,692	472,689	1,505,584	2,472,965
23	92	31,904	1,565,963	1,597,959	634,858	293,298	0	928,157	634,951	325,202	1,565,963	2,526,116
24	92	21,045	1,599,623	1,620,760	762,906	165,344	0	928,250	762,999	186,389	1,599,623	2,549,010
25	4,219	16,935	1,487,054	1,508,208	866,194	62,141	0	928,335	870,413	79,076	1,487,054	2,436,543

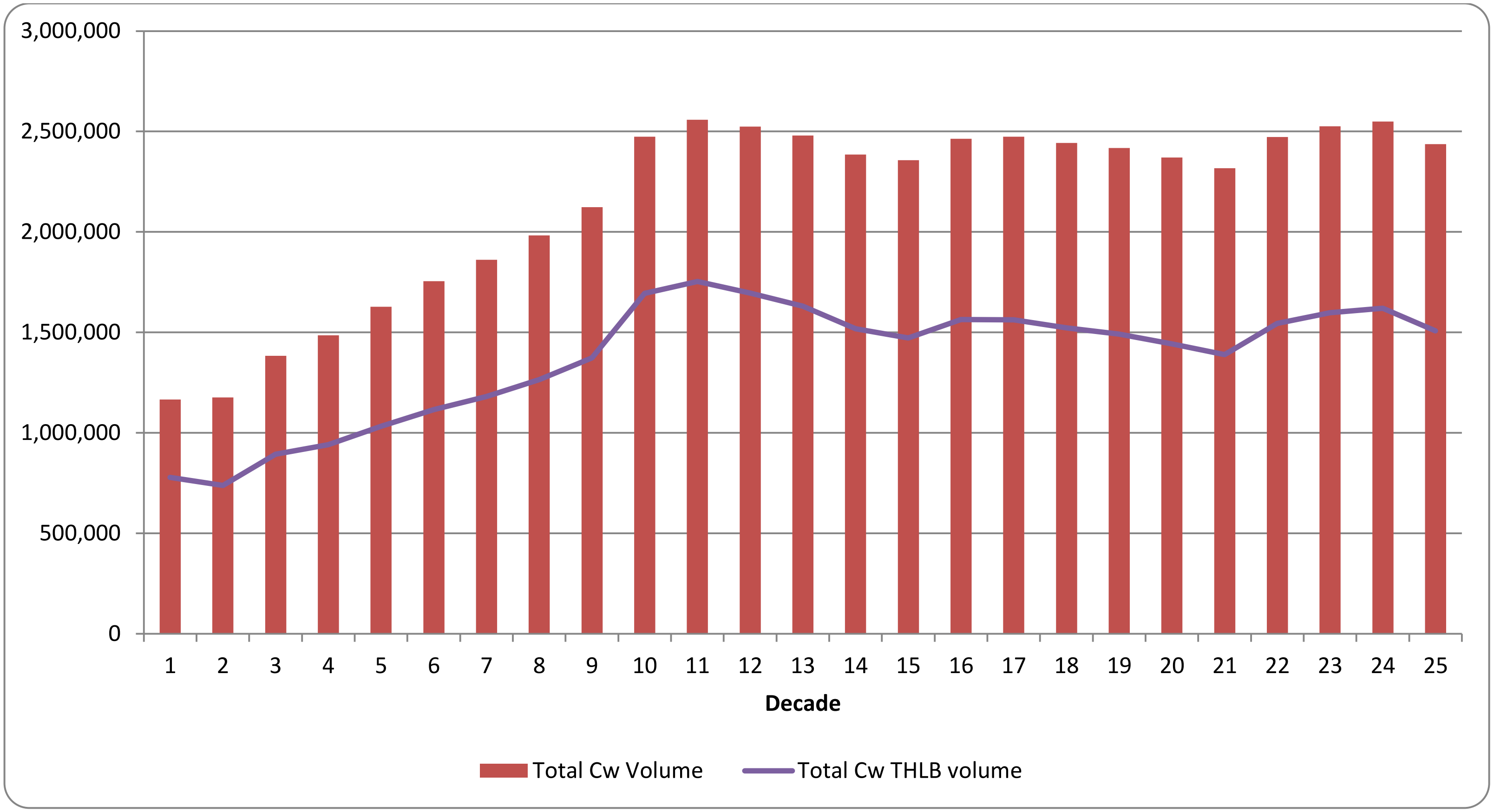

Figure 40 - Block 4 Base Case cedar volume (m^3) estimates over time

The forest within Block 4 is generally a Hemlock-Balsam (HemBal) forest with the majority of cedar found within managed stands in the THLB. Thus it is generally young.

Table 24 – Block 5 Base Case cedar volume (m^3) estimates over time

	THLB				Non-Contributing Land Base				Total			
Decade	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	88,517	9,792	61,341	159,650	1,007,257	36,957	71,178	1,115,392	1,095,775	46,748	132,519	1,275,042
2	67,535	120	121,730	189,385	1,037,926	6,288	142,108	1,186,322	1,105,461	6,409	263,837	1,375,707
3	55,567	170	187,593	243,330	1,037,926	6,924	226,776	1,271,625	1,093,493	7,094	414,369	1,514,955
4	43,169	169	247,514	290,852	1,039,653	5,221	313,072	1,357,945	1,082,821	5,390	560,586	1,648,798
5	34,140	173	315,848	350,160	1,039,653	5,242	393,452	1,438,346	1,073,792	5,414	709,300	1,788,507
6	27,173	197	330,861	358,231	1,042,483	6,721	462,455	1,511,659	1,069,656	6,918	793,316	1,869,891
7	20,759	117	304,022	324,898	1,043,602	6,706	526,201	1,576,509	1,064,361	6,823	830,223	1,901,407
8	10,014	419	370,795	381,229	1,043,602	7,291	582,189	1,633,082	1,053,616	7,710	952,984	2,014,310
9	2,673	58	404,725	407,456	1,043,602	8,095	632,819	1,684,515	1,046,275	8,153	1,037,544	2,091,971
10	58	17	399,734	399,809	1,043,602	8,334	679,575	1,731,511	1,043,660	8,352	1,079,308	2,131,320
11	58	18	378,242	378,318	1,043,961	22,675	705,794	1,772,430	1,044,019	22,693	1,084,036	2,150,748
12	58	284	441,735	442,077	1,044,214	191,011	573,400	1,808,625	1,044,272	191,295	1,015,135	2,250,702
13	58	7,834	515,294	523,186	1,044,214	507,313	290,397	1,841,924	1,044,272	515,147	805,691	2,365,110
14	0	16,474	534,673	551,148	1,044,945	741,837	85,241	1,872,023	1,044,945	758,311	619,915	2,423,171
15	0	32,125	444,868	476,993	1,044,945	853,223	0	1,898,169	1,044,945	885,348	444,868	2,375,162
16	0	35,012	414,237	449,249	1,044,945	875,908	0	1,920,853	1,044,945	910,920	414,237	2,370,102
17	0	25,274	474,048	499,322	1,049,801	891,190	0	1,940,990	1,049,801	916,464	474,048	2,440,312
18	0	30,997	443,858	474,854	1,050,859	906,422	0	1,957,281	1,050,859	937,419	443,858	2,432,135
19	0	34,731	405,174	439,905	1,051,302	915,560	0	1,966,862	1,051,302	950,292	405,174	2,406,767
20	0	39,195	426,410	465,605	1,052,008	918,327	0	1,970,334	1,052,008	957,522	426,410	2,435,939
21	0	40,550	535,588	576,138	1,052,136	920,158	0	1,972,294	1,052,136	960,708	535,588	2,548,433
22	0	44,544	597,788	642,332	1,068,691	904,508	0	1,973,198	1,068,691	949,052	597,788	2,615,531
23	0	45,869	560,618	606,487	1,261,778	711,873	0	1,973,651	1,261,778	757,742	560,618	2,580,138
24	0	51,165	496,870	548,035	1,618,318	355,749	0	1,974,068	1,618,318	406,914	496,870	2,522,103
25	186	53,182	468,477	521,845	1,869,579	104,847	0	1,974,426	1,869,765	158,029	468,477	2,496,271

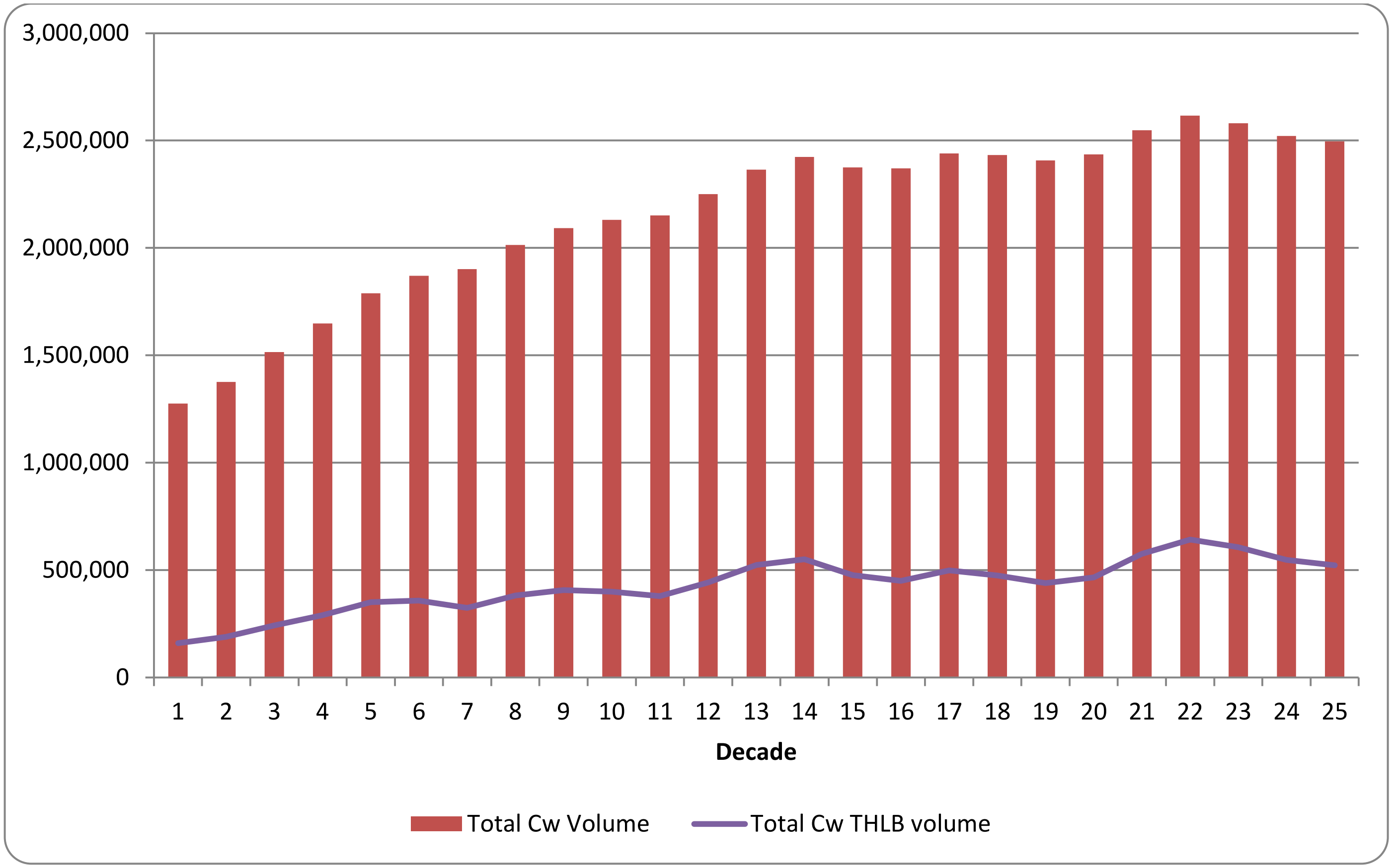

Figure 41 - Block 5 Base Case cedar volume (m^3) estimates over time

With the SCCO objectives constraining a significant portion of the old forest area, there is significant volume of old cedar within the non-contributing land base and it is expected to increase over time as younger reserved forest ages. The amount of cedar within the THLB increases over time as managed stands age.

Table 25 – TFL 39 Base Case cedar volume (m^3) estimates over time

	THLB				Non-Contributing Land Base				Total			
Decade	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total	> 250 yrs old	140-250 yrs old	< 140 yrs old	Total
1	2,239,539	277,185	3,331,936	5,848,660	3,282,797	212,606	1,196,842	4,692,246	5,522,337	489,791	4,528,778	10,540,906
2	1,584,283	56,246	3,936,027	5,576,556	3,433,138	72,895	1,519,192	5,025,225	5,017,422	129,141	5,455,219	10,601,781
3	1,230,726	55,982	4,441,346	5,728,054	3,433,138	109,227	1,846,026	5,388,392	4,663,864	165,209	6,287,372	11,116,446
4	1,073,472	89,881	4,651,337	5,814,690	3,460,664	190,624	2,099,354	5,750,642	4,534,135	280,505	6,750,691	11,565,332
5	994,870	203,700	4,951,380	6,149,949	3,460,664	487,441	2,138,240	6,086,344	4,455,533	691,141	7,089,620	12,236,294
6	774,543	277,492	5,235,551	6,287,585	3,475,415	735,294	2,178,758	6,389,467	4,249,958	1,012,786	7,414,309	12,677,053
7	696,725	329,183	5,450,129	6,476,037	3,488,263	947,511	2,222,216	6,657,990	4,184,989	1,276,694	7,672,345	13,134,027
8	556,051	283,813	5,847,830	6,687,694	3,488,263	1,146,781	2,259,482	6,894,526	4,044,315	1,430,595	8,107,311	13,582,221
9	477,882	316,741	6,076,758	6,871,382	3,488,437	1,370,146	2,246,809	7,105,391	3,966,319	1,686,887	8,323,567	13,976,773
10	411,020	363,902	6,336,081	7,111,002	3,488,564	1,600,620	2,203,583	7,292,766	3,899,583	1,964,522	8,539,663	14,403,769
11	387,779	354,181	6,345,550	7,087,510	3,490,710	1,887,203	2,075,192	7,453,104	3,878,488	2,241,384	8,420,742	14,540,614
12	384,379	334,290	6,153,293	6,871,963	3,495,404	2,603,277	1,490,888	7,589,569	3,879,783	2,937,567	7,644,182	14,461,532
13	367,426	444,572	5,956,293	6,768,290	3,507,670	3,387,310	813,263	7,708,242	3,875,095	3,831,882	6,769,556	14,476,533
14	360,884	596,258	5,737,448	6,694,589	3,549,532	3,911,691	351,805	7,813,028	3,910,416	4,507,948	6,089,253	14,507,617
15	372,960	854,825	5,317,877	6,545,661	3,674,871	4,188,781	39,017	7,902,669	4,047,831	5,043,606	5,356,893	14,448,330
16	396,095	777,763	5,267,447	6,441,305	4,007,571	3,971,559	0	7,979,130	4,403,666	4,749,322	5,267,447	14,420,434
17	400,197	496,709	5,712,410	6,609,316	4,290,935	3,752,588	0	8,043,523	4,691,132	4,249,298	5,712,410	14,652,839
18	384,086	492,887	5,768,900	6,645,873	4,533,153	3,561,184	0	8,094,336	4,917,239	4,054,070	5,768,900	14,740,209
19	393,956	516,639	5,837,351	6,747,946	4,743,727	3,386,593	0	8,130,320	5,137,682	3,903,232	5,837,351	14,878,266
20	427,120	493,832	5,731,239	6,652,190	4,978,331	3,176,326	0	8,154,657	5,405,451	3,670,157	5,731,239	14,806,847
21	434,768	471,884	5,616,353	6,523,005	5,218,982	2,954,203	0	8,173,186	5,653,751	3,426,088	5,616,353	14,696,191
22	430,329	473,211	5,729,224	6,632,764	5,519,358	2,668,745	0	8,188,104	5,949,687	3,141,956	5,729,224	14,820,867
23	425,926	510,945	5,687,678	6,624,549	6,337,021	1,863,209	0	8,200,230	6,762,946	2,374,154	5,687,678	14,824,778
24	462,223	495,923	5,674,452	6,632,599	7,219,262	990,626	0	8,209,888	7,681,485	1,486,549	5,674,452	14,842,486
25	566,615	401,565	5,651,261	6,619,441	7,799,474	417,364	0	8,216,839	8,366,090	818,929	5,651,261	14,836,280

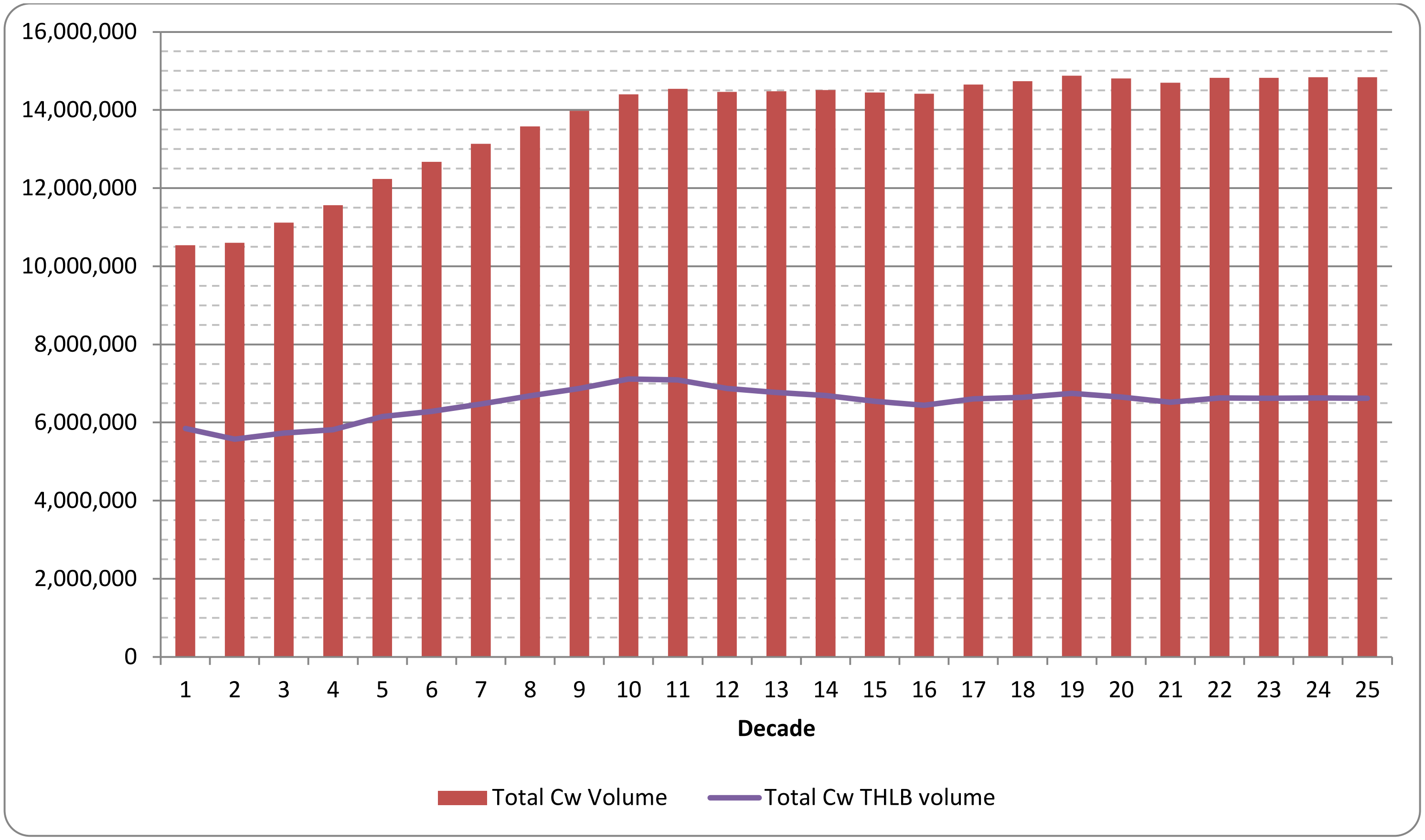

Figure 42 – TFL 39 Base Case cedar volume (m^3) estimates over time

Across the entire TFL, the amount cedar is forecast to increase by over 40%, mainly due to growth within the non-contributing landbase. Cedar within the THLB also increases slightly, with an overall shift towards younger ages.

3.0 Alternate Harvest Flows

This section examines two alternate flow scenarios. Results are presented for TFL 39 as a whole. Details by supply block can be found in Appendix B.

3.1 Maintain current AAC[2]

Table 26 and Figure 43 represent an attempt to maintain the current AAC for the first 10 years. It was impossible to maintain the current AAC contribution of 125,000 m^3/year within Blocks 3 and 5. The highest feasible harvest level was 115,000 m^3/year so the "current" AAC indicated is 10,000 m^3/year less than the actual AAC. The results indicate that, compared to the Base Case, an additional 3.848 million m^3 (12.9%) could be harvested over the first 20 years with a total of approximately 5 million m^3 (3.4%) less being harvested over the following 100 years. Overall, 1.68 million m^3 less is harvested.

Table 26 - Harvest levels maintaining current AAC

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Maintain current AAC	Difference
1	2012	2021	1,537,900	1,840,500	+ 302,600
2	2022	2031	1,451,500	1,533,700	+ 82,200
3 - 4	2032	2051	1,379,700	1,362,700	- 17,000
5	2052	2061	1,399,400	1,362,700	- 36,700
6	2062	2071	1,470,000	1,362,700	- 107,300
7	2072	2081	1,520,000	1,393,200	- 126,800
8	2082	2091	1,551,300	1,448,100	- 103,200
9	2092	2101	1,551,300	1,503,100	- 48,200
10	2102	2111	1,551,300	1,524,200	- 27,100
11	2112	2121	1,563,900	1,551,400	- 12,500
12	2122	2131	1,563,900	1,556,400	- 7,500
13 - 25	2132	2261	1,563,900	1,560,100	- 3,800

[2] Due to administrative processes within the *Forest Act (*prior to enactment of the *Allowable Annual Cut Administration Regulation*) and the timing of certain events, the current (April 2014) official AAC for TFL 39 is 1,885,980 m^3 as it still includes 21,000 m^3 within Block 7, 10,000 m^3 for the Tri-Port CFA and the 4,478 m^3 for the woodlots in Block 2 even though these areas have been deleted from the TFL. The current AAC figure presented here ignores this administrative anomaly.

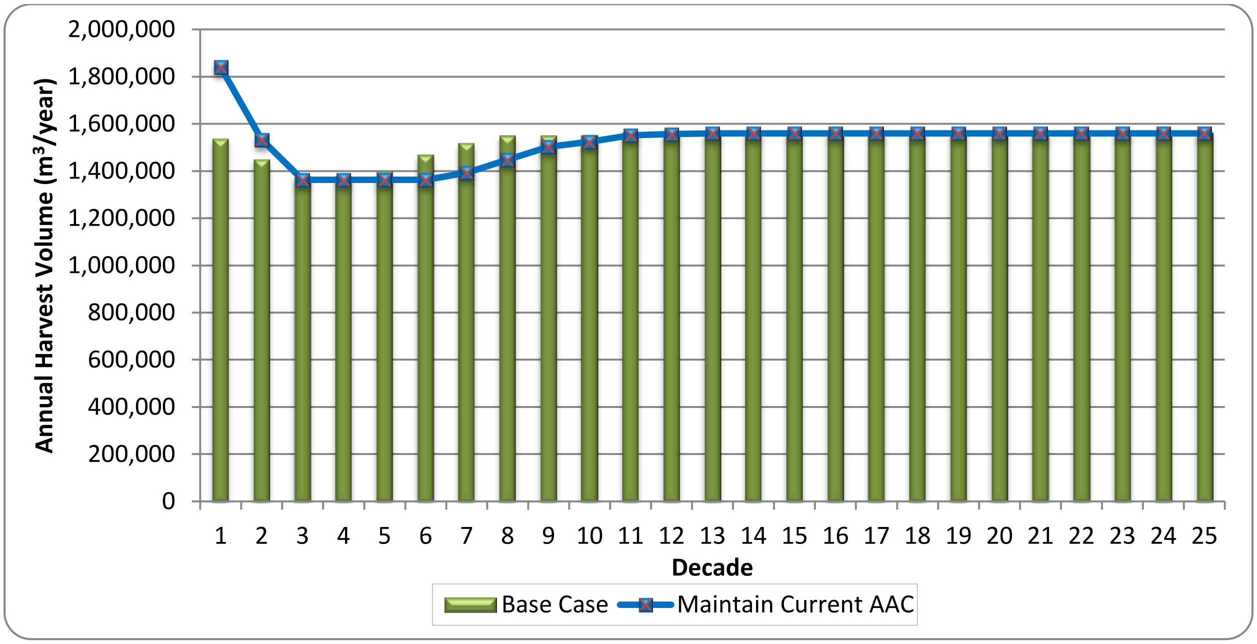

Figure 43 – Harvest levels maintaining current AAC

This alternate schedule does not recognize the possible increased harvest in Block 1 and requires declines of 20% in Block 2 in Decade 2 and 3 and more than 80% in the second decade in Blocks 3 and 5 (see Appendix B). Since the non-conventional volume constraints are still applied, this schedule forces the conventionally-operable inventory to be harvested at younger ages and makes mid and long-term timber supply more sensitive to minimum harvest criteria assumptions.

3.2 Non-declining even flow

Table 27 and Figure 44 show the impact of immediately dropping to a non-declining even flow (NDEF) harvest level. The initial harvest level is approximately 2% lower than the Base Case while the mid-term timber supply “dip” is eliminated. The LTHL is 55,600 m^3/year (3.6%) lower. Over the entire 250 years approximately 5.43 million m^3 (1.4%) less timber is harvested.

Table 27 – Harvest levels with non-declining even flow

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	NDEF	Difference
1	2012	2021	1,537,900	1,508,300	- 29,600
2	2022	2031	1,451,500	1,508,300	+ 56,800
3 - 4	2032	2051	1,379,700	1,508,300	+ 128,600
5	2052	2061	1,399,400	1,508,300	+ 108,900
6	2062	2071	1,470,000	1,508,300	+ 38,300
7	2072	2081	1,520,000	1,508,300	- 11,700
8 - 10	2082	2111	1,551,300	1,508,300	- 43,000
11 - 25	2112	2261	1,563,900	1,508,300	- 55,600

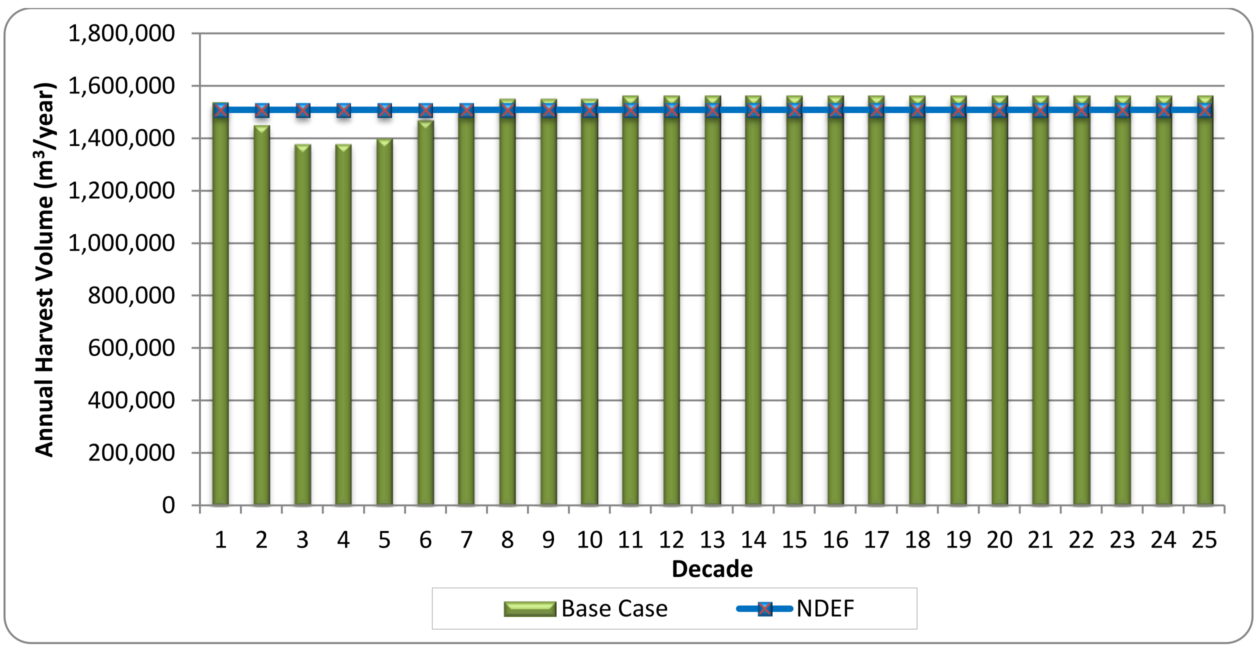

Figure 44 – Harvest levels with non-declining even flow

Since the Base Case for Block 1 is NDEF, this schedule is the same. Requesting a NDEF schedule eliminates the mid-term dip in Block 2 at the expense of short and long-term timber supply. A NDEF schedule in Block 4 increases short-term harvest while reducing mid and long-term harvest levels. For Blocks 3 and 5, a NDEF schedule achieves the same short-term harvest level but a reduced long-term harvest level due to the long-term growing stock constraint. For further details see Appendix B2.

4.0 Sensitivity Analyses

Sensitivity analysis provides a measure of the upper and lower bounds of the Base Case harvest forecast, reflecting the uncertainty of assumptions made in the Base Case. By developing and testing a number of sensitivity issues, it is possible to determine which variables most affect results. This in turn facilitates management decisions that must be made in the face of uncertainty. As Woodstock was used as an optimization tool to generate the Base Case, it is expected that the results will be sensitive to any changes to the inputs.

To allow meaningful comparison of sensitivity analyses, they are performed by varying (from the Base Case) only the assumption being evaluated. In general, sensitivities were run (1) with the same flow constraints as used in the Base Case and, (2) attempting to maintain the same initial harvest as the Base Case.

Sensitivity issues are summarized in Table 28. The timber supply impacts are illustrated in Sections 4.1 through 4.21.

Table 28 – Current Management Sensitivity Analyses

Issue	Sensitivity tested summary	Section
Landbase available for harvesting	Reduce THLB by 5%	4.1
Growth and Yield	Mature volumes increased by 10%	4.2
	Mature volumes decreased by 10%	4.3
	Immature volumes increased by 10%	4.4
	Immature volumes decreased by 10%	4.5
	Use SIBEC Site Index estimates	4.6
	Increase OAF2 by 10% for unmanaged immature yields	4.7
Forest management / Silviculture	No future genetic gain yield improvements	4.8
	Blocks 3 and 5 managed separately	4.16
Operability	Increase non-conventional harvest	4.9
	Remove non-conventional harvest constraint	4.10
	Exclude non-conventional landbase	4.11
Visual Quality	Reduce the percent disturbed within each VQO polygon	4.12
Biodiversity	Remove Western Forest Strategy impacts (area and yield impacts)	4.13
Minimum harvest criteria	Increase minimum harvest DBH criteria by 2 cm	4.14
	Decrease minimum harvest DBH criteria by 2 cm	4.15

Issue	Sensitivity tested summary	Section
Ecosystem Based Management	Meet landscape-level biodiversity requirements aspatially	4.17
	Apply risk managed landscape-level biodiversity targets	4.18
	Apply 50% RONV targets in Block 5	4.19
	Excludes SCCO objectives	4.20
Summary	Summary of sensitivity impacts	4.21

4.1 Reduce THLB by 5%

Several of the landbase netdowns used to derive the THLB (see Section 6 of the IP) are estimates and therefore subject to uncertainty. This sensitivity tests the impact of reducing the THLB. Originally this sensitivity was proposed to be conducted by excluding unstable terrain (“Class V” and “equivalent” classifications); however due to the netdowns applied there is very little unstable terrain in the Base Case THLB (see Table 29).

Table 29 – Unstable land within TFL 39

Landbase	Total area (ha)	Productive Forest Area (ha)	Operable Area (ha)	THLB Area (ha)	% of Total THLB (ha)	THLB Volume (m^3)	% of Total THLB (m^3)
Block 1	9,683	3,221	2,421	145	0.3%	79,120	0.4%
Block 2	11,366	5,467	3,992	304	0.3%	162,920	0.5%
Block 3	72	67	63	5	0.2%	2,370	0.3%
Block 4	2,021	1,450	1,341	145	0.6%	72,460	0.9%
Block 5	5,615	1,747	1,147	27	0.8%	12,320	1.4%
TFL 39 Total	28,757	11,952	8,964	626	0.4%	329,190	0.5%

Due to the small area involved, excluding unstable terrain would have a negligible impact on harvest levels. There is no netdown for which the degree of uncertainty is greater than the others so it was decided to uniformly decrease the THLB by reducing the harvestable area within each polygon in the data set by five percent.

Table 30 and Figure 45 indicate the results of applying the same assumptions as used in the Base Case.

Table 30 – Harvest levels with THLB reduced by 5%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Reduced THLB	Difference	Alternate Reduced THLB	Difference
1	2012	2021	1,537,900	1,468,400	- 69,500	1,537,900	0
2	2022	2031	1,451,500	1,386,000	- 65,500	1,419,500	- 32,000
3 - 4	2032	2051	1,379,700	1,311,700	- 68,000	1,341,700	- 38,000
5	2052	2061	1,399,400	1,328,500	- 70,900	1,358,600	- 40,800
6	2062	2071	1,470,000	1,399,000	- 71,000	1,379,000	- 91,000
7	2072	2081	1,520,000	1,449,000	- 71,000	1,379,000	- 141,000
8	2082	2091	1,551,300	1,478,100	- 73,200	1,433,100	- 118,200
9 - 10	2092	2111	1,551,300	1,478,100	- 73,200	1,472,900	- 78,400
11 - 25	2112	2261	1,563,900	1,490,100	- 73,800	1,485,900	- 78,000

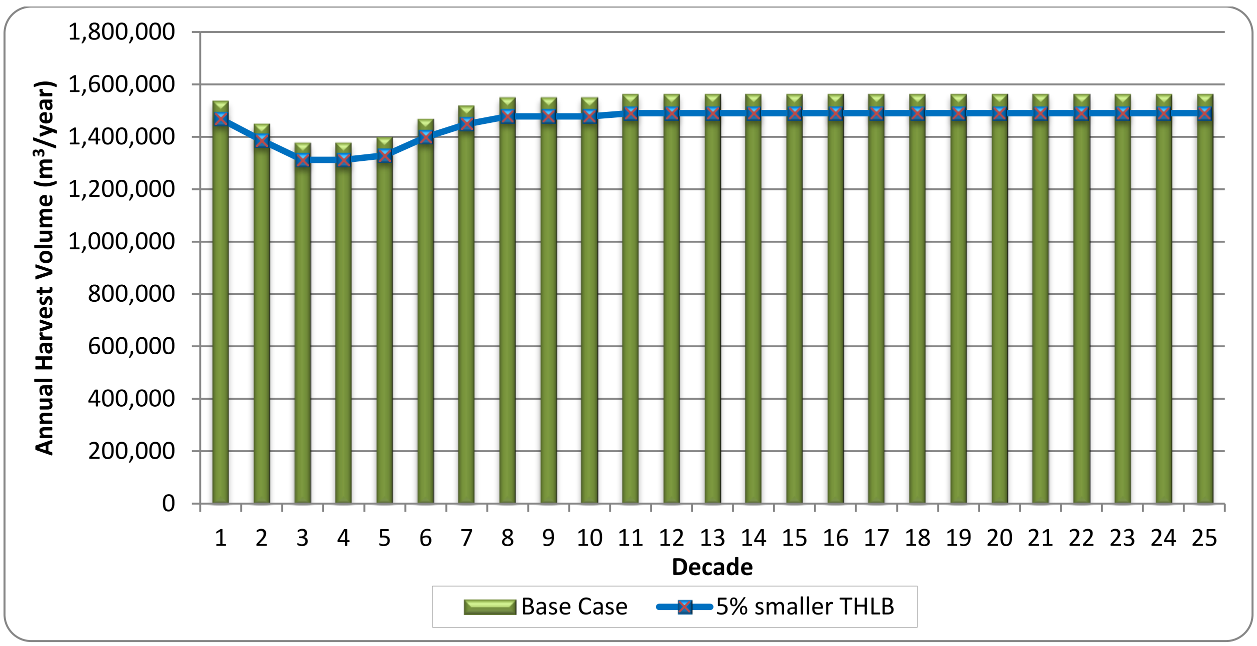

Figure 45 – Harvest levels with THLB reduced by 5%

The initial harvest level is 69,500 m^3/year (4.5%) less than the Base Case. The timber supply impacts are less than the THLB impact partially due to the non-conventional volume constraints in the Base Case mitigating the impact of reducing the non-conventional THLB. The LTHL is 73,800 m^3/year (4.7%) lower and total harvest over the 250 years is 18.1 million m^3 (4.7%) less.

Alternatively, the initial harvest level of the Base Case can be achieved by reducing mid-term timber supply (refer to Figure 46). Compared to the schedule above, this alternate schedule achieves higher harvest levels for the first 50 years, lower harvest during the following 30 years and a LTHL 4,200 m^3/year (0.3%) lower. Overall, 153,000 m^3 less is harvested.

See Appendix B3 for details by supply block.

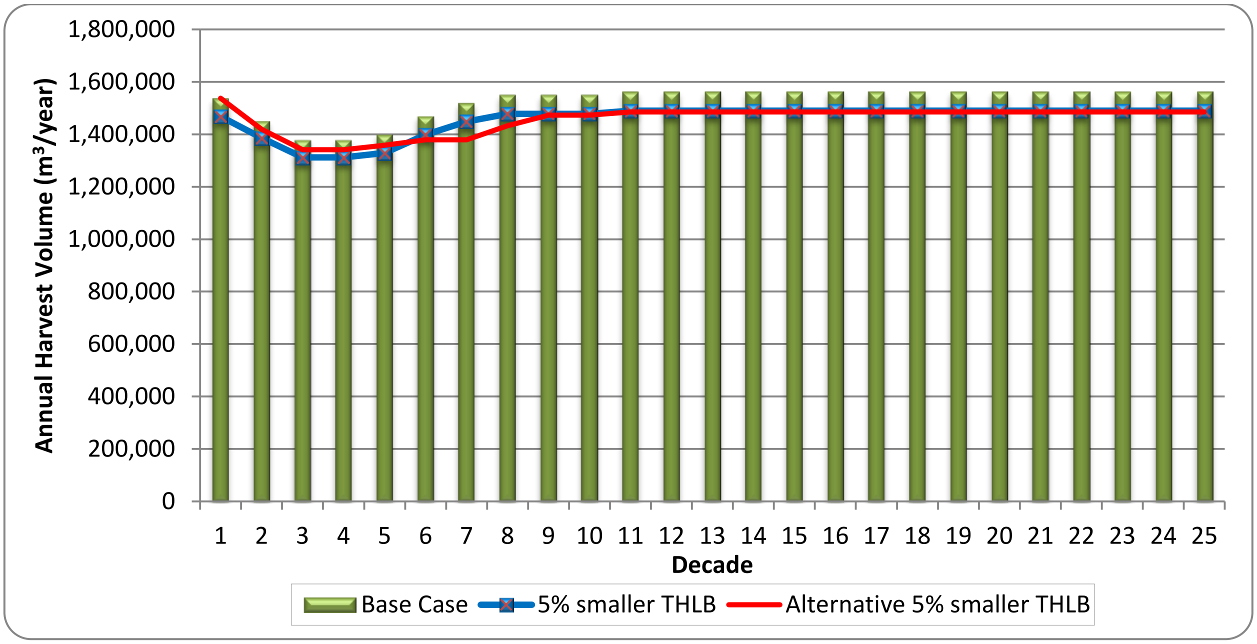

Figure 46 – Alternate harvest levels with THLB reduced by 5%

Most THLB netdowns are legal reserves (e.g. UWRs, OGMAs) or have a high degree of spatial confidence (e.g. non-forest, inoperable). Netdowns with some degree of uncertainty include riparian management, terrain stability and stand-level retention. The assumptions used for these netdowns are based on analyses of recently harvested cutblocks or have been used for past timber supply analyses and no better information is available.

4.2 Mature volumes increased by 10%

The sensitivity of timber supply to volume estimates of mature stands (older than 140 years in 2012) was tested by increasing (this Section) and decreasing (Section 4.3) these volumes by 10%. The volumes in these stands were estimated using area-weighted inventory averages with 1990's audit results used to adjust some stands (see Section 5.1 of the Information Package for details).

Mature stands provide the majority of the total volume in the first decade of the Base Case schedule (see Figure 3); however the contribution varies significantly by individual supply block due to the differing THLB age class distributions (refer to Section 2.1) and targets incorporated for the amount of second growth harvested in the initial period. This sensitivity adds 2.72 million m^3 (4.2%) to the current THLB inventory. These results (Table 31 and Figure 47) indicate the harvest levels achieved when allowing the initial harvest level to increase.

Table 31 – Harvest levels with increased mature stands yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased Mature Volumes	Difference	Alternate Increased Mature Volumes	Difference
1	2012	2021	1,537,900	1,575,600	+ 37,700	1,545,200	+ 7,300
2	2022	2031	1,451,500	1,486,100	+ 34,600	1,470,200	+ 18,700
3 - 4	2032	2051	1,379,700	1,405,600	+ 25,900	1,414,400	+ 34,700
5	2052	2061	1,399,400	1,425,900	+ 26,500	1,434,700	+ 35,300
6	2062	2071	1,470,000	1,491,100	+ 21,100	1,499,800	+ 29,800
7	2072	2081	1,520,000	1,541,100	+ 21,100	1,549,800	+ 29,800
8 - 10	2082	2111	1,551,300	1,552,500	+ 1,200	1,552,600	+ 1,300
11 - 25	2112	2261	1,563,900	1,563,900	0	1,564,000	+ 100

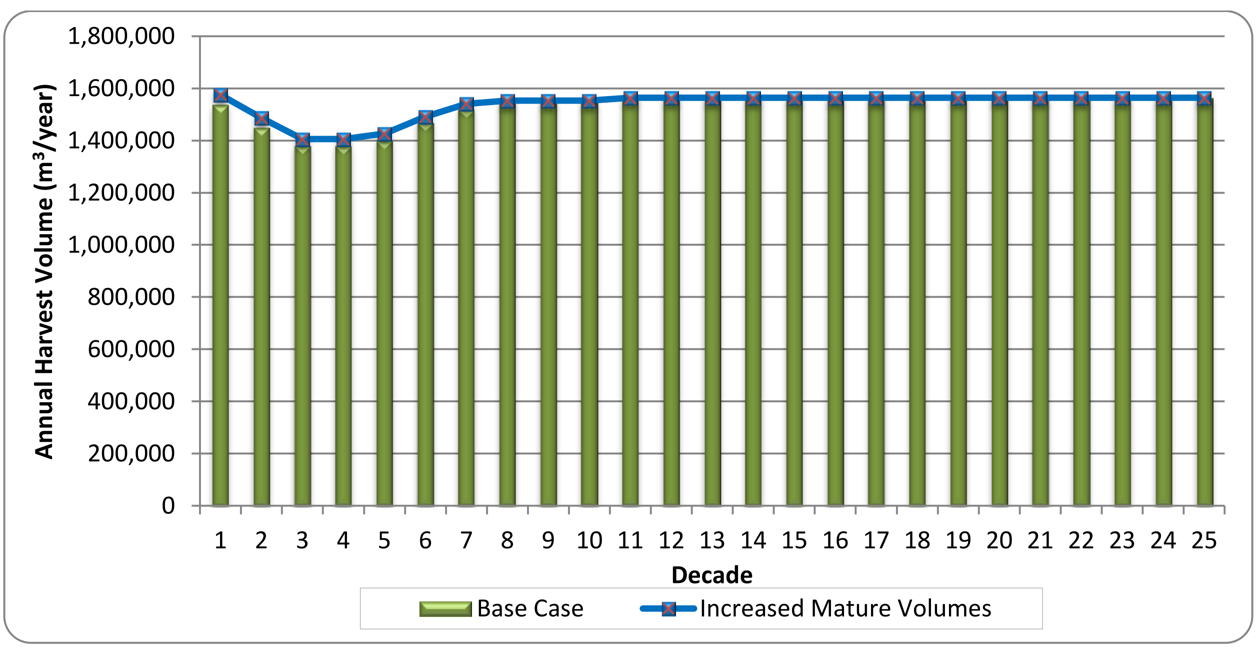

Figure 47 – Harvest levels with increased mature stands yields

As expected, with the increase in currently operable inventory short and mid-term harvest levels can be increased. The harvest level in the first 20 years is 2.4% greater and averages 1.6% greater over the following 50 years. The LTHL is unaffected. Total harvest over the entire 250 years is 1.96 million m^3 (0.5%) more than the Base Case.

Short-term harvest level is less than 10% greater due to the second growth requirements and non-conventional constraints applied in the Base Case. These restrictions reduce the timber supply contribution from mature stands and therefore the gains achieved by increasing the mature yields.

Alternatively, the increased mature volume could be used to reduce the timber supply “dip” in Block 2 by maintaining the initial harvest level of the Base Case and using the additional volume in the mid-term (see red line in Figure 48). Also, this approach allows the second growths stands to age a little more and achieve higher yields, thereby further increasing mid-term timber supply.

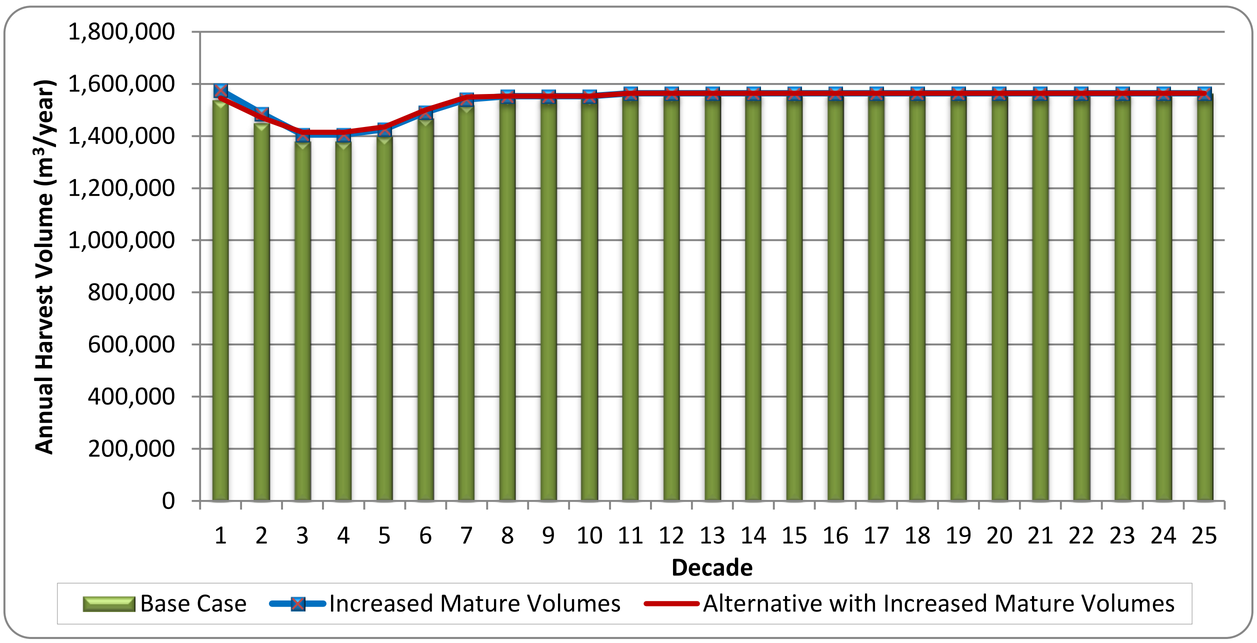

Figure 48 – Alternate harvest levels with increased mature stands yields

This alternate schedule reduces the initial harvest level (relative to the schedule shown in Figure 47) by 30,400 m^3/year (1.9%) but increases the harvest level in Decades 3 – 7 by 8,800 m^3/year (0.6%). The difference in LTHL and total volume harvested over the 250 years between these two possible schedules are 100 m^3/year and 9,000 m^3 respectively.

Details by individual supply blocks are shown in Appendix B4.

4.3 Mature volumes decreased by 10%

The decreased yields result in approximately 2.72 million m^3 (4.2%) less inventory on the THLB today when compared to the Base Case. Table 32 and Figure 49 indicate the results of applying the same modelling rules as used in the Base Case

Table 32 – Harvest levels with decreased mature stands yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Decreased Mature Volumes	Difference	Alternate Decreased Mature Volumes	Difference
1	2012	2021	1,537,900	1,481,300	- 56,600	1,537,900	0
2	2022	2031	1,451,500	1,399,900	- 51,600	1,449,900	- 1,600
3 - 4	2032	2051	1,379,700	1,362,200	- 17,500	1,372,100	- 7,600
5	2052	2061	1,399,400	1,381,300	- 18,100	1,374,100	- 25,300
6	2062	2071	1,470,000	1,452,300	- 17,700	1,412,200	- 57,800
7	2072	2081	1,520,000	1,507,400	- 12,600	1,480,200	- 39,800
8	2082	2091	1,551,300	1,549,600	- 1,700	1,535,000	- 16,300
9 - 10	2092	2111	1,551,300	1,549,600	- 1,700	1,547,100	- 4,200
11 - 25	2112	2261	1,563,900	1,563,100	- 800	1,560,200	- 3,700

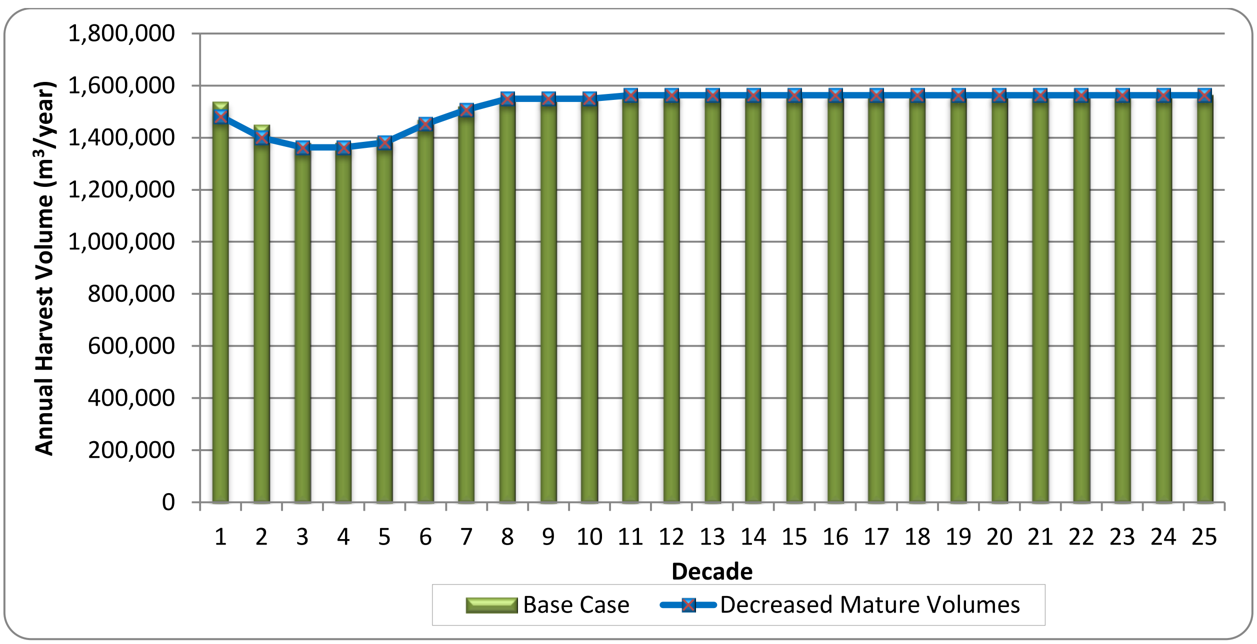

Figure 49 – Harvest levels with decreased mature stands yields

The reduced inventory results in an initial harvest level decrease of 56,600 m^3/year (3.7%). The LTHL is 800 m^3/year (0.1%) less than the Base Case while roughly 2.09 million m^3 (0.5%) less timber is harvested over the 250 years.

As with the increased mature volumes discussed in Section 4.2 , short-term harvest level is reduced by less than 10% due to the second growth requirements and non-conventional constraints applied in the Base Case. These restrictions reduce the timber supply contribution from mature stands and therefore the loss realized by decreasing the mature yields.

Alternatively, the initial harvest level of the Base Case can be achieved with an impact to mid-term timber supply (see Figure 50). This alternate schedule achieves higher harvest levels during the first 40 years but lower levels for the remainder of the schedule. The greatest reduction in timber supply occurs during Decades 6 - 8 due to reduced inventory as a result of higher short-term harvest. This schedule results in a LTHL approximately 3,700 m^3/year (0.2%) lower than the Base Case and about 2.21 million m^3 (0.6%) less timber harvested over the 250 years.

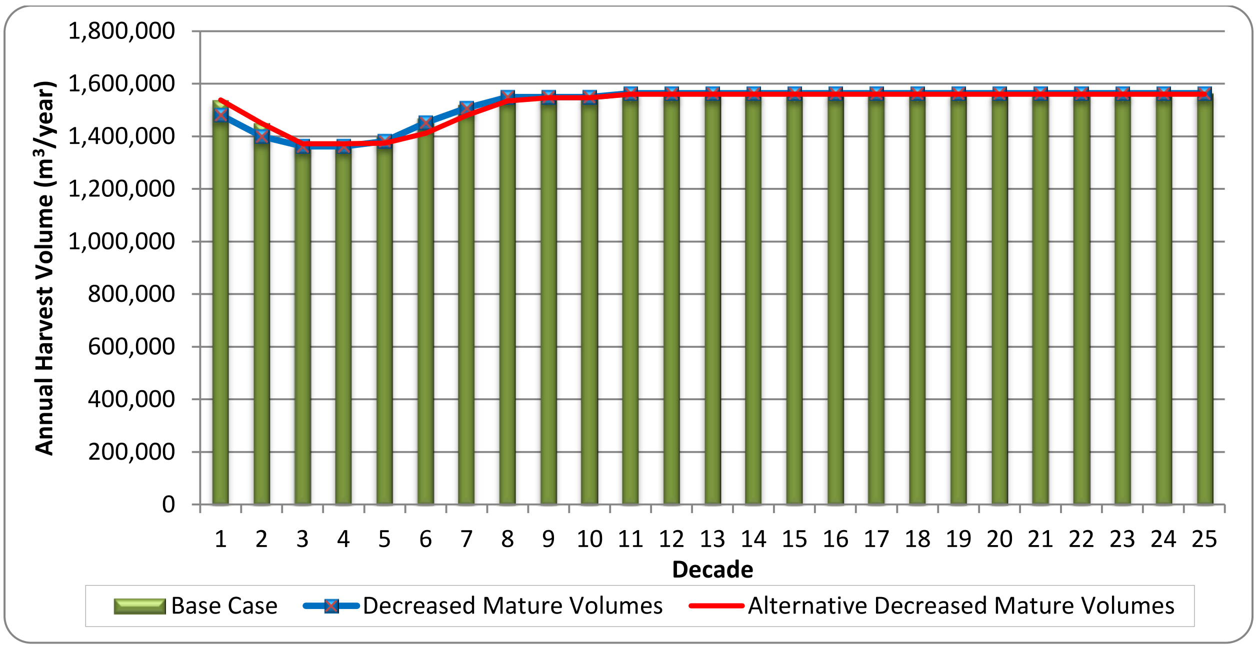

Figure 50 – Alternate harvest levels with decreased mature stands yields

Individual supply block schedules are shown in Appendix B5.

Volume estimates for mature stands are based on inventory cruises from the 1960's that have been updated and upgraded with new cruise data over time. The inventory was audited in the 1990's with no statistically significant difference found for the cruised portion of the inventory. For the un-cruised portion of the inventory (photo-typed to most similar cruised stand-type), statistically significant differences were found and the volumes used in this analysis have been adjusted accordingly.

4.4 Immature volumes increased by 10%

The sensitivity of timber supply to immature stands (140 years old and younger in 2012) volume estimates was tested by increasing (this section) and decreasing (Section 4.5) these volumes by 10%. Volumes in these younger stands were estimated from attributes and assumptions detailed in Section 8 of the IP and the MFLNRO's *Table Interpolation Program for Stand Yields* (TIPSY) version 4.2.

Table 33 and Figure 51 indicate that with increased immature yields timber supply is significantly greater, including in the short-term. This is logical as immature stands provide the majority of volume in Block 1 throughout the schedule and beginning in the second or third decade in the other blocks (refer to Section 2.1 for timber supply contribution details by supply block). Increasing immature yields by 10% adds 3.83 million m^3 (5.8%) to THLB growing stock, of which 1.65 million m^3 is immediately available.

This run results in approximately 35.06 million m^3 (9.2%) more harvest than the Base Case over the 250 year planning horizon. The long term harvest level is 9.6% greater than in the Base Case, slightly less than 10% greater due to the annual non-conventional harvest restrictions reducing the impact of the higher volumes within the non-conventional portion of the THLB.

Table 33 – Harvest levels with increased immature stands yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased Immature Volumes	Difference	Alternate Increased Immature Volumes	Difference
1	2012	2021	1,537,900	1,618,600	+ 80,700	1,605,800	+ 67,900
2	2022	2031	1,451,500	1,529,600	+ 78,100	1,526,300	+ 74,800
3 - 4	2032	2051	1,379,700	1,505,100	+ 125,400	1,526,300	+ 146,600
5	2052	2061	1,399,400	1,526,100	+ 126,700	1,526,300	+ 126,900
6	2062	2071	1,470,000	1,599,200	+ 129,200	1,598,600	+ 128,600
7	2072	2081	1,520,000	1,656,500	+ 136,500	1,663,200	+ 143,200
8 - 10	2082	2111	1,551,300	1,700,600	+ 149,300	1,698,600	+ 147,300
11 - 25	2112	2261	1,563,900	1,714,300	+ 150,400	1,714,200	+ 150,300

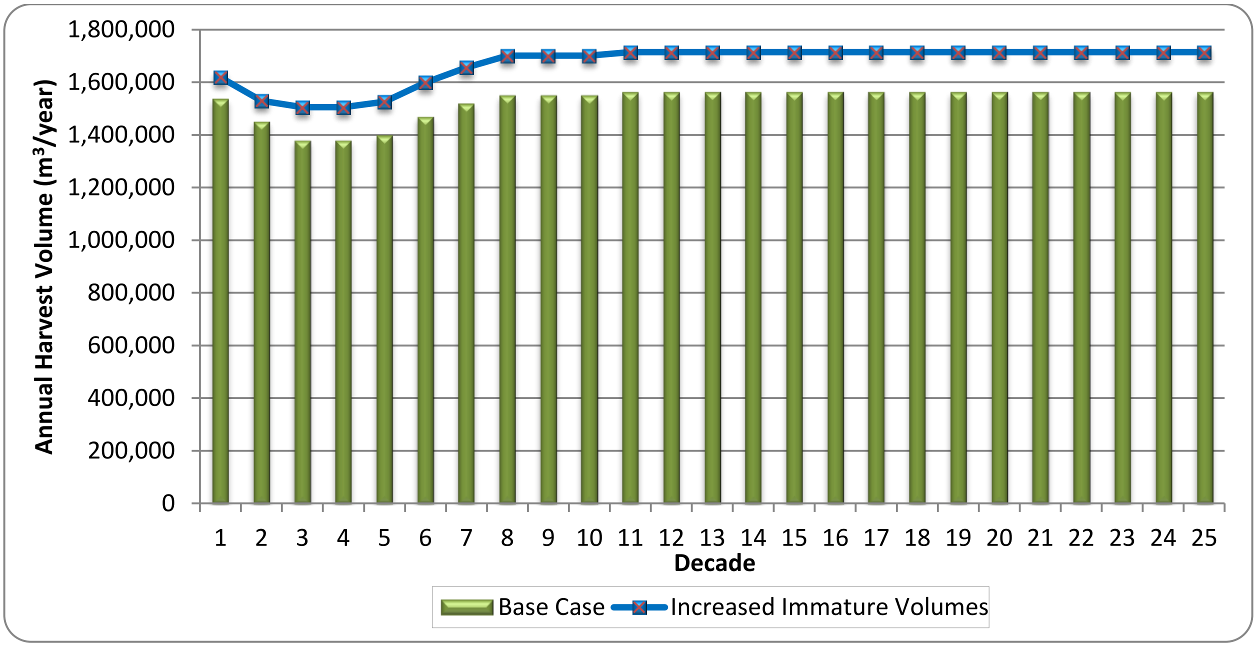

Figure 51 – Harvest levels with increased immature stands yields

Alternatively, the initial harvest level of the Base Case for Block 2 can be achieved with an increase to mid-term timber supply (see Figure 52). Relative to the schedule shown above, this alternate schedule reduces the initial harvest level by 12,800 m^3/year (0.8%) but increases harvest in Decade 3 and 4 by 21,200 m^3/ year (1.4%) and LTHL is unaffected. Overall about 0.25 million m^3 (0.6%) more timber is harvested over the 250 years.

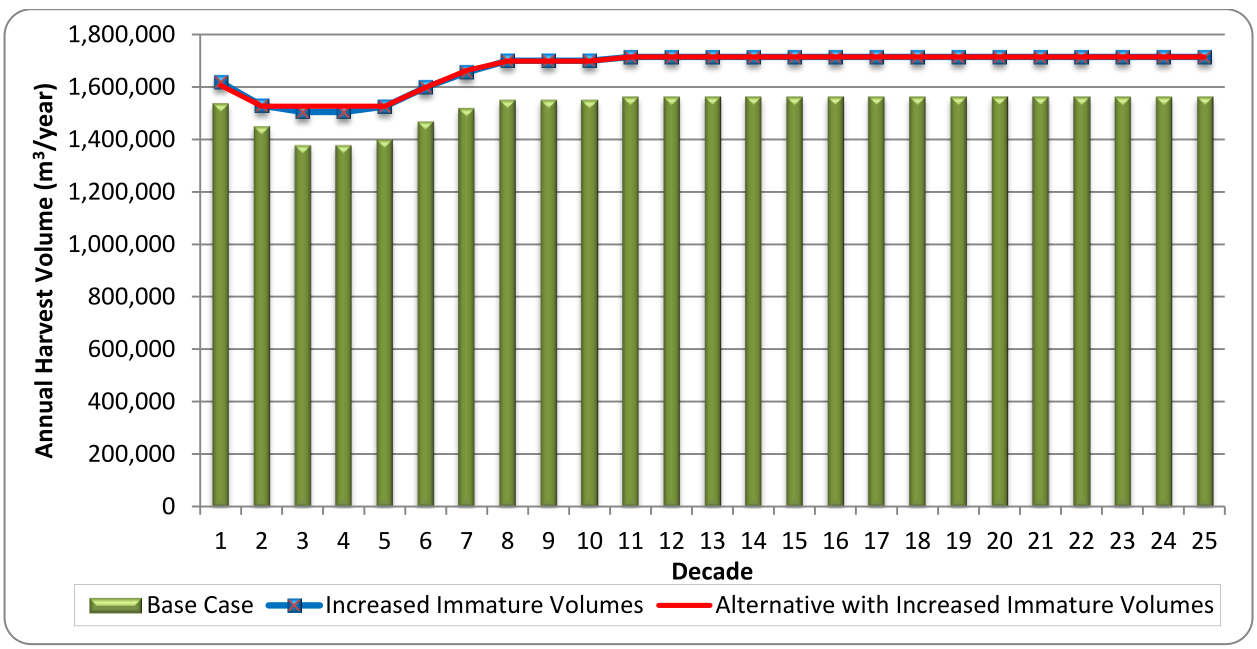

Figure 52 – Alternate harvest levels with increased immature stands yields

Details by individual supply blocks are shown in Appendix B6.

4.5 Immature volumes decreased by 10%

With immature stands yields decreased by 10%, timber supply is affected through the entire planning horizon (see Table 34 and Figure 53). Total THLB growing stock is reduced by 3.83 million m^3 and available growing stock by 1.76 million m^3 (4.7%). Initial harvest level is reduced by 112,100 m^3/year (7.3%). The timber supply impact gradually increases such that the long term harvest level is 155,800 m^3/year (10.0%) lower than the Base Case results. Over the entire 250 year planning horizon, 35.83 million m^3 (9.4 %) less is harvested in this sensitivity.

Table 34 – Harvest levels with decreased immature stands yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Decreased Immature Volumes	Difference	Alternate Decreased Immature Volumes	Difference
1	2012	2021	1,537,900	1,425,800	- 112,100	1,537,900	0
2	2022	2031	1,451,500	1,345,100	- 106,400	1,448,500	- 3,000
3 - 4	2032	2051	1,379,700	1,272,400	- 107,300	1,327,100	- 52,600
5	2052	2061	1,399,400	1,290,900	- 108,500	1,327,100	- 72,300
6	2062	2071	1,470,000	1,351,500	- 118,500	1,327,100	- 142,400
7	2072	2081	1,520,000	1,395,500	- 124,500	1,337,600	- 182,400
8 - 9	2082	2101	1,551,300	1,397,600	- 153,700	1,340,700	- 210,600
10	2102	2111	1,551,300	1,397,600	- 153,700	1,347,100	- 204,200
11 - 25	2112	2261	1,563,900	1,408,100	- 155,800	1,397,800	- 166,100

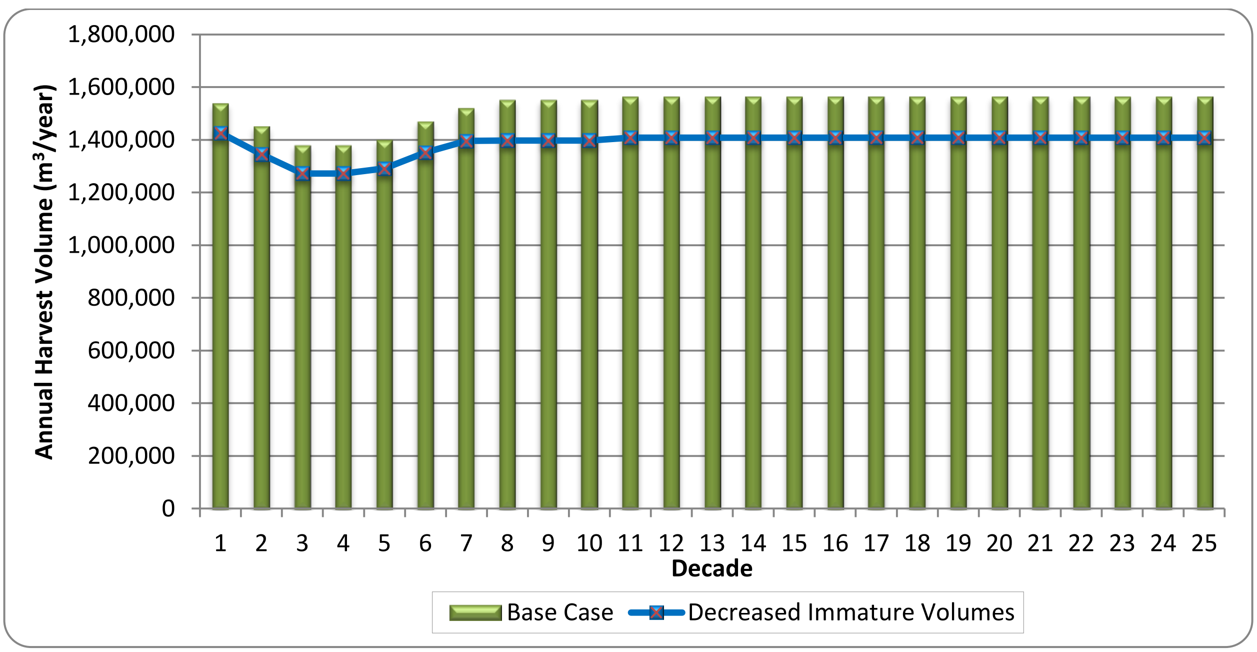

Figure 53 – Harvest levels with decreased immature stands yields

Alternatively, the initial harvest level of the Base Case can be achieved by decreasing mid-term timber supply relative to the schedule indicated in Table 16 and Figure 47. This alternate schedule (see Figure 54) increases short-term harvest by 7.8% but decreases harvest in Decade 7 – 9 by 4.1%. Long-term harvest is reduced by approximately 10,000 m^3/year (0.7%). Overall, about 0.4 million m^3 (0.1%) less timber is harvested over the 250 years.

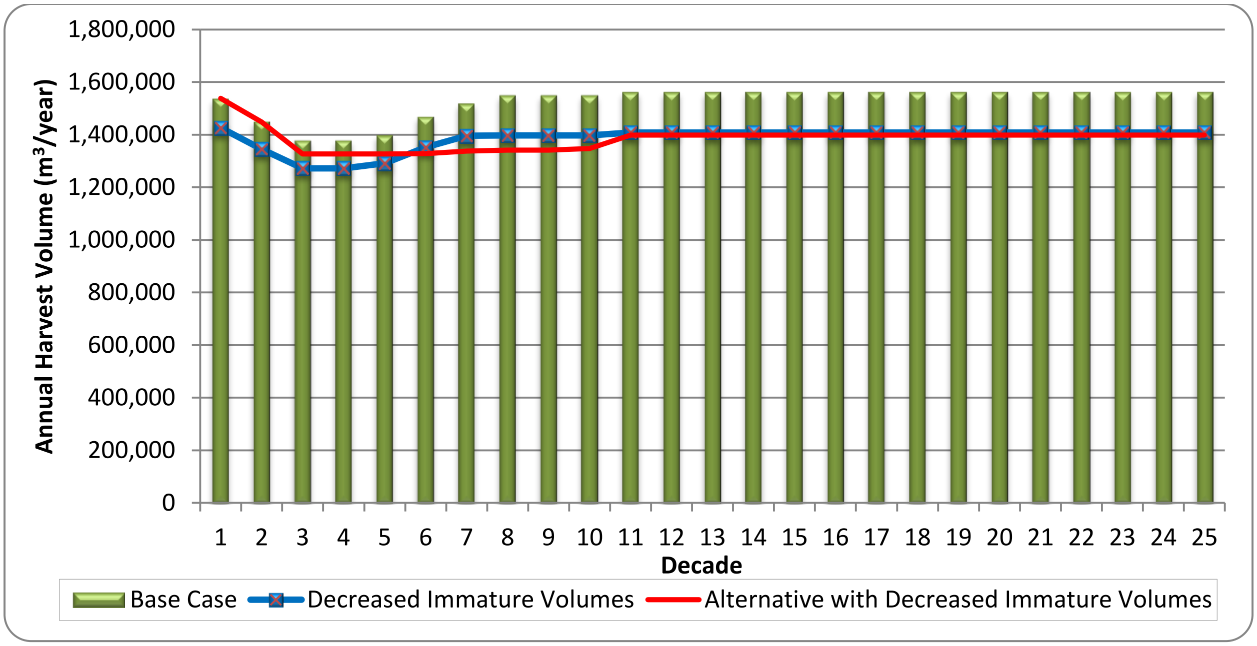

Figure 54 – Alternate harvest levels with decreased immature stands yields

Individual supply block schedules are shown in Appendix B7.

4.6 Use SIBEC Site Index estimates

The Base Case used WFP site indexes to estimate site productivity. These site index values are statistically-based estimates of average site index for the major commercial tree species in TFL 39. A frequently used approach for estimating site productivity is to use Terrestrial Ecosystem Mapping (TEM – site series mapping) and the associated SIBEC (Site Index by Biogeoclimatic Ecosystem Classification) site index estimates. Normally the use of TEM and SIBEC depends on an accuracy assessment having been done for the TEM. No such assessment has been done for the TFL 39 TEM, but this analysis was run to indicate the sensitivity of timber supply to site productivity estimates.

The SIBEC site indexes result in a 1.42 million m^3 (2.2%) increase in THLB inventory at the beginning of the analysis but an increase of 2.31 million m^3 (6.2%) in available inventory (mainly in Block 1). The greater increase in available inventory is due to more stands meeting both the minimum diameter and volume thresholds. Overall, SIBEC estimates increase immature stands yields by approximately 2-3% on average (at average harvest ages) but the impact varies significantly across the analysis units and supply blocks (see Appendix B8).

The increased yields create greater timber supply in the mid and long-term (when comparing against the Base Case); however, short-term timber supply is reduced in Blocks 2 and 3/5 such that total TFL 39 timber supply is also reduced (refer to Table 35 and Figure 55). Overall, there is 8.93 million m^3 (2.3%) more harvested. The long term harvest level is approximately 0.9% more than the Base Case level.

Table 35 – Harvest levels with yields based on SIBEC values

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	SIBEC-based Yields	Difference	Alternate SIBEC-based Yields	Difference
1	2012	2021	1,537,900	1,500,000	- 37,900	1,538,000	+ 100
2	2022	2031	1,451,500	1,433,600	- 17,900	1,447,500	- 4,000
3	2032	2041	1,379,700	1,433,600	+ 53,900	1,422,300	+ 42,600
4	2032	2051	1,379,700	1,444,500	+ 64,800	1,433,200	+ 53,500
5	2052	2061	1,399,400	1,465,300	+ 65,900	1,453,900	+ 54,500
6	2062	2071	1,470,000	1,523,600	+ 53,600	1,512,300	+ 42,300
7	2072	2081	1,520,000	1,573,600	+ 53,600	1,562,300	+ 42,300
8	2082	2091	1,551,300	1,581,300	+ 30,000	1,578,900	+ 27,600
9 - 10	2092	2111	1,551,300	1,582,700	+ 31,400	1,582,300	+ 31,300
11 - 25	2112	2261	1,563,900	1,602,100	+ 38,200	1,602,000	+ 38,100

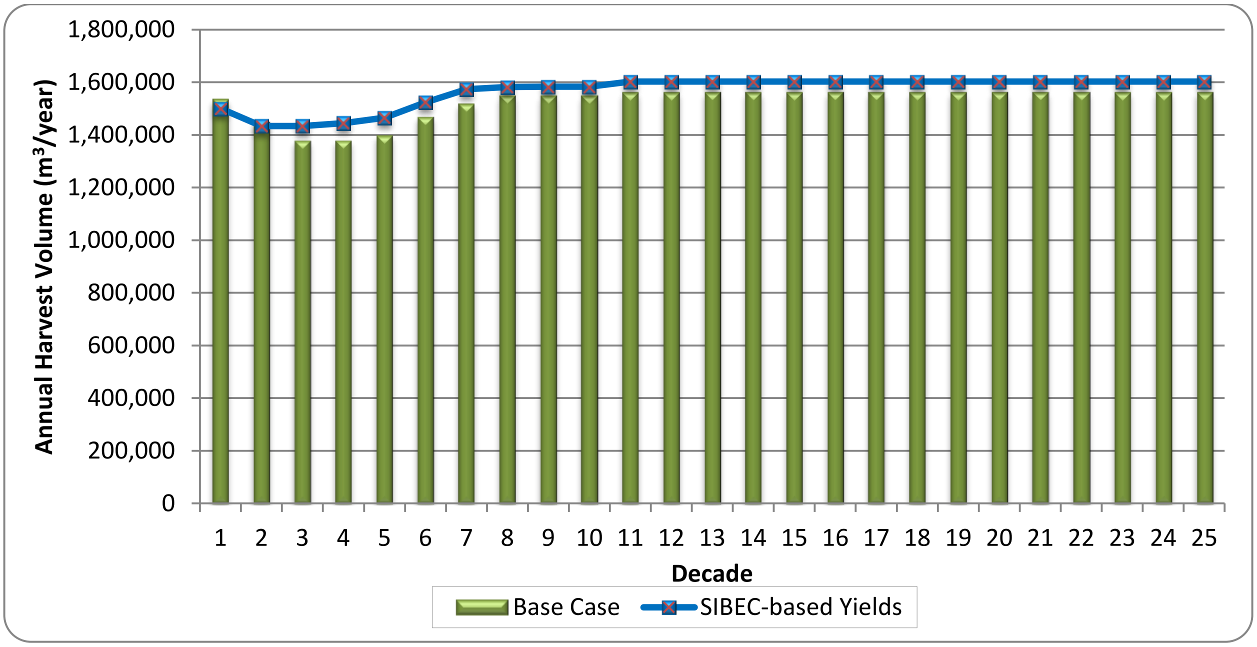

Figure 55 – Harvest levels with yields based on SIBEC values

Rather than decreasing the short-term harvest, it is feasible to maintain the initial harvest level of the Base Case by reducing the mid-term timber supply increase (see Figure 56). This alternative schedule increases the initial harvest level by 37,900 m^3/year and reduces mid-term timber supply by 11,400 m^3/year relative to the schedule shown above. The long-term harvest level is unaffected and total harvest is reduced by 88,000 m^3.

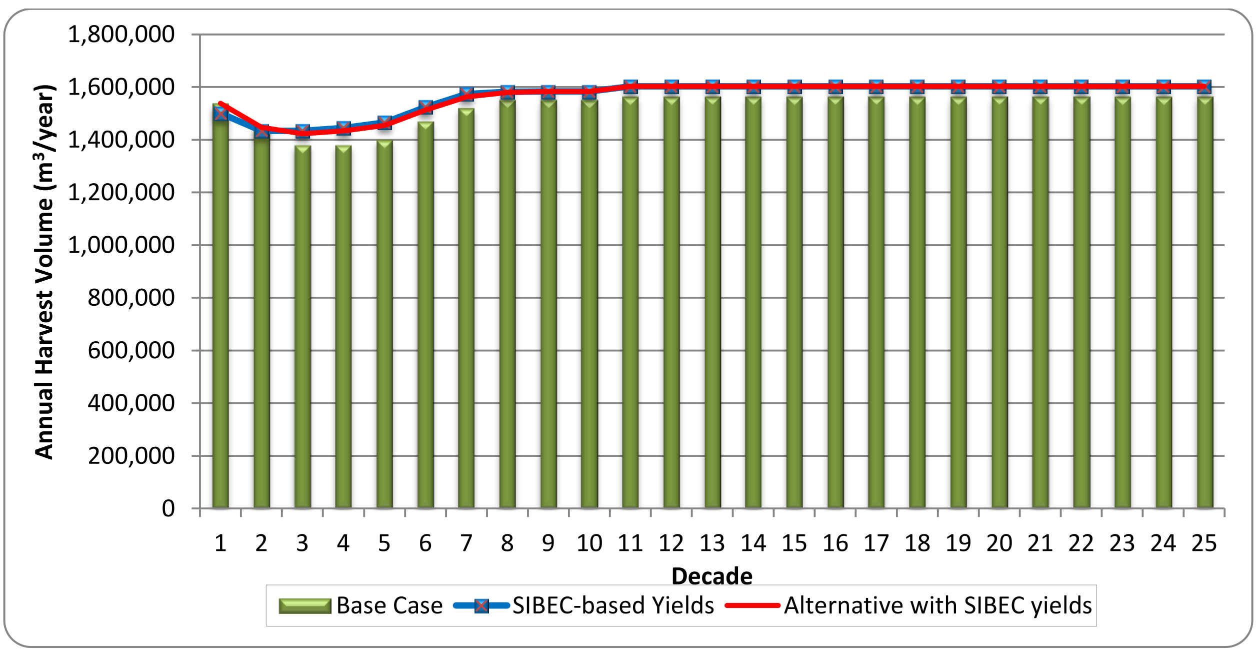

Figure 56 – Alternate harvest levels with SIBEC-based yields

Individual supply block schedules are shown in Appendix B8.

4.7 Increased OAF2 for Unmanaged Immature Stands

The Base Case includes yields for unmanaged immature stands (ages 51-140 years in 2012) are based on TIPSY yield model output calibrated using "pole size" cruise results (see Section 9.5.2 of the IP for details). The more commonly used approach is to use the VDYP yield model for unmanaged stands; however, the TFL 39 forest inventory does not have all attributes required by VDYP. A further review of the TIPSY-based yield tables for these stands indicated that some yields at older ages (greater than 80 years) were up to 10% higher than average cruise results. Also, a comparison to yield tables used in the latest TFL 6 analysis for similar analysis units, which were generated using VDYP 6.6, indicated that VDYP yields tend to be lower than TIPSY at older ages. For this sensitivity analysis, new yield tables were generated for unmanaged immature stands with OAF2 increased by 10% (i.e., generally from 5 % to 15%). This change reduces (compared to the base yield tables) yields at age 100 years by 10 percent, with reductions being 1 percent less for every 10 years younger and 1 percent greater for every 10 years older.

These changes reduce the total THLB growing stock by 1.97 million m^3 (3.0%) and available inventory by 2.17 million m^3 (5.8%). As initial timber supply in Blocks 1 and 3/5 largely depends on contribution from unmanaged immature stands, these yield changes reduce the total initial harvest level by 21,800 m^3/year (1.4%) – refer to Table 36 and Figure 57. The timber supply impact increases to 39,000 m^3/year (2.8%) in the fifth and sixth decades and then decreases to about 1 percent. The mid-term impact is greater as the contribution from these stands increases in this time frame. The long-term impact results from harvesting managed stands at younger ages and therefore reduced yields due to less mid-term timber supply from unmanaged stands. Overall, approximately 4.9 million m^3 (~1.3%) less is harvested over the 250 years.

Table 36 – Harvest levels with increased OAF2 for unmanaged immature stands

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased OAF2	Difference	Alternate Increased OAF2	Difference
1	2012	2021	1,537,900	1,516,100	- 21,800	1,537,900	0
2	2022	2031	1,451,500	1,429,700	- 21,800	1,425,100	- 26,400
3 - 4	2032	2051	1,379,700	1,351,900	- 27,800	1,347,300	- 32,400
5	2052	2061	1,399,400	1,360,400	- 39,000	1,355,700	- 43,700
6	2062	2071	1,470,000	1,430,900	- 39,100	1,426,300	- 43,700
7	2072	2081	1,520,000	1,502,700	- 17,300	1,502,400	- 17,600
8 - 10	2082	2111	1,551,300	1,534,400	- 16,900	1,534,600	- 16,700
11 - 25	2112	2261	1,563,900	1,547,500	- 16,400	1,547,700	- 16,200

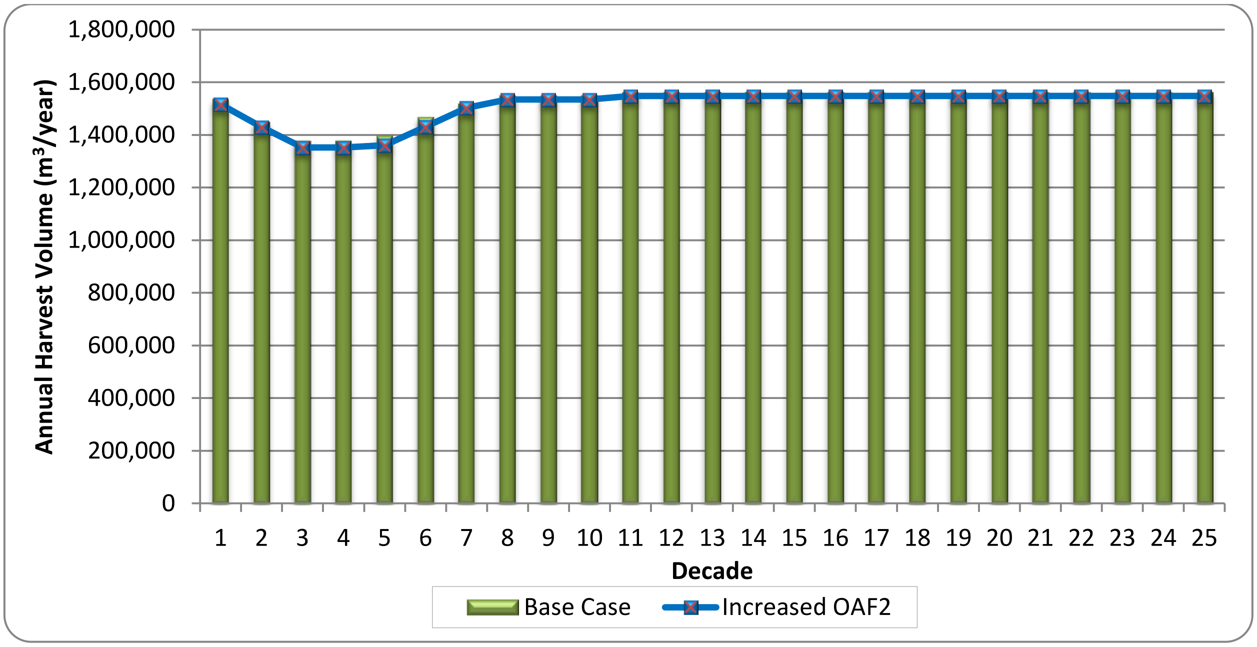

Figure 57 – Harvest levels with increased OAF2 for unmanaged immature stands

It is feasible to maintain the initial harvest level of the Base Case by reducing mid-term timber supply (see Figure 58). This alternative schedule increases the initial harvest level by 21,800 m^3/year and reduces mid-term timber supply by 4,600 m^3/year relative to the schedule shown above. The long-term harvest level is unaffected and total harvest is increased by 16,000 m^3.

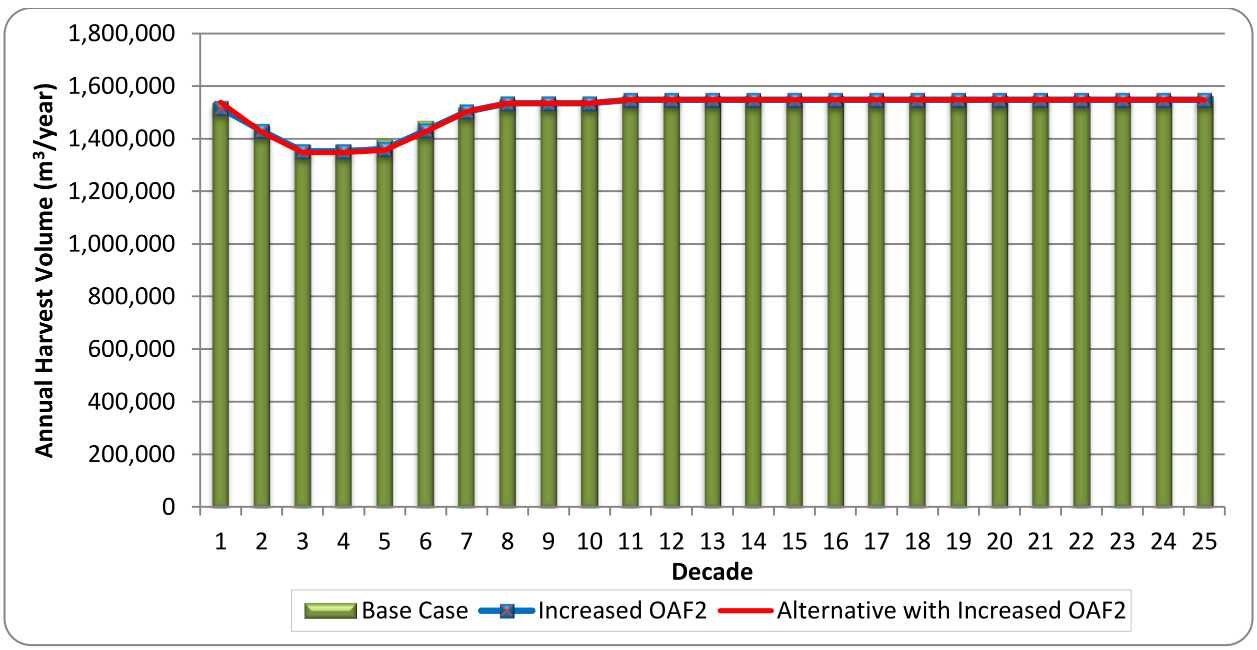

Figure 58 – Alternate harvest levels with increased OAF2 for unmanaged immature stands

Individual supply block schedules are shown in Appendix B9.

Immature yields were calibrated by “pole-size” cruise results. The results of the two sensitivity analyses with reduced immature yields (all immature yields reduced by 10% (Section 4.5) and increased OAF2 for unmanaged immature (Section 4.7)) indicate that the initial harvest of the Base Case can be maintained without creating mid-term timber supply “crashes”. These details provide some assurance that short-term timber supply need not be adjusted for any downward pressure on immature stands yields estimates.

4.8 No Future Genetic Gains

During reviews of other TFL analysis assumptions questions have been raised regarding the amount of western hemlock that had been planted in the last 10 years and the assumptions for planting that species in the future – the concern being the amount of genetic worth (GW – often referred to as "genetic gain") applied for hemlock may be optimistic and therefore overestimate timber supply. The Base Case yields were generated with GW values for hemlock of 10% on low elevation sites and 6% on high elevation sites. These values were reduced from the GW values of planted hemlock (14% and 9% respectively) to reflect the fact that not all hemlock sites are planted and that naturally regenerated hemlock will likely form part of the harvested stand even on sites where hemlock is planted.

This analysis tests the sensitivity of timber supply to the genetic gain values assumed for all species in future stands. Douglas fir, western red cedar and yellow cedar also have genetic gains assumed as these species are regularly planted using improved stock.

As the yield changes impact only future stands there is no short term timber supply impact. The schedule shown in Table 37 and Figure 59 indicates the LTHL achieved is 3.2% lower than the Base Case and roughly 10.55 million m^3 (2.8%) less is harvested over the 250 years. The transition to this lower LTHL requires a reduced mid-term timber supply due to lower inventory levels.

Table 37 – Harvest levels with no future genetic gains

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1	2012	2021	1,537,900	1,537,900	0
2	2022	2031	1,451,500	1,451,500	0
3 - 4	2032	2051	1,379,700	1,373,700	- 6,000
5	2052	2061	1,399,400	1,382,100	- 17,300
6	2062	2071	1,470,000	1,413,700	-56,300
7	2072	2081	1,520,000	1,463,700	- 56,300
8 - 10	2082	2111	1,551,300	1,498,600	- 52,700
11 - 25	2112	2261	1,563,900	1,513,600	- 50,300

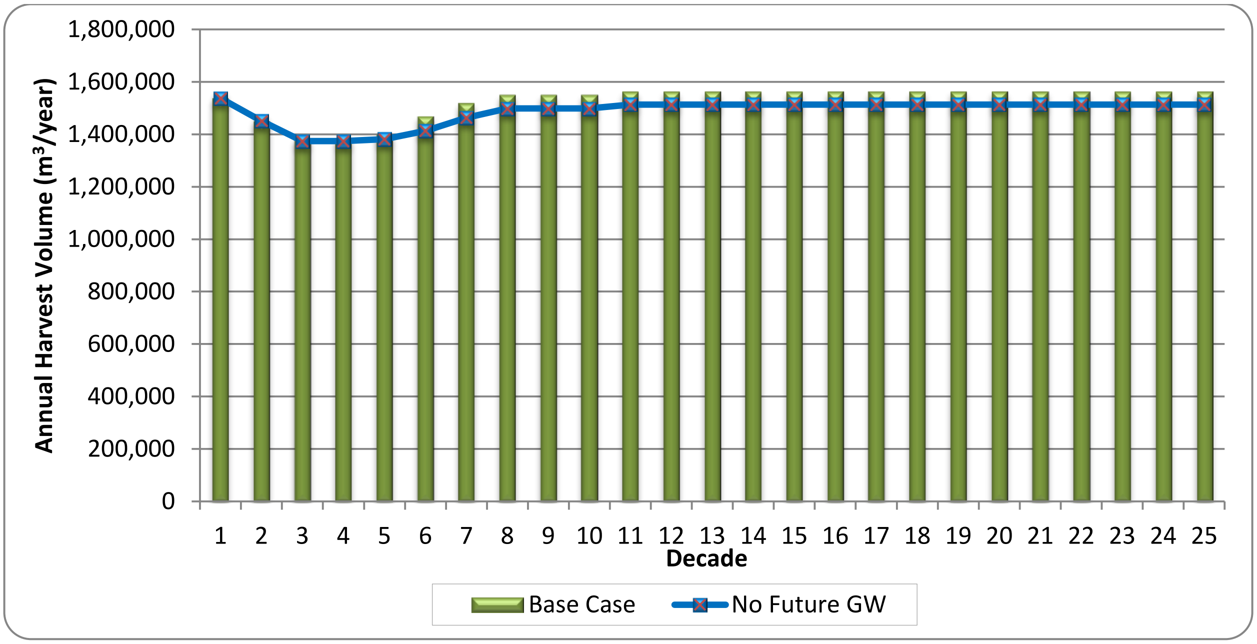

Figure 59 – Harvest levels with no future genetic gains

Details by individual supply blocks are shown in Appendix B10.

WFP owns and operates a seed orchard and tree nursery on the Saanich Peninsula. The orchards at this facility include low and high elevation Douglas Fir, low elevation western redcedar, low and high elevation western hemlock, and low elevation Sitka spruce orchards as well as yellow cedar hedge orchards. The genetic gains applied in the Base Case yields reflect the current values obtained from these seed sources.

4.9 Increase Harvest from Non-conventional Areas

The next three analyses test the sensitivity of timber supply to assumptions associated with the non-conventional land base. The significance of the non-conventional land base is indicated in Table 20: 11.3% of the total THLB area; 18.5% of the total THLB volume; 23% of the total initial available volume. The volume proportions are significantly greater than the area proportion due to less harvest history and therefore higher than average ages and stand volumes.

Table 38 – Non-conventional THLB Statistics[3]

	Block 1	Block 2	Block 3	Block 4	Block 5	TOTAL
Non-conventional THLB (ha)	8,755	6,519	0	3,362	757	19,393
Total THLB (ha)	48,033	91,666	2,336	25,854	3,313	171,202
% Non-conventional	***18.2%***	***7.1%***	***0.0%***	***13.0%***	***22.8%***	***11.3%***
Non-conventional THLB Vol (m^3)	5,734,189	3,963,125	0	2,009,598	422,231	12,129,143
Total THLB Vol (m3)	22,293,984	32,481,972	939,581	8,931,703	938,236	65,585,476
% Non-conventional	***25.7%***	***12.2%***	***0.0%***	***22.5%***	***45.0%***	***18.5%***
Avail Non-conventional Vol (m3)	3,289,697	3,327,296	0	1,728,163	362,560	8,707,716
Total Avail Vol (m3)	11,499,320	20,049,698	738,688	4,303,791	1,284,958	37,876,455
% Non-conventional	***28.6%***	***16.6%***	***0.0%***	***40.2%***	***28.2%***	***23.0%***

Recall that the Base Case includes constraints limiting the amount of non-conventional volume harvested in each supply block in any year. Another approach is to manage the conventional and non-conventional portions of the THLB as two separate. In this analysis separate “long-term stable” growing stock constraints are applied to the conventional and non-conventional THLB growing stocks and separate flow constraints are applied. Reviewing the Base Case results indicated that conventionally operable old growth timber only contributes significant timber supply in the first 30 years or so. To avoid requiring logging and sawmilling equipment capable of handling relatively small volumes of large old growth logs far into the future, this analysis was modelled such that old growth non-conventional volume had to be harvested as an even-flow over the first 40 years.

Table 39 and Figure 60 indicate that with increased non-conventional harvesting the initial harvest level can be 113,300 m^3/year (7.4%) higher (22,500 m^3/year conventional harvest and 90,900 m^3/year non-conventional harvest), with larger gains in the following 30 years (note that in Figure 60, the conventional and non-conventional volumes are indicated separately and in a cumulative style). Mid and long-term timber supply is reduced due to less non-conventional inventory. Over the entire 250 years approximately 1.42 million m^3 (0.4%) more is harvested.

[3] Volumes in Table 38 are 2014 estimates as this is the date to which the modelling data was projected.

Table 39 – Harvest levels with increased non-conventional harvesting

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Non-conventional Increased	Difference
1	2012	2021	1,537,900	1,651,200	+ 113,300
2	2022	2031	1,451,500	1,569,100	+ 117,600
3 - 4	2032	2051	1,379,700	1,495,200	+ 115,500
5	2052	2061	1,399,400	1,348,800	- 50,600
6	2062	2071	1,470,000	1,420,500	- 49,500
7	2072	2081	1,520,000	1,477,200	- 42,800
8	2082	2091	1,551,300	1,517,300	- 34,000
9	2092	2101	1,551,300	1,526,000	- 25,300
10	2102	2111	1,551,300	1,534,700	- 16,600
11	2112	2121	1,563,900	1,539,000	- 24,900
12	2122	2131	1,563,900	1,544,700	- 19,200
13	2132	2141	1,563,900	1,552,600	- 11,300
14	2142	2151	1,563,900	1,555,900	- 8,000
15	2152	2161	1,563,900	1,558,200	- 5,700
16 - 25	2162	2261	1,563,900	1,560,700	- 3,200

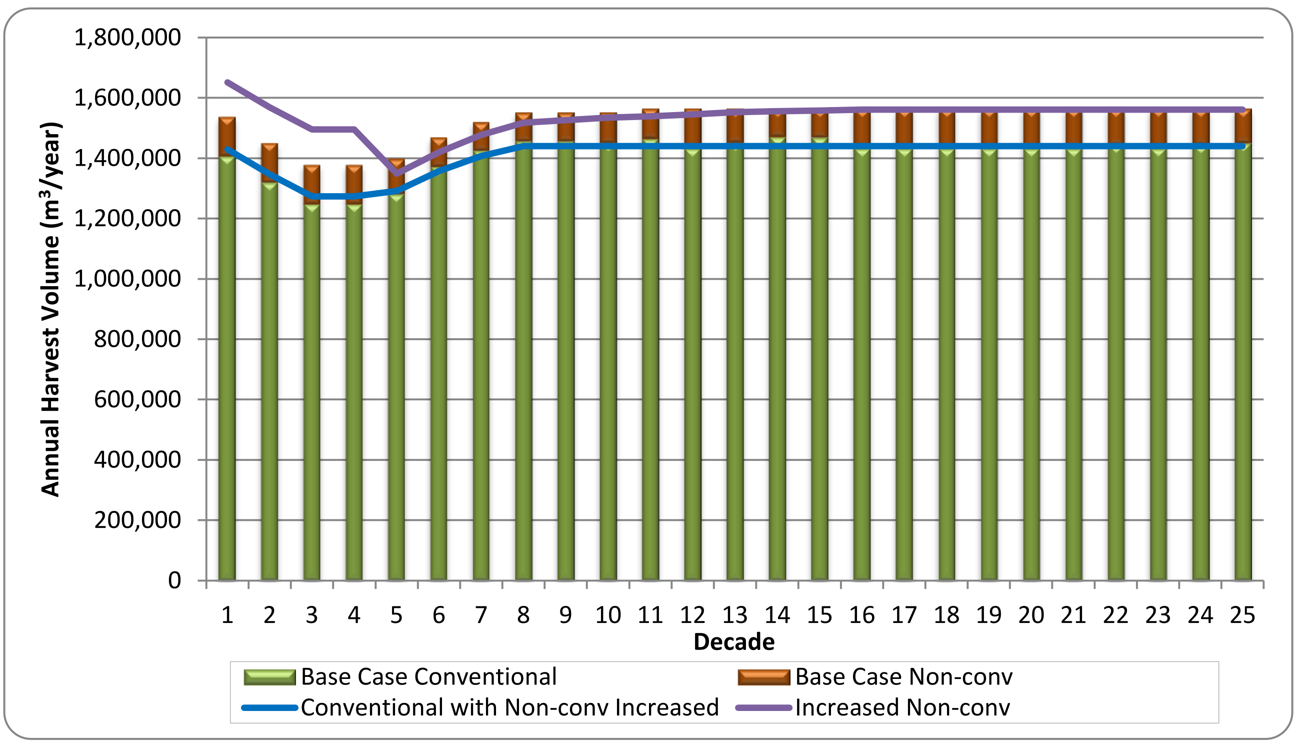

Figure 60 – Harvest levels with increased non-conventional harvesting

Individual supply block schedules, including the non-conventional /conventional volumes split, are shown in Appendix B11.

The Base Case includes restrictions on the timber supply from non-conventionally operable areas that reflect performance during the 2000 to 2010 period. During this time lumber markets were severely reduced due to the unprecedented economic downturn between 2007 and 2010. More recently, lumber prices have begun to recover as the housing market in the United States improves and demand in China and Japan holds steady or improves modestly. The combination of improving markets and reduced supply from the interior of BC due to the mountain pine beetle epidemic has most market analysts forecasting lumber prices to rise dramatically. During 2012 and the first quarter of 2013, lumber prices rose substantially indicating that the lumber “super cycle” may be starting. The mid-2013 fall back in prices has largely been erased by steady price increases through the last half of 2013 and early 2014.

The higher prices should allow economic access to more of the higher cost non-conventional land base than is incorporated in the Base Case.

4.10 Remove non-conventional volume constraint

Past timber supply analyses for TFL 39 did not differentiate the contribution of conventional and non-conventional volume. This analysis tests the impact that constraining the non-conventional contribution has on harvest levels achieved in the Base Case. In this analysis the long-term "stable" growing stock constraint is applied to the total THLB growing stock (rather than only the conventional THLB growing stock as done in the Base Case) because in this sensitivity the entire THLB is being utilized to provide a sustainable timber supply, whereas in the Base Case the conventional THLB is being utilized to provide a sustainable timber supply while the timber supply from the non-conventional THLB is restricted.

Table 40 and Figure 61 indicate that with the non-conventional harvest constraint removed the initial harvest level can be 57,600 m^3/year (3.7%) higher. In percentage terms, the timber supply gains are similar in the following 30 years. The LTHL is approximately 1.7% higher, with the total non-conventional contribution averaging roughly 9%. Over the entire 250 years approximately 8.18 million m^3 (2.1%) more is harvested. Note the large variance in non-conventional contribution over time in Figure 61 (values are cumulative in Figure 61).

Table 40 – Harvest levels with no non-conventional constraint

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No non-conventional Constraint	Difference
1	2012	2021	1,537,900	1,595,500	+ 57,600
2	2022	2031	1,451,500	1,507,900	+ 56,400
3 - 4	2032	2051	1,379,700	1,429,000	+ 49,300
5	2052	2061	1,399,400	1,429,000	+ 29,600
6	2062	2071	1,470,000	1,491,700	+ 21,700
7	2072	2081	1,520,000	1,557,800	+ 37,800
8 - 10	2082	2111	1,551,300	1,590,500	+ 39,200
11 - 25	2112	2261	1,563,900	1,590,500	+ 26,600

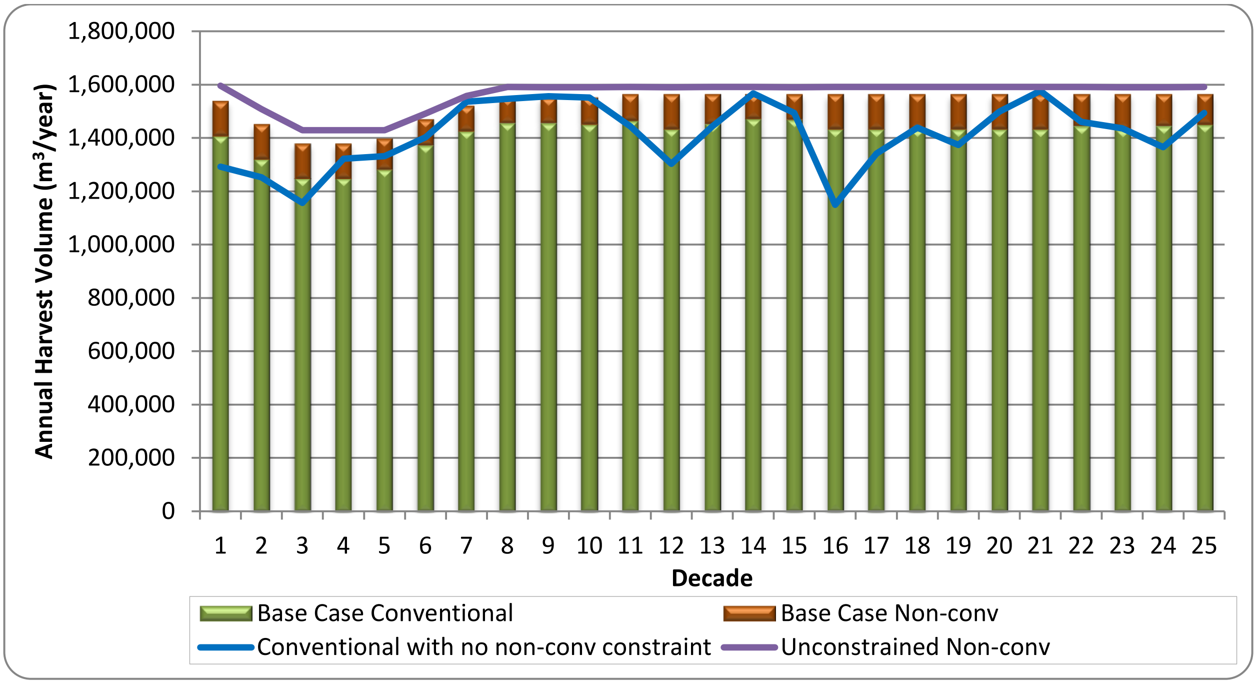

Figure 61 – Harvest levels without non-conventional constraint

Short-term timber supply gains are less than the non-conventional partition analysis discussed in Section 4.9 due to not imposing the even-flow old growth non-conventional harvest requirement in this analysis. That constraint pushed more non-conventional volume into the short-term at the expense of the mid and long-term.

Individual supply block schedules, including the conventional/non-conventional volumes split, are shown in Appendix B12.

4.11 Exclude non-conventional operable land base

In recent years, harvest in the high cost non-conventional operable inventory has been less than its contribution to the current merchantable inventory. The Base Case reflects this level of performance; however, recall that during this time frame demand for forest products reached record lows due to the worldwide recession. This analysis tests the sensitivity of timber supply to the exclusion of the non-conventional land base.

Table 41 and Figure 62 indicate the results of this sensitivity - harvest levels are roughly 9% less than those of the Base Case for the first 60 years. The LTHL is 120,300 m^3/year (7.7%) less than that achieved in the Base Case and the total volume harvested over the 250 years is 30.33 million m^3 (7.9%) less.

Table 41 – Harvest levels with non-conventional THLB excluded

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	No non-conventional Logging	Difference	Alternate No non-conventional Logging	Difference
1	2012	2021	1,537,900	1,397,600	- 140,300	1,537,900	0
2	2022	2031	1,451,500	1,316,100	- 135,400	1,392,800	- 58,700
3 - 4	2032	2051	1,379,700	1,253,200	- 126,500	1,267,100	- 112,600
5	2052	2061	1,399,400	1,269,300	- 130,100	1,267,100	- 132,300
6	2062	2071	1,470,000	1,337,000	-133,000	1,284,600	- 185,400
7	2072	2081	1,520,000	1,406,500	- 113,500	1,301,400	- 218,600
8	2082	2091	1,551,300	1,443,600	- 107,700	1,368,500	- 182,800
9	2092	2101	1,551,300	1,443,600	- 107,700	1,436,000	- 115,300
10	2102	2111	1,551,300	1,443,600	- 107,700	1,437,900	- 113,400
11 - 25	2112	2261	1,563,900	1,443,600	- 120,300	1,437,900	- 126,000

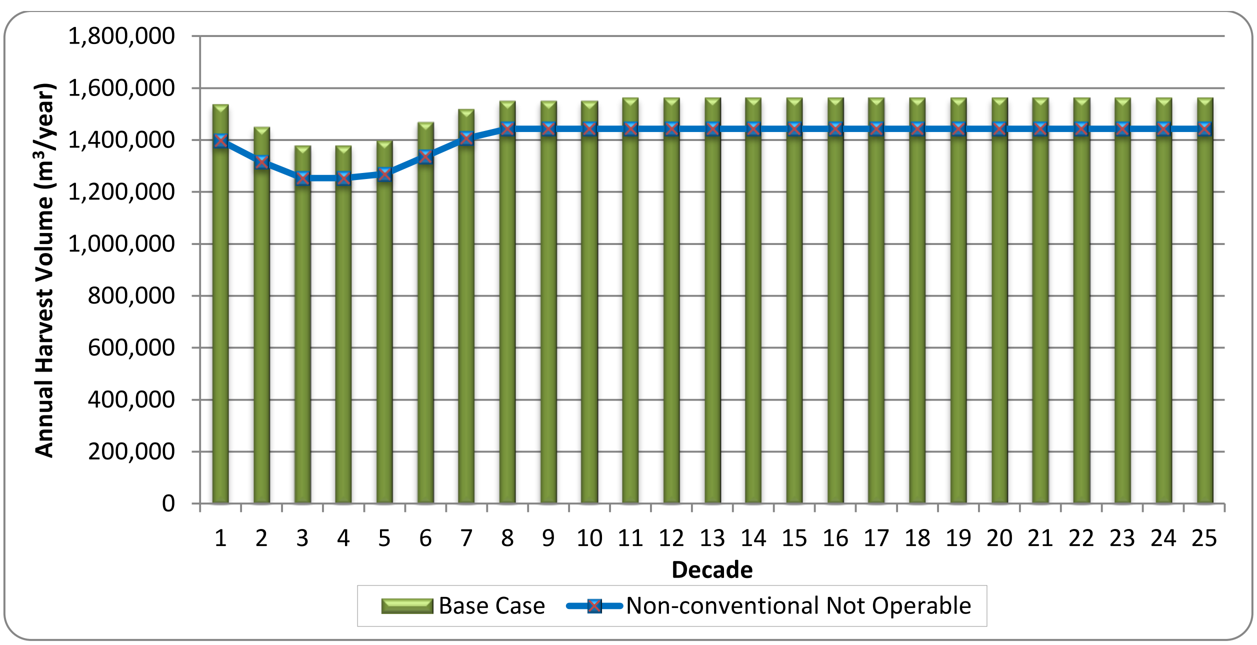

Figure 62 - Harvest levels with non-conventional THLB excluded

Instead of allowing the initial harvest level to be affected, it is possible to develop a schedule that maintains the initial harvest of the Base Case and limits future declines to 10%/decade (see Figure 63). This alternate schedule increases short-term harvest at the expense of mid-term harvest and a minor (0.4%) incremental impact to long-term harvest. Total harvest is 31.22 million m^3 (8.2%) less than the Base Case.

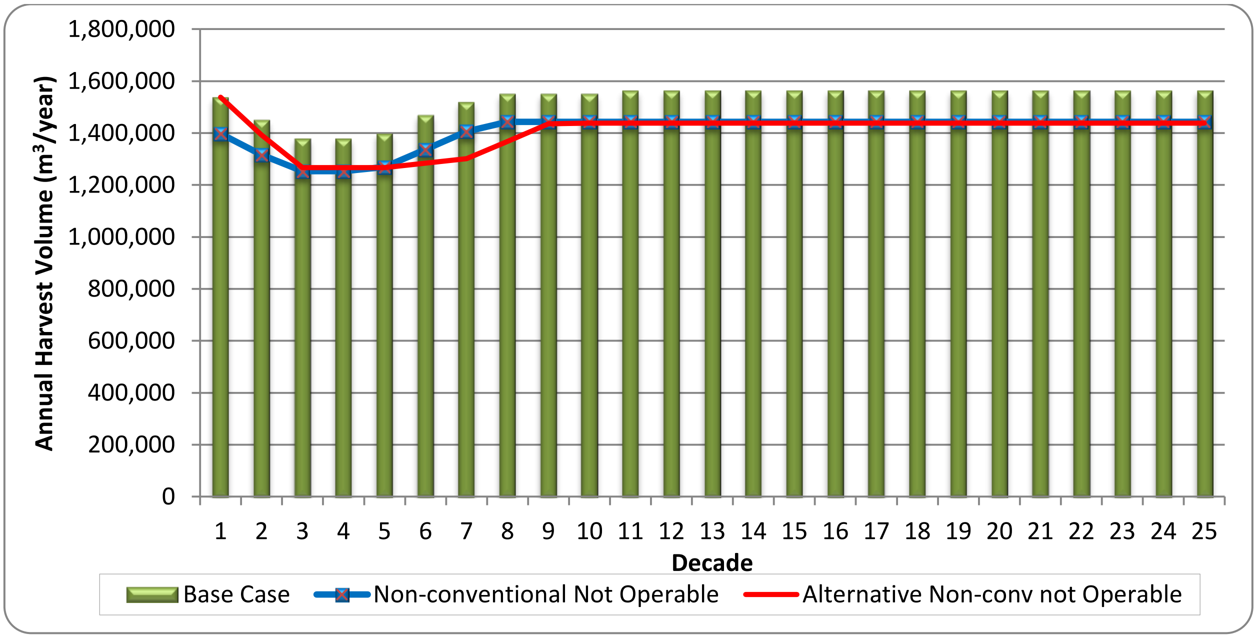

Figure 63 – Alternate harvest levels with non-conventional THLB excluded

Details by individual supply blocks are shown in Appendix B13.

4.12 VQOs more constraining

To test the sensitivity of timber supply to the assumptions used for managing visual quality objectives (VQOs), this sensitivity uses the mid-point of the disturbance range for each VQO class rather than the upper limit as in the Base Case (Table 42). Constraints were applied to individual VQO polygons within Blocks 3, 4 and 5. Due to the number of VQO polygons in Blocks 1 and 2, they were grouped by VQO class within each watershed. Applying constraints to individual VQO polygons resulted in models taking days to solve while grouping allowed models to be solved generally in less than 3 hours. A solution was generated with the disturbance limits applied to individual VQO polygons rather than the aggregated polygons and there was no material difference in harvest volumes achieved. This indicates that the aggregation of the VQO polygons had no significant impact on timber supply results.

Table 42 – Maximum disturbance by VQO class

VQO	Maximum disturbance %	
	Base Case	Sensitivity
Modification (M)	25%	20%
Partial Retention (PR)	15%	10%
Retention (R)	5%	2.5%

Table 43 and Figure 64 indicate the results of this sensitivity. Short term harvest levels are unaffected as there is sufficient inventory outside the visually sensitive areas to maintain the Base Case harvest levels. Commencing in 2032 (Decade 3) the more restrictive visual quality management assumptions (relative to the Base Case) begin having a timber supply impact. The LTHL is reduced by only 1,200 m^3/year (0.1%).

Table 43 - Harvest levels with more restrictive visual quality management

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	VQOs more constraining	Difference
1	2012	2021	1,537,900	1,537,900	0
2	2022	2031	1,451,500	1,451,400	- 100
3 - 4	2032	2051	1,379,700	1,376,500	- 3,200
5	2052	2061	1,399,400	1,396,200	- 3,200
6	2062	2071	1,470,000	1,466,800	-3,200
7	2072	2081	1,520,000	1,516,800	- 3,200
8 - 10	2082	2111	1,551,300	1,550,100	- 1,200
11 - 25	2112	2261	1,563,900	1,562,700	- 1,200

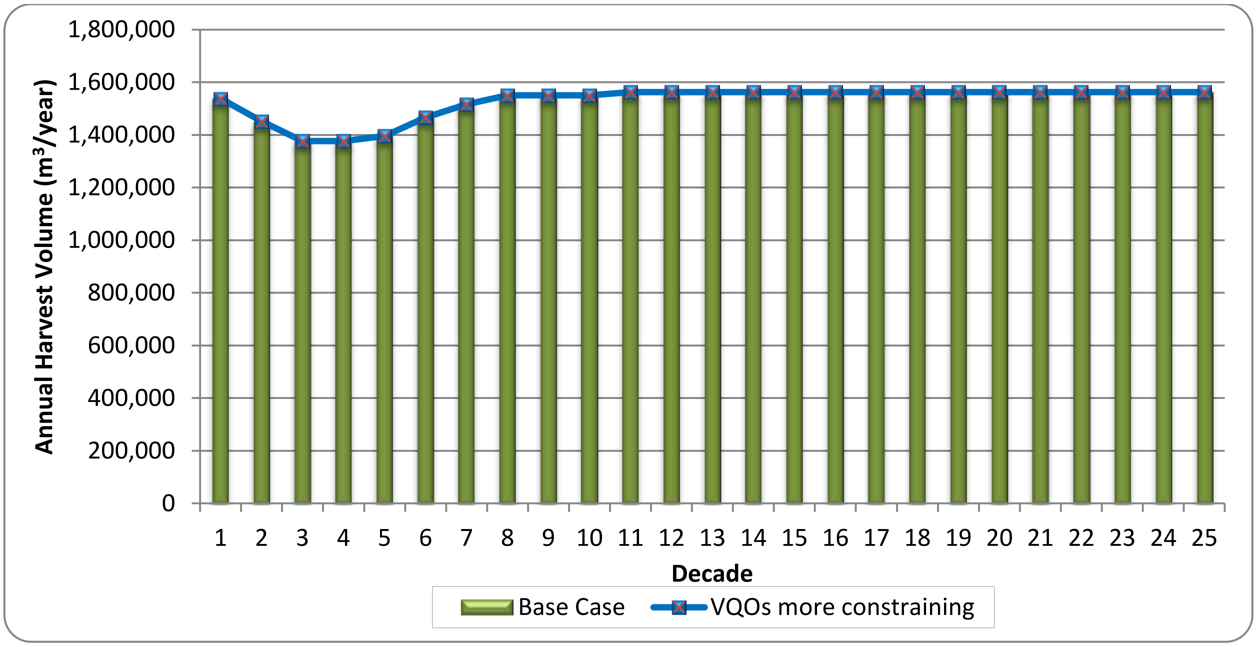

Figure 64 - Harvest levels with more restrictive visual quality management

Individual supply block schedules are shown in Appendix B14.

Visual impact assessments are used to guide cutblock design in order to mitigate the visual impact of cutblocks and roads and therefore reducing the timber supply impact of visual quality management. The screening effect of strategically located stand-level retention can be used to effectively reduce the visual impact of cutblocks. These practices allow for higher disturbance percentages to be achieved within a VQO polygon and therefore support using the higher percentage limits for timber supply modelling.

4.13 Remove Western Forest Strategy Impacts

Nearly all of the harvest within TFL 39 over the past 13 years was done using the retention silviculture system (mainly group retention). This is a result of the policies (forest management strategies) of WFP predecessor companies (MacMillan Bloedel, Weyerhaeuser and Cascadia Forest Products). The WFP forest strategy approach is to vary the use of retention systems and the amount of stand level retention by Resource Management Zones of the Vancouver Island Land Use Plan (or similar zones for tenures not subject to VILUP) and by ecosection (see Section 11.3.3 in the IP for details).

In the Base Case the impacts of the Western Forest Strategy were modeled by including variable THLB area netdowns (see Section 6.18.2 of the IP) and reducing yields of future stands and stands currently aged 1 – 14 years due to shading from retained trees (see Section 9.4.2.1.2 of the IP). This sensitivity tests the timber supply implications that these forest strategy impacts have on the Base Case harvest levels. Due to stand-level retention objectives of the SCCO applying to Blocks 3 and 5, the area impact of stand-retention was maintained in this analysis. However, to investigate the sensitivity of timber supply in Blocks 3 and 5 to the yield impact of shading, the yield reduction was removed.

The initial THLB area increases by 2.2% while both total and available THLB inventory increase by 2.1%. The increase in operable area and higher future yields allow short and mid-term harvest to increase by roughly 3.5% (refer to Table 44 and Figure 65). Long-term harvest is increased by 74,100 m^3/year (4.7%). Over the 250 years, 16.88 million m^3 (4.4%) more is harvested.

Table 44 - Harvest levels with no Western Forest Strategy

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No WFS	Difference	Alternate No WFS	Difference
1	2012	2021	1,537,900	1,591,100	+ 53,200	1,560,700	+ 22,800
2	2022	2031	1,451,500	1,501,700	+ 50,200	1,483,200	+ 31,700
3	2032	2041	1,379,700	1,423,900	+ 44,200	1,431,900	+ 52,200
4	2032	2051	1,379,700	1,428,200	+ 48,500	1,436,100	+ 56,400
5	2052	2061	1,399,400	1,448,900	+ 49,500	1,456,900	+ 57,500
6	2062	2071	1,470,000	1,521,700	+51,700	1,529,700	+ 59,700
7	2072	2081	1,520,000	1,571,700	+51,700	1,579,700	+ 59,700
8	2082	2091	1,551,300	1,626,700	+ 75,400	1,627,100	+ 75,800
9 - 10	2092	2111	1,551,300	1,627,300	+ 76,000	1,627,800	+ 76,500
11 - 25	2112	2261	1,563,900	1,638,000	+ 74,100	1,638,400	+ 74,500

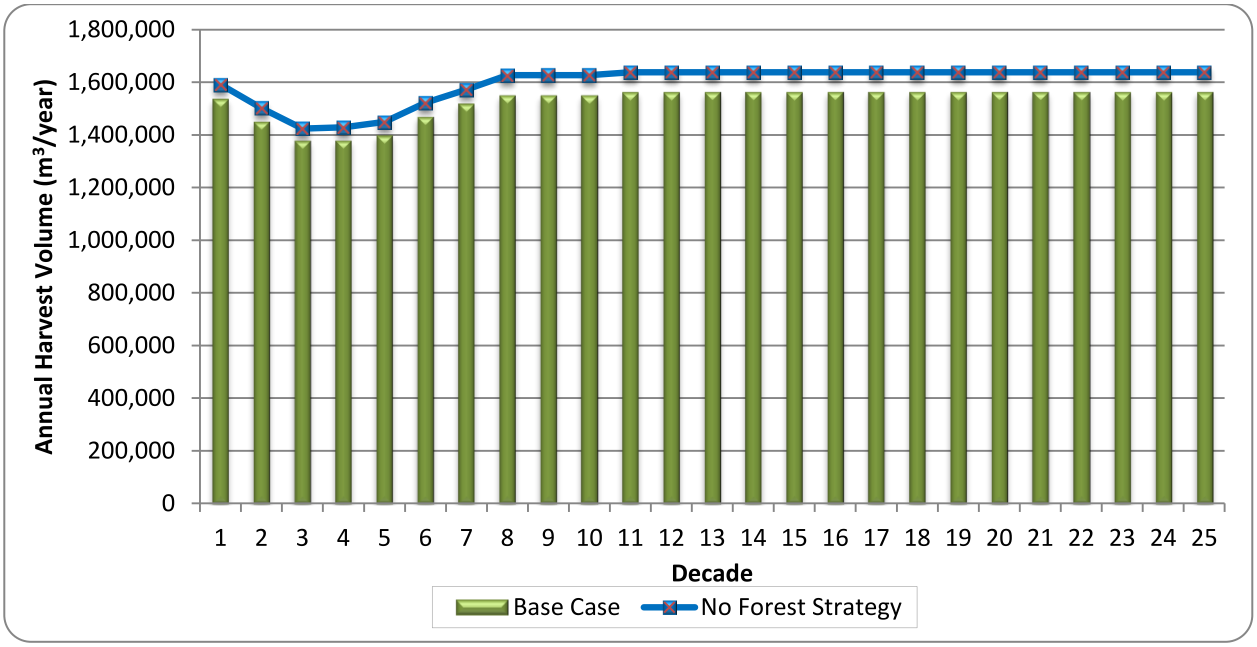

Figure 65 - Harvest levels with no Western Forest Strategy

Alternatively, the increase in operable timber can be used to lessen the mid-term timber supply "dip" in Block 2. This alternate schedule (indicated in Figure 66) maintains the initial harvest level of the Block 2 Base Case. At the TFL level, this reduces the initial harvest level by 30,400 m^3/year but increase harvest in Decades 3 – 7 by 7,900 m^3/year and long-term harvest by 400 m^3/year. Overall, 16,000 m^3 less is harvested than in the schedule shown in Figure 65.

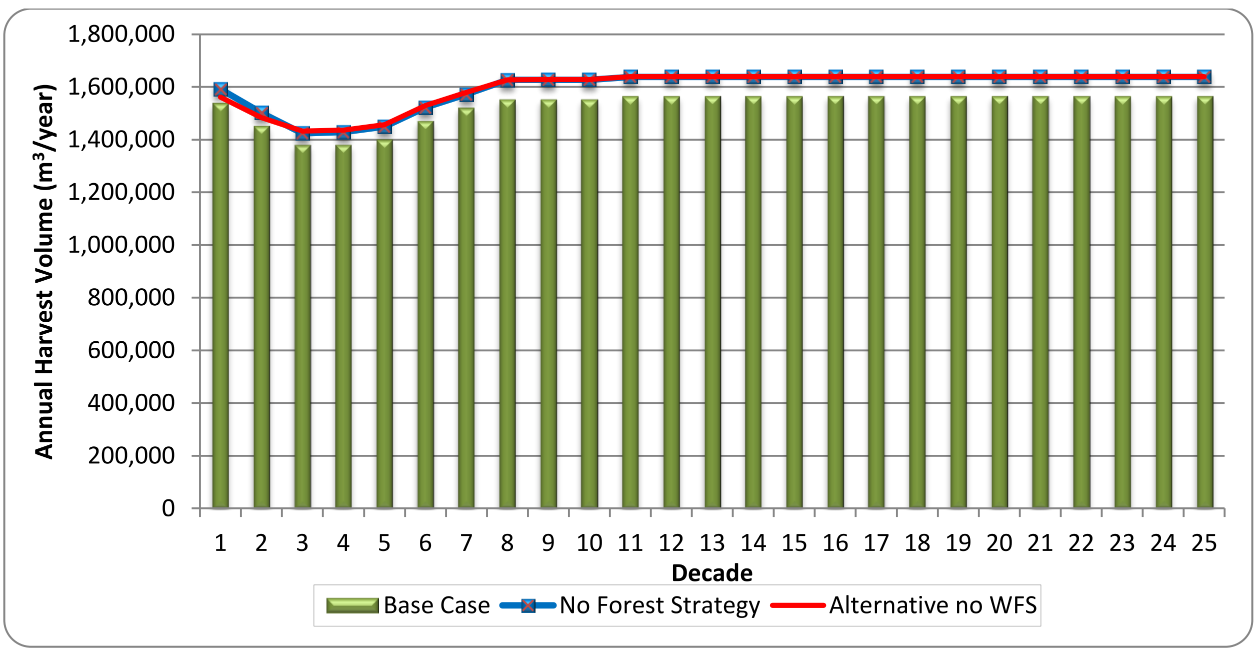

Figure 66 – Alternate harvest levels with no Western Forest Strategy

Details by individual supply blocks are shown in Appendix B15.

The Western Forest Strategy is a company program designed to conserve biodiversity on company tenures outside of the central coast land use decision area. It evolved from policies employed by legacy companies (WFP, Canfor and Cascadia Forest Products) and supports sustainable forest management. The strategy was created with safety in mind and biological, social and economic aspects of sustainable forest management. There is a monitoring and adaptive management program in support of the strategy. The Base Case includes assumptions of the impact of implementing the strategy based on past performance and research associated with monitoring results. No changes to the strategy are planned for the foreseeable future.

4.14 Increase minimum harvest DBH criteria by 2cm

Minimum harvest criteria are simply the minimum criteria for use in the timber supply model – stands are not available for harvest by the model until the minimum criteria are met. Actual harvesting occurs in some stands below the minimum modelled criteria while other stands are not harvested until well past the minimum criteria due to managing for other resource values. Minimum criteria are often specified by an age and a minimum volume per hectare. This analysis used a minimum average stand diameter-at-breast-height (DBH) that varied by harvesting system and a minimum volume per hectare (see section 11.3.1 of the IP). The concept is that larger diameters in general reflect higher net values.

Table 45 indicates the minimum average stand DBH used in the Base Case and in this analysis. The minimum DBHs were increased by 2 cm for the sensitivity analysis. In terms of years, this delays harvest eligibility from 5 to 40 years depending on the analysis unit, with the average delay being slightly more than 10 years.

Table 45 – Larger Minimum Harvest Criteria

Harvest System	Minimum Average DBH	
	Base Case	Sensitivity
Ground	30 cm	32 cm
Cable	37 cm	39 cm
Non-conventional	42 cm	44 cm

The larger DBH criteria reduce the initial available inventory by 2.81 million m^3 (7.6%). Table 46 and Figure 67 indicate the results of maintaining the rest of the Base Case assumptions. The delayed availability of stands necessitates reduced short and mid-term harvest levels in order to allow sufficient inventory to build such that the LTHL is slightly affected (0.9% lower). Overall 5.76 million m^3 (1.5%) less is harvested in this sensitivity analysis.

Table 46 - Harvest levels with larger minimum DBH criteria

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Larger DBH	Difference	Alternate Larger DBH	Difference
1	2012	2021	1,537,900	1,501,100	- 36,800	1,537,900	0
2	2022	2031	1,451,500	1,405,100	- 46,400	1,447,400	- 4,100
3 - 4	2032	2051	1,379,700	1,331,900	- 47,800	1,358,900	- 20,800
5	2052	2061	1,399,400	1,350,400	- 49,000	1,360,300	- 39,100
6	2062	2071	1,470,000	1,420,800	- 49,200	1,376,100	- 93,900
7	2072	2081	1,520,000	1,470,800	- 49,200	1,433,200	- 86,800
8	2082	2091	1,551,300	1,525,800	- 25,500	1,488,200	- 63,100
9	2092	2101	1,551,300	1,528,400	- 22,900	1,525,100	- 26,200
10	2102	2111	1,551,300	1,550,500	- 800	1,547,500	- 3,800
11 - 25	2112	2261	1,563,900	1,550,500	- 13,400	1,547,500	- 16,400

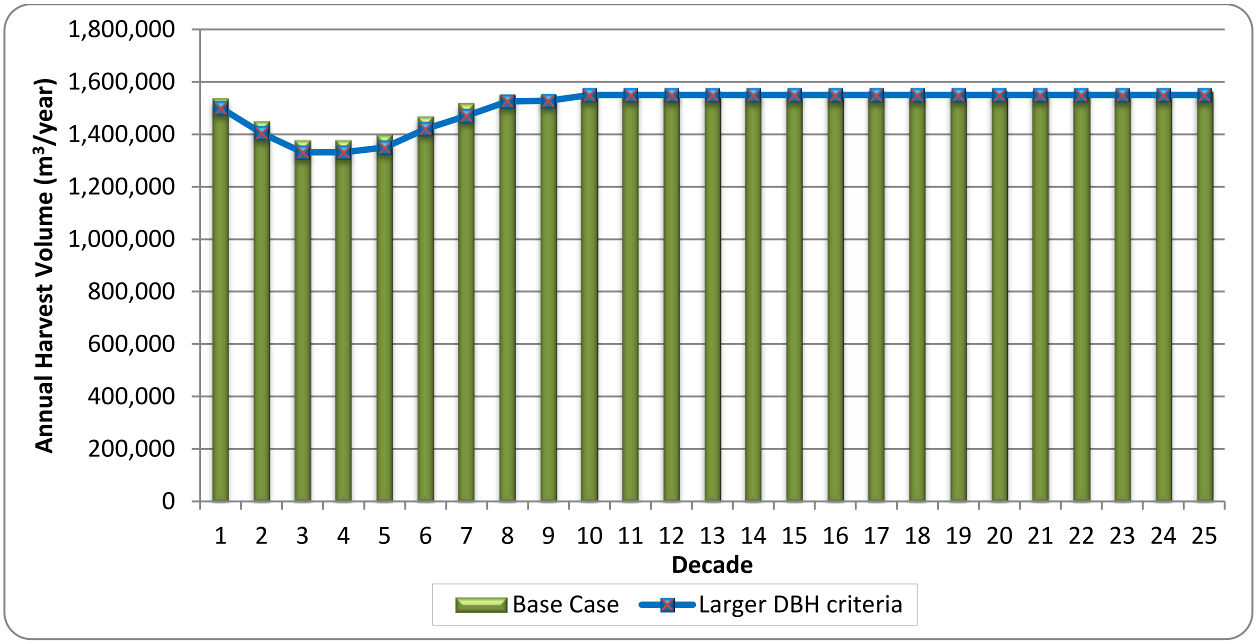

Figure 67 – Harvest levels with larger minimum DBH criteria

Alternatively, the initial harvest level of the Base Case can be achieved by reducing mid-term timber supply (see Figure 68). Relative to the schedule shown in Figure 67, this alternate schedule increases harvest during the first 50 years but reduces harvest thereafter, with the LTHL reduced by 3,000 m^3/year and total harvest by 282,000 m^3.

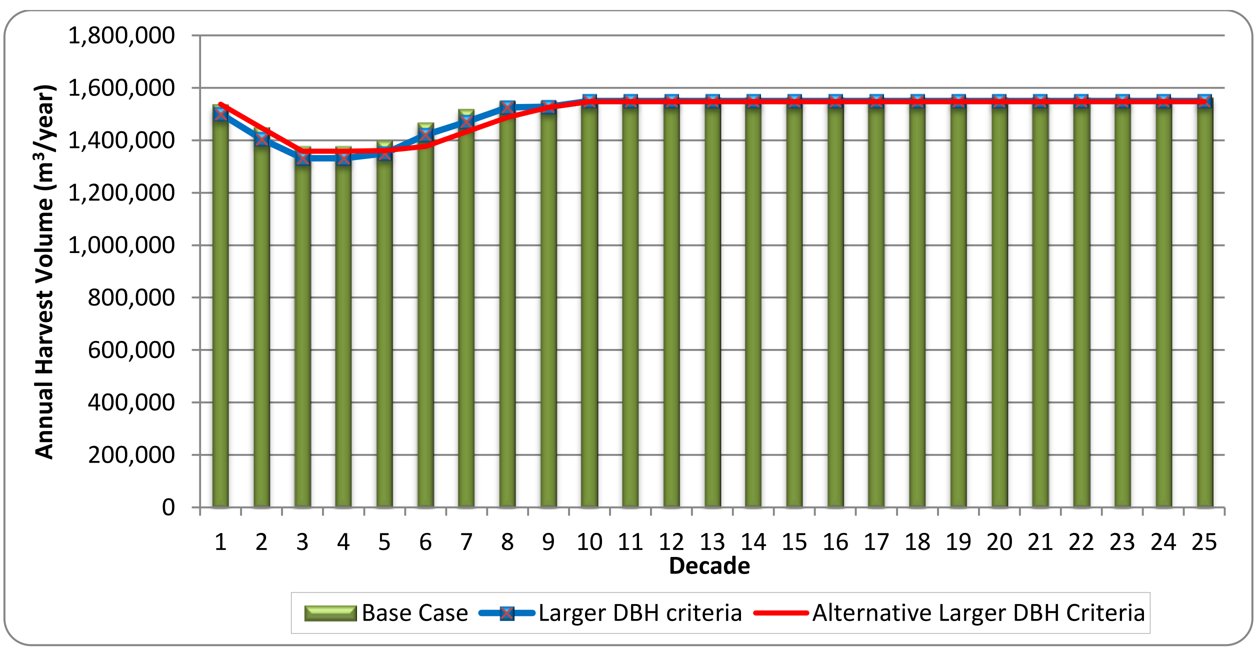

Figure 68 – Alternate harvest levels with larger minimum DBH criteria

Individual supply block schedules are shown in Appendix B16.

4.15 Decrease minimum harvest DBH criteria by 2cm

For this sensitivity analysis the minimum DBHs were decreased by 2 cm (see Table 47). In terms of years, the smaller DBHs accelerate harvest eligibility from 5 to 50 years depending on the analysis unit, with the average being about 10 years.

Table 47 – Smaller Minimum Harvest Criteria

Harvest System	Minimum Average DBH	
	Base Case	Sensitivity
Ground	30 cm	28 cm
Cable	37 cm	35 cm
Non-conventional	42 cm	40 cm

The smaller DBH criteria increase the initial available inventory by 2.71 million m^3 (7.3%). Table 48 and Figure 69 indicate the results of applying all other Base Case assumptions. The earlier availability of stands allows increased short and mid-term harvest levels; short term is increased by 2.5% and mid-term by 3.1%. The LTHL is affected minimally (0.2% higher). Overall 3.82 million m^3 (1.0%) more is harvested in this sensitivity analysis.

Table 48 - Harvest levels with smaller minimum DBH criteria

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Smaller DBH	Difference	Alternate Smaller DBH	Difference
1	2012	2021	1,537,900	1,575,400	+ 37,500	1,545,600	+ 7,700
2	2022	2031	1,451,500	1,486,000	+ 34,500	1,492,600	+ 41,100
3	2032	2041	1,379,700	1,415,800	+ 36,100	1,420,000	+ 40,300
4	2042	2051	1,379,700	1,422,400	+ 42,700	1,426,600	+ 46,900
5	2052	2061	1,399,400	1,442,900	+ 43,500	1,447,100	+ 47,700
6	2062	2071	1,470,000	1,515,400	+ 45,400	1,519,600	+ 49,600
7	2072	2081	1,520,000	1,567,100	+ 47,100	1,567,400	+ 47,400
8 - 10	2082	2111	1,551,300	1,567,100	+ 15,800	1,567,400	+ 16,100
11 - 25	2112	2261	1,563,900	1,567,100	+ 3,200	1,567,400	+ 3,500

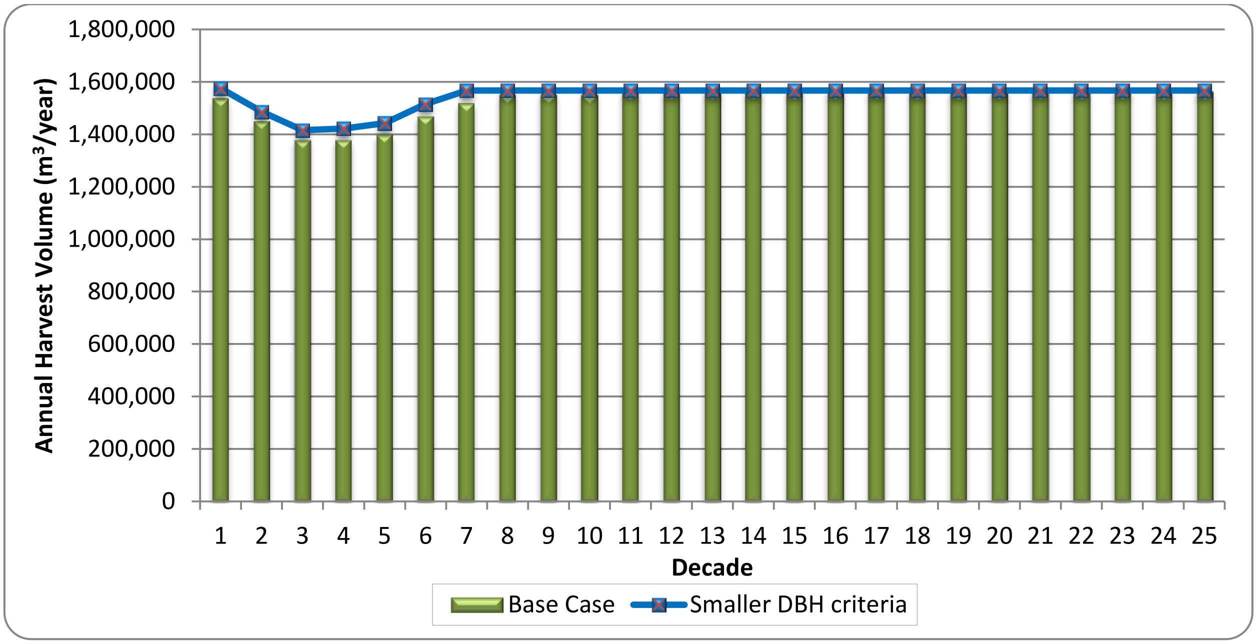

Figure 69 – Harvest levels with smaller minimum DBH criteria

Alternatively, the increase in operable timber can be used to lessen the mid-term timber supply "dip" in Block 2. This alternate schedule (indicated in Figure 70) maintains the initial harvest level of the Block 2 Base Case. At the TFL level and relative to the schedule shown in Figure 63, this reduces the initial harvest level by 29,800 m^3/year but increases harvest in the second decade by 6,600 m3/year and in Decades 3 – 6 by 4,200 m^3/year and long-term harvest by 300 m^3/year. Overall, 7,000 m^3 less is harvested than in the schedule shown in Figure 69.

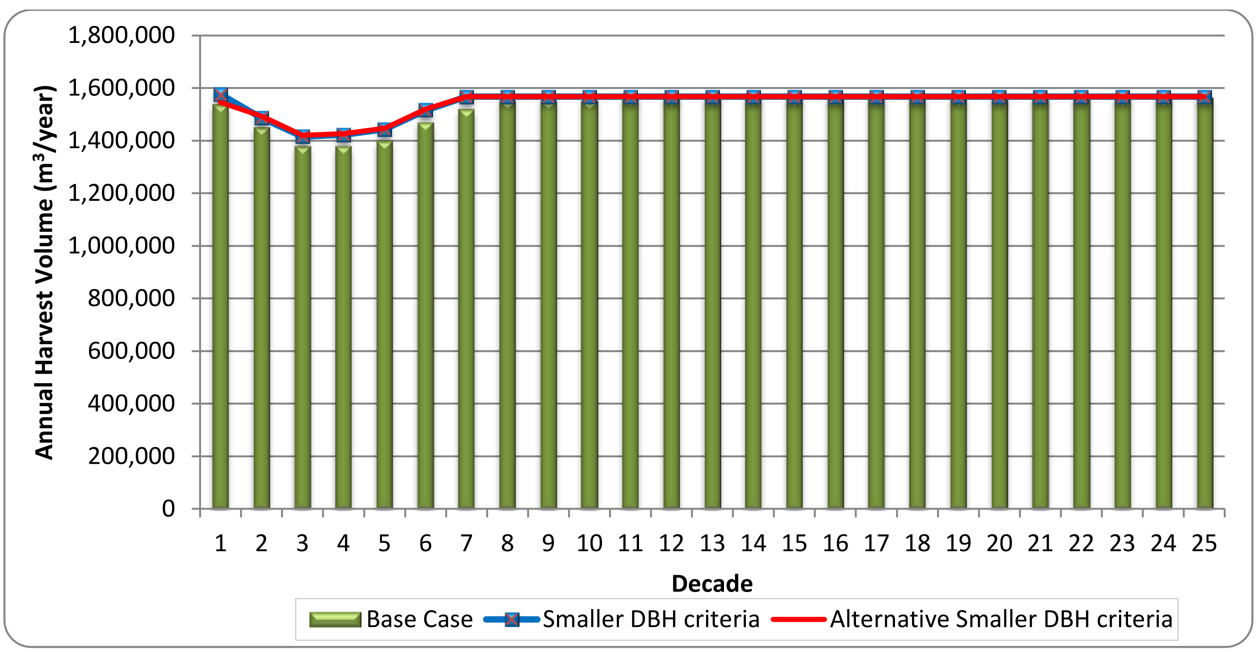

Figure 70 – Alternate harvest levels with smaller minimum DBH criteria

Details by individual supply blocks are shown in Appendix B17.

The minimum harvest criteria applied in the Base Case is intended to reflect economic aspects of a sustainable harvesting program. In general, as DBH of a tree increases so does the value of the logs that can be derived from it. Therefore, the higher the harvest costs, the larger the trees (and longer rotations) required to achieve an economically viable harvest. For this reason, the minimum DBH criteria increases from a low associated with ground-based harvesting to a high associated with non-conventional harvesting systems (e.g. sky-line or helicopter).

The actual average stand DBH that generates a margin-positive stand is site-specific, depending on multiple factors including tree species and associated log values, stand density (stems per hectare), harvest and stumpage costs, and final product prices. The sensitivity analysis results indicate that short-term timber supply can be maintained (with some mid and long-term timber supply loss) even if the DBH criteria used is somewhat optimistic.

4.16 Blocks 3 and 5 managed individually

Within the Base Case, Block 3 (North Broughton Island) and Block 5 (Phillips River) are modeled as a single supply unit due to the relatively small THLB and both being subject to the South Central Coast Order (SCCO). This sensitivity analysis explores the impact of modeling these blocks separately.

Table 49 and Figure 71 indicate that, at the TFL-level, short and mid-term harvest levels are reduced by up to 10,300 m^3/year (0.7%). Over the 250 years, 635,000 m^3 (0.2%) less is harvested.

Table 49 - Harvest levels with Blocks 3 and 5 modeled separately

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Blocks 3 & 5 Separate	Difference
1	2012	2021	1,537,900	1,536,700	- 1,200
2	2022	2031	1,451,500	1,447,700	- 3,800
3	2032	2041	1,379,700	1,373,500	- 6,200
4	2042	2051	1,379,700	1,371,300	- 8,400
5	2052	2061	1,399,400	1,389,100	- 10,300
6	2062	2071	1,470,000	1,459,700	- 10,300
7	2072	2081	1,520,000	1,509,700	- 10,300
8	2082	2091	1,551,300	1,542,300	- 9,000
9	2092	2101	1,551,300	1,547,300	- 4,000
10	2102	2111	1,551,300	1,551,300	0
11 - 25	2112	2261	1,563,900	1,563,900	0

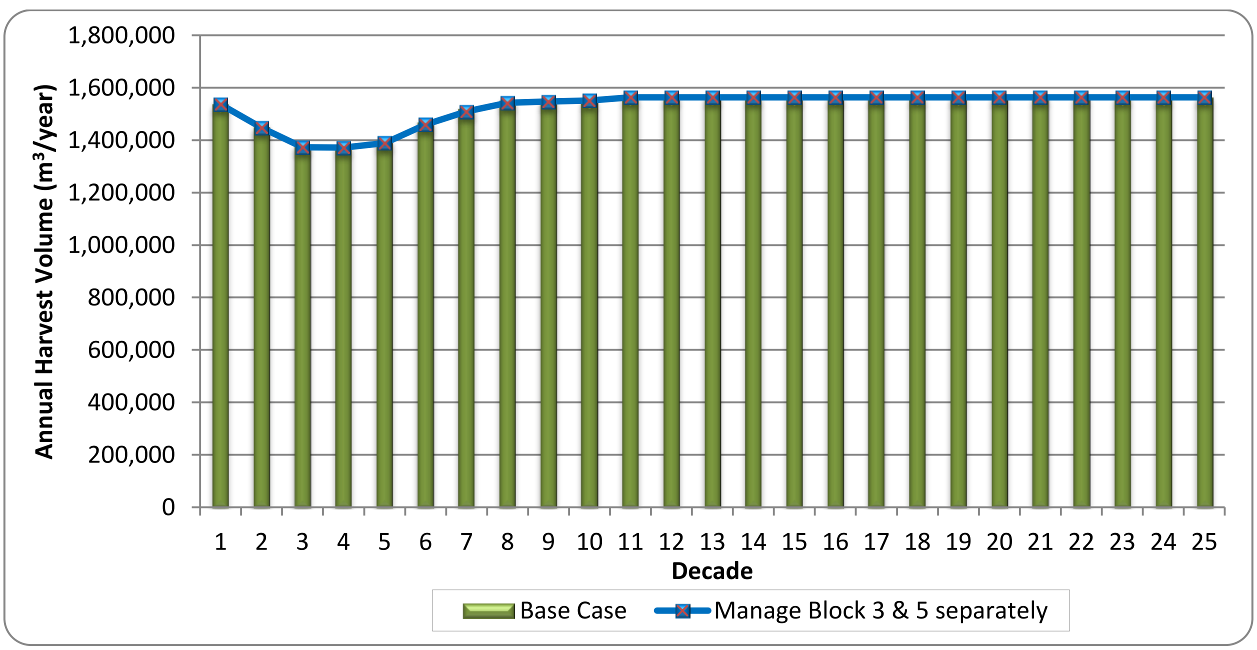

Figure 71 – Harvest levels with Blocks 3 and 5 modeled separately

The timber supply reduction results from applying growing stock constraints within each block rather than across the two combined. Due to the respective THLB age class distributions (refer to Appendix B in the IP), short-term timber supply from Block 3 is greater than long-term while Block 5 is the opposite. When combined, the age class distributions complement each other such that timber supply is fairly constant over time. When managed separately, timber supply declines in Block 3 as the abundance of operable second growth is harvested, thus reducing growing stock. Timber supply in Block 5 increases as second growth ages into operable conditions.

See Appendix B18 for details at the individual block level (for Block 3 and Block 5 only as the other three blocks are unaffected).

4.17 SCCO old seral targets addressed aspatially

As detailed in Section 6.17 of the Information Package, the Base Case utilized strategic-level reserve design (SLRD) to address the landscape level biodiversity objective of the SCCO. In this analysis, the SLRD netdown was removed and the model altered to address the old seral targets by site series surrogate (SSS) as indicated in Appendix B of the Information Package.

This change increases the THLB within the two blocks by a total of 3,925 ha (69%), THLB growing stock by 1,845,200 m^3 (98%) and available growing stock by 1,569,100 m^3 (122%); however the old forest requirements by SSS result in these increases being unavailable in the short and medium-term. Table 50 and Figure 72 indicate that, at the TFL-level, short and mid-term harvest levels are reduced by 700 m^3/year (0.1%). This impact is a result of more area being constrained with Block 3 with this approach. Block 3 is a small portion of the Broughton landscape unit and has relatively little old growth; therefore, the SLRD impact is proportionately less than the productive forest area (i.e., the SLRD utilized old forest outside of Block 3 more). Removing the SLRD and meeting the SSS targets entirely within Block 3 reduces the effective THLB within Block 3.

Table 50 - Harvest levels with SCCO old seral addressed aspatially

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Aspatial SCCO Old Seral	Difference
1	2012	2021	1,537,900	1,537,200	- 700
2	2022	2031	1,451,500	1,450,800	- 700
3 - 4	2032	2051	1,379,700	1,379,000	- 700
5	2052	2061	1,399,400	1,398,700	- 700
6	2062	2071	1,470,000	1,469,300	- 700
7	2072	2081	1,520,000	1,109,300	- 700
8	2082	2091	1,551,300	1,551,900	+ 600
9	2092	2101	1,551,300	1,556,900	+ 5,600
10	2102	2111	1,551,300	1,557,700	+ 6,400
11 - 25	2112	2261	1,563,900	1,570,300	+ 6,400

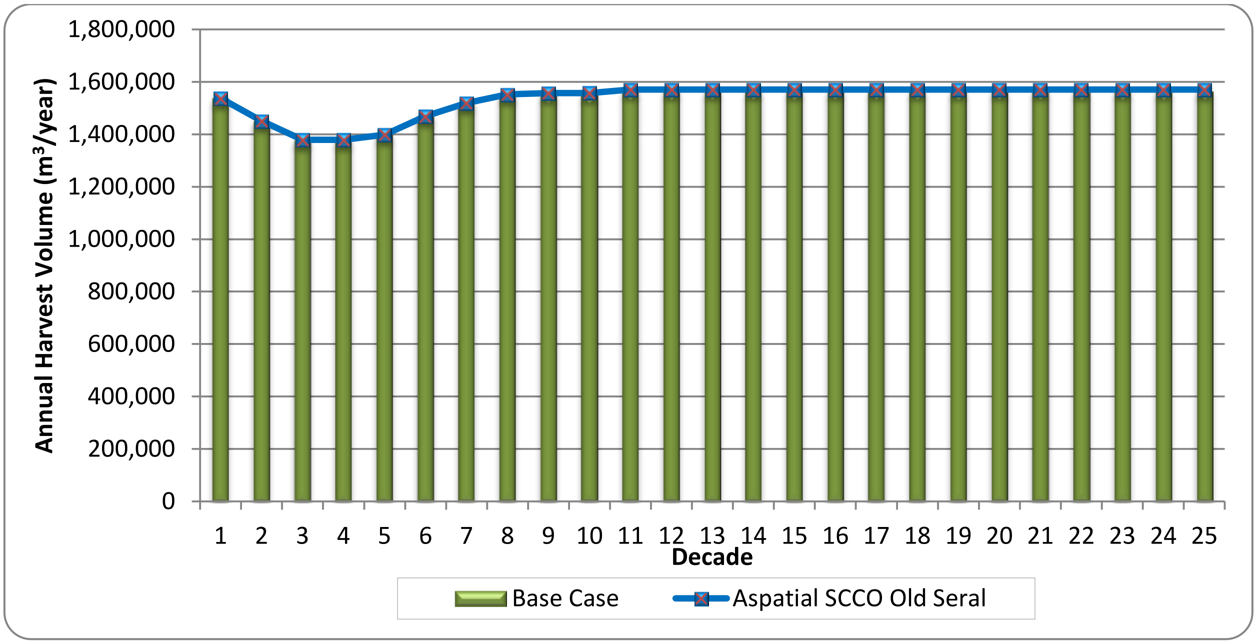

Figure 72 – Harvest levels with SCCO old seral addressed aspatially

The long-term harvest level is 6,400 m3/year (0.4%) higher as the larger THLB allows more harvest opportunity in the long-term; non-contributing forest ages to become old forest thereby freeing THLB. Over the 250 years, 1.04 million m^3 (0.4%) more is harvested.

See Appendix B19 for details at the individual block level (for Block 3 and Block 5 only as the other three blocks are unaffected).

4.18 SCCO risk-managed old seral targets

Objective 14(6) of the South Central Coast Order (SCCO) allows the amount of retained old forest in a landscape unit to be reduced to "risk-managed" targets under certain circumstances. As detailed in Section 6.17 of the Information Package, the amount of old forest to be retained is based on the concept of range of natural variation (RONV). The "default" targets for Broughton and Phillips landscape units are based on RONV of 30% and 70% respectively. The risk-managed targets for Phillips are based on 30% RONV while Broughton is unchanged. In this analysis the SLRD netdown was removed and the model altered to address the old seral targets by SSS.

Table 51 and Figure 73 indicate that, at the TFL-level, short and mid-term harvest levels are increased by 6,100 m^3/year (0.4%) and LTHL by 16,700 m^3/year (1.1%). Over the 250 years, 3.3 million m^3 (0.9%) more is harvested.

Table 51 - Harvest levels with SCCO risk-managed old seral targets

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	SCCO risk-managed old seral	Difference
1	2012	2021	1,537,900	1,544,000	+ 6,100
2	2022	2031	1,451,500	1,457,600	+ 6,100
3 - 4	2032	2051	1,379,700	1,385,800	+ 6,100
5	2052	2061	1,399,400	1,405,500	+ 6,100
6	2062	2071	1,470,000	1,476,100	+ 6,100
7	2072	2081	1,520,000	1,526,100	+ 6,100
8	2082	2091	1,551,300	1,558,700	+ 7,400
9	2092	2101	1,551,300	1,563,700	+ 12,400
10	2102	2111	1,551,300	1,568,000	+ 16,700
11 - 25	2112	2261	1,563,900	1,580,600	+ 16,700

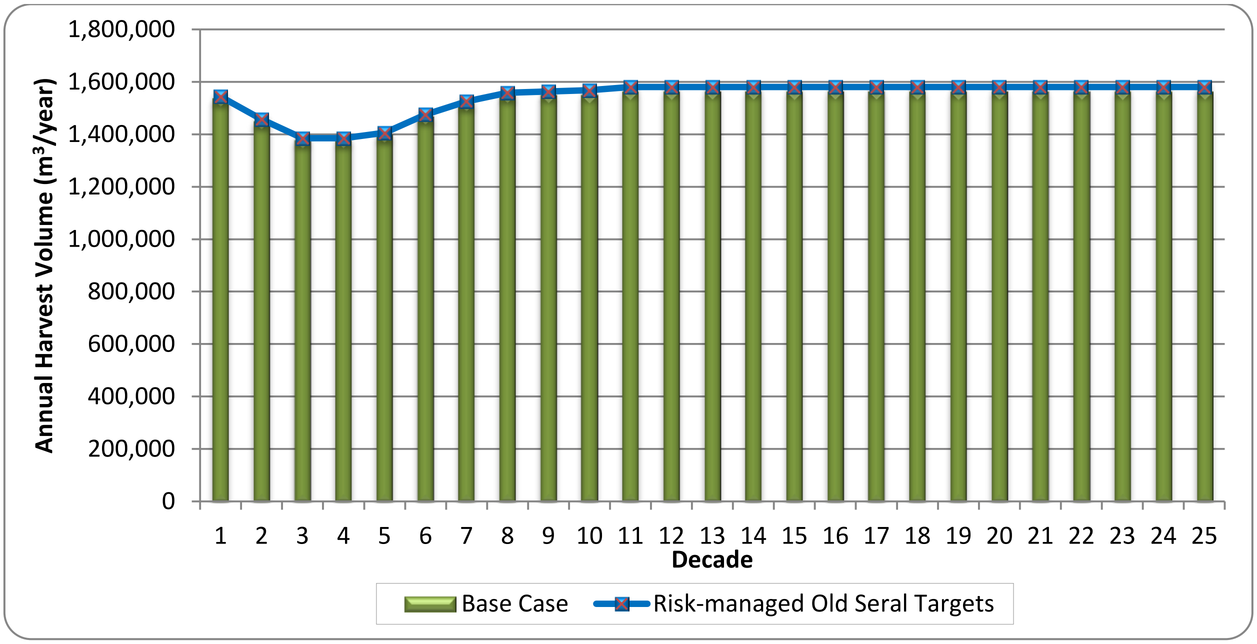

Figure 73 – Harvest levels with SCCO risk-managed old seral targets

While not a large impact at the TFL-level, this change has a significant impact to timber supply within the combined Block 3 and 5 – short-term timber supply is increased by nearly 15% and long-term by 37% (see Appendix B20 for details at the individual block level (for Block 3 and Block 5 only as the other three blocks are unaffected)).

4.19 Phillips old seral targets based on 50% RONV

The RONV targets in the SCCO vary between 30%, 50% and 70%. This analysis tests the timber supply impacts of setting old seral targets based on 50% RONV for the Phillips landscape unit (Block 5).

Table 52 and Figure 74 indicate that short and mid-term harvest levels are increased by 3,100 m^3/year (0.2%) and long-term harvest by 13,100 m3/year (0.8%). Over the 250 years, 2.45 million m^3 (0.2%) more is harvested.

Table 52 - Harvest levels with 50% RONV in Block 5

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Phillips 50% RONV	Difference
1	2012	2021	1,537,900	1,541,100	+ 3,100
2	2022	2031	1,451,500	1,454,600	+ 3,100
3 - 4	2032	2051	1,379,700	1,382,800	+ 3,100
5	2052	2061	1,399,400	1,402,500	+ 3,100
6	2062	2071	1,470,000	1,473,100	+ 3,100
7	2072	2081	1,520,000	1,523,100	+ 3,100
8	2082	2091	1,551,300	1,555,700	+ 4,400
9	2092	2101	1,551,300	1,560,700	+ 9,400
10	2102	2111	1,551,300	1,564,400	+ 13,100
11 - 25	2112	2261	1,563,900	1,577,000	+ 13,100

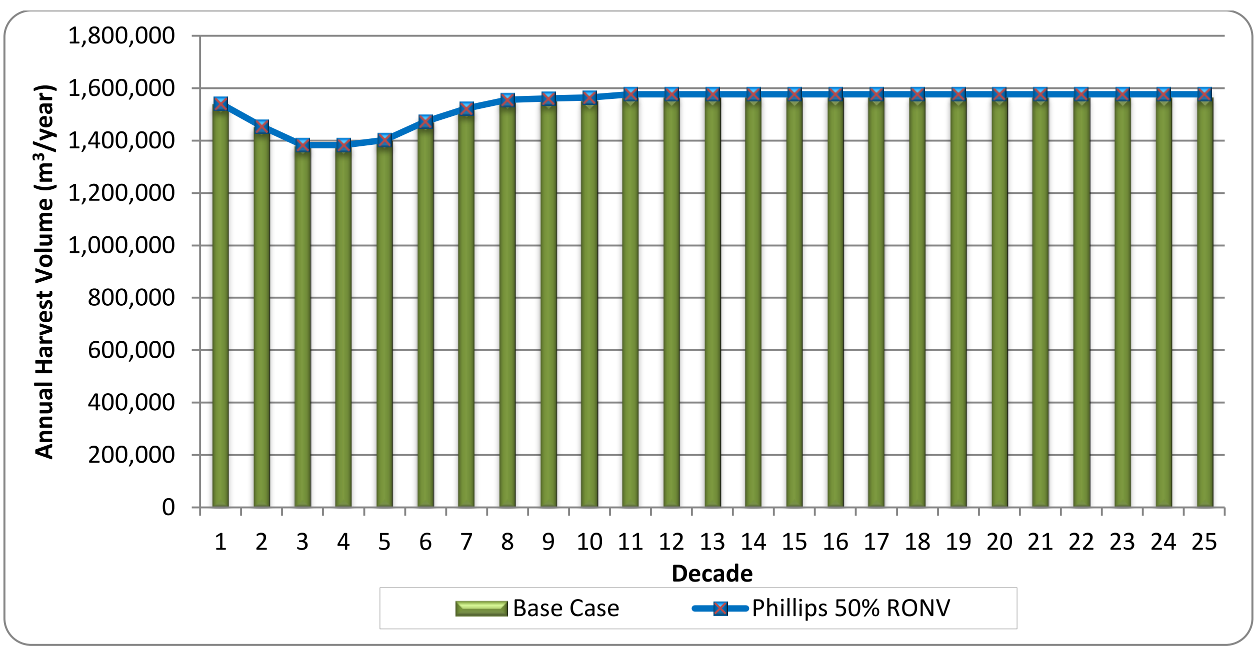

Figure 74 – Harvest levels with 50% RONV in Block 5

While not a great impact at the TFL-level, this change has a significant impact to timber supply within the combined Block 3 and 5 – short-term timber supply is increased by nearly 7.5% and long-term by 29% (see Appendix B21 for details at the individual block level (for Block 3 and Block 5 only as the other three blocks are unaffected)).

EBM targets are currently being re-negotiated and the results (expected in late 2014) may significantly change netdowns, particularly in Block 5. If warranted by amendments to the SCCO, the AAC contribution from Blocks 3 and 5 may be re-visited before the next TFL 39 AAC determination is due.

4.20 No South Central Coast Order Netdowns

To explore the timber supply impact of the SCCO and implementation of ecosystem-based management (EBM) this analysis was constructed by removing all SCCO-related netdowns (high value bear habitat, red and blue-listed ecosystems, SLRD). Stand-level retention was assumed to be similar so no changes were made to that netdown. All other assumptions in the Base Case were unaltered.

This change increases the THLB within the two blocks by a total of 4,425 ha (78%), THLB growing stock by 2,280,300 m^3 (121%) and available growing stock by 1,592,200 m^3 (124%). Table 53 and Figure 75 indicate that total TFL harvest could be increased by 1.3% throughout the planning horizon.

Table 53 - Harvest levels with no SCCO netdowns

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No SCCO	Difference
1	2012	2021	1,537,900	1,556,200	+ 18,300
2	2022	2031	1,451,500	1,469,800	+ 18,300
3 - 4	2032	2051	1,379,700	1,398,000	+ 18,300
5	2052	2061	1,399,400	1,417,700	+ 18,300
6	2062	2071	1,470,000	1,488,300	+ 18,300
7	2072	2081	1,520,000	1,538,300	+ 18,300
8	2082	2091	1,551,300	1,570,900	+ 19,600
9 - 10	2092	2111	1,551,300	1,571,500	+ 20,200
11 - 25	2112	2261	1,563,900	1,584,100	+ 20,200

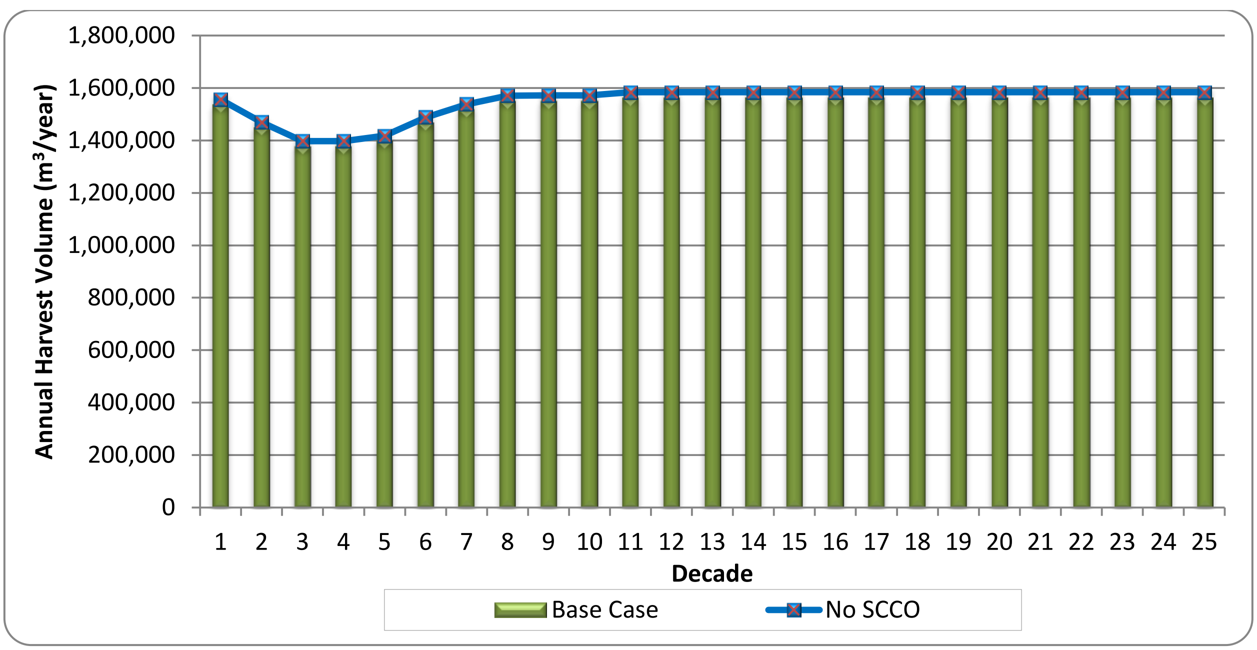

Figure 75 – Harvest levels with no SCCO netdowns

At the block level this increases the timber supply from Block 3 and 5 combined by 45% (see Appendix B22 for details at the individual block level (for Block 3 and Block 5 only as the other three blocks are unaffected).

The above results maintained the maximum 5,000 m^3/year contribution from non-conventional stands within Blocks 3 and 5. With the THLB area nearly doubling, non-conventional opportunity would likely be increased by some unknown amount. To avoid arbitrarily setting a limitation, an analysis was done that removed both the SCCO netdowns and the non-conventional restriction for comparison with the results of the analysis done with the SCCO netdowns applied but the non-conventional restriction removed (see Section 4.10).

Comparing these two scenarios (refer to Table 54 and Figure 76 below) indicates that the initial harvest level for Block 3 and 5 combined, and therefore the TFL (as the other blocks are unchanged), would be 46,700 m^3/year higher. This increase equates to 2.9% overall and 103% for Block 3/5. See Appendix B23 for details for Block 3 and 5.

Table 54 - Harvest levels with no SCCO netdowns and no non-conventional restrictions

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			No non-conventional Cap	No non-conventional Cap & No SCCO	Difference
1	2012	2021	1,595,600	1,642,300	+ 46,700
2	2022	2031	1,507,900	1,545,400	+ 37,500
3 - 5	2032	2061	1,429,100	1,465,000	+ 35,900
6	2062	2071	1,491,800	1,527,700	+ 35,900
7	2072	2081	1,557,900	1,593,800	+ 35,900
8 - 25	2082	2261	1,590,600	1,626,200	+ 35,600

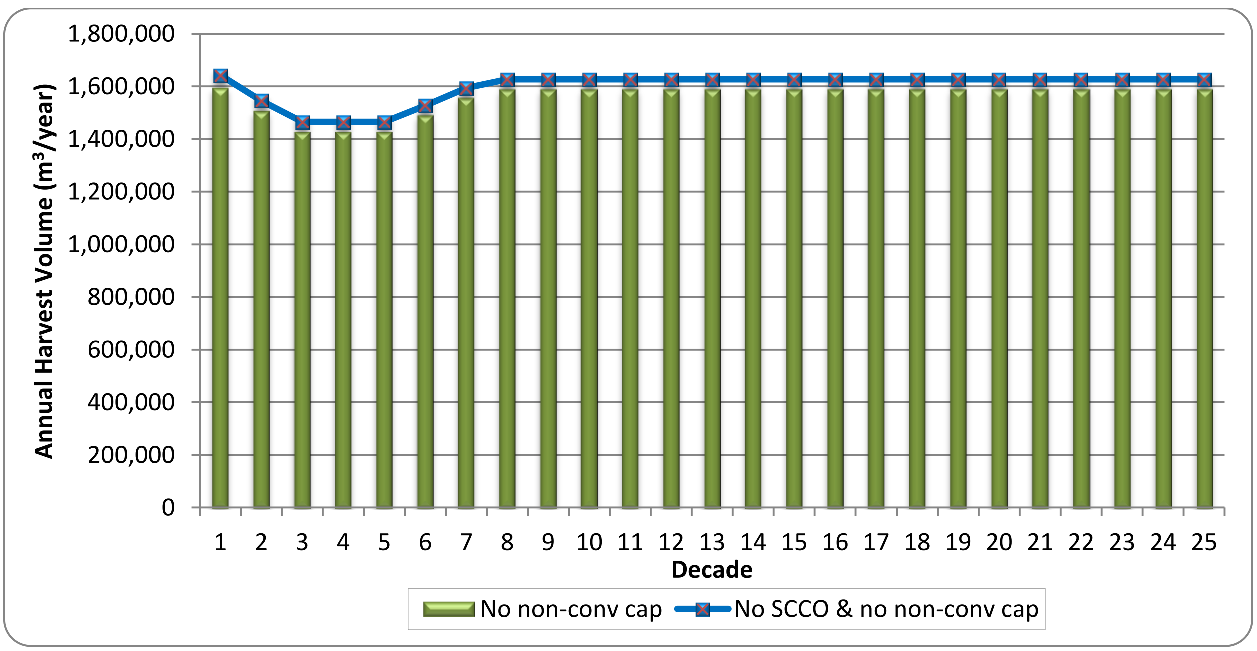

Figure 76 – Harvest levels with no SCCO netdowns and no non-conventional restrictions

4.21 Summary of sensitivity impacts

Table 55 provides a summary of the impacts of the sensitivity issues explored. Impacts shown indicate the aggregate differences over the defined time periods and are rounded to the nearest tenth of a percent. Values in parentheses refer to alternate schedules presented for the associated sensitivity analysis.

Table 55 – Summary of sensitivity analyses harvest impacts

		Harvest Interval (decades)		
		1 – 2	**3 – 9**	**10 - 25**
	Base Case total net harvest level (m^3)	29,894,000	118,027,000	234,585,000
Issue tested	**Sensitivity**	**Percentage Impact**		
Available landbase	THLB reduced by 5% (alternate: maintain initial harvest of Base Case)	- 4.5% (0.0%)	- 4.8% (- 5.3%)	- 4.7% (- 4.7%)
Growth and yield	Mature stands yields increased by 10% (alternate: maintain initial harvest of Base Case)	+ 2.4% (+ 0.9%)	+ 1.1% (+ 1.4%)	0.0% (0.0%)
	Mature stands yields decreased by 10% (alternate: maintain initial harvest of Base Case)	- 3.6% (- 0.1%)	- 0.7% (- 1.4%)	- 0.1% (- 0.2%)
	Immature stands yields increased by 10% (alternate: maintain initial harvest of Base Case)	+ 5.3% (+ 4.8%)	+9.2 % (+ 9.6%)	+ 9.6% (+ 9.6%)
	Immature stands yields decreased by 10% (alternate: maintain initial harvest of Base Case)	- 7.3% (- 0.1%)	- 8.7% (- 9.6%)	- 10.0% (-10.6%)
	Use SIBEC Site Index estimates (alternate: maintain initial harvest of Base Case)	- 0.1% (- 0.1%)	+ 3.3% (+ 2.8%)	+ 2.4% (+ 2.4%)
	Increased OAF2 for unmanaged immature (alternate: maintain initial harvest of Base Case)	- 1.5% (- 0.9%)	- 1.7% (- 1.9%)	- 1.0% (- 1.0%)
Forest management / Silviculture	No future genetic gains	0.0%	- 2.5%	- 3.2%
	Blocks 3 and 5 managed separately	- 0.2%	- 0.5%	0.0%
Operability	Increase non-conventional harvest	+ 6.8%	+ 0.4%	- 0.4%
	Remove non-conventional harvest constraint	+ 3.8%	+ 2.6%	+ 1.7%
	Exclude non-conventional landbase (alternate: maintain initial harvest of Base Case)	- 9.2% (- 2.0%)	- 8.1% (- 9.9%)	- 7.7% (- 8.2%)
Visual Management	Reduce disturbance limits	0.0%	- 0.2%	- 0.1%
Biodiversity	Remove Western Forest Strategy impacts (alternate: maintain initial harvest of Base Case)	+ 3.5% (+ 2.1%)	+ 4.0% (+ 4.3%)	+ 4.7% (+ 4.8%)
Minimum harvest criteria	Increase minimum DBH by 2cm (alternate: maintain initial harvest of Base Case)	- 2.8% (- 0.1%)	- 2.5% (- 3.0%)	- 1.5% (- 1.6%)

		Harvest Interval (decades)		
		1 – 2	**3 – 9**	**10 - 25**
Base Case total net harvest level (m^3)		29,894,000	118,027,000	234,585,000
Issue tested	**Sensitivity**	**Percentage Impact**		
Minimum harvest criteria	Decrease minimum DBH by 2cm (alternate: maintain initial harvest of Base Case)	+ 2.4% (+ 1.7%)	+ 2.2% (+ 2.3%)	+ 0.2% (+ 0.2%)
Ecosystem Based Management	Meet landscape level biodiversity requirements aspatially	0.0%	0.1%	0.4%
	Apply risk-managed landscape level biodiversity targets	+ 0.4%	+ 0.6%	+ 1.1%
	Apply 50% RONV targets in Block 5	+ 0.2%	+ 0.4%	+ 0.8%
	No South Central Coast Order netdowns	+ 1.2%	+ 1.3%	+ 1.3%
	No South Central Coast Order netdowns or non-conventional constraint in Block 3/5 (alternate: compare to no non-conventional constraint with SCCO applied)	+ 6.6% (+ 2.7%)	+ 5.0% (+ 2.4%)	+ 4.0% (+2.3%)

5.0 Analysis Summary and Proposed AAC

5.1 Changes since MP #8

There have been considerable changes in the TFL 39 landbase and timber supply analysis assumptions since MP #8. Main changes include:

- Deletion of Block 6, multiple conservancies, BCTS, private land and small tenures areas has reduced the gross area of TFL 39 by nearly 50%. The current AAC of 1,885,980 m^3/year reflects most, but not all these area changes.
- Ecosystem Based Management has been implemented for Blocks 3 and 5.
- Landscape unit planning (OGMAs) and increased allowances for riparian areas have decreased the THLB on the remaining TFL 39.
- Smaller allowances for stand-level retention and recreation partially offset the increased netdowns for OGMAs and riparian management.
- Immature yields are based on FLNRO's TIPSY yield model rather than the proprietary model Y_XENO.
- The definition of minimum harvest ages has been changed to relate to average stand diameter and harvest system rather than age and volume.
- Harvest scheduling uses optimization compared to the simulation approach in MP #8

5.2 MP #9 Base Case Initial Harvest

The starting harvest level of 1,537,900 m^3/year in the Base Case reflects both the reduced TFL 39 landbase and the changes in management practices.

- As noted above, the current TFL 39 AAC of 1,885,980 m^3/year does not fully account for area deletions from the TFL. It still includes AAC contributions of 21,000 m^3/year associated with the former Block 7 (Namu), 10,000 m^3/year for area deleted from Block 4 to form part of a community forest, and 4,478 m^3/year for areas deleted from Block 2 for woodlots.
- The Base Case starting harvest level, an 18.5% decrease from the current AAC, also reflects the impacts of applying ecosystem-based management in Blocks 3 and 5, reduced old-growth availability due to OGMAs, restricting non-conventional contribution and different minimum harvest criteria.

5.3 Sensitivity Analyses

The initial harvest level in the Base Case is robust. The analysis indicates for most sensitivities with downward pressure on timber supply, harvest projections with initial harvest levels similar to the Base Case have little additional impact on mid-term harvest rates compared to alternative harvest schedules where the initial harvest level was allowed to be reduced. Further context for consideration of individual sensitivities includes:

- Inventory audits in the 1990s provide support for average volumes in the mature forest.
- Immature yield sensitivities include both positive (SIBEC site indexes are higher than in the Base Case) and negative views (uncertainty about older immature yields and future genetic gains). For genetic gains, WFP has been and expects to continue planting improved seedlings.
- WFP is planning to implement a harvested cutblock tracking system which will include comparisons of inventory (analysis) volume projections with estimates of harvest volumes plus waste. It is expected that this will provide a broad (forest level) check on yield assumptions.
- The non-conventional harvest system landbase is a significant component of the total. During the last 10 years harvest has occurred in these areas. This is portrayed in the Base Case. Forecast market conditions indicate further opportunities in the coming years. Refer below to the discussion on non-conventional harvest areas.
- In the past, harvest in second-growth stands was largely in older stands, especially in Block 1. More recently, harvest also has occurred in younger stands. Going forward, WFP will monitor harvested second-growth cutblocks (including age and average volume/ha) for information appropriate for comparing with and refinement of minimum harvest ages in timber supply analyses.

5.4 Non-conventional Harvest Areas

The Base Case followed the practice in other WFP TFL analyses (TFL19 [January 2009], TFL 44 [June 2010] and TFL 6 [May 2011]) of constraining harvest from non-conventional operable areas to reflect average performance of the previous 5 to 10 years. For TFL 39, the reference period of 2000 to 2010 included the severely reduced lumber markets during the unprecedented economic downturn of 2007 to 2010.

The main difference from the other recent analyses mentioned, is the current position in the lumber market cycle and the market outlook. Lumber prices have begun to recover as the housing market in the United States improves and demand in China and Japan holds steady or improves modestly. The combination of improving markets and reduced supply from the interior of BC due to the mountain pine epidemic has most market analysts forecasting lumber prices to rise dramatically. During 2012 and the first quarter of 2013, lumber prices increased substantially indicating that the lumber “super cycle” may be starting. The mid-2013 fall back in prices has largely been erased by steady price increases through the last half of 2013 and early 2014.

WFP recommends an AAC to provide opportunity to take advantage of the expected higher lumber prices - to harvest additional volume from the higher cost non-conventional land base than is incorporated in the Base Case:

Recommended TFL 39 AAC: 1,629,000 m^3/year

The recommended AAC is based on increasing the harvest contribution from non-conventional areas by 91,000 m^3/year from 131,000 m^3/year in the Base Case to the 222,000 m^3/year projected in the sensitivity analysis discussed in Section 4.9.

WFP will be establishing a spatial data set that clearly defines conventional and non-conventional operable areas and will be tracking harvested area by TFL Block and operability class. This information will be available for the next timber supply analysis.

5.5 Block 4

An application has been made to delete Block 4 from TFL 39 and to add it to neighbouring TFL 6. This reorganization of TFLs will streamline forest management and administration of the combined areas and will not compromise the level of forest management.

It is expected that this change in TFL boundaries will occur after the TFL 39 AAC Determination. The timber supply analysis by TFL Block and a specified AAC contribution for Block 4 will facilitate the process for reducing the TFL 39 AAC and increasing the TFL 6 AAC when the change occurs.

Recommended Block 4 partition of: 202,000 m^3/year

5.6 Blocks 3 and 5

A specified AAC partition is recommended for Blocks 3 and 5, subject to the South Central Coast Order including Ecosystem Based Management (EBM). EBM targets are currently being re-negotiated and the results (expected in late 2014) may significantly change netdowns, particularly in Block 5. A specified AAC contribution for Blocks 3 & 5 facilitates changing the AAC contribution from Blocks 3 & 5 if warranted.

Recommended Blocks 3 & 5 partition of: 45,000 m^3/year

5.7 Summary of Recommendations

A TFL 39 AAC of 1,629,000 m^3/year is recommended. This includes 1,831 m^3/year allocated to First Nations in the Campbell River Resource District.

The proposed AAC is 13.5% less than the current AAC of 1,885,980 m^3/year.

The recommendation is 91,100 m^3/year higher than the initial harvest of 1,537,900 m^3/year in the Base Case to provide additional opportunities for harvesting higher cost non-conventional operable areas in the strong markets forecast for the coming years.

To recognize special circumstances for Blocks 3&5 and Block 4 (discussed above) it is recommended that the TFL 39 AAC be specified as follows:

Total AAC: 1,629,000 m^3/year, including the following partitions:

Block 4:	202,000 m^3/year
Blocks 3&5:	45,000 m^3/year

Appendix A: Detailed Base Case Harvest Schedule Statistics

Appendix A1 – Additional Base Case Statistics for Block 1

The following tables provide average annual values (per decade) for the Base Case harvest schedule for Block 1.

Table 56 – Block 1 Base Case Average Annual Statistics by Harvest System

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	176,577	130	814	208,730	160	758	50,000	112	939	435,306	142	798
2	2022	2031	67,886	136	800	317,423	137	892	50,000	185	794	435,309	142	865
3	2032	2041	237,452	109	818	147,858	123	767	50,000	307	696	435,310	136	784
4	2042	2051	176,136	102	771	209,174	104	754	50,000	160	874	435,310	110	773
5	2052	2061	220,582	84	574	164,728	147	776	50,000	285	777	435,310	131	659
6	2062	2071	187,938	79	656	197,372	105	837	50,000	228	840	435,310	108	748
7	2072	2081	153,911	106	823	231,399	114	844	50,000	242	826	435,311	126	834
8	2082	2091	47,509	84	717	337,801	84	751	50,000	248	812	435,310	103	754
9	2092	2101	113,762	71	648	271,549	89	788	50,000	231	784	435,311	101	746
10	2102	2111	218,928	83	706	166,383	100	847	50,000	220	804	435,310	105	765
11	2112	2121	306,084	72	669	79,227	96	862	50,000	167	939	435,310	87	722
12	2122	2131	207,497	71	643	177,813	100	807	50,000	209	894	435,310	99	727
13	2132	2141	159,969	70	637	225,341	96	862	50,000	180	941	435,310	96	769
14	2142	2151	147,192	57	492	238,119	76	757	50,000	147	999	435,311	78	656
15	2152	2161	52,115	65	661	333,196	79	764	50,000	159	963	435,311	86	768
16	2162	2171	49,712	97	743	335,599	99	781	50,000	167	970	435,310	106	794
17	2172	2181	245,288	67	661	140,023	116	768	50,000	153	987	435,311	93	721
18	2182	2191	186,064	73	632	199,247	102	815	50,000	164	1,003	435,311	97	739
19	2192	2201	216,461	74	672	168,850	97	804	50,000	161	1,064	435,311	93	752
20	2202	2211	226,892	70	672	158,419	81	769	50,000	164	1,029	435,311	85	735
21	2212	2221	102,237	68	606	283,075	75	742	50,000	174	1,168	435,311	85	734
22	2222	2231	39,020	66	652	346,290	86	803	50,000	157	1,044	435,310	93	808
23	2232	2241	233,048	65	658	152,263	85	765	50,000	167	1,144	435,311	84	729
24	2242	2251	118,690	82	708	266,620	94	798	50,000	181	1,158	435,311	101	799
25	2252	2261	226,305	72	627	159,006	86	796	50,000	168	1,113	435,310	88	719
Average			164,690	81	670	220,620	100	793	50,000	189	925	435,310	103	753

Table 57 – Block 1 Base Case Average Annual Statistics by Harvest System for Natural[4] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	176,577	130	814	208,730	160	758	50,000	112	939	435,306	142	798
2	2022	2031	67,875	136	800	317,423	137	892	50,000	185	794	435,298	142	865
3	2032	2041	227,000	110	830	138,096	126	777	50,000	307	696	415,096	139	793
4	2042	2051	115,488	113	813	146,849	112	761	50,000	160	874	312,337	120	796
5	2052	2061	37,082	162	727	95,276	188	772	49,942	285	776	182,300	209	764
6	2062	2071	21,295	137	840	42,364	147	842	50,000	228	840	113,659	181	841
7	2072	2081	38,894	172	941	38,228	214	904	49,874	243	825	126,996	212	881
8	2082	2091	4,222	185	976	3,403	234	867	49,511	249	810	57,135	244	824
9	2092	2101	180	150	1,048	1,130	194	945	38,929	271	768	40,240	268	773
10	2102	2111	523	156	1,192	4,352	178	882	35,063	273	769	39,938	261	783
11	2112	2121	395	195	348	165	200	844	27,529	217	952	28,089	216	928
12	2122	2131	0	-	-	13,975	178	896	32,059	263	867	46,034	237	876
13	2132	2141	2	195	348	130	195	348	21,929	261	868	22,061	261	860
14	2142	2151	0	-	-	0	-	-	10,925	247	1,007	10,925	247	1,007
15	2152	2161	0	-	-	0	-	-	12,675	250	804	12,675	250	804
16	2162	2171	5,824	246	1,172	18,568	246	951	11,745	271	770	36,138	254	909
17	2172	2181	1,980	261	911	3,023	258	1,028	7,992	283	894	12,995	274	925
18	2182	2191	243	284	774	0	-	-	10,257	286	999	10,500	286	992
19	2192	2201	0	-	-	0	-	-	7,279	302	966	7,279	302	966
20	2202	2211	0	-	-	0	-	-	6,402	309	803	6,402	309	803
21	2212	2221	0	-	-	0	-	-	5,148	312	1,268	5,148	312	1,268
22	2222	2231	0	-	-	0	-	-	4,142	314	989	4,142	314	989
23	2232	2241	0	-	-	0	-	-	3,944	328	1,147	3,944	328	1,147
24	2242	2251	0	-	-	0	-	-	2,382	330	867	2,382	330	867
25	2252	2261	0	-	-	0	-	-	1,407	323	757	1,407	323	757
Average			27,903	127	822	41,268	148	815	25,565	238	829	94,737	166	821

[4] Natural Stands are all stands established before 1962.

Table 58 – Block 1 Base Case Average Annual Statistics by Harvest System for Managed[5] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	0	-	-	0	-	-	0	-	-	0	-	-
2	2022	2031	11	65	377	0	-	-	0	-	-	11	65	377
3	2032	2041	10,451	74	622	9,762	75	657	0	-	-	20,214	74	639
4	2042	2051	60,648	81	703	62,325	85	738	0	-	-	122,973	83	721
5	2052	2061	183,499	68	551	69,452	90	782	0	90	909	253,010	74	600
6	2062	2071	166,643	72	638	155,008	94	836	58	-	-	321,651	83	720
7	2072	2081	115,018	83	789	193,171	94	833	0	90	1,080	308,315	90	816
8	2082	2091	43,288	74	699	334,398	82	750	126	99	1,029	378,175	81	744
9	2092	2101	113,581	71	648	270,419	89	787	489	91	844	395,071	84	743
10	2102	2111	218,405	83	705	162,031	98	846	11,071	95	899	395,373	89	763
11	2112	2121	305,688	72	670	79,062	96	862	14,937	107	924	407,222	78	711
12	2122	2131	207,497	71	643	163,837	93	801	22,471	111	947	389,276	82	712
13	2132	2141	159,967	70	637	225,211	96	863	17,941	116	1,007	413,249	88	765
14	2142	2151	147,192	57	492	238,119	76	757	28,071	119	996	424,386	73	650
15	2152	2161	52,115	65	661	333,196	79	764	39,075	129	1,032	422,635	82	767
16	2162	2171	43,888	78	709	317,031	90	773	37,325	135	1,054	399,173	93	785
17	2172	2181	243,308	66	660	137,000	113	763	38,254	129	1,007	422,316	87	716
18	2182	2191	185,821	73	632	199,247	102	815	42,008	132	1,004	424,811	92	735
19	2192	2201	216,461	74	672	168,850	97	804	39,743	137	1,082	428,032	89	749
20	2202	2211	226,892	70	672	158,419	81	769	42,721	143	1,073	428,909	81	734
21	2212	2221	102,237	68	606	283,075	75	742	43,598	158	1,157	430,163	82	731
22	2222	2231	39,020	66	652	346,290	86	803	44,852	143	1,049	431,168	91	806
23	2232	2241	233,048	65	658	152,263	85	765	45,858	153	1,144	431,367	81	727
24	2242	2251	118,690	82	708	266,620	94	798	46,056	174	1,178	432,929	100	798
25	2252	2261	226,305	72	627	159,006	86	796	47,618	164	1,128	433,904	88	719
Average			136,787	71	646	179,352	89	788	48,593	138	1,052	340,573	95	736

[5] Managed Stands are all stands established since 1962.

Table 59 – Block 1 Base Case Average Annual Contributions of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Natural Stands				Managed Stands				Total			
			Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)
1	2012	2021	435,306	109,547	16,264	46,633	0	0	0	0	435,306	109,547	16,264	46,633
2	2022	2031	435,298	127,729	25,257	55,133	11	2	0	2	435,309	127,732	25,257	55,135
3	2032	2041	415,096	126,234	17,876	61,223	20,214	2,310	357	1,828	435,310	128,544	18,233	63,051
4	2042	2051	312,337	125,373	32,044	45,953	122,973	26,776	9,275	8,974	435,310	152,149	41,319	54,927
5	2052	2061	182,300	71,844	23,206	25,977	253,010	62,289	23,269	28,052	435,310	134,133	46,475	54,030
6	2062	2071	113,659	46,523	14,403	19,200	321,651	100,819	60,184	41,033	435,310	147,342	74,587	60,234
7	2072	2081	126,996	41,676	11,750	17,105	308,315	90,660	35,112	54,064	435,311	132,335	46,862	71,168
8	2082	2091	57,135	22,798	9,316	8,046	378,175	50,809	34,012	65,225	435,310	73,607	43,328	73,271
9	2092	2101	40,240	16,194	7,278	6,531	395,071	60,815	35,169	62,614	435,311	77,009	42,447	69,144
10	2102	2111	39,938	15,585	6,563	4,257	395,373	87,204	34,987	69,012	435,310	102,789	41,551	73,268
11	2112	2121	28,089	9,438	1,203	3,652	407,222	77,591	27,816	67,699	435,310	87,029	29,020	71,351
12	2122	2131	46,034	18,596	6,708	5,202	389,276	119,421	34,388	58,308	435,310	138,017	41,096	63,510
13	2132	2141	22,061	7,068	1,869	2,950	413,249	169,893	40,702	58,686	435,310	176,961	42,571	61,636
14	2142	2151	10,925	3,994	538	1,852	424,386	62,319	13,004	74,244	435,311	66,313	13,543	76,096
15	2152	2161	12,675	4,624	834	2,141	422,635	85,446	20,268	71,641	435,311	90,070	21,102	73,782
16	2162	2171	36,138	9,520	964	5,015	399,173	119,449	29,284	61,778	435,310	128,969	30,247	66,793
17	2172	2181	12,995	3,654	810	1,437	422,316	51,309	17,975	67,326	435,311	54,963	18,785	68,763
18	2182	2191	10,500	3,159	732	961	424,811	145,211	41,860	55,524	435,311	148,370	42,593	56,485
19	2192	2201	7,279	2,885	488	1,327	428,032	151,108	36,742	62,419	435,311	153,992	37,231	63,746
20	2202	2211	6,402	1,962	815	594	428,909	109,549	25,530	67,524	435,311	111,511	26,345	68,117
21	2212	2221	5,148	2,201	554	862	430,163	54,075	14,842	75,050	435,311	56,277	15,396	75,912
22	2222	2231	4,142	1,725	489	586	431,168	146,262	34,344	65,272	435,310	147,987	34,833	65,858
23	2232	2241	3,944	1,308	349	475	431,367	63,768	20,801	71,785	435,311	65,077	21,150	72,260
24	2242	2251	2,382	579	29	236	432,929	157,344	39,817	61,996	435,311	157,923	39,846	62,232
25	2252	2261	1,407	637	160	305	433,904	138,582	30,544	64,763	435,310	139,219	30,704	65,069
Average			94,737	30,994	7,220	12,706	340,573	85,321	26,411	52,593	435,310	116,315	33,631	65,299

Table 60 – Block 1 Base Case Average Ages and Yields of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Hemlock Species Harvest Volume (m^3)	Hemlock Average Stand Harvest Age (years)	Hemlock Average Stand Harvest Volume per Ha (m^3/ha)[6]	Balsam Species Harvest Volume (m^3)	Balsam Average Stand Harvest Age (years)	Balsam Average Stand Harvest Volume per Ha (m^3/ha)[6]	Cedar Species Harvest Volume (m^3)	Cedar Average Stand Harvest Age (years)	Cedar Average Stand Harvest Volume per Ha (m^3/ha)[6]
1	2012	2021	109,547	164	806	16,264	255	777	46,633	158	806
2	2022	2031	127,732	160	873	25,257	271	853	55,135	143	868
3	2032	2041	128,544	149	792	18,233	231	781	63,051	147	789
4	2042	2051	152,149	113	781	41,319	107	765	54,927	116	777
5	2052	2061	134,133	155	666	46,475	198	657	54,030	134	665
6	2062	2071	147,342	121	813	74,587	122	806	60,234	105	813
7	2072	2081	132,335	140	878	46,862	147	873	71,168	122	877
8	2082	2091	73,607	146	826	43,328	146	818	73,271	97	826
9	2092	2101	77,009	141	902	42,447	142	901	69,144	98	902
10	2102	2111	102,789	132	896	41,551	144	891	73,268	98	896
11	2112	2121	87,029	108	851	29,020	113	849	71,351	82	850
12	2122	2131	138,017	109	785	41,096	125	778	63,510	93	785
13	2132	2141	176,961	99	811	42,571	105	799	61,636	95	810
14	2142	2151	66,313	102	896	13,543	99	896	76,096	76	896
15	2152	2161	90,070	107	890	21,102	111	890	73,782	84	890
16	2162	2171	128,969	114	910	30,247	115	882	66,793	102	907
17	2172	2181	54,963	132	926	18,785	129	912	68,763	84	907
18	2182	2191	148,370	101	824	42,593	106	823	56,485	90	819
19	2192	2201	153,992	98	812	37,231	100	811	63,746	91	811
20	2202	2211	111,511	96	839	26,345	104	828	68,117	80	839
21	2212	2221	56,277	121	977	15,396	124	975	75,912	82	975
22	2222	2231	147,987	103	886	34,833	108	886	65,858	89	886
23	2232	2241	65,077	118	955	21,150	121	955	72,260	78	955
24	2242	2251	157,923	112	885	39,846	120	882	62,232	94	875
25	2252	2261	139,219	98	819	30,704	105	819	65,069	86	819
Average			116,315	120	829	33,631	134	819	65,299	99	827

[6] Average volume per hectare indicates the average stand volume when the respective species is found within the stand. For example, in Decade #1 the average volume for harvested stands containing hemlock was 806 m^3/ha.

Appendix A2 – Additional Base Case Statistics for Block 2

The following tables provide average annual values per decade for the Base Case harvest schedule for Block 2.

Table 61 – Block 2 Base Case Average Annual Statistics by Harvest System

			Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
Period (Decade #)	Start Year	End Year	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	397,067	208	612	427,222	263	687	40,000	295	617	864,289	239	647
2	2022	2031	550,144	198	693	187,724	245	683	40,000	295	715	777,868	214	691
3	2032	2041	480,252	79	686	185,798	225	760	40,000	316	682	706,050	131	704
4	2042	2051	460,045	100	734	206,004	96	800	40,000	337	688	706,049	112	749
5	2052	2061	411,981	104	742	265,187	116	807	28,882	287	765	706,050	116	766
6	2062	2071	416,451	95	709	299,598	100	839	40,000	254	771	756,049	106	759
7	2072	2081	571,252	90	711	194,793	105	871	40,000	293	710	806,045	104	744
8	2082	2091	482,619	76	645	311,087	99	859	40,000	303	704	833,706	95	714
9	2092	2101	637,874	75	705	155,831	91	907	40,000	313	717	833,705	90	737
10	2102	2111	400,266	86	696	393,439	101	882	40,000	241	865	833,704	101	781
11	2112	2121	394,077	81	743	399,631	102	873	40,000	123	1,147	833,708	93	815
12	2122	2131	541,376	84	678	252,331	98	830	40,000	134	1,098	833,707	91	732
13	2132	2141	513,072	74	653	280,635	98	867	40,000	125	1,083	833,706	84	727
14	2142	2151	591,982	71	624	201,722	95	837	40,000	127	1,079	833,704	79	680
15	2152	2161	507,558	75	750	286,150	91	894	40,000	127	1,070	833,708	83	807
16	2162	2171	211,753	110	774	581,954	127	870	40,000	137	1,069	833,706	123	851
17	2172	2181	470,469	88	705	323,234	110	869	40,000	138	1,068	833,703	99	774
18	2182	2191	589,371	80	626	204,335	94	884	40,000	134	1,072	833,706	86	689
19	2192	2201	575,442	80	702	218,263	92	871	40,000	144	1,087	833,705	86	753
20	2202	2211	279,414	76	730	514,292	94	863	40,000	134	1,075	833,705	90	821
21	2212	2221	656,472	73	694	137,237	94	841	40,000	141	1,123	833,709	80	729
22	2222	2231	471,284	77	781	322,421	94	876	40,000	157	1,111	833,706	87	828
23	2232	2241	535,034	71	661	258,673	91	855	40,000	168	1,098	833,707	82	726
24	2242	2251	459,411	95	691	334,295	101	852	40,000	151	1,086	833,706	100	762
25	2252	2261	471,475	78	608	322,223	98	865	40,000	146	1,089	833,697	89	704
Average			483,046	92	687	290,563	118	839	39,555	200	905	813,164	106	744

Table 62 – Block 2 Base Case Average Annual Statistics by Harvest System for Natural[7] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	395,539	209	612	427,215	263	687	40,000	295	617	862,754	239	647
2	2022	2031	463,600	222	690	165,950	269	675	40,000	295	715	669,550	238	688
3	2032	2041	153,136	97	649	138,883	277	749	40,000	316	682	332,019	199	692
4	2042	2051	133,944	153	714	77,311	121	773	40,000	337	688	251,254	172	726
5	2052	2061	58,185	254	686	92,082	171	757	28,725	288	765	178,992	217	733
6	2062	2071	45,536	209	740	30,297	194	746	38,367	261	763	114,200	222	749
7	2072	2081	57,219	195	997	18,286	237	874	40,000	293	710	115,505	236	858
8	2082	2091	12,077	222	909	9,785	295	766	40,000	303	704	61,862	286	746
9	2092	2101	274	154	1,276	35	150	844	40,000	313	717	40,310	312	719
10	2102	2111	1,057	176	1,098	2,455	152	846	30,092	273	802	33,604	261	812
11	2112	2121	638	165	1,186	0	-	-	4,786	236	907	5,424	227	933
12	2122	2131	1,103	316	760	103	345	764	5,612	200	931	6,818	221	895
13	2132	2141	1,501	317	576	946	321	690	0	-	-	2,447	319	615
14	2142	2151	3,339	245	415	1,333	291	595	0	-	-	4,672	258	454
15	2152	2161	10,188	236	387	605	216	349	0	-	-	10,793	234	385
16	2162	2171	35,839	223	897	1,664	276	576	48	310	598	37,551	226	875
17	2172	2181	24,763	269	1,192	15,339	264	1,219	0	-	-	40,102	267	1,202
18	2182	2191	2,217	319	637	588	323	415	153	265	1,132	2,957	317	588
19	2192	2201	1,417	307	703	1,598	307	796	24	240	362	3,039	307	743
20	2202	2211	637	347	623	443	349	630	979	295	755	2,059	323	681
21	2212	2221	712	338	475	24	326	751	39	310	760	775	336	490
22	2222	2231	75	303	673	2	295	636	0	-	-	77	302	672
23	2232	2241	37	325	620	7	347	525	61	330	530	105	329	558
24	2242	2251	61	329	537	16	333	454	0	-	-	78	330	517
25	2252	2261	39	325	636	0	-	-	38	342	639	77	333	637
Average			56,125	200	678	39,399	244	715	15,557	296	714	111,081	229	696

[7] Natural Stands are all stands established before 1962.

Table 63 – Block 2 Base Case Average Annual Statistics by Harvest System for Managed[8] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	1,544	60	531	0	-	-	0	-	-	1,544	60	531
2	2022	2031	86,543	66	707	21,774	65	753	0	-	-	108,317	66	715
3	2032	2041	327,116	70	705	46,914	69	794	0	-	-	374,030	70	715
4	2042	2051	326,101	79	743	128,694	81	817	0	-	-	454,795	79	763
5	2052	2061	353,797	79	752	173,104	87	837	158	90	936	527,059	82	778
6	2062	2071	370,915	81	705	269,302	90	851	1,633	105	1,006	641,849	85	761
7	2072	2081	514,033	78	689	176,506	92	870	0	-	-	690,540	81	728
8	2082	2091	470,542	72	640	301,302	93	862	0	-	-	771,844	80	712
9	2092	2101	637,599	75	705	155,795	91	907	0	-	-	793,395	78	738
10	2102	2111	399,209	86	695	390,983	101	882	9,908	143	1,132	800,100	94	780
11	2112	2121	393,439	81	743	399,631	102	873	35,214	108	1,189	828,284	92	814
12	2122	2131	540,273	84	678	252,228	98	830	34,388	123	1,131	826,889	90	731
13	2132	2141	511,571	73	654	279,689	97	867	40,000	125	1,083	831,259	84	728
14	2142	2151	588,643	70	626	200,389	93	839	40,000	127	1,079	829,033	78	681
15	2152	2161	497,370	72	765	285,545	90	897	40,000	127	1,070	822,915	81	818
16	2162	2171	175,914	88	753	580,289	127	871	39,952	137	1,070	796,155	119	850
17	2172	2181	445,706	78	689	307,895	102	856	40,000	138	1,068	793,601	90	760
18	2182	2191	587,154	79	626	203,747	94	887	39,847	133	1,072	830,749	86	689
19	2192	2201	574,025	80	702	216,665	91	872	39,976	144	1,088	830,666	86	753
20	2202	2211	278,776	75	731	513,849	94	863	39,021	130	1,087	831,647	89	821
21	2212	2221	655,760	73	695	137,213	94	841	39,961	141	1,123	832,934	80	729
22	2222	2231	471,209	77	781	322,420	94	876	40,000	157	1,111	833,629	87	828
23	2232	2241	534,998	71	661	258,666	91	855	39,939	168	1,100	833,602	82	726
24	2242	2251	459,350	95	691	334,279	101	853	40,000	151	1,086	833,629	100	762
25	2252	2261	471,436	78	608	322,223	98	865	39,961	146	1,089	833,620	89	704
Average			426,921	77	689	251,164	98	863	23,998	137	1,095	702,083	87	753

[8] Managed Stands are all stands established since 1962.

Table 64 – Block 2 Base Case Average Annual Contributions of Hemlock, Balsam and Cedar

			Natural Stands				Managed Stands				Total			
Period (Decade #)	Start Year	End Year	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)
1	2012	2021	862,754	403,412	166,359	50,026	1,544	761	43	31	864,289	404,172	166,403	50,057
2	2022	2031	669,550	337,173	159,374	30,308	108,317	40,867	3,238	3,248	777,868	378,040	162,612	33,556
3	2032	2041	332,019	167,857	83,797	12,280	374,030	207,230	35,725	21,998	706,050	375,086	119,522	34,278
4	2042	2051	251,254	135,029	82,331	7,376	454,795	243,059	36,145	14,777	706,049	378,088	118,477	22,153
5	2052	2061	178,992	88,854	42,470	10,611	527,059	301,658	69,926	28,002	706,050	390,512	112,396	38,613
6	2062	2071	114,200	57,661	36,088	4,488	641,849	366,621	102,800	31,414	756,049	424,282	138,888	35,901
7	2072	2081	115,505	54,017	26,247	6,225	690,540	330,129	107,902	27,284	806,045	384,145	134,148	33,510
8	2082	2091	61,862	29,220	18,403	2,166	771,844	339,911	108,869	23,585	833,706	369,130	127,272	25,751
9	2092	2101	40,310	19,262	13,349	1,211	793,395	480,650	85,546	37,377	833,705	499,912	98,896	38,588
10	2102	2111	33,604	15,671	12,120	943	800,100	524,288	137,170	36,941	833,704	539,959	149,290	37,884
11	2112	2121	5,424	2,556	2,161	97	828,284	571,390	133,457	47,741	833,708	573,946	135,618	47,838
12	2122	2131	6,818	3,548	2,210	472	826,889	482,429	129,586	38,833	833,707	485,977	131,796	39,304
13	2132	2141	2,447	1,018	670	198	831,259	455,819	87,159	35,005	833,706	456,837	87,829	35,202
14	2142	2151	4,672	1,346	739	120	829,033	377,238	64,730	27,219	833,704	378,584	65,469	27,339
15	2152	2161	10,793	2,183	631	294	822,915	531,014	73,965	34,085	833,708	533,198	74,596	34,379
16	2162	2171	37,551	17,543	5,884	1,541	796,155	478,643	148,714	32,670	833,706	496,186	154,598	34,211
17	2172	2181	40,102	17,800	1,552	2,220	793,601	502,387	96,918	34,300	833,703	520,187	98,470	36,520
18	2182	2191	2,957	1,252	263	455	830,749	527,982	94,198	33,678	833,706	529,233	94,461	34,134
19	2192	2201	3,039	1,196	109	470	830,666	602,412	107,806	41,682	833,705	603,609	107,915	42,152
20	2202	2211	2,059	858	450	311	831,647	520,239	90,602	32,942	833,705	521,097	91,052	33,253
21	2212	2221	775	324	121	243	832,934	314,792	59,625	19,372	833,709	315,117	59,746	19,616
22	2222	2231	77	30	18	25	833,629	580,417	106,771	36,394	833,706	580,447	106,789	36,419
23	2232	2241	105	29	9	19	833,602	428,291	74,784	26,604	833,707	428,320	74,793	26,622
24	2242	2251	78	31	8	28	833,629	598,260	107,362	36,662	833,706	598,291	107,369	36,691
25	2252	2261	77	30	13	29	833,620	577,010	117,113	41,276	833,697	577,040	117,126	41,305
Average			111,570	54,316	26,215	5,286	702,083	415,340	87,206	29,725	813,653	469,656	113,421	35,011

Table 65 – Block 2 Base Case Average Ages and Yields of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Hemlock			Balsam			Cedar		
			Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[9]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[9]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[9]
1	2012	2021	404,172	242	654	166,403	261	656	50,057	261	650
2	2022	2031	378,040	214	698	162,612	282	703	33,556	218	699
3	2032	2041	375,086	124	711	119,522	202	726	34,278	107	714
4	2042	2051	378,088	110	757	118,477	139	759	22,153	126	761
5	2052	2061	390,512	111	774	112,396	141	783	38,613	130	776
6	2062	2071	424,282	104	767	138,888	126	785	35,901	106	772
7	2072	2081	384,145	108	752	134,148	125	783	33,510	118	769
8	2082	2091	369,130	100	721	127,272	122	788	25,751	101	788
9	2092	2101	499,912	89	744	98,896	115	783	38,588	91	785
10	2102	2111	539,959	98	789	149,290	114	810	37,884	98	813
11	2112	2121	573,946	90	823	135,618	102	826	47,838	96	830
12	2122	2131	485,977	89	739	131,796	101	763	39,304	96	747
13	2132	2141	456,837	88	735	87,829	94	748	35,202	93	748
14	2142	2151	378,584	85	686	65,469	91	788	27,339	91	783
15	2152	2161	533,198	83	815	74,596	89	877	34,379	86	860
16	2162	2171	496,186	119	860	154,598	137	894	34,211	126	874
17	2172	2181	520,187	99	782	98,470	103	841	36,520	105	826
18	2182	2191	529,233	90	696	94,461	93	777	34,134	92	746
19	2192	2201	603,609	86	761	107,915	88	763	42,152	87	766
20	2202	2211	521,097	91	829	91,052	98	871	33,253	94	867
21	2212	2221	315,117	86	736	59,746	98	849	19,616	89	837
22	2222	2231	580,447	87	836	106,789	96	856	36,419	86	847
23	2232	2241	428,320	88	733	74,793	102	832	26,622	88	821
24	2242	2251	598,291	100	770	107,369	103	791	36,691	98	776
25	2252	2261	577,040	90	711	117,126	89	717	41,305	88	718
Average			469,656	104	752	113,421	133	784	35,011	113	777

[9] Average volume per hectare indicates the average stand volume when the respective species is found within the stand For example, in Decade #1 the average volume for harvested stands containing hemlock was 654 m^3/ha.

Appendix A3 – Additional Base Case Statistics for Block 4

The following tables provide average annual values per decade for the Base Case harvest schedule for Block 4.

Table 66 – Block 4 Base Case Average Annual Statistics by Harvest System

			Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
Period (Decade #)	Start Year	End Year	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	80,022	178	769	80,934	251	715	36,000	301	651	196,956	231	723
2	2022	2031	97,534	108	719	63,423	258	820	36,000	311	709	196,957	194	747
3	2032	2041	111,437	82	667	49,523	118	794	36,000	324	787	196,960	135	716
4	2042	2051	143,370	82	721	17,589	98	786	36,000	329	805	196,959	129	741
5	2052	2061	68,202	101	725	115,209	115	877	33,245	340	854	216,656	145	820
6	2062	2071	105,374	100	861	128,063	99	762	3,908	285	784	237,345	102	616
7	2072	2081	112,201	113	1,056	124,856	104	870	289	316	656	237,345	108	949
8	2082	2091	89,606	95	1,000	147,181	102	888	558	302	567	237,345	100	926
9	2092	2101	181,197	89	1,014	55,706	89	955	442	106	1,136	237,345	89	1,000
10	2102	2111	164,324	87	840	65,175	99	924	7,846	118	848	237,345	91	862
11	2112	2121	176,201	86	779	67,442	106	877	6,234	124	607	249,878	92	798
12	2122	2131	92,694	88	830	121,192	107	845	35,991	115	1,063	249,877	101	865
13	2132	2141	156,636	81	754	75,204	93	687	18,039	119	1,080	249,878	88	597
14	2142	2151	118,113	74	770	131,764	92	861	0	-	-	249,878	84	816
15	2152	2161	123,484	68	842	126,394	87	866	0	-	-	249,878	77	854
16	2162	2171	52,919	75	773	160,959	114	857	36,000	159	1,064	249,878	112	861
17	2172	2181	168,181	76	704	45,697	101	831	36,000	146	1,011	249,878	90	759
18	2182	2191	147,392	74	680	66,487	107	814	36,000	149	980	249,878	93	746
19	2192	2201	89,499	70	664	124,378	99	835	36,000	151	1,010	249,877	96	782
20	2202	2211	159,879	74	650	53,999	88	861	36,000	175	1,069	249,878	91	730
21	2212	2221	156,068	67	767	57,811	80	664	36,000	173	1,070	249,878	86	611
22	2222	2231	66,840	65	727	158,472	95	849	24,565	183	981	249,877	96	823
23	2232	2241	48,231	62	649	165,647	96	848	36,000	128	1,042	249,878	94	821
24	2242	2251	142,760	75	656	82,480	93	849	24,638	123	1,073	249,878	85	740
25	2252	2261	129,216	77	679	101,343	93	845	19,318	278	737	249,877	99	743
Average			119,255	85	761	95,477	109	833	22,843	207	642	237,575	106	774

Table 67 – Block 4 Base Case Average Annual Statistics by Harvest System for Natural[10] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	79,135	180	771	80,934	251	715	36,000	301	651	196,069	231	723
2	2022	2031	69,202	128	773	63,391	259	820	36,000	311	709	168,592	216	775
3	2032	2041	30,281	102	617	21,123	176	829	36,000	324	787	87,403	212	727
4	2042	2051	40,952	98	837	9,120	115	771	35,755	330	803	85,827	197	815
5	2052	2061	5,420	348	717	42,936	155	847	32,377	345	847	80,733	244	837
6	2062	2071	4,337	213	755	4,028	252	738	3,908	285	784	12,273	249	758
7	2072	2081	26,772	151	1,364	4,784	207	1,066	289	316	656	31,845	161	1,297
8	2082	2091	3,941	179	1,089	1,853	282	873	460	330	735	6,255	221	982
9	2092	2101	0	-	-	0	-	-	0	-	-	0	-	-
10	2102	2111	61	143	963	1,919	167	887	137	152	1,190	2,117	165	904
11	2112	2121	2	215	1,595	0	-	-	0	-	-	2	215	1,595
12	2122	2131	14	215	1,384	0	-	-	0	-	-	14	215	1,384
13	2132	2141	0	-	-	0	-	-	0	-	-	0	-	-
14	2142	2151	0	-	-	0	-	-	0	-	-	0	-	-
15	2152	2161	0	-	-	812	215	1,109	0	-	-	812	215	1,109
16	2162	2171	317	211	1,776	1,713	215	1,059	887	313	790	2,917	245	1,000
17	2172	2181	0	-	-	0	-	-	71	340	762	71	340	762
18	2182	2191	0	-	-	0	-	-	0	-	-	0	-	-
19	2192	2201	0	-	-	0	-	-	0	-	-	0	-	-
20	2202	2211	0	-	-	0	-	-	0	-	-	0	-	-
21	2212	2221	0	-	-	0	-	-	0	-	-	0	-	-
22	2222	2231	0	-	-	0	-	-	0	-	-	0	-	-
23	2232	2241	0	-	-	0	-	-	0	-	-	0	-	-
24	2242	2251	0	-	-	0	-	-	0	-	-	0	-	-
25	2252	2261	906	305	1,883	275	310	1,883	10,790	326	667	11,971	324	712
Average			10,454	146	798	9,315	222	789	7,707	321	747	27,476	221	780

[10] Natural Stands are all stands established before 1962.

Table 68 – Block 4 Base Case Average Annual Statistics by Harvest System for Managed[11] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting: Harvest Volume (m^3)	Ground-based Harvesting: Average Harvest Age (years)	Ground-based Harvesting: Average Harvest Volume per Ha (m^3/ha)	Cable Harvesting: Harvest Volume (m^3)	Cable Harvesting: Average Harvest Age (years)	Cable Harvesting: Average Harvest Volume per Ha (m^3/ha)	Non-conventional Harvesting: Harvest Volume (m^3)	Non-conventional Harvesting: Average Harvest Age (years)	Non-conventional Harvesting: Average Harvest Volume per Ha (m^3/ha)	Total: Harvest Volume (m^3)	Total: Average Harvest Age (years)	Total: Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	887	60	643	0	-	-	0	-	-	887	60	643
2	2022	2031	28,332	61	613	33	70	782	0	-	-	28,364	61	614
3	2032	2041	81,157	74	688	28,400	75	769	0	-	-	109,557	74	707
4	2042	2051	102,418	76	683	8,469	79	802	245	150	1,139	111,132	76	692
5	2052	2061	62,782	80	726	72,273	91	896	868	160	1,184	135,923	86	810
6	2062	2071	101,037	95	923	124,035	94	906	0	-	-	225,072	94	914
7	2072	2081	85,428	101	986	120,072	100	864	0	-	-	205,500	100	911
8	2082	2091	85,664	91	997	145,328	100	888	98	173	1,255	231,090	96	925
9	2092	2101	181,197	89	1,014	55,706	89	955	442	106	1,136	237,345	89	1,000
10	2102	2111	164,263	87	840	63,256	96	939	7,709	117	1,083	235,228	90	871
11	2112	2121	176,199	86	782	67,442	106	935	6,234	124	1,064	249,876	92	824
12	2122	2131	92,680	88	830	121,192	107	845	35,991	115	1,063	249,863	101	865
13	2132	2141	156,636	81	769	75,204	93	853	18,039	119	1,080	249,878	88	810
14	2142	2151	118,113	74	770	131,764	92	861	0	-	-	249,878	84	816
15	2152	2161	123,484	68	842	125,582	86	868	0	-	-	249,066	77	855
16	2162	2171	52,602	74	771	159,246	113	856	35,113	155	1,089	246,961	111	862
17	2172	2181	168,181	76	705	45,697	101	845	35,929	146	1,063	249,807	90	765
18	2182	2191	147,392	74	681	66,487	107	841	36,000	149	1,048	249,878	93	758
19	2192	2201	89,499	70	666	124,378	99	847	36,000	151	1,073	249,877	96	794
20	2202	2211	159,879	74	650	53,999	88	861	36,000	175	1,069	249,878	91	730
21	2212	2221	156,068	67	783	57,811	80	881	36,000	173	1,041	249,878	86	834
22	2222	2231	66,840	65	728	158,472	95	851	24,565	183	1,020	249,877	96	827
23	2232	2241	48,231	62	649	165,647	96	848	36,000	128	1,056	249,878	94	823
24	2242	2251	142,760	75	656	82,480	93	851	24,638	123	1,073	249,878	85	740
25	2252	2261	128,309	76	678	101,069	92	852	8,529	216	1,104	237,907	88	754
Average			108,801	79	761	86,162	96	866	15,136	149	1,063	210,099	91	818

[11] Managed Stands are all stands established since 1962.

Table 69 – Block 4 Base Case Average Annual Contributions of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Natural Stands				Managed Stands				Total			
			Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)
1	2012	2021	196,069	115,208	37,843	21,740	887	335	0	9	196,956	115,543	37,843	21,749
2	2022	2031	168,592	102,907	40,736	10,932	28,364	13,189	215	916	196,957	116,096	40,951	11,849
3	2032	2041	87,403	50,619	21,552	10,556	109,557	43,196	982	10,447	196,960	93,815	22,534	21,003
4	2042	2051	85,827	56,645	19,753	4,879	111,132	50,185	2,677	14,391	196,959	106,831	22,429	19,270
5	2052	2061	80,733	50,075	15,623	9,789	135,923	91,321	12,754	14,278	216,656	141,397	28,377	24,067
6	2062	2071	12,273	6,500	3,496	1,210	225,072	166,852	25,790	21,210	237,345	173,352	29,286	22,420
7	2072	2081	31,845	25,104	4,828	1,066	205,500	142,073	32,326	22,543	237,345	167,176	37,154	23,609
8	2082	2091	6,255	4,313	1,212	368	231,090	161,094	27,456	24,082	237,345	165,407	28,668	24,450
9	2092	2101	0	0	0	0	237,345	181,768	24,742	9,137	237,345	181,768	24,742	9,137
10	2102	2111	2,117	1,379	682	47	235,228	155,061	24,690	35,984	237,345	156,440	25,372	36,031
11	2112	2121	2	1	0	0	249,876	156,121	31,167	41,701	249,878	156,122	31,167	41,701
12	2122	2131	14	8	0	6	249,863	144,000	35,732	42,684	249,877	144,008	35,732	42,690
13	2132	2141	0	0	0	0	249,878	157,965	24,992	46,309	249,878	157,965	24,992	46,309
14	2142	2151	0	0	0	0	249,878	166,634	20,655	40,932	249,878	166,634	20,655	40,932
15	2152	2161	812	631	148	32	249,066	185,698	12,903	30,261	249,878	186,329	13,051	30,292
16	2162	2171	2,917	1,849	506	481	246,961	148,320	35,266	35,547	249,878	150,169	35,772	36,028
17	2172	2181	71	33	35	1	249,807	153,113	29,233	40,889	249,878	153,146	29,268	40,889
18	2182	2191	0	0	0	0	249,878	145,602	32,869	41,720	249,878	145,602	32,869	41,720
19	2192	2201	0	0	0	0	249,877	147,894	31,539	42,580	249,877	147,894	31,539	42,580
20	2202	2211	0	0	0	0	249,878	149,499	28,748	44,124	249,878	149,499	28,748	44,124
21	2212	2221	0	0	0	0	249,878	177,527	16,899	25,077	249,878	177,527	16,899	25,077
22	2222	2231	0	0	0	0	249,877	155,389	26,929	36,799	249,877	155,389	26,929	36,799
23	2232	2241	0	0	0	0	249,878	156,089	26,976	42,452	249,878	156,089	26,976	42,452
24	2242	2251	0	0	0	0	249,878	152,060	27,796	46,282	249,878	152,060	27,796	46,282
25	2252	2261	11,971	6,520	2,230	996	237,907	146,112	25,731	44,409	249,877	152,631	27,962	45,405
Average			27,476	16,872	5,946	2,484	210,099	133,884	22,363	30,190	237,575	150,756	28,308	32,674

Table 70 – Block 4 Base Case Average Ages and Yields of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Hemlock			Balsam			Cedar		
			Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[12]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[12]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[12]
1	2012	2021	115,543	205	730	37,843	251	730	21,749	286	738
2	2022	2031	116,096	176	754	40,951	263	771	11,849	197	755
3	2032	2041	93,815	138	723	22,534	288	721	21,003	92	723
4	2042	2051	106,831	128	748	22,429	249	747	19,270	92	748
5	2052	2061	141,397	134	828	28,377	203	828	24,067	157	828
6	2062	2071	173,352	100	913	29,286	116	913	22,420	97	914
7	2072	2081	167,176	109	958	37,154	113	958	23,609	100	958
8	2082	2091	165,407	99	936	28,668	109	903	24,450	95	936
9	2092	2101	181,768	87	1010	24,742	109	907	9,137	83	1010
10	2102	2111	156,440	90	880	25,372	98	865	36,031	90	879
11	2112	2121	156,122	90	832	31,167	101	827	41,701	91	829
12	2122	2131	144,008	99	873	35,732	107	869	42,690	101	877
13	2132	2141	157,965	87	818	24,992	90	814	46,309	88	818
14	2142	2151	166,634	82	824	20,655	89	801	40,932	84	824
15	2152	2161	186,329	75	864	13,051	90	815	30,292	82	865
16	2162	2171	150,169	106	872	35,772	134	867	36,028	106	872
17	2172	2181	153,146	87	773	29,268	101	768	40,889	89	773
18	2182	2191	145,602	89	765	32,869	103	764	41,720	93	765
19	2192	2201	147,894	92	802	31,539	109	826	42,580	96	802
20	2202	2211	149,499	87	737	28,748	105	737	44,124	84	732
21	2212	2221	177,527	76	842	16,899	126	789	25,077	81	828
22	2222	2231	155,389	88	835	26,929	113	848	36,799	93	825
23	2232	2241	156,089	91	831	26,976	101	858	42,452	98	831
24	2242	2251	152,060	85	748	27,796	86	747	46,282	85	747
25	2252	2261	152,631	96	759	27,962	111	760	45,405	90	759
Average			150,756	101	822	28,308	137	812	32,674	100	821

[12] Average volume per hectare indicates the average stand volume when the respective species is found within the stand. For example, in Decade #1 the average volume for harvested stands containing hemlock was 730 m^3/ha.

Appendix A4 – Additional Base Case Statistics for Blocks 3 and 5 combined

The following tables provide average annual values per decade for the Base Case harvest schedule for Blocks 3 and 5 combined0.

Table 71 – Blocks 3&5 Base Case Average Annual Statistics by Harvest System

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	14,012	252	632	22,336	292	666	5,000	297	773	41,349	279	665
2	2022	2031	25,628	104	827	10,722	115	996	5,000	311	761	41,350	132	856
3	2032	2041	25,821	96	707	10,529	117	984	5,000	321	793	41,350	128	772
4	2042	2051	31,157	104	661	5,193	110	782	5,000	331	852	41,350	132	693
5	2052	2061	15,509	75	560	20,841	92	808	5,000	343	811	41,350	116	693
6	2062	2071	182	169	1,151	37,175	98	816	3,993	300	832	41,350	118	819
7	2072	2081	17,597	78	563	18,753	112	853	5,000	289	824	41,350	119	698
8	2082	2091	19,985	76	520	19,980	113	812	5,000	305	845	44,965	118	652
9	2092	2101	9,908	73	517	30,056	116	983	5,000	201	1,011	44,964	116	822
10	2102	2111	2,597	73	559	39,686	115	944	2,681	119	1,104	44,964	113	915
11	2112	2121	19,268	81	573	22,354	109	798	3,342	123	1,006	44,964	98	692
12	2122	2131	31,184	86	581	8,781	106	787	5,000	125	991	44,965	94	643
13	2132	2141	25,877	69	484	14,898	110	801	4,190	131	1,006	44,965	89	590
14	2142	2151	13,404	63	454	29,060	90	768	2,500	149	1,059	44,965	85	645
15	2152	2161	3,687	65	454	36,278	122	905	5,000	146	1,031	44,965	120	848
16	2162	2171	0	-	-	39,965	164	1,169	5,000	149	1,030	44,965	163	1,151
17	2172	2181	4,528	83	628	35,436	114	846	5,000	148	1,029	44,964	114	833
18	2182	2191	3,638	77	612	36,327	93	760	5,000	146	1,041	44,965	98	768
19	2192	2201	21,903	81	587	18,061	93	763	5,000	155	1,063	44,964	94	685
20	2202	2211	24,411	87	629	15,553	100	743	4,999	161	1,096	44,964	100	699
21	2212	2221	32,867	82	629	7,097	101	754	5,000	158	1,078	44,965	94	678
22	2222	2231	17,102	92	746	22,863	94	763	5,000	164	1,097	44,964	101	783
23	2232	2241	4,878	95	713	35,086	94	781	5,000	160	1,077	44,965	102	797
24	2242	2251	13,908	106	733	26,056	105	821	5,000	169	1,108	44,964	112	814
25	2252	2261	7,072	81	619	32,893	94	758	4,250	177	1,145	44,215	100	755
Average			15,445	92	605	23,839	115	833	4,638	207	957	43,922	117	744

Table 72 – Blocks 3&5 Base Case Average Annual Statistics by Harvest System for Natural[13] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	14,012	252	632	22,336	292	666	5,000	297	773	41,349	279	665
2	2022	2031	22,395	110	938	10,595	115	998	5,000	311	761	37,991	138	925
3	2032	2041	17,160	112	958	10,529	117	984	5,000	321	793	32,689	145	936
4	2042	2051	20,802	122	828	4,107	119	764	5,000	331	852	29,909	157	822
5	2052	2061	38	350	703	1,196	127	773	5,000	343	811	6,234	302	803
6	2062	2071	66	149	1524	989	204	780	3,993	300	832	5,048	279	826
7	2072	2081	664	168	1,114	931	290	837	5,000	289	824	6,595	277	848
8	2082	2091	315	202	1,117	413	233	794	5,000	305	845	5,728	295	852
9	2092	2101	0	-	-	778	181	840	2,377	285	902	3,155	259	886
10	2102	2111	0	-	-	0	-	-	0	-	-	0	-	-
11	2112	2121	0	-	-	0	-	-	0	-	-	0	-	-
12	2122	2131	0	-	-	0	-	-	0	-	-	0	-	-
13	2132	2141	0	-	-	52	350	489	0	-	-	52	350	489
14	2142	2151	0	-	-	0	-	-	0	-	-	0	-	-
15	2152	2161	0	-	-	0	-	-	0	-	-	0	-	-
16	2162	2171	0	-	-	1,452	241	1,137	0	-	-	1,452	241	1137
17	2172	2181	0	-	-	0	-	-	0	-	-	0	-	-
18	2182	2191	0	-	-	0	-	-	0	-	-	0	-	-
19	2192	2201	0	-	-	0	-	-	0	-	-	0	-	-
20	2202	2211	0	-	-	0	-	-	0	-	-	0	-	-
21	2212	2221	0	-	-	0	-	-	0	-	-	0	-	-
22	2222	2231	0	-	-	0	-	-	0	-	-	0	-	-
23	2232	2241	0	-	-	0	-	-	0	-	-	0	-	-
24	2242	2251	0	-	-	0	-	-	0	-	-	0	-	-
25	2252	2261	0	-	-	0	-	-	0	-	-	0	-	-
Average			3,018	141	838	2,135	200	797	1,655	311	814	6,808	201	819

[13] Natural Stands are all stands established before 1962.

Table 73 – Blocks 3&5 Base Case Average Annual Statistics by Harvest System for Managed[14] Stands

Period (Decade #)	Start Year	End Year	Ground-based Harvesting			Cable Harvesting			Non-conventional Harvesting			Total		
			Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)	Harvest Volume (m^3)	Average Harvest Age (years)	Average Harvest Volume per Ha (m^3/ha)
1	2012	2021	0	-	-	0	-	-	0	-	-	0	-	-
2	2022	2031	3,233	62	455	127	145	867	0	-	-	3,359	65	463
3	2032	2041	8,661	64	465	0	-	-	0	-	-	8,661	64	465
4	2042	2051	10,355	66	471	1,086	78	860	0	-	-	11,441	67	492
5	2052	2061	15,470	74	560	19,646	90	810	0	-	-	35,116	83	677
6	2062	2071	116	180	1,010	36,186	95	817	0	-	-	36,302	95	818
7	2072	2081	16,933	74	553	17,822	102	854	0	-	-	34,755	89	675
8	2082	2091	19,670	74	516	19,567	111	812	0	-	-	39,236	92	631
9	2092	2101	9,908	73	517	29,278	114	987	2,623	126	1,136	41,809	105	817
10	2102	2111	2,597	73	559	39,686	115	944	2,681	119	1,104	44,964	113	915
11	2112	2121	19,268	81	573	22,354	109	798	3,342	123	1,006	44,964	98	692
12	2122	2131	31,184	86	581	8,781	106	787	5,000	125	991	44,965	94	643
13	2132	2141	25,877	69	484	14,846	109	803	4,190	131	1,006	44,913	88	590
14	2142	2151	13,404	63	454	29,060	90	768	2,500	149	1,059	44,965	85	645
15	2152	2161	3,687	65	454	36,278	122	905	5,000	146	1,031	44,965	120	848
16	2162	2171	0	-	-	38,512	162	1,170	5,000	149	1,030	43,512	160	1,152
17	2172	2181	4,528	83	628	35,436	114	846	5,000	148	1,029	44,964	114	833
18	2182	2191	3,638	77	612	36,327	93	760	5,000	146	1,041	44,965	98	768
19	2192	2201	21,903	81	587	18,061	93	763	5,000	155	1,063	44,964	94	685
20	2202	2211	24,411	87	629	15,553	100	743	4,999	161	1,096	44,964	100	699
21	2212	2221	32,867	82	629	7,097	101	754	5,000	158	1,078	44,965	94	678
22	2222	2231	17,102	92	746	22,863	94	763	5,000	164	1,097	44,964	101	783
23	2232	2241	4,878	95	713	35,086	94	781	5,000	160	1,077	44,965	102	797
24	2242	2251	13,908	106	733	26,056	105	821	5,000	169	1,108	44,964	112	814
25	2252	2261	7,072	81	619	32,893	94	758	4,250	177	1,145	44,215	100	755
Average			12,427	79	567	21,704	107	836	2,983	149	1,061	37,114	101	732

[14] Managed Stands are all stands established since 1962.

Table 74 – Blocks 3&5 Base Case Average Annual Contributions of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Natural Stands				Managed Stands				Total			
			Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)	Harvest Volume (m^3)	Hemlock Harvest Volume (m^3)	Balsam Harvest Volume (m^3)	Cedar Harvest Volume (m^3)
1	2012	2021	41,349	16,958	5,523	14,050	0	0	0	0	41,349	16,958	5,523	14,050
2	2022	2031	37,991	28,630	4,772	3,485	3,359	2,263	465	344	41,350	30,893	5,236	3,828
3	2032	2041	32,689	22,767	3,370	5,898	8,661	3,954	754	2,957	41,350	26,721	4,124	8,854
4	2042	2051	29,909	17,710	2,631	8,870	11,441	4,234	852	5,284	41,350	21,945	3,484	14,154
5	2052	2061	6,234	3,329	1,668	863	35,116	16,123	2,480	15,418	41,350	19,452	4,148	16,281
6	2062	2071	5,048	2,560	1,308	839	36,302	18,874	3,319	9,892	41,350	21,435	4,627	10,731
7	2072	2081	6,595	3,401	1,752	1,161	34,755	16,420	6,489	5,108	41,350	19,821	8,241	6,269
8	2082	2091	5,728	2,889	1,716	807	39,236	11,123	2,751	13,788	44,965	14,012	4,467	14,595
9	2092	2101	3,155	1,938	584	514	41,809	16,476	4,137	17,349	44,964	18,414	4,720	17,863
10	2102	2111	0	0	0	0	44,964	18,210	3,454	17,380	44,964	18,210	3,454	17,380
11	2112	2121	0	0	0	0	44,964	13,260	3,313	18,928	44,964	13,260	3,313	18,928
12	2122	2131	0	0	0	0	44,965	11,293	2,856	20,280	44,965	11,293	2,856	20,280
13	2132	2141	52	24	5	6	44,913	9,283	4,968	19,934	44,965	9,307	4,973	19,940
14	2142	2151	0	0	0	0	44,965	3,008	10,631	20,831	44,965	3,008	10,631	20,831
15	2152	2161	0	0	0	0	44,965	7,193	7,807	21,667	44,965	7,193	7,807	21,667
16	2162	2171	1,452	1,029	1	423	43,512	19,212	8,813	10,840	44,965	20,240	8,813	11,263
17	2172	2181	0	0	0	0	44,964	6,896	11,202	15,642	44,964	6,896	11,202	15,642
18	2182	2191	0	0	0	0	44,965	4,498	8,706	20,645	44,965	4,498	8,706	20,645
19	2192	2201	0	0	0	0	44,964	7,583	5,387	20,279	44,964	7,583	5,387	20,279
20	2202	2211	0	0	0	0	44,964	11,127	1,670	20,662	44,964	11,127	1,670	20,662
21	2212	2221	0	0	0	0	44,965	8,776	4,321	20,259	44,965	8,776	4,321	20,259
22	2222	2231	0	0	0	0	44,964	3,874	8,638	20,563	44,964	3,874	8,638	20,563
23	2232	2241	0	0	0	0	44,965	3,108	10,331	19,376	44,965	3,108	10,331	19,376
24	2242	2251	0	0	0	0	44,964	5,647	8,950	17,917	44,964	5,647	8,950	17,917
25	2252	2261	0	0	0	0	44,215	4,535	7,947	19,867	44,215	4,535	7,947	19,867
Average			6,808	4,049	933	1,477	37,114	9,079	5,210	15,008	43,922	13,128	6,143	16,485

Table 75 – Blocks 3&5 Base Case Average Ages and Yields of Hemlock, Balsam and Cedar

Period (Decade #)	Start Year	End Year	Hemlock			Balsam			Cedar		
			Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[15]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[15]	Species Harvest Volume (m^3)	Average Stand Harvest Age (years)	Average Stand Harvest Volume per Ha (m^3/ha)[15]
1	2012	2021	16,958	270	672	5,523	281	672	14,050	288	671
2	2022	2031	30,893	122	865	5,236	152	866	3,828	175	889
3	2032	2041	26,721	124	780	4,124	153	775	8,854	127	785
4	2042	2051	21,945	133	700	3,484	195	698	14,154	116	699
5	2052	2061	19,452	119	700	4,148	186	700	16,281	91	697
6	2062	2071	21,435	116	827	4,627	153	828	10,731	106	827
7	2072	2081	19,821	121	705	8,241	135	799	6,269	114	688
8	2082	2091	14,012	141	723	4,467	163	731	14,595	97	659
9	2092	2101	18,414	126	877	4,720	127	895	17,863	108	830
10	2102	2111	18,210	116	942	3,454	110	972	17,380	111	923
11	2112	2121	13,260	102	708	3,313	108	814	18,928	94	699
12	2122	2131	11,293	95	639	2,856	110	721	20,280	92	648
13	2132	2141	9,307	93	617	4,973	93	695	19,940	86	596
14	2142	2151	3,008	89	540	10,631	90	709	20,831	84	651
15	2152	2161	7,193	151	946	7,807	103	932	21,667	123	857
16	2162	2171	20,240	182	1308	8,813	155	1190	11,263	146	1164
17	2172	2181	6,896	137	874	11,202	117	851	15,642	104	837
18	2182	2191	4,498	109	786	8,706	97	797	20,645	96	774
19	2192	2201	7,583	90	643	5,387	102	811	20,279	90	684
20	2202	2211	11,127	96	699	1,670	141	859	20,662	96	701
21	2212	2221	8,776	93	675	4,321	100	748	20,259	90	679
22	2222	2231	3,874	111	790	8,638	99	807	20,563	97	785
23	2232	2241	3,108	111	830	10,331	99	811	19,376	97	797
24	2242	2251	5,647	117	838	8,950	109	835	17,917	106	811
25	2252	2261	4,535	103	733	7,947	99	775	19,867	96	758
Average			13,128	129	757	6,143	125	805	16,485	108	749

15 Average volume per hectare indicates the average stand volume when the respective species is found within the stand. For example, in Decade #1 the average volume for harvested stands containing hemlock was 672 m^3/ha.

Appendix B: Alternative Harvest Flows and Sensitivity Analyses Details by Supply Block

Appendix B1 – Maintain Current AAC

Maintaining the current AAC contribution of Block 1 (roughly 408,000 m^3/year) for the first 10 years allows the balance of the schedule to be 435,900 m^3/year; 600 m^3/year (0.1%) higher than the Base Case. Overall, 129,000 m^3 less is harvested.

Table 76 – Block 1 Harvest levels maintaining current AAC

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Maintain current AAC	Difference
1	2012	2021	435,300	408,000	- 27,300
2 - 25	2022	2261	435,300	435,900	+ 600

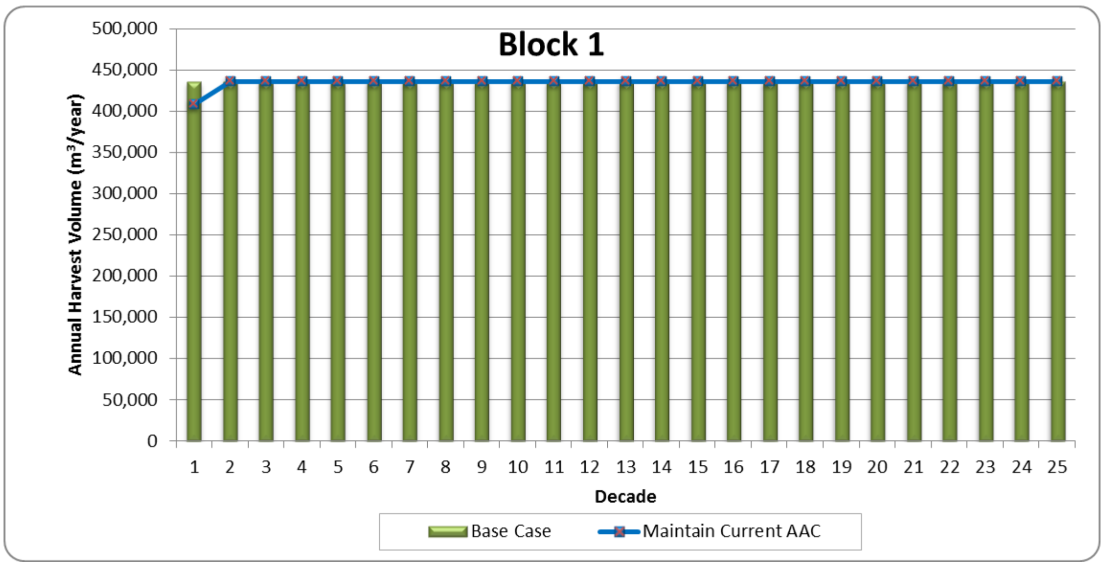

Figure 77 – Block 1 Harvest levels maintaining current AAC

Maintaining the current AAC contribution of Block 2 (about 1,068,800 m^3/year) for the first 10 years requires declines of 20% for each of the following 2 decades and lengthens the mid-term timber supply “dip”. The long-term harvest level (LTHL) is 829,000 m^3/year; 4,700 m^3/year (0.6%) less than the Base Case. Total harvest is 1.12 million m^3 (0.6%) less. The higher short-term harvest level greatly reduces the available inventory, thus pushing harvest to shorter rotations and making mid and long-term timber supply more reliant on minimum harvest criteria.

Table 77 - Block 2 Harvest levels maintaining current AAC

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Maintain current AAC	Difference
1	2012	2021	864,300	1,068,800	+ 204,500
2	2022	2031	777,900	855,000	+ 77,100
3 - 5	2032	2061	706,100	684,000	- 22,100
6	2062	2071	756,100	684,000	- 72,100
7	2072	2081	806,100	714,500	- 91,600
8	2082	2091	833,700	764,500	- 69,200
9	2092	2101	833,700	814,500	- 19,200
10 - 25	2102	2261	833,700	829,000	- 4,700

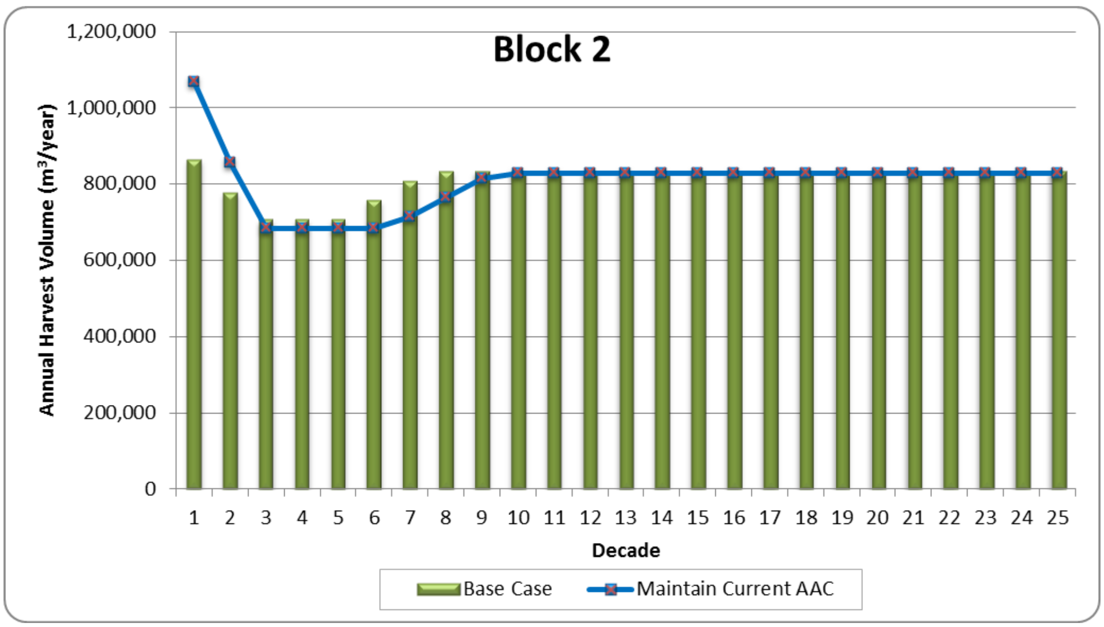

Figure 78 – Block 2 Harvest levels maintaining current AAC

Maintaining the current AAC contribution of Block 4 (approximately 248,700 m^3/year) for 10 years can be done if harvest declines 11% in the second decade. Over the first 50 years, this alternate schedule harvests 1.3 million m^3 (12.9%) more than the Base Case; however over the balance of the schedule approximately 1.5 million m^3 (3.0%) less is harvested. Overall, 213,000 m^3 (0.4%) less is harvested. Like in Block 2, the higher short-term harvest level greatly reduces the available inventory, thus pushing harvest to shorter rotations and making mid and long-term timber supply more dependent on minimum harvest criteria.

Table 78 - Block 4 Harvest levels maintaining current AAC

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Maintain current AAC	Difference
1	2012	2021	197,000	248,700	+ 51,700
2 - 4	2022	2051	197,000	221,300	+ 24,300
5	2052	2061	216,700	221,300	+ 4,600
6 - 9	2062	2101	237,300	221,300	- 16,000
10	2102	2111	237,300	222,800	- 14,500
11 - 25	2112	2261	249,900	245,100	- 4,800

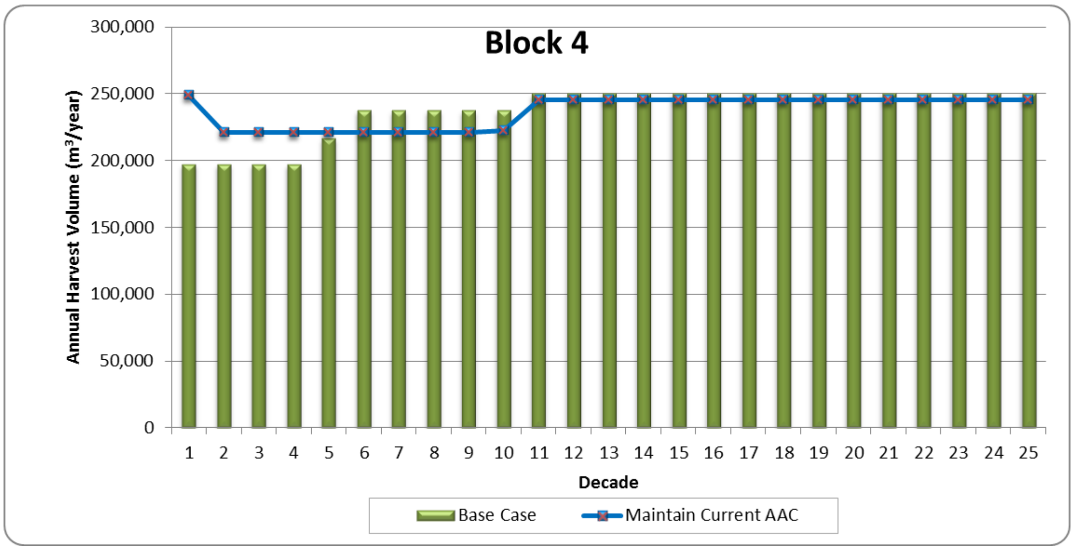

Figure 79 – Block 4 Harvest levels maintaining current AAC

It is infeasible to maintain the AAC contribution for Blocks 3 and 5 at 125,000 m^3/year due to insufficient harvestable inventory. The highest possible initial harvest level was determined to be 115,000 m^3/year. This high initial harvest level requires a significant mid-term “dip” to allow harvestable inventory to grow but does achieve a LTHL 5,100 m^3/year (11%) higher. Overall 224,000 m^3 (2%) less is harvested.

Table 79 - Block 3&5 Harvest levels maintaining current AAC

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Maintain current AAC	Difference
1	2012	2021	41,300	115,000	+ 73,700
2 - 7	2022	2081	41,300	21,400	- 19,900
8	2082	2091	45,000	26,400	- 18,600
9	2092	2101	45,000	31,400	- 13,600
10	2102	2111	45,000	36,400	- 8,600
11	2112	2121	45,000	41,400	- 3,600
12	2122	2131	45,000	46,400	+ 1,400
13 - 25	2132	2261	45,000	50,100	+5,100

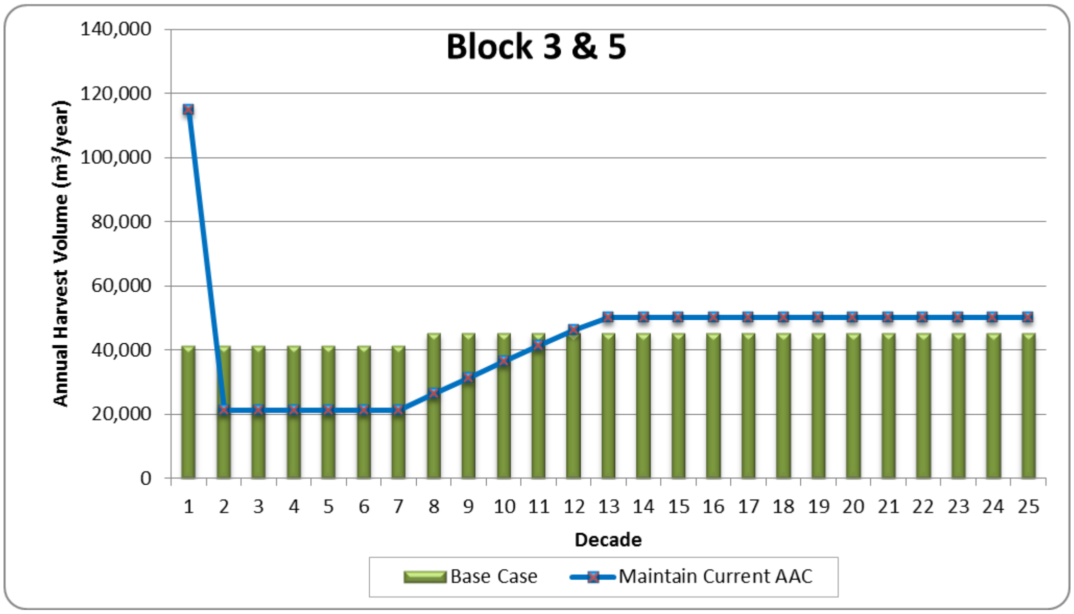

Figure 80 – Block 3&5 Harvest levels maintaining current AAC

Appendix B2 – Non-Declining Even Flow

Since the Base Case for Block 1 is a non-declining even flow (NDEF) schedule, this schedule is the same.

Table 80 – Block 1 NDEF Harvest levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	NDEF	Difference
1 - 25	2012	2261	408,000	435,300	0

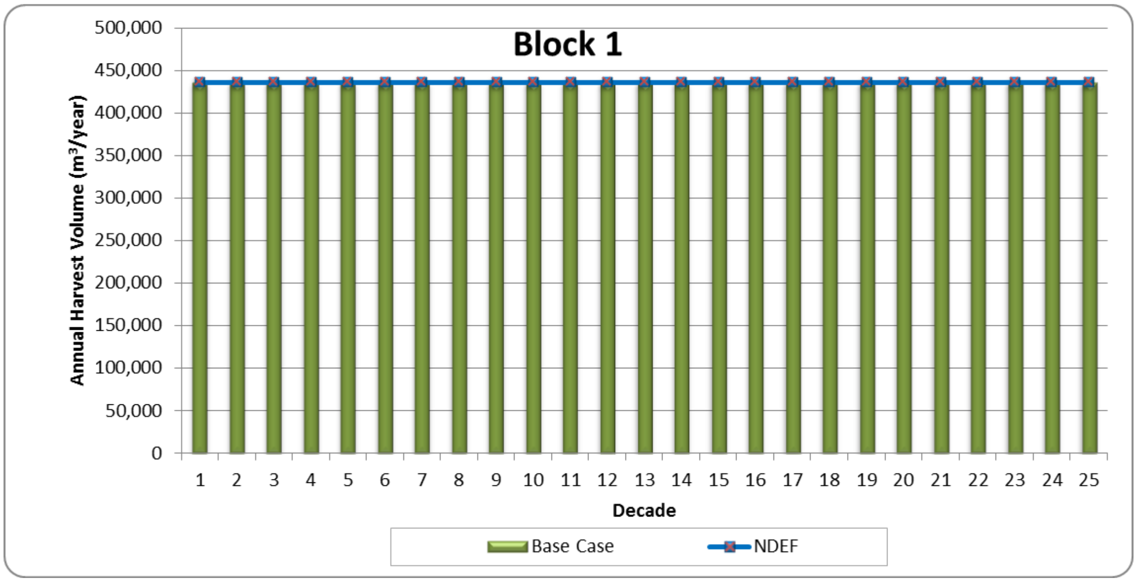

Figure 81 – Block 1 NDEF Harvest levels

A NDEF schedule for Block 2 eliminates the mid-term timber supply "dip" of the Base Case schedule. The harvest level is initially 58,000 m^3/year (6.7%) less but is 100,200 m^3/year (14.2%) greater during Decade 3 to Decade 5 (2032 – 2061). The long-term harvest level (LTHL) is 27,400 m^3/year (3.3%) less than the Base Case and overall, 1.72 million m^3 (0.8%) less is harvested. The higher mid-term harvest level reduces the operable growing stock and shortens the average long-term rotation age by seven years.

Table 81 – Block 2 NDEF Harvest levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	NDEF	Difference
1	2012	2021	864,300	806,300	- 58,000
2	2022	2031	777,900	806,300	+ 28,400
3 - 5	2032	2061	706,100	806,300	+ 100,200
6	2062	2071	756,100	806,300	+ 50,200
7	2072	2081	806,100	806,300	+ 200
8 - 25	2082	2261	833,700	806,300	- 27,400

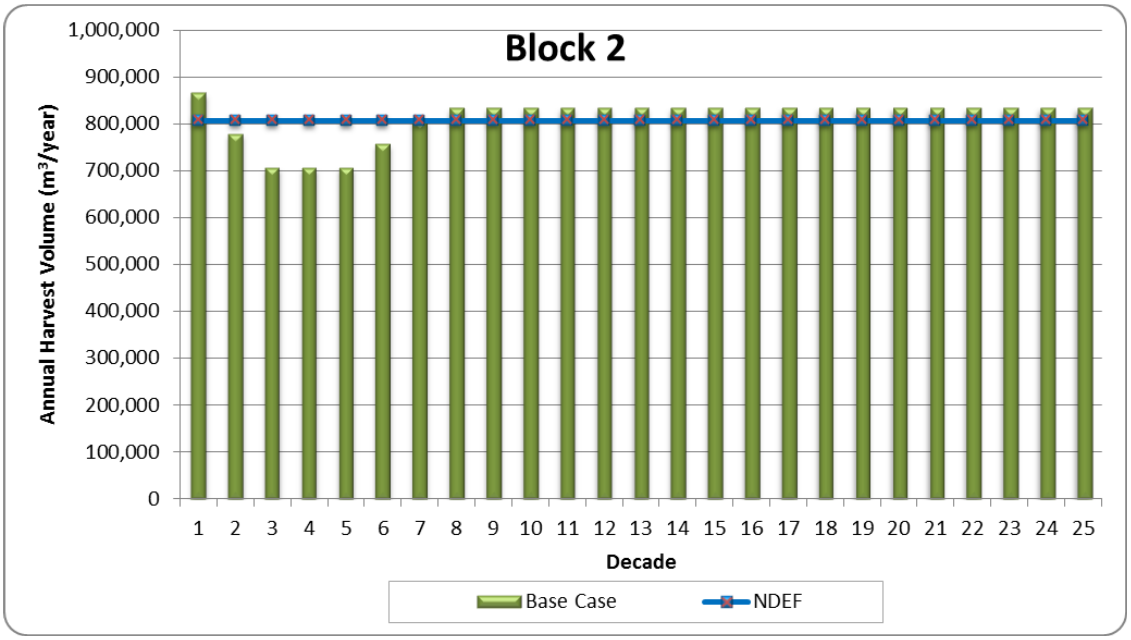

Figure 82 – Block 2 NDEF Harvest levels

The Block 4 NDEF increases the short-term harvest level at the expense of the mid and long-term harvest levels of the Base Case schedule. The short-term harvest level is 28,300 m^3/year (14.4%) higher but harvest is 12,000 m^3/year (5.1%) less in the mid-term and 24,600 m3/year (9.8%) less in the long-term. Overall, 3.07 million m^3 (5.2%) less is harvested. Due to the lack of mature second growth, the higher short-term harvest level greatly reduces the operable growing stock and shortens the average long-term rotation age by ten years.

Table 82 - Block 4 NDEF Harvest levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	NDEF	Difference
1 - 4	2012	2051	197,000	225,300	+ 28,300
5	2052	2061	216,700	225,300	+ 8,600
6 - 10	2062	2111	237,300	225,300	- 12,000
11 - 25	2112	2261	249,900	225,300	- 24,600

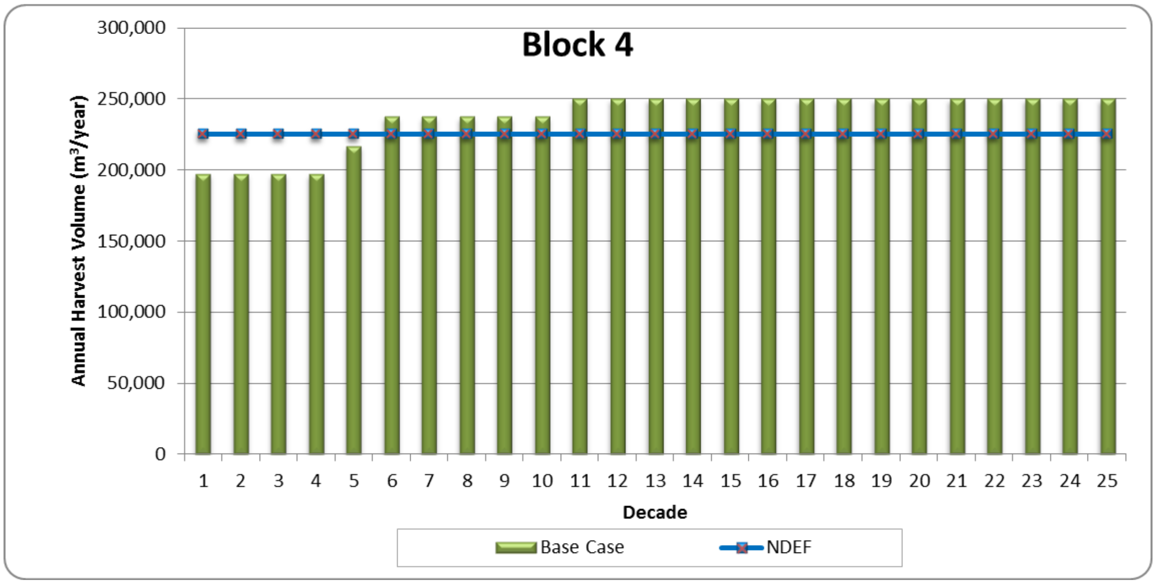

Figure 83 – Block 4 NDEF Harvest levels

The Blocks 3 and 5 NDEF results in an insignificant increase of 100 m^3/year to the short-term harvest level and a long-term harvest level 3,600 m^3/year (8%) less than the Base Case schedule. Overall, 641,000 m^3 (5.8%) less is harvested. Short-term available inventory limits the harvest level when no change in harvest level is allowed.

Table 83 - Block 3&5 NDEF Harvest levels

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	NDEF	Difference
1 - 7	2012	2081	41,300	41,400	+ 100
8 - 25	2082	2261	45,000	41,400	- 3,600

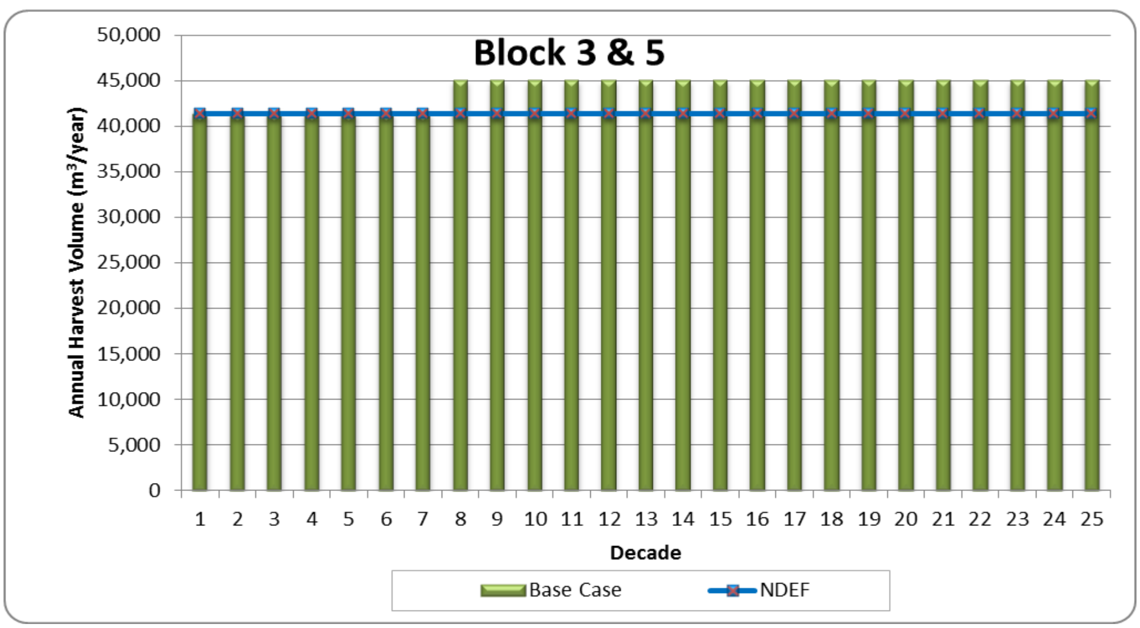

Figure 84 –Block 3&5 NDEF Harvest levels

Appendix B3 – Reduce THLB by 5%

Reducing the THLB of Block 1 by 5% reduces the harvest by 4.4% (19,300 m^3/year). As this schedule is a non-declining even-flow (NDEF), the total harvest is reduced by the same percentage, which equates to 4,825,000 m^3. Alternatively, the initial harvest level of the Base Case can be achieved and the harvest level thereafter is reduced by 4.5% (19,700 m^3/year). This alternate schedule reduces total harvest over the 250 years by 4,728,000 m^3 (4.3%). The reduced harvest is less than the reduction in THLB (percentage wise) due to the restriction placed on contribution from the non-conventional land base nullifying the impact of the reduced non-conventional THLB.

Table 84 – Block 1 Harvest levels with 5% smaller THLB

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Reduced THLB	Difference	Alternate Reduced THLB	Difference
1	2012	2021	435,300	416,000	- 19,300	435,300	0
2 - 25	2022	2261	435,300	416,000	- 19,300	415,600	- 19,700

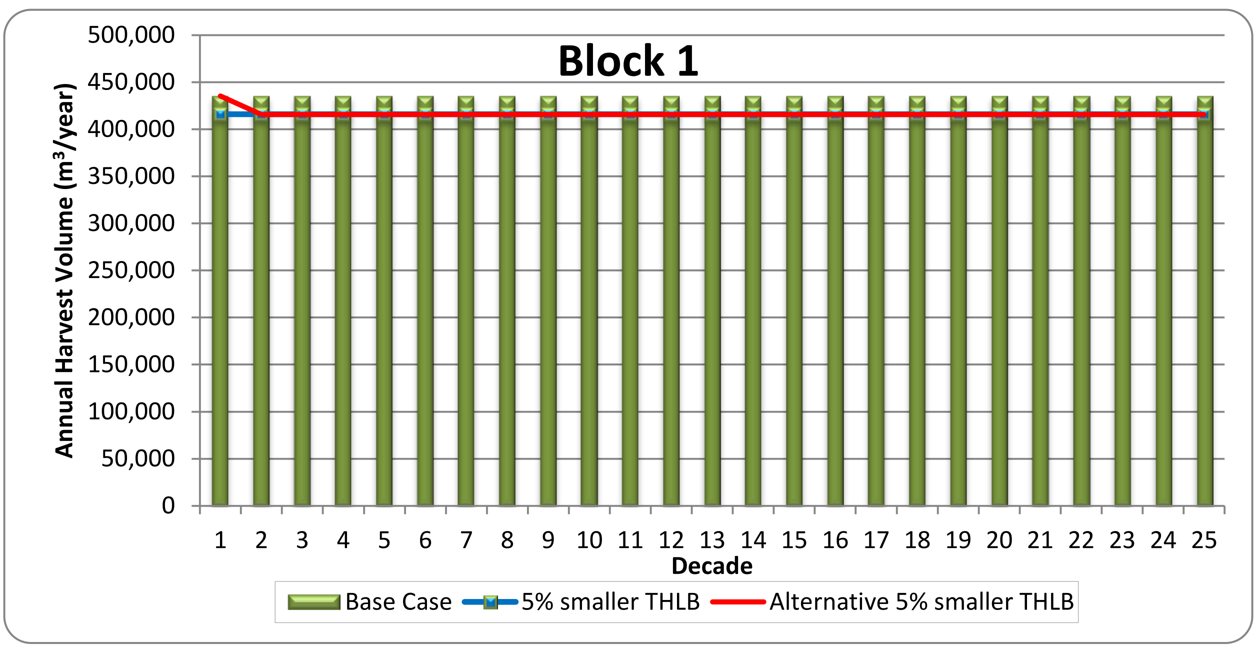

Figure 85 –Block 1 Harvest levels with 5% smaller THLB

Reducing the THLB of Block 2 by 5% reduces the initial harvest by 39,600 m^3/year (4.6%), mid-term harvest by 38,100 m^3/year (5.4%) and long-term harvest by 40,000 m^3/year (4.8%). The total harvest is reduced by 4.8%, or 9.86 million m^3. The harvest reduction is less than the reduction in THLB (percentage wise) due to the restriction placed on contribution from the non-conventional land base partially nullifying the impact of the reduced non-conventional THLB.

Table 85 – Block 2 Harvest levels with 5% smaller THLB

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Reduced THLB	Difference	Alternate Reduced THLB	Difference
1	2012	2021	864,300	824,700	- 39,600	864,300	0
2	2022	2031	777,900	742,200	- 35,700	777,900	0
3 - 5	2032	2061	706,100	668,000	- 38,100	700,100	- 6,000
6	2062	2071	756,100	718,000	- 38,100	700,100	- 56,000
7	2072	2081	806,100	768,000	- 38,100	700,100	- 106,000
8	2082	2091	833,700	793,700	- 40,000	750,100	- 83,600
9 - 25	2022	2261	833,700	793,700	- 40,000	789,900	- 43,800

Alternatively, the initial harvest level of the Base Case can be achieved and short-term timber supply increased. This increase is due to harvest declining by the maximum permitted (10%/decade) in all three schedules. Relative to the Base Case, the mid-term timber supply "dip" is extended by 20 years and the LTHL is reduced by 43,800 m^3/year (5.3%). This alternate schedule reduces total harvest over the 250 years by 10.08 million m^3 (5.0%). The impact to overall timber supply is greater following this schedule due to the higher short-term harvest levels reducing the operable inventory such that long-term average harvest age and therefore average yield is reduced.

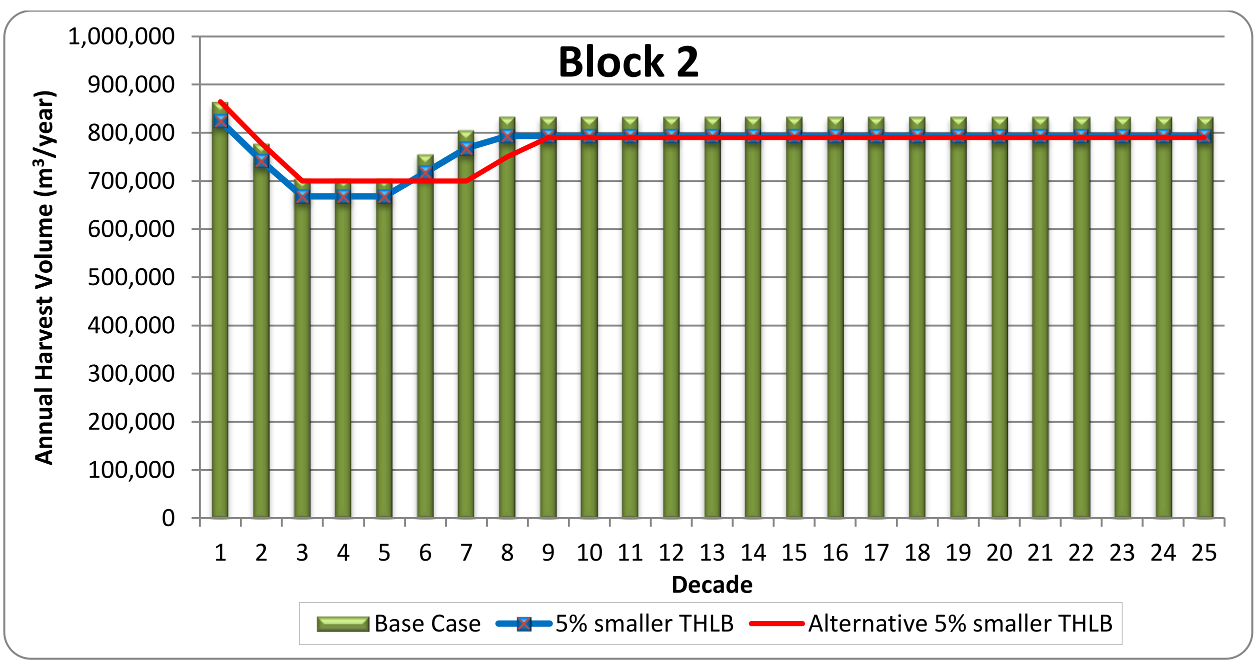

Figure 86 –Block 2 Harvest levels with 5% smaller THLB

Reducing the THLB of Block 4 by 5% reduces the initial harvest by 8,900 m^3/year (4.5%), mid-term harvest by 11,900 m^3/year (5.0%) and long-term harvest by 12,500 m^3/year (5.0%) (see chart below). The total harvest is reduced by 2.94 million m^3, or 5.0%. Alternatively, the initial harvest level of the Base Case can be achieved by marginally reducing mid-term timber supply, with no change to the LTHL or overall harvest.

The percentage reduction in harvest is equal to the percentage reduction in THLB indicating that the timber supply from Block 4 is sensitive to the THLB estimate.

Table 86 – Block 4 Harvest levels with 5% smaller THLB

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Reduced THLB	Difference	Alternate Reduced THLB	Difference
1	2012	2021	197,000	188,100	- 8,900	197,000	0
2 - 4	2022	2051	197,000	188,100	- 8,900	187,100	- 9,900
5	2052	2061	216,700	204,900	- 11,800	204,100	- 12,600
6 -10	2062	2111	237,300	225,400	- 11,900	224,500	- 12,800
11 - 25	2112	2261	249,900	237,400	- 12,500	237,400	- 12,500

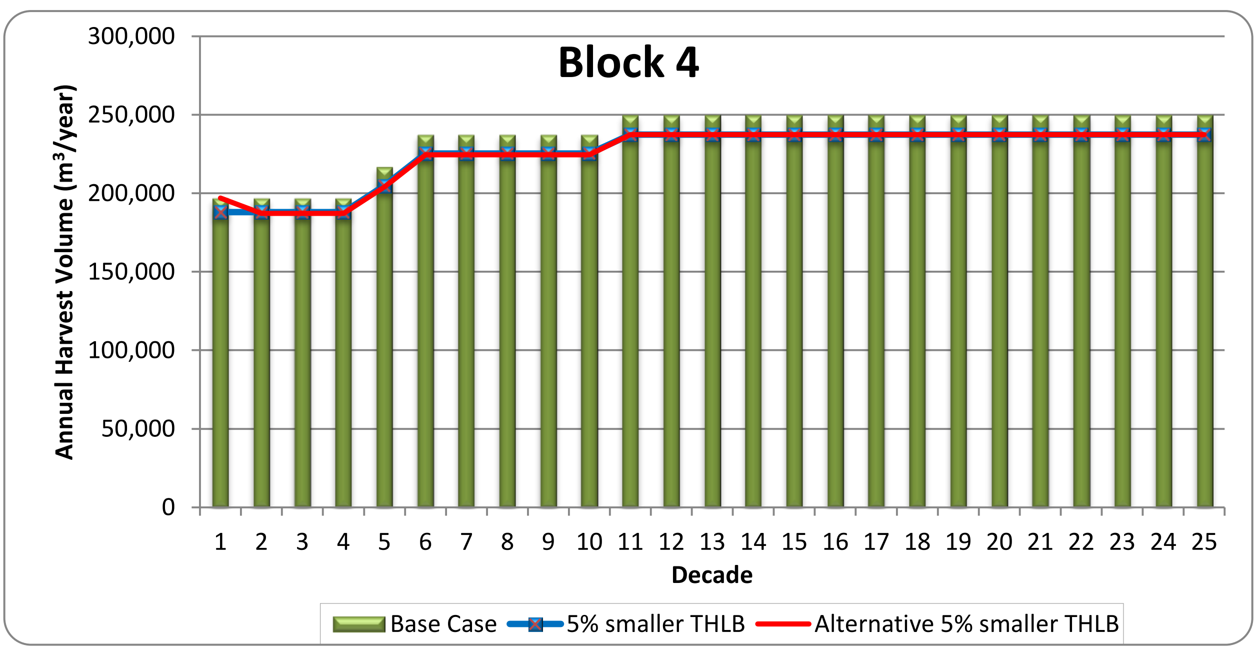

Figure 87 –Block 4 Harvest levels with 5% smaller THLB

Reducing the THLB of Blocks 3/5 by 5% reduces the short-term harvest by 1,800 m^3/year (4.4%), and long-term harvest by 2,100 m^3/year (4.7%) (see chart below). The total harvest is reduced by 504,000 m^3, or 4.6%. Alternatively, the initial harvest level of the Base Case can be achieved by reducing mid-term timber supply, with no change to the LTHL or overall harvest.

Table 87 – Block 3&5 Harvest levels with 5% smaller THLB

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Reduced THLB	Difference	Alternate Reduced THLB	Difference
1	2012	2021	41,300	39,500	- 1,800	41,300	0
2 - 8	2022	2091	41,300	39,500	- 1,800	38,900	- 2,400
9 - 25	2092	2261	45,000	42,900	- 2,100	43,000	- 2,000

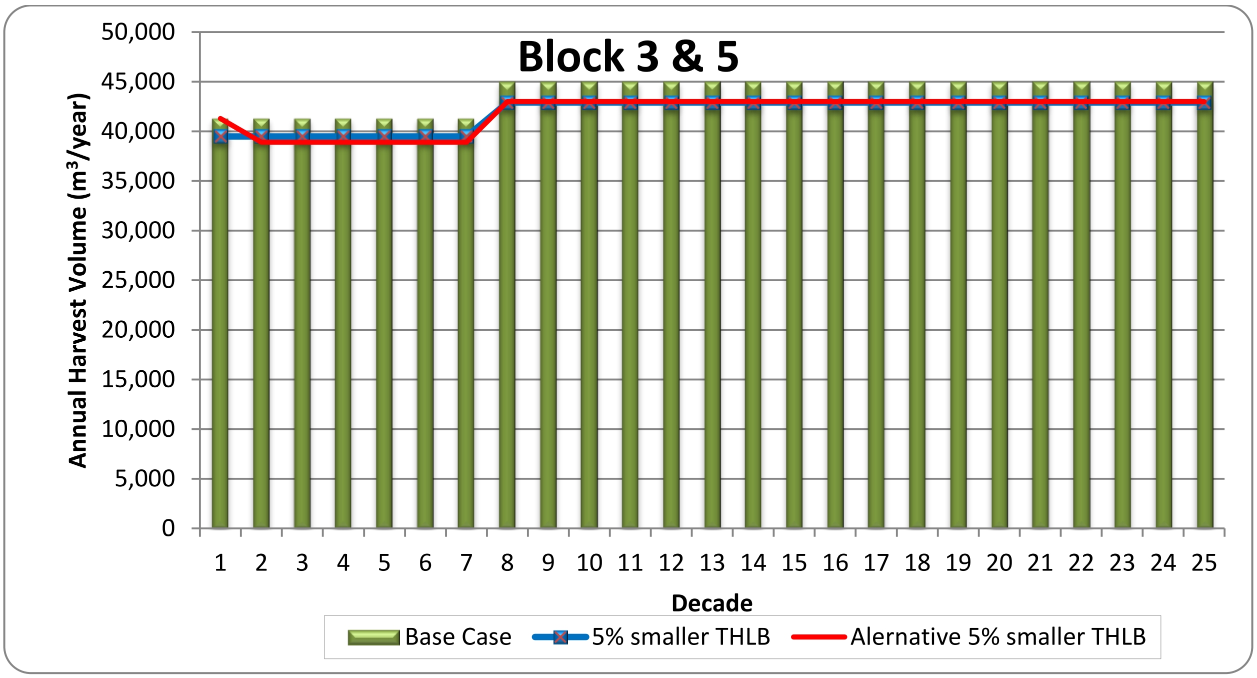

Figure 88 –Block 3&5 Harvest levels with 5% smaller THLB

Appendix B4 – Mature Volumes Increased by 10%

Increasing mature stands (> 140 years old) volume has negligible impact (400 m^3/year or 0.1%) on the timber supply from Block 1 due to the requirement that at least 80% of the harvest be sourced from second growth stands and the constrained contribution from non-conventional stands (of which approximately one-half are mature).

Table 88 – Block 1 Harvest levels with mature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Mature volumes increased	Difference
1 - 25	2012	2261	435,300	435,700	+ 400

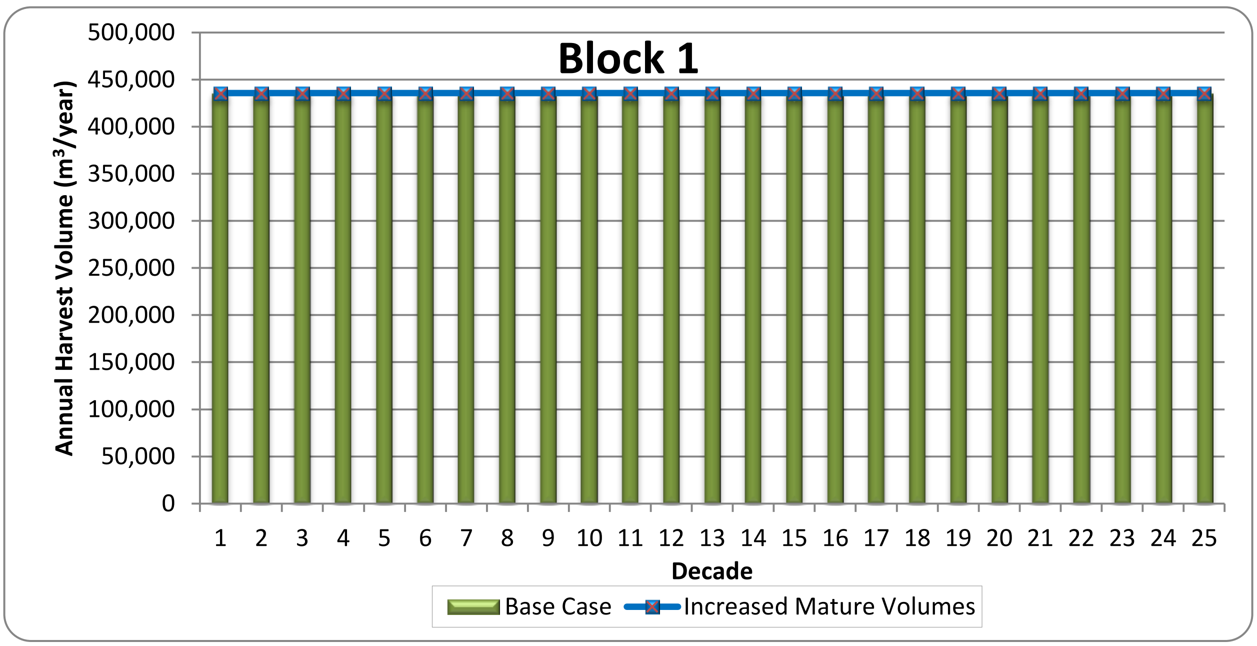

Figure 89 – Block 1 Harvest levels with mature volumes increased 10%

Increasing mature volumes in Block 2 permits the initial harvest to increase by 30,400 m^3/year (3.5%). Gain in the second decade is the same percentage (or 27,300 m^3/year) while mid-term timber supply is increased by 18,600 m^3/year (2.6%). Long-term harvest is basically unaffected with a decrease of 300 m^3/year. Total harvest is increased by 1.45 million m^3 (0.7%). Alternatively, the additional mature volume could be used to lessen the mid-term timber supply “dip” by maintaining the initial harvest level of the Base Case for Block 2 and increasing the mid-term harvest level by 27,400 m3/year (3.9%). The LTHL of this alternate schedule is only 200 m^3/year less than the Base Case LTHL and total harvest is, again, increased by 1.45 million m^3 (0.7%).

Table 89 – Block 2 Harvest levels with mature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Mature volumes increased	Difference	Alternate Mature volumes increased	Difference
1	2012	2021	864,300	894,700	+ 30,400	864,300	0
2	2022	2031	777,900	805,200	+ 27,300	789,300	+11,400
3 - 5	2032	2061	706,100	724,700	+ 18,600	733,500	+ 27,400
6	2062	2071	756,100	774,700	+ 18,600	783,500	+ 27,400
7	2072	2081	806,100	824,700	+ 18,600	833,500	+ 27,400
8 - 25	2082	2261	833,700	833,400	- 300	833,500	- 200

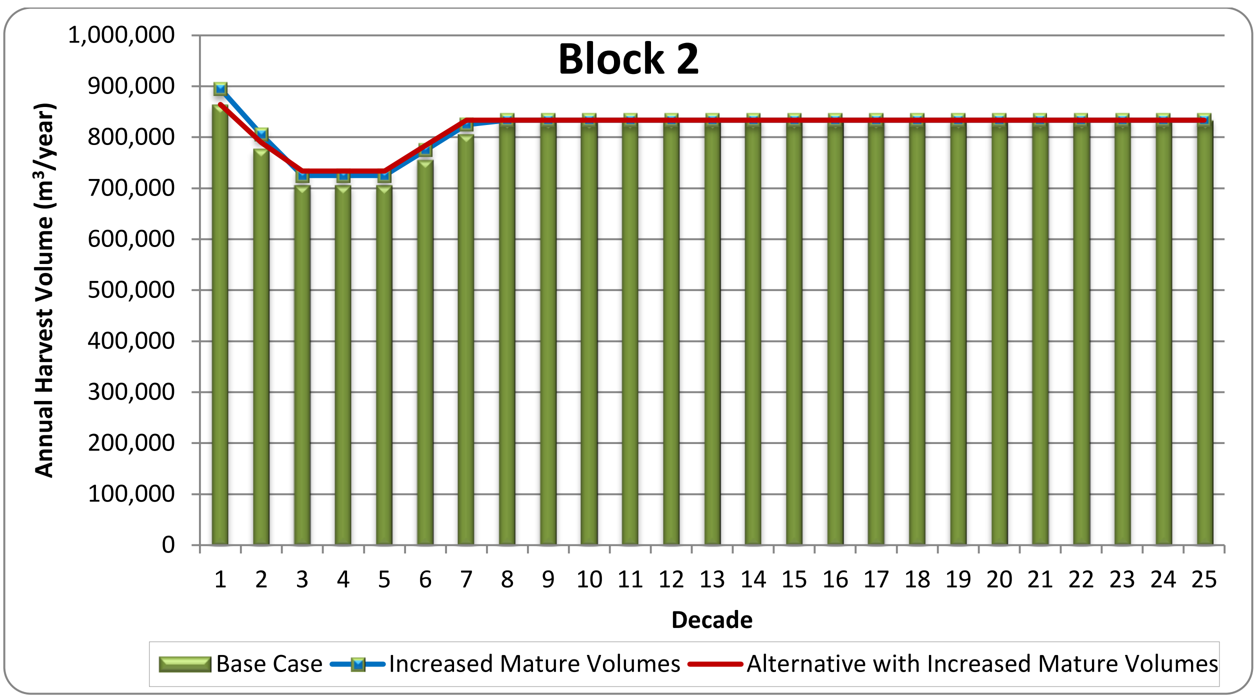

Figure 90 – Block 2 Harvest levels with mature volumes increased 10%

An increase in short-term timber supply of 6,000 m^3/year (3.0%) is possible in Block 4 when mature stands volumes are increased by 10%. Mid-term harvest is increased 1,100 m^3/year (0.5%) and long-term is decreased by 100 m^3/year. Total harvest is increased by 344,000 m^3 (0.6%).

Table 90 – Block 4 Harvest levels with mature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Mature volumes increased	Difference
1 - 4	2012	2051	197,000	203,000	+ 6,000
5	2052	2061	216,700	223,200	+ 6,500
6 -10	2062	2111	237,300	238,400	+ 1,100
11 - 25	2112	2261	249,900	249,800	- 100

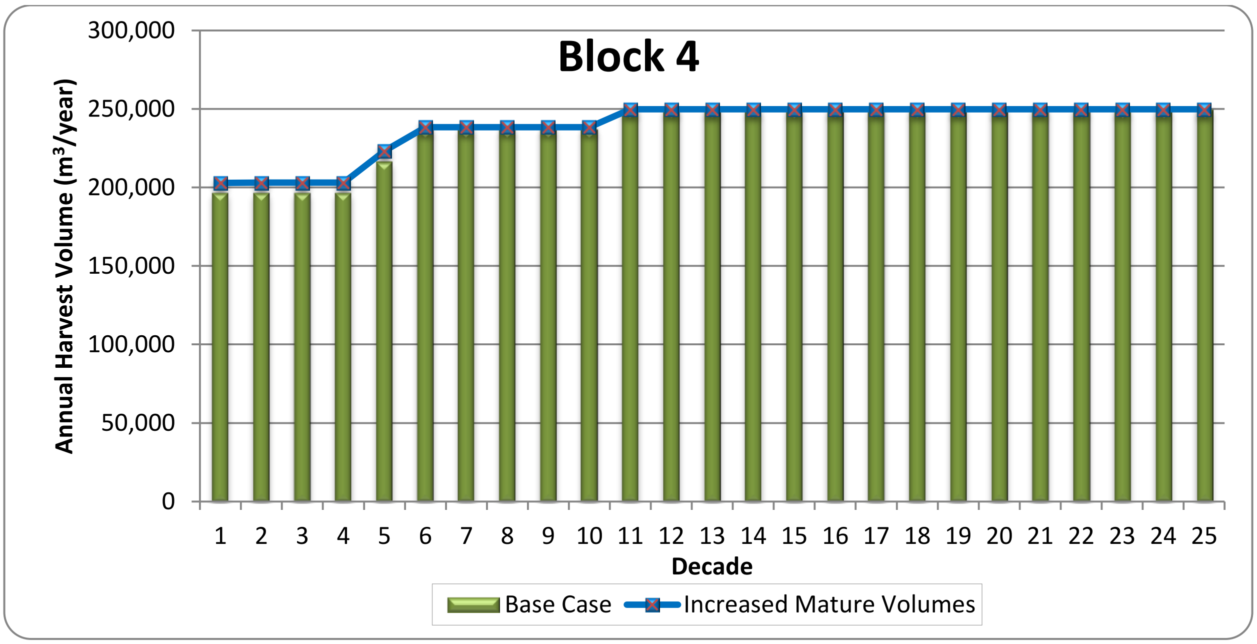

Figure 91 – Block 4 Harvest levels with mature volumes increased 10%

Increasing mature stands volumes by 10% in Blocks 3 and 5 results in 900 m^3/year (2.2%) greater short and mid-term harvest levels and no change to the long-term. Overall 63,000 m^3 (0.6%) more is harvested.

Table 91 – Block 3&5 Harvest levels with mature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Mature volumes increased	Difference
1 – 7	2012	2281	41,300	42,200	+ 900
8 - 25	2082	2261	45,000	45,000	0

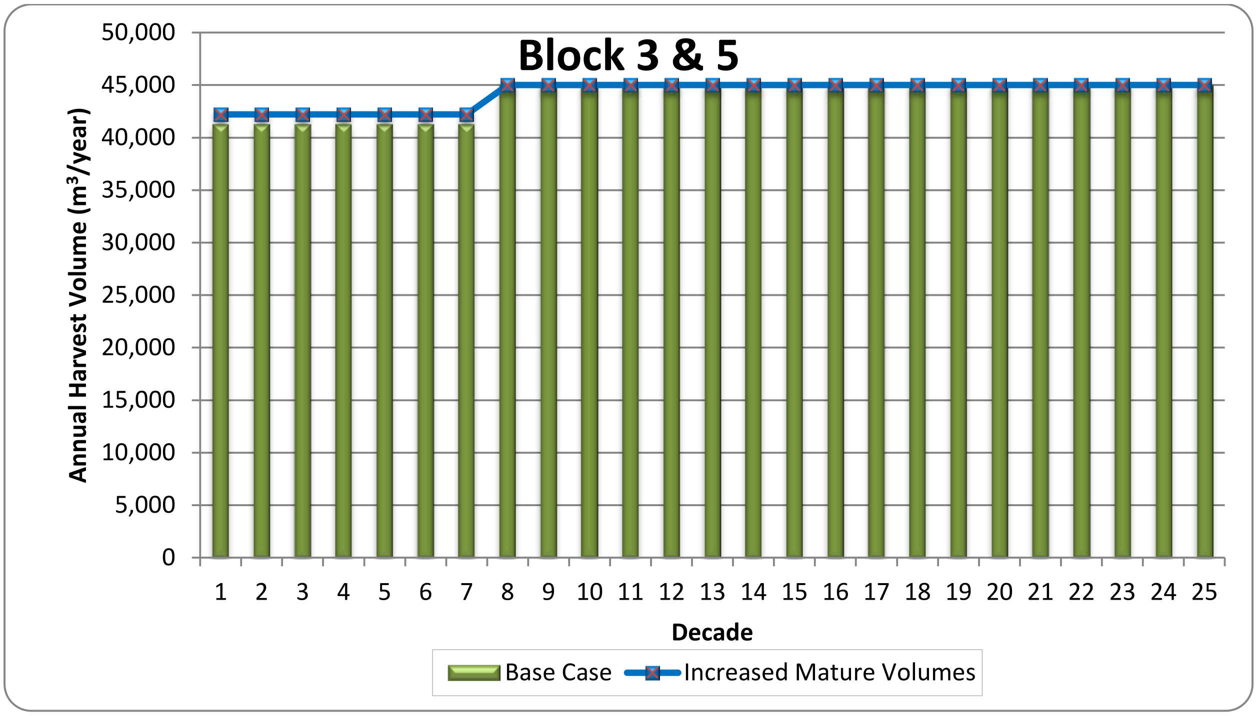

Figure 92 – Block 3&5 Harvest levels with mature volumes increased 10%

Appendix B5 – Mature Volumes Decreased by 10%

Reducing mature volumes by 10% reduces the harvest level in Block 1 by 500 m^3/year (0.1%). The impact is reduced due to the second growth harvest requirement and the constrained contribution from non-conventional stands.

Table 92 – Block 1 Harvest levels with mature volumes reduced 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Mature volumes reduced	Difference
1 - 25	2012	2261	435,300	434,800	- 500

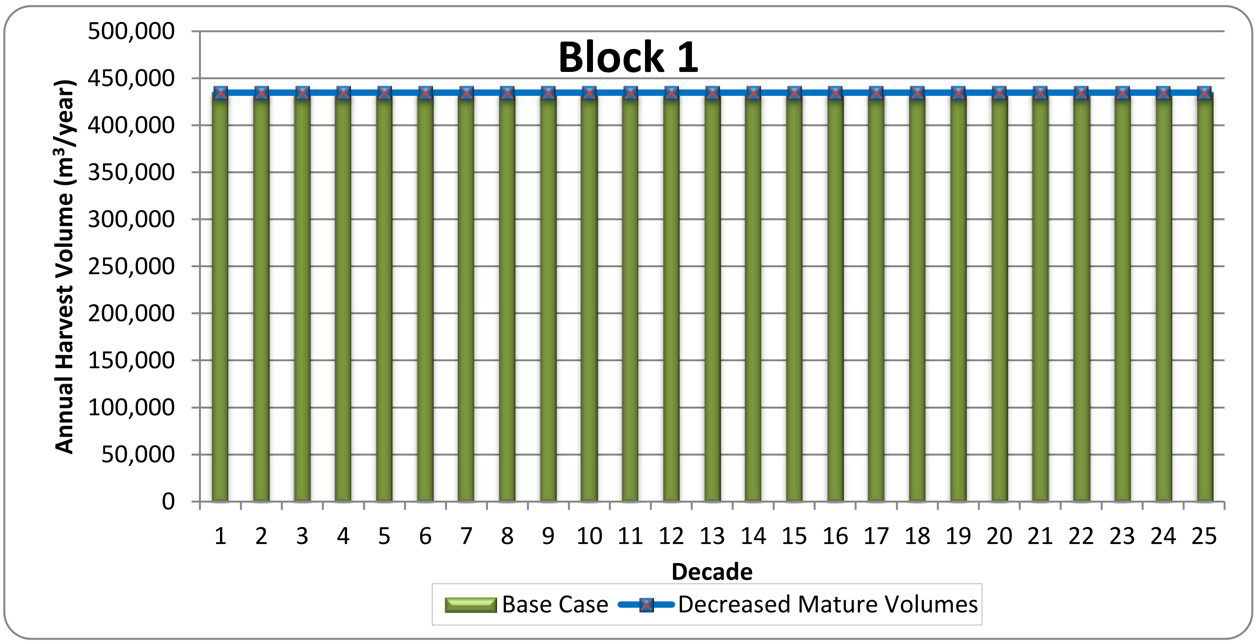

Figure 93 – Block 1 Harvest levels with mature volumes reduced 10%

Short-term timber supply from Block 2 is reduced by 5.7% when mature volumes are reduced by 10%. Mid-term supply is reduced by 1.5% and long-term is reduced by less than 0.1% (400 m^3/year). Total harvest is reduced by 1.55 million m^3 (0.8%). Instead of reducing short-term timber supply, the harvest in the first 20 years of the Base Case can be maintained by reducing the timber supply in the latter half of the mid-term and reducing the LTHL by 3,300 m^3/year (0.4%). Total harvest in this alternate schedule is 1.65 million m^3 (0.8%) less than the Base Case.

Table 93 – Block 2 Harvest levels with mature volumes reduced 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Mature volumes reduced	Difference	Alternate Mature volumes reduced	Difference
1	2012	2021	864,300	814,700	- 49,600	864,300	0
2	2022	2031	777,900	733,200	- 44,700	777,900	0
3 - 5	2032	2061	706,100	695,500	- 10,600	700,100	- 6,000
6	2062	2071	756,100	744,500	- 10,600	718,300	- 37,800
7	2072	2081	806,100	794,500	- 10,600	768,300	- 37,800
8	2082	2091	833,700	833,300	- 400	818,500	- 15,400
9 - 25	2092	2261	833,700	833,300	- 400	830,400	- 3,400

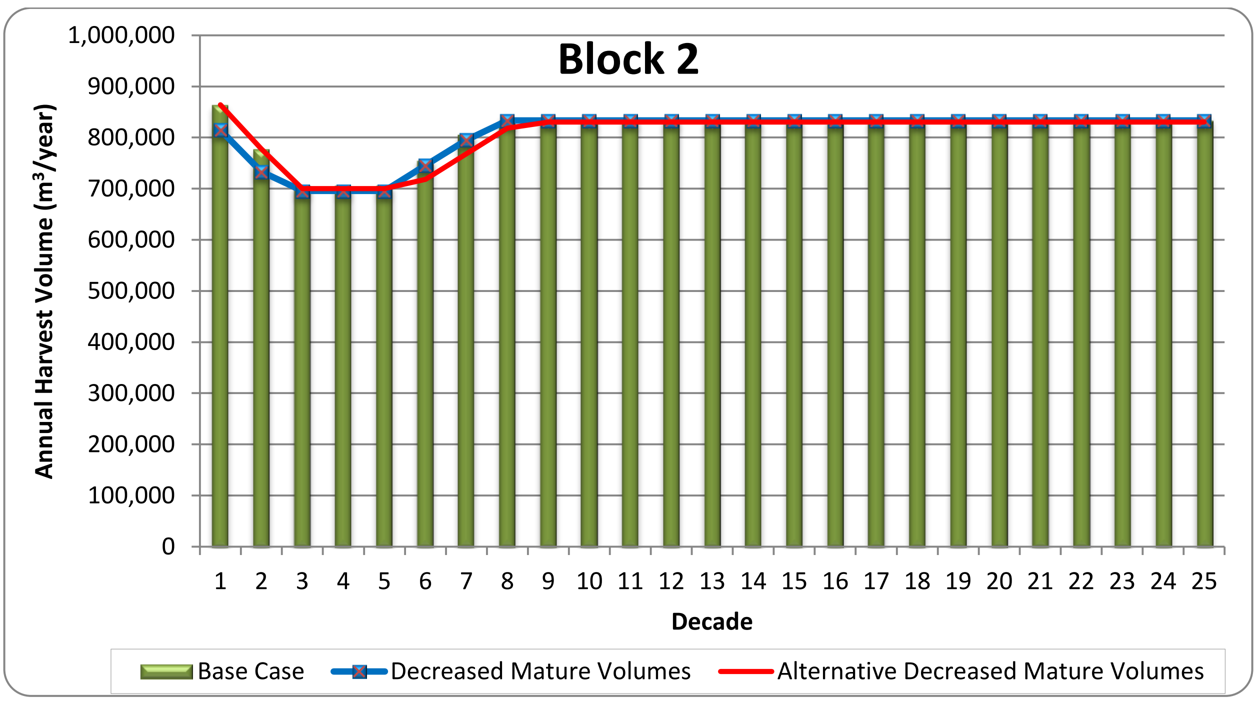

Figure 94 – Block 2 Harvest levels with mature volumes reduced 10%

Reducing volume estimates in mature stands within Block 4 by 10% results in the short-term harvest level being lessened by 5,700 m^3/year (2.9%) and mid-term harvest by 700 m^3/year (0.3%). Long-term harvest is unaffected and total harvest is reduced by 361,000 m^3 (0.6%). Alternatively, the initial harvest level of the Base Case can be achieved by delaying the transition to the mid-term harvest level by one decade with no change in the long-term harvest level or the total volume harvested.

Table 94 – Block 4 Harvest levels with mature volumes reduced 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Mature volumes reduced	Difference	Alternate Mature volumes reduced	Difference
1 - 4	2012	2051	197,000	191,300	- 5,700	197,000	0
5	2052	2061	216,700	210,500	- 6,200	199,000	- 17,700
6	2062	2071	237,300	231,500	- 5,800	218,900	- 18,400
7 - 10	2072	2111	237,300	236,600	- 700	236,900	- 400
11 - 25	2112	2261	249,900	250,000	+ 100	250,000	+ 100

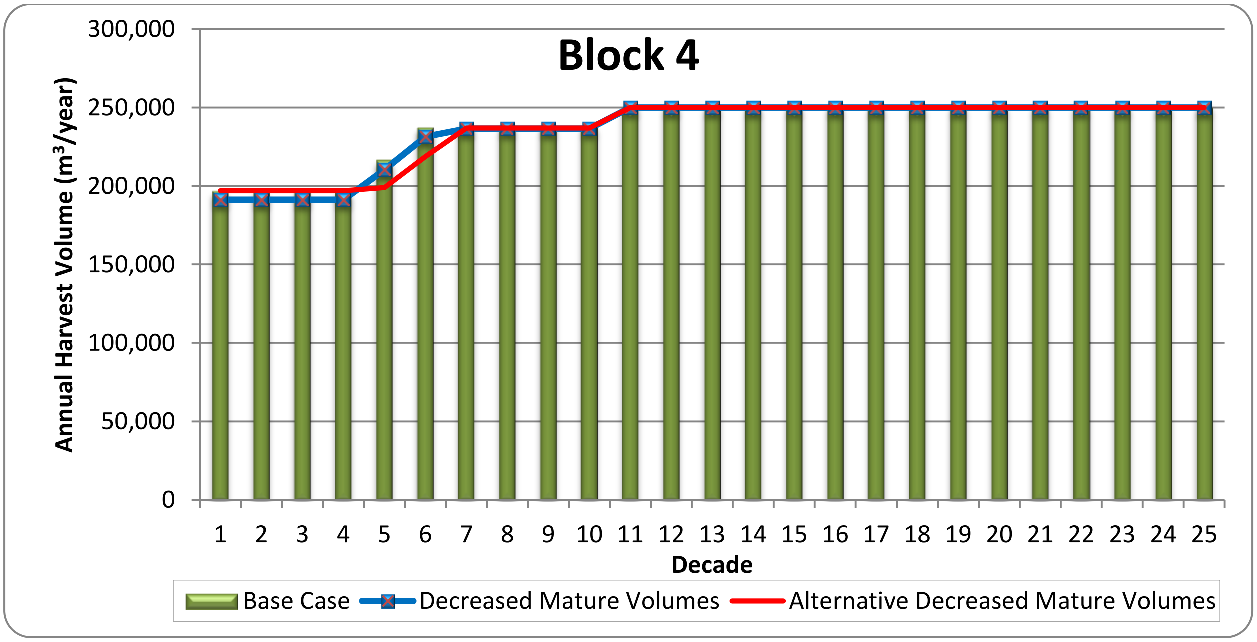

Figure 95 – Block 4 Harvest levels with mature volumes reduced 10%

Total timber supply within Blocks 3 and 5 (combined) is reduced by 56,000 m^3 (0.5%) when mature volumes are reduced by 10%. Short and mid-term harvest is reduced by 800 m^3/year (1.9%) and long-term is unaffected. An alternate schedule that maintains the initial harvest level of the Base Case is possible. This alternative reduces the balance of the short and mid-term harvest by 1,100 m^3/year (2.7%) and leaves the long-term unaffected. Total harvest is reduced by 66,000 m^3 (0.6%). These timber supply impacts are relatively minor due to the old seral requirements of EBM limiting the old forest within the THLB.

Table 95 – Block 3&5 Harvest levels with mature volumes reduced 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Mature volumes reduced	Difference	Alternate Mature volumes reduced	Difference
1	2012	2021	41,300	40,500	- 800	41,300	0
2 - 7	2022	2081	41,300	40,500	- 800	40,200	- 1,100
8 - 25	2082	2261	45,000	45,000	0	45,000	0

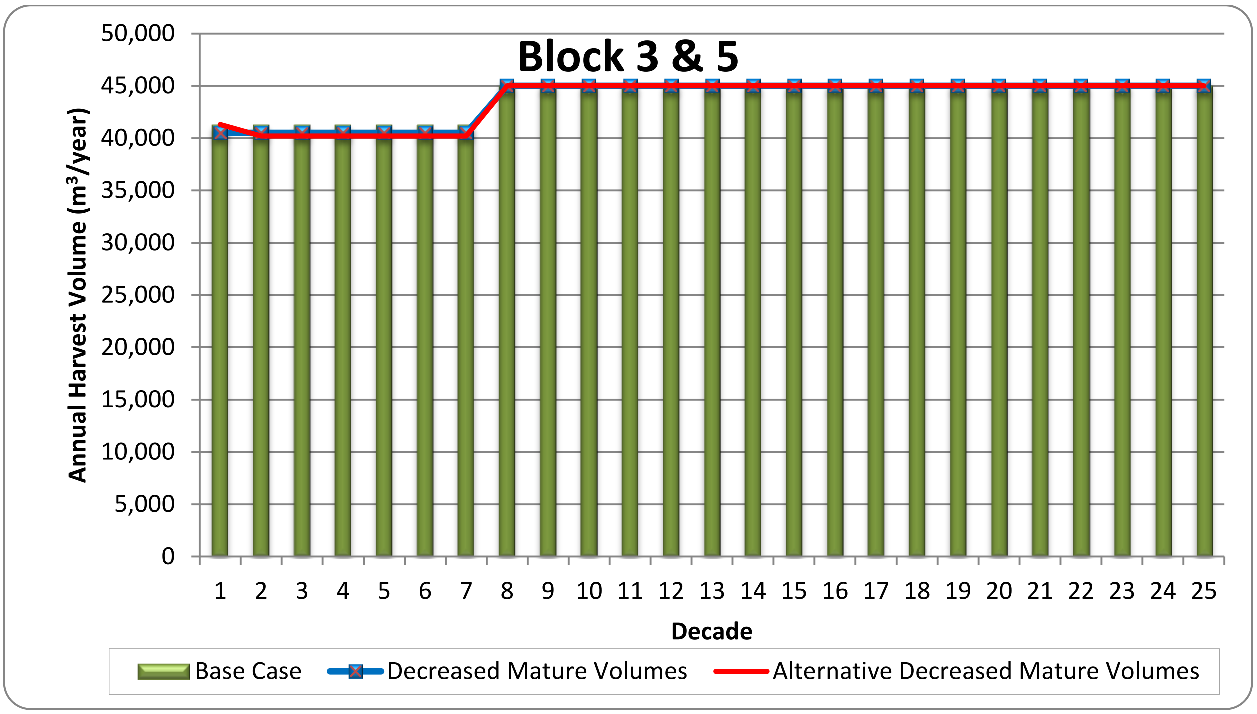

Figure 96 – Block 3&5 Harvest levels with mature volumes reduced 10%

Appendix B6 – Immature Volumes Increased by 10%

Since the Base Case for Block 1 requires that 80% of the initial harvest be sourced from immature stands (<141 years old), timber supply is sensitive to immature stands volume estimates. Increasing the volume estimates by 10% increases the harvest level by 9.0% (39,300 m^3/year).

Table 96 – Block 1 Harvest levels with immature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Immature volumes increased	Difference
1 - 25	2012	2261	435,300	474,600	+ 39,300

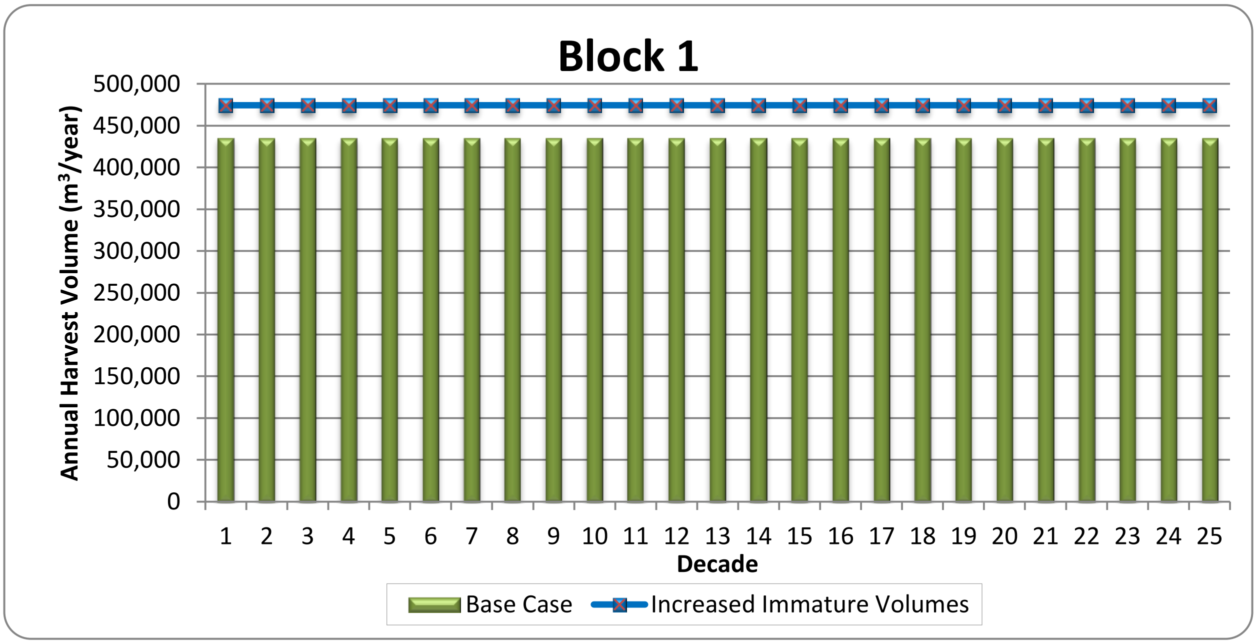

Figure 97 – Block 1 Harvest levels with immature volumes increased 10%

Higher immature yields increase short-term harvest in Block 2 by 2.9%, increase mid-term harvest by 70,100 m^3/year (average of 9.6%) and long-term by 81,600 m^3/year (9.8%). Total harvest is increased by 18.68 million m^3 (9.2%). A second schedule was developed that maintained the initial harvest level of the Base Case for Block 2 and increased mid-term timber supply by 78,700 m^3/year (average of 11%) and the long-term by 81,400 m^3/year (9.8%). Total harvest is 18.66 million m^3 (9.2%) higher. Long-term gain is not 10% in either schedule due to the constraint on non-conventional contribution partly nullifying gains within the non-conventional THLB.

Table 97 – Block 2 Harvest levels with immature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Immature volumes increased	Difference	Alternate Immature volumes increased	Difference
1	2012	2021	864,300	889,700	+ 25,400	864,300	0
2	2022	2031	777,900	800,700	+ 22,800	784,800	+ 6,900
3 - 5	2032	2061	706,100	776,200	+ 70,100	784,800	+ 78,700
6	2062	2071	756,100	826,200	+ 70,100	834,800	+ 78,700
7	2072	2081	806,100	876,200	+ 70,100	884,800	+ 78,700
8 - 25	2082	2261	833,700	915,300	+ 81,600	915,100	+ 81,400

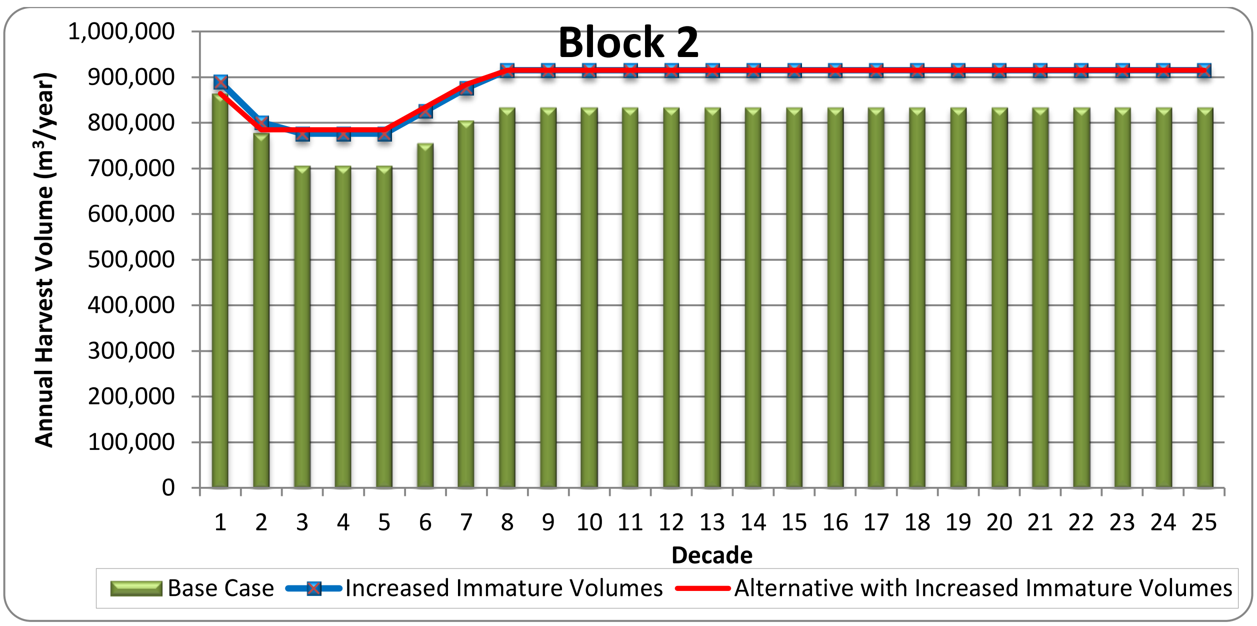

Figure 98 – Block 2 Harvest levels with immature volumes increased 10%

Increasing immature yields by 10% allows the short-term harvest in Block 4 to be 13,200 m^3/year (6.7%) higher and long-term greater by 25,300 m^3/year (10.1%). Total harvest is improved by 5.61 million m^3 (9.4%).

Table 98 – Block 4 Harvest levels with immature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Immature volumes increased	Difference
1 - 4	2012	2051	197,000	210,200	+ 13,200
5	2052	2061	216,700	231,200	+ 14,500
6	2062	2071	237,300	254,300	+ 17,000
7 - 10	2072	2111	237,300	261,600	+ 24,300
11 - 25	2112	2261	249,900	275,200	+ 25,300

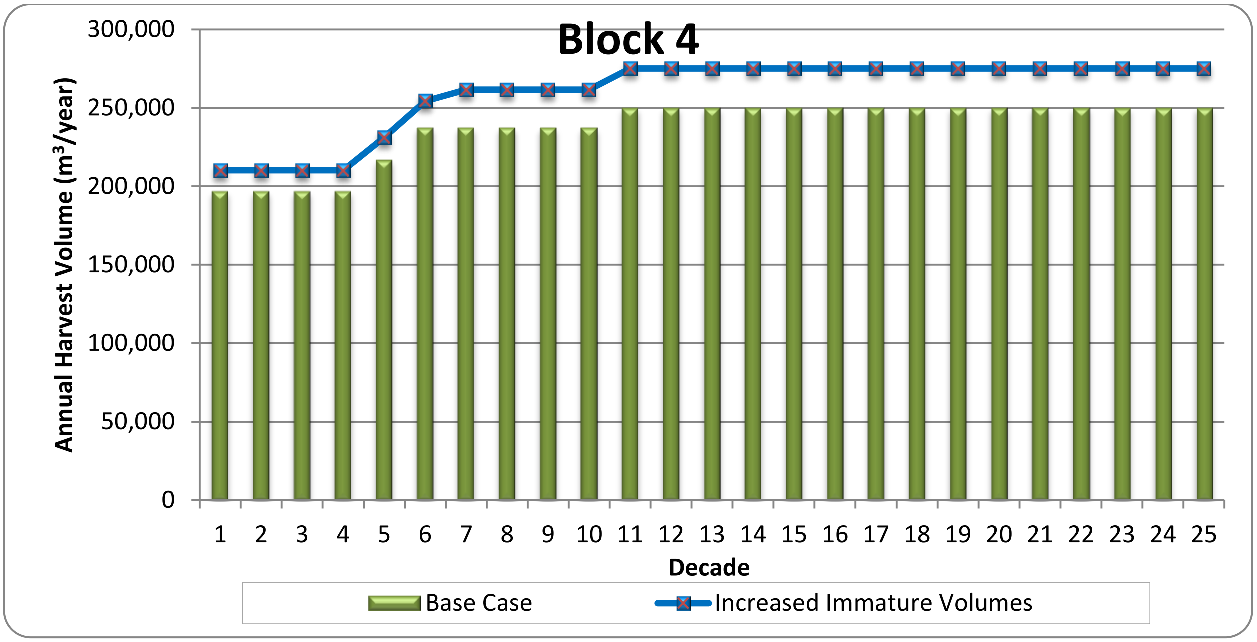

Figure 99 – Block 4 Harvest levels with immature volumes increased 10%

The short and mid-term timber supply from Block 3 and 5 combined can be increased by 2,800 m^3/year (6.8%) with immature yields increased by 10%. The long-term harvest is increased by 4,200 m^3/year (9.3%) and total harvest by 951,000 m^3 (8.7%).

Table 99 – Block 3&5 Harvest levels with immature volumes increased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Immature volumes increased	Difference
1 – 7	2012	2281	41,300	44,100	+ 2,800
8 - 25	2082	2261	45,000	49,200	+ 4,200

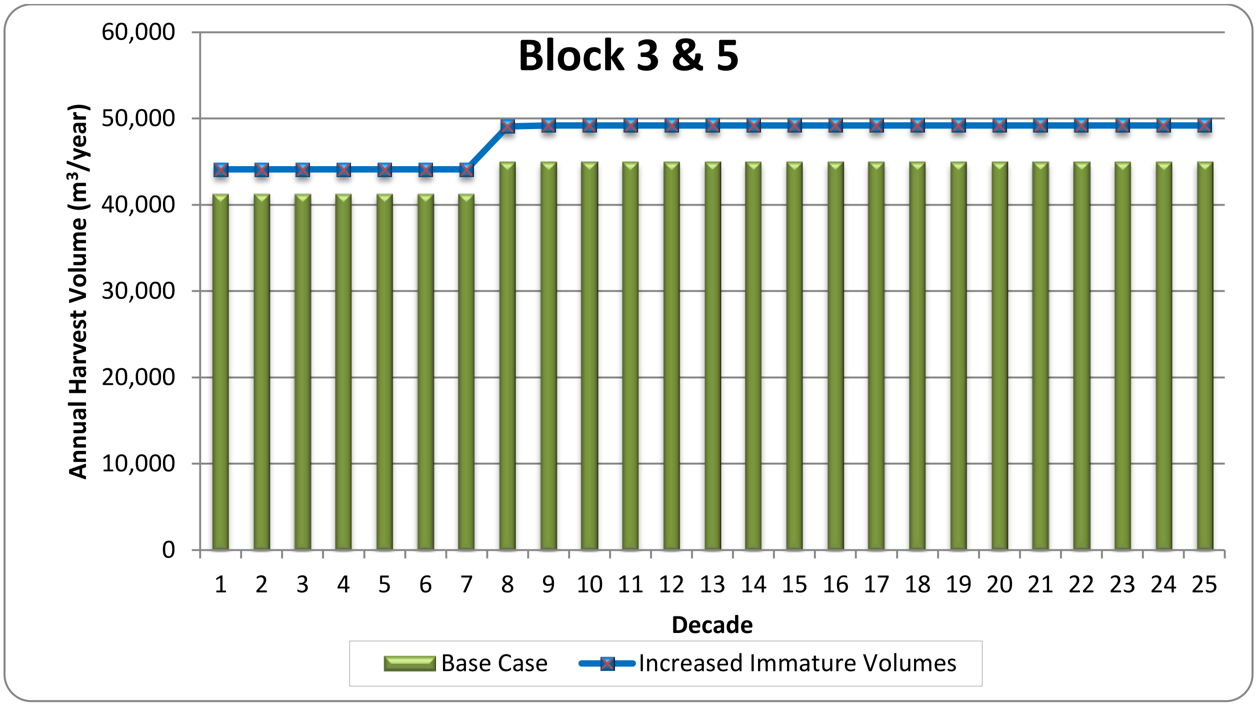

Figure 100 – Block 3&5 Harvest levels with immature volumes increased 10%

Appendix B7 – Immature Volumes Decreased by 10%

Reducing immature yields by 10% lessens timber supply from Block 1 by 39,900 m^3/year (9.2%). As the schedule is a non-declining even-flow this is also the percentage impact to total harvest (or 9.98 million m^3). Alternatively, the initial harvest level of the Base Case can be achieved for 20 years and then harvest declines to 393,000 m^3/year – a reduction of 42,300 m^3/year (9.7%). Total harvest in this alternate schedule is 9.76 million m^3 (9.0%) less than the Base Case.

Table 100 – Block 1 Harvest levels with immature volumes decreased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Immature volumes decreased	Difference	Alternate Immature volumes decreased	Difference
1 - 2	2012	2031	435,300	395,400	- 39,900	435,300	0
3 - 25	2032	2261	435,300	395,400	- 39,900	392,400	- 42,900

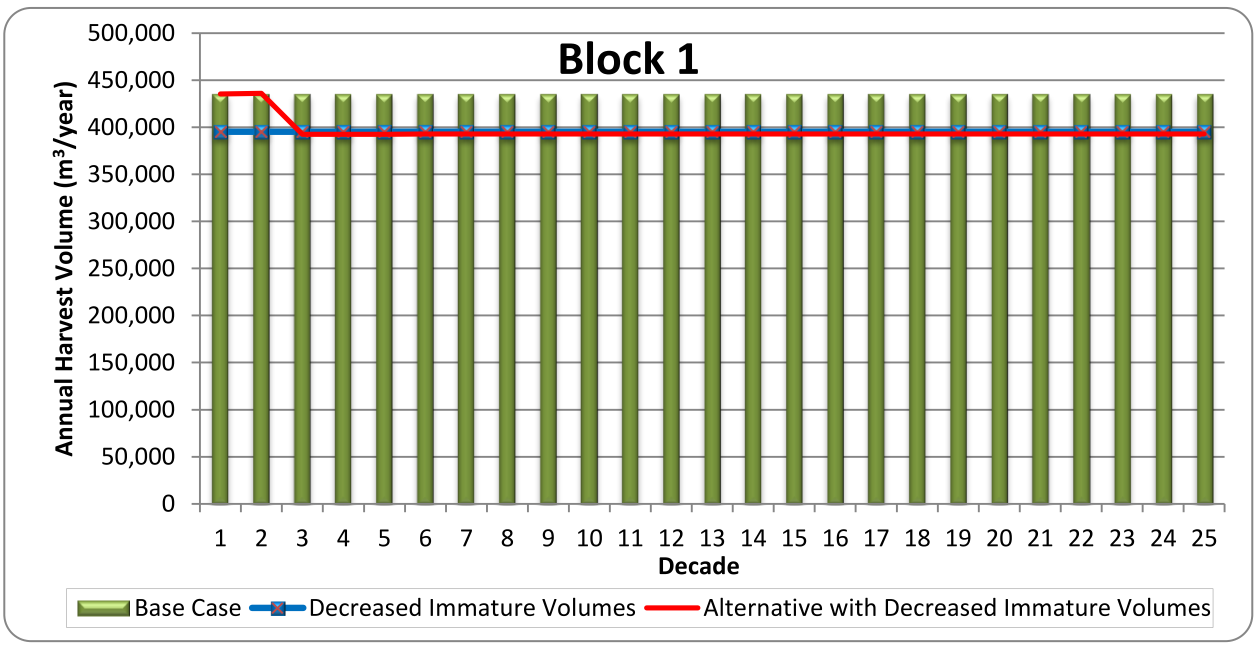

Figure 101 – Block 1 Harvest levels with immature volumes decreased 10%

Lower immature yields decrease short-term harvest in Block 2 by 6.6%, decrease mid-term harvest by 52,400 m^3/year (average of 7.3%) and long-term by 86,000 m^3/year (10.3%). Total harvest is decreased by 19.25 million m^3 (9.5%). A second schedule was developed that maintained the initial harvest level of the Base Case for Block 2, increased the lowest harvest level by 46,400 m^3/year (7.1%) but extended the length of time the lowest harvest level applied by 50 years and decreased the long-term by a further 7,800 m^3/year (1.0%). Total harvest is 18.82 million m^3 (9.7%) less. Long-term loss is slightly greater than 10% due to maintaining higher short and mid-term harvest levels (when natural and current managed second growth stands contribute the largest proportion of timber supply) causing a further reduction to long-term growing stock.

Table 101 – Block 2 Harvest levels with immature volumes decreased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Immature volumes decreased	Difference	Alternate Immature volumes decreased	Difference
1	2012	2021	864,300	807,100	- 57,200	864,300	0
2	2022	2031	777,900	726,400	- 51,500	777,900	0
3 - 5	2032	2061	706,100	653,700	- 52,400	700,100	- 6,000
6	2062	2071	756,100	703,700	- 58,400	700,100	- 56,000
7	2072	2081	806,100	747,700	- 86,000	700,100	- 106,000
8 - 9	2082	2101	833,700	747,700	- 86,000	700,100	- 133,600
10	2102	2111	833,700	747,700	- 86,000	706,400	- 127,300
11 - 25	2112	2261	833,700	747,700	- 86,000	739,900	- 93,800

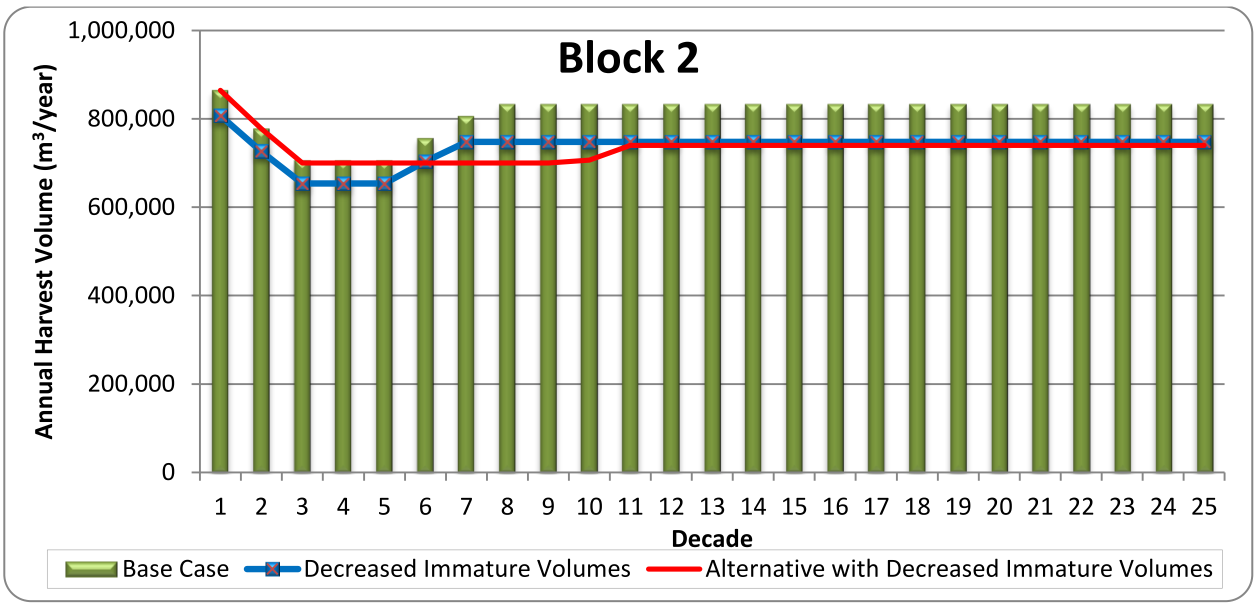

Figure 102 – Block 2 Harvest levels with immature volumes decreased 10%

Decreasing immature yields by 10% reduces the short-term harvest in Block 4 by 12,200 m^3/year (6.2%), mid-term harvest by 23,500 m^3/year (9.9%) and long-term by 25,700 m^3/year (10.3%). Total harvest is decreased by 5.65 million m^3 (9.5%). Maintaining the initial harvest level of the Base Case for Block 4 is feasible by extending the length of time it applies by 20 years, thus reducing mid-term timber supply, and reducing the mid-term harvest level by 30,300 m^3/year (12.8%). In this schedule, the long-term harvest level is 25,600 m^3/year (10.2%) less than the Base Case and total harvest is 5.65 million m^3 (9.5%) lower. Like Block 2, long-term harvest is decreased by more than 10% as a result of lowered growing stock levels resulting from relatively higher short-term harvest.

Table 102 – Block 4 Harvest levels with immature volumes decreased 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Immature volumes reduced	Difference	Alternate Immature volumes reduced	Difference
1 - 4	2012	2051	197,000	184,800	- 12,200	197,000	0
5	2052	2061	216,700	203,200	- 13,500	197,000	- 19,700
6	2062	2071	237,300	213,800	- 23,500	197,000	- 40,300
7 - 10	2072	2111	237,300	213,800	- 23,500	207,000	- 30,300
11 - 25	2112	2261	249,900	224,200	- 25,700	224,300	- 25,600

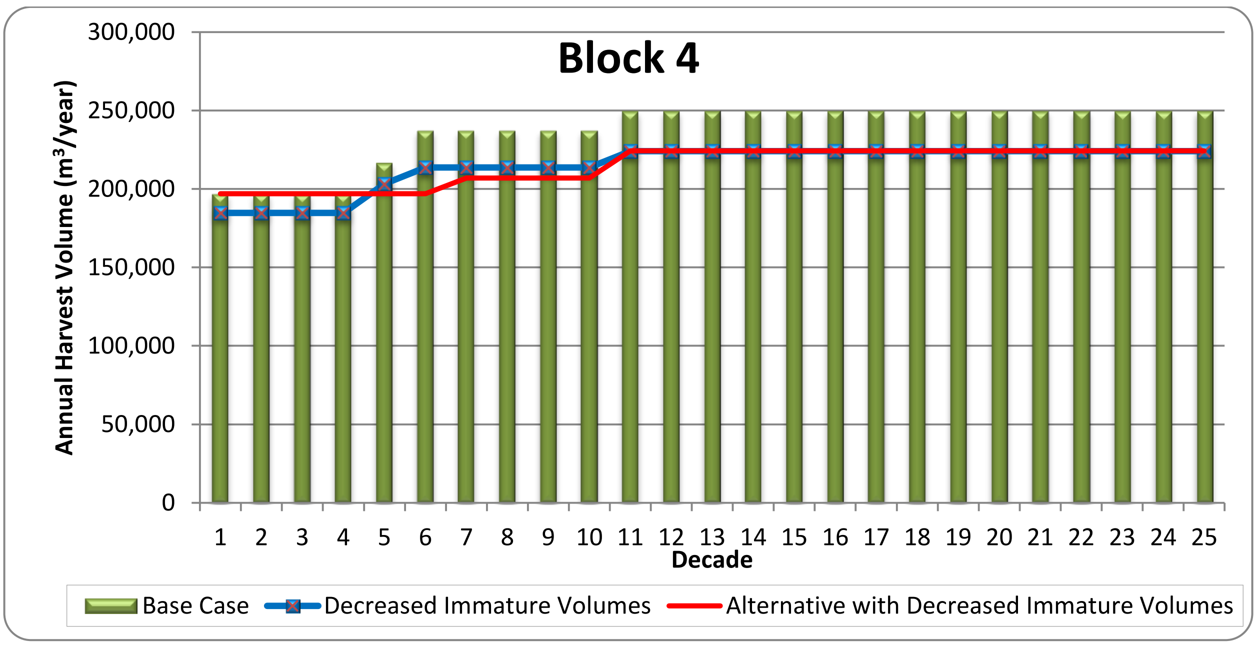

Figure 103 – Block 4 Harvest levels with immature volumes decreased 10%

Short and mid-term harvest from Blocks 3 and 5 is reduced by 2,700 m^3/year (6.5%) when immature yields area reduced by 10%. Long-term is reduced by 4,300 m^3/year (9.6%) and total volume harvested is 963,000 m^3 less. Alternatively, the initial harvest level of the Base Case can be achieved if mid-term timber supply is reduced by 3,700 m3/year (9.0%). This alternate schedule achieves a LTHL of 40,800 m^3/year – a reduction of 4,200 m^3/year (9.3%) from the Base Case – and a total harvest 978,000 m^3 (8.9%) less than the Base Case.

Table 103 – Block 3&5 Harvest levels with immature volumes reduced 10%

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Immature volumes reduced	Difference	Alternate Immature volumes reduced	Difference
1	2012	2021	41,300	38,600	- 2,700	41,300	0
2 - 7	2022	2081	41,300	38,600	- 2,700	37,600	- 3,700
8 - 25	2082	2261	45,000	40,700	- 4,300	40,800	- 4,200

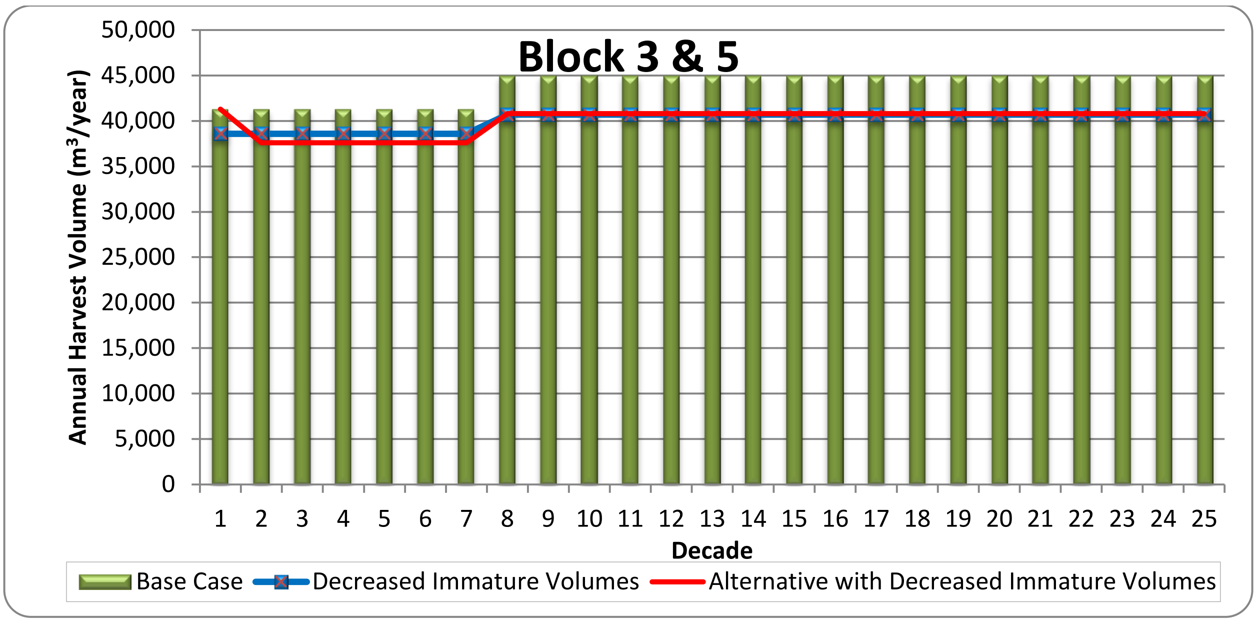

Figure 104 – Block 3&5 Harvest levels with immature volumes decreased 10%

Appendix B8 – Use SIBEC Site Index Estimates

Using SIBEC site index estimates based on the TFL 39 terrestrial ecosystem mapping (TEM) increases the Block 1 THLB growing stock by 1.5 million m^3 (6.7%) of which 0.9 million m^3 is within the areas "locked" to address green-up and adjacency in the opening forest conditions. The net gain of 0.6 million m^3 (2.7%) includes volume within the constrained non-conventional landbase. After accounting for all these constraints there is not enough additional operable inventory to increase timber supply so harvest level is unchanged.

Table 104 – Block 1 Harvest levels with SIBEC-based yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	SIBEC-based yields	Difference
1 - 25	2012	2261	435,300	435,300	0

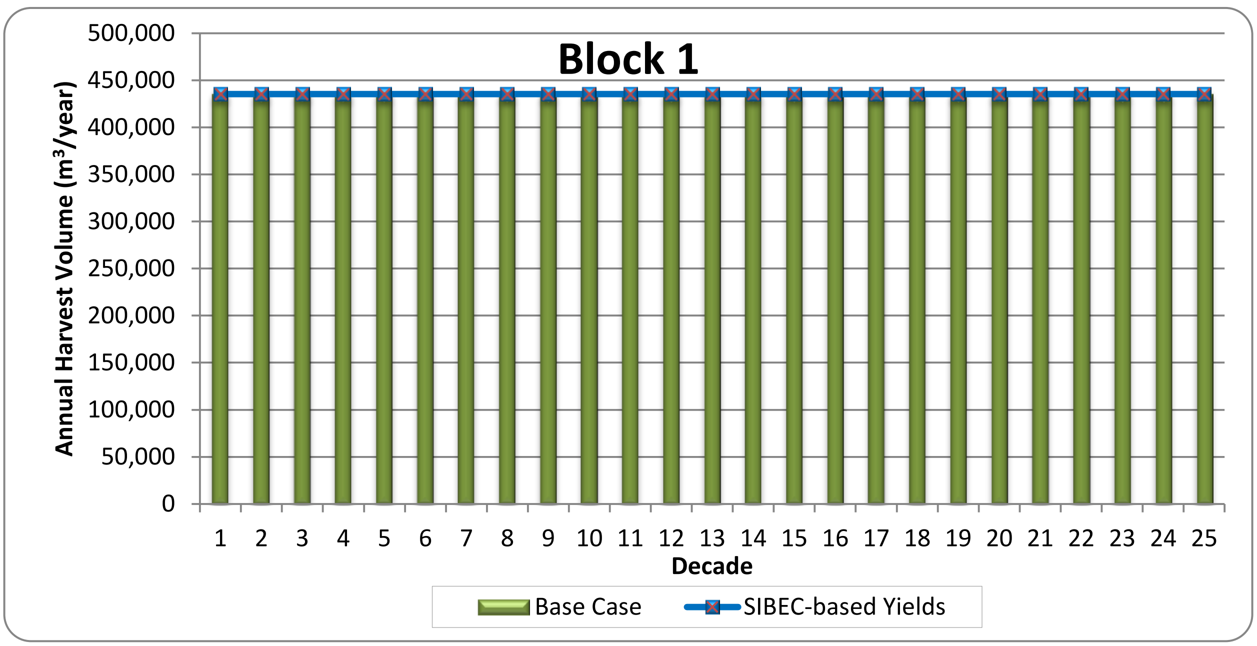

Figure 105 – Block 1 Harvest levels with SIBEC-based yields

Applying SIBEC within Block 2 increases the THLB growing stock by 203,400 m^3 (0.6%); however, "available" inventory (meets minimum harvest criteria) is reduced by 83,700 m^3 (0.4%). Yields from managed second growth is improved by about 5% allowing mid and long-term harvest levels to increase by about 8% and 4% respectively. Total volume is maximized (8.33 million m^3 (4.1%) more than in Base Case) by reducing the initial harvest level by 34,000 m^3/year (3.9%). Alternatively the initial harvest level from the Base Case can be maintained by reducing mid-term timber supply gains to about 7% (rather than 8%), with no impact to long-term harvest. Total volume harvested in this alternate schedule is 8.32 million m^3 (4.1%) more than the Base Case.

Table 105 – Block 2 Harvest levels with SIBEC-based yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	SIBEC-based yields	Difference	Alternate SIBEC-based yields	Difference
1	2012	2021	864,300	830,300	- 34,000	864,300	0
2	2022	2031	777,900	763,900	- 14,000	777,900	0
3 - 5	2032	2061	706,100	763,900	+ 57,800	754,700	+ 48,600
6	2062	2071	756,100	813,900	+ 57,800	804,700	+ 48,600
7	2072	2081	806,100	863,900	+ 57,800	854,700	+ 48,600
8 - 25	2082	2261	833,700	866,600	+ 32,900	866,400	+ 32,700

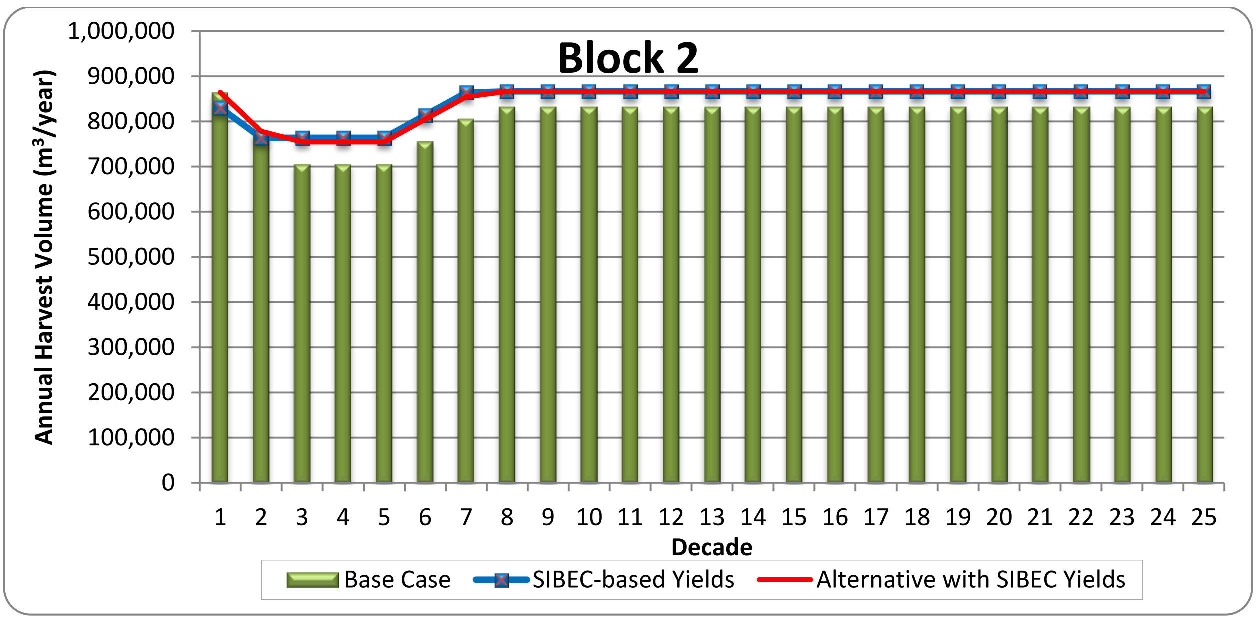

Figure 106 – Block 2 Harvest levels with SIBEC-based yields

Applying SIBEC within Block 4 decreases the initial THLB growing stock by 101,700 m^3 (1.1%); however, “available” inventory is increased by 272,000 m^3 (6.3%). The increase in “available” inventory allows the transition to a slightly reduced (300 m^3/year lower (0.1%)) mid-term harvest level to occur 10 years earlier than in the Base Case. Long-term harvest is increased by 6,500 m^3/year and total harvest is 1.19 million m^3 higher.

Table 106 – Block 4 Harvest levels with SIBEC-based yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	SIBEC-based yields	Difference
1 - 3	2012	2041	197,000	197,000	0
4	2042	2051	197,000	207,900	+ 10,900
5	2052	2061	216,700	228,700	+ 12,000
6 - 10	2062	2111	237,300	237,000	- 300
11 - 25	2112	2261	249,900	256,400	+ 6,500

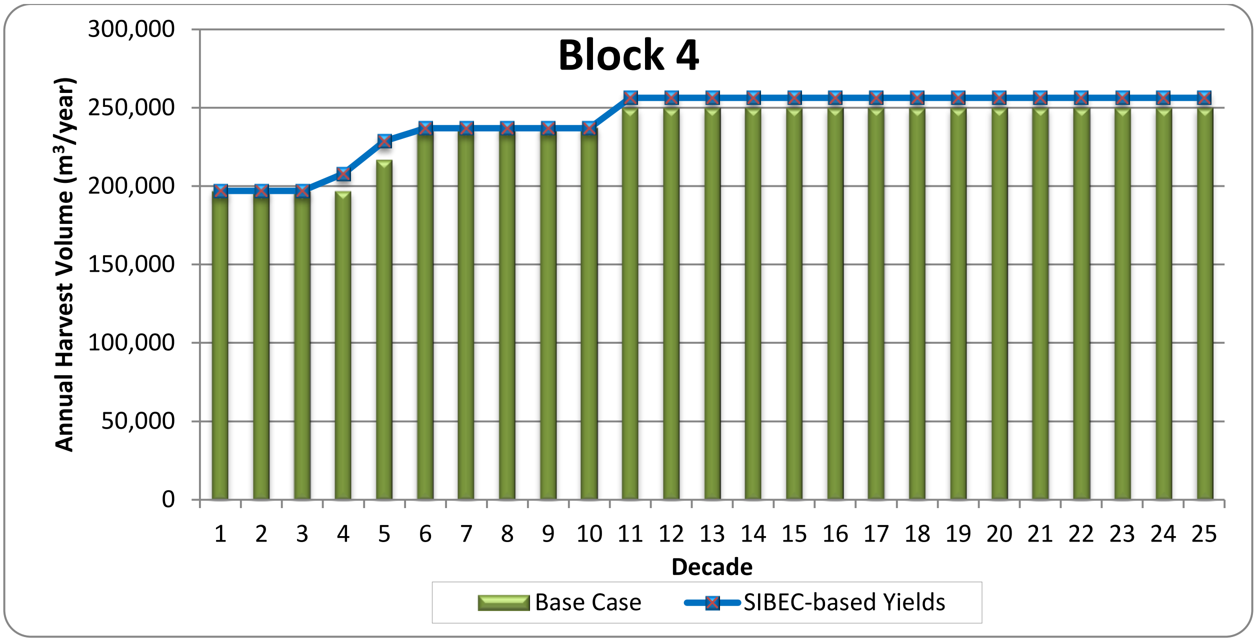

Figure 107 – Block 4 Harvest levels with SIBEC-based yields

Using SIBEC estimates in Blocks 3 and 5 reduces the opening THLB growing stock by 182,200 m^3 (9.7%) and the “available” growing stock by 221,300 m^3 (17.2%). The reduced inventory lowers short and mid-term timber supply by 4,000 m^3/year (9.7%) and long-term supply by 1,300 m^3/year (2.9%). The long-term impact is mitigated by the reduced short and mid-term harvest and total harvest is 528,000 m3 (4.8%) less than the Base Case.

It is possible to devise a schedule that achieves the same initial harvest level as the Base Case. This schedule requires mid-term timber supply to be 6,200 m^3/year (15%) less than the Base Case and achieves the same LTHL as the schedule discussed above. Total harvest is 604,000 m^3 (5.5%) lower than the Base Case.

Table 107 – Block 3&5 Harvest levels with SIBEC-based yields

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	SIBEC-based yields	Difference	Alternate SIBEC-based yields	Difference
1	2012	2021	41,300	37,300	- 4,000	41,300	0
2	2022	**2031**	41,300	37,300	- 4,000	37,200	- 4,100
3 - 7	2032	2081	41,300	37,300	- 4,000	35,100	- 6,200
8	2082	2091	45,000	42,300	- 2,700	40,100	- 4,900
9 - 25	2092	2261	45,000	43,700	- 1,300	43,800	- 1,200

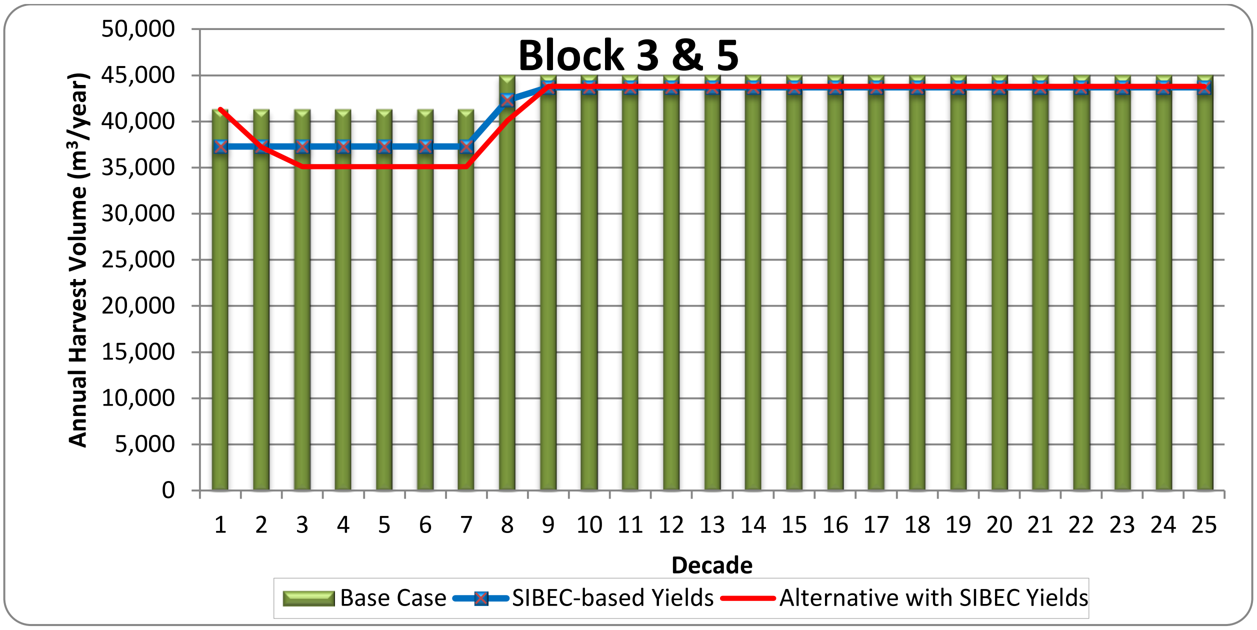

Figure 108 – Block 3&5 Harvest levels with SIBEC-based yields

Appendix B9 – Increased OAF2 for Unmanaged Immature Stands

Short and mid-term timber supply from Block 1 is dependent on contribution from stands currently aged between 51 and 140 years as roughly 60% of the THLB volume is in this age group (refer to Appendix B of the Information Package). Increasing OAF2 by 10% for these stands reduces the total THLB volume by 1.58 million m^3 (7.1%) and the available growing stock by 880,000 m^3 (7.7%). The reduced operable inventory drives short and mid-term harvest levels to be reduced by 20,400 m^3/year (4.7%) and long-term by 9,200 m3/year (2.1%). Total volume harvested is lowered by 2.97 million m^3 (2.7%). Alternatively, the initial harvest level of the Base Case can be achieved by reducing mid-term timber supply by 24,500 m^3/year (5.6%). Long-term harvest is 9,000 m^3/year (2.1%) lower in this alternate schedule and total harvest is reduced by 2.94 million m^3 (2.7%).

Table 108 – Block 1 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased OAF2	Difference	Alternate Increased OAF2	Difference
1	2012	2021	435,300	414,900	- 20,400	435,300	0
2 - 7	2022	2081	435,300	414,900	- 20,400	410,800	- 24,500
8 - 25	2082	2261	435,300	426,100	- 9,200	426,300	- 9,000

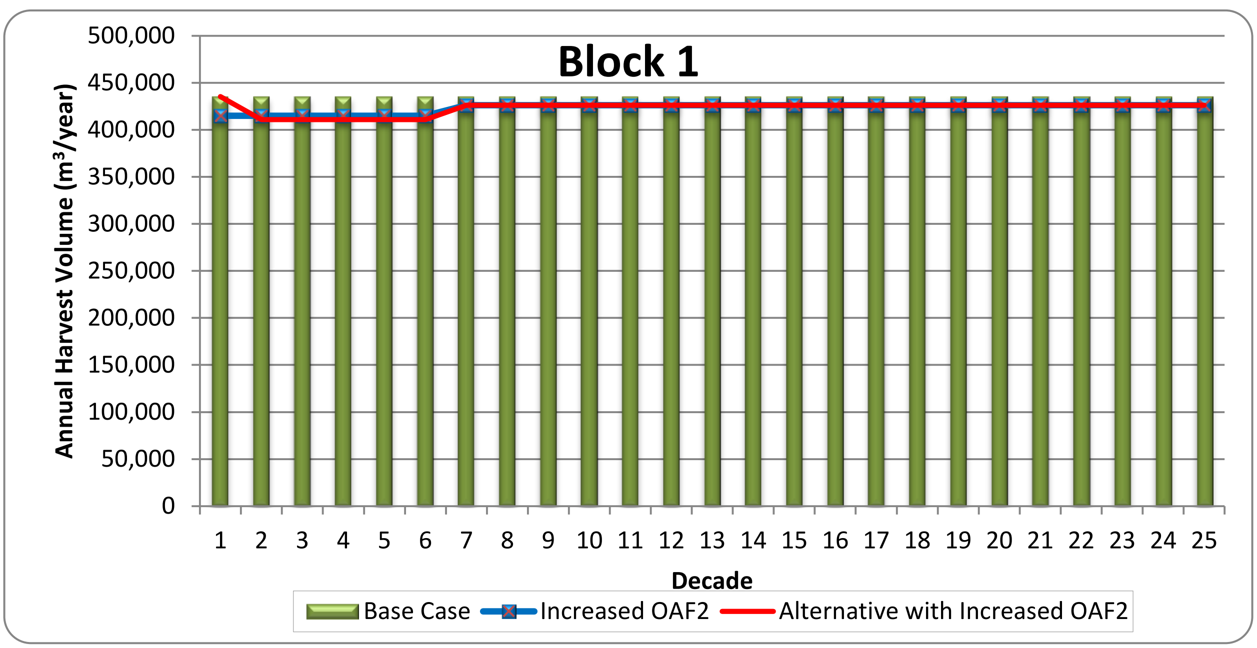

Figure 109 – Block 1 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Block 2 timber supply is less dependent on the 51-140 age group so increasing OAF2 by 10% for these stands has a minor timber supply impact. Harvest levels for the first 20 years are unchanged, reduced by 6,000 m^3/year (0.8%) for the next 50 years and reduced by 6,900 m^3/year

(0.8%) thereafter. Total harvest is reduced by 1.54 million m^3 (0.8%).

Table 109 – Block 2 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Increased OAF2	Difference
1	2012	2021	864,300	864,300	0
2	2022	2031	777,900	777,900	0
3 - 5	2032	2061	706,100	700,100	- 6,000
6	2062	2071	756,100	750,100	- 6,000
7	2072	2081	806,100	800,100	- 6,000
8 - 25	2082	2261	833,700	826,800	- 6,900

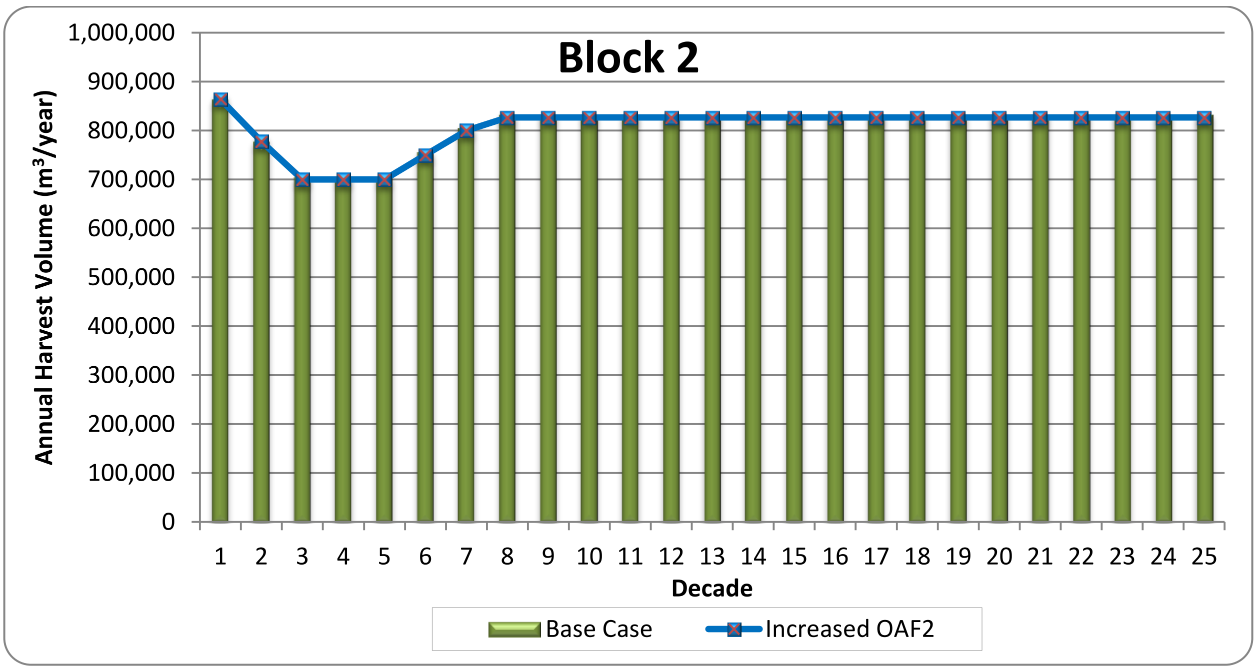

Figure 110 – Block 2 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Increasing OAF2 by 10% for 51-140 year old stands decreases Block 4 timber supply in Decade 5 and 6 by 11,300 m^3/year (~ 5%), in Decades 7 – 10 by 700 m^3/year (0.3%) and LTHL by 200 m^3/year (0.1%). Total harvest is reduced by 284,000 m^3 (0.5%). Short-term harvest is unchanged.

Table 110 - Block 4 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Increased OAF2	Difference
1 - 4	2012	2051	197,000	197,000	0
5	2052	2061	216,700	205,400	- 11,300
6	2062	2071	237,300	226,000	- 11,300
7 - 10	2072	2111	237,300	236,600	- 700
11 - 25	2112	2261	249,900	249,700	- 200

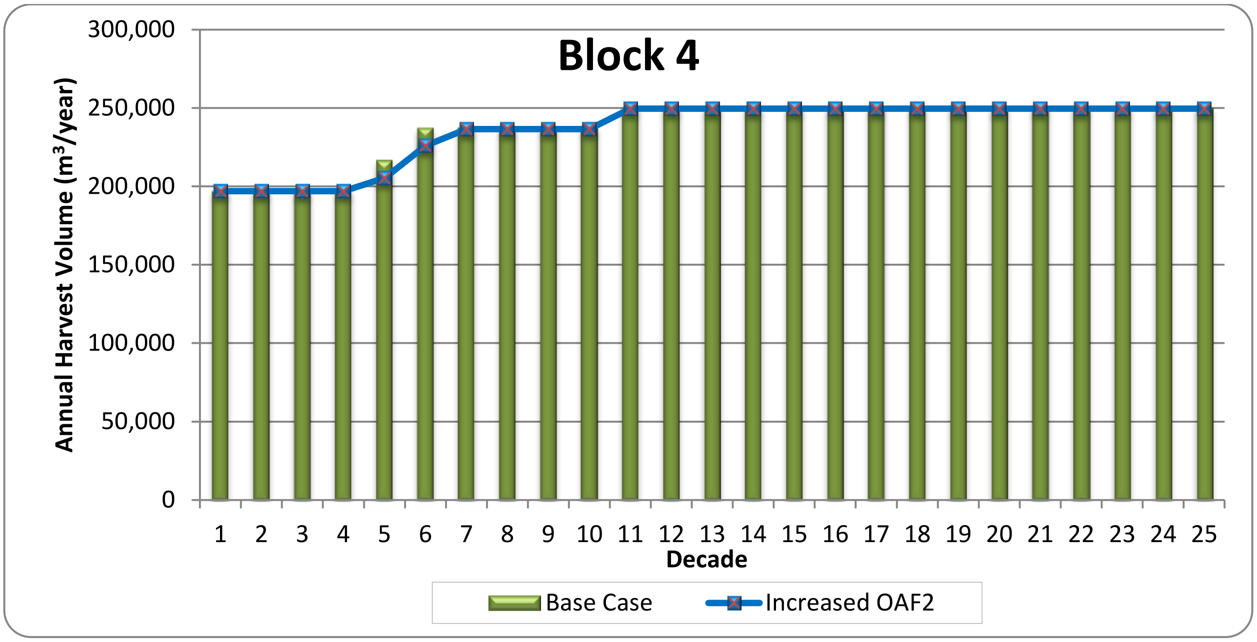

Figure 111 – Block 4 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Short and mid-term timber supply from Block 3 and 5 (combined) is reduced by 1,400 m^3/year (3.4%) when OAF2 for 51-140 year old stands is increased by 10%. Long-term harvest is decreased by 100 m^3/year (0.2%) and total harvest is lowered by 116,000 m^3 (1.1%). It is possible to achieve the initial harvest of the Base Case by reducing mid-term harvest by 1,900 m^3/year (4.6%). Long-term harvest is again 100 m^3/year lower and total harvest is 137,000 m^3 (1.2%) less.

Table 111 – Block 3&5 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased OAF2	Difference	Alternate Increased OAF2	Difference
1	2012	2021	41,300	39,900	- 1,400	41,300	0
2 - 7	2022	2081	41,300	39,900	- 1,400	39,400	- 1,900
8	2082	2091	45,000	44,900	- 100	44,400	- 600
9 - 25	2092	2261	45,000	44,900	- 100	43,000	- 100

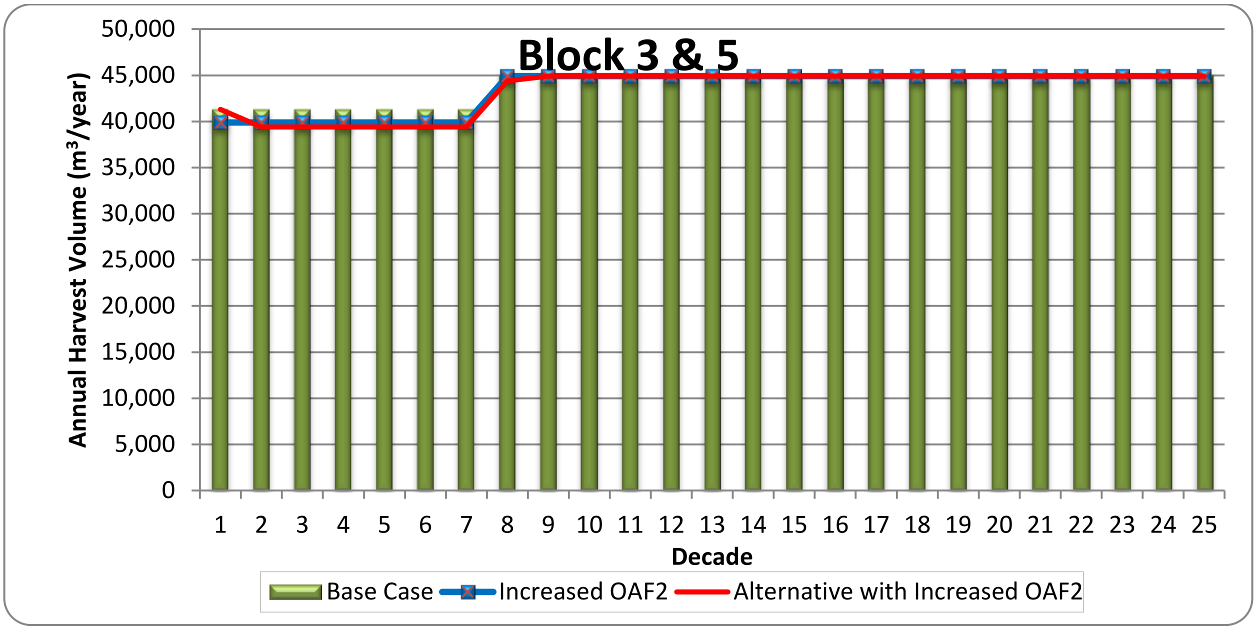

Figure 112 – Block 3&5 Harvest levels with Increased OAF2 for Unmanaged Immature Stands

Appendix B10 – No Future Genetic Gain (Worth)

Eliminating yield gains due to genetic worth values applied to all future stands reduces timber supply from Block 1 by 20,700 m^3/year (4.8%) beginning in the sixth decade. Total harvest is reduced by 4.14 million m^3 (3.8%).

Table 112 – Block 1 Harvest levels with no Future Genetic Worth

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1 - 5	2012	2061	435,300	435,300	0
6 - 25	2062	2261	435,300	414,600	- 20,700

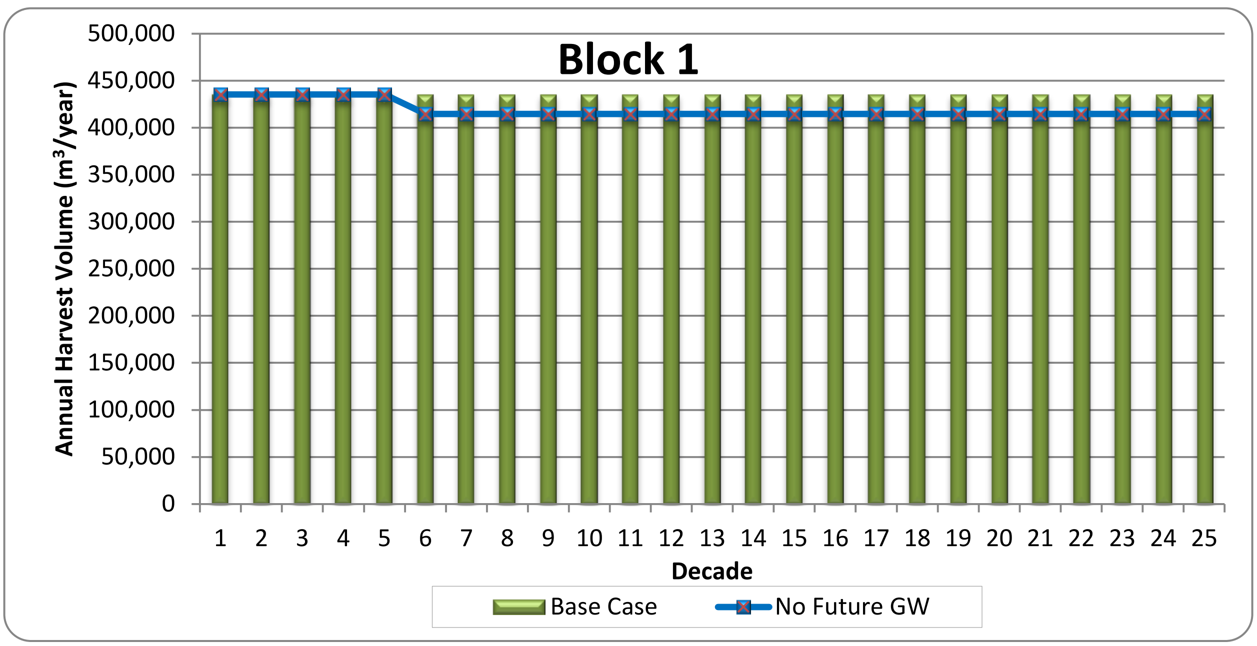

Figure 113 – Block 1 Harvest levels with no Future Genetic Worth

Eliminating genetic gain from future stands within Block 2 reduces the LTHL by 19,900 m^3/year (2.4%). The transition to this lower LTHL begins in Decades 3 – 5 when harvest is 6,000 m^3/year (0.8%) lower. Total harvest is 4.25 million m^3 (2.1%) less.

Table 113 – Block 2 Harvest levels with no Future Genetic Worth

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1	2012	2021	864,300	864,300	0
2	2022	2031	777,900	777,900	0
3 - 5	2032	2061	706,100	700,100	- 6,000
6	2062	2071	756,100	731,800	- 24,300
7	2072	2081	806,100	781,800	- 24,300
8 - 25	2082	2261	833,700	813,800	- 9,000

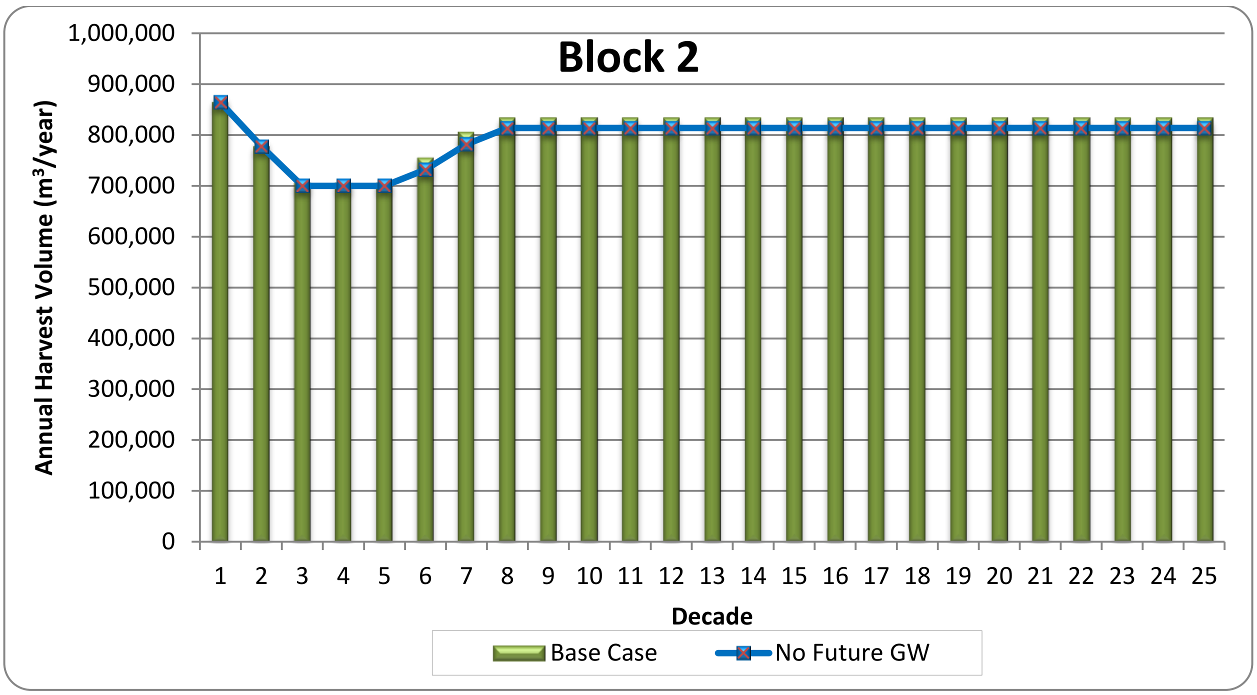

Figure 114 – Block 2 Harvest levels with no Future Genetic Worth

Short-term harvest within Block 4 is unaffected by assuming no genetic gain in future stands. Mid-term harvest levels are reduced by 11,400 m^3/year (4.8%) due to less THLB growing stock. The reduced mid-term harvest allows the long-term harvest to somewhat recover such that it is lower by 9,000 m^3/year (3.6%). Total harvest is 2.03 million m^3 (3.4%) less.

Table 114 - Block 4 Harvest levels with no Future Genetic Worth

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1 - 4	2012	2051	197,000	197,000	0
5	2052	2061	216,700	205,400	- 11,300
6 - 10	2062	2111	237,300	225,900	- 11,400
11 - 25	2112	2261	249,900	240,900	- 9,000

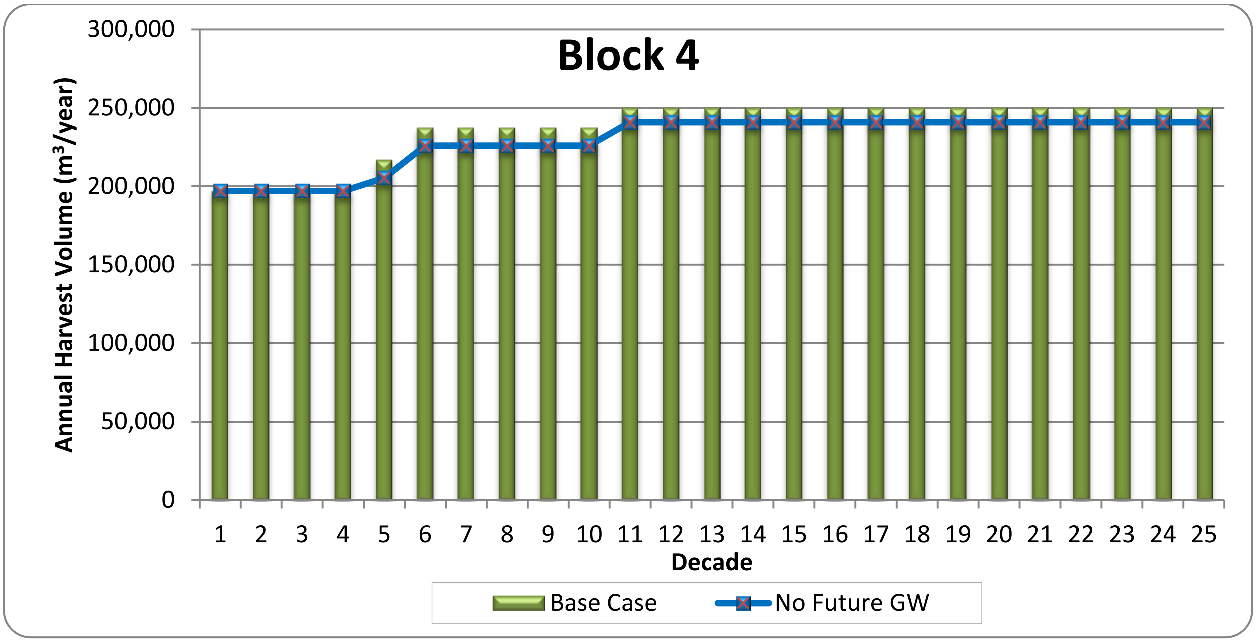

Figure 115 – Block 4 Harvest levels with no Future Genetic Worth

Long-term timber supply from Block 3 and 5 combined is 800 m^3/year (1.8%) lower when future stand yields do not include benefits of genetic gain. Total harvest is reduced by 137,000 m^3 (1.2%).

Table 115 – Block 3&5 Harvest levels with no Future Genetic Worth

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1 – 7	2012	2281	41,300	41,400	+ 100
8 - 25	2082	2261	45,000	44,200	- 800

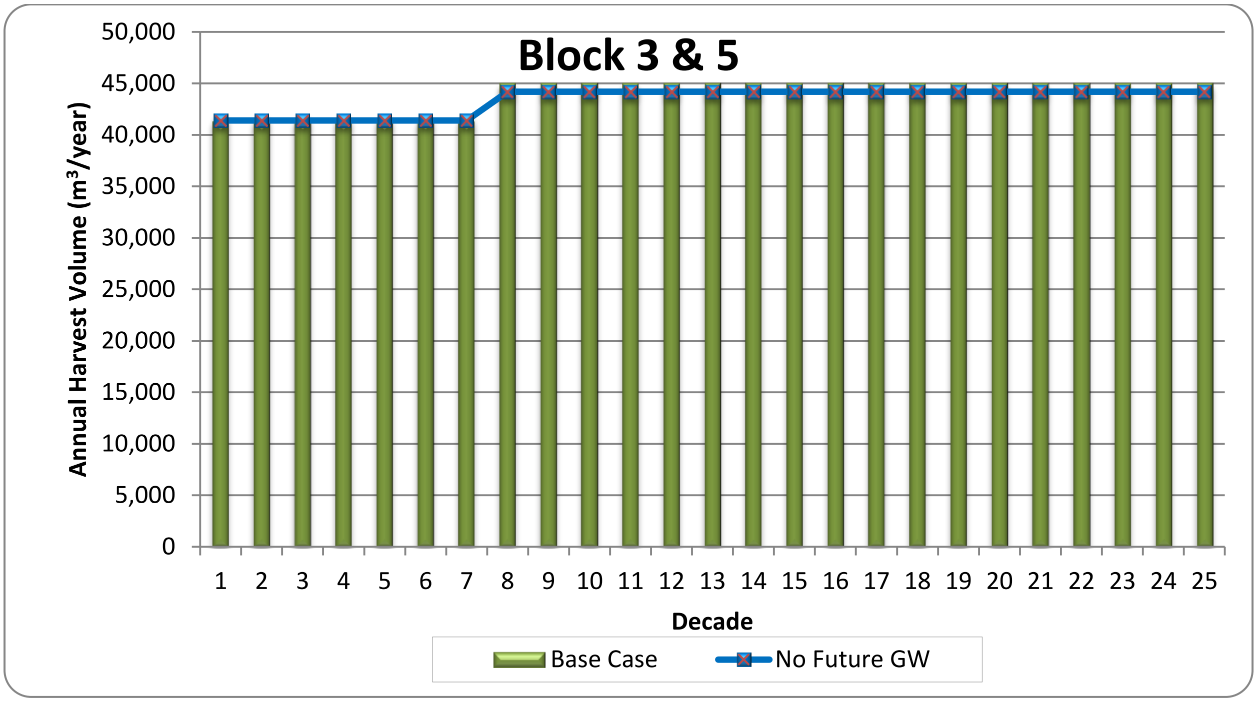

Figure 116 – Block 3&5 Harvest levels with no Future Genetic Worth

Appendix B11 – Increased Harvest from Non-conventional Areas

As mentioned in Section 4.9, this analysis was conducted by managing conventional and non-conventional (NC) landbases separately. For the first 40 years, non-conventional harvest is restricted to current mature timber and a non-declining even-flow. Afterwards, non-conventional volume is strictly second growth. The charts in this appendix indicate the contribution from conventional and non-conventional in a cumulative manner.

Under these assumptions, Block 1 timber supply can be increased by 39,000 m^3/year (9.0%) over the first 40 years. After that there is a period of 50 years over which non-conventional volume initially falls 3,400 m^3/year (0.8%) below the Base Case (in Decade 5) but then gradually recovers such that the LTHL is 23,800 m^3/year (5.5%) higher than the Base Case. Conventional harvest decreases by 200 m^3/year throughout the planning period. Total harvest increases by 5.72 million m^3 (5.3%).

Table 116 – Block 1 Harvest levels with increased non-conventional harvest

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	Increased NC	Base Case	Increased NC	Base Case	Increased NC
1 - 4	2012	2051	385,300	385,100	50,000	89,200	435,300	474,300
5	2052	2061	385,300	385,100	50,000	46,800	435,300	431,900
6	2062	2071	385,300	385,100	50,000	51,500	435,300	436,600
7	2072	2081	385,300	385,100	50,000	56,600	435,300	441,700
8	2082	2091	385,300	385,100	50,000	62,300	435,300	447,400
9	2092	2101	385,300	385,100	50,000	58,500	435,300	453,600
10 - 25	2102	2261	385,300	385,100	50,000	74,100	435,300	459,100

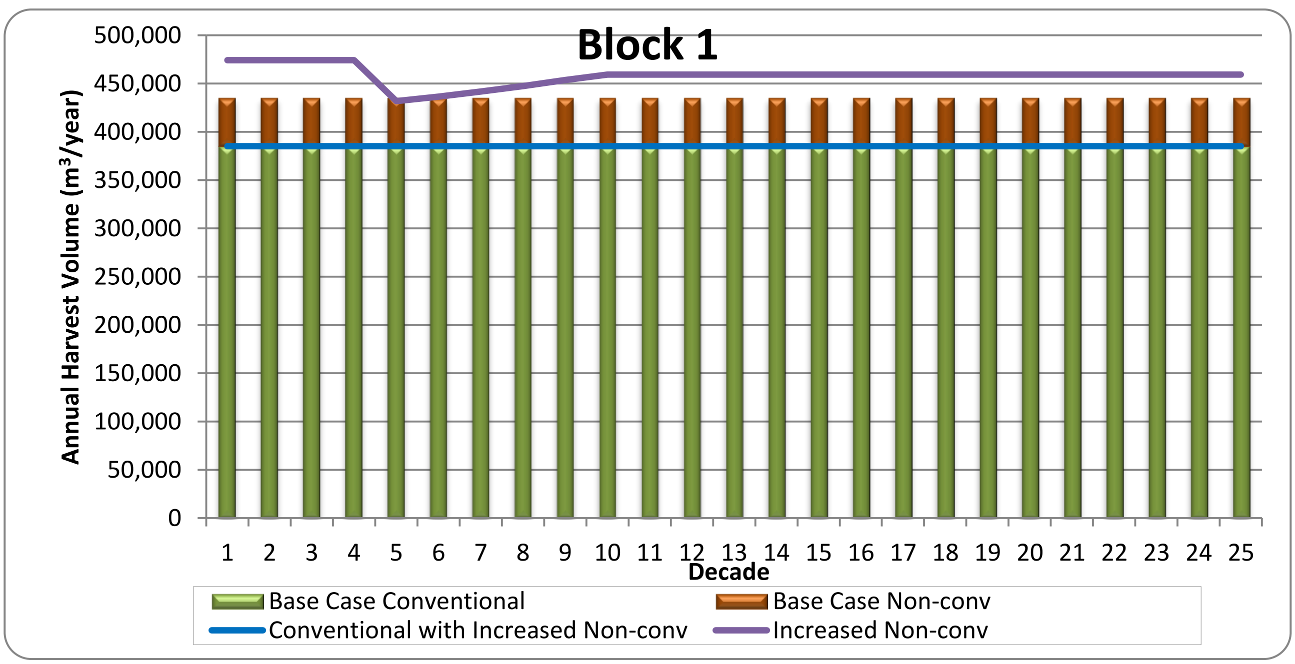

Figure 117 – Block 1 Harvest levels with increased non-conventional harvest

Block 2 non-conventional timber supply for the first 40 years is increased by 42,800 m^3/year when a non-conventional partition is applied as described. Conventional timber supply is decreased by 2,800 m^3/year in the first 10 years; thus the total initial harvest level is increased by 40,000 m^3/year (4.6%). Total harvest is increased by 44,300 m^3/year (5.7%) in the second decade and 42,200 m^3/year (6.0%) in Decades 3 and 4. Beginning in Decade 5 and continuing until Decade 15 total harvest is reduced by between 14,700 m^3/year and 31,200 m^3/year (1.8% - 4.4%) as immature non-conventional stands reach operable size. As a result of lower THLB inventory, long-term harvest is reduced by 12,200 m3/year (1.5%). Total harvest is lessened by 2.14 million m^3 (1.1%), with total conventional volume immaterially changed.

Table 117 – Block 2 Harvest levels with increased non-conventional harvest

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	Increased NC	Base Case	Increased NC	Base Case	Increased NC
1	2012	2021	824,300	821,500	40,000	82,800	864,300	904,300
2	2022	2031	737,900	739,300	40,000	82,800	777,900	822,100
3 - 4	2032	2051	666,100	665,400	40,000	82,800	706,100	748,200
5	2052	2061	677,200	665,400	28,900	9,500	706,100	674,900
6	2062	2071	716,100	715,400	40,000	10,500	756,100	725,900
7	2072	2081	766,000	765,400	40,000	11,500	806,100	776,900
8	2082	2091	793,700	794,300	40,000	12,700	833,700	807,000
9	2092	2101	793,700	794,300	40,000	13,900	833,700	808,200
10	2102	2111	793,700	794,300	40,000	15,300	833,700	809,600
11	2112	2121	793,700	794,300	40,000	16,900	833,700	811,200
12	2122	2131	793,700	794,300	40,000	18,600	833,700	812,900
13	2132	2141	793,700	794,300	40,000	20,400	833,700	814,700
14	2142	2151	793,700	794,300	40,000	22,500	833,700	816,800
15	2152	2161	793,700	794,300	40,000	24,700	833,700	819,000
16 - 25	2162	2261	793,700	794,300	40,000	27,200	833,700	821,500

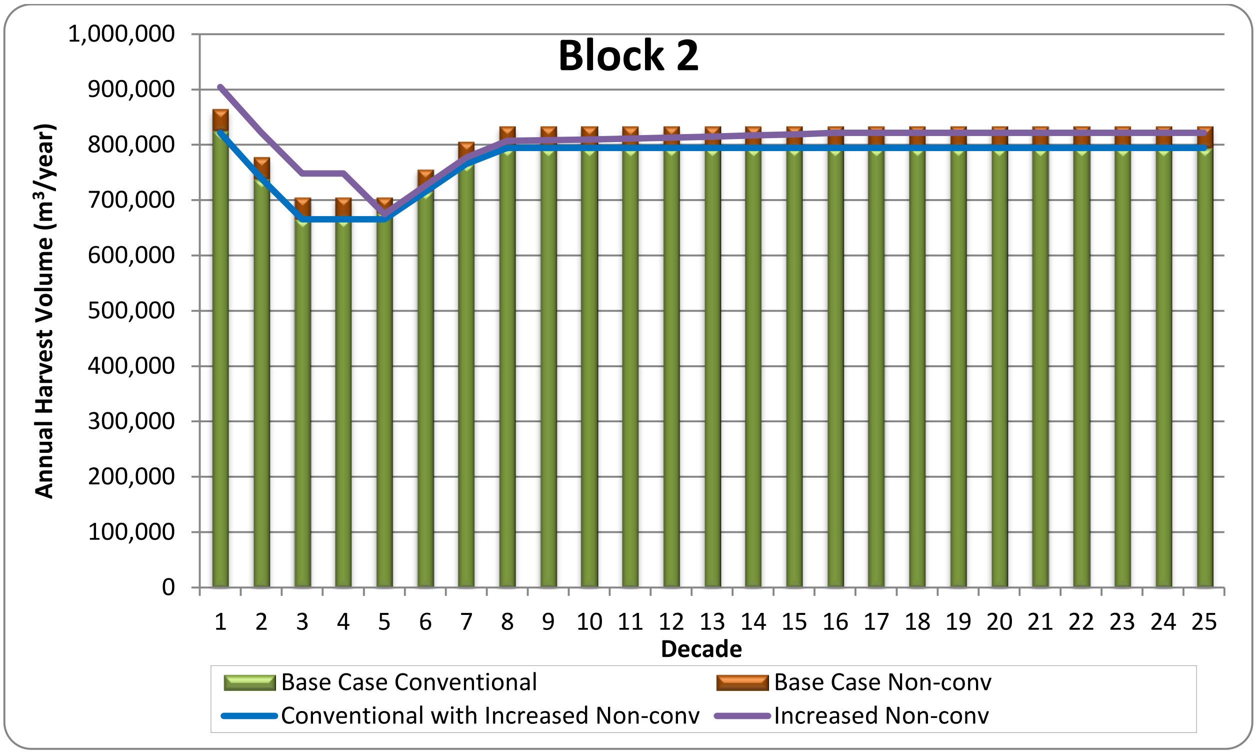

Figure 118 – Block 2 Harvest levels with increased non-conventional harvest

Block 4 timber supply over the first 40 years can be significantly improved by implementing a non-conventional partition as both conventional and non-conventional volumes can be increased. Short-term conventional harvest can be increased due to lower mid-term harvest levels with initial conventional volume increased by 25,400 m^3/year (15.8%). The initial non-conventional volume can be increased by 4,800 m^3/year (13.3%) resulting in an overall increase to the initial harvest of 30,200 m^3/year (15.3%). Conventional harvest can increase through Decades 5 and 6 as immature stands grow into merchantable conditions such that the long-term conventional harvest of 220,600 m^3/year is reached in the sixth decade. Non-conventional volume remains steady at 40,800 m^3/year for the first 40 years and then declines to nearly zero for 20 years due to lack of operable inventory. Beginning in Decade 7, non-conventional volume gradually increases as immature stands grow into merchantable conditions. Long-term non-conventional harvest of 15,700 m^3/year is reached in Decade 14. Total harvest is reduced by 1.84 million m^3 of which 1.77 million m^3 is non-conventional.

Table 118 – Block 4 Harvest levels with increased non-conventional harvest

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	Increased NC	Base Case	Increased NC	Base Case	Increased NC
1 - 4	2012	2051	161,000	186,400	36,000	40,800	197,000	227,100
5	2052	2061	183,400	205,000	33,300	600	216,700	205,600
6	2062	2071	233,400	220,600	3,900	800	237,300	221,400
7	2072	2081	237,000	220,600	300	1,300	237,300	221,900
8	2082	2091	236,700	220,600	600	1,900	237,300	222,500
9	2092	2101	236,900	220,600	400	2,800	237,300	223,400
10	2102	2111	229,500	220,600	7,800	4,300	237,300	224,900
11	2112	2121	243,600	220,600	6,200	6,400	249,900	227,000
12	2122	2131	213,900	220,600	36,000	9,600	249,900	230,200
13	2132	2141	231,900	220,600	18,000	14,400	249,900	235,000
14 - 15	2142	2161	249,900	220,600	0	15,700	249,900	236,300
16 - 21	2162	2221	213,900	220,600	36,000	15,700	249,900	236,300
22	2222	2231	225,300	220,600	24,600	15,700	249,900	236,300
23	2232	2241	213,900	220,600	36,000	15,700	249,900	236,300
24	2242	2251	225,300	220,600	24,600	15,700	249,900	236,300
25	2252	2261	230,600	220,600	19,300	15,700	249,900	236,300

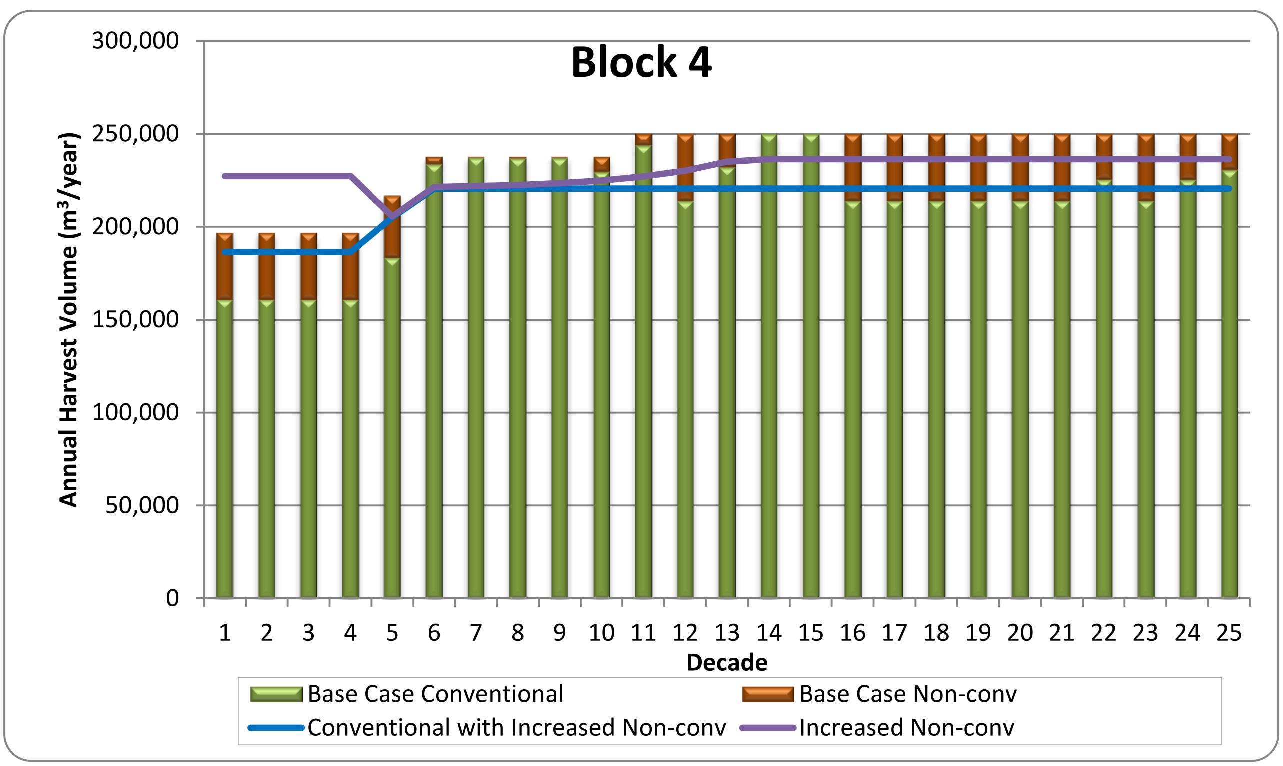

Figure 119 – Block 4 Harvest levels with increased non-conventional harvest

Similar to Block 4, short-term timber supply from Blocks 3 and 5 can be improved by implementing a non-conventional partition. An additional 4,100 m^3/year (82%) can be harvested non-conventionally with no change to conventional volumes; therefore, total harvest is increased by 4,100 m^3/year (10.2%). Under this scenario, non-conventional volume is inconsequential from Decade 5 to Decade 8. Beginning in Decade 9, non-conventional volume begins to contribute to timber supply as immature stands reach merchantable size. Long-term non-conventional harvest level of 3,800 m^3/year is achieved beginning in Decade 13. Total harvest is decreased by 315,000 m^3 (2.9%).

Table 119 – Block 3&5 Harvest levels with increased non-conventional harvest

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	Increased NC	Base Case	Increased NC	Base Case	Increased NC
1 - 4	2012	2051	36,300	36,400	5,000	9,100	41,300	45,500
5	2052	2061	36,300	36,400	5,000	0	41,300	36,400
6	2062	2071	37,300	36,400	4,000	200	41,300	36,600
7	2072	2081	36,300	36,400	5,000	300	41,300	36,700
8	2082	2091	40,000	40,000	5,000	500	45,000	40,500
9	2092	2101	40,000	40,000	5,000	800	45,000	40,700
10	2102	2111	42,300	40,000	2,700	1,100	45,000	41,100
11	2112	2121	41,700	40,000	3,300	1,700	45,000	41,700
12	2122	2131	40,000	40,000	5,000	2,600	45,000	42,500
13	2132	2141	40,800	40,000	4,200	3,800	45,000	43,800
14	2142	2151	42,500	40,000	2,500	3,800	45,000	43,800
15 - 25	2152	2261	40,000	40,000	5,000	3,800	45,000	43,800

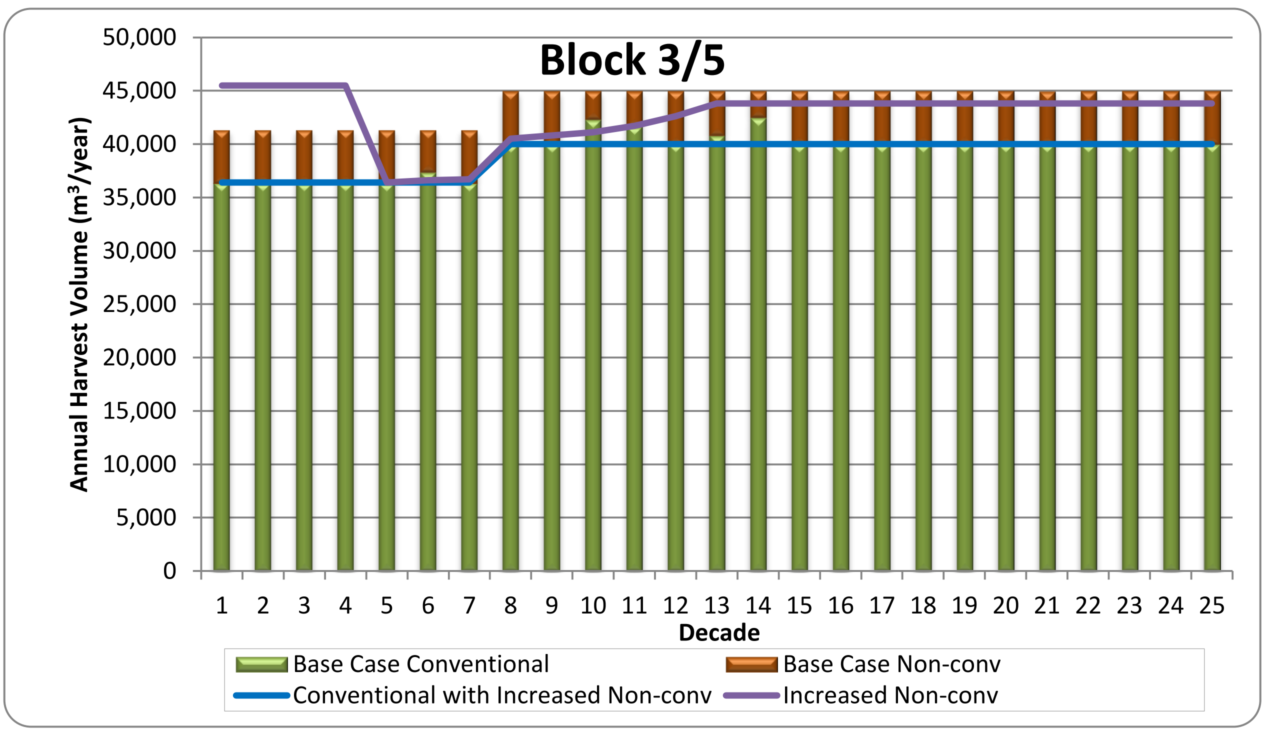

Figure 120 – Block 3&5 Harvest levels with increased non-conventional harvest

Appendix B12 – Remove non-conventional volume constraint

The charts in this appendix display the contribution from conventional and non-conventional in a cumulative manner.

Timber supply from Block 1 is improved by 25,000 m^3/year (5.7%) to 460,300 m^3/year when the constraint on contribution from non-conventional stands is removed. In total, 6.25 million m^3 (5.7%) more is harvested and non-conventional volume is 16.1% of the total. Note the large variance in conventional/non-conventional split through time; non-conventional contribution varies from 0.7% in Decade 15 to 40.6% in Decade 12.

Table 120 – Block 1 Harvest levels without non-conventional constraint

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	No NC Constraint	Base Case	No NC Constraint	Base Case	No NC Constraint
1	2012	2021	385,300	342,200	50,000	118,100	435,300	460,300
2	2022	2031	385,300	390,300	50,000	70,000	435,300	460,300
3	2032	2041	385,300	318,900	50,000	141,400	435,300	460,300
4	2042	2051	385,300	377,300	50,000	83,000	435,300	460,300
5	2052	2061	385,300	383,000	50,000	77,300	435,300	460,300
6	2062	2071	385,300	403,200	50,000	57,100	435,300	460,300
7	2072	2081	385,300	450,100	50,000	10,200	435,300	460,300
8	2082	2091	385,300	430,600	50,000	29,700	435,300	460,300
9	2092	2101	385,300	434,800	50,000	25,500	435,300	460,300
10	2102	2111	385,300	443,800	50,000	16,500	435,300	460,300
11	2112	2121	385,300	337,300	50,000	123,000	435,300	460,300
12	2122	2131	385,300	273,500	50,000	186,800	435,300	460,300
13	2132	2141	385,300	388,800	50,000	71,500	435,300	460,300
14	2142	2151	385,300	445,600	50,000	14,700	435,300	460,300
15	2152	2161	385,300	457,200	50,000	3,100	435,300	460,300
16	2162	2171	385,300	333,000	50,000	127,300	435,300	460,300
17	2172	2181	385,300	287,900	50,000	172,400	435,300	460,300
18	2182	2191	385,300	371,100	50,000	89,200	435,300	460,300
19	2192	2201	385,300	364,600	50,000	95,700	435,300	460,300
20	2202	2211	385,300	426,200	50,000	34,100	435,300	460,300
21	2212	2221	385,300	452,300	50,000	8,000	435,300	460,300
22	2222	2231	385,300	392,200	50,000	68,100	435,300	460,300
23	2232	2241	385,300	419,400	50,000	40,900	435,300	460,300
24	2242	2251	385,300	296,200	50,000	164,100	435,300	460,300
25	2252	2261	385,300	430,700	50,000	29,600	435,300	460,300

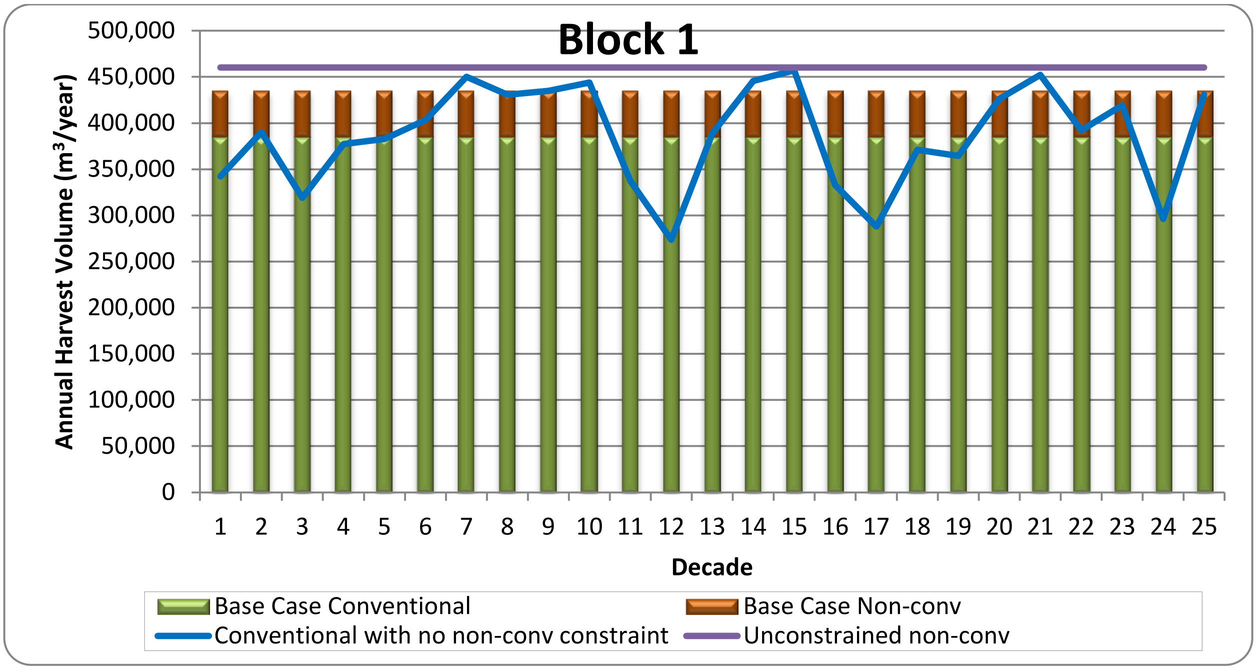

Figure 121 – Block 1 Harvest levels without non-conventional constraint

When the constraint on non-conventional timber is removed, timber supply from Block 2 can be improved by 1.4% in the first 20 years: 12,000 m^3/year in the first decade and 10,700 m^3/year in the second decade. The gain in the mid-term is 3,700 m^3/year (0.5%) and 8,500 m^3/year (1.0%) in the long-term. Total harvest increases by 1.94 million m^3 (1.0%) to 205.23 million m^3, of which non-conventional is 5.7% (11.75 million m^3). The variance in the conventional/non-conventional split is not as large as in Block 1, varying from 0.3% in Decade 21 to 20.1% in Decade 16.

Table 121 – Block 2 Harvest levels without non-conventional constraint

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	No NC Constraint	Base Case	No NC Constraint	Base Case	No NC Constraint
1	2012	2021	824,300	754,000	40,000	122,300	864,300	876,300
2	2022	2031	737,900	706,500	40,000	82,100	777,900	788,600
3	2032	2041	666,100	626,500	40,000	83,300	706,100	709,800
4	2042	2051	666,100	685,700	40,000	24,100	706,100	709,800
5	2052	2061	677,200	695,300	28,900	14,500	706,100	709,800
6	2062	2071	716,100	732,800	40,000	27,000	756,100	759,800
7	2072	2081	766,100	798,200	40,000	11,600	806,100	809,800
8	2082	2091	793,700	833,200	40,000	9,000	833,700	842,200
9	2092	2101	793,700	834,100	40,000	8,100	833,700	842,200
10	2102	2111	793,700	826,600	40,000	15,500	833,700	842,200
11	2112	2121	793,700	830,500	40,000	11,700	833,700	842,200
12	2122	2131	793,700	799,400	40,000	42,700	833,700	842,200
13	2132	2141	793,700	782,200	40,000	59,900	833,700	842,200
14	2142	2151	793,700	833,600	40,000	8,600	833,700	842,200
15	2152	2161	793,700	755,700	40,000	86,500	833,700	842,200
16	2162	2171	793,700	672,600	40,000	169,500	833,700	842,200
17	2172	2181	793,700	821,000	40,000	21,200	833,700	842,200
18	2182	2191	793,700	783,600	40,000	58,600	833,700	842,200
19	2192	2201	793,700	730,900	40,000	111,300	833,700	842,200
20	2202	2211	793,700	814,500	40,000	27,700	833,700	842,200
21	2212	2221	793,700	839,700	40,000	2,500	833,700	842,200
22	2222	2231	793,700	819,200	40,000	22,900	833,700	842,200
23	2232	2241	793,700	790,800	40,000	51,300	833,700	842,200
24	2242	2251	793,700	795,500	40,000	46,600	833,700	842,200
25	2252	2261	793,700	785,300	40,000	56,900	833,700	842,200

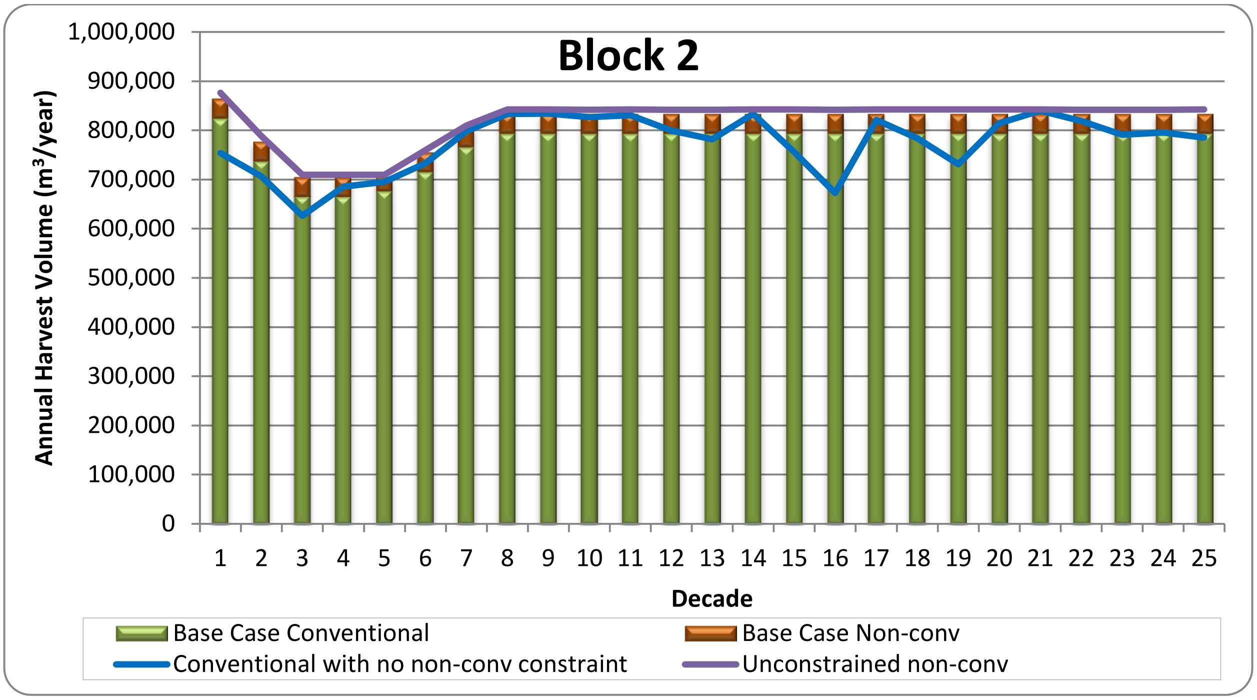

Figure 122 – Block 2 Harvest levels without non-conventional constraint

An increase in short-term timber supply of 16,600 m^3/year (8.4%), to 213,600 m^3/year, is created in Block 4 when the non-conventional constraint is removed. This increase continues through the following 30 years before the lack of operable non-conventional inventory creates a timber supply deficit (relative to the Base Case) in Decades 5 and 6. In Decades 7 -10, timber supply is improved by 5,000 m^3/year (2.1%) but for the remainder of the planning period timber supply is reduced by 7,500 m^3/year (3.0%). Total harvest is reduced by 401,000 m3 (0.7%) to 58.99 million m^3 and non-conventional contributes 9.6% (5.68 million m^3). Non-conventional contribution varies from 0.1% in Decade 15 to 50% in Decade 16.

Table 122 – Block 4 Harvest levels without non-conventional constraint

			Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
Period (Decade #)	Start Year	End Year	Base Case	No NC Constraint	Base Case	No NC Constraint	Base Case	No NC Constraint
1	2012	2021	161,000	166,100	36,000	47,500	197,000	213,600
2	2022	2031	161,000	131,700	36,000	82,000	197,000	213,600
3	2032	2041	161,000	166,200	36,000	47,400	197,000	213,600
4	2042	2051	161,000	213,300	36,000	300	197,000	213,600
5	2052	2061	183,400	208,700	33,300	5,000	216,700	213,600
6	2062	2071	233,400	223,900	3,900	2,300	237,300	226,300
7	2072	2081	237,000	242,000	300	400	237,300	242,400
8	2082	2091	236,700	238,200	600	4,100	237,300	242,300
9	2092	2101	236,900	241,800	400	500	237,300	242,400
10	2102	2111	229,500	240,000	7,800	2,300	237,300	242,300
11	2112	2121	243,600	233,500	6,200	8,900	249,900	242,400
12	2122	2131	213,900	189,100	36,000	53,200	249,900	242,400
13	2132	2141	231,900	233,400	18,000	9,000	249,900	242,400
14	2142	2151	249,900	241,900	0	500	249,900	242,400
15	2152	2161	213,900	242,000	0	300	249,900	242,400
16	2162	2171	213,900	121,100	36,000	121,300	249,900	242,400
17	2172	2181	213,900	208,800	36,000	33,600	249,900	242,400
18	2182	2191	213,900	238,700	36,000	3,700	249,900	242,400
19	2192	2201	213,900	233,900	36,000	8,400	249,900	242,300
20	2202	2211	213,900	213,500	36,000	28,900	249,900	242,400
21	2212	2221	213,900	241,900	36,000	500	249,900	242,400
22	2222	2231	225,300	203,600	24,600	38,800	249,900	242,400
23	2232	2241	213,900	184,700	36,000	57,600	249,900	242,400
24	2242	2251	225,300	238,700	24,600	3,600	249,900	242,400
25	2252	2261	230,600	234,800	19,300	7,600	249,900	242,400

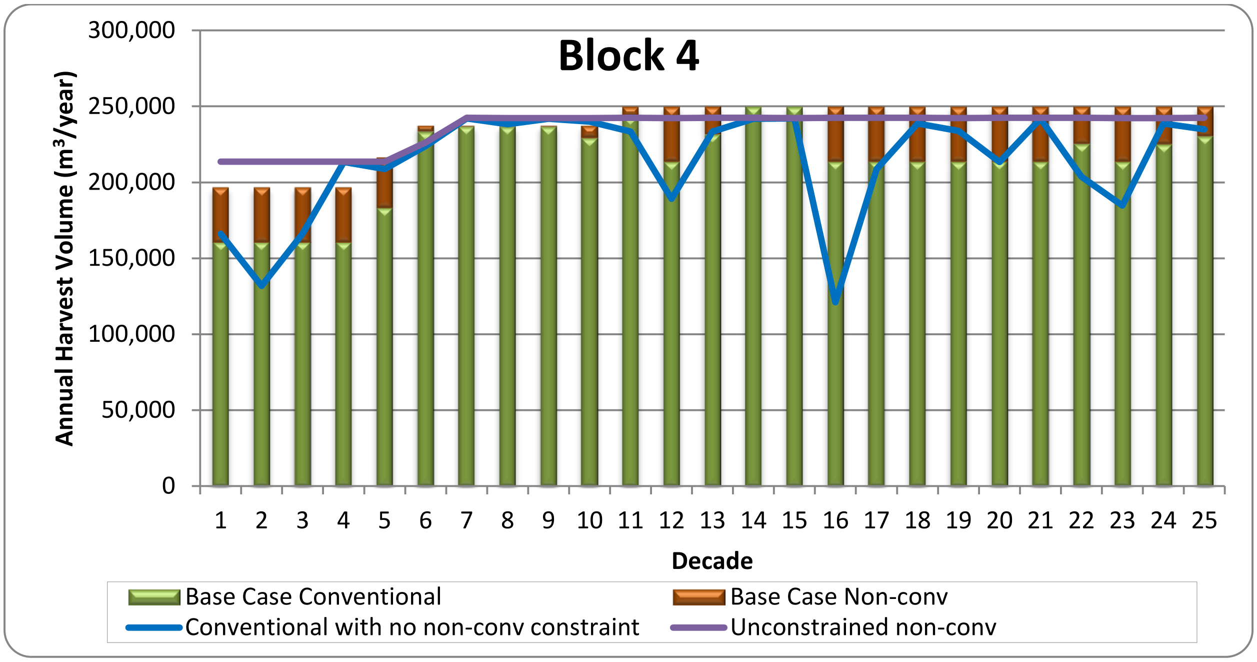

Figure 123 – Block 4 Harvest levels without non-conventional constraint

When the constraint on contribution from non-conventional stands is removed from Blocks 3 and 5, short-term harvest improves by 4,100 m^3/year (9.9%) to 45,400 m^3/year and long-term harvest improves by 700 m^3/year (1.6%) to 45,700 m^3/year. Total harvest increases by 413,000 m^3 (3.8%). Non-conventional contributes 12.3% of the overall harvest, varying from 0% in the fourth decade to 52% in the sixteenth decade.

Table 123 – Block 3&5 Harvest levels without non-conventional constraint

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)					
			Conventional		Non-Conventional		Total	
			Base Case	No NC Constraint	Base Case	No NC Constraint	Base Case	No NC Constraint
1	2012	2021	36,300	30,300	5,000	15,100	41,300	45,400
2	2022	2031	36,300	24,100	5,000	21,300	41,300	45,400
3	2032	2041	36,300	45,200	5,000	200	41,300	45,400
4	2042	2051	36,300	45,400	5,000	0	41,300	45,400
5	2052	2061	36,300	45,000	5,000	400	41,300	45,400
6	2062	2071	37,300	43,200	4,000	2,200	41,300	45,400
7	2072	2081	36,300	45,100	5,000	300	41,300	45,400
8	2082	2091	40,000	44,300	5,000	1,400	45,000	45,700
9	2092	2101	40,000	45,500	5,000	100	45,000	45,700
10	2102	2111	42,300	40,500	2,700	5,200	45,000	45,700
11	2112	2121	41,700	41,800	3,300	3,800	45,000	45,700
12	2122	2131	40,000	40,400	5,000	5,300	45,000	45,700
13	2132	2141	40,800	38,800	4,200	6,900	45,000	45,700
14	2142	2151	42,500	45,600	2,500	0	45,000	45,700
15	2152	2161	40,000	38,700	5,000	7,000	45,000	45,700
16	2162	2171	40,000	22,000	5,000	23,700	45,000	45,700
17	2172	2181	40,000	23,200	5,000	22,500	45,000	45,700
18	2182	2191	40,000	45,200	5,000	500	45,000	45,700
19	2192	2201	40,000	44,300	5,000	1,400	45,000	45,700
20	2202	2211	40,000	44,400	5,000	1,300	45,000	45,700
21	2212	2221	40,000	42,800	5,000	2,800	45,000	45,700
22	2222	2231	40,000	45,400	5,000	300	45,000	45,700
23	2232	2241	40,000	41,000	5,000	4,700	45,000	45,700
24	2242	2251	40,000	34,600	5,000	11,100	45,000	45,700
25	2252	2261	40,000	43,000	5,000	2,700	45,000	45,700

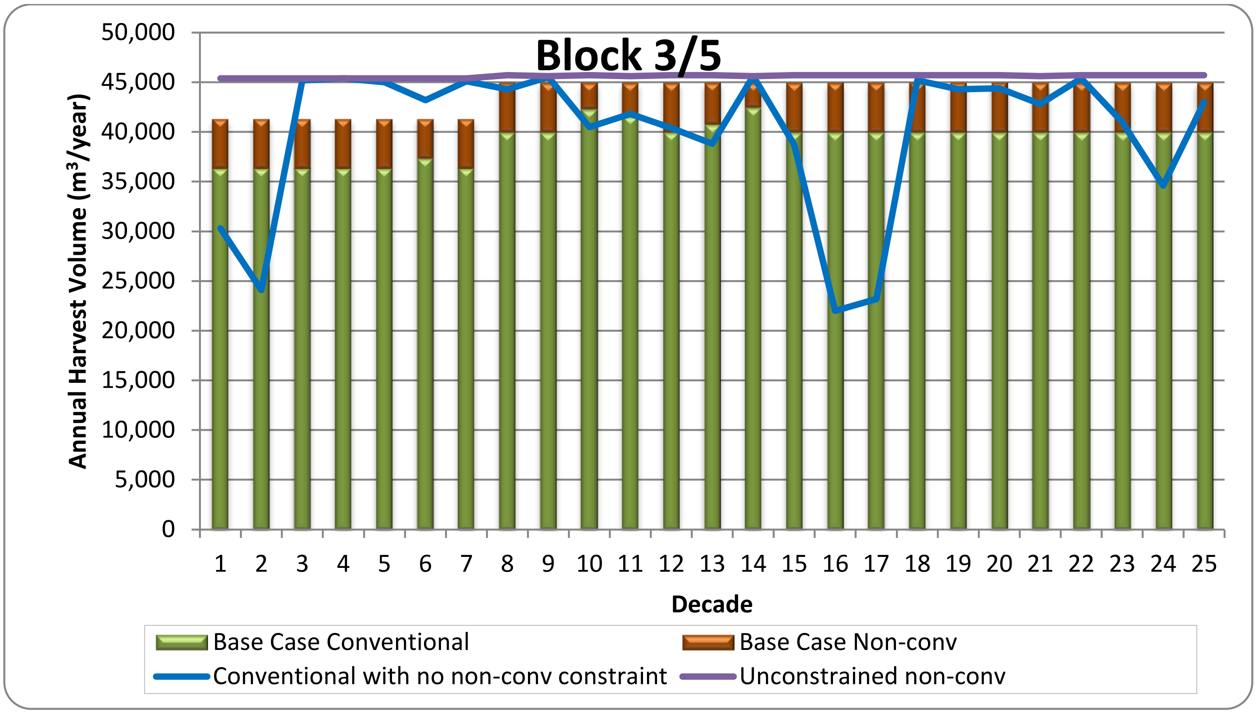

Figure 124 – Block 3&5 Harvest levels without non-conventional constraint

Appendix B13 – Exclude non-conventional operable land base

Assuming no contribution from non-conventional stands reduces the timber supply from Block 1 by 50,000 m^3/year (11.5%). Alternatively, the initial harvest level of the Base Case can be achieved by reducing longer-term harvest by 52,500 m3/year (12.1%) and total harvest by 12.27 million m3 (11.3%).

Table 124 – Block 1 Harvest levels with no contribution from non-conventional

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No non-conventional	Difference	Alternate No non-conventional	Difference
1	2012	2021	435,300	385,300	- 50,000	435,300	0
2	2022	2031	435,300	385,300	- 50,000	422,400	- 12,900
3	2032	2041	435,300	385,300	- 50,000	380,200	- 55,100
4 - 5	2042	2061	435,300	385,300	- 50,000	380,700	- 54,600
6 - 25	2062	2261	435,300	385,300	- 50,000	382,800	- 52,500

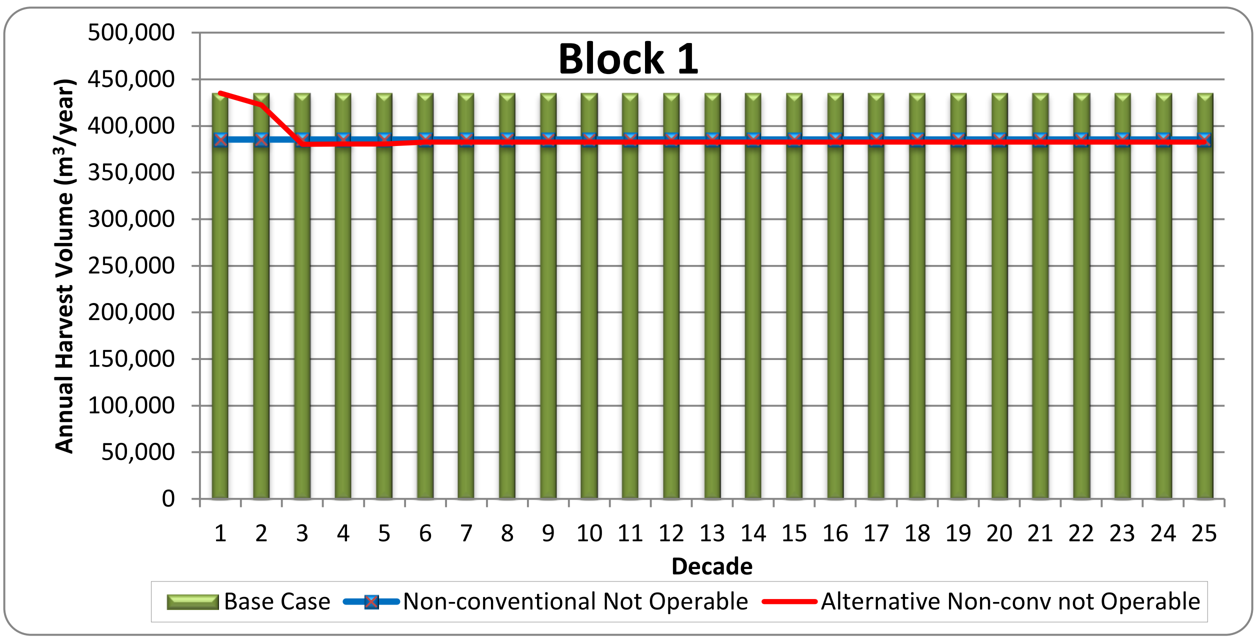

Figure 125 – Block 1 Harvest levels with no contribution from non-conventional

When there is no timber supply contribution from non-conventional stands, the harvest level in Block 2 declines by 5.7% in the first 20 years: 49,200 m^3/year in first decade and 44,300 m^3/year in the second decade. Mid-term harvest decreases by 35,500 m^3/year (5.0%) and long-term harvest by 40,400 m^3/year (4.8%). Total harvest is reduced by 9.98 million m^3 (4.9%) – an average of roughly 39,900 m^3/year. Alternatively, Base Case harvest levels can be equaled for the first 20 years after which harvest levels must decline to 700,100 m^3/year for a period of 50 years. Timber supply then recovers over 20 years to a long-term cut of 789,300 m^3/year, 44,000

m^3/year (12.1%) less than the Base Case. Total harvest in this alternate schedule is 10.25 million m^3 (5.0%) less than the Base Case – an average of about 41,000 m^3/year.

Table 125 – Block 2 Harvest levels with no contribution from non-conventional

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No non-conventional	Difference	Alternate No non-conventional	Difference
1	2012	2021	864,300	815,100	- 49,200	864,300	0
2	2022	2031	777,900	733,600	- 44,300	777,900	0
3 - 5	2032	2061	706,100	670,600	- 35,500	700,100	- 6,000
6	2062	2071	756,100	720,600	- 35,500	700,100	- 56,000
7	2072	2081	806,100	770,600	- 35,500	700,100	- 106,000
8	2082	2091	833,700	793,300	- 40,400	743,700	- 90,000
9 - 25	2092	2261	833,700	793,300	- 40,400	789,300	- 44,400

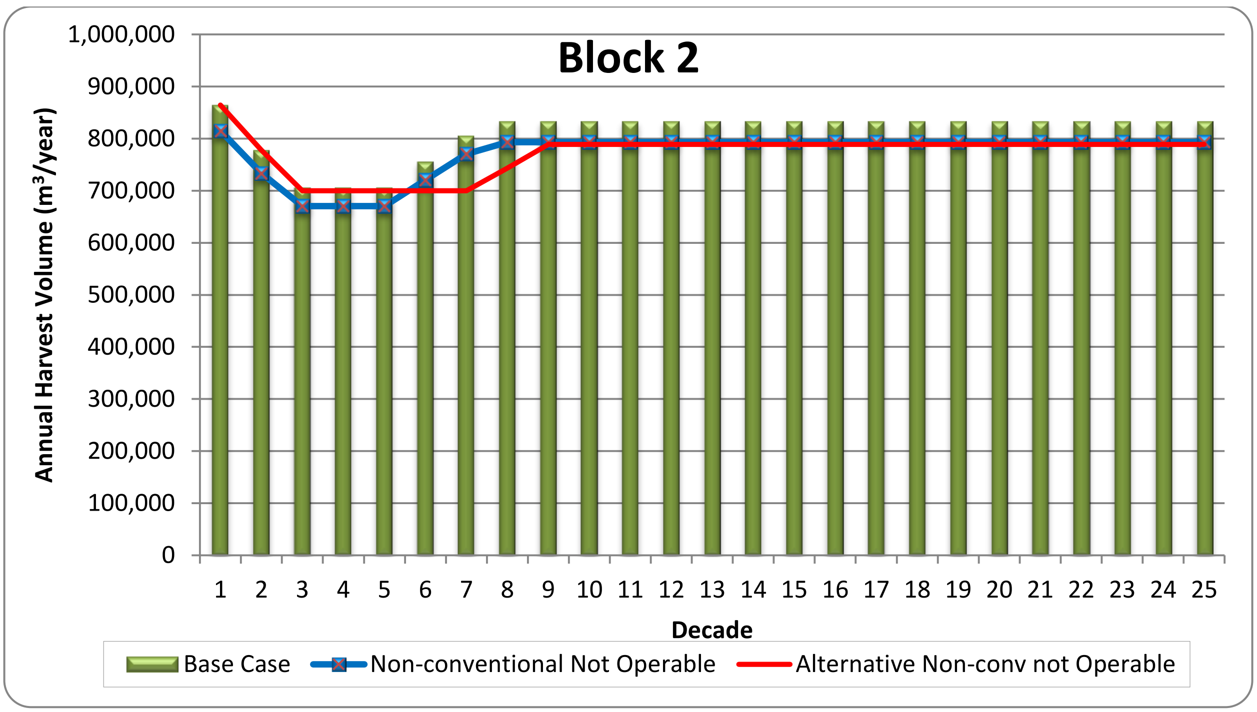

Figure 126 – Block 2 Harvest levels with no contribution from non-conventional

Eliminating harvest from non-conventional stands reduces short-term timber supply from Block 4 by 36,000 m^3/year (18.3%) to 161,000 m^3/year. Harvest then increases over a period of 40 years to the new long-term level of 225,000 m^3/year, 24,900 m^3/year (10.0%) less than the Base Case. Total harvest is 6.60 million m^3 (11.1%) less than the Base Case. It is possible to maintain the initial harvest of the Base Case by reducing mid-term harvest and delaying the transition to the new long-term harvest level of 226,000 m^3/year. This alternate schedule harvests 7.31 million m^3 (12.3%) less than the Base Case.

Table 126 – Block 4 Harvest levels with no contribution from non-conventional

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No non-conventional	Difference	Alternate No non-conventional	Difference
1	2012	2021	197,000	161,000	- 36,000	197,000	0
2	2022	2031	197,000	161,000	- 36,000	155,300	- 41,700
3 - 4	2032	2051	197,000	161,000	- 36,000	153,000	- 44,000
5	2052	2061	216,700	177,100	- 39,600	153,000	- 63,700
6	2062	2071	237,300	194,800	- 42,500	168,300	- 69,000
7	2072	2081	237,300	214,200	- 23,100	185,100	- 52,200
8	2082	2091	237,300	225,000	- 12,300	203,700	- 33,600
9	2092	2101	237,300	225,000	- 12,300	224,000	- 13,300
10	2102	2111	237,300	225,000	- 12,300	226,000	- 11,300
11 - 25	2112	2261	249,900	225,000	- 24,900	226,000	- 23,900

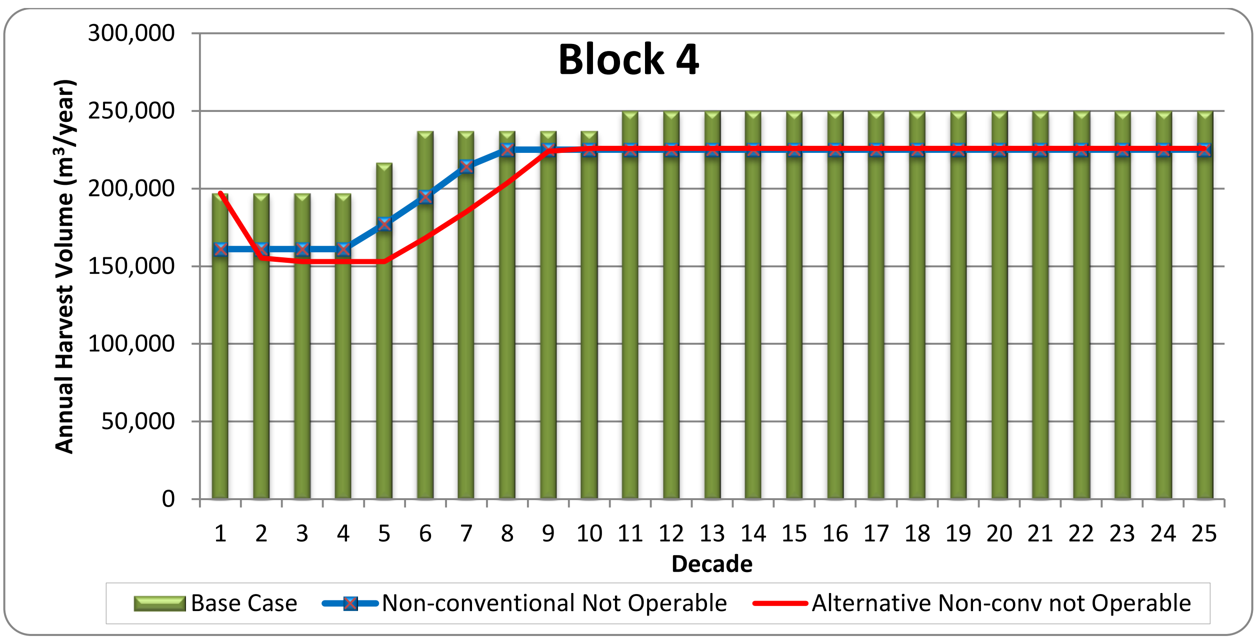

Figure 127 – Block 4 Harvest levels with no contribution from non-conventional

When non-conventional stands provide no timber supply, the harvest level in Blocks 3 and 5 declines by 4,900 m^3/year (11.9%) for the first 70 years and 5,000 m^3/year (11.1%) for the remaining 180 years. Total harvest is reduced by 1.24 million m^3 (11.3%). Alternatively, initial Base Case harvest level can be equaled after which harvest levels must decline to 33,400 m^3/year for a period of 50 years. Timber supply then recovers over 20 years to a long-term cut of 39,900 m^3/year, 5,100 m^3/year (11.3%) less than the Base Case. Total harvest in this alternate schedule is 1.37 million m^3 (12.4%) less than the Base Case – an average of about 5,500 m^3/year.

Table 127 – Block 3&5 Harvest levels with no contribution from non-conventional

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No non-conventional	Difference	Alternate No non-conventional	Difference
1	2012	2021	41,300	36,400	- 4,900	41,300	0
2	2022	2031	41,300	36,400	- 4,900	37,200	- 4,100
3	2032	2041	41,300	36,400	- 4,900	33,500	- 7,800
4 – 7	2042	2081	41,300	36,400	- 4,900	33,400	- 7,900
8	2082	2091	45,000	40,000	- 5,000	38,400	- 6,600
9 - 25	2092	2261	45,000	40,000	- 5,000	39,900	- 5,100

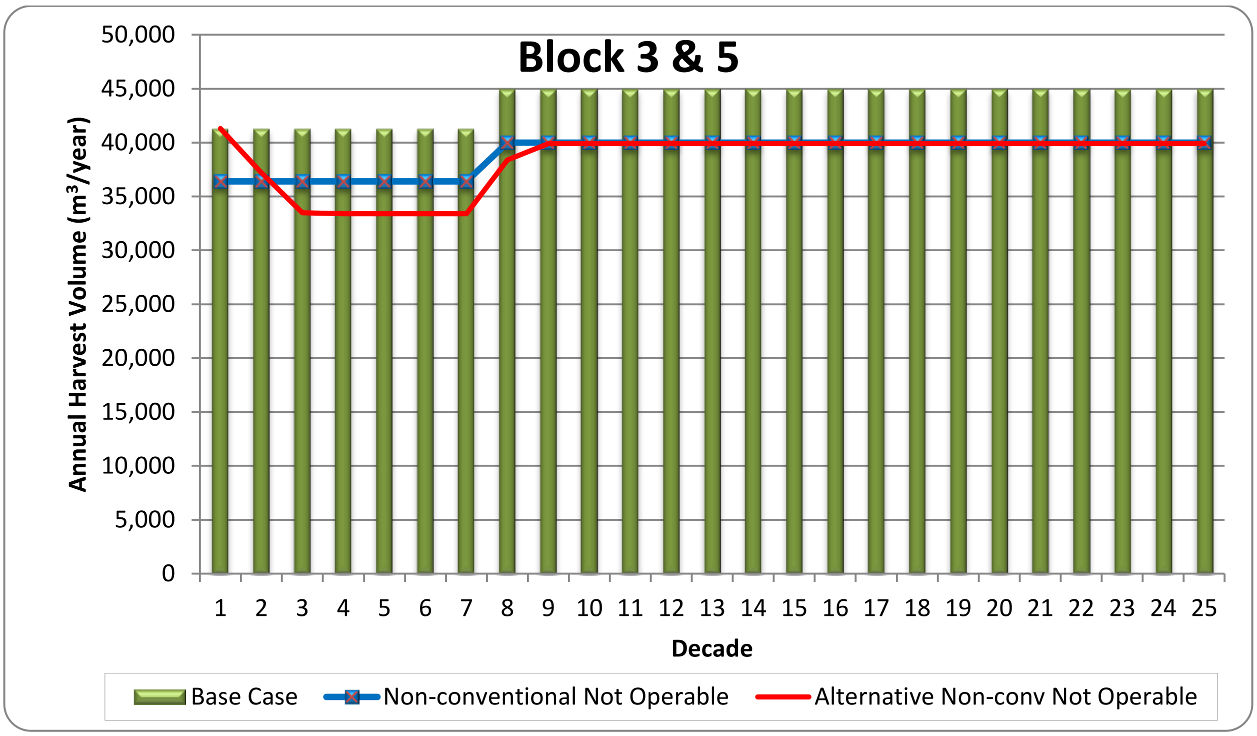

Figure 128 – Block 3&5 Harvest levels with no contribution from non-conventional

Appendix B14 – VQOs More Constraining

Even though nearly 45% of Block 1 THLB is assigned a VQO, reducing the disturbance limits to the mid-point of the percentile disturbance range reduces timber supply by only 100 m^3/year. This is due to sufficient operable inventory existing outside of VQO polygons that an alternate schedule can be created such that virtually the same harvest level is achieved.

Table 128 – Block 1 Harvest levels with VQOs more constraining

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	VQOs more constraining	Difference
1 - 25	2012	2261	435,300	435,200	- 100

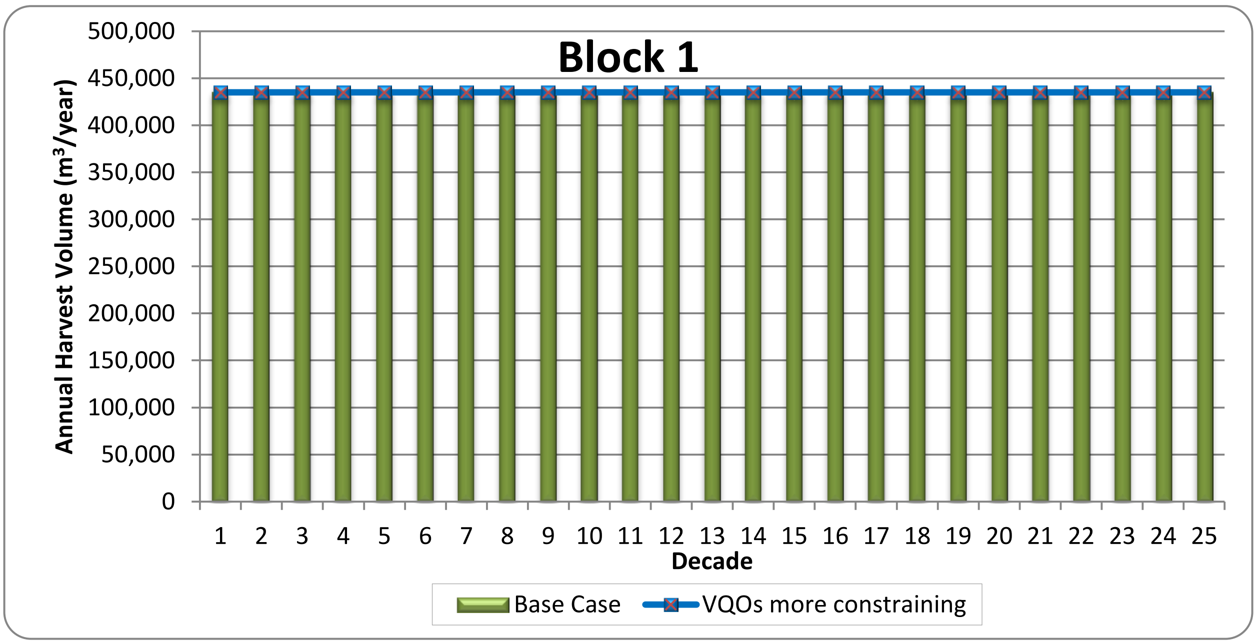

Figure 129 – Block 1 Harvest levels with VQOs more constraining

With nearly 20% of Block 2 THLB assigned to a VQO, reducing the disturbance limits has a slight timber supply impact. No difference is evident for the first 20 years as there is sufficient operable inventory outside of the VQO polygons to achieve the same short-term harvest levels. However, between Decade 3 and Decade 7, mid-term timber supply is reduced by 3,200 m^3/year (0.5%). Long-term timber supply is reduced by 1,100 m^3/year (0.1%) and total harvest is reduced by 358,000 m^3 (0.2%).

Table 129 – Block 2 Harvest levels with VQOs more constraining

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	VQOs more constraining	Difference
1	2012	2021	864,300	864,300	0
2	2022	2031	777,900	777,900	0
3 - 5	2032	2061	706,100	702,900	- 3,200
6	2062	2071	756,100	752,900	- 3,200
7	2072	2081	806,100	802,900	- 3,200
8 - 25	2082	2261	833,700	832,600	- 1,100

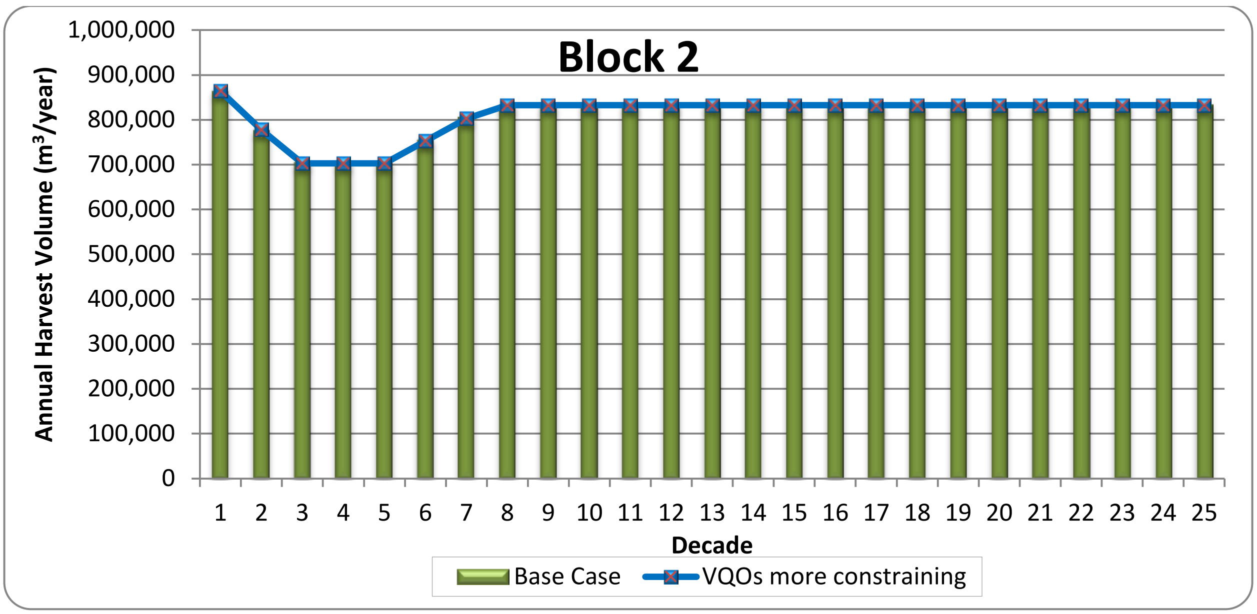

Figure 130 – Block 2 Harvest levels with VQOs more constraining

As only 1.4% of the Block 4 THLB is assigned a VQO, further constraining harvest within the VQO polygons has no timber supply impact.

Table 130 - Block 4 Harvest levels with VQOs more constraining

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	VQOs more constraining	Difference
1 - 4	2012	2051	197,000	197,000	0
5	2052	2061	216,700	216,700	0
6 - 10	2062	2111	237,300	237,300	0
11 - 25	2112	2261	249,900	249,900	0

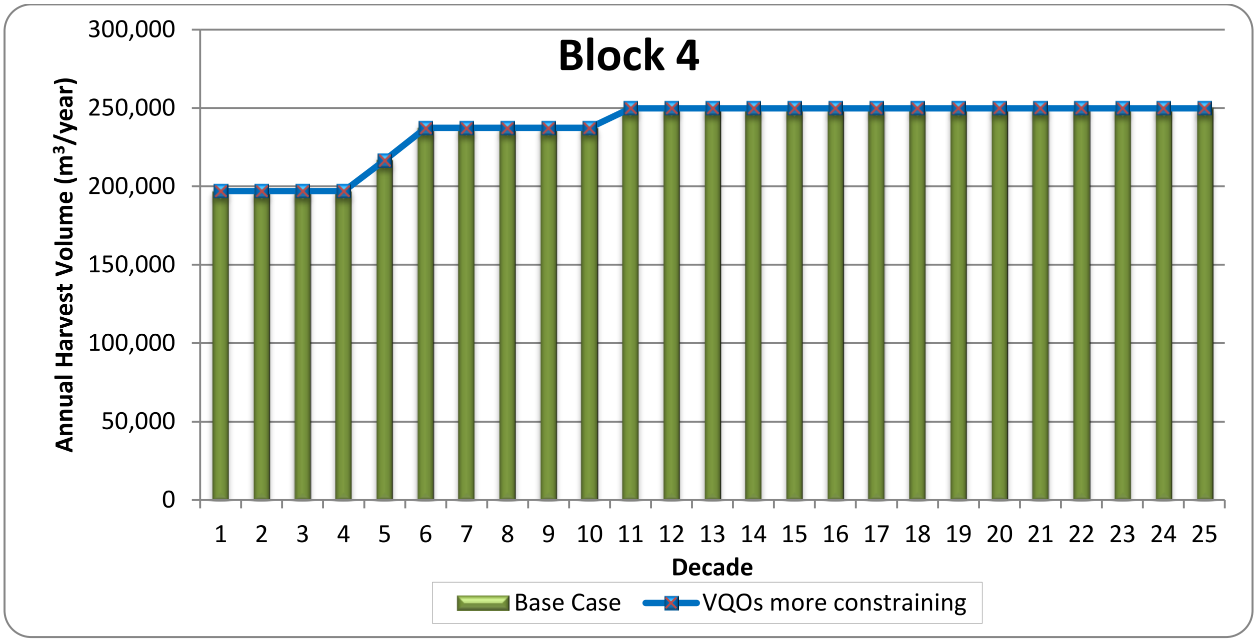

Figure 131 – Block 4 Harvest levels with VQOs more constraining

Further constraining VQO polygons within Block 3 and 5 has no impact on timber supply from these blocks.

Table 131 – Block 3&5 Harvest levels with VQOs more constraining

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1 – 7	2012	2281	41,300	41,300	0
8 - 25	2082	2261	45,000	45,000	0

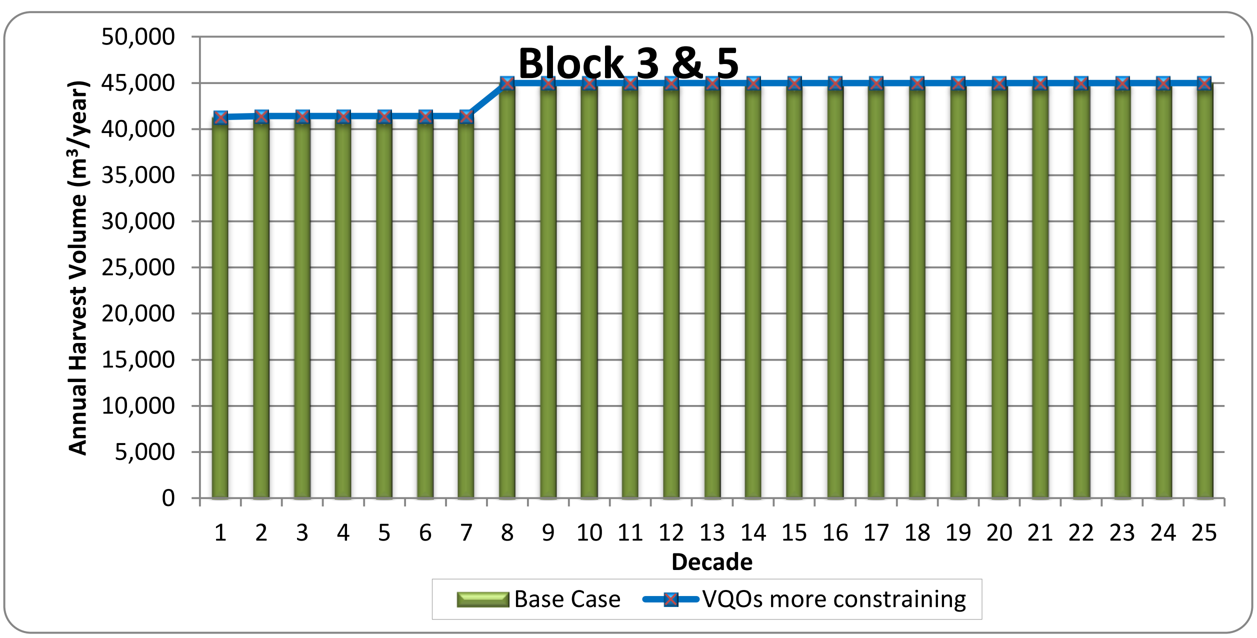

Figure 132 – Block 3&5 Harvest levels with VQOs more constraining

Appendix B15 – Remove Western Forest Strategy Impacts

Removing the area netdowns applied for the Western Forest Strategy (WFS) increases the THLB of Block 1 by 930 ha (1.9%) and THLB volume by nearly 450,000 m^3 (2.0%). Future yields are increased by 3.0% as that was the reduction applied to account for the shading effect of retained trees. Applying these changes allows timber supply to increase by 16,700 m^3/year (3.8%) to 452,000 m^3/year.

Table 132 – Block 1 Harvest levels with no Western Forest Strategy

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No WFS	Difference
1 - 25	2012	2261	435,300	452,000	+ 16,700

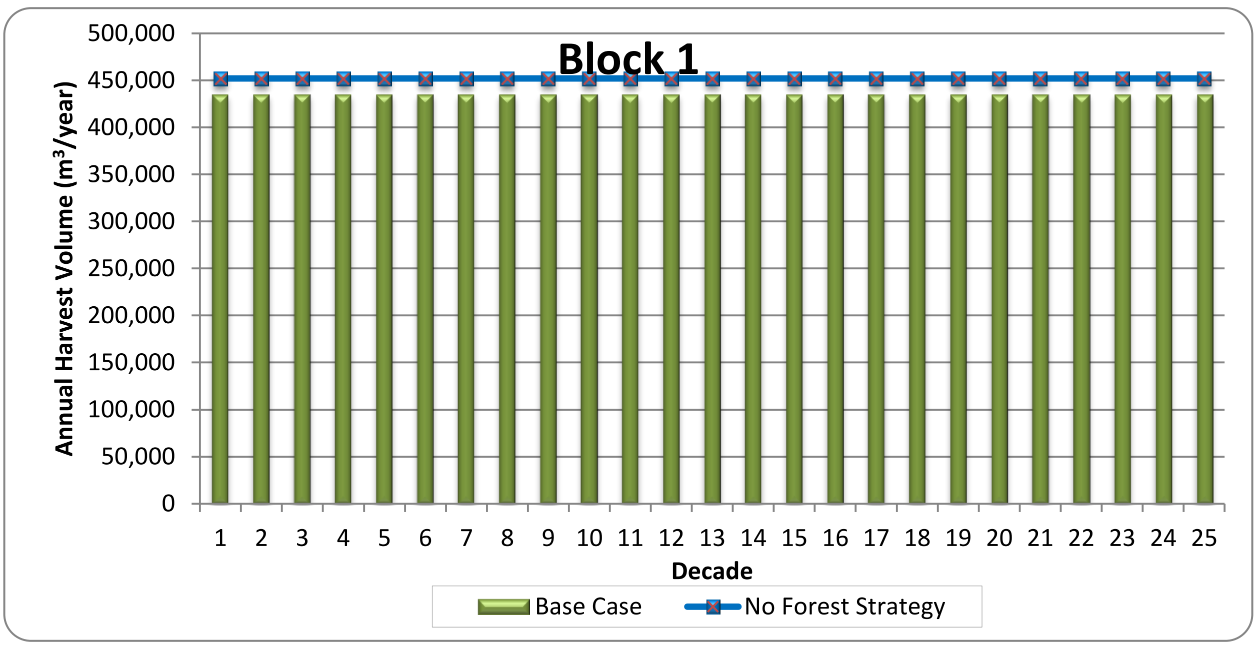

Figure 133 – Block 1 Harvest levels with no Western Forest Strategy

By not applying netdowns for the WFS within Block 2 the THLB increases by 2,445 ha (2.7%) and THLB volume by 818,350 m^3 (2.5%). Long-term yields increase with the removal of the impact from shading. These changes allow the initial harvest level to increase by 30,400 m^3/year (3.5%). Mid-term harvest improves by 21,400 m^3/year (3.0%) and long-term by 43,800 m^3/year (5.3%). Overall harvest increase by 9.53 million m^3 (4.7%). Alternatively, the larger THLB and higher future yields could be used to increase mid-term timber supply. This alternate schedule maintains the initial harvest level of the Base Case, increases mid-term harvest by 29,300 m^3/year (4.1%) and long-term harvest by 44,200 m^3/year (5.3%). Total harvest increases by 9.51 million m^3 (4.7%).

Table 133 – Block 2 Harvest levels with no Western Forest Strategy

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	No WFS	Difference	Alternate No WFS	Difference
1	2012	2021	864,300	894,700	+ 30,400	864,300	0
2	2022	2031	777,900	805,200	+ 27,300	786,800	+ 8,900
3 - 5	2032	2061	706,100	727,500	+ 21,400	735,400	+ 29,300
6	2062	2071	756,100	777,500	+ 21,400	785,400	+ 29,300
7	2072	2081	806,100	827,500	+ 21,400	835,400	+ 44,200
8 - 25	2082	2261	833,700	877,500	+ 43,800	877,900	+ 44,200

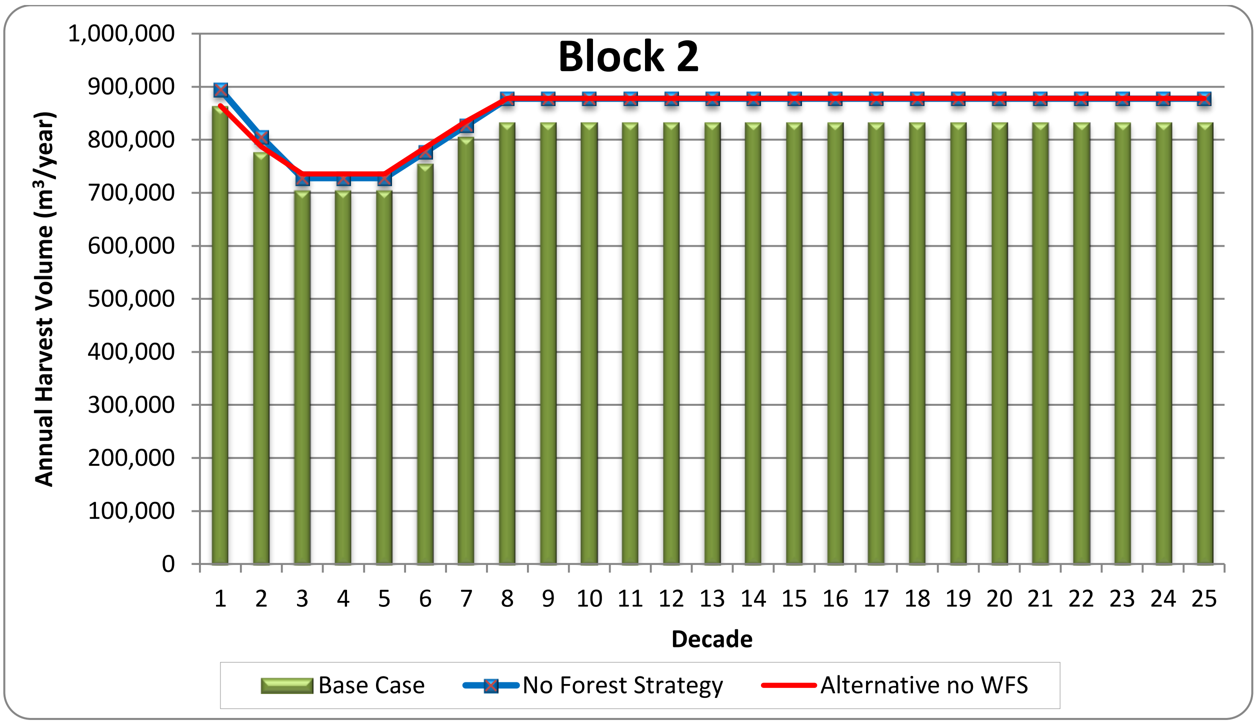

Figure 134 – Block 2 Harvest levels with no Western Forest Strategy

Block 4 THLB area increases by 412 ha (1.6%) and THLB volume by 135,000 m^3 (1.5%) when the WFS netdowns are not applied. These increases allow short-term harvest to increase by 6,000 m^3/year (3.0%), mid-term harvest to increase by 13,500 m^3/year (5.7%) and long-term harvest to increase by 11,600 m^3/year (4.6%). Total harvest increases by 2.81 million m^3 (4.7%).

Table 134 - Block 4 Harvest levels with no Western Forest Strategy

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	VQOs more constraining	Difference
1 - 3	2012	2041	197,000	203,000	+ 6,000
4	2042	2051	197,000	207,300	+10,300
5	2052	2061	216,700	228,000	+ 11,300
6 - 10	2062	2111	237,300	250,800	+ 13,500
11 - 25	2112	2261	249,900	261,500	+11,600

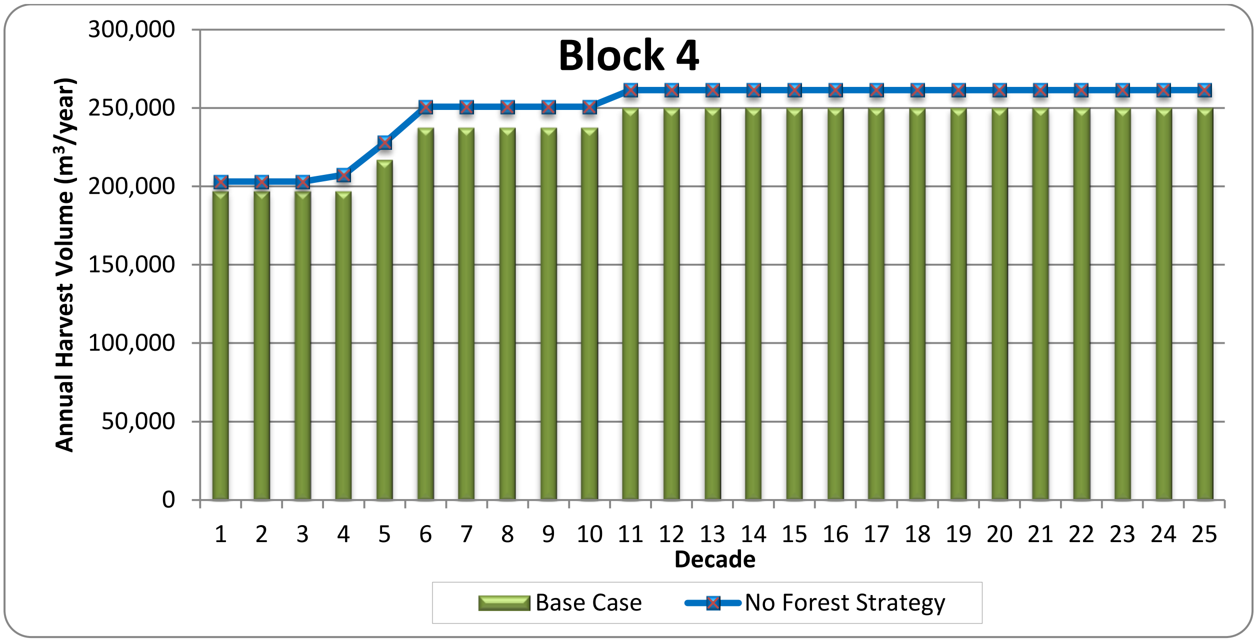

Figure 135 – Block 4 Harvest levels with no Western Forest Strategy

No netdowns were applied for the WFS in Blocks 3 and 5 due to these blocks being subject to the stand-level objectives of the South Central Coast Order. To test the impact of the yield reductions assumed to be associated with the shading effect of retained trees; this scenario was run assuming no yield effect. Long-term harvest improves by 2,000 m^3/year (4.4%) and total harvest increases by 361,000 m3 (3.3%).

Table 135 – Block 3&5 Harvest levels with no yield impact for shading from retained trees

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No Future GW	Difference
1 – 7	2012	2281	41,300	41,400	+ 100
8	2082	2091	45,000	46,400	+ 1,400
9 - 25	2092	2261	45,000	47,000	+ 2,000

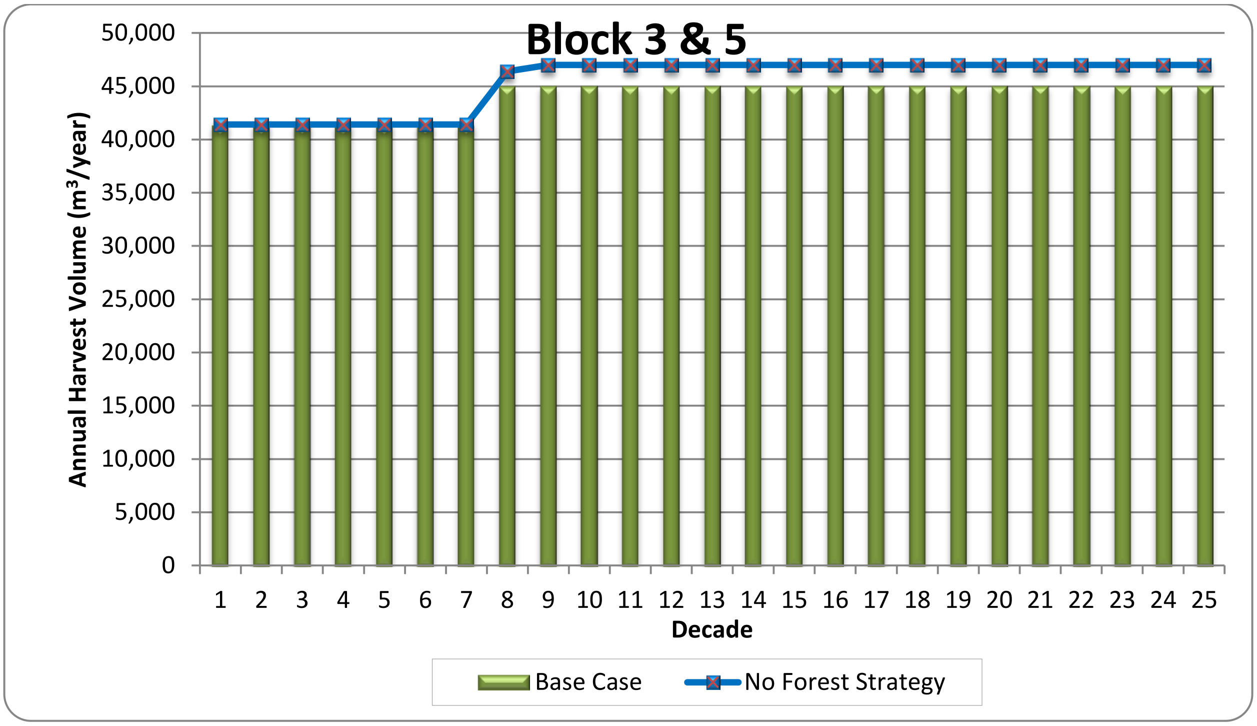

Figure 136 – Block 3&5 Harvest levels with no yield impact for shading from retained trees

Appendix B16 – Increase Minimum DBH by 2cm

Increasing the minimum average stand diameter criteria by 2 cm reduces the initial available inventory by 1.09 million m^3 (9.5%) for Block 1. The reduction to initially available inventory and the delay in availability of stands in the future creates a loss of 6,800 m^3/year (1.6%); therefore total harvest is 1.70 million m^3 less. Alternatively, the Base Case harvest level can be maintained for 20 years and then harvest must decline by 7,200 m^3/year (1.7%). Total harvest improves by 16,000 m^3 under this schedule as compared to immediately declining to the even-flow harvest.

Table 136 – Block 1 Harvest levels with Increased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased Minimum DBH	Difference	Alternate Increased Minimum DBH	Difference
1 - 2	2012	2031	435,300	428,500	- 6,800	435,300	0
3 – 4	2032	2051	435,300	428,500	- 6,800	426,700	- 8,600
5 - 25	2052	2261	435,300	428,500	- 6,800	428,100	- 7,200

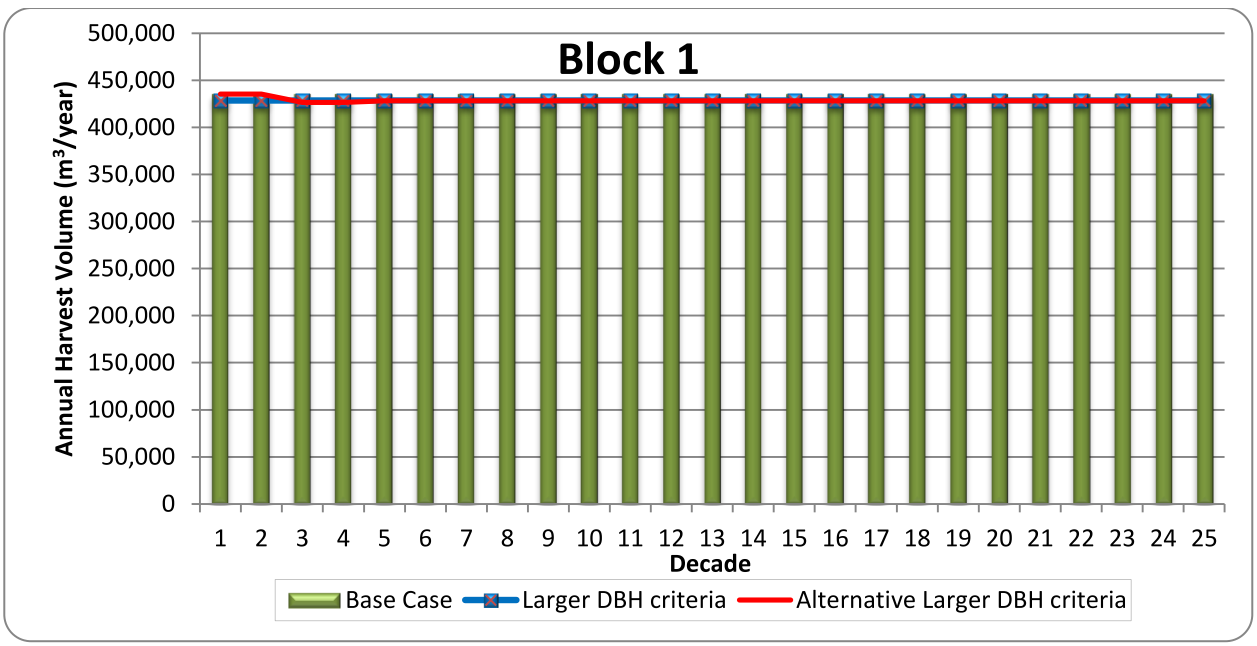

Figure 137 – Block 1 Harvest levels with Increased Minimum DBH

With minimum average stand diameter criteria increased by 2 cm, the initial available inventory in Block 2 is reduced by 1.16 million m^3 (5.8%). The reduced available inventory lessens the initial harvest by 14,300 m^3/year (1.7%), mid-term by 25,400 m^3/year (3.6%) and long-term by 3,000 m^3/year (0.4%). Total harvest declines by 2.19 million m^3 (1.1%). Alternatively, harvest in the first 20 years can be maintained at Base Case levels, then decline to a mid-term level 6,000 m^3/year (0.8%) less than the Base Case (and for an additional 10 years) and finally transition to a LTHL

5,600 m^3/year (0.7%) less than the Base Case. Total harvest from this schedule is 2.43 million m^3 (1.2%) less than the Base Case. The impact to long-term timber supply is less than short and mid-term impacts because the reduced short and mid-term harvest levels allow the transition to longer rotations to occur.

Table 137 – Block 2 Harvest levels with Increased Minimum DBH

			Annual Harvest Volume (m^3)				
Period (Decade #)	Start Year	End Year	Base Case	Increased Minimum DBH	Difference	Alternate Increased Minimum DBH	Difference
1	2012	2021	864,300	850,000	- 14,300	864,300	0
2	2022	2031	777,900	754,000	- 23,900	777,900	0
3 - 5	2032	2061	706,100	680,700	- 25,400	700,100	- 6,000
6	2062	2071	756,100	730,700	- 25,400	705,400	- 50,700
7	2072	2081	806,100	780,700	- 25,400	755,400	- 50,700
8	2082	2091	833,700	830,700	- 3,000	805,400	- 28,300
9 - 25	2092	2261	833,700	830,700	- 3,000	828,100	- 5,600

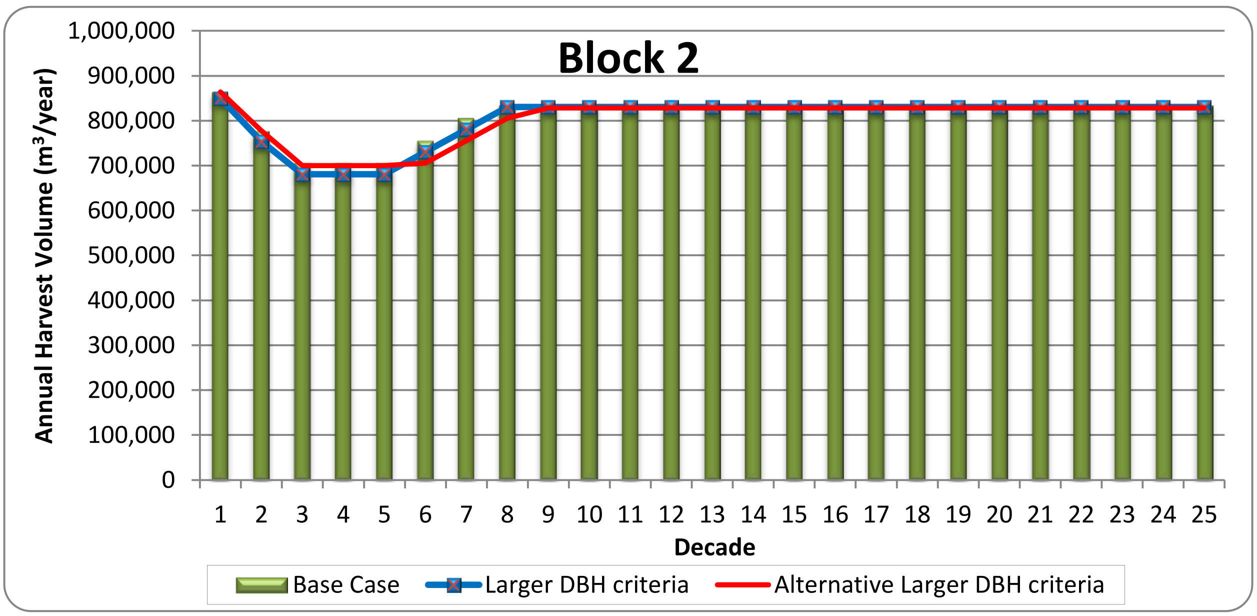

Figure 138 – Block 2 Harvest levels with Increased Minimum DBH

Larger minimum average diameter harvest criteria decreases the initial available inventory in Block 4 by 460,000 m^3 (10.7%). This reduced inventory and the delay in stand availability reduces short-term timber supply by 11,300 m^3/year (5.7%), mid-term timber supply by 12,600 m^3/year (5.3%), and long-term timber supply by 3,100 m^3/year (1.2%). Overall harvest is reduced by 1.45 million m^3 (2.4%). A schedule that maintains the short-term harvest of the Base Case can be created by extending the time this harvest level applies by 10 years and transitioning to the LTHL in a more gradual manner. Relative to the Base Case, this schedule has a long-term harvest level 3,100 m^3/year (1.2%) lower and reduces overall harvest by 1.45 million m^3 (2.4%).

Table 138 – Block 4 Harvest levels with Increased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Increased Minimum DBH	Difference	Alternate Increased Minimum DBH	Difference
1 - 4	2012	2051	197,000	185,700	- 11,300	197,000	0
5	2052	2061	216,700	204,300	- 12,400	197,000	- 19,700
6	2062	2071	237,300	224,700	- 12,600	207,400	- 29,900
7 - 8	2072	2091	237,300	224,700	- 12,600	214,500	- 22,800
9	2092	2101	237,300	224,700	- 12,600	224,400	- 12,900
10	2102	2111	237,300	246,800	+ 9,500	246,800	+ 9,500
11 - 25	2112	2261	249,900	246,800	- 3,100	246,800	- 3,100

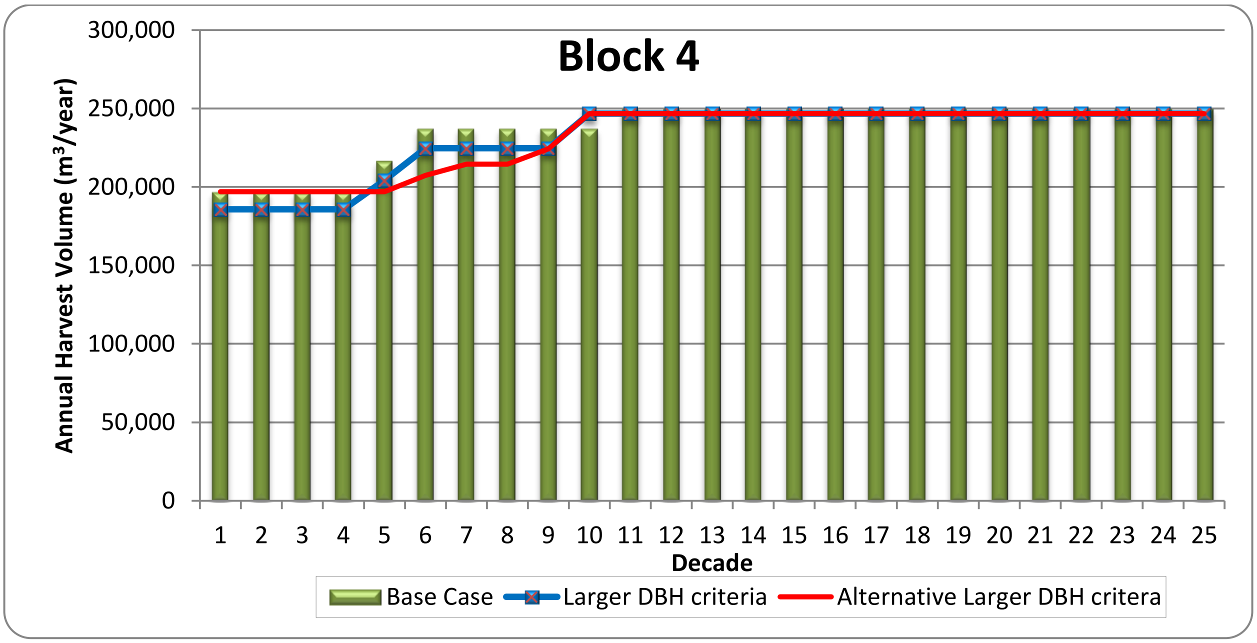

Figure 139 – Block 4 Harvest levels with Increased Minimum DBH

Initially available growing stock is reduced by 98,600 m^3 (7.7%) in Block 3 and 5 when the minimum diameter criteria is increased by 2 cm. This reduction plus the delay in availability of stands reduces short-term timber supply by 4,400 m^3/year (10.7%) and long-term timber supply by 500 m^3/year (1.1%). Total harvest declines by 424,000 m^3 (1.5%). Alternatively, the initial harvest of the Base Case can be achieved by reducing mid-term timber supply by 6,200 m^3/year (15.0%). Again, long-term supply declines by 500 m^3/year. Total harvest is reduced by 485,000 m^3 (4.4%).

Table 139 – Block 3&5 Harvest levels with Increased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Increased Minimum DBH	Difference	Alternate Increased Minimum DBH	Difference
1	2012	2021	41,300	36,900	- 4,400	41,300	0
2	2022	2031	41,300	36,900	- 4,400	37,200	- 4,100
3 - 7	2032	2081	41,300	36,900	- 4,400	35,100	- 6,200
8	2082	2091	45,000	41,900	- 4,300	40,100	- 4,900
9 - 25	2092	2261	45,000	44,500	- 500	44,500	- 500

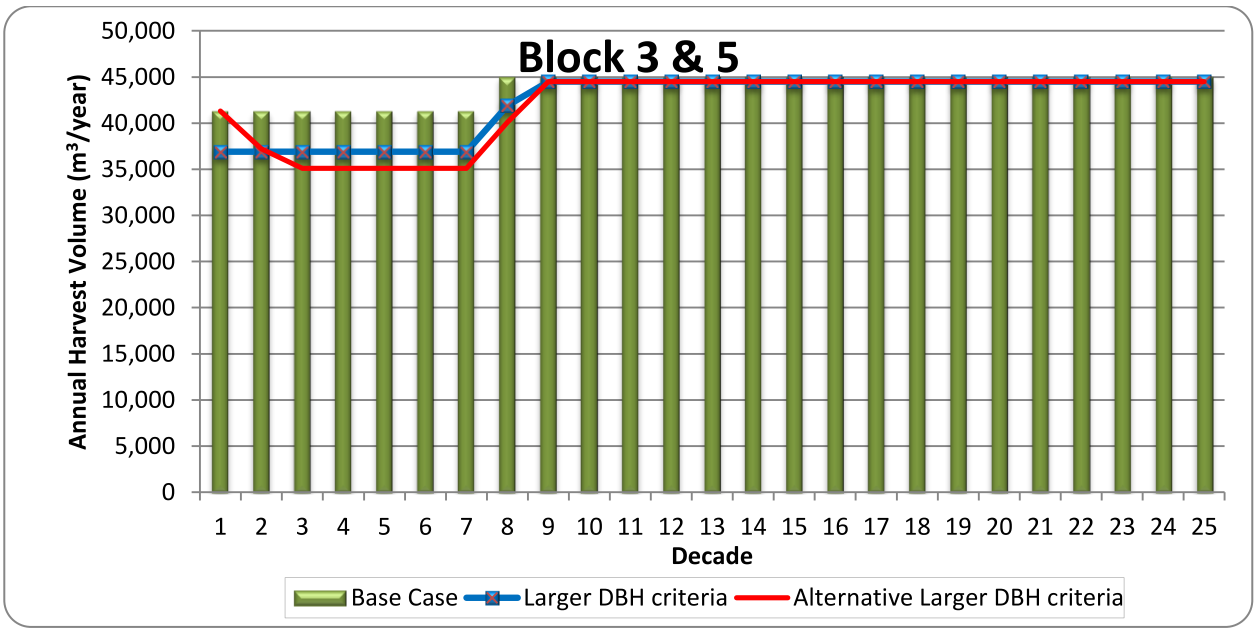

Figure 140 – Block 3&5 Harvest levels with Increased Minimum DBH

Appendix B17 – Decrease Minimum DBH by 2cm

If minimum harvest diameter criteria is decreased by 2 cm the initial available inventory in Block 1 increases by 878,200 m^3 (7.6%). This and earlier availability of stands into the future allows timber supply to improve by 2,600 m^3/year (0.6%) and total harvest increases by 650,000 m^3 (0.6%).

Table 140 – Block 1 Harvest levels with Decreased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Decreased Minimum DBH	Difference
1 - 25	2012	2261	435,300	437,900	+ 2,600

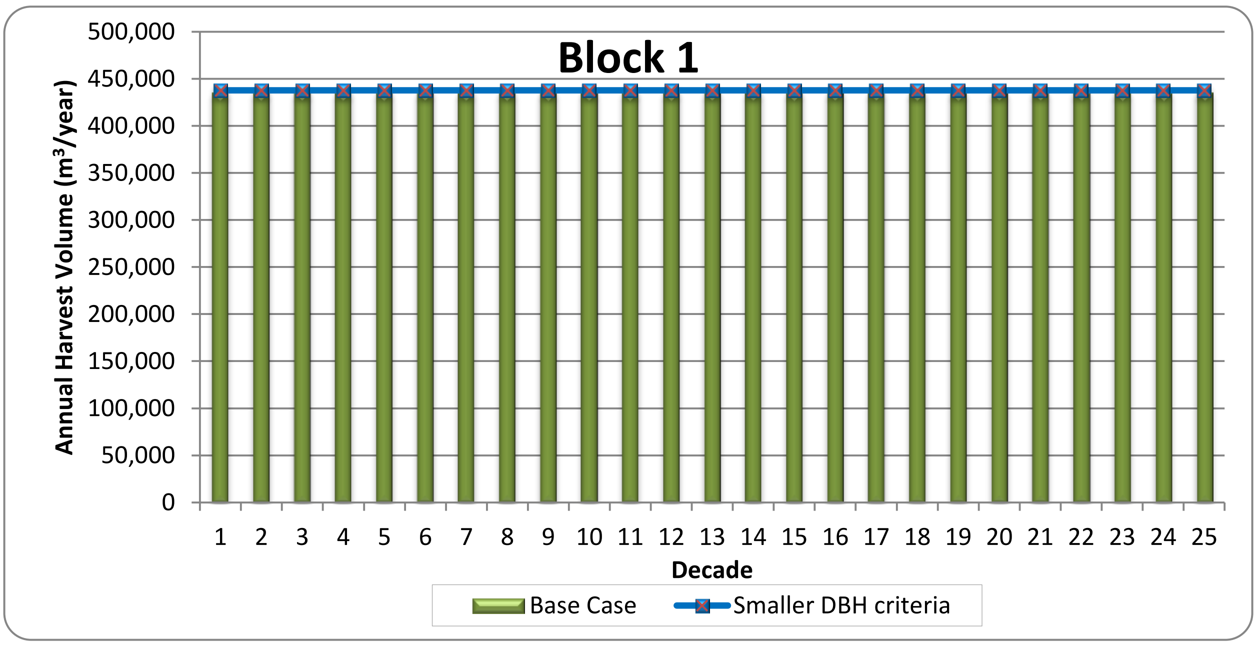

Figure 141 – Block 1 Harvest levels with Decreased Minimum DBH

By decreasing minimum diameter criteria 2 cm the initially available growing stock in Block 2 increases by 1.19 million m^3 (5.9%). This increase in available inventory, plus earlier stand availability in the future, allows short and mid-term harvest to increase by about 28,400 m^3/year (on average) and long-term to increase by 800 m^3/year (0.1%). Total harvest is increased by 2.13 million m^3 (1.0%). Alternatively, the additional inventory can be used to lessen the mid-term timber supply “dip”. This alternate schedule maintains the initial harvest level of the Base Case, increases mid-term timber supply by about 32,000 m^3/year (4.5% on average), and increase LTHL by 1,000 m^3/year (0.1%). Total harvest increases by 2.10 million m^3 (1.0%).

Table 141 – Block 2 Harvest levels with Decreased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)				
			Base Case	Decreased Minimum DBH	Difference	Alternate Decreased Minimum DBH	Difference
1	2012	2021	864,300	894,100	+ 29,800	864,300	0
2	2022	2031	777,900	804,700	+ 26,800	811,200	+ 33,300
3 - 5	2032	2061	706,100	734,500	+ 28,400	738,600	+ 32,500
6	2062	2071	756,100	784,500	+ 28,400	788,600	+ 32,500
7	2072	2081	806,100	834,500	+ 28,400	834,700	+ 28,600
8 - 25	2082	2261	833,700	834,500	+ 800	834,700	+ 1,000

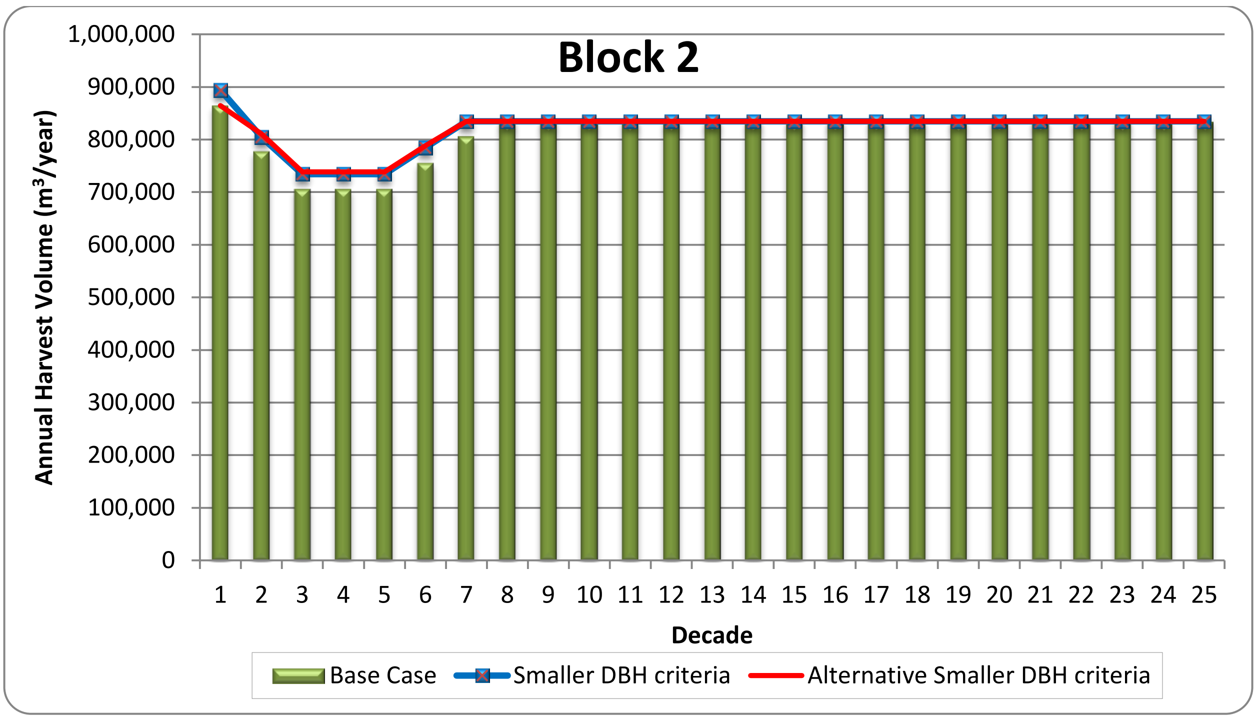

Figure 142 – Block 2 Harvest levels with Decreased Minimum DBH

Smaller harvest diameter criteria increases initially available inventory in Block 4 by 592,100 m^3 (13.8%). This permits short-term harvest to increase by 1,000 m^3/year (0.5%), mid-term harvest increase by up to 12,000 m^3/year (5.1%) and reduces LTHL by 600 m^3/year (0.2%). Total harvest increase by 681,000 m^3 (1.1%). Long-term harvest is slightly lower due to the greater mid-term harvest reducing inventory levels and shorter long-term rotations.

Table 142 – Block 4 Harvest levels with Decreased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Decreased Minimum DBH	Difference
1 - 3	2012	2041	197,000	198,000	+ 1,000
4	2042	2051	197,000	204,600	+ 7,600
5	2052	2061	216,700	225,000	+ 8,300
6	2062	2071	237,300	247,500	+ 10,200
7 – 10	2072	2101	237,300	249,300	+ 12,000
11 - 25	2112	2261	249,900	249,300	- 600

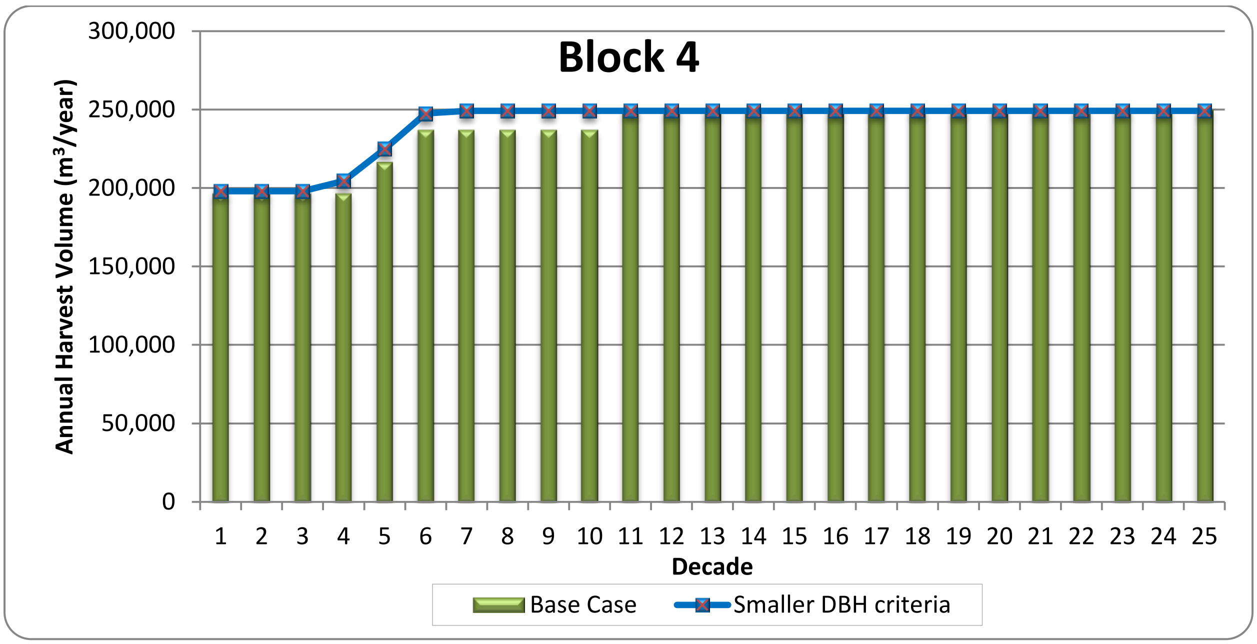

Figure 143 – Block 4 Harvest levels with Decreased Minimum DBH

If minimum harvest diameter criteria is decreased by 2 cm the initial available inventory in Block 3 and 5 increases by 54,700 m^3 (4.3%). This and earlier availability of stands into the future allows timber supply to improve by 4,100 m^3/year (9.9%) in the short and mid-term and 400 m^3/year (0.9%) in the long-term. Total harvest increases by 359,000 m^3 (3.3%).

Table 143 – Block 3&5 Harvest levels with Decreased Minimum DBH

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Decreased Minimum DBH	Difference
1 – 7	2012	2281	41,300	45,400	+ 4,100
8 - 25	2082	2261	45,000	45,400	+ 400

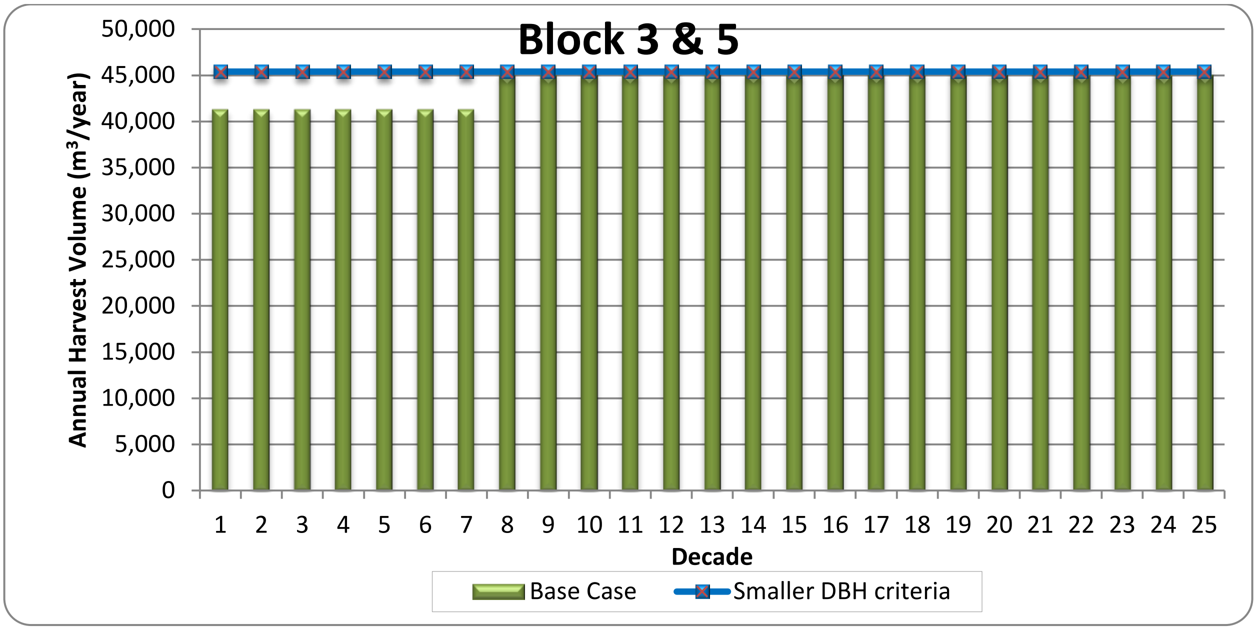

Figure 144 – Block 3&5 Harvest levels with Decreased Minimum DBH

Appendix B18 – Blocks 3 and 5 Managed Individually

Managing Block 3 and Block 5 separately greatly reduces mid-term timber supply. Harvest in Decades 5 – 7 is reduced by 10,300 m^3/year. This is not large impact at TFL-level (0.7%) but is nearly 25% less from Block 3 and 5.

Table 144 – Block 3&5 Harvest levels with block managed individually

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Blocks managed individually	Difference
1	2012	2021	41,300	40,100	- 1,200
2	2022	2031	41,300	37,500	- 3,800
3	2032	2041	41,300	35,100	- 6,200
4	2042	2051	41,300	32,900	- 8,400
5 – 7	2052	2081	41,300	31,000	- 10,300
8	2082	2091	45,000	36,000	- 9,000
9	2092	2101	45,000	41,000	- 4,000
10 - 25	2102	2261	45,000	45,000	0

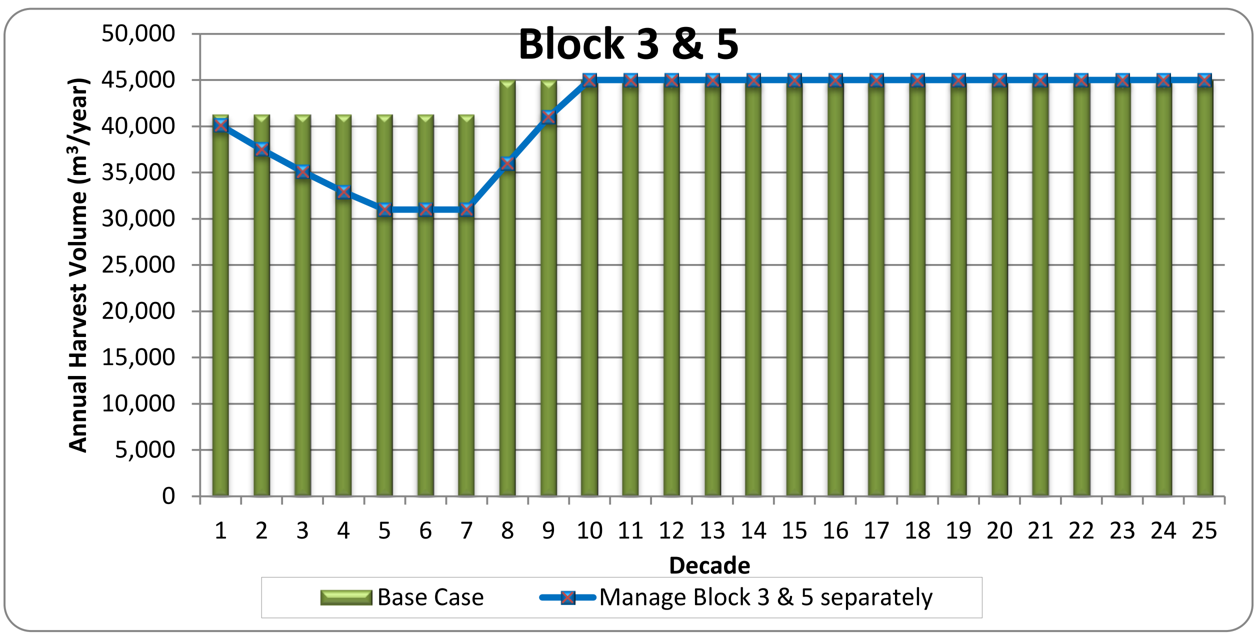

Figure 145 – Block 3&5 Harvest levels with block managed individually

Table 145 – Block 3 Harvest levels with block managed individually

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Blocks managed individually	Difference
1	2012	2021	20,900	26,600	+ 5,700
2	2022	2031	30,700	23,900	- 6,800
3	2032	2041	28,800	21,500	- 7,300
4	2042	2051	30,500	19,400	- 11,100
5	2052	2061	14,800	17,400	+ 2,600
6	2062	2071	700	17,400	+ 16,700
7	2072	2081	16,500	17,400	+ 900
8	2082	2091	14,900	17,400	+ 2,500
9	2092	2101	12,900	17,400	+ 4,500
10	2102	2111	9,300	17,400	+ 8,100
11	2112	2121	29,800	17,400	- 12,400
12	2122	2131	33,200	17,400	- 15,800
13	2132	2141	22,200	17,400	- 4,800
14	2142	2151	7,700	17,400	+ 9,700
15	2152	2161	17,300	17,400	+ 100
16	2162	2171	9,000	17,400	+ 8,400
17	2172	2181	3,400	17,400	+ 14,000
18	2182	2191	12,800	17,400	+ 4,600
19	2192	2201	23,600	17,400	- 6,200
20	2202	2211	38,700	17,400	- 21,300
21	2212	2221	28,300	17,400	- 10,900
22	2222	2231	11,000	17,400	+ 6,400
23	2232	2241	6,800	17,400	+ 10,600
24	2242	2251	10,000	17,400	+ 7,400
25	2252	2261	12,800	17,400	+ 4,600

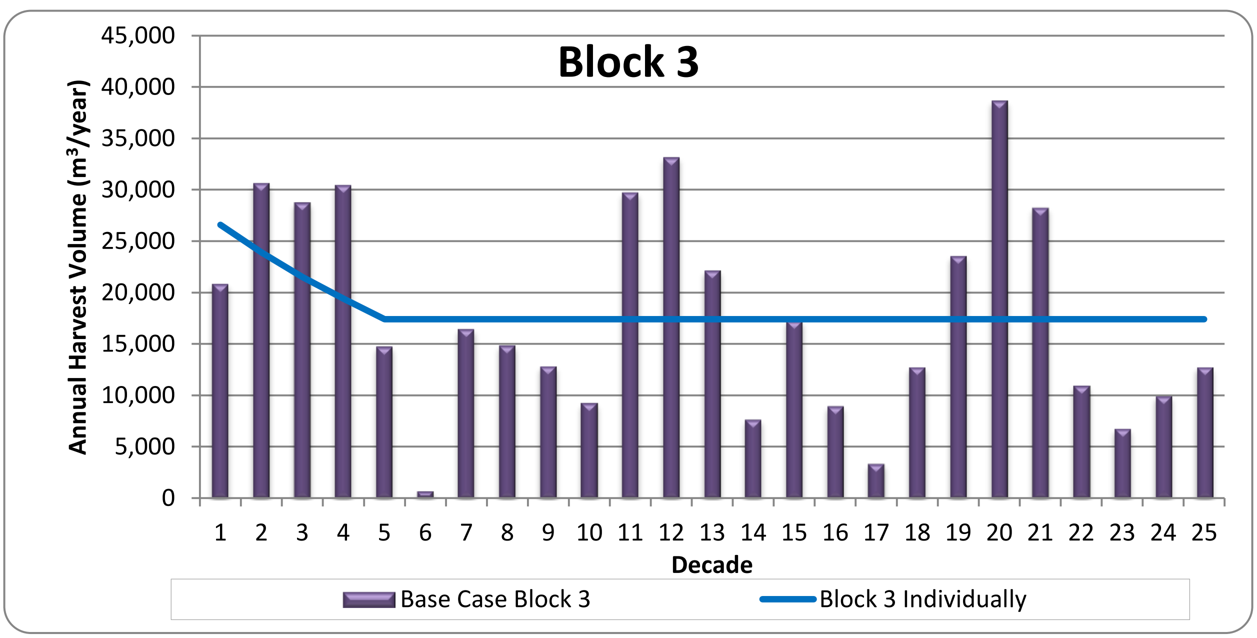

Figure 146 – Block 3 Harvest levels with blocks managed individually

Table 146 – Block 5 Harvest levels with block managed individually

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Blocks managed individually	Difference
1	2012	2021	20,400	13,600	- 6,800
2	2022	2031	10,600	13,600	+ 3,000
3	2032	2041	12,600	13,600	+ 1,000
4	2042	2051	10,900	13,600	+ 2,700
5	2052	2061	26,600	13,600	- 13,000
6	2062	2071	40,600	13,600	- 27,000
7	2072	2081	24,900	13,600	- 11,300
8	2082	2091	30,000	18,600	- 11,400
9	2092	2101	32,100	23,600	- 8,500
10	2102	2111	35,600	27,500	- 8,100
11	2112	2121	15,200	27,500	+ 12,300
12	2122	2131	11,800	27,500	+ 15,700
13	2132	2141	22,800	27,500	+ 4,700
14	2142	2151	37,200	27,500	- 9,700
15	2152	2161	27,600	27,500	- 100
16	2162	2171	36,000	27,500	- 8,500
17	2172	2181	41,600	27,500	- 14,100
18	2182	2191	32,100	27,500	- 4,600
19	2192	2201	21,400	27,500	+ 6,100
20	2202	2211	6,300	27,500	+ 21,200
21	2212	2221	16,600	27,500	+ 10,900
22	2222	2231	34,000	27,500	- 6,500
23	2232	2241	38,100	27,500	- 10,600
24	2242	2251	34,900	27,500	- 7,400
25	2252	2261	32,100	27,500	- 4,600

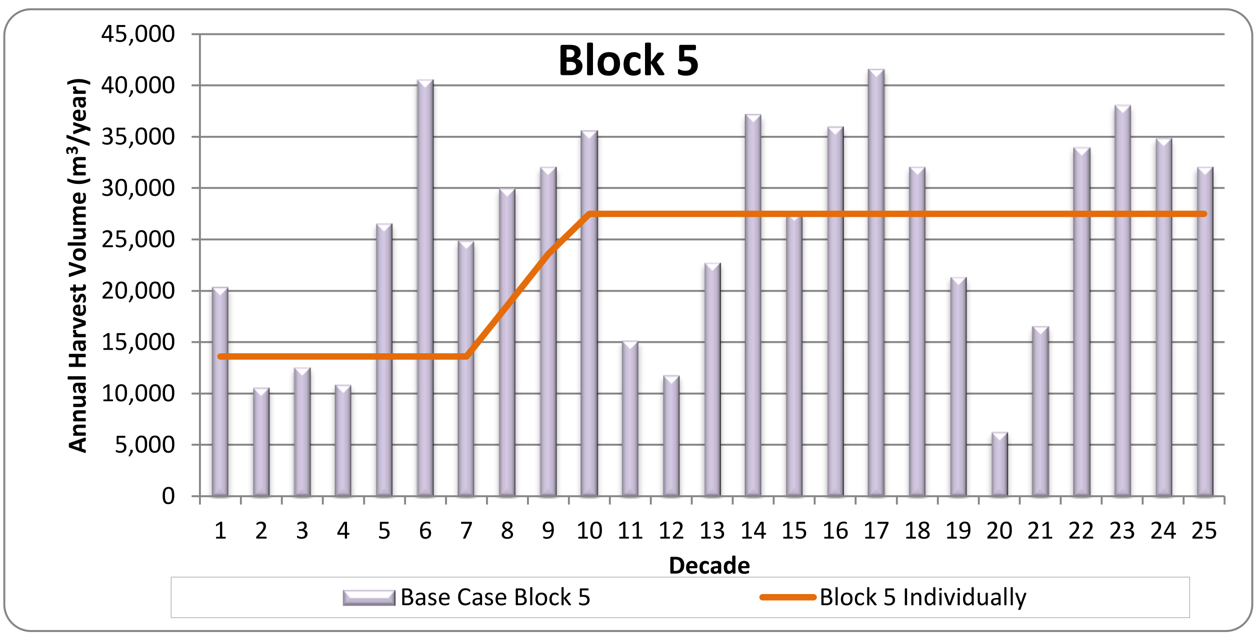

Figure 147 – Block 5 Harvest levels with block managed individually

Appendix B19 – SCCO Old Seral Targets Addressed Aspatially

Meeting the old seral objectives aspatially reduces short-term harvest by 700 m^3/year (1.7%) but increases long-term harvest opportunity by 6,400 m^3/year (14.2%).

Table 147 – Block 3&5 Harvest levels with old seral addressed aspatially

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Aspatial Old Seral	Difference
1 - 7	2012	2081	41,300	40,600	- 700
8	2082	2091	45,000	45,600	+ 600
9	2092	2101	45,000	50,600	+ 5,600
10 - 25	2102	2261	45,000	51,400	+ 6,400

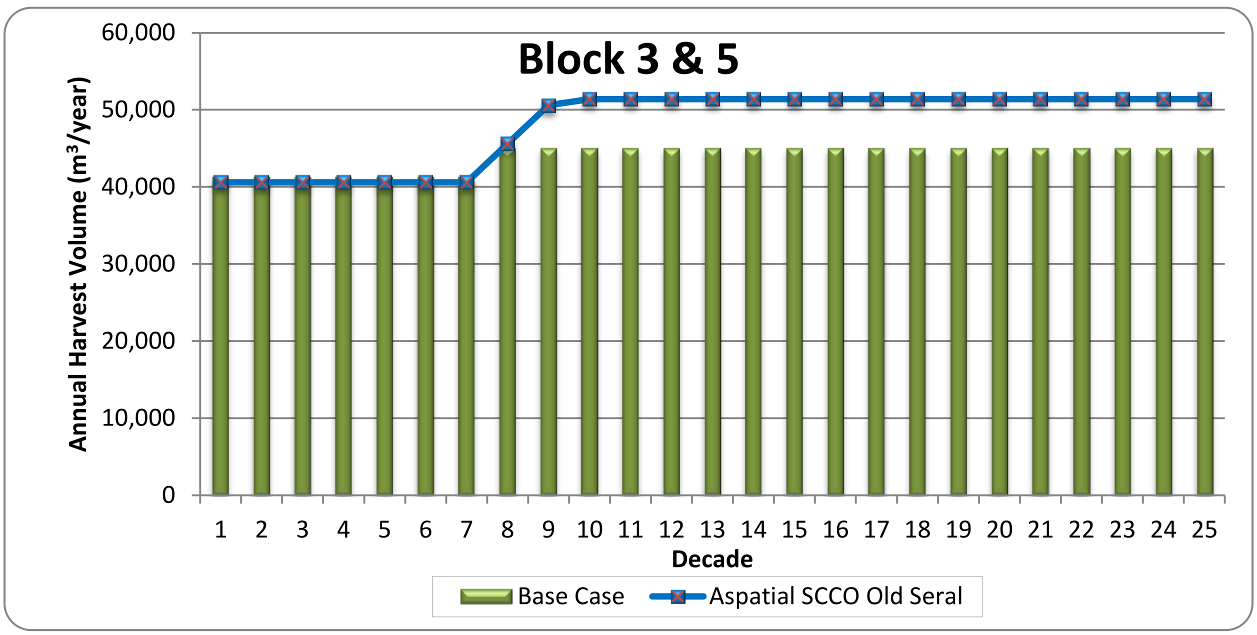

Figure 148 – Block 3&5 Harvest levels with old seral addressed aspatially

Table 148 – Block 3 Harvest levels with old seral addressed aspatially

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Aspatial Old Seral	Difference
1	2012	2021	20,900	11,600	- 9,300
2	2022	2031	30,700	23,400	- 7,300
3	2032	2041	28,800	25,400	- 3,400
4	2042	2051	30,500	27,700	- 2,800
5	2052	2061	14,800	23,600	+ 8,800
6	2062	2071	700	18,200	+ 17,500
7	2072	2081	16,500	23,700	+ 7,200
8	2082	2091	14,900	18,900	+ 4,000
9	2092	2101	12,900	3,300	- 9,600
10	2102	2111	9,300	500	- 8,800
11	2112	2121	29,800	29,600	- 200
12	2122	2131	33,200	34,200	+ 1,000
13	2132	2141	22,200	32,700	+ 10,500
14	2142	2151	7,700	16,600	+ 8,900
15	2152	2161	17,300	4,800	- 12,500
16	2162	2171	9,000	21,700	+ 12,700
17	2172	2181	3,400	30,400	+ 27,000
18	2182	2191	12,800	6,700	- 6,100
19	2192	2201	23,600	20,700	- 2,900
20	2202	2211	38,700	38,600	- 100
21	2212	2221	28,300	21,100	- 7,200
22	2222	2231	11,000	30,500	+ 19,500
23	2232	2241	6,800	5,200	- 1,600
24	2242	2251	10,000	6,100	- 3,900
25	2252	2261	12,800	5,500	- 7,300

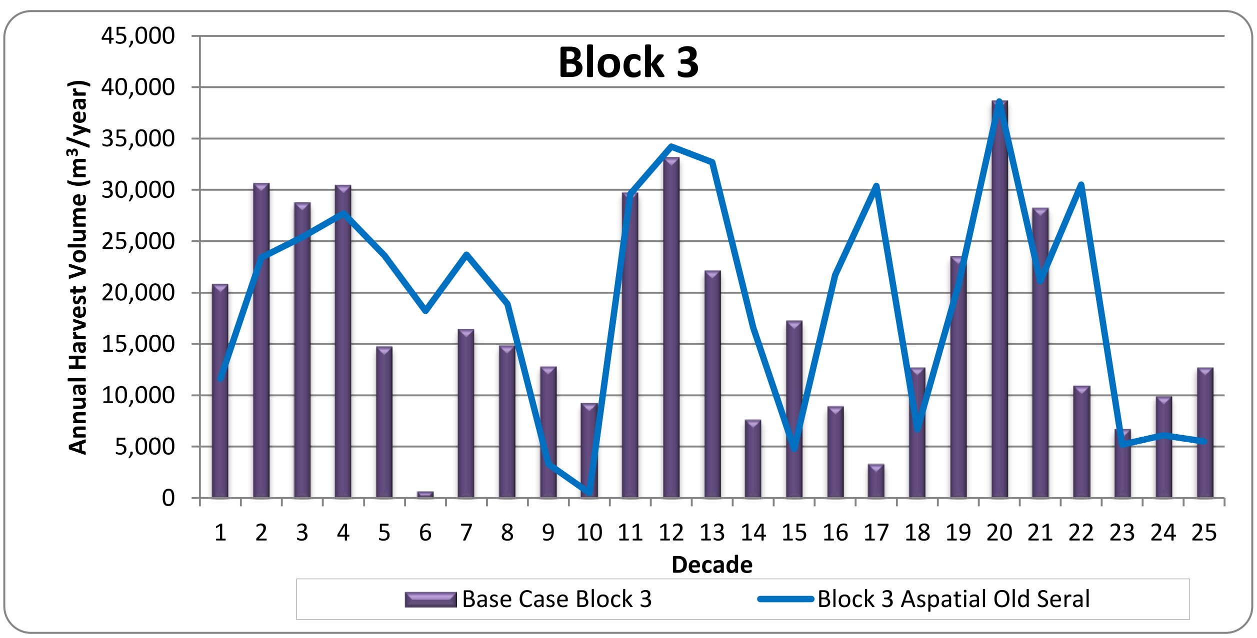

Figure 149 – Block 3 Harvest levels with old seral addressed aspatially

Table 149 – Block 5 Harvest levels with old seral addressed aspatially

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Aspatial Old Seral	Difference
1	2012	2021	20,400	29,100	+ 8,700
2	2022	2031	10,600	17,300	+ 6,700
3	2032	2041	12,600	15,200	+ 2,600
4	2042	2051	10,900	12,900	+ 2,000
5	2052	2061	26,600	17,000	- 9,600
6	2062	2071	40,600	22,400	- 18,200
7	2072	2081	24,900	17,000	- 7,900
8	2082	2091	30,000	26,700	- 3,300
9	2092	2101	32,100	47,300	+ 15,200
10	2102	2111	35,600	50,800	+ 15,200
11	2112	2121	15,200	21,800	+ 6,600
12	2122	2131	11,800	17,100	+ 5,300
13	2132	2141	22,800	18,600	- 4,200
14	2142	2151	37,200	34,800	- 2,400
15	2152	2161	27,600	46,500	+ 18,900
16	2162	2171	36,000	29,600	- 6,400
17	2172	2181	41,600	21,000	- 20,600
18	2182	2191	32,100	44,600	+ 12,500
19	2192	2201	21,400	30,700	+ 9,300
20	2202	2211	6,300	12,700	+ 6,400
21	2212	2221	16,600	30,300	+ 13,700
22	2222	2231	34,000	20,900	- 13,100
23	2232	2241	38,100	46,100	+ 8,000
24	2242	2251	34,900	45,200	+ 10,300
25	2252	2261	32,100	45,900	+ 13,800

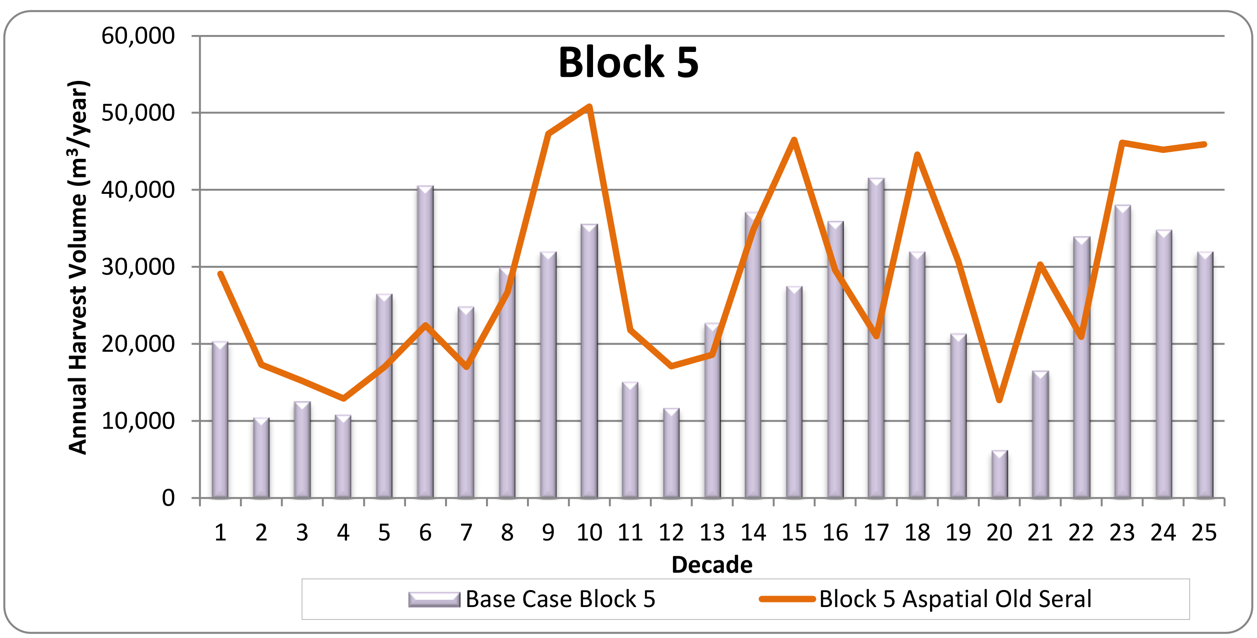

Figure 150 – Block 5 Harvest levels with old seral addressed aspatially

Appendix B20 – SCCO Risk-managed Old Seral Targets

Reducing the old seral targets in Block 5 (Phillips landscape unit) to 30% RONV increases short-term harvest from Block 3 and 5 by 6,100 m^3/year (14.8%) and long-term harvest by 16,700 m^3/year (37.1%). Total harvest is increased by 3.30 million m^3 (30.0%).

Table 150 – Block 3&5 Harvest levels with risk-managed old seral targets

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Aspatial Old Seral	Difference
1 - 7	2012	2081	41,300	47,400	+ 6,100
8	2082	2091	45,000	52,400	+ 7,400
9	2092	2101	45,000	57,400	+ 12,400
10 - 25	2102	2261	45,000	61,700	+ 16,700

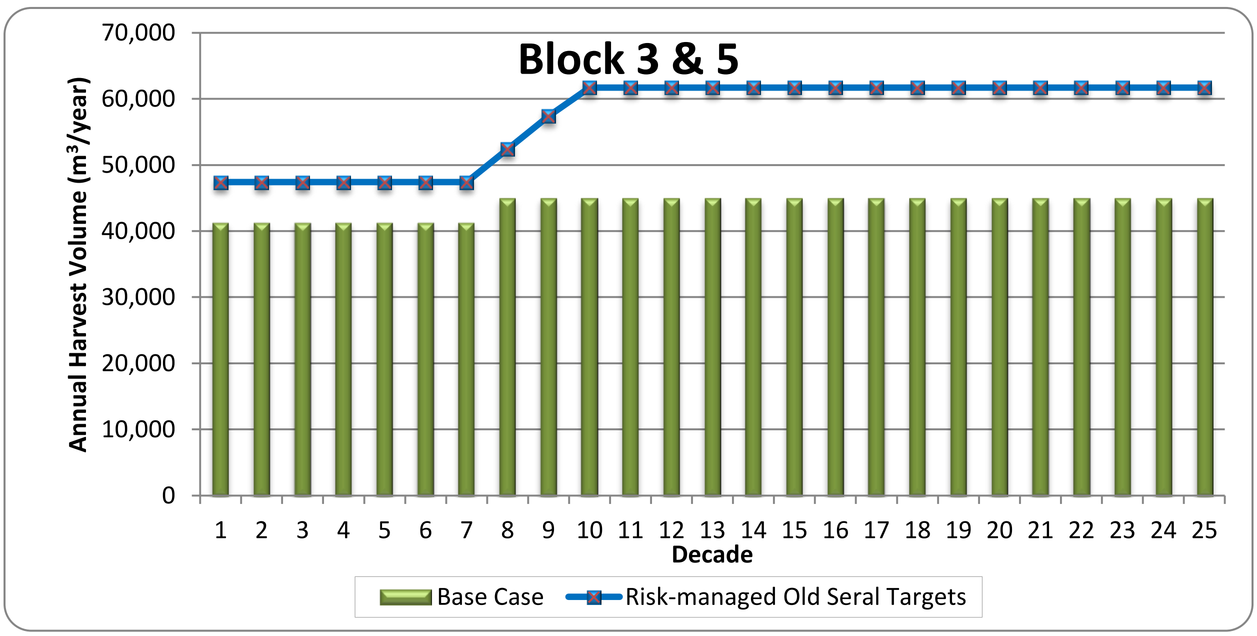

Figure 151 – Block 3&5 Harvest levels with risk-managed old seral targets

Table 151 – Block 3 Harvest levels with risk-managed old seral targets

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	Risk-managed Old Seral	Difference
1	2012	2021	20,900	6,100	- 14,800
2	2022	2031	30,700	32,200	+ 1,500
3	2032	2041	28,800	29,300	+ 500
4	2042	2051	30,500	29,900	- 600
5	2052	2061	14,800	18,300	+ 3,500
6	2062	2071	700	0	- 700
7	2072	2081	16,500	27,000	+ 10,500
8	2082	2091	14,900	8,600	- 6,300
9	2092	2101	12,900	4,500	- 8,400
10	2102	2111	9,300	0	- 9,300
11	2112	2121	29,800	30,400	+ 600
12	2122	2131	33,200	42,100	+ 8,900
13	2132	2141	22,200	17,200	- 5,000
14	2142	2151	7,700	6,700	- 1,000
15	2152	2161	17,300	25,600	+ 8,300
16	2162	2171	9,000	26,800	+ 17,800
17	2172	2181	3,400	27,600	+ 24,200
18	2182	2191	12,800	7,100	- 5,700
19	2192	2201	23,600	16,800	- 6,800
20	2202	2211	38,700	52,000	+ 13,300
21	2212	2221	28,300	24,900	- 3,400
22	2222	2231	11,000	5,700	- 5,300
23	2232	2241	6,800	12,800	+ 6,000
24	2242	2251	10,000	21,900	+ 11,900
25	2252	2261	12,800	27,700	+ 14,900

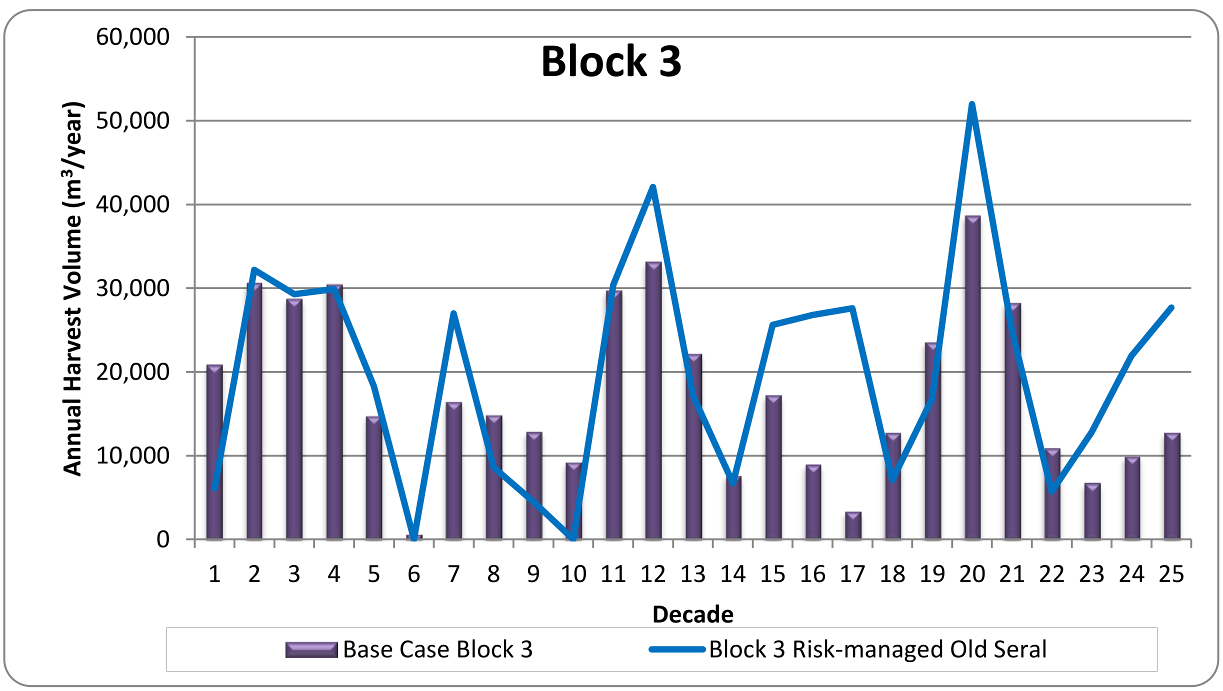

Figure 152 – Block 3 Harvest levels with risk-managed old seral targets

Table 152 – Block 5 Harvest levels with risk-managed old seral targets

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	Risk-managed Old Seral	Difference
1	2012	2021	20,400	41,400	+ 21,000
2	2022	2031	10,600	15,200	+ 4,600
3	2032	2041	12,600	18,200	+ 5,600
4	2042	2051	10,900	17,600	+ 6,700
5	2052	2061	26,600	29,200	+ 2,600
6	2062	2071	40,600	47,400	+ 6,800
7	2072	2081	24,900	20,400	- 4,500
8	2082	2091	30,000	43,900	+ 13,900
9	2092	2101	32,100	52,900	+ 20,800
10	2102	2111	35,600	61,700	+ 26,100
11	2112	2121	15,200	31,300	+ 16,100
12	2122	2131	11,800	19,600	+ 7,800
13	2132	2141	22,800	44,400	+ 21,600
14	2142	2151	37,200	55,000	+ 17,800
15	2152	2161	27,600	36,100	+ 8,500
16	2162	2171	36,000	34,900	- 1,100
17	2172	2181	41,600	34,100	- 7,500
18	2182	2191	32,100	54,600	+ 22,500
19	2192	2201	21,400	44,900	+ 23,500
20	2202	2211	6,300	9,700	+ 3,400
21	2212	2221	16,600	36,800	+ 20,200
22	2222	2231	34,000	56,000	+ 22,000
23	2232	2241	38,100	48,900	+ 10,800
24	2242	2251	34,900	39,800	+ 4,900
25	2252	2261	32,100	34,000	+ 1,900

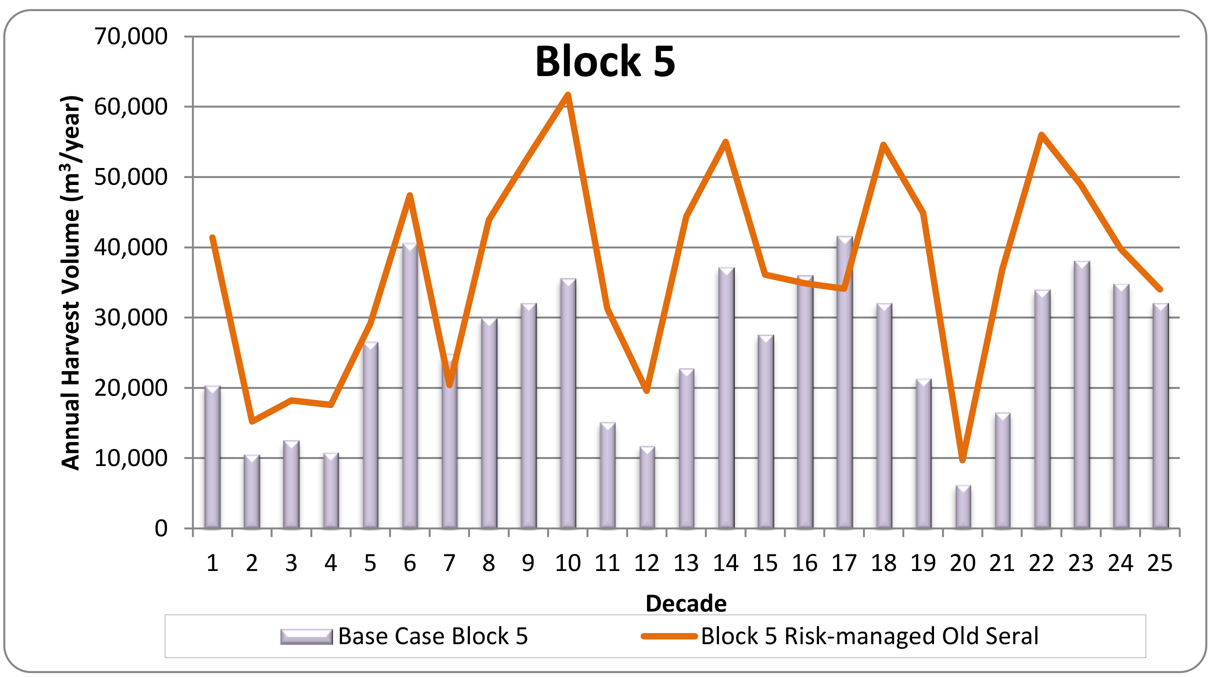

Figure 153 – Block 5 Harvest levels with risk-managed old seral targets

Appendix B21 – Phillips Old Seral Targets based on 50% RONV

Reducing the old seral targets in Block 5 (Phillips landscape unit) to 50% RONV increase short-term harvest from Block 3 and 5 by 3,100 m^3/year (7.5%) and long-term harvest by 13,100 m^3/year (29.1%). Total harvest is increased by 2.45 million m^3 (22.3%).

Table 153 – Block 3&5 Harvest levels with 50% RONV old seral targets in Block 5

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	50% RONV Targets for Block 5	Difference
1 - 7	2012	2081	41,300	44,400	+ 3,100
8	2082	2091	45,000	49,400	+ 4,400
9	2092	2101	45,000	54,400	+ 9,400
10 - 25	2102	2261	45,000	58,100	+ 13,100

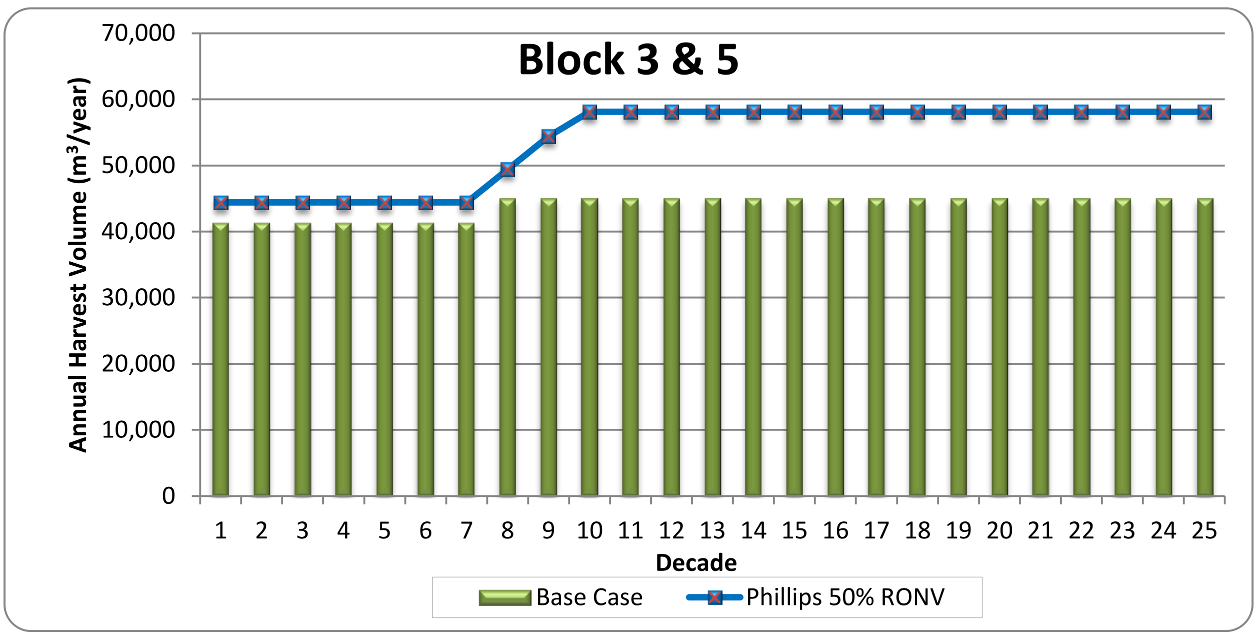

Figure 154 – Block 3&5 Harvest levels with 50% RONV old seral targets in Block 5

Table 154 – Block 3 Harvest levels with 50% RONV old seral targets in Block 5

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	50% RONV Targets for Block 5	Difference
1	2012	2021	20,900	10,700	- 10,200
2	2022	2031	30,700	25,300	- 5,400
3	2032	2041	28,800	28,600	- 200
4	2042	2051	30,500	29,500	- 1,000
5	2052	2061	14,800	23,500	+ 8,700
6	2062	2071	700	800	+ 100
7	2072	2081	16,500	31,600	+ 15,100
8	2082	2091	14,900	18,600	+ 3,700
9	2092	2101	12,900	4,400	- 8,500
10	2102	2111	9,300	0	- 9,300
11	2112	2121	29,800	22,200	- 7,600
12	2122	2131	33,200	34,000	+ 800
13	2132	2141	22,200	29,000	+ 6,800
14	2142	2151	7,700	14,100	+ 6,400
15	2152	2161	17,300	7,500	- 9,800
16	2162	2171	9,000	32,100	+ 23,100
17	2172	2181	3,400	33,200	+ 29,800
18	2182	2191	12,800	6,200	- 6,600
19	2192	2201	23,600	18,600	- 5,000
20	2202	2211	38,700	41,400	+ 2,700
21	2212	2221	28,300	20,500	- 7,800
22	2222	2231	11,000	27,400	+ 16,400
23	2232	2241	6,800	4,400	- 2,400
24	2242	2251	10,000	4,500	- 5,500
25	2252	2261	12,800	20,800	+ 8,000

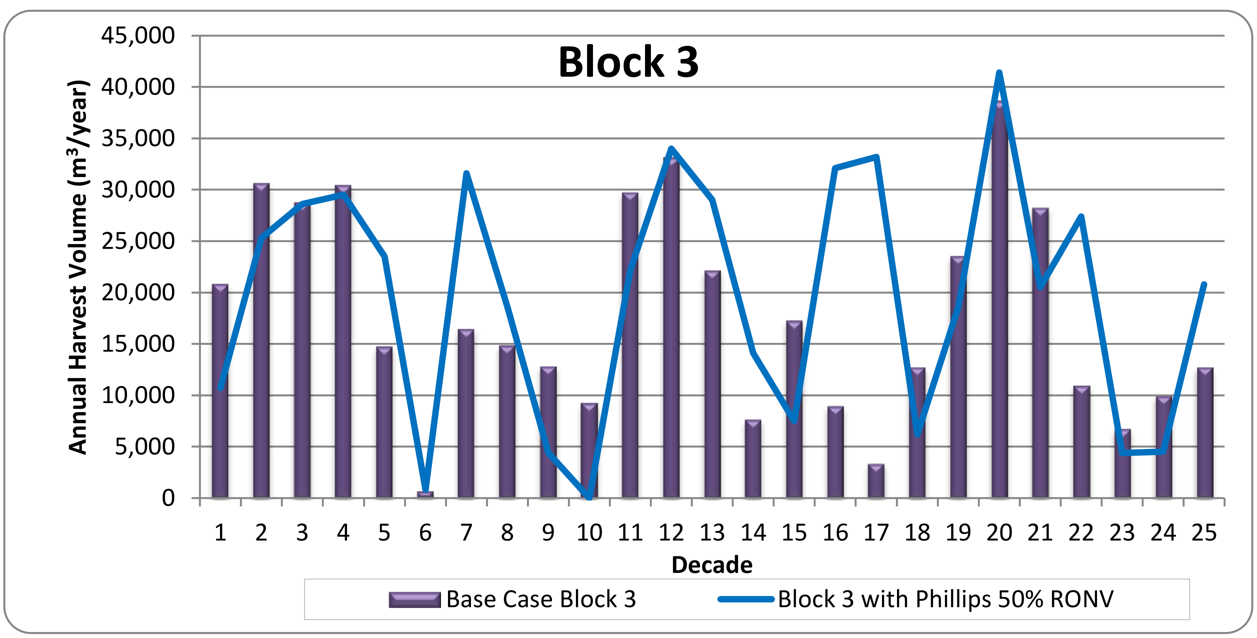

Figure 155 – Block 3 Harvest levels with 50% RONV old seral targets in Block 5

Table 155 – Block 5 Harvest levels with 50% RONV old seral targets in Block 5

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	50% RONV Targets for Block 5	Difference
1	2012	2021	20,400	33,700	+ 13,300
2	2022	2031	10,600	19,100	+ 8,500
3	2032	2041	12,600	15,800	+ 3,200
4	2042	2051	10,900	14,900	+ 4,000
5	2052	2061	26,600	20,900	- 5,700
6	2062	2071	40,600	43,600	+ 3,000
7	2072	2081	24,900	12,800	- 12,100
8	2082	2091	30,000	30,800	+ 800
9	2092	2101	32,100	50,000	+ 17,900
10	2102	2111	35,600	58,100	+ 22,500
11	2112	2121	15,200	36,000	+ 20,800
12	2122	2131	11,800	24,100	+ 12,300
13	2132	2141	22,800	29,100	+ 6,300
14	2142	2151	37,200	44,000	+ 6,800
15	2152	2161	27,600	50,600	+ 23,000
16	2162	2171	36,000	26,100	- 9,900
17	2172	2181	41,600	25,000	- 16,600
18	2182	2191	32,100	51,900	+ 19,800
19	2192	2201	21,400	39,600	+ 18,200
20	2202	2211	6,300	16,800	+ 10,500
21	2212	2221	16,600	37,600	+ 21,000
22	2222	2231	34,000	30,700	- 3,300
23	2232	2241	38,100	53,700	+ 15,600
24	2242	2251	34,900	53,600	+ 18,700
25	2252	2261	32,100	37,400	+ 5,300

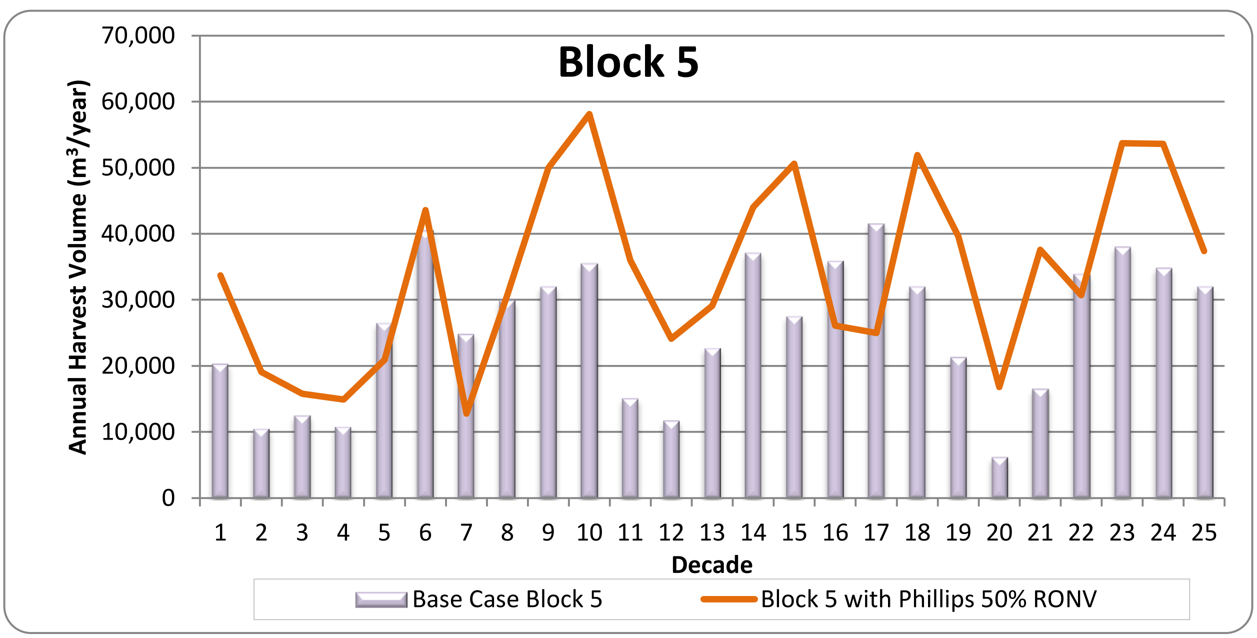

Figure 156 – Block 5 Harvest levels with 50% RONV old seral targets in Block 5

Appendix B22 – No South Central Coast Order Netdowns

Removing the netdowns associated with the SCCO increases short-term harvest from Block 3 and 5 by 18,300 m^3/year (44.3%) and long-term harvest by 20,200 m^3/year (44.9%). Total harvest is increased by 4.91 million m^3 (44.7%).

Table 156 – Block 3&5 Harvest levels with no SCCO order

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No SCCO Order	Difference
1 - 7	2012	2081	41,300	59,600	+ 18,300
8	2082	2091	45,000	64,600	+ 19,600
9 - 25	2092	2261	45,000	65,200	+ 20,200

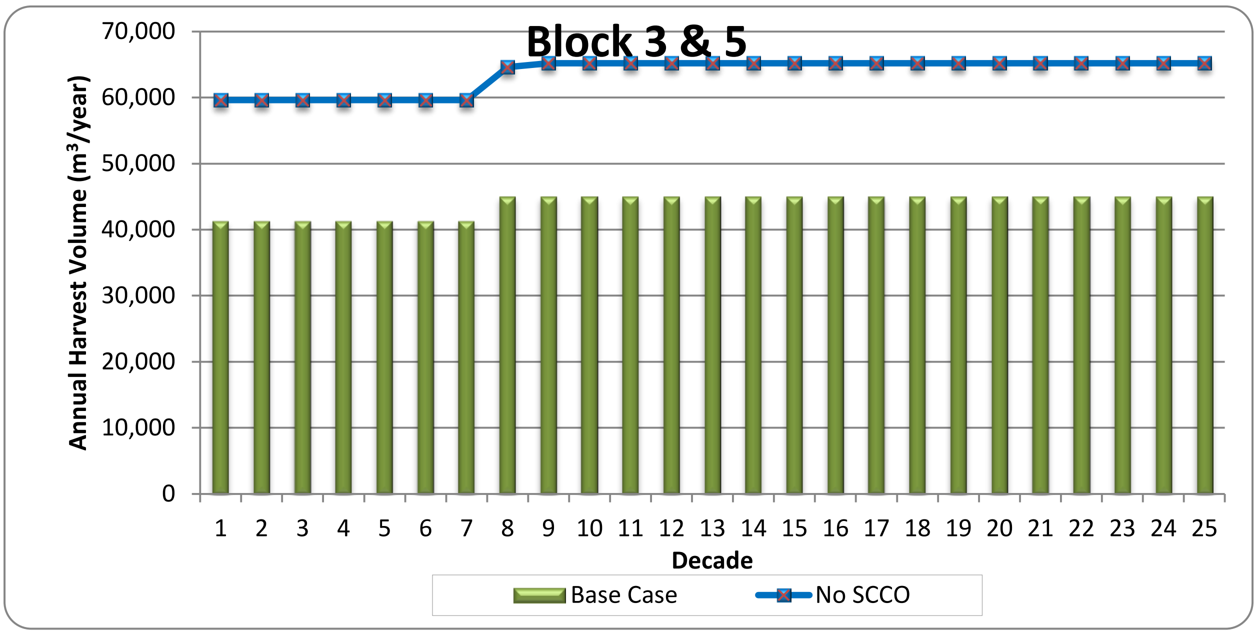

Figure 157 – Block 3&5 Harvest levels with no SCCO order

Table 157 – Block 3 Harvest levels with no SCCO order

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) Base Case	No SCCO Order	Difference
1	2012	2021	20,900	21,000	+ 100
2	2022	2031	30,700	30,400	- 300
3	2032	2041	28,800	47,400	+ 18,600
4	2042	2051	30,500	38,200	+ 7,700
5	2052	2061	14,800	22,400	+ 7,600
6	2062	2071	700	2,100	+ 1,400
7	2072	2081	16,500	13,500	- 3,000
8	2082	2091	14,900	33,800	+ 18,900
9	2092	2101	12,900	12,700	- 200
10	2102	2111	9,300	1,800	- 7,500
11	2112	2121	29,800	44,700	+ 14,900
12	2122	2131	33,200	47,200	+ 14,000
13	2132	2141	22,200	22,700	+ 500
14	2142	2151	7,700	9,000	+ 1,300
15	2152	2161	17,300	25,200	+ 7,900
16	2162	2171	9,000	15,300	+ 6,300
17	2172	2181	3,400	12,000	+ 8,600
18	2182	2191	12,800	12,200	- 600
19	2192	2201	23,600	24,900	+ 1,300
20	2202	2211	38,700	55,800	+ 17,100
21	2212	2221	28,300	19,700	- 8,600
22	2222	2231	11,000	31,400	+ 20,400
23	2232	2241	6,800	8,300	+ 1,500
24	2242	2251	10,000	13,300	+ 3,300
25	2252	2261	12,800	18,500	+ 5,700

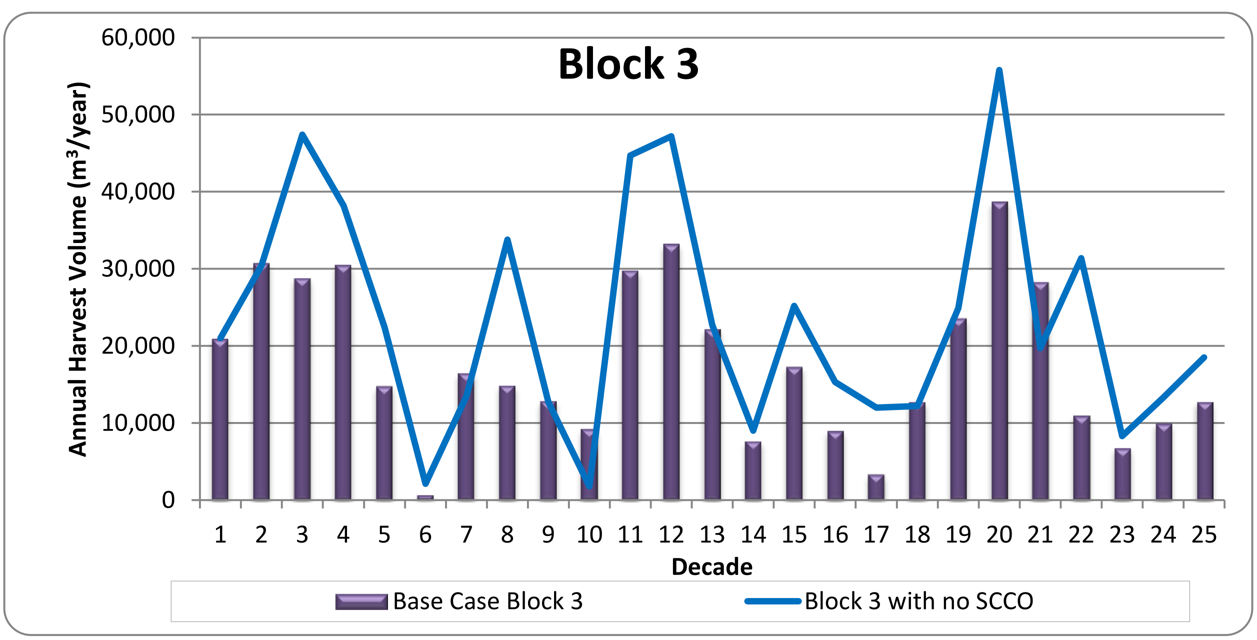

Figure 158 – Block 3 Harvest levels with no SCCO order

Table 158 – Block 5 Harvest levels with no SCCO order

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			Base Case	No SCCO Order	Difference
1	2012	2021	20,400	38,600	+ 18,200
2	2022	2031	10,600	29,200	+ 18,600
3	2032	2041	12,600	12,200	- 400
4	2042	2051	10,900	21,300	+ 10,400
5	2052	2061	26,600	37,100	+ 10,500
6	2062	2071	40,600	57,400	+ 16,800
7	2072	2081	24,900	46,100	+ 21,200
8	2082	2091	30,000	30,800	+ 800
9	2092	2101	32,100	52,500	+ 20,400
10	2102	2111	35,600	63,400	+ 27,800
11	2112	2121	15,200	20,500	+ 5,300
12	2122	2131	11,800	18,000	+ 6,200
13	2132	2141	22,800	42,500	+ 19,700
14	2142	2151	37,200	56,200	+ 19,000
15	2152	2161	27,600	40,000	+ 12,400
16	2162	2171	36,000	49,900	+ 13,900
17	2172	2181	41,600	53,200	+ 11,600
18	2182	2191	32,100	53,000	+ 20,900
19	2192	2201	21,400	40,300	+ 18,900
20	2202	2211	6,300	9,400	+ 3,100
21	2212	2221	16,600	45,500	+ 28,900
22	2222	2231	34,000	33,800	- 200
23	2232	2241	38,100	56,900	+ 18,800
24	2242	2251	34,900	51,900	+ 17,000
25	2252	2261	32,100	46,700	+ 14,600

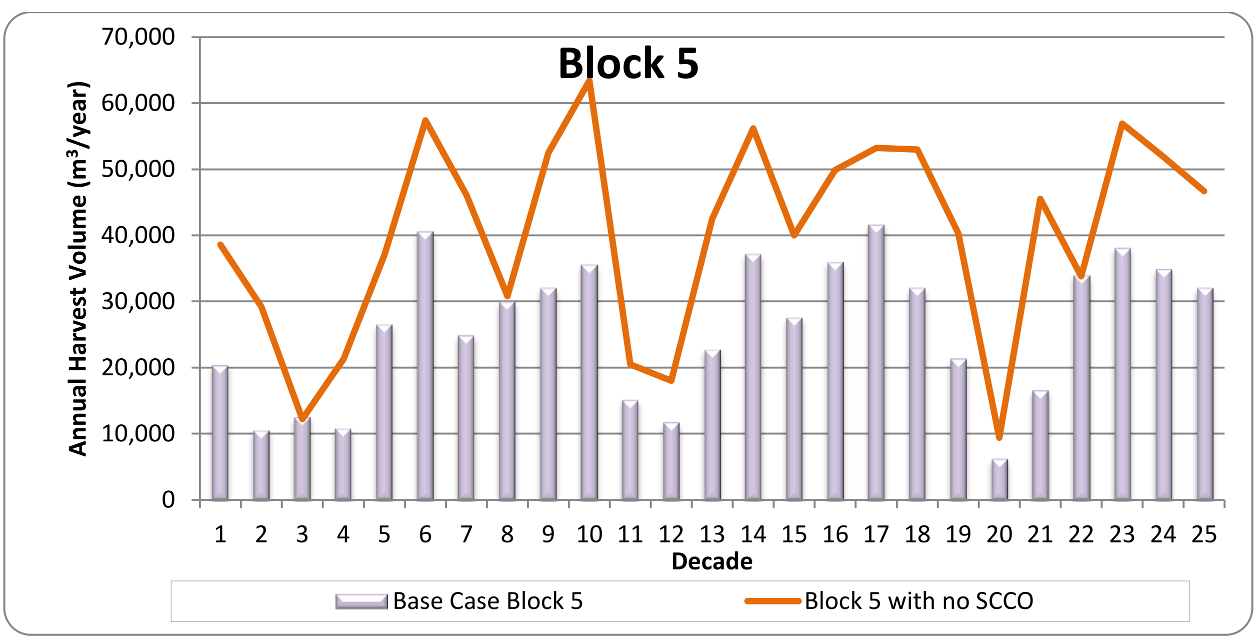

Figure 159 – Block 5 Harvest levels with no SCCO order

Appendix B23 – No South Central Coast Order and no Non-conventional Restriction

Removing the netdowns associated with the SCCO and the non-conventional constraint increases the initial harvest from Block 3 and 5 by 46,700 m^3/year (102.9%) when compared to the scenario where the SCCO applied but the non-conventional constraint did not. Long-term harvest increases by 35,600 m^3/year (77.9%). Total harvest is increased by 9.05 million m^3 (79.4%).

Table 159 – Block 3&5 Harvest levels with no SCCO order or non-conventional restriction

			Annual Harvest Volume (m^3)		
Period (Decade #)	Start Year	End Year	SCCO Order without non-conventional restriction	No SCCO Order and no non-conventional restriction	Difference
1	2012	2021	45,400	92,100	+ 46,700
2	2022	2031	45,400	82,900	+ 37,500
3 - 7	2032	2081	45,400	81,300	+ 35,900
8 - 25	2082	2261	45,700	81,300	+ 35,600

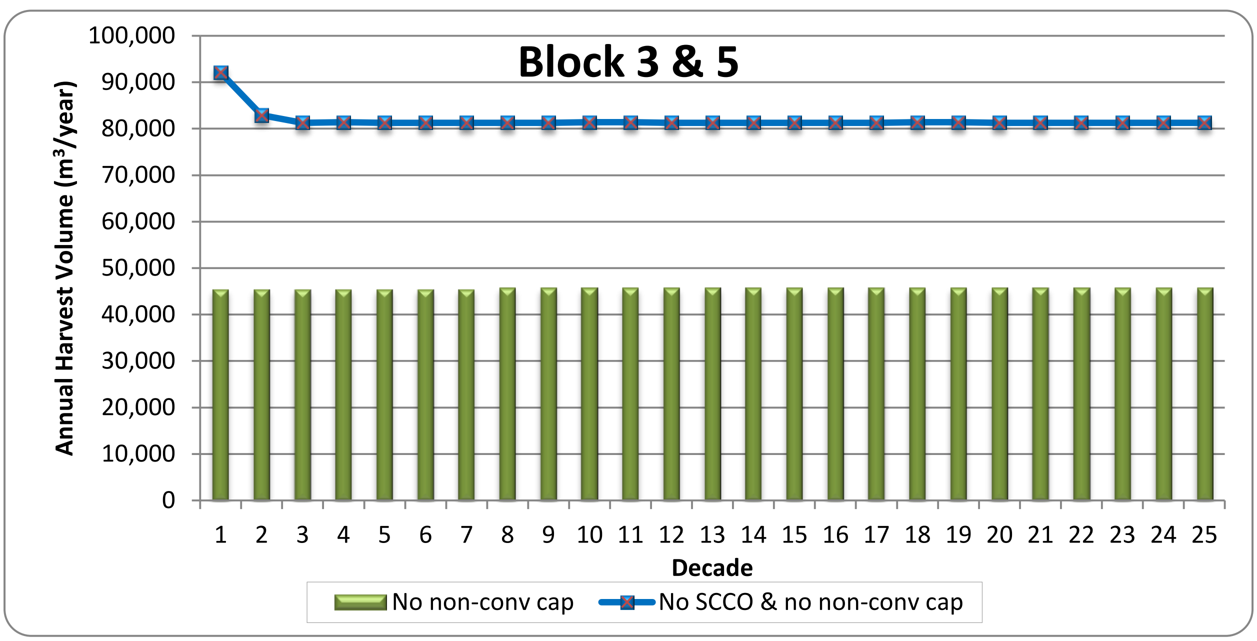

Figure 160 – Block 3&5 Harvest levels with no SCCO order or non-conventional restriction

Table 160 – Block 3 Harvest levels with no SCCO order or non-conventional restriction

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3) SCCO Order without non-conventional restriction	No SCCO Order and no non-conventional restriction	Difference
1	2012	2021	16,700	27,400	+ 10,700
2	2022	2031	17,200	2,700	- 14,500
3	2032	2041	37,000	3,800	- 33,200
4	2042	2051	40,300	73,400	+ 33,100
5	2052	2061	18,300	43,700	+ 25,400
6	2062	2071	1,700	1,300	- 400
7	2072	2081	15,500	40,500	+ 25,000
8	2082	2091	16,900	13,800	- 3,100
9	2092	2101	19,900	31,100	+ 11,200
10	2102	2111	13,400	20,000	+ 6,600
11	2112	2121	27,400	37,600	+ 10,200
12	2122	2131	36,600	26,300	- 10,300
13	2132	2141	21,400	50,900	+ 29,500
14	2142	2151	3,700	13,300	+ 9,600
15	2152	2161	3,500	100	- 3,400
16	2162	2171	2,600	2,200	- 400
17	2172	2181	5,600	2,200	- 3,400
18	2182	2191	24,800	17,500	- 7,300
19	2192	2201	20,900	28,700	+ 7,800
20	2202	2211	43,800	54,900	+ 11,100
21	2212	2221	23,100	16,900	- 6,200
22	2222	2231	15,500	57,000	+ 41,500
23	2232	2241	6,300	13,300	+ 7,000
24	2242	2251	4,200	8,200	+ 4,000
25	2252	2261	12,900	12,700	- 200

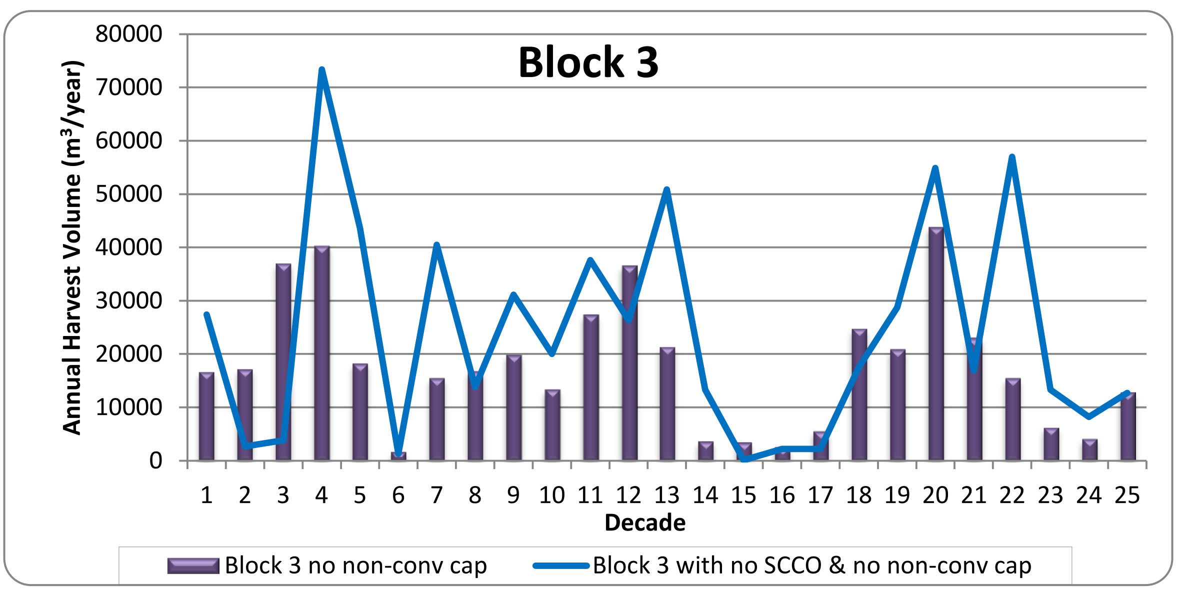

Figure 161 – Block 3 Harvest levels with no SCCO order or non-conventional restriction

Table 161 – Block 5 Harvest levels with no SCCO order or non-conventional restriction

Period (Decade #)	Start Year	End Year	Annual Harvest Volume (m^3)		
			SCCO Order without non-conventional restriction	No SCCO Order and no non-conventional restriction	Difference
1	2012	2021	28,700	64,700	+ 36,000
2	2022	2031	28,100	80,200	+ 52,100
3	2032	2041	8,300	77,500	+ 69,200
4	2042	2051	5,100	8,000	+ 2,900
5	2052	2061	27,100	37,600	+ 10,500
6	2062	2071	43,700	80,000	+ 36,300
7	2072	2081	29,900	40,800	+ 10,900
8	2082	2091	28,800	67,500	+ 38,700
9	2092	2101	25,700	50,200	+ 24,500
10	2102	2111	32,300	61,400	+ 29,100
11	2112	2121	18,300	43,800	+ 25,500
12	2122	2131	9,000	55,000	+ 46,000
13	2132	2141	24,300	30,400	+ 6,100
14	2142	2151	42,000	68,000	+ 26,000
15	2152	2161	42,100	81,200	+ 39,100
16	2162	2171	43,000	79,100	+ 36,100
17	2172	2181	40,100	79,100	+ 39,000
18	2182	2191	20,800	63,900	+ 43,100
19	2192	2201	24,800	52,700	+ 27,900
20	2202	2211	1,900	26,400	+ 24,500
21	2212	2221	22,500	64,400	+ 41,900
22	2222	2231	30,200	24,300	- 5,900
23	2232	2241	39,300	68,000	+ 28,700
24	2242	2251	41,400	73,100	+ 31,700
25	2252	2261	32,800	68,600	+ 35,800

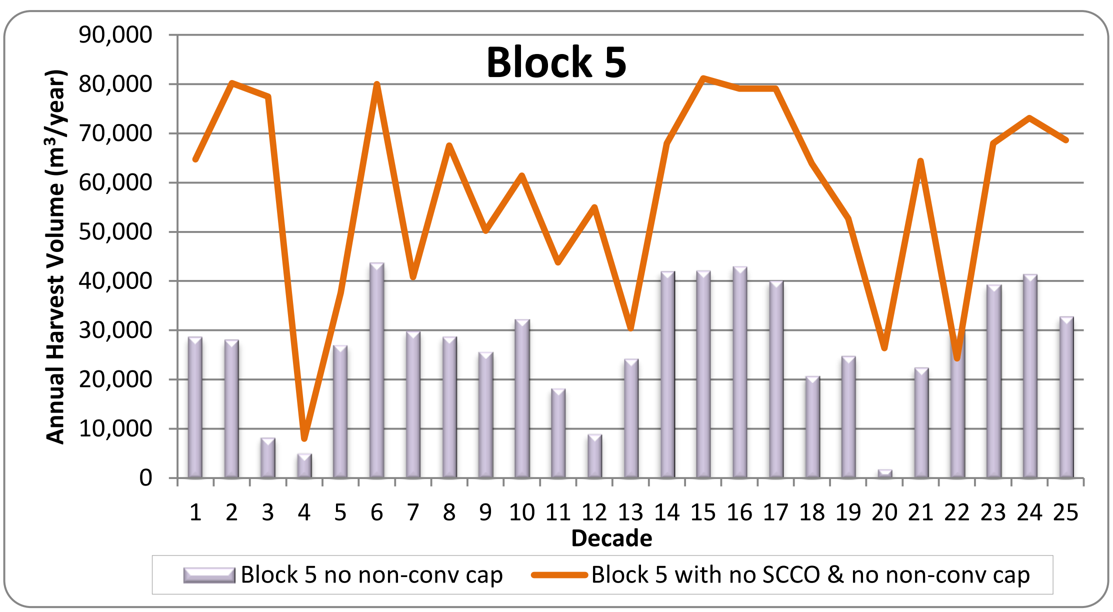

Figure 162 – Block 5 Harvest levels with no SCCO order or non-conventional restriction

Appendix 2: Timber Supply Analysis Information Package

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WESTERN FOREST PRODUCTS INC.

Tree Farm Licence 39

Timber Supply Analysis Information Package

In Preparation of

MANAGEMENT PLAN 9

Submitted to the
Ministry of Forests, Lands and Natural Resource Operations
Forest Analysis & Inventory Branch
Victoria, BC

Version 3
April 2014

REGISTERED PROFESSIONAL FORESTER
PROVINCE OF BRITISH COLUMBIA
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Planning Forester
Western Forest Products Inc.

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Revisions since Version 1

The following revisions were made to Version 1 (June 2012) of the Information Package to create this document.

Correct typographical errors and formatting issues and update date on title page and in page headers.
Update Table 5 and sections 6.1 and 6.1.11 to reflect Sliammon First Nation tenure area deletion dated May 28, 2012.
Expanded discussion in sections 5.1and 5.2 about using cruise results to enhance the forest inventory. Cruise results only used for stands cruised (i.e. no other adjustments or extrapolations made).
Moved discussion re: root rot from OAF section (9.3) to volume reduction section (9.4.2.1.1).
Provided clarification that volume reduction for stand level retention is in addition to area reduction (section 9.4.2.1.2).
Added discussion to recreation features inventory section (6.13)
Revised yield tables for Block 1 CWHdm and CWHxm2 variants in Appendices E, F and G due to change to OAF2 to address root rot
Revised Block 1 volumes in Table 7 and Appendix A to reflect effect of increase OAF 2 for root rot
Added a sensitivity analysis where OAF2 is increased by 10% to reduce immature TIPSY yields at older ages
Added discussion to section 11.2.3 stating that adjacency requirements for recently harvested cutblocks are addressed in the model.

The following revisions were made to Version 2 (October 2012) of the Information Package to create this document.

Corrected more typographical errors.
Added clarification re: MCIII volume adjustments in Section 5.1.
Corrected reductions for Blocks 3 and 5 in Tables 6, 7, 23, 24 and 26.
Corrected Block 1 THLB areas by analysis unit in Table 45 and Table 46.
Added clarification in Section 9.4.1 re: mature average line volumes and associated reductions.
Added clarification in Appendix B re: different ecological inventories used to develop SSS
Updated date on title page and in page headers.

Acknowledgements

The signatory greatly appreciates the following for their contributions to the preparation of this document:

- Ray Robazza, Jonathan Flintoft, Jim McDowell, Cindy Fife, Shane Renouf, Stuart Glen, Rudi VanZwaaij and John Pezel of WFP for their operational input;
- Martin Buchanan, John Deal and Sue McDonald of WFP for their help with the Ecosystem-based Management (EBM) and wildlife management assumptions;
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- Ross Pettit of Cypress Geomatics for his GIS support;
- Marian Goodman of WFP for her editorial suggestions; and
- Peter Kofoed of WFP for his help with the yield assumptions and his support, guidance, and history lessons.

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1 INTRODUCTION

This Information Package (IP) provides a summary of data, assumptions, and modelling procedures proposed for use in the Timber Supply Analysis (TSA) for Western Forest Products' (WFP) Tree Farm Licence (TFL) 39 Management Plan (MP) #9.

Significant changes to the administration of the TFL have occurred since the last analysis was completed in 2000, some of which are detailed further in this document:

- In 2004, private lands within the TFL were withdrawn.
- In 2005, Weyerhaeuser sold its BC Coastal Group to Brascan (now known as Brookfield). Two separate corporate entities were created to manage the former Weyerhaeuser BC Coastal Group assets – Island Timberlands for the majority of private land holdings and Cascadia Forest Products for crown tenures and sawmills.
- In 2006, Western Forest Products purchased Cascadia Forest Products.
- Between 2006 and 2008, several conservancies were established that removed portions of TFL 39 on Haida Gwaii (Queen Charlotte Islands) and on the Central Coast.
- In 2009, portions of TFL 39 were deleted to form part of the Pacific TSA due to the *Forest Revitalization Act* (often referred to as "Bill 28").
- In 2010, the TFL was subdivided by deleting Block 6 on Haida Gwaii to create TFL 60.
- Also in 2010, a portion of Block 4 (Port McNeill) was deleted to help create a Community Forest for the communities of Port Hardy, Port McNeill and Port Alice on northern Vancouver Island.

The Allowable Annual Cut (AAC) was adjusted for several of the above items so that the current AAC (June 2012) is 1,907,980 m^3/year. Further details of these changes are provided in Section 6.1.

In November 2009, provincial legislation was revised requiring the provincial Timber Supply Review (TSR) process for TFLs to be completed at least every ten years so the provincial Chief Forester can determine the AAC for TFLs. Previously, TFL reviews were required every five years. Other legislation changes include revision of content requirements and the approval process for TFL Management Plans.

WFP will complete a timber supply analysis that estimates timber harvest over a 250-year planning horizon (in five-year planning periods) based on the current estimate of the harvestable land base, existing old forest timber volumes and regenerating forest growth rates. The harvest forecast projects timber supply impacts of current environmental protection and management practices including operational requirements of the *Forest and Range Practices Act* (FRPA), approved Forest Stewardship Plans (FSP), orders (including the South Central Coast Order, March 2009) and, other regulations and guidelines significant to timber supply. Sensitivity analyses will be used to investigate impacts of different management scenarios and to examine the relative importance of variations in assumptions. These may include the removal of area from the timber harvesting land base (THLB), imposing forest-cover constraints, or changes in growth and yield (G&Y) estimates.

The timber supply forecast will attempt to achieve the long-term harvest potential, and minimize the rate of change during the transition from the current level of harvest to the mid- and long-term sustainable levels.

TFL 39 is comprised of five separate supply blocks dispersed along the British Columbian coast (see Figure 1):

- Block 1 located on the Sunshine Coast near the City of Powell River;
- Block 2 located on Vancouver Island near the community of Sayward;
- Block 3 located on North Broughton Island within the Broughton Archipelago (north-east of Port McNeill);
- Block 4 located on Vancouver Island near the Town of Port McNeill; and
- Block 5 located on the mainland coast in the Phillips River watershed.

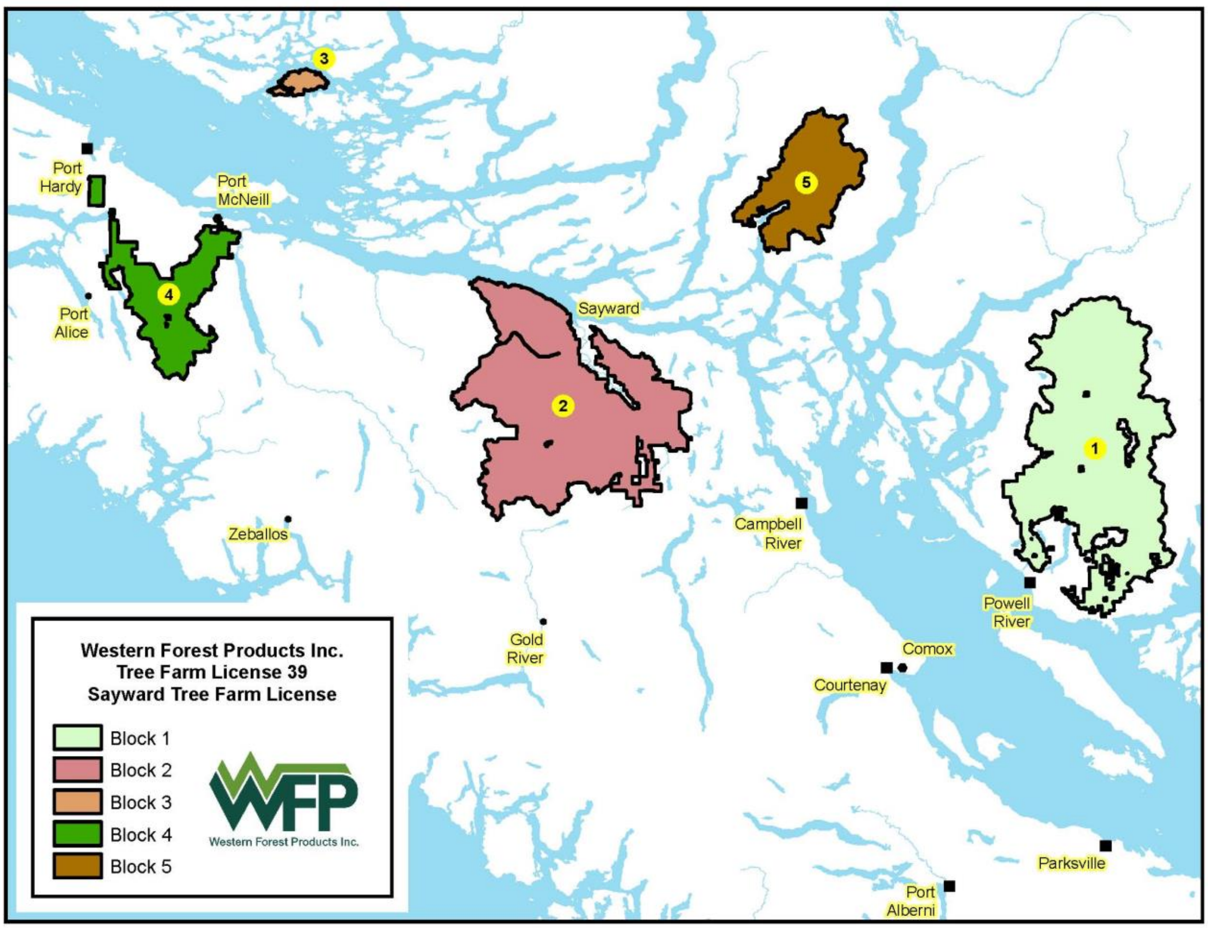

Figure 1 - TFL 39

2 PROCESS

2.1 Overview

This information package is submitted for review to the Timber Supply Forester at the Forest Analysis and Inventory Branch, Ministry of Forests, Lands and Natural Resource Operations (FLNRO). Upon acceptance, the IP will guide the timber supply analysis and, with the timber supply analysis report, be appended to MP #9. These will be considered by the Chief Forester in determining the new AAC for TFL 39. Two review and comment opportunities, review of this draft IP and review of the draft MP, will be provided to the general public, First Nations and other interested government agencies.

2.2 Analysis Approach

TFL 39 is composed of five distinct supply blocks; therefore, separate harvest forecasts will be provided for Blocks 1, 2, and 4, with Blocks 3 and 5 combined. Total TFL harvest in any period is the sum of the individual harvest volumes. Blocks 3 and 5 are combined because they are subject to the same land use objectives (South Central Coast Order) and the relatively small timber harvesting land base for each suggests that operationally they will be managed as one supply unit. A sensitivity analysis will explore the timber supply impact of managing these two blocks as separate supply units.

2.3 Growth and Yield

Yield tables for existing stands are be divided into five groups based on age. Existing mature stands greater than age 140 years have existing volumes estimated from average lines. These generated volumes remain static (flat line) throughout the analysis, as the assumption for these stands is growth net decay is zero. Stands that are less than age 141 years are split into four groups based on age and all have volumes estimated and projected with TIPSY Version 4.1c. Stands less than age 141 years and greater than age 50 years are assigned yield tables based on assessment of stands subject to inventory cruises (see section 5.2 for details). These stands pre-date MacMillan Bloedel's (WFP's predecessor) Intensive Forest Management Program which began in 1962. Existing stands less than age 51 years are split into two categories based on age. Current stands aged 15 to 50 years are differentiated from younger stands (i.e., 1 to 14 years of age) for which genetic gains and growth impacts from trees retained during previous harvests are expected. TIPSY yield projections will be assigned to existing not satisfactorily restocked (NSR) areas and simulated harvest areas according to expected management regimes.

3 TIMBER SUPPLY FORECASTS/OPTIONS/SENSITIVITY ANALYSES

Section three describes the TFL 39 land base and methods used to determine the portion of the land base that contributes to timber harvesting (THLB). Some portions of the productive land base, while not contributing to the harvest, are essential for non-timber resource sustainability. Areas within all tables in this section may not sum due to rounding to the nearest hectare.

3.1 Current Management Option

The current management option (or "Base Case") represents current operational requirements and management practices of the TFL. The forecast of current management incorporates existing land use designations, including Resource Management Zones[1]; current regulations and guidelines including the *Forest and Range Practices Act* and the South Central Coast Order; and approved Forest Stewardship Plans. This option is used as the basis for analysing various timber supply projections.

Current management of TFL 39 includes:

- Operable land base of forested area accessible using conventional and non-conventional (helicopter) harvesting methods.
- Restricted performance on non-conventional land base (see Section 11.3.2).
- Exclusion of uneconomic mature forest stands.
- Harvesting of mature and immature stands.
- Silviculture that meets free growing requirements carried out on all regenerated stands. The majority of harvested areas are planted.
- Known tree improvement gains applied to existing stands ≤ 14 years old and future regenerated stands.
- Visual quality objectives (VQOs) modelled on VQOs established for the Campbell River Forest District on December 14, 2005; VQO's established for Block 1 on June 19, 2009; and recommended visual quality classes in the TFL 39 Block 4 Visual Landscape Inventory.
- Green-up heights for cutblock adjacency within Block 2 and 4 assigned based on Resource Management Zones established in the Vancouver Island Higher Level Plan. Special and General zones have a 3m green-up requirement while Enhanced zones have a 1.3m green-up height. For all of Block 1, the height is 3m.
- Future Wildlife Tree and other stand-level retention within the THLB accounted for by a percentage area reduction.
- Biodiversity and Landscape Units – Established Old Growth Management Areas (OGMAs) removed from the THLB. Also removed are draft OGMAs in the Haslam LU (Block 1), the Holberg LU (Block 4), and the Keogh LU (Block 4). For landscape units with a Low BEO where the OGMAs have utilized the 2/3 drawdown permissible in the *Order Establishing Provincial Non-Spatial Old Growth Objectives* effective June 30, 2004 (NSOG) to some extent, long term old forest targets are modelled aspatially. Mature seral targets are incorporated for the one Special Management Zone within TFL 39 (SMZ #11: Schoen-Strathcona within Block 2).
- Established Ungulate Winter Ranges (UWRs) and Wildlife Habitat Areas removed from the THLB.

[1] Vancouver Island land Use Plan (VILUP) Resource Management Zones and Resource Management Zone objectives approved by Government in December 2000.

- Varying netdowns for terrain stability management depending on mapping type (see Section 6.15).
- Riparian management based on the FSP results/strategies and a review of riparian management applied on sample cutblocks harvested between 2000 and 2008.
- Minimum harvest criteria based on average stand diameter-at-breast-height (DBH) which varies by harvesting system plus a minimum harvestable volume of $350m^3$ per hectare. Minimum DBH and minimum volume requirements must be met before a stand can be harvested.
- A relatively small area of deciduous leading stands included in the THLB and volume in these stands contributes to the analysis.

As a result of the Central Coast Land Use Decision and subsequent enactment of land use orders, the province committed to implementing ecosystem-based management (EBM) within the Central and North Coast. Blocks 3 and 5 of TFL 39 fall within the area covered by the South Central Coast Order (SCCO, March 2009). Land use objectives that direct forest practices within Blocks 3 and 5 of TFL 39 are discussed in detail throughout this document. The SCCO and background information can be found at:

http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/objectives/index.html

A list of EBM components included in the order is provided below. These are discussed in detail in the document (refer to section numbers) and summarized in Section 7.

First Nations
- Objective 3: First Nations' traditional forest resources (Section 7.1);
- Objective 4: First Nations' traditional heritage features (Section 6.18.3);
- Objective 5: Culturally modified trees (Section 6.18.3);
- Objective 6: Monumental cedar (Section 6.18.3);
- Objective 7: Stand-level retention of Western red and Yellow Cedar (Section 6.18.3);

Aquatic Habitats
- Objective 8: Important fisheries watersheds (Section 11.2.8.2.1);
- Objective 9: High value fish habitat (Section 6.8.2.1);
- Objective 10: Aquatic habitat that is not high value fish habitat (Section 6.8.2.2);
- Objective 11: Forested swamps (Section 6.8.2.3);
- Objective 12: Upland streams (Section 11.2.8.2.2);
- Objective 13: Active fluvial units (Section 6.8.2.4);

Biodiversity
- Objective 14: Landscape-level biodiversity (Section 6.17);
- Objective 15: Red and blue-listed plant communities (Section 6.14);
- Objective 16: Stand-level retention (Section 6.18.3); and
- Objective 17: Grizzly bear habitat (Section 6.11.2).

3.2 Sensitivity Analyses

Sensitivity analyses will be conducted for the current management option to examine the potential impact of uncertainty in several key attributes, including the removal of operable areas from the THLB, imposing forest-cover constraints, or changes in growth and yield estimates.

Table 1 - Sensitivity Analyses

Concern Tested	Proposed Sensitivity Analysis
Land base available for harvesting	▪ no harvesting of unstable terrain (Class V and "equivalents")
Growth and yield	▪ adjust mature volumes +/-10% ▪ adjust immature volumes +/-10% ▪ apply SIBEC estimates of site index ▪ increase OAF 2 by 10% for unmanaged immature yields
Forest Management / Silviculture	▪ exclude future genetic gain adjustments ▪ Blocks 3 and 5 managed separately
Operability	▪ no heli volume constraint ▪ no harvesting of heli-operable landbase
Visual Management	▪ assume mid-range disturbance limit
Biodiversity	▪ remove Western Forest Strategy impacts (area and yield impacts)
Minimum harvest ages	▪ add 2 cm to the minimum harvest criteria ▪ subtract 2cm to the minimum harvest criteria
Ecosystem Based Management	• meet landscape level biodiversity requirements aspatially • apply risk managed landscape level biodiversity targets • apply 50% RONV targets in Block 5 • exclude SCCO objectives

3.3 Alternate Harvest Flow

The harvest level in the current management option will adjust each decade in the first part of the run towards the estimated long-term harvest level (LTHL) and will change at a rate that minimizes the length of time (if any) where harvest levels are less than the long-term harvest level. The results of the base case will determine potential alternate harvest flows. One option may be to continue the initial harvest as long as possible while still minimizing the length of time (if any) where harvest levels are less than the long-term harvest level. Another option is a non-declining harvest level.

During preparation of the timber supply analysis the need for further sensitivity analyses or harvest flows may become apparent. If warranted, additional analyses will be included in the final timber supply analysis for consideration by the Chief Forester.

4 HARVEST MODEL

The TFL 39 timber supply analysis, including harvest level and forest inventory projections, will be developed using the Woodstock component of Remsoft's Spatial Planning System (www.remsoft.com).

Woodstock is a pseudo-spatial timber supply model that projects harvesting activities across a land base over a specific period of time. These models are referred to as pseudo-spatial because data used to create the model has spatial components to it, but harvest schedules produced are not spatially explicit. It is possible to bring spatial context into this model by applying constraints to spatial attributes of the land base such as landscape units or watersheds. Harvest schedules produced using these models report harvest timing for different types of stands as opposed to specific polygons harvested in each period. Therefore, it is not possible to explicitly model spatial management objectives such as cutblock size, adjacency and green-up requirements or patch size targets using this model.

Woodstock uses optimization to establish a harvest schedule that incorporates objectives such as visual quality, biodiversity, wildlife habitat with the objective of timber harvest. In Woodstock, harvest volume is maximized subject to the maintenance of other values on the land base.

5 FOREST COVER INVENTORY

The first forest inventory was completed in 1964. Later cruises of mature and immature forest have been incorporated. The base of this analysis is a December 31, 2011 inventory reflecting changes in land base and ownership, fire, logging and reforestation.

The basic building block of the inventory is the "stand." Each stand is identified by the following variables:

1. A measure of site productivity: expressed by site index classes.
2. Immature age by year established.
3. Up to four species: in descending order of basal area.
4. A measure of stocking:
    - Volume class of mature and older second growth cruised during the last 30 years;
    - Basal area of cruised second-growth stands (cruised more than 30 years ago); and
    - Number of stems per hectare and distribution in younger stands.

These inventory measures permit highly specific aggregation of similar stands for yield projection and analysis.

5.1 Mature Inventory

Mature inventory is defined as stands greater than 100 years of age at the time of the 1960s inventory cruises. Today stands greater than 140 years old are classified as mature.

Since the original 1964 cruise, the mature inventory has been upgraded and updated as follows:

1. In 1966, mature volumes were recompiled, as required by MoF, to close utilization standards (15 cm top diameter for trees 22.5 cm and larger).
2. In 1972, mature volumes were recompiled using new MB decay factors.
3. In 1988 and 1999, operational cruising was combined with the mature inventory to improve the less intensive original inventory in these areas.
4. On both occasions average lines were recalculated to reflect remaining samples in the remaining area (i.e., not included in the operational cruise).
5. In 1999, volume recompilation used MB's 1972 loss factors and Kozak's Taper Equation Version 4.1.

In addition, the mature inventory has been updated to reflect areas logged.

Thirty-four percent of the productive mature forest area (38% of the mature THLB area) is estimated from operational cruising, a more intensive cruise than the earlier inventories. These cruise plots were randomly located via a grid such that no bias was created. The cruise results were assigned to the subject stands only (i.e. the results were not extrapolated to other stands).

Most of the original 1964 mature inventory that remained was subject to inventory audits in the late 1990s, only Block 3 was not audited and had a small volume of mature timber. Audits occurred in accessible timber (MCI) and inaccessible timber (MCIII) as classed in the 1964 inventory. Inventory volumes in the MCI type were compiled from samples while volumes in the MCIII type were estimated from photo-coding (i.e., matched to most similar MCI type). The 1993 operability inventory replaced the accessibility classification.

The results of the audit are indicated in Table 2.

Table 2 – Comparison of Inventory and Audit Mature Volumes

		Average volume (m^3/ha)[1]		
Block	**Accessibility**	**1964 Inventory**	**Audit Cruise**	**Ratio**
1	MCI	766	759	0.99
	MCIII	564	738	1.31[2]
2	MCI	765	835	1.09
	MCIII	494	770	1.56[2]
4	MCI	896	848	0.95
	MCIII	551	696	1.26[2]
5	MCI	760	857	1.13
	MCIII	556	848	1.53[2]

Since MCIII volume estimates are not based on direct plot measurement, it was agreed that the last analysis (MP #8) would apply the audit comparison results to those volumes. The same adjustments are being applied for this analysis: stands originally classified as MCIII have their gross volume adjusted by the applicable ratio in Table 2. The volume reductions discussed in Section 9.4.1 are applied after this MCIII adjustment ratio has been applied.

Since the MCI volume estimates are based on plots and no statistically significant difference was found for any of the four blocks, no adjustments are being applied to the volume estimates. During the MP #8 review process, concern of not applying the adjustment ratios even if not statistically significant was raised by the Resource Inventory Branch (now Forest Analysis and Inventory Branch) of the Ministry of Forests (now Ministry of Forests, Lands and Natural Resource Operations). As the sensitivity of timber supply to mature volume estimates is planned to be explored, this issue can be discussed in the analysis report.

5.2 Immature Forest Inventory

All the immature forest was cruised and mapped during the 1964 inventory. Each stand was described according to age, species, site index class and stocking. Stand information for newly planted and natural

[1] Volumes are close utilization less decay.
[2] Significant difference (95% level) according to a paired t-test. This result is applied to the inventory mature volumes for the MP#9 analysis.

stands is added to a forest information management system (currently Cengea Forest Resources). Updates are added for any changes found by assessment of survival and free-growing status. The practice had been to re-inventory new stands as they reach “pole size”, generally between 30 and 40 years. At this stage, site index is measured based on growth of the new stand and volume or basal area are obtained as measures of stocking. Over 43,600 hectares of this cruise data remains in the current inventory for TFL 39. As with the mature stands, the cruise plots were randomly located via a grid such that no bias was created. The cruise results were assigned to the subject stands only (i.e. the results were not extrapolated to other stands).

5.3 Age Class Distributions

Table 3, Table 4 and Figure 2 indicate the area-based age class distributions of the forested land base of TFL 39 as of December 31, 2011. Areas listed as zero years old in Blocks 1 and 2 are overstated because they include areas planted in 2011 but for which the species information was not yet available. Detailed area and timber volume summaries by block are shown in Appendix A: Detailed Age Class Distributions by Block.

5.4 Age and Volume Projections

Woodstock will be structured using five-year long planning periods. For the purpose of timber volume estimates the assumption will be that harvesting occurs during the mid-year of the five-year planning periods. To achieve this, the initial ages and volumes used in Woodstock are projected to the year 2014: the mid-year of the first five-year planning period (i.e., 2012 – 2016). In areas recently harvested waiting reforestation the assumption is that that the new stand was established two years after harvest was completed (e.g., areas harvested in 2011 are reforested in 2013 with one-year old seedlings) according to the assumptions detailed in Section 9.6.5.

Table 3 – Productive Forest Age Class Distribution

		Productive Forest Area (ha)					
Age Class	**Age (years)**	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 5**	**Total**
0	0	1,741	3,537	0	106	12	**5,394**
1	1-20	8,865	19,484	401	6,299	2,035	**37,084**
2	21-40	9,284	26,016	1,288	10,387	3,126	**50,101**
3	41-60	6,788	18,703	18	5,566	244	**31,319**
4	61-80	6,249	7,370	456	2,108	114	**16,297**
5	81-100	12,277	2,444	997	281	139	**16,138**
6	101-120	8,238	729	27	107	0	**9,102**
7	121-140	570	195	0	13	40	**817**
8	141-250	2,815	3,345	2	998	477	**7,637**
9	>250	12,278	46,119	928	8,457	8,090	**75,870**
Total		**69,104**	**127,941**	**4,117**	**34,322**	**14,276**	**249,759**

Table 4 – THLB Age Class Distributions

		THLB (ha)					
Age Class	Age (years)	Block 1	Block 2	Block 3	Block 4	Block 5	Total
0	0	1,540	3,127	0	92	0	**4,759**
1	1-20	7,560	17,400	301	5,389	714	**31,363**
2	21-40	7,154	22,339	742	8,484	1,555	**40,274**
3	41-60	5,220	15,225	11	4,598	113	**25,167**
4	61-80	4,786	5,495	271	1,562	45	**12,159**
5	81-100	8,995	1,714	644	192	17	**11,563**
6	101-120	5,346	482	19	79	0	**5,927**
7	121-140	414	82	0	12	14	**522**
8	141-250	1,656	2,135	2	618	135	**4,545**
9	>250	5,362	23,667	236	4,828	423	**34,518**
Total		**48,033**	**91,666**	**2,227**	**25,855**	**3,017**	**170,796**

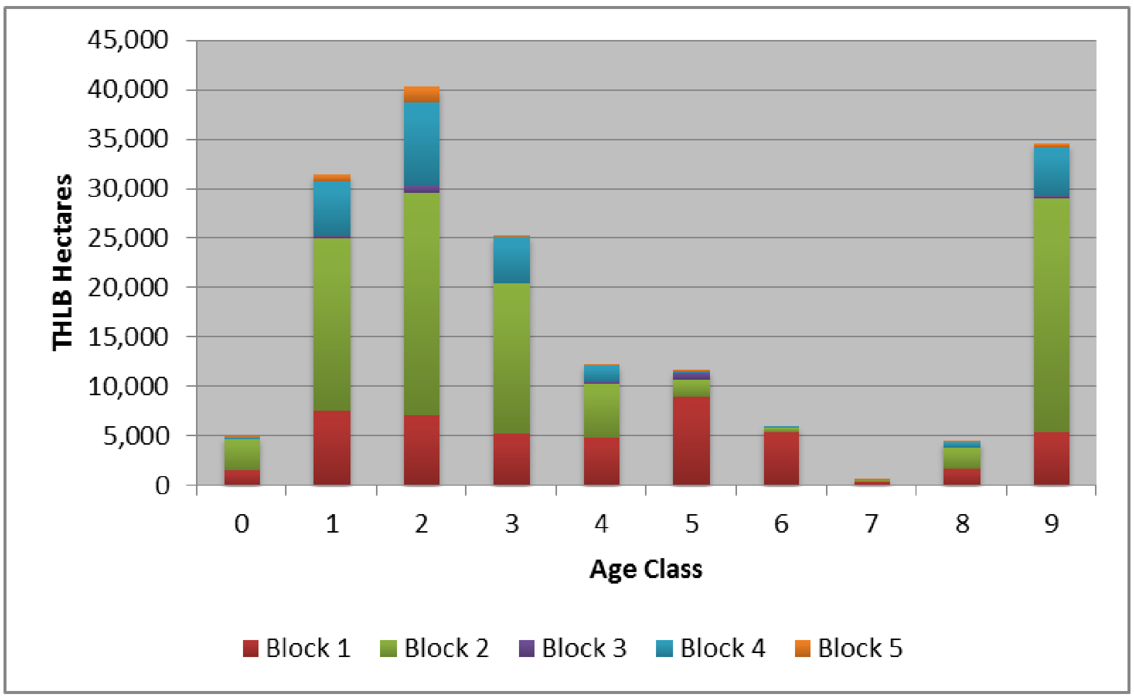

Figure 2 - THLB Age Class Distribution

6 DESCRIPTION OF LAND BASE

Section six describes the TFL 39 land base and methods used to determine the portion of the land base that contributes to timber harvesting – hereinafter referred to as the timber harvesting land base (THLB). Portions of the productive land base, while not contributing to the harvest, are crucial to meeting the demands for non-timber resource sustainability. Areas within all tables in this section may not sum due to rounding to the nearest hectare.

6.1 AAC and Land base Changes and Allocations

At the time of the TFL 39 MP #8 AAC Determination in 2001, the TFL area was estimated at 801,393 ha and the AAC was determined as 3,660,000 m^3, with a partition of 125,000 m^3 assigned to areas known as the “Haida declared protected areas”. Of the total AAC, 314,740 m^3 was attributed to BCTS with the remaining 3,345,260 m^3 allocated to WFP (Weyerhaeuser at that time).

Initiated in 1996, the Central Coast Land and Resource Management Planning process resulted in the provincial government agreeing to protect significant portions of the central coast and to implement EBM within the remaining land base. Most of the areas to be protected were first Designated Areas under the *Forest Act* and later became conservancies. The impact to TFL 39 is detailed below.

Similarly in 2003, a Land and Resource Management Planning process began on Haida Gwaii (formerly the Queen Charlotte Islands). This process resulted in the protection of a significant portion of the islands as conservancies and implementation of EBM. The impact to TFL 39 is detailed below.

In 2003, the provincial government enacted the *Forest Revitalization Act*, which reallocated 20 percent of the AAC for major licensees, such as WFP, to others, such as BC Timber Sales, First Nations and small tenures, such as Community Forests and Woodlots. The effect for TFL 39 was the reallocation of 559,721 m^3 of AAC from WFP to others: 397,267 m^3 to BCTS (for a new total of 712,007 m^3); 145,454 m^3 to First Nations; 7,000 m^3 for woodlots; and 10,000 m^3 to a Community Forest. WFP’s AAC was reduced by 421,494 m^3 as of the end of 2004 and by a further 138,677 m^3 as of the end of 2005. Areas have been deleted from TFL 39 for the all these allocations except for 1,831 m^3 of First Nations volume within Block 2. Refer to Table 5 for a summary of changes in area and AAC since the MP #8 analysis.

6.1.1 Private Land Withdrawal

A total of 17,483 ha were removed effective July 9, 2004 (Instrument 167) by deleting private land from the TFL. This affected six of the seven blocks within the TFL. The TFL 39 AAC and that allocated to WFP was reduced by 113,000 m^3 to 3,547,000 m^3 and 3,232,260 m^3 respectively.

Table 5 – Changes in Area and AAC Since MP#8 AAC Determination

Description	Area (ha)								Total AAC (m^3/year)
	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Total	
MP 8 AAC Determination (November 2001)	186,979	203,065	15,747	51,541	47,411	240,311	56,339	801,393	3,660,000
Private land withdrawal (July 2004)	-2,936	-1,314	-244	-2,598	0	-10,328	-63	-17,483	-113,000
Koeye Conservancy established (July 2006)	0	0	0	0	0	0	-18,763	-18,763	0[1]
Phillips Estuary Conservancy established (May 2007)	0	0	0	0	-970	0	0	-970	0[1]
Woodlots within Block 2 (January 2008)	0	-991	0	0	0	0	0	-991	-4,478[2]
Yaagun Suu Conservancy established (May 2008)	0	0	0	0	0	-6,615	0	-6,615	0[1]
Namu Conservancy established (June 2008)	0	0	0	0	0	0	-10,953	-10,953	0[1]
Several Haida Gwaii conservancies established (December 2008)	0	0	0	0	0	-26,512	0	-26,512	0[1]
Pacific TSA reallocation (July 2009)	-26,526	-44,555	-11,039	-852	0	0	-26,560	-109,532	-556,404
Create TFL 60 (January 2010)	0	0	0	0	0	-196,856	0	-196,856	-1,082,616
Tri-Port Community Forest allocation (January 2010)	0	0	0	-1,319	0	0	0	-1,319	-10,000[2]
Sliammon First Nation tenure (May 2012)	-3,599	0	0	0	0	0	0	-3,599	-22,000
Current TFL 39 Area (October 2012)	**153,918**	**156,205**	**4,464**	**46,772**	**46,441**	**0**	**0**	**407,800**	**1,850,502**[2]

[1] While the AAC was not permanently reduced due to the creation of these conservancies, prior to establishment as conservancies most were Designated Areas under Part 13 of the *Forest Act*. Temporary AAC reductions were put in place for the Designated Areas via section 173 of the *Forest Act*.

[2] Due to administrative processes within the *Forest Act (*prior to enactment of the *Allowable Annual Cut Administration Regulation*) and the timing of certain events, the current (March 2014) official AAC for TFL 39 is 1,885,980 m^3 as it still includes 21,000 m^3 within Block 7, 10,000 m^3 for the Tri-Port CFA and the 4,478 m^3 for the woodlots in Block 2 even though these areas have been deleted from the TFL. The current AAC figure presented here ignores this administrative anomaly.

6.1.2 Koeye Conservancy Established

On July 14, 2006 the Koeye Conservancy was established under the *Park (Conservancy Enabling) Amendment Act, 2006*. This conservancy removed approximately 18,763 ha from Block 7 on the central coast. No AAC reduction was made to account for the creation of this conservancy; however a temporary AAC reduction of 21,000 m^3 was in place from July 3, 2002 to June 30, 2004. A further temporary AAC reduction of 43,000 m^3 was applied to a Designated Area that included both the Koeye Conservancy and the Namu Conservancy (Section 6.1.6 below) from September 28, 2006 to May 23, 2010.

6.1.3 Phillips Estuary Conservancy Established

On May 31, 2007, the Phillips Estuary Conservancy was established via the *Parks and Protected Areas Statutes Amendment Act, 2007*. Deletion of approximately 971 ha from Block 5 did not result in an AAC reduction due to the small area impacted.

6.1.4 Woodlots in Block 2

On January 23, 2008, two areas totalling 991 ha were deleted from Block 2 via Ministerial Order #3(4) 27-1 under Section 3 of the *Forestry Revitalization Act*. AAC attributed to these areas totalled 4,478 m^3; however, AAC for TFL 39 was not reduced, as at that time the Chief Forester had to determine the AAC impact of an area deletion and this was not done for this deletion. In June 2011, the *Allowable Annual Cut Administration Regulation* was enacted to ensure the AAC of a TFL (or timber supply area (TSA)) is automatically adjusted when an area is added or deleted from a TFL (or TSA) and the instrument or order making the change specifies an AAC associated with the area being added or deleted.

6.1.5 Yaagun Suu Conservancy Established

On May 29, 2008 the Yaagun Suu Conservancy was established in Block 6 under the *Protected Areas of British Columbia (Conservancies and Parks) Amendment Act, 2008* (Bill 38). This deleted approximately 6,615 ha from TFL 39. Like the Koeye Conservancy, the AAC of the TFL was not reduced to reflect the establishment of the Yaagun Suu Conservancy. Prior to the establishment of Yaagun Suu as a conservancy, this area was part of a Designated Area under Part 13 of the *Forest Act*. The AAC for the TFL was temporarily reduced by 250,000 m^3 from September 8, 2006 to December 31, 2009, to account for the Designated Area, part of which was the Yaagun Suu Conservancy.

6.1.6 Namu Conservancy Established

On June 27, 2008 the Namu Conservancy was established within Block 7 under the *Protected Areas of British Columbia (Conservancies and Parks) Amendment Act, 2008*. This conservancy removed approximately 10,953 ha from the TFL. No permanent AAC reduction was made. A temporary AAC reduction of 43,000 m^3 was in effect from September 28, 2006 to May 23, 2010, to account for a Designated Area covering the locations of the Namu and Koeye (Section 6.1.2 above) Conservancies.

6.1.7 Multiple Conservancies Established on Haida Gwaii

On December 30, 2008 several conservancies were established on Haida Gwaii via the *Park Act*. Those that affected TFL 39 include:

- Daawuuxusda
- Danmaxyaa
- Kamdis
- Kunxalas
- K'uuna Gwaay
- Scaay Taaw Sllwaay K'adjuu
- Yaaguun Gandlaay
- Duu Guusd
- Tlall

In total, creation of these conservancies deleted approximately 26,512 ha from Block 6. Similar to conservancies discussed earlier, the AAC of TFL 39 was not reduced to reflect removal of this area from the TFL but was partially accounted for through Designated Areas that included some of these conservancies as well as other areas. Temporary AAC reductions of 43,000 from July 1, 2005 to December 31, 2009 and 250,000 m^3 effective September 8, 2006 to December 31, 2009 applied to the Designated Areas.

6.1.8 Pacific TSA Reallocation

Instrument #170 signed by the Minister on July 15, 2009, deleted areas from Blocks 1, 2, 3, 4 and 7 in order to add them to the Pacific TSA. The Pacific TSA was created as part of the Forestry Revitalization Plan to be the area within which some of the BCTS allocation created by the plan would be harvested. In total, 109,532 ha were deleted from TFL 39 and an AAC allocation of 556,404 m^3 was attributed to this area.

6.1.9 TFL 60 created

On January 15, 2010, TFL 60 was created on Haida Gwaii by deleting Block 6 from TFL 39 via Instrument #173. TFL 60 has an area of approximately 196,856 ha and an AAC of 1,082,616 m^3.

6.1.10 North Vancouver Island Community Forest

An area of 1,319 ha intended to supply an AAC of 10,000 m^3 was deleted from Block 4 on January 19, 2010, via Ministerial Order #3(4) 27-2 under Section 3 of the *Forestry Revitalization Act*. This area, together with an area deleted from TFL 6, was used to form a Community Forest for the northern Vancouver Island communities of Port Hardy, Port McNeill and Port Alice with a total AAC of approximately 15,000 m^3.

6.1.11 Sliammon First Nation Tenure Opportunity

An area identified within Block 1 was deleted on May 28, 2012 via Instrument #174 to facilitate awarding a forest tenure to the Sliammon First Nation. This area (3,599 ha) is intended to provide approximately 22,000 m^3 of AAC.

6.2 Timber Harvesting Land Base Determination

The productive forest land base (PFLB) is the area of productive forest within the TFL that contributes to landscape-level objectives (e.g., biodiversity) and non-timber resource management. It excludes non-forested areas, non-productive forest area and existing roads.

The THLB is the portion of the TFL where harvesting is expected to occur. It is a subset of the PFLB as it excludes areas that are inoperable, uneconomic for harvesting or expected to be set aside for management of non-timber resources. Operationally, harvesting occurs outside the modelled THLB as the THLB used in the analysis is a GIS-based estimate of an operational reality.

The THLB and total long-term land base in TFL 39 by block are presented in Table 6 with the Timber Licence / Crown land split shown in Table 8. Merchantable volume estimates are indicated in Table 7. Areas and volumes have been compiled from databases constructed for the preparation of this information package.

For MP #8 in 2000, the total reductions area amounted to 54 percent of the total area of the TFL. For MP #9 the reductions are 236,777 ha or 58 percent of the total area.

The following sections show total area classified in each category noted in Table 6 and serve to summarize the area deducted from the land base in the order the categories appear in Table 6 (i.e., overlapping constraints are addressed in a hierarchy).

Table 6 - Land Base Netdown (ha)

Classification	Block 1	Block 2	Block 3	Block 4	Block 5	Total	% Total	% PFLB
Total Land Base	**153,918**	**156,205**	**4,464**	**46,772**	**46,441**	**407,800**	**100.0%**	
Less Non-forest	33,995	4,792	120	3,374	12,495	54,776	13.4%	
Less Existing Roads	1,407	4,393	161	1,337	263	7,561	1.9%	
Total Forested	**118,516**	**147,020**	**4,184**	**42,061**	**33,683**	**345,463**	**84.7%**	
Less Non-productive	49,412	19,079	67	7,739	19,407	95,704	23.5%	
Total Productive	**69,104**	**127,941**	**4,117**	**34,322**	**14,276**	**249,759**	**61.2%**	**100.0%**
Less Inoperable	3,646	5,693	47	372	1,736	11,494	2.8%	4.6%
Less Plutonic R/W	747	0	0	0	0	747	0.2%	0.3%
Total Operable	**64,711**	**122,248**	**4,070**	**33,950**	**12,540**	**237,518**	**58.2%**	**95.1%**
Reductions:								
Riparian Management	4,628	9,398	608	3,324	1,432	19,390	4.8%	7.8%
Ungulate Winter Ranges	848	4,313	0	358	832	6,351	1.6%	2.5%
Old Growth Management Areas (established)	4,977	8,120	0	889	0	13,986	3.4%	5.6%
Old Growth Management Areas (draft)	87	0	0	587	0	674	0.2%	0.2%
Wildlife Habitat Areas	70	1	0	0	6	77	0.0%	0.0%
High Value Bear Habitat	0	0	0	0	550	550	0.1%	0.2%
Uneconomic	609	989	145	409	851	3,003	0.7%	1.2%
Recreation	11	531	0	6	31	579	0.1%	0.2%
Red/Blue listed ecosystems	0	0	265	0	1,293	1,558	0.4%	0.6%
Terrain Stability	2,892	2,837	46	1,304	931	8,010	2.0%	3.2%
Avalanche Areas	87	26	0	19	8	140	0.0%	0.1%
Strategic Level Reserve Design	0	0	520	0	3,082	3,602	0.9%	1.4%
Total Operable Reductions	**14,209**	**26,217**	**1,584**	**6,896**	**9,016**	**57,922**	**14.2%**	**23.2%**
Reduced Land base	**50,501**	**96,031**	**2,485**	**27,054**	**3,524**	**179,596**	**44.0%**	**71.9%**
Less allowance for stand-level retention	2,468	4,365	149	1,200	211	8,393	2.1%	3.4%
Current THLB	**48,033**	**91,666**	**2,336**	**25,854**	**3,313**	**171,203**	**41.9%**	**68.5%**
Less future roads	214	1,521	59	72	12	1,879	0.5%	0.8%
Long-term Land base	**47,819**	**90,145**	**2,277**	**25,782**	**3,301**	**169,325**	**41.4%**	**67.7%**

Table 7 – Timber Volume[1] Netdown ('000 m³)

Classification	Block 1	Block 2	Block 3	Block 4	Block 5	Total	% Total
Total Land Base	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Non-forest	0	0	0	0	0	0	0.0%
Less Existing Roads	0	0	0	0	0	0	0.0%
Total Forested	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Non-productive	0	0	0	0	0	0	0.0%
Total Productive	**32,536.7**	**50,891.2**	**1,580.8**	**12,208.2**	**6,950.1**	**104,369.7**	**100.0%**
Less Inoperable	2,455.8	3,599.0	20.1	264.2	1,125.0	7,460.0	7.1%
Less Plutonic R/W	265.5	0	0	0	0	266.8	0.3%
Total Operable	**29,815.4**	**47,303.7**	**1,560.7**	**11,944.0**	**5,825.1**	**96,642.9**	**92.6%**
Reductions:							
Riparian Management	2,144.0	4,211.9	301.5	1,320.2	603.9	8,596.8	8.2%
Ungulate Winter Ranges	652.6	3,166.6	0	234.5	600.9	4,652.5	4.5%
Old Growth Management Areas (established)	2,791.1	5,177.0	0	540.0	0	8,517.8	8.2%
Old Growth Management Areas (draft)	48.0	0	0	405.8	0	454.8	0.4%
Wildlife Habitat Areas	25.1	0.8	0	0	1.0	26.9	0.0%
High Value Bear Habitat	0	0	0	0	346.4	343.0	0.3%
Uneconomic	193.7	363.2	38.0	113.4	382.4	1,086.5	1.0%
Recreation	8.5	380.0	0	2.7	10.7	402.0	0.4%
Red/Blue listed ecosystems	0	0	152.9	0	990.8	1,143.7	1.1%
Terrain Stability	1,538.1	1,493.0	16.6	625.3	500.9	4,179.9	1.0%
Avalanche Areas	225.1	15.5	0	8.4	6.8	255.8	0.2%
Strategic Level Reserve Design	0	0	106.3	0	1,437.4	1,543.7	1.5%
Total Operable Reductions	**7,626.2**	**14,808.0**	**615.3**	**3,250.3**	**4,861.9**	**31,203.3**	**29.9%**
Reduced Land base	**22,189.2**	**32,495.7**	**945.4**	**8,693.7**	**907.4**	**65,439.6**	**62.7%**
Less allowance for stand-level retention	842.3	1,430.1	56.7	376.7	54.5	2,771.5	2.7%
Current THLB	**21,346.9**	**31,065.6**	**888.7**	**8,317.0**	**852.9**	**62,668.1**	**60.0%**

[1] Data updated to the December 31, 2011 for logging and ages; therefore, volumes listed represent estimates at the end of 2011.

Table 8 – Timber Licence (Schedule A) / Crown (Schedule B) THLB Split

TFL Block	THLB (ha)		
	Schedule A	Schedule B	Total
Block 1	111	47,922	48,033
Block 2	12,011	79,655	91,666
Block 3	665	1,562	2,227
Block 4	2,645	23,209	25,854
Block 5	149	2,868	3,017
Total	**15,581**	**155,216**	**170,797**

6.3 Non-Forest

The non-forest portion of TFL 39 includes areas where merchantable tree species are largely absent and most of the area is alpine, rock, slides and wet areas (Table 9).

Table 9 - Non-forest Area

Description	Gross non-forest area (ha)						Total Area Reduction (ha)
	Block 1	Block 2	Block 3	Block 4	Block 5	Total	
Alpine	12,773	1,708	0	334	11,160	25,975	25,975
Rock and slides	822	209	0	504	288	1,833	1,833
Water	19,794	2,269	114	2,143	805	25,125	25,125
Industrial	52	78	5	138	16	289	289
Other	555	527	0	254	226	1,563	1,563
TOTAL	**33,995**	**4,792**	**120**	**3,374**	**12,495**	**54,776**	**54,776**

6.4 Existing Roads

Existing roads are excluded from the timber harvesting land base. This reduction is due to a combination of classified and unclassified roads. Classified roads are mapped as forest cover polygons distinctly separate from adjacent polygons. Unclassified roads are mapped as lineal features. For the purposes of determining the area of unclassified roads, all such roads are assumed to occupy a 13 metre unproductive width. This width reflects the average width across all the blocks and all road classes (mainlines, branch roads and spurs). Ideally varying widths would be used depending on the road class; however, the data for road classes is incomplete so that approach was not possible.

All trails and the majority of landings are rehabilitated and restocked following logging; therefore, the associated area reduction is thought to be insignificant. Table 10 summarizes the areas of existing roads in the TFL.

Table 10 - Existing Roads

TFL Block	Length (km)	Area Reduction (ha)
Block 1	1,465	1,407
Block 2	4,192	4,393
Block 3	154	161
Block 4	1,301	1,337
Block 5	265	263
Total	7,377	7,561

6.5 Non-Productive Forests

TFL 39 includes 95,704 ha of non-productive forest (Table 11). These areas are mostly mature stands defined as having an inventory volume of less than 211 m^3/ha (i.e., the metric equivalent of 3,000 ft^3/acre cut-off used in the 1960's inventory). Non-productive forests contribute to landscape level biodiversity. While not incorporated into the biodiversity calculations, these components provide a margin of safety around biodiversity requirements.

Table 11 - Non-productive Area

TFL Block	Gross Non-productive Area (ha)	Total Area Reduction (ha)
Block 1	49,412	49,412
Block 2	19,079	19,079
Block 3	67	67
Block 4	7,739	7,739
Block 5	19,407	19,407
Total	**95,704**	**95,704**

6.6 Physical Operability

Mapping of the physical operability was updated in 1998/1999 in preparation for MP #8. The mapping classifies areas as conventional (i.e., accessible by ground-based harvesting systems), non-conventional (i.e., access limitations suitable for aerial systems such as helicopter) or inoperable (i.e., areas not likely harvestable by any system). The area classified as non-conventional increased in recognition of difficulty and cost of building roads in some areas, particularly steep terrain with unstable soils.

Only Inoperable areas were removed from the THLB (see Table 12).

Table 12 - Area by Physical Operability Type

Description	Productive Area (ha)						Volume Reduction ('000 m^3)
	Block 1	Block 2	Block 3	Block 4	Block 5	Total	
Conventional	50,286	110,221	4,070	28,579	6,589	199,745	-
Non-conventional	15,171	12,027	0	5,371	5,951	38,520	-
Operable (subtotal)	**65,458**	**122,248**	**4,070**	**33,950**	**12,540**	**238,266**	**-**
Inoperable	3,646	5,693	47	372	1,736	11,494	7,460.0
Total	**69,104**	**127,941**	**4,117**	**34,322**	**14,276**	**249,759**	**7,460.0**

6.7 Plutonic Right-Of-Way

Since the 1980s, BC Hydro has been acquiring power from Independent Power Producers (IPPs). On July 27, 2006, BC Hydro awarded 38 contracts to IPPs across British Columbia, one being the partnership between Plutonic Power Corporation (now Alterra Power Corp.) and GE Energy Financial Services for the Toba Montrose "run-of-river" project. The project includes two generating facilities in the Toba Valley approximately 80km north of Powell River. Electricity generated at these sites is transmitted through 155km of line to Saltery Bay, where it connects to BC Hydro transmission lines. A portion of the right-of-way for the new transmission lines passes through Block 1 of TFL 39. Table 13 indicates the direct impact that this right-of-way has on Block 1. An additional operational impact not yet incorporated in the operability inventory is that areas formerly accessible using conventional harvest systems now require aerial systems to allow for the safe travel of equipment due to insufficient clearance under the lines. Also, the presence of the lines and support towers increases the risk associated with harvesting potentially unstable terrain upslope of the lines such that risk-management strategies may preclude harvesting some areas that would be harvested without the presence of the infrastructure.

Table 13 – Plutonic Right-of-Way Area within Block 1

TFL Block	Gross Plutonic RoW Area (ha)	Total Area Reduction (ha)
Block 1	885	747

6.8 Riparian Management Areas

Detailed riparian features mapping is on-going for TFL 39 through cutblock development. Operational stream inventories associated with development planning have been conducted since 1988 (with the introduction of the *Coastal Fisheries Forestry Guidelines*) and various reconnaissance (1:20,000) fish and fish habitat inventory projects have been completed. These inventories provide information on fish distribution, habitat and habitat restoration opportunities. This detailed information provides the basis for estimating riparian classes and reserve areas for waterbodies. Netdowns for riparian features are the first netdown applied in the hierarchy; therefore, the values listed in Table 6 are the productive forest area and the area removed to determine the estimated THLB area.

6.8.1 FRPA Riparian Management

The timber supply analysis utilizes the available stream classifications in the Geographic Information System (GIS) to apply Riparian Management Areas (RMAs) to known streams, lakes and wetlands based on FRPA Riparian Reserve Zone (RRZ) widths and assumed levels of retention within Riparian

Management Zones (RMZs). The assumed RMZ retention levels and effective RMAs are listed in Table 14. Retention levels were estimated based on a review of harvested cutblocks and classification of riparian features in and adjacent to the harvest area. As more streams are identified during detailed cutblock layout than are included in the data used for the timber supply analysis, retention levels in the RMZs have been increased from the levels indicated in this review. This approach differs from the one percent incremental netdown for unmapped streams applied in the last analysis. Also as most S2-S6 streams are represented by a line, effective management area widths account for the stream body width.

Table 14 – FRPA Riparian Management Areas

Riparian Feature Class	Size Class	Reserve Zone (m)	Management Zone Width (m)	Management Zone Netdown (%)	Effective Management Area (m)[1]
Streams	*Width (m)*				
S1-A	>=100	0	100	80	80
S1-B	>20.0 - 99.9	50	20	75	65
S2	>5.0 - 20.0	30	20	70	44
S3	>1.5 - 5.0	20	20	50	30
S4	<1.5	0	30	33.3	10
S5	>3.0	0	30	50	15
S6	<3.0	0	20	20	4
Lakes	*Area (ha)*				
L1-A	>=1000	0	15[2]	100	15
L1-B	>5.0 - 999.9	10	15[2]	50	17.5
L2 (dry zones)	1.0 - 5.0	10	20	25	15
L3 (wet zones)	1.0 - 5.0	0	30	25	7.5
L4 (dry zones)	0.5 - 1.0	0	30	25	7.5
Wetlands	*Area (ha)*				
W1	>5.0	10	40	25	20
W2 (dry zones)	1.0 - 5.0	10	20	25	15
W3 (wet zones)	1.0 - 5.0	0	30	25	7.5
W4 (dry zones)	0.5 - 1.0	0	30	25	7.5
W5	>5.0	10	40	25	20

[1] Effective Management Area = RRZ + (RMZ *(netdown %/100)). This width is applied to both sides of streams and to the perimeter of lakes and wetlands.
[2] WFP RMZ for TSA purposes only, not FPPR RMZ

Riparian management areas also protect other values such as riparian vegetation, wildlife habitat features and often culturally modified trees (CMTs).

6.8.2 South Central Coast Order Riparian Management

The SCCO has several objectives related to riparian management:

- Objective 8 – Important fisheries watersheds
- Objective 9 – High value fish habitat
- Objective 10 – Aquatic habitat that is not high value fish habitat
- Objective 11 – Forested swamps
- Objective 12 – Upland streams

- Objective 13 – Active fluvial units

Objectives for Important Fisheries Watersheds and upland streams are addressed using forest cover constraints and are discussed in Section 11.2.8.2. The following EBM riparian buffers are applied with the FRPA buffers indicated in Table 14 such that the wider of the two widths takes precedence.

6.8.2.1 *High Value Fish Habitat (SCCO Obj. 9)*

"High value fish habitat" (HVFH) is defined as critical spawning and rearing areas for anadromous and non-anadromous fish and includes estuaries, wet flood plains and marine interface areas. For this analysis, HVFH is assumed to occur in all fish-bearing streams with a gradient of less than or equal to 5 percent. This gradient criterion is meant to capture the extent of alluvial fish-bearing streams, which in the absence of a watershed-level assessment, are assumed to be HVFH[1]. The SCCO requires a reserve zone with a width, on average, of 1.5 times the height of the dominant trees. A buffer of 60m (1.5 x 40 m (assumed height of dominant trees)) is applied to both sides of the applicable stream reaches.

6.8.2.2 *Aquatic Habitat that is not High Value Fish Habitat (SCCO Obj. 10)*

Aquatic habitat that is not HVFH is found in S1, S2, and S3 streams, and lakes and wetlands greater than 0.25 ha in size. The SCCO requires 90 percent of the functional riparian forest (i.e., forest that has reached hydrologically effective green-up) be retained within a management zone with a width, on average, of 1.5 times the height of the dominant trees. A buffer width of 54 m (0.9 x 1.5 x 40 m) is applied to such features.

6.8.2.3 *Forested Swamps (SCCO Obj. 11)*

The SCCO requires a management zone of 1.5 times the height of the dominant trees adjacent to forested swamps greater than 0.25 ha, within which 70 percent of the functional riparian forest must be retained. As forested swamps are relatively rare in coastal BC and must be identified on the ground, the assumption is that the SCCO objective for stand-level retention (see Section 6.18.3) addresses the forested swamp management objective as well.

6.8.2.4 *Active Fluvial Units (SCCO Obj. 13)*

Active fluvial units are defined in the SCCO as active floodplains where water flows over land in a normal flood event, and includes low and medium benches. The objective is to retain 90 percent of the functional riparian forest on these units. A review of the floodplain dataset derived for the Central Coast Land and Resource Management Plan indicated there are no identified active fluvial units within Block 3. Within Block 5, the Philips River floodplain is captured by netdowns for riparian features, including HVFH, and grizzly bear habitat. No additional netdown is applied for this EBM objective. A significant portion of this floodplain is located within the Phillips Estuary Conservancy.

6.8.3 Ocean Foreshore

A 40 m "reserve" zone (netdown) is applied to ocean shorelines to account for the management of visual quality, operability issues, eagle nests and possible marine interface areas that qualify as "high value fish habitat" as defined in the SCCO.

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[1] Background and Intent Document for the SCC and CNC Land Use Objectives Orders, April 18, 2008, pg. 23.
Source: http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/objectives/index.html

6.9 Ungulate Winter Ranges

Ungulate Winter Ranges (UWRs) for Columbian black-tailed deer, Roosevelt elk and Mountain goats have been approved in four blocks of TFL 39 (see Table 15). UWRs are included in the data set for analysis and will be excluded from the THLB based on assigned netdown. All UWRs within Blocks 2, 4 and 5 have 100 percent netdowns while the UWRs for mountain goats within Block 1 have netdowns varying from 50 percent to 100 percent applied.

Table 15 - Ungulate Winter Ranges Area

TFL Block	UWR ID	Productive UWR Area (ha)	Total Area Reduction (ha)	Ungulate Species
Block 1	U-2-004	2,697	848	Mountain goat
Block 2	U-1-004	4,598	4,313	Black-tailed deer, Roosevelt elk
Block 3	N/A	0	0	N/A
Block 4	U-1-006	396	358	Black-tailed deer, Roosevelt elk
Block 5	U-2-013	852	832	Mountain goat
Total	**-**	**8,543**	**6,351**	**-**

Within Block 1 there are proposed UWRs for Black-tailed deer. These UWRs total 1,637 ha and are incorporated in the data for analysis. Rather than a land base netdown, these polygons have forest cover constraints applied. Details are provided in Section 11.2.1. In summary, no more than 20 percent of a polygon will be covered by a stand less than 20 years old and at least 20 percent of the polygon will be covered by trees at least 80 years old.

6.10 Old Growth Management Areas

Landscape Units and Biodiversity Emphasis Options (BEOs) were designated through the *Order Establishing Provincial Non-Spatial Old Growth Objectives* effective June 30, 2004 (NSOG order). This order is in effect until Old Growth Management Areas (OGMAs) are spatially determined through Landscape Unit planning. OGMAs have been established within Lois (Block 1), Bunster (Block 1), Powell-Daniels (Block 1), Powell Lake (Block 1), Adam-Eve (Block 2), Salmon (Block 2), White (Block 2), Sayward (Block 2), Lower Nimpkish (Block 4) and Marble (Block 4) landscape units. Draft OGMAs in Haslam (Block 1), Keogh (Block 4), and Holberg (Block 4) landscape units have been identified to meet the NSOG order. These draft OGMAs will be used in the timber supply analysis but must complete a public and First Nations' review process before becoming legal.

OGMAs for landscape units with a Low BEO need identify enough area to meet the old seral target drawn down to 1/3 for the first rotation (i.e., 80 years). Targets for the end of the second rotation (i.e., 160 years) and the end of the third rotation (i.e., 240 years) will be addressed as forest cover constraints (see Section 11.2.4 for details).

SCCO Objective 14 (landscape level biodiversity) replaces the NSOG order for Blocks 3 and 5. See Section 6.17 for details.

Table 16 - TFL 39 OGMA Status and Areas

TFL Block	Landscape Unit	BEO	OGMA Status (June 2012)	OGMA Area (ha)	
				Productive	Area Reduction
Block 1	Lois	Low	Established	1,911	1,441
Block 1	Bunster	Intermediate	Established	405	364
Block 1	Powell-Daniels	Intermediate	Established	1,537	1,063
Block 1	Powell Lake	Low	Established	3,191	2,108
Block 2	Adam-Eve	Low	Established	4,391	2,005
Block 2	Salmon	Low	Established	6,410	2,011
Block 2	White	High	Established	7,637	3,729
Block 2	Sayward	Intermediate	Established	535	376
Block 4	Lower Nimpkish	Low	Established	0	0
Block 4	Marble	Intermediate	Established	1,674	889
Established OGMAs (subtotal)				***27,691***	***13,986***
Block 1	Haslam	Low	Draft	101	87
Block 4	Holberg	Low	Draft	0	0
Block 4	Keogh	Low	Draft	931	587
Draft OGMAs (subtotal)				***1,032***	***674***
OGMAs Total				**28,723**	**14,660**

6.11 Wildlife Habitat Areas

6.11.1 FRPA

Wildlife Habitat Areas (WHAs) are established to conserve species at risk habitat. In the absence of WHAs, Section 7 of the *Forest Planning and Practices Regulation* (FPPR) requires holders of a Forest Stewardship Plan (FSP) to specify a result or strategy to address species at risk habitat if a notice has been issued under section 7 of the FPPR. At the time the timber supply analysis data set was put together a total of nine Wildlife Habitat Areas (WHAs; 1-085 [Block 2], 1-087 [Block 2], 1-185 [Block 4], 1-204 [Block 4], 1-205 [Block 4], 2-073 [Block 5], 2-074 [Block 5], 2-075 [Block 5], 2-082 [Block 1]) had been approved within the boundaries of TFL 39, with an additional WHA (1-203 in Block 2) agreed to but not approved, for a total of ten WHAs incorporated in the analysis data. Five are for Marbled Murrelet; two are for Northern goshawk; three are for Grizzly bear. In addition to the ten WHAs, areas identified within Block 1 (in the applicable FSP) are reserved from harvesting for the purpose of protecting grizzly bear and marbled murrelet habitats. These areas meet the intent of the FPPR Section 7 notice for the Sunshine Coast District for these species. These areas, while not legally established WHAs, are treated as such for the timber supply analysis. The WHAs have a total area of 2,039 ha (see Table 17).

Table 17 – FRPA Wildlife Habitat Areas

Description	Productive Wildlife Habitat Area (ha)	Total Area Reduction (ha)
Wildlife Habitat Area - Marbled murrelet	450	0
Wildlife Habitat Area – Northern goshawk	323	1
Wildlife Habitat Area – Grizzly bear	146	6
WHA sub-total	**919**	**7**
Spatial Reserve – Marbled murrelet	953	66
Spatial Reserve – Grizzly bear	167	4
Spatial Reserve sub-total	**1,120**	**70**
TOTAL	**2,039**	**77**

Other species identified in the FPPR Section 7 notices for Campbell River, North Island – Central Coast and Sunshine Coast Resource Districts include Coastal-tailed frogs, Great blue herons, Keen's long-eared myotis and Red-legged frogs. While WHAs may be established within TFL 39 in the future to address conservation of habitat for these species at risk and additional WHAs may be established for species listed in Table 17, the analysis will not make allowance for full implementation of the Identified Wildlife Management Strategy (IWMS) timber supply impact policy ("1 percent budget") as this would be speculation as to where the impact would be allocated within the districts (IWMS impacts are tracked at the district level).

It should be noted for the purposes of the IWMS policy regarding the timber supply impact, the THLB impact of these WHAs is determined using MP#8 data and is different than the impacts indicated in Table 17.

6.11.2 South Central Coast Order Objective for Grizzly Bear Habitat

Grizzly bears are an important regional species on the Central Coast. Objective 17 within the SCCO specifies maintenance of grizzly bear habitat as set out in Schedule 2 of the order. "Class 1" habitat is netted out of the land base. No such habitat is found in Block 3 while Table 18 indicates the habitat area found within Block 5.

Table 18 – SCCO Grizzly Bear Habitat

Description	Productive Bear Habitat Area (ha)	Total Area Reduction (ha)
Class 1 bear habitat	1,341	550
TOTAL	**1,341**	**550**

6.12 Economic Operability

A broad inventory classification is applied as a high-level filter for economic operability in mature forest (i.e., >140 years).

The classification is applied to mature forest areas that are productive and physically operable. It is a separate layer of map information from the physical operability classification. See Section 6.6 for discussion of physical operability.

Inventory attributes (refer to Table 19) for this classification include species and percentage of poor grades for cedar and cypress stands, significant determinants of timber value. They also include volume per hectare and harvest method, which have a significant effect on harvesting costs.

Economic classes include economic, marginal and uneconomic. Uneconomic areas are removed from the net timber harvesting land base for the base option in the MP #9 Timber Supply Analysis.

Table 19 - Inventory[1] and Logging Method Criteria for Classification of Economic Operability

Stand Type	Conventional		Non-Conventional	
	Uneconomic	Marginal	Uneconomic	Marginal
Fd, FdHw, FdCw	<271	271-380	<434	434-542
Hw, HwBa	<325	325-434	<488	488-597
HwBaCy (<40% X,Y,Z)	<325	325-434	<434	434-542
HwBaCy (>=40% X,Y,Z)	<434	434-542	<542	542-651
Cw (<40% X,Y,Z)	<271	271-380	<380	380-488
Cw (>=40% X,Y,Z)	<380	380-488	<542	542-651
Total Productive Area	1,712 ha	2,069 ha	2,873 ha	1,447 ha
Total Productive Volume	516,300 m^3	769,719 m^3	1,049,585 m^3	656,345 m^3
THLB Area	0 ha	1,419 ha	0 ha	786 ha
THLB Volume	0 m^3	533,189 m^3	0 m^3	356,729 m^3

Harvest areas by operability class for the years 2000 to 2010 for Blocks 1, 2 and 4 are summarized in Table 20. The THLB area by operability class is provided for comparative purposes. Blocks 3 and 5 are not included due to limited activity within these blocks during this time frame. In recent years, harvest in the high cost non-conventional mature inventory has been significantly less than its contribution to the current merchantable inventory. A substantial portion of this volume is hemlock and balsam of relatively low value in recent markets.

WFP intends to explore the contribution of this economically challenging timber in the timber supply analysis. In the Base Case, contribution to timber supply by the heli-operable landbase within Blocks 1, 2 and 4 will be constrained to amounts consistent with recent performance. There is no heli-operable area within Block 3. The Block 5 land base is heavily constrained by EBM objectives so the contribution from the heli-operable portion in initial model runs will be reviewed and a decision made whether a constraint needs to be applied.

The sensitivity of timber supply to assumptions related to the contribution from the heli-operable land base will be tested by removing the constraints applied in the Base Case and by assuming no heli harvesting occurs (refer to Section 3.2).

[1] Volumes are m^3/ha without breakage and Waste2 deducted but include the audit adjustments described in Section 5.1.

Table 20 - Harvest Area for 2000 to 2010 by Operability Class (Blocks 1, 2 and 4)

Operability Class	% of Harvest Area (2000-2010)	% of Total THLB	% of THLB >60 yrs old[1]
Block 1			
Conventional economic	87.2%	82.2%	72.1%
Non-conventional economic	10.5%	16.1%	25.2%
Conventional marginal	0.9%	0.6%	0.8%
Non-conventional marginal	0.4%	1.1%	1.9%
Inoperable/Uneconomic	1.0%	0%	0%
Block 1 Total	***100.0%***	***100.0%***	***100.0%***
Block 2			
Conventional economic	92.8%	90.4%	77.9%
Non-conventional economic	3.9%	6.6%	14.7%
Conventional marginal	1.5%	2.5%	6.0%
Non-conventional marginal	0.1%	0.5%	1.4%
Inoperable/Uneconomic	1.7%	0%	0%
Block 2 Total	***100.0%***	***100.0%***	***100.0%***
Block 4			
Conventional economic	78.9%	86.0%	61.0%
Non-conventional economic	16.7%	12.0%	33.0%
Conventional marginal	1.3%	0.9%	2.7%
Non-conventional marginal	1.3%	1.1%	3.3%
Inoperable/Uneconomic	1.8%	0%	0%
Block 4 Total	***100.0%***	***100.0%***	***100.0%***
TOTAL for Blocks 1, 2 and 4			
Conventional economic	89.1%	87.2%	73.8%
Non-conventional economic	7.6%	10.3%	20.9%
Conventional marginal	1.3%	1.7%	3.5%
Non-conventional marginal	0.4%	0.8%	1.8%
Inoperable/Uneconomic	1.6%	0%	0%
GRAND TOTAL	**100.0%**	**100.0%**	**100.0%**

6.13 Recreation Features Inventory

Within Block 1 there are several recreation sites and trails. The following recreation sites were removed from the THLB:

- Dodd Lake
- Emma Lake
- Goat Lake
- Horseshoe Lake
- Ireland Lake
- Middle Point
- Nanton Ireland Lake
- Nanton Lake
- North Dodd Lake
- Spring Lake

[1] Age as of December 31, 2011. Therefore this represents the current THLB greater than 60 years old.

- Lewis Lake
- Lois Lake (two sites)
- Lois Point
- Tony Lake
- Windsor Lake

There are approximately 140 km of trails within Block 1 including:

- Alpha Lake Trails
- Beta Lake Trail
- Lang Creek Trail
- Powell Forest Canoe Route
- Suicide Creek Trail
- Sunshine Coast Trail

Approximately 60 km of these trails fall within areas removed from the THLB for roads, riparian features and non-productive forest. Management of portions of these trails which fall within the THLB (approximately 80 km) is assumed to be accounted for by the netdown for stand-level retention (see Section 6.18).

On April 12, 2006, a provincial *Government Actions Regulation* (GAR) Order was established to identify Recreation Resource Features for the Campbell River Forest District. The features associated with Block 2 are removed from the THLB. Most features are associated with high elevation (alpine) or riparian features. While the GAR Order does not necessarily preclude harvesting within the identified features, a conservative assumption of a 100% netdown is applied. The features within Block 5 are mainly associated with the Phillips River and therefore are removed from the THLB almost entirely by the riparian netdown assumptions (see Section 6.8), with a small incremental effect on the THLB.

There are no recreation netdowns applied within Block 3.

Several recreation sites have been removed from the THLB within Block 4:

- Clint Beek Park (Keogh Lake)
- Devils Bath
- Eternal Fountain
- Kathleen Lake
- Maynard Lake
- Reappearing River
- Three Isle Lake
- Vanishing River

Table 21 summarizes areas removed by recreation netdowns.

Table 21 – Recreation Areas

TFL Block	Productive Recreation Area (ha)	Total Area Reduction (ha)
Block 1	19	11
Block 2	1,651	531
Block 3	0	0
Block 4	17	6
Block 5	389	31
Total	**2,076**	**579**

Past analyses made reductions to the THLB based on the TFL 39 recreation inventory. This practice is not followed in this analysis. The recreation inventory was used in the Forest Practices Code era to adequately manage and conserve recreation resources. With the advent of FRPA, the provincial government must establish objectives for managing forest resources. Other than designating sites and trails described above, no recreation objectives exist for TFL 39 at the time of writing this document. A large number of recreation inventory polygons are associated with either fish-bearing riparian features (i.e., rivers, larger streams, lakes) that have reserve zones for protection and with scenic areas managed for visual quality (see Section 11.2.1) or high-elevation areas that do not support productive forest types and are not part of the THLB.

6.14 Red and Blue Listed Plant Communities

Objective 15 of the SCCO requires the protection of all occurrences of red-listed (i.e., endangered or threatened) plant communities (subject to a maximum exception of 5 percent of each occurrence for road, other infrastructure or safety reasons) and at least 70 percent of blue-listed (i.e., special concern) plant communities. Red-listed and blue-listed plant communities are itemized in Schedule 5 and 6 of the SCCO, respectively. These plant communities generally align with specific site series. Applicable plant communities / site series for TFL 39 are listed in Table 22.

Table 22 – Red and Blue Listed Plant Communities

Plant Community	Site Series	Red / Blue	Netdown
Western hemlock / flat moss	CWHdm 01	Blue	70%
Douglas-fir – Western hemlock / salal	CWHdm 03	Blue	70%
Western redcedar / sword fern	CWHdm 05	Blue	70%
Western redcedar / three-leaved foamflower	CWHdm 07	Blue	70%
Black cottonwood / red osier dogwood (Red alder / Salmonberry)	CWHdm 10	Blue	70%
Western redcedar - Sitka spruce / skunk cabbage	CWHdm 12 CWHvm1 14	Blue	70%
Western hemlock – Western redcedar / salal	CWHvm1 03 CWHvm2 03	Blue	70%
Western redcedar – Western hemlock / swordfern	CWHvm1 04 CWHvm2 04	Blue	70%
Douglas-fir – Lodgepole pine / kinnikinnick	CWHdm 02	Red	100%
Douglas-fir / swordfern	CWHdm 04	Red	100%
Western hemlock – Western redcedar / Deer fern	CWHdm 06	Red	100%
Sitka spruce / salmonberry	CWHdm 08 CWHvm1 09	Red	100%
Western redcedar / salmonberry	CWH dm 13	Red	100%
Western redcedar / black twinberry	CWHdm 14	Red	100%

The approach taken in developing the timber supply analysis data set is to utilize terrestrial ecosystem mapping (TEM) that has been completed for all of TFL 39. TEM identifies up to three site series per mapped polygon. The netdowns applied for red-listed plant communities are the area-equivalent of the decile presence of the red-listed site series in forest stands that are in the old seral stage (i.e., > 250 years old). For example, if a 10 ha old seral TEM polygon was classified as being 30 percent CWHdm 14, the applied netdown is 3 ha (i.e., 30 percent of 10 ha). Similarly, netdowns applied for blue-listed site series are 70 percent of the decile presence of blue-listed site series in forest stands that are in the old seral stage. Application of this logic results in the areas shown in Table 23.

Table 23 – Red and Blue Listed Plant Communities Areas

TFL Block	Productive Red / Blue Area (ha)	Total Area Reduction (ha)
Block 3	350	265
Block 5	2,025	1,293
Total	**2,375**	**1,558**

6.15 Terrain Stability

There are several different types of terrain stability mapping in TFL 39. Blocks 1 and 2 have a mix of Environmentally Sensitive Area (ESA - Es1/Es2) and Detailed Terrain Stability (DTSM or 5-class) mappings. The DTSM within Block 1 is a new inventory for Powell-Daniels and the north-east portion of the Powell Lake landscape units. The mapping, completed between 2007 and 2010, was done by Denny Menard & Associates with TDB Consultants providing GIS services utilizing Forest Investment Account (FIA) funding. Blocks 3 and 4 have only ESA mapping.

A pilot project encompassing Block 5 (and portions of TFL 44) was completed by Denny Menard & Associates and Golder Associates. The pilot project used DTSM and landslide inventory data to define statistically-based landslide hazard mapping (LSHM) polygons for landslides from roads and within cutblocks. For the timber supply analysis, netdowns associated with the latter classification will be utilized in estimating the THLB.

Table 24 indicates, by block of TFL 39, mapping type and the netdowns associated with various unstable terrain classifications.

Table 24 - Terrain Stability Netdowns

TFL Block	Mapping Type	Terrain Classification	Netdown %	Productive Ha	Total Area Reduction (ha)
Block 1	ESA	Es1	90	842	334
		Es2	20	4,097	623
	DTSM	IV	20	6,382	942
		V	90	1,579	993
Block 1 Total				***12,900***	***2,892***
Block 2	ESA	Es1	85	3,041	1,366
		Es2	15	8,239	891
	DTSM	IV	20	536	78
		V	90	951	502
Block 2 Total				***12,767***	***2,837***
Block 3	ESA	Es1	85	63	30
		Es2	15	155	16
Block 3 Total				***218***	***46***
Block 4	ESA	Es1	85	1,341	851
		Es2	15	3,711	453
Block 4 Total				***5,052***	***1,304***
Block 5	LSHM	Orange	20	3,516	435
		Red	90	1,147	496
Block 5 Total				***4,663***	***931***
GRAND TOTAL				**35,600**	**8,010**

6.16 Avalanche Areas

Avalanche run-out zones (Ea) are another type of ESA mapped within TFL 39. A 20 percent netdown is applied to these areas. There are no avalanche areas mapped in Block 3. As seen in Table 25 there is relatively little area removed from the THLB for Ea mapping. Reductions for non-productive forest, inoperable areas and unstable terrain removed most areas mapped as avalanche run-out zones.

Table 25 – Avalanche Areas

TFL Block	Productive Avalanche Area (ha)	Total Area Reduction (ha)
Block 1	849	87
Block 2	495	26
Block 3	0	0
Block 4	229	19
Block 5	214	8
Total	**1,787**	**140**

In the last timber supply analysis for TFL 39, a cover constraint was applied such that no more than 20 percent of the forested area mapped as Ea could be less than 30 years of age at any time. In that analysis 1,205 ha of THLB was subjected to that constraint. With only 140 ha of THLB being mapped as Ea in this analysis, the cover constraint will not be applied as the timber supply impact of applying such a constraint would be minimal.

6.17 Strategic-Level Reserve Design

The intent of SCCO Objective 14 is to provide landscape level biodiversity. This objective replaces the non-spatial old growth order and related old-growth management areas within the area covered by the SCCO. The order identifies within each landscape unit a percentage (e.g., 30, 50 or 70 percent) to maintain or recruit from the amount of old forest (i.e., > 250 years old) that would normally occur under conditions of natural disturbance. This concept is referred to as RONV, the range of natural variation. The objective is to provide for the recruitment of younger forests into old forest where inadequate old forest is present.

The RONV target for the Broughton LU (Block 3) is 30 percent and is 70 percent for the Phillips LU (Block 5). These percentages are used to identify Site Series Surrogate (SSS) RONV requirements in Schedule 4(b) of the SCCO. A permissible alternative is to retain an amount of old forest by site series or grouping of site series equal to or greater than the RONV requirement. These requirements are to be listed in Schedule 4(a), but as this schedule has not yet been developed, this approach is not available for use.

For strategic planning purposes, a mapping initiative was undertaken to spatially identify areas required to be reserved to meet the objectives within the land use orders that apply to the central coast. This mapping, known as strategic-level reserve design (SLRD), was done for the Broughton and Phillips landscape units. In the Base Case analysis, the SLRD mapping will form the basis for meeting the landscape level biodiversity objective in the SCCO.

SLRD mapping for Broughton and Phillips was done using the following strategy:

- TFL 39 MP #8 THLB data was modified to include Class 1 Grizzly bear habitat, updated UWRs and WHAs, and updated parks and protected areas boundaries.
- Mapped focal species habitat with high co-location value within old forest in the non-contributing land base. Focal species include monumental cedar, red and blue listed plant communities, grizzly bears, marbled murrelet, Northern goshawk, mountain goats and Pacific tailed frog.
- If a SSS target is achieved at this stage, no further mapping is required. If not, continue mapping SSS in the non-contributing land base.
- If a SSS representation target cannot be met with the old forest in the non-contributing land base, identify areas of old forest in the THLB giving priority to co-located habitat. If a SSS representation target is still not met, identify younger forest first within the non-contributing land base and, if necessary, second within the THLB, to recruit into old forest.

Table 26 indicates the total area and incremental netdown for the SLRDs and therefore for meeting the landscape level biodiversity objective of the SCCO.

Table 26 – Strategic-Level Reserve Design Areas

TFL Block	Productive SLRD Area (ha)	Total Area Reduction (ha)
Block 3	746	520
Block 5	11,211	3,082
Total	**11,957**	**3,602**

Three sensitivity analyses (see section 3.2) are proposed to explore the timber supply impacts of the SLRDs and SCCO Objective 14:

1. Rather than using SLRDs, apply the default percentage of RONV targets from Schedule 4 of the SCCO as cover constraints (see Appendix B: for details);
2. Apply risk managed targets from Schedule 4;
3. Apply 50 percent RONV targets within Block 5.

Managing to risk managed targets is permissible subject to several conditions being met as detailed in SCCO Objective 14 (6).

6.18 Area Reductions to Reflect Stand-level Retention in Cutblocks

6.18.1 FRPA Wildlife Tree Retention Areas

Where feasible and wildlife objectives can be met, wildlife tree retention areas (WTRAs) are located in constrained areas such as riparian reserves, inoperable stands or unstable slopes. For some landscape units where OGMAs have been established, WTRA requirements were also established (see Table 27). For all other landscape units, the FPPR "default" of 7 percent applies.

Table 27 – Landscape Unit Specific WTRA Objectives

TFL Block	Landscape Unit	BEC Subzone	WTRA %
Block 1	Bunster	CDFmm	7
		CWHxm1	8
		CWHdm	10
		CWHvm2	10
		MHmm1	6
	Lois	CWHxm	12
		CWHdm	14
		CWHvm	14
		MHmm	11
	Powell – Daniels	CWHdm	11
		CWHvm	10
		MHmm	4
	Powell Lake	CWHdm	10
		CWHvm	12
		MHmm	8
Block 2	Sayward	CWHmm1	13
		CWHmm2	10
		CWHxm	14
		MHmm1	2

In order to account for WTRA located in harvestable areas a THLB area reduction is applied. A review of ten years of harvested cutblocks (2001-2010) in Blocks 1, 2 and 4 indicated that overall the WTRAs reduced the THLB by 3 percent in Blocks 1 and 4 and 2 percent in Block 2. As the WTRA requirements can differ by landscape unit and BEC subzone, varying netdowns are applied such that the total THLB reduction is consistent with the results of the review (see Table 28).

6.18.2 Western Forest Strategy Stand-level Retention

As detailed in Section 11.3.3 applying the Western Forest Strategy (WFS) results in at least 56.6 percent of the harvest area in Blocks 1, 2 and 4 being within retention system cutblocks (with the remainder being clearcut or clearcut-with-reserves) The same cutblock review discussed in Section 6.18.1 indicated the overall incremental area retained to meet the retention silviculture system requirements reduced the THLB by 2 percent in Block 1, 3 percent in Block 2 and 1.5 percent in Block 4. As WFS requirements can differ by resource management zone and BEC subzone, varying netdowns are applied such that the total THLB reduction is consistent with the results of the review (see Table 28), with the relationship between resource management zones and landscape units accounted for.

Table 28 - THLB % Netdowns for Stand-level Retention in Blocks 1, 2 and 4

TFL Block	Landscape Unit	BEC Subzone	Productive Area (ha)	THLB % reduction for WTRA	THLB % reduction for WFS	Total THLB % reduction	Area reduction (ha)
Block 1	Bunster	CWHdm	3,799	2.7%	6.1%	8.8%	268
		CWHxm2	469	2.2%	7.3%	9.5%	42
		CWHvm2	2,037	2.7%	2.6%	5.3%	79
		MHmm1	503	1.6%	4.7%	6.3%	19
	Haslam	CWHdm	1,989	1.9%	4.9%	6.8%	118
		CWHxm2	132	1.9%	4.5%	6.4%	7
		CWHvm2	431	1.9%	1.4%	3.3%	11
		MHmm1	64	1.9%	1.3%	3.2%	1
	Lois	CWHdm	12,858	3.8%	0.6%	4.4%	470
		CWHxm2	276	3.3%	1.6%	4.9%	12
		CWHvm2	6,003	3.8%	0.1%	3.9%	184
		MHmm1	3,163	3.0%	1.3%	4.3%	92
	Powell-Daniels	CWHdm	791	3.0%	5.5%	8.5%	39
		CWHvm1	6,116	2.7%	2.6%	5.3%	200
		CWHvm2	3,031	2.7%	2.6%	5.3%	96
		MHmm1	1,604	1.1%	5.7%	6.8%	58
	Powell Lake	CWHdm	10,991	2.7%	2.6%	5.3%	427
		CWHvm1	3,098	3.3%	0.1%	3.4%	65
		CWHvm2	7,596	3.3%	0.3%	3.6%	172
		MHmm1	4,150	2.2%	2.1%	4.3%	108
	TOTAL		***69,104***	***3.0%***	***2.0%***	***5.0%***	***2,468***

TFL Block	Landscape Unit	BEC Subzone	Productive Area (ha)	THLB % reduction for WTRA	THLB % reduction for WFS	Total THLB % reduction	Area reduction (ha)
Block 2	Adam-Eve	CWHvm1	21,962	2.0%	1.3%	3.3%	527
		CWHvm2	13,552	2.0%	1.3%	3.3%	273
		CWHxm2	1	2.0%	4.0%	6.0%	0
		MHmm1	4,763	2.0%	1.3%	3.3%	86
	Salmon	CWHmm1	4,634	2.0%	4.0%	6.0%	213
		CWHmm2	3	2.0%	2.9%	4.9%	0
		CWHvm1	12,957	2.0%	1.3%	3.3%	302
		CWHvm2	13,354	2.0%	1.3%	3.3%	341
		CWHxm2	16,166	2.0%	4.1%	6.1%	755
		MHmm1	3,558	2.0%	1.3%	3.3%	62
	Sayward	CWHmm1	670	2.0%	6.5%	8.5%	23
		CWHmm2	226	2.0%	2.2%	4.2%	8
		CWHvm2	37	2.0%	1.3%	3.3%	0
		CWHxm2	4,574	2.0%	7.4%	9.4%	320
		MHmm1	31	2.0%	1.3%	3.3%	1
	White	CWHvm1	14,945	2.0%	5.1%	7.1%	708
		CWHvm2	11,699	2.0%	6.2%	8.2%	578
		CWHxm2	602	2.0%	7.6%	9.6%	40
		MHmm1	4,208	2.0%	5.9%	7.9%	127
	TOTAL		***127,941***	***2.0%***	***3.0%***	***5.0%***	***4,365***
Block 4	Holberg	CWHvm1	1,581	3.0%	0.4%	3.4%	48
	Keogh	CWHvm1	8,186	3.0%	0.9%	3.9%	256
		CWHvm2	2,665	3.0%	1.1%	4.1%	79
		MHmm1	380	3.0%	0.9%	3.9%	11
	Lower Nimpkish	CWHvm1	1,044	3.0%	0.5%	3.5%	31
		CWHvm2	115	3.0%	0.6%	3.6%	4
	Marble	CWHvm1	13,872	3.0%	2.0%	5.0%	542
		CWHvm2	5,566	3.0%	2.0%	5.0%	199
		MHmm1	913	3.0%	2.0%	5.0%	30
	TOTAL		***34,322***	***3.0%***	***1.5%***	***4.5%***	***1,200***
GRAND TOTAL			**231,367**				**8,032**

6.18.3 South Central Coast Order Stand-level Retention

The SCCO has several objectives related to stand-level retention:

- Objective 4: First Nations' traditional heritage features;
- Objective 5: Culturally modified trees;
- Objective 6: Monumental cedar;
- Objective 7: Stand-level retention of Western red and Yellow Cedar; and
- Objective 16: Stand-level retention.

The first four objectives listed above are objectives to manage for resources important to First Nations while the fifth is to provide structural and habitat elements at the stand-level that enhance landscape-level connectivity. Consideration of First Nations' values in Objectives 4, 5, 6 and 7 is estimated to have a 1.3 percent incremental impact on the THLB. This impact is based on a netdown (0.63 percent) developed for the Kingcome Timber Supply Area timber supply review (2008) which was doubled for use in the Mid-Coast Timber Supply Area review (2010). Mapping of First Nations' cultural sites within Blocks 3 and 5 is limited; therefore, to be conservative the higher netdown value used for the Mid-Coast was applied.

Objective 16 requires a minimum of 15 percent of a cutblock be reserved as stand-level retention and for cutblocks greater than or equal to 15 ha in size, one-half of the retention is to be within the cutblock. Objective 7(3) also specifies requirements for stand-level retention: retain mature and old western red and yellow cedar in a range of diameters representative of the pre-harvest stand. As landscape-level netdowns (e.g., riparian, wildlife habitat, landscape-level biodiversity) can be used to meet stand-level retention requirements, the task is to determine the net incremental impact of stand-level retention requirements.

A 2007 EBM monitoring report by Symmetree Consulting Group examined retention left in cutblocks and attempted to classify "biological anchors" on which retention areas were positioned. This assessment indicated the average retention was 21 percent and approximately 22 percent of retention areas were found on "anchors" not related to landscape-level netdowns already considered when determining the THLB or in meeting First Nations' objectives discussed above. This infers a 4.6 percent (21 percent x 22 percent) netdown for meeting SCCO Objective 16.

Combining these two factors results in a 5.9 percent (i.e., 1.3 percent + 4.6 percent) netdown for stand-level retention due to the SCCO. This is rounded to 6.0 percent and results in the areas being removed from the THLB as indicated in Table 29.

Table 29 – SCCO Stand-Level Retention Areas

TFL Block	Productive Area (ha)	Total Area Reduction (ha)
Block 3	4,117	149
Block 5	14,276	211
Total	**18,393**	**360**

This level of stand-retention is expected to influence the growth of regenerating stands; therefore a growth and yield impact will be applied as explained in Section 9.4.2.

6.19 Future Roads

Projected road systems were developed as part of the physical operability classification of TFL 39 (refer to Section 6.6). This road system was digitized into the GIS in conjunction with the operability classification, which allowed for the same approach used with existing roads to predict area summaries (see Section 6.4). While the information is somewhat dated, these projected roads were used to estimate the area that would be lost to future timber production as road development occurs. The area available for timber production will be reduced when the model harvests these polygons.

With implementation of EBM within Blocks 3 and 5, the roads projected in the late 1990's no longer represent logical road development within these operating areas. Rather than spatially identifying future road development, a 5 percent reduction in productive area will be applied within the timber supply model for all conventionally operable areas currently greater than 50 years old. The assumption is younger stands were developed by existing roads and therefore the growing site loss has been accounted for by allowances detailed in Section 6.4. No reductions for future roads in non-conventional harvest areas will be made as by definition these areas will be harvested by aerial systems and accessed by roads developed for nearby conventional harvest areas.

Table 30 indicates future road areas in the TFL that have to be developed.

Table 30 - Future Roads

TFL Block	Gross Road Area (ha)	Total Area Reduction (ha)
Block 1	214	214
Block 2	1,521	1,521
Block 3	1,184	59
Block 4	72	72
Block 5	245	12
Total	**3,236**	**1,879**

6.20 Caves and Karst

All three FLNRO Resource Districts within which TFL 39 is located (i.e., Sunshine Coast, Campbell River, North Island – Central Coast) have issued GAR Orders identifying the following as karst resource features:

- karst caves;
- important features and elements within very high or high vulnerability karst terrain; and
- significant surface karst features.

With the issuing of these orders, forest licensees in these districts must ensure primary forest activities (i.e., timber harvesting; road construction, maintenance and deactivation; and silviculture treatments) do not damage or render these features ineffective (FPPR Section 70).

With the assistance of members of local caving groups WFP created a cave inventory in the GIS which is confidential but is referenced during development planning. Additionally, provincial reconnaissance karst potential mapping is available for reference. The impact of protecting karst features on timber supply is uncertain. To date, little area has been reserved during operational planning to protect karst features. Impact estimates will improve as operational planning proceeds in karst areas. For purpose of this analysis, no netdowns for karst management will be made as it is assumed that any reserves required are accounted for by stand-level retention allowances (see Section 6.18).

6.21 Cultural Heritage Resources

Archaeological sites consist of the physical remains of past human activity. Protection and management of impacts to archaeological sites is governed by the *Heritage Conservation Act.* The term "cultural heritage resources" applies to a variety of heritage resources defined in the *Forest Act* as "an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people." Under FRPA, the objectives set by government for cultural heritage resources are to conserve, or, if necessary, protect cultural heritage resources that are:

(a) the focus of a traditional use by an aboriginal people that is of continuing importance to that people, and

(b) not regulated under the *Heritage Conservation Act*.

An archaeological overview assessment (AOA) for the former Port McNeill Forest District (including Blocks 3 and 4 of TFL 39) was completed in 1995 by I.R. Wilson Consultants Ltd. The purpose of the AOA was to identify and assess archaeological resource potential. Specifically the AOA provides a basis for predictions regarding archaeological site variability, density and distribution as well as a framework within which to evaluate site significance.

An AOA for the eastern portion of the Campbell River District (including Blocks 2 and 5 of TFL 39) was completed in 2007 by Millennia Research Limited. The focus was on producing archaeological predictive models for CMTs, shell midden/habitation, fish traps, pictographs, petroglyphs and trench embankment/refuge.

Additional information for Block 3 and 5 can be found in the 1999 Golder Associates AOA for the Central Coast LRMP area which was undertaken on behalf of the Ministry of Forests. The objectives of the study were to summarize and evaluate existing information regarding cultural heritage resources in the study area and develop a series of predictive models to help assess the need for archaeological investigation prior to land development.

Baseline Archaeological Services Ltd. undertook an archaeological inventory in 2004 for selected locations within Blocks 2 and 5 of TFL 39. The significance of this study was that it targeted several inland areas particularly inland small and medium sized lakes, generally less than 100 ha in size. Most other inventory work has focussed on areas close to the ocean shoreline.

A Traditional Use Study (TUS) of the Quatsino First Nation's traditional territory was undertaken in 1996 and has been maintained to date. The Galgalis Traditional Use Study was compiled for the Kwakiutl Territorial Fisheries Commission in 1998. The study is a collection of input from a number of the Kwakwaka'wakw First Nations on northern Vancouver Island, the south central coast of BC and the islands in between. In 2009, WFP secured FIA funding to work with the Kwakiutl First Nation and took steps that will lead to the update and maintenance of the information.

First Nations who have completed traditional use studies retain the detailed information regarding traditional use sites and values identified within their asserted traditional territories. TUS information is not typically shared with forest licensees, but where this information exists it is considered by decision-makers when making statutory decisions.

Other landscape-level inventories have been completed for various portions of TFL 39. Numerous proposed cutblocks within TFL 39 have been intensively surveyed for CMTs. This stand level information has been entered into WFP's GIS database and is used for planning purposes.

Within Blocks 3 and 5, cultural heritage resources are addressed by an aspatial THLB netdown as described in Section 6.18.3. No explicit reductions for cultural heritage resources have been made to the inventory files for Blocks 1, 2 and 4 as management of the most common features such as CMTs are assumed to be addressed by already-accounted-for reserves such as riparian protection and stand-level retention.

6.22 Deciduous Stands

Table 31 shows stand areas in the inventory defined as deciduous-leading and total percentage (values in Table 6) comprised. In total, deciduous-leading stands represent about 1.2 percent of the THLB with nearly two-thirds found in Block 1 where there is a significant history of harvesting deciduous stands (mainly alder). During the period 2006 – 2011, 2.4 percent of the harvest area was from deciduous-leading stands, which indicates it is reasonable to include deciduous stands within the THLB and allow the area to contribute to future timber supply.

Table 31 - Area of Deciduous Forest Types

TFL Block	Productive Deciduous Area (ha)	Net Deciduous Area (ha)	Deciduous % of Total Area		
			Productive Forest	THLB	2006-2011 Logging
Block 1	2,050	1,265	3.0%	2.6%	4.0%
Block 2	1,445	616	1.1%	0.7%	2.1%
Block 3	2	2	0.0%	0.1%	N/A
Block 4	187	78	0.5%	0.3%	0.1%
Block 5	96	5	0.7%	0.2%	N/A
TOTAL	**3,780**	**1,966**	**1.5%**	**1.2%**	**2.4%**

7 ECOSYSTEM-BASED MANAGEMENT

As mentioned in Section 3.1, the provincial government is committed to implementing ecosystem-based management within the North and Central Coast area in a manner that maintains ecosystem integrity and improves human well-being concurrently. The South Central Coast Order (amended as of March 2009) established land use objectives applicable to Blocks 3 and 5 of TFL 39 that were designed to support implementation of EBM. This section provides further background on the SCCO objectives and summarizes how those objectives will be addressed in the timber supply analysis.

7.1 SCCO Objective 3 – First Nations' traditional forest resources

The intent of this objective is to provide for the maintenance of forest resources traditionally used by First Nations for food, social and ceremonial purposes. These resources include monumental cedar for which there is a separate objective (see Section 7.4), wild plant foods, botanical medicine, wildlife and can include merchantable timber (in addition to monumental cedars). Wildlife resources are managed via landscape-level netdowns for riparian areas and specific wildlife habitat (see Sections 6.8.2, 6.9, and 6.11) and stand-level retention (see Section 6.18.3). Stand-level retention in addition to landscape-level netdowns for red and blue-listed plant communities and landscape-level biodiversity are assumed to address the management of plants that qualify as traditional forest resources.

The timber supply review of the Mid-Coast Timber Supply Area made an allowance of 1,500 m^3/year for harvest within the THLB in excess of the AAC. This amount was derived from Free Use Permit volumes and the presence of six First Nations and does not necessarily reflect total use by First Nations.

Due to the relatively small THLB within Blocks 3 and 5 of TFL 39 and the fact these areas comprise only a portion of applicable First Nation territories (as opposed to the Mid-Coast timber supply area which encompasses several First Nations' territories), no additional allowance will be made for the potential timber supply impact of this objective. It is assumed that the netdowns applied to derive the estimate of the THLB (refer to Section 6) and the allowance for non-recoverable timber (see Section 10) is sufficient.

7.2 SCCO Objective 4 – First Nations' traditional heritage resources

"The intent of this objective is to provide for the protection of defined First Nation's traditional heritage resources that are of continuing importance to the First Nation within areas proposed for forest development activities. The objective directs Licensees to share information and work with First Nations to protect traditional heritage resources." *(SCC and CNC Background and Intent Document, April 2008)*.

This objective is addressed by a THLB netdown as detailed in Section 6.18.3.

7.3 SCCO Objective 5 – Culturally modified trees

"The intent of this objective is to provide for the identification and protection of culturally modified trees that are of continuing importance to First Nations. The objective directs Licensees to share information and work with First Nations to identify and protect culturally modified trees within areas proposed to be altered or harvested and to reserve culturally modified tree areas where practicable." *(SCC and CNC Background and Intent Document, April 2008)*.

This objective is addressed by a THLB netdown as detailed in Section 6.18.3.

7.4 SCCO Objective 6 – Monumental cedar

"The intent of this objective is to provide for the maintenance of monumental cedar for First Nations use. The South Central Coast objective directs Licensees to share information and collaborate with First Nations to maintain a sufficient volume of monumental cedar to support present and future cultural use." *(SCC and CNC Background and Intent Document, April 2008)*. Monumental cedar is defined as "a large old western red cedar or a large old yellow cedar that will fulfill the domestic needs of the applicable First Nation for cultural cedar use." *(SCCO, March 2009)*.

This objective is addressed by a THLB netdown as detailed in Section 6.18.3.

7.5 SCCO Objective 7 – Stand level retention of western red and yellow cedar

"The intent of this objective is to ensure sufficient Western red and Yellow cedar is maintained to support First Nations present and future cultural and social uses." *(SCC and CNC Background and Intent Document, April 2008)*.

This objective is addressed by a THLB netdown as detailed in Section 6.18.3.

7.6 SCCO Objective 8 – Important fisheries watersheds

"The intent of this objective is to ensure forest development activities do not have a material adverse impact on hydroriparian processes and habitats in important fisheries watersheds." *(SCC and CNC Background and Intent Document, April 2008)*. Important fisheries watersheds are identified in Schedule 3 to the SCCO but do not include watersheds composed of S5 and S6 streams flowing directly into the ocean. For TFL 39, parts of Block 5 are identified as important fisheries watersheds.

This objective requires maintenance of the "equivalent clearcut area" (ECA) in applicable watersheds to less than 20 percent. ECA is an indicator that quantifies the percentage of the productive forest area within a watershed where the hydrologic response resulting from disturbance is equivalent to the hydrologic response of a clearcut.

This objective is addressed by forest cover constraint as detailed in Section 11.2.8.2.1.

7.7 SCCO Objective 9 – High value fish habitat

"The intent of this objective is to maintain and/or accelerate the natural ecological progression towards late seral structure of forests adjacent to high value fish habitat and to protect hydroriparian ecosystems which contain high value fish habitat." *(SCC and CNC Background and Intent Document, April 2008)*. High value fish habitat is defined in the SCCO as critical spawning and rearing areas for anadromous and non-anadromous fish including estuaries, wet flood plains and marine interface areas.

This objective is addressed by a spatial netdown as described in Section 6.8.2.1.

7.8 SCCO Objective 10 – Aquatic habitat that is not high value fish habitat

"The intent of this objective is to maintain the natural ecological function of streams (Class S1 – S3), lakes and wetlands that are not considered high value fish habitat." *(SCC and CNC Background and Intent Document, April 2008)*.

This objective is addressed by a spatial netdown as described in Section 6.8.2.2.

7.9 SCCO Objective 11 – Forested swamps

The intent of this objective is to maintain the natural ecological function of forested swamps by managing the forest area adjacent to these ecosystems. No netdown is applied for this objective as these ecosystems are rare and need to be field verified. Refer to Section 6.8.2.3 for more details.

7.10 SCCO Objective 12 – Upland streams

"The intent of this objective is to maintain the natural ecological function of upland streams and to provide for the maintenance of hydrological and ecological processes within specified watersheds." *(SCC and CNC Background and Intent Document, April 2008)*. Not every small upland stream (i.e., class S4-S6 streams with a slope greater than 5 percent) must be managed but at least 70 percent of the upland portion of a watershed must be maintained as functional riparian forest. Functional riparian forest is defined in the SCCO as forest that has reached hydrologically effective green-up and also contains some large trees adjacent to streams to provide large organic debris.

Since it is the upland area that is being managed, the entire forested portion of a watershed with slope greater than 5 percent is subject to this objective. The objective applies to the Important Fisheries Watersheds subject to Objective 8 (see Section 7.6 above). As the upland area is a portion of a watershed it is assumed that the forest cover constraint for Objective 8 also addresses this objective. This constraint is detailed in Section 11.2.8.2.1.

7.11 SCCO Objective 13 – Active fluvial units

"The intent of this objective is to maintain the integrity and natural ecological function of active fluvial units." *(SCC and CNC Background and Intent Document, April 2008)*. Active fluvial units are defined in the SCCO as active floodplains where water flows over land in a normal flood event and includes low and medium benches and the hydrogeomorphic zone of an active fan.

This objective requires retention of 90 percent of the functional riparian forest on an active fluvial unit. As there is significant overlap of active fluvial units, high value fish habitat and grizzly bear habitat, it is assumed that the netdowns for these two resources as well as landscape-level biodiversity (refer to Sections 6.8.2.1, 6.11.2, 6.17 respectively) address this objective.

7.12 SCCO Objective 14 – Landscape level biodiversity

The intent of this objective is to provide for landscape level biodiversity by maintaining a stated proportion of forest in old seral condition in each ecosystem type by landscape unit based on the relative rarity of the ecosystem type and by limiting the amount of mid-seral forest present across a landscape unit at any one time.

The old seral component is addressed by a spatial netdown as described in Section 6.17. The mid-seral limit is addressed via a forest cover constraint and is detailed in Section 11.2.8.2.3.

7.13 SCCO Objective 15 – Red-listed and blue-listed plant communities

The intent of this objective is to protect and maintain the abundance and distribution of existing rare, threatened and endangered plant communities. All occurrences of red-listed plant communities and at least 70 percent of the occurrences of blue-listed plant communities are to be protected.

This objective is addressed by a spatial netdown as described in Section 6.14.

7.14 SCCO Objective 16 – Stand level retention

"The intent of this objective is to maintain forest structure and habitat elements at the stand level to enhance landscape level connectivity and provide specific habitat niches within the harvest area." *(SCC and CNC Background and Intent Document, April 2008)*. A minimum of 15 percent of a cutblock is to be retained with one-half (50 percent) of the retention to be internal to the cutblock if it is 15 hectares or larger.

This objective is addressed by an aspatial netdown as described in Section 6.18.3.

7.15 SCCO Objective 17 – Grizzly bear habitat

The intent of this objective is to support the long-term viability of this important regional species by spatially identifying habitat to be maintained as functional habitat.

This objective is addressed by a spatial netdown as described in Section 6.11.2.

8 INVENTORY AGGREGATION

This section describes the delineation of the TFL land base and definition of stand types needed to complete the timber supply analysis. The TFL area is categorized in a hierarchy of different management zones to allow for a variety of forest cover constraints (e.g., biodiversity). Areas within all tables in this section may not sum due to rounding to the nearest hectare.

8.1 Management Zones

Unique forest cover objectives will be modelled through different management zones. VILUP Resource Management Zones (Special Management Zones (SMZs), General Management Zones (GMZs) and Enhanced Forestry Zones (EFZs)) and Landscape Units are delineated in the data (Table 32 and Table 34) and will be used to apply forest cover constraints (see Section 11.2 for details). For the SCCO area (Table 33) mid-seral constraints will be applied as explained in Section 11.2.8.2.

Table 32 - Area by VILUP Resource Management Zone

TFL Block	Mgmt Zone	Mgmt Unit	Seral[1] Stage	Productive Forest (ha)	THLB Area (ha)	Management Considerations (from Vancouver Island Summary Land Use Plan)
2	N/A	N/A (Agriculture)	Early	527	484	***Agriculture and Settlement Lands*** to recognize areas that can accommodate sustainable agriculture activity.
			Mid	1,126	770	
			Mature	26	20	
			Old	46	1	
			Total	**1,724**	**1,275**	
	EFZ 28	Adam-Eve	Early	16,091	13,967	***Enhanced Forestry Zone*** suited for enhanced timber harvesting and silviculture, while maintaining significant fish and wildlife values, as well as visuals along travel corridors; particular efforts to maintain soil, terrain and watershed integrity indicated.
			Mid	5,265	4,218	
			Mature	1,931	1,261	
			Old	17,337	9,786	
			Total	**40,624**	**29,232**	
	EFZ 30	Salmon	Early	19,172	17,183	***Enhanced Forestry Zone*** with significant opportunity for enhanced timber harvesting, and enhanced silviculture in second growth forests; fish and wildlife, as well as biodiversity values in CWHxm2 along Salmon riparian area require elevated management attention; landscape level development of long-term recovery plan of old seral attributes in CWHxm2 along Salmon riparian system; integration of significant recreational values associated with Salmon system.
			Mid	15,458	12,486	
			Mature	1,786	1,294	
			Old	12,396	6,735	
			Total	**48,813**	**37,698**	
	GMZ 31	Sayward	Early	1,516	1,320	***General Management Zone*** with focus on integration of high second growth timber values with significant fish and wildlife values, as well as visual/recreation and tourism values; biodiversity management with focus on long term replacement of old seral forest attributes in CWHxm1 and xm2
			Mid	2,182	1,751	
			Mature	1,027	722	
			Old	709	233	

[1] Early seral is <40 years old; Mid seral is 40-80 years old in CWH zone and 40-120 years old in MH zone; Mature seral is 81-250 years old in CWH zone and 121-250 years old in MH zone; Old seral is >250 years old.

TFL Block	Mgmt Zone	Mgmt Unit	Seral[1] Stage	Productive Forest (ha)	THLB Area (ha)	Management Considerations (from Vancouver Island Summary Land Use Plan)
	GMZ 31	Sayward	***Total***	**5,434**	**4,026**	through active silviculture measures; specific opportunities for enhanced harvesting and second growth management and with enhanced silviculture practices, including commercial thinning treatments which exist and should be identified at landscape level of planning.
	GMZ 29	White	Early	7,550	6,411	***General Management Zone*** with focus on integration of high fish, wildlife and biodiversity values with significant timber values.
			Mid	3,543	2,776	
			Mature	1,612	978	
			Old	10,111	4,662	
			Total	**22,816**	**14,827**	
	SMZ 11	Schoen-Strathcona	Early	2,670	2,224	***Special Management Zone*** where focus should be on maintenance of old growth biodiversity and habitat values, as well as backcountry recreation potential and maintenance of viewsheds around Victoria and Warden Peaks; this SMZ should become a focal area for old growth retention at the landscape level.
			Mid	19	0	
			Mature	323	133	
			Old	5,519	2,250	
			Total	**8,530**	**4,608**	
4	EFZ 5	Holberg	Early	705	625	***Enhanced Forestry Zone*** suited for enhanced timber harvesting and production, while maintaining fish values and watershed integrity.
			Mid	1,009	867	
			Mature	39	30	
			Old	290	220	
			Total	**2,043**	**1,742**	
	EFZ 6	Keogh-Cluxewe	Early	2,650	2,337	***Enhanced Forestry Zone*** suited for enhanced silviculture, and with limited opportunity for enhanced timber harvesting; integration of visual values along coastline and highway corridor, as well as recreational values along Keogh River.
			Mid	3,820	2,944	
			Mature	353	279	
			Old	2,278	1,490	
			Total	**9,102**	**7,050**	
	GMZ 7	Marble	Early	12,829	10,507	***General Management Zone***, particularly suited for enhanced silviculture in second growth stands; high fisheries values, wildlife values/capability, as well as ecosystem representation and connectivity functions result in intermediate biodiversity significance; integration of recreational values associated with lakes.
			Mid	3,451	2,846	
			Mature	1,007	592	
			Old	5,889	3,118	
			Total	**23,176**	**17,062**	
TOTAL				**162,264**	**117,521**	

Table 33 - Area by SCCO Landscape Unit

TFL Block	Landscape Unit	Seral[1] Stage	Productive Forest (ha)	THLB Area (ha)
3	Broughton	Early	1,671	1,043
		Mid	492	282
		Mature	1,026	665
		Old	928	236
		Total	**4,117**	**2,227**
5	Phillips	Early	5,173	2,269
		Mid	363	157
		Mature	650	167
		Old	8,090	423
		Total	**14,276**	**3,017**
TOTAL			**18,393**	**5,244**

[1] Early seral is <40 years old; Mid seral is 40-80 years old in CWH zone and 40-120 years old in MH zone; Mature seral is 81-250 years old in CWH zone and 121-250 years old in MH zone; Old seral is >250 years old.

Table 34 - Area by Landscape Unit and BEC Variant (all TFL blocks)

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
1	Bunster (Intermediate)	CWHdm	Early	1,052	161	15%	891	85%
			Mid	456	113	25%	343	75%
			Mature	2,209	574	26%	1,635	74%
			Old	82	58	70%	25	30%
		CWHdm Total		3,799	905	24%	2,894	76%
		CWHxm2	Early	0	0	-	0	-
			Mid	12	2	15%	10	85%
			Mature	457	60	13%	397	87%
			Old	0	0	-	0	-
		CWHxm2 Total		469	62	13%	407	87%
		CWHvm2	Early	982	133	14%	849	86%
			Mid	135	43	32%	92	68%
			Mature	529	201	38%	328	62%
			Old	390	234	60%	156	40%
		CWHvm2 Total		2,037	611	30%	1,426	70%
		MHmm1	Early	144	20	14%	124	86%
			Mid	32	21	66%	11	34%
			Mature	5	4	80%	1	20%
			Old	321	178	55%	143	45%
		MHmm1 Total		503	223	44%	279	56%
	Bunster Total			***6,807***	***1,802***	***26%***	***5,006***	***74%***
	Haslam (Low)	CWHdm	Early	435	38	9%	397	91%
			Mid	497	65	13%	432	87%
			Mature	1,025	164	16%	860	84%
			Old	32	30	92%	2	8%
		CWHdm Total		1,989	298	15%	1,692	85%
		CWHxm2	Early	42	3	6%	39	94%
			Mid	29	15	52%	14	48%
			Mature	61	14	23%	47	77%
			Old	0	0	-	0	-
		CWHxm2 Total		132	32	24%	100	76%
		CWHvm2	Early	19	2	8%	17	92%
			Mid	375	62	17%	313	83%
			Mature	32	14	44%	18	56%
			Old	6	6	100%	0	-
		CWHvm2 Total		431	84	19%	348	81%
		MHmm1	Early	7	0	-	7	100%
			Mid	50	14	28%	36	72%
			Mature	1	1	100%	0	-
			Old	5	5	100%	0	-
		MHmm1 Total		64	21	33%	43	67%
	Haslam Total			***2,617***	***434***	***17%***	***2,183***	***83%***
	Lois (Low)	CWHdm	Early	3,726	440	12%	3,285	88%
			Mid	4,465	1,064	24%	3,402	76%

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
1	Lois (Low)		Mature	4,455	894	20%	3,562	80%
			Old	210	140	67%	70	33%
		CWHdm Total		12,856	2,538	20%	10,318	80%
		CWHxm2	Early	72	4	5%	59	95%
			Mid	42	16	38%	26	62%
			Mature	162	12	7%	150	93%
			Old	0	0	-	0	-
		CWHxm2 Total		276	32	11%	245	89%
		CWHvm2	Early	727	160	22%	567	78%
			Mid	3,982	771	19%	3,211	81%
			Mature	705	155	22%	550	78%
			Old	589	389	66%	200	34%
		CWHvm2 Total		6,003	1,475	25%	4,528	75%
		MHmm1	Early	850	138	16%	712	84%
			Mid	667	103	15%	564	85%
			Mature	218	101	46%	118	54%
			Old	1,428	747	52%	681	48%
		MHmm1 Total		3,163	1,089	34%	2,075	66%
	Lois Total			***22,299***	***5,134***	***23%***	***17,165***	***77%***
	Powell Daniels (Intermediate)	CWHdm	Early	166	48	29%	118	71%
			Mid	209	84	40%	125	60%
			Mature	366	192	52%	174	48%
			Old	50	32	64%	18	36%
		CWHdm Total		791	356	45%	435	55%
		CWHvm1	Early	3,474	943	27%	2,531	73%
			Mid	86	29	34%	67	66%
			Mature	910	320	35%	590	65%
			Old	1,646	1,156	70%	490	30%
		CWHvm1 Total		6,116	2,448	40%	3,668	60%
		CWHvm2	Early	787	172	22%	615	78%
			Mid	55	15	27%	40	73%
			Mature	219	98	45%	120	55%
			Old	1,971	1,009	51%	962	49%
		CWHvm2 Total		3,031	1,295	43%	1,737	57%
		MHmm1	Early	198	32	16%	166	84%
			Mid	20	16	84%	3	16%
			Mature	0	0	-	0	-
			Old	1,387	745	54%	641	46%
		MHmm1 Total		1,604	794	50%	810	50%
	Powell Daniels Total			***11,543***	***4,893***	***42%***	***6,650***	***58%***
	Powell Lake (Low)	CWHdm	Early	2,157	190	9%	1,967	91%
			Mid	986	220	22%	766	78%
			Mature	7,753	2,692	35%	5,061	95%
			Old	95	31	32%	64	68%
		CWHdm Total		10,991	3,113	29%	7,858	71%
		CWHvm1	Early	1,231	391	32%	840	68%

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
1	Powell Lake (Low)		Mid	738	278	38%	461	62%
			Mature	750	320	43%	430	57%
			Old	379	254	67%	125	33%
		CWHvm1 Total		3,098	1,243	40%	1,855	60%
		CWHvm2	Early	2,736	563	21%	2,173	79%
			Mid	701	230	33%	471	67%
			Mature	2,655	1,159	44%	1,496	56%
			Old	1,505	776	52%	729	48%
		CWHvm2 Total		7,596	2,728	36%	4,869	64%
		MHmm1	Early	706	110	16%	596	84%
			Mid	247	123	50%	124	50%
			Mature	1,017	345	34%	671	66%
			Old	2,180	1,124	52%	1,056	48%
		MHmm1 Total		4,150	1,702	41%	2,448	59%
	Powell Lake Total			***25,836***	***8,806***	***34%***	***17,030***	***66%***
Block 1 Grand Total				***69,104***	***21,071***	***30%***	***48,033***	***70%***
2	Adam-Eve (Low)	CWHxm2	Early	1	0	-	1	100%
			Mid	0	0	-	0	-
			Mature	0	0	-	0	-
			Old	0	0	-	0	-
		CWHxm2 Total		1	0	-	1	100%
		CWHvm1	Early	11,889	1,612	14%	10,276	86%
			Mid	4,639	854	18%	3,785	82%
			Mature	916	401	44%	515	56%
			Old	4,519	2,308	51%	2,211	49%
		CWHvm1 Total		21,962	5,176	24%	16,786	76%
		CWHvm2	Early	3,825	463	12%	3,362	88%
			Mid	539	155	29%	383	71%
			Mature	804	245	30%	559	70%
			Old	8,384	3,375	40%	5,009	60%
		CWHvm2 Total		13,552	4,239	31%	9,313	69%
		MHmm1	Early	264	35	13%	229	87%
			Mid	31	28	89%	3	11%
			Mature	173	16	10%	156	90%
			Old	4,295	1,824	42%	2,471	58%
		MHmm1 Total		4,763	1,904	40%	2,859	60%
	Adam-Eve Total			***40,277***	***11,318***	***28%***	***28,959***	***72%***
	Salmon (Low)	CWHxm2	Early	3,696	410	11%	3,286	89%
			Mid	10,759	2,365	22%	8,394	78%
			Mature	696	223	32%	472	68%
			Old	1,016	738	73%	278	27%
		CWHxm2 Total		16,166	3,736	23%	12,430	77%
		CWHvm1	Early	5,979	596	10%	5,383	90%
			Mid	3,775	584	15%	3,192	85%
			Mature	234	81	34%	153	66%
			Old	2,969	1,900	64%	1,069	36%

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area ha	Non Contributing Area %	THLB Area ha	THLB Area %
		CWHvm1 Total		12,957	3,160	24%	9,796	76%
2	Salmon (Low)	CWHvm2	Early	7,251	612	8%	6,639	92%
			Mid	567	98	17%	469	83%
			Mature	641	116	18%	525	82%
			Old	4,895	1,605	33%	3,290	67%
		CWHvm2 Total		13,354	2,431	18%	10,924	82%
		CWHmm1	Early	2,245	314	14%	1,931	86%
			Mid	1,519	251	17%	1,268	83%
			Mature	135	59	44%	75	56%
			Old	735	441	60%	294	40%
		CWHmm1 Total		4,634	1,065	23%	3,569	77%
		CWHmm2	Early	2	0	-	2	100%
			Mid	0	0	-	0	-
			Mature	0	0	-	0	-
			Old	1	0	-	1	100%
		CWHmm2 Total		3	0	-	3	100%
		MHmm1	Early	544	97	18%	448	82%
			Mid	35	27	79%	7	21%
			Mature	108	13	12%	95	88%
			Old	2,870	1,039	36%	1,831	64%
		MHmm1 Total		3,558	1,176	33%	2,381	67%
	Salmon Total			***50,672***	***11,568***	***23%***	***39,104***	***77%***
	Sayward (Intermediate)	CWHxm2	Early	1,241	181	15%	1,059	85%
			Mid	1,956	422	22%	1,534	78%
			Mature	984	304	31%	680	69%
			Old	394	327	83%	67	17%
		CWHxm2 Total		4,574	1,234	27%	3,340	73%
		CWHvm2	Early	10	0	-	10	100%
			Mid	0	0	-	0	-
			Mature	0	0	-	0	-
			Old	27	23	86%	4	14%
		CWHvm2 Total		37	23	63%	14	37%
		CWHmm1	Early	230	16	7%	214	93%
			Mid	273	24	9%	249	91%
			Mature	41	3	7%	38	93%
			Old	125	85	68%	40	32%
		CWHmm1 Total		670	128	19%	541	81%
		CWHmm2	Early	85	4	5%	81	95%
			Mid	0	0	-	0	-
			Mature	9	1	11%	8	89%
			Old	132	39	29%	93	71%
		CWHmm2 Total		226	44	19%	182	81%
		MHmm1	Early	0	0	-	0	-
			Mid	0	0	-	0	-
			Mature	0	0	-	0	-
			Old	31	2	7%	28	93%

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
		MHmm1 Total		31	2	7%	29	93%
2	***Sayward Total***			***5,538***	***1,432***	***26%***	***4,106***	***74%***
	White (High)	CWHxm2	Early	125	26	21%	98	79%
			Mid	358	77	22%	281	78%
			Mature	17	7	42%	10	58%
			Old	102	91	89%	11	11%
		CWHxm2 Total		602	201	33%	400	67%
		CWHvm1	Early	7,159	1,129	16%	6,030	84%
			Mid	2,793	594	21%	2,199	79%
			Mature	759	377	50%	382	50%
			Old	4,235	2,902	69%	1,333	31%
		CWHvm1 Total		14,945	5,001	33%	9,944	67%
		CWHvm2	Early	2,763	406	15%	2,357	85%
			Mid	314	100	32%	214	68%
			Mature	1,090	407	37%	683	63%
			Old	7,532	3,433	46%	4,099	54%
		CWHvm2 Total		11,699	4,346	37%	7,353	63%
		MHmm1	Early	217	34	16%	183	84%
			Mid	35	13	38%	22	62%
			Mature	99	41	42%	57	58%
			Old	3,858	2,320	60%	1,538	40%
		MHmm1 Total		4,208	2,408	57%	1,800	43%
	White Total			***31,454***	***11,957***	***38%***	***19,497***	***62%***
Block 2 Grand Total				***127,941***	***36,275***	***28%***	***91,666***	***72%***
3	Broughton (Low)	CWHvm1	Early	1,671	628	38%	1,043	62%
			Mid	492	210	43%	282	57%
			Mature	1,026	361	35%	665	65%
			Old	928	691	75%	236	25%
		CWHvm1 Total		4,117	1,890	46%	2,227	54%
	Broughton Total			***4,117***	***1,890***	***46%***	***2,227***	***54%***
Block 3 Grand Total				***4,117***	***1,890***	***46%***	***2,227***	***54%***
4	Holberg (Low)	CWHvm1	Early	566	66	12%	500	88%
			Mid	909	129	14%	780	86%
			Mature	31	3	9%	28	91%
			Old	76	11	14%	65	86%
		CWHvm1 Total		1,581	208	13%	1,373	87%
	Holberg Total			***1,581***	***208***	***13%***	***1,373***	***87%***
	Keogh (Low)	CWHvm1	Early	2,698	348	13%	2,351	87%
			Mid	4,362	949	22%	3,413	78%
			Mature	180	78	43%	102	57%
			Old	944	399	42%	545	58%
		CWHvm1 Total		8,185	1,773	22%	6,411	78%
		CWHvm2	Early	1,095	190	17%	905	83%
			Mid	92	14	15%	79	85%
			Mature	208	41	20%	166	80%
			Old	1,270	493	39%	777	61%

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
4	Keogh (Low)	CWHvm2 Total		2,665	738	28%	1,926	72%
		MHmm1	Early	58	8	14%	50	86%
			Mid	0	0	-	0	-
			Mature	17	6	35%	11	65%
			Old	305	78	26%	227	74%
		MHmm1 Total		380	92	24%	288	76%
	Keogh Total			***11,229***	***2,604***	***23%***	***8,626***	***77%***
	Lower Nimpkish (Low)	CWHvm1	Early	337	45	13%	292	87%
			Mid	480	81	17%	399	83%
			Mature	43	8	19%	35	81%
			Old	184	46	25%	137	75%
		CWHvm1 Total		1,044	181	17%	863	83%
		CWHvm2	Early	32	2	5%	30	95%
			Mid	0	0	-	0	-
			Mature	5	0	4%	5	96%
			Old	77	11	14%	66	86%
		CWHvm2 Total		115	13	11%	102	89%
	Lower Nimpkish Total			***1,159***	***194***	***17%***	***966***	***83%***
	Marble (Intermediate)	CWHvm1	Early	8,705	1,533	18%	7,172	82%
			Mid	2,435	450	18%	1,985	82%
			Mature	537	228	42%	310	58%
			Old	2,194	1,231	56%	964	44%
		CWHvm1 Total		13,871	3,441	25%	10,430	75%
		CWHvm2	Early	2,556	506	20%	2,050	80%
			Mid	2	0	9%	2	91%
			Mature	347	126	36%	221	64%
			Old	2,661	1,061	40%	1,600	60%
		CWHvm2 Total		5,566	1,693	30%	3,873	70%
		MHmm1	Early	137	20	15%	117	85%
			Mid	0	0	-	0	-
			Mature	31	9	28%	22	72%
			Old	745	299	40%	446	60%
		MHmm1 Total		913	327	36%	586	64%
	Marble Total			***20,351***	***5,461***	***27%***	***14,889***	***73%***
Block 4 Grand Total				***34,322***	***8,467***	***25%***	***25,855***	***75%***

TFL Block	Landscape Unit (BEO)	BEC	Seral Stage	Productive Forest (ha)	Non Contributing Area		THLB Area	
					ha	%	ha	%
5	Phillips (High)	CWHvm1	Early	4,220	2,389	57%	1,831	43%
			Mid	363	207	57%	156	43%
			Mature	396	342	86%	54	14%
			Old	2,641	2,544	96%	97	4%
		CWHvm1 Total		7,620	5,482	72%	2,138	28%
		CWHvm2	Early	926	497	54%	429	46%
			Mid	0	0	-	0	-
			Mature	243	132	54%	111	46%
			Old	3,611	3,406	94%	205	6%
		CWHvm2 Total		4,780	4,035	84%	745	16%
		MHmm1	Early	27	16	57%	12	43%
			Mid	0	0	-	0	-
			Mature	14	13	90%	1	10%
			Old	1,834	1,713	93%	121	7%
		MHmm1 Total		1,876	1,742	93%	134	7%
	Phillips Total			***14,276***	***11,259***	***79%***	***3,017***	***21%***
Block 5 Grand Total				***14,276***	***11,259***	***79%***	***3,017***	***21%***
TFL 39 GRAND TOTAL				***249,758***	***78,961***	***32%***	***170,797***	***68%***

8.2 Analysis Units

The forested area is aggregated into groups of similar stands to produce growth and yield information needed to model timber supply with separate groupings for the THLB and non-contributing (NC) land bases. For existing stands, analysis units (AUs) are based on TFL block, biogeoclimatic subzone/variant (variant), site productivity class, age class, harvest economics (mature stands only), and species groups. These grouping are described in more detail in the following sections.

8.2.1 Variant assignment

Variants were assigned using the TFL 39 Terrestrial Ecosystem Mapping (TEM). Each polygon in the TFL was assigned to one of seven analysis unit level variants. MHmmp1 was combined with MHmm1 to limit the number of unique combinations (Table 35). A detailed breakdown by TFL block, landscape unit and seral stage is indicated in Table 34.

Table 35 - Analysis Units Subzones

	Area (ha)	
Variant	**Productive Forest**	**THLB**
CWHdm	30,427	23,197
CWHxm2	22,222	16,924
CWHmm1	5,303	4,110
CWHmm2	230	185
CWHvm1	95,487	65,492
CWHvm2	70,865	47,155
MHmm1	25,213	13,733
Total	**249,747**	**170,796**

8.2.2 Productivity class assignment

Site index estimates for the five main species (Ba, Cw, Cy, Fd, Hw) were attached to each forest cover polygon (see Section 9.1 for details). Site productivity classes are based on the site index value for the future stand leading species by variant as indicated in Table 36.

Table 36 - Future Stands Leading Species

Variant	Future leading species
CWHdm	Fd
CWHxm2	Fd
CWHmm1	Fd
CWHmm2	Fd
CWHvm1	Hw
CWHvm2	Hw
MHmm1	Hw

Site index ranges were grouped into three productivity classes by species as listed in Table 37.

Table 37 - Site Productivity Classes

Site Productivity Class	Future leading species	Site Index Range (m)	THLB Area (ha)
Poor	Fd	< 28	4,032
	Hw	< 25	20,750
Medium	Fd	28 – 33	21,574
	Hw	25 – 32	86,110
Good	Fd	>33	18,758
	Hw	>32	19,572
Total		**-**	**170,796**

8.2.3 Age class

Stands were assigned to five different age classes based on management era. Ages are based on known or estimated ages as of December 31, 2011.

8.2.3.1 Unmanaged stands

8.2.3.1.1 Mature

Mature stands were defined as stands greater than 100 years of age at time of the 1960's inventory. This was translated to stands greater than 140 years of age for this analysis. Volume in these stands is assumed static.

8.2.3.1.2 Immature

Immature stands are aged between 51 years and 140 years. The assumption is these stands are the result of natural regeneration following harvesting or natural disturbances. Volume in these stands is estimated using FLNRO's *Table Interpolation Program for Stand Yields* (TIPSY) version 4.1.

8.2.3.2 Managed Stands

Managed stands have been established since inception of MacMillan Bloedel's (MB - WFP predecessor company) Intensive Forest Management Program, which began in 1962. Most of these stands are the result of planting but there are naturally regenerated stands present in these age ranges. Volume in these stands is estimated using TIPSY.

8.2.3.2.1 Stands aged 15 – 50 years

These stands have been established since inception of MB's Intensive Forest Management Program but with insignificant genetic gain values and prior to the implementation of the retention silviculture system. Most of these stands were planted but some naturally regenerated stands are present. The assumption is stands in this age class were reforested to lower densities (i.e., stems-per-hectare) than more recent stands.

8.2.3.2.2 Stands aged 1 – 14 years

These most recently established stands have genetic gain values and are influenced by higher levels of stand-level retention from the previous harvest due to the use of the retention silviculture system.

8.2.3.3 Future stands

These stands (including current not satisfactorily restocked (NSR) stands) have genetic gain values greater than the 1 – 14 year old stands and are influenced by higher levels of stand-level retention from the previous harvest due to the use of the retention silviculture system (refer to Section 9.4.2 for details on the modelling of this influence).

8.2.4 Harvest Economics

As volume per hectare is a criterion used in defining the harvest economics of mature stands (see Section 6.12), marginally economic stands will have a significantly lower average volume per hectare than economic stands; therefore, mature stands are separated into "Economic" or "Marginally Economic" analysis units. Immature stands do not have this attribute assigned to them as they are assumed economic.

8.2.5 Species Groups

Existing stands were grouped into one of six species groups based on the following logic:

- 'Cw' if the leading or secondary species is western red cedar;
- 'Cy' if the leading or secondary species is yellow cedar;
- 'Fd' if the leading or secondary species is Douglas fir, or if the leading species is spruce or pine;
- 'HB' if the leading species is hemlock or balsam and the secondary species is not Cw, Cy or Fd;
- 'Decid' if the leading species is a deciduous species; and
- 'Grouped' to limit the number of unique combinations if applying the above logic results in a minor area (generally less than 5 ha) of a species group.

As future stands assumptions are based on TFL block, variant, and site class (refer to Section 9.6.5) no species group is required. Therefore, 'N/A' is applied for future stands species groups.

8.2.6 Analysis unit codes

A six-digit code identifies the TFL block, variant, productivity class, age class, harvest economics (mature stands only) and species group for each analysis unit (Table 38).

Table 38 - Analysis Units Legend

First Digit ***TFL Block***	**Second Digit** ***BEC Variant***	**Third Digit** ***Site Class***	**Fourth Digit** ***Age***	**Fifth Digit** ***Harvest Economics***	**Sixth Digit** ***Species Group***
1 Block 1	1 CWHdm	1 Poor	1 Future	0 N/A or Economic	0 Grouped or N/A
2 Block 2	2 CWHxm2	2 Medium	2 1 - 14 years	1 Marginal	1 Cw
3 Block 3	3 CWHmm1	3 Good	3 15 - 50 years		2 Cy
4 Block 4	4 CWHmm2		4 51 – 140 years		3 Fd
5 Block 5	5 CWHvm1		5 > 140 years		4 HB
	6 CWHvm2				5 Decid
	7 MHmm1				

For example, code 253504 identifies the Block 2/CWHvm1/Good Site/Mature/Economic/HemBal analysis unit.

9 GROWTH AND YIELD

This section describes the approach used to develop yield tables for managed and natural stands. The general approach is to develop yield tables for existing and future stands. Specific yield tables are developed for:

1) Existing natural mature stands;
2) Existing natural immature stands;
3) Existing managed stands; and
4) Future managed stands.

Summaries in this section are for the THLB only as this is the portion of the land base that contributes to the timber supply. Similar summaries were produced for the non-contributing land base such that separate yield tables were generated for each AU where applicable, i.e., one for the THLB and one for the NC land base.

9.1 Site Index

WFP's biophysical site index model (BSIM) approach will be used for the analysis. This is the same model structure used in the base case in TFL 39 MP #8 (2000) and TFL 44 MP #3 (1997), MP #4 (2002) and MP #5 (2010).

The BSIM model uses species, biogeoclimatic variant and geographic location (i.e., latitude, longitude and operating area) to assign site index based on the leading species for each stand. Note BSIM uses Barker and Goudie's (1987) model for Sitka spruce rather than Nigh's (1996) model. The differences are minor at younger ages (i.e., less than 80 years at breast height) where site index estimates are made.

Site index values were estimated for the five main species (Ba, Cw, Cy, Fd and Hw) for each stand. The site index for the leading species is the inventory site index if it is based on a cruise age of greater than 20 years of age in an immature stand (refer to Section 5.2); otherwise the leading species site index is the BSIM value. SI values for the other four species (i.e., other than the leading species) for each stand are BSIM estimates.

Table 39 shows the mean site index for the TFL is 27.0 m (using a combination of BSIM and valid cruise estimates with current leading species).

Table 39 - THLB Area-weighted Average Site Index Values

	Site Class			
BEC variant	**Poor**	**Medium**	**Good**	**Total**
CWHdm	23.1	30.0	31.8	30.5
CWHxm2	24.1	28.2	33.9	28.5
CWHmm1	22.9	26.7	34.0	26.7
CWHmm2	-	24.1	-	24.1
CWHvm1	22.2	27.2	31.5	27.9
CWHvm2	20.4	25.5	29.4	24.6
MHmm1	20.2	24.9	32.2	23.1
Total	**21.3**	**26.6**	**31.7**	**27.0**

9.2 Utilization Levels

The utilization level is 12.5 cm for all existing stands less than 141 years old and for future stands. Stump height for these stands is 30 cm and top diameter inside bark (DIB) is 10 cm. Utilization level for mature stands is 22.5 cm, with stump height of 30 cm and top DIB of 15 cm (Table 40). Operationally mature stands are utilized to a minimum DBH of 17.5 cm; however, 22.5 cm was the minimum DBH used in compiling the 1960's inventory and is therefore used in this analysis.

Table 40 - Utilization Levels

Age Class	Utilization			Firmwood Standard
	Minimum DBH (cm)	Stump Height (cm)	Top DIB (cm)	
Mature (>140 years old)	22.5	30.0	15.0	50%
Immature (<141 years old)	12.5	30.0	10.0	50%

9.3 Operational Adjustment Factors

Adjustments to immature stand volumes are different than MP #8 because a different yield model will be used in this analysis. A proprietary model, Y-XENO, was used in MP #8 whereas TIPSY will be used in this analysis. The unadjusted TIPSY output reflects growth relationships observed in research plots generally located in fully-stocked, even-aged stands of uniform site and in forests of little or no pest activity. To reflect operational environments, two operational adjustment factors (OAFs) were applied to TIPSY outputs to reduce the potential yields. OAF 1 is constant across all ages and is intended to account for small, unmapped non-productive areas in a stand and competition from non-commercial tree species and brush. OAF 2 increases with age and is intended to reflect the impact of insects, disease and decay. For this analysis, since no studies have been done to develop local factors, subject to Section 9.4.2.1.1, provincial "default" OAFs will be applied:

1. OAF 1: 15 percent
2. OAF 2: 5 percent

9.4 Volume Reductions

9.4.1 Mature Volume

Gross mature stand volumes (close utilization less decay) are reduced to reflect the presence of cull grades (Grade Z) and estimates of waste and breakage. These factors vary by TFL block as described below.

9.4.1.1 Cull (Z) Grades

The mature timber inventory includes cull (Z) grade timber that is not part of the AAC as it is neither scaled nor charged as residue for cut control purposes. The following volume deductions (by block) for cull grades are based on average proportions for the operational cruise portion of the inventory (Table 41).

Table 41 – Cull Grades Percentages

TFL Block	Cull %
Block 1	1.9%
Block 2	2.3%
Block 3	4.3%
Block 4	4.3%
Block 5	3.0%

9.4.1.2 Waste and Breakage

Since the start of annual residue surveys in 1967 and until 1989, MacMillan Bloedel Ltd. (now WFP) measured all residue components including breakage and W2 (volume in logs that are less than 50% sound), resulting in a unique data set. Actual measured breakage and W2 are applied to the inventory as a netdown for analysis purposes. An average of 7.82 percent for the period 1985 to 1989 is applied in the timber supply analysis.

9.4.1.3 Total Mature Volumes Reductions

The cull factor and the waste and breakage factor are applied multiplicatively so that the following mature volume reduction factors are applied by block (Table 42):

Table 42 – Mature Volume Reductions

TFL Block	Mature Volume Reduction (%)
Block 1	9.6%
Block 2	9.9%
Block 3	11.8%
Block 4	11.8%
Block 5	10.6%

9.4.2 Immature Volume

9.4.2.1.1 Root Rot in Block 1

Root diseases (mainly *Phellinus weirii*) are commonly found within Block 1on medium and good sites within the CWHdm and CWHxm2 variants. Such diseases spread primarily through root contact and can attack and gradually kill trees throughout their life cycle. Various studies have indicated volume losses ranging from 5.0% to 8.9%, with a 7% mid-point. To account for this estimated volume loss, OAF 2 is increased from the provincial “default” 5% to 12% on medium and good sites within the CWHdm and CWHxm2 variants within Block 1. This change is not to be interpreted as a local OAF adjustment but merely the methodology chosen to model the impact of root rot.

9.4.2.1.2 Shading from Retained Trees

Volume reductions will be applied to stands aged 1 – 14 years and all future stands to model the growth impact of stand-level retention in the previous harvest (refer to Section 6.18). Within Blocks 1, 2 and 4, a volume reduction of 2 percent will be applied to applicable stands in Enhanced Forestry Zones where stand-level retention is assumed to average at least 10 percent; a 3 percent volume reduction will be applied to relevant stands in General Management Zones where average stand-level retention will be at least 15 percent; and a 5 percent volume reduction will be applied to pertinent stands in Special Management Zones to account for stand-level retention of at least 20 percent. Within Blocks 3 and 5 a volume reduction of 5 percent will be applied as retention levels are anticipated to be similar to those within SMZs elsewhere in TFL 39.

These reductions are based on similar assumptions used in previous analyses for TFLs 6 and 44 and are in addition to the area reductions described in Section 6.18. The general notion that growth impacts on forest regeneration increase with greater retention has been observed in early research results conducted by Dr. Nick Smith within TFLs 39 and 44. This reduction will occur when individual stands are harvested during modelling. Yield curves are left unaltered.

9.5 Yield Tables for Unmanaged Stands

9.5.1 Existing Mature Stand Volumes

The timber volume in existing mature stands (i.e., those > 140 years old) was determined for each analysis unit by calculating the area-weighted average inventory volumes and volume-weighted average species composition. Table 43 shows the totals by TFL block while details by analysis unit are listed in Appendix C: Mature Stand Yield Tables.

Table 43 - Existing Mature Volume Summary by TFL Block

TFL Block	THLB Area (ha)	Weighted Avg Volume/ha (m^3/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
Block 1	7,067	691	4,886,626	24%	15%	11%	5%	44%	1%
Block 2	26,458	682	18,041,647	28%	7%	16%	2%	47%	0%
Block 3	238	536	132,593	3%	56%	10%	0%	31%	0%
Block 4	5,440	736	4,002,447	30%	10%	11%	0%	49%	0%
Block 5	535	819	437,953	27%	16%	8%	1%	47%	0%
Total	**39,738**	**692**	**27,501,266**	**27%**	**9%**	**14%**	**2%**	**47%**	**0%**

9.5.2 Unmanaged Immature Stand Volumes

Unmanaged immature stands are between 51 and 140 years old in 2011. The assumption is these stands are the result of natural regeneration following harvesting or natural disturbances. Volume is estimated using TIPSY with natural regeneration assumed (i.e., not planted).

As mentioned in Section 5.2, the practice had been to re-inventory stands as they reach “pole size” (i.e., generally 30-40 years old). These cruise results are used to update the forest inventory for species composition and site index estimates. The subsequent volume estimate at the time of cruise can be used to “calibrate” TIPSY so the yield table values and cruised volume estimates are reasonably similar for the age at time of cruise.

Cruise volume estimates can vary significantly within any given analysis unit due to variable species composition, stocking density and site indexes within contributing stands. Review of the cruise results across these analysis units and TIPSY outputs at varying stand densities indicated, on average, using a density of 1,200 naturally regenerated stems-per-hectare (SPH) in TIPSY best replicated cruise volumes. Species composition and site index input values (for TIPSY) were based on the THLB area-weighted average within each analysis unit (see Table 44).

Yield tables for each unmanaged immature analysis unit are listed in Appendix D: Unmanaged Immature Yield Tables.

Table 44 - TIPSY Inputs for Unmanaged Immature Stands

Existing AU	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	THLB Area (ha)
111403	-	10	-	71	19	-	-	23.0	-	23.0	24.0	-	2,512
112401	4	31	-	14	51	-	25.1	24.0	-	32.0	26.0	-	306
112403	-	8	-	73	19	-	-	23.0	-	31.0	26.0	-	3,052
112404	11	12	2	24	38	13	25.1	23.0	23.0	31.0	25.0	24.0	59
113401	1	39	-	13	47	-	25.1	25.0	-	33.0	27.0	-	1,749
113403	-	10	-	67	23	-	-	23.0	-	37.0	27.0	-	6,052
113404	12	5	-	3	70	10	25.1	23.0	-	34.0	28.0	28.0	437
113405	-	7	-	19	12	62	-	23.0	-	33.0	28.0	28.0	1,293
121403	-	9	-	82	9	-	-	23.0	-	22.0	22.0	-	303
122400	-	9	-	15	29	47	-	23.0	-	29.0	22.0	24.0	22
122401	-	39	-	18	43	-	-	24.0	-	28.0	21.0	-	12
122403	-	11	-	61	28	-	-	23.0	-	29.0	23.0	-	206
123403	-	10	-	78	12	-	-	23.0	-	38.0	21.0	-	76
123405	-	15	-	22	11	52	-	23.0	-	34.0	26.0	28.0	26
151400	1	11	-	61	27	-	30.2	23.0	-	35.0	19.0	-	210
151405	-	4	-	5	25	66	-	23.0	-	33.0	20.0	20.0	58
152400	10	10	-	36	44	-	27.1	23.0	-	32.0	29.0	-	77
152401	5	35	-	10	50	-	30.1	23.0	-	33.0	29.0	-	368
153401	-	49	1	20	30	-	-	24.0	23.0	33.0	32.0	-	225
153403	-	26	-	55	19	-	-	23.0	-	34.0	32.0	-	111
153404	-	-	-	-	100	-	-	-	-	-	35.0	-	47
153405	-	-	-	-	3	97	-	-	-	-	32.0	28.0	69
161401	4	29	3	10	54	-	25.1	23.0	23.0	33.0	21.0	-	278
161403	2	8	1	43	46	-	25.1	23.0	23.0	30.0	20.0	-	437
161404	25	7	4	1	63	-	24.8	23.0	23.0	33.0	21.0	-	258
162401	5	34	-	6	55	-	25.2	24.0	-	33.0	28.0	-	627
162403	3	8	-	60	29	-	21.9	23.0	-	29.0	28.0	-	1,775
162404	37	5	1	1	56	-	24.5	23.0	23.0	32.0	28.0	-	925
162405	1	3	-	24	7	65	25.1	23.0	-	34.0	28.0	24.0	39
163400	5	28	2	16	49	-	25.3	23.0	23.0	33.0	33.0	-	71
163403	-	15	-	31	54	-	-	23.0	-	34.0	33.0	-	151
171400	7	10	2	18	63	-	23.0	23.0	23.0	32.0	19.0	-	168
172400	23	5	1	40	31	-	20.4	23.0	23.0	28.0	27.0	-	144
Block 1 Total	**3**	**13**	**-**	**49**	**30**	**5**	**24.6**	**23.2**	**23.0**	**32.1**	**26.4**	**27.5**	**22,143**
221403	-	6	-	63	31	-	-	22.8	-	25.0	26.5	-	896
222401	2	26	-	10	62	-	24.4	22.6	-	31.1	24.4	-	566
222403	1	4	-	45	50	-	24.9	22.8	-	31.0	27.4	-	4,594
222404	17	5	-	5	73	-	23.7	22.8	-	31.1	27.1	-	1,000
222405	-	2	-	9	14	75	-	22.8	-	31.1	27.0	24.0	557

Existing AU	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	THLB Area (ha)
223400	18	1	-	-	81	-	22.4	22.8	-	-	28.7	-	87
223403	1	2	-	71	26	-	24.9	22.8	-	35.8	26.6	-	1,323
232401	2	29	-	7	62	-	23.1	22.8	-	31.1	23.6	-	158
232403	3	6	-	34	57	-	22.7	22.8	-	29.8	25.5	-	320
232404	30	4	-	11	55	-	22.9	22.8	-	31.1	24.7	-	235
251400	32	1	-	4	63	-	23.3	22.8	-	33.2	23.1	-	603
252401	5	20	-	4	71	-	22.6	22.8	-	36.6	28.4	-	94
252403	4	1	-	36	59	-	22.6	22.8	-	33.4	29.4	-	411
252404	39	1	-	2	58	-	23.0	22.8	-	31.6	28.8	-	2,435
253400	3	12	-	37	48	-	22.6	24.1	-	34.2	33.2	-	145
253404	18	-	-	1	81	-	22.7	-	-	31.8	32.8	-	680
261400	39	8	1	2	50	-	23.2	22.8	22.8	30.6	19.9	-	207
262404	69	-	-	-	31	-	21.1	-	-	-	27.1	-	1,012
263400	61	2	1	-	36	-	20.9	22.8	22.8	-	32.3	-	55
271400	39	-	-	17	44	-	22.3	-	-	31.1	20.3	-	21
272404	65	-	-	-	35	-	20.7	-	-	-	26.6	-	14
Block 2 Total	**16**	**4**	**-**	**27**	**50**	**3**	**23.7**	**22.8**	**22.8**	**31.6**	**27.3**	**24.0**	**15,413**
351401	-	35	-	-	65	-	-	18.5	-	-	20.9	-	75
351404	9	-	-	-	91	-	18.5	-	-	-	21.9	-	69
352401	5	41	-	-	54	-	18.5	20.0	-	-	28.4	-	352
352403	-	35	-	-	65	-	-	18.5	-	-	28.8	-	19
352404	14	4	-	-	82	-	18.5	18.5	-	-	29.2	-	349
353404	7	4	-	-	89	-	18.5	18.5	-	-	34.5	-	81
Block 3 Total	**8**	**21**	**-**	**-**	**71**	**-**	**18.5**	**19.1**	**-**	**-**	**28.1**	**-**	**945**
451401	3	33	-	1	63	-	18.5	18.5	-	33.2	21.5	-	278
451404	20	1	-	-	79	-	19.4	18.5	-	-	21.9	-	232
452401	-	41	-	1	58	-	-	19.5	-	33.2	28.8	-	792
452403	3	11	-	41	45	-	18.5	18.5	-	32.5	29.1	-	100
452404	14	1	-	-	85	-	18.7	18.6	-	-	29.1	-	1,566
453404	15	1	-	-	84	-	18.5	18.8	-	-	34.6	-	917
461404	35	-	-	-	65	-	20.9	-	-	-	21.0	-	39
Block 4 Total	**11**	**12**	**-**	**1**	**76**	**-**	**18.7**	**18.8**	**-**	**33.1**	**29.3**	**-**	**3,925**
513400	-	-	-	-	65	35	-	-	-	-	24.0	28.0	1
551404	1	-	-	-	71	28	25.1	-	-	-	23.1	20.0	48
552404	-	1	-	-	99	-	-	22.8	-	-	28.0		18
553400	-	16	-	-	34	50	-	22.8	-	-	32.7	28.0	10
Block 5 TOTAL	**1**	**2**	**-**	**-**	**73**	**24**	**25.1**	**22.8**	**-**	**-**	**25.5**	**21.4**	**76**

9.6 Yield Tables for Managed Stands

9.6.1 Stocking density

A significant planting program has existed in TFL 39 since 1962, the start of MacMillan Bloedel's (predecessor licensee) Intensive Forest Management Program. For the last 20 to 25 years most of the harvested area has been planted, typically at planting levels of around 1,100 sph, with many areas also consisting of substantial natural in-growth. TIPSY does not directly model planted stands with natural in-growth so managed stands yields are modelled on generalized planting success alone.

Future stands are modelled as if planted at between 900 and 1,100 sph depending on the site, with higher densities typically utilized on more productive sites to mitigate competition from brush.

Stands currently aged 1 to 14 years are modelled as if planted at 1,000 sph. This is supported by recent practice and a review of free-growing stands.

Stands currently aged 15 to 50 years are modelled as if planted at 900 sph. Although much of this area was planted, there were more naturally regenerated areas in earlier years and less use of fertilizer at-time-of-planting, so modelling these stands with a lower average planting density seems reasonable (i.e., yields are generally expected to be lower than more recently established stands).

9.6.2 Fertilization

Since 2002, nitrogen fertilization (post-establishment) has occurred on approximately 4,725 ha in TFL 39; 2,320 ha in Block 1; 1,700 ha in Block 2; and 705 ha in Block 4. Fertilization treatments mostly occurred on stands where Douglas fir is the leading species. Fertilization programs have been contingent on government funding programs and are expected to continue in the next few years. Fertilization will not be incorporated into the yield tables for current or future stands.

9.6.3 Volumes for Existing Managed Stands Aged 15 - 50 Years

Silviculture assumptions for existing managed stands aged 15 – 50 years includes a plantation regeneration method for all stands, species composition from the inventory database, establishment density based on inventory and free-growing stand data and expected relative stocking success. These silviculture assumptions and THLB area-weighted site index estimates by species were used as inputs in Batch TIPSY 4.1 (see Table 45). No genetic gain was applied to stands in this age range.

Table 45- TIPSY Inputs for Existing Managed Stands Aged 15 – 50 Years

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	THLB Area (ha)
112303	900	1	10	-	66	23	-	25.1	22.8	-	30.1	27.8	-	85
113301	900	7	42	2	7	42	-	25.1	22.8	22.8	33.2	27.0	-	229
113303	900	1	10	-	79	10	-	25.1	22.8	-	33.2	25.4	-	1,907
113304	900	31	5	3	2	59	-	25.1	22.8	22.7	33.6	27.9	-	388
151301	900	4	46	-	19	31	-	27.2	22.8	-	33.2	17.5	-	12
152301	900	11	40	-	4	45	-	29.3	22.8	-	33.3	25.9	-	1,122
152303	900	3	17	-	56	24	-	28.9	22.8	-	33.4	25.8	-	479
152304	900	33	7	-	1	59	-	28.2	22.8	-	34.1	26.2	-	702
153301	900	6	42	-	5	47	-	29.6	22.7	-	33.2	32.2	-	166
153303	900	4	6	-	73	17	-	30.2	22.8	-	33.2	32.2	-	414
153304	900	30	3	-	1	66	-	29.2	22.8	-	33.2	32.2	-	321
161300	900	29	16	5	2	48	-	25.1	22.8	22.8	30.2	19.7	-	32
162301	900	14	39	3	2	42	-	25.5	22.7	22.8	32.1	27.5	-	617
162302	900	33	3	39	-	25	-	23.6	22.8	22.7	-	27.1	-	450
162303	900	4	4	1	75	16	-	24.3	22.8	22.8	30.5	27.3	-	1,233
162304	900	42	4	3	1	50	-	24.9	22.8	22.8	34.2	27.5	-	2,115
162305	900	-	21	-	7	19	53	-	22.8	-	34.3	27.3	24.0	5
163300	900	15	17	-	26	42	-	30.2	22.8	-	33.2	32.2	-	77
172301	900	26	36	4	-	34	-	23.1	22.8	22.8	-	26.8	-	73
172302	900	46	1	30	-	23	-	22.4	22.8	22.7	-	26.4	-	463
172303	900	5	1	4	82	8	-	22.7	22.8	22.8	28.1	26.4	-	363
172304	900	50	1	8	-	41	-	22.9	22.8	22.8	-	26.6	-	778

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	THLB Area (ha)
Block 1 Total		**18**	**15**	**7**	**27**	**33**	**1**	**25.4**	**22.8**	**22.8**	**32.1**	**25.9**	**24.0**	**12,032**
221303	900	-	13	-	62	25	-	-	22.8	-	22.1	26.1	-	130
222301	900	2	43	-	9	46	-	24.0	22.8	-	31.1	27.3	-	532
222303	900	-	8	-	66	26	-	-	22.8	-	31.1	26.7	-	2,704
222304	900	18	4	1	3	74	-	24.1	22.8	22.8	31.1	27.2	-	482
223300	900	9	6	-	2	83	-	22.6	22.8	-	36.6	27.5	-	80
223303	900	1	-	-	58	41	-	22.6	-	-	35.8	27.3	-	94
232301	900	7	16	5	3	69	-	22.9	22.8	22.8	31.1	26.0	-	269
232303	900	2	4	1	63	30	-	22.7	22.8	22.8	31.1	25.7	-	1,716
232304	900	30	3	4	2	61	-	22.7	22.8	22.8	31.1	25.5	-	831
242300	900	22	7	13	11	47	-	22.6	22.8	22.8	31.1	21.2	-	59
251301	900	14	20	8	-	58	-	22.6	22.8	22.8	-	23.4	-	36
251303	900	5	4	-	56	35	-	22.6	22.8	-	33.1	23.1	-	487
251304	900	32	4	-	1	63	-	22.6	22.8	-	33.3	21.9	-	1,104
252301	900	9	26	1	3	61	-	23.6	22.7	22.8	32.1	26.6	-	963
252302	900	10	3	28	6	53	-	23.8	22.8	22.4	31.1	26.8	-	249
252303	900	2	2	1	53	42	-	23.0	22.8	22.8	34.1	27.0	-	3,472
252304	900	19	2	1	1	77	-	23.5	22.8	22.8	33.2	27.2	-	6,636
253301	900	3	23	-	1	73	-	22.6	22.8	-	36.6	32.4	-	831
253302	900	3	1	31	2	63	-	22.6	22.8	22.8	36.6	32.4	-	104
253303	900	3	2	-	56	39	-	22.6	22.8	-	36.6	32.3	-	2,889
253304	900	19	2	-	1	78	-	22.6	22.8	-	36.6	32.3	-	4,587
261302	900	31	7	23	-	39	-	22.8	22.8	22.6	-	18.8	-	170
261303	900	4	1	2	48	45	-	22.6	22.8	22.8	31.1	21.2	-	139
261304	900	47	1	6	1	45	-	22.6	22.8	22.8	31.1	19.7	-	1,133
262301	900	7	30	4	2	57	-	24.6	22.8	22.8	31.1	26.9	-	152
262302	900	11	1	30	5	53	-	23.1	22.8	22.7	31.4	26.4	-	940
262303	900	7	2	5	49	37	-	23.2	22.8	22.8	32.1	26.7	-	520
262304	900	39	1	4	-	56	-	23.8	22.7	22.8	-	27.3	-	3,666
263300	900	42	1	3	4	50	-	22.3	22.8	22.7	36.6	32.2	-	429
271300	900	50	0	12	1	37	-	22.6	-	22.8	31.1	19.2	-	137
272300	900	37	0	37	0	26	-	22.1	-	22.7	-	26.5	-	49
Block 2 Total		**16**	**5**	**3**	**21**	**56**	**-**	**23.1**	**22.8**	**22.8**	**33.6**	**27.7**	**-**	**35,588**
352300	900	1	65	3	0	31	-	25.1	22.8	0.0	30.1	27.8	-	778
Block 3 Total		**1**	**65**	**3**	**0**	**31**	**-**	**25.1**	**22.8**	**0.0**	**30.1**	**27.8**	**-**	**778**
451300	900	25	11	3	2	59	-	18.6	18.5	19.9	33.3	19.0	-	35
452301	900	3	37	1	3	56	-	18.8	18.6	18.8	33.2	29.8	-	2,897
452302	900	6	7	47	-	40	-	19.1	19.3	19.4	-	28.9	-	430
452303	900	0	6	-	61	33	-	-	18.6	-	33.3	30.0	-	2,224
452304	900	15	1	1	-	83	-	18.9	18.7	19.4	-	29.8	-	4,281
453301	900	2	32	-	2	64	-	18.5	18.5	-	33.2	33.8	-	150
453303	900	-	1	-	61	38	-	-	18.5	-	33.2	33.8	-	506
453304	900	5	2	-	-	93	-	18.5	18.5	-	-	33.8	-	447
462301	900	6	20	3	-	71	-	20.9	20.9	20.7	-	26.8	-	64
462302	900	16	2	45	-	37	-	20.5	20.8	20.7	-	26.7	-	446
462303	900	4	0	1	93	2	-	21.0	-	21.0	34.1	26.6	-	49

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	THLB Area (ha)
462304	900	36	1	3	-	60	-	20.7	20.9	20.6	-	26.7	-	1,304
472300	900	50	-	11	-	39	-	19.3	-	18.9	-	26.5	-	31
Block 4 Total		**11**	**11**	**4**	**14**	**61**	**-**	**19.2**	**19.0**	**19.5**	**33.2**	**29.7**	**-**	**12,865**
551300	900	18	18	-	3	61	-	25.1	22.8	-	33.2	27.0	-	16
552300	900	29	10	5	1	55	-	25.1	22.8	22.8	33.2	25.4	-	57
553301	900	5	42	-	3	50	-	25.1	22.8	-	33.6	27.9	-	910
553303	900	1	7	-	61	31	-	25.1	22.8	-	-	21.2	-	422
553304	900	17	5	-	-	78	-	25.1	22.8	-	-	27.2	-	403
561300	900	24	6	9	4	57	-	27.2	22.8	22.8	33.2	17.5	-	8
562301	900	1	31	8	2	58	-	29.3	22.8	22.8	33.3	25.9	-	19
562302	900	56	-	28	-	16	-	28.9	-	22.8	-	25.8	-	58
562304	900	37	3	5	2	53	-	28.2	22.8	22.8	34.1	26.2	-	170
563300	900	16	19	0	16	49	-	29.6	22.7	-	33.2	32.2	-	14
572304	900	50	-	14	-	36	-	30.2	-	22.8	-	32.2	-	10
Block 5 Total		**12**	**22**	**1**	**14**	**51**	**-**	**25.6**	**22.8**	**22.8**	**33.5**	**26.1**	**-**	**2,087**

Yield curves for each existing managed age 15 – 50 years analysis unit are listed and shown in Appendix E: Existing Managed Aged 15 – 50 Years Yield Tables.

9.6.4 Volumes for Existing Managed Stands Aged 1 - 14 Years

Silviculture assumptions for existing managed stands aged 1 – 14 years includes a plantation regeneration method for all stands, species composition from the inventory database and stand assessments, establishment density reflecting stocking success. These silviculture assumptions and THLB area-weighted site index estimates by species were used as inputs in Batch TIPSY 4.1 (Table 46). Genetic gain for Cw, Cy, Fd and Hw was applied to stands in this age range based on average values for common seedlots planted in TFL 39 since 2000. Expected genetic gains for Hw are reduced 30 percent to reflect a component of natural regeneration expected in the harvested stands.

In the timber supply model, yields for these stands will be reduced to account for the impact on growth by trees retained in the previous harvest (see Sections 9.4.2 and 11.3.3 for more details).

Average TIPSY inputs for existing managed stands aged 1 – 14 years are given in Table 46.

Table 46 - TIPSY Inputs for Existing Managed Stands Aged 1 – 14 years

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	Genetic Gain %			THLB Area (ha)
														Cw	Fd	Hw[1]	
111203	1,000	-	11	-	79	10	-	-	22.8	-	25.6	27.7	-	4	8	4	47
112200	1,000	2	15	-	43	40	-	25.1	22.9	-	30.3	28.0	-	4	8	4	121
113201	1,000	3	31	1	16	49	-	25.1	22.7	19.2	33.4	25.9	-	4	8	4	168
113203	1,000	-	11	-	66	23	-	-	22.8	-	33.2	24.6	-	4	8	4	2,624
113204	1,000	30	9	2	9	50	-	21.1	22.8	22.8	33.2	26.5	-	4	8	4	58
113205	1,000	-	10	-	22	12	56	-	22.8	-	33.2	24.9	28.0	4	8	4	145

[1] GW for Hw reduced from 6% in CWHdm, CWHxm2, CWHmm1, and CWHvm1 variants to reflect expected natural regeneration component in future harvested stands.

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	Genetic Gain %			THLB Area (ha)
														Cw	Fd	Hw[1]	
122203	1,000	-	10	-	71	19	-	-	22.8	-	28.0	21.2	-	4	8	4	4
123200	1,000	-	10	-	9	6	75	-	22.8	-	33.2	27.1	28.0	4	8	4	5
123203	1,000	-	5	-	85	10	-	-	22.8	-	34.1	22.6	-	4	8	4	58
151200	1,000	12	9	-	10	69	-	30.0	22.8	-	33.2	19.9	-	4	8	4	42
152200	1,000	16	41	-	9	34	-	24.2	22.9	-	32.5	25.8	-	4	8	4	141
153200	1,000	9	31	1	22	37	-	25.1	22.8	22.8	33.2	32.2	-	4	8	4	78
161200	1,000	22	13	10	8	47	-	24.7	22.8	22.7	33.3	18.3	-	-	-	-	172
162201	1,000	14	44	4	5	33	-	23.9	21.8	22.8	34.2	27.7	-	-	-	-	83
162202	1,000	14	9	42	3	32	-	24.2	22.8	18.9	33.3	27.4	-	-	-	-	102
162203	1,000	5	15	1	32	47	-	24.9	22.8	22.8	33.7	27.7	-	-	-	-	54
162204	1,000	48	6	8	-	38	-	21.5	22.8	22.8	-	27.6	-	-	-	-	124
171200	1,000	27	9	9	1	54	-	23.5	22.8	22.8	31.8	19.3	-	-	-	-	176
172200	1,000	38	-	21	3	38	-	19.3	-	19.1	27.7	26.3	-	-	-	-	90
Block 1 Total		**7**	**14**	**3**	**45**	**28**	**2**	**23.8**	**22.8**	**21.7**	**32.6**	**24.8**	**28.0**	**2.8**	**5.8**	**2.8**	**4,292**
222201	1,000	6	35	1	9	49	-	23.7	21.4	22.8	31.1	19.6	-	4	8	4	134
222203	1,000	-	6	-	67	27	-	-	22.8	-	31.0	25.7	-	4	8	4	1,249
222204	1,000	28	11	3	3	55	-	21.5	22.8	22.8	31.1	20.8	-	4	8	4	53
222205	1,000	-	2	-	12	15	71	-	22.8	-	31.1	26.4	24.0	4	8	4	144
223201	1,000	6	42	2	4	46	-	22.6	22.2	22.8	36.6	23.4	-	4	8	4	20
232200	1,000	21	14	8	16	41	-	20.7	22.7	22.8	24.6	18.4	-	4	8	4	214
242200	1,000	25	8	6	11	50	-	16.8	22.8	22.8	31.1	18.9	-	-	-	4	24
251201	1,000	15	28	4	2	51	-	22.8	22.3	22.8	34.3	20.9	-	4	8	4	577
251202	1,000	6	4	28	-	62	-	23.0	22.8	22.8	-	19.2	-	4	-	4	120
251203	1,000	2	8	1	33	56	-	22.8	22.8	22.8	33.4	20.0	-	4	8	4	151
251204	1,000	33	9	4	1	53	-	22.5	22.8	22.8	32.9	19.7	-	4	8	4	1,264
252201	1,000	21	45	4	1	29	-	22.7	20.6	22.8	33.0	26.6	-	4	8	4	371
252202	1,000	14	9	45	1	31	-	21.8	22.8	20.1	33.8	26.5	-	4	8	4	106
252203	1,000	4	17	1	50	28	-	24.6	22.8	22.8	23.1	27.0	-	4	8	4	48
252204	1,000	50	9	2	-	39	-	20.5	22.8	22.8	-	26.5	-	4	-	4	771
253201	1,000	10	38	5	6	41	-	20.9	20.6	20.3	36.6	32.3	-	4	8	4	145
253203	1,000	1	4	-	42	53	-	22.6	22.8	-	34.6	32.4	-	4	8	4	409
253204	1,000	46	9	2	2	41	-	19.9	22.8	22.8	36.6	32.3	-	4	8	4	332
261201	1,000	12	28	5	1	54	-	22.9	22.7	22.8	31.7	20.0	-	-	-	-	267
261202	1,000	16	1	33	-	50	-	22.9	22.8	21.4	-	18.5	-	-	-	-	567
261204	1,000	32	5	8	1	54	-	22.8	22.8	22.8	32.2	19.5	-	-	-	-	1,823
262202	1,000	15	7	41	-	37	-	21.9	22.2	18.1	-	26.2	-	-	-	-	508
262204	1,000	50	4	4	1	41	-	19.4	22.8	22.8	22.4	26.7	-	-	-	-	1,062
263200	1,000	42	11	4	5	38	-	18.9	22.5	22.3	24.7	32.2	-	-	-	-	28
271200	1,000	22	5	29	3	41	-	17.9	22.3	20.1	21.1	18.2	-	-	-	-	100
271204	1,000	48	1	7	-	44	-	18.2	22.8	22.8	-	18.7	-	-	-	-	429
272200	1,000	43	-	26	-	31	-	19.1	-	21.2	-	26.5	-	-	-	-	38
Block 2 Total		**26**	**10**	**8**	**11**	**44**	**1**	**21.7**	**22.6**	**22.4**	**31.0**	**23.2**	**24.0**	**2**	**5**	**2**	**10,954**
351200	1,000	4	34	4	-	58	-	18.5	18.5	18.5	-	17.4	-	4	-	4	7
352201	1,000	3	45	11	-	41	-	18.5	16.6	17.5	-	26.8	-	4	-	4	123
352204	1,000	17	3	-	-	80	-	18.6	18.5	-	-	26.8	-	4	-	4	135

Existing AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Dr %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Dr SI	Genetic Gain %			THLB Area (ha)
														Cw	Fd	Hw[1]	
Block 3 Total		**10**	**23**	**11**	**-**	**61**	**-**	**18.5**	**17.6**	**17.5**	**-**	**26.6**	**-**	**4**	**-**	**4**	**265**
451201	1,000	11	26	11	1	51	-	18.8	18.8	19.1	33.2	18.5	-	4	8	4	289
451203	1,000	27	8	2	1	62	-	18.9	18.7	18.9	33.2	20.8	-	4	8	4	266
452201	1,000	13	47	7	3	30	-	18.4	17.4	17.3	33.2	29.2	-	4	8	4	396
452204	1,000	22	5	1	6	66	-	19.2	18.6	19.0	33.2	29.3	-	4	8	4	608
453201	1,000	5	40	-	9	46	-	18.5	16.9	-	33.2	33.8	-	4	8	4	75
453204	1,000	7	3	-	-	90	-	18.8	18.5	-	-	33.8	-	4	-	4	208
461201	1,000	10	24	11	-	55	-	20.7	20.6	20.7	-	17.8	-	-	-	-	113
461202	1,000	10	6	30	-	54	-	20.9	20.4	20.7	-	15.8	-	-	-	-	133
461204	1,000	33	3	7	-	57	-	20.9	20.9	20.8	-	18.4	-	-	-	-	271
462202	1,000	18	3	43	-	36	-	18.4	19.2	15.6	-	26.1	-	-	-	-	187
462204	1,000	50	1	5	-	44	-	19.0	20.4	20.5	-	26.4	-	-	-	-	272
471200	1,000	16	7	19	-	58	-	18.6	18.6	18.5	-	17.3	-	-	-	-	50
472204	1,000	61	1	5	-	33	-	19.4	18.5	15.3	-	25.3	-	-	-	-	56
Block 4 Total		**22**	**14**	**8**	**2**	**54**	**-**	**19.2**	**19.0**	**18.9**	**33.2**	**25.1**	**-**	**2.5**	**8**	**2.5**	**2,925**
551200	1,000	19	14	5	7	55	-	27.6	22.8	22.8	33.2	20.7	-	4	8	4	36
552200	1,000	25	36	1	3	35	-	21.9	20.4	14.1	30.2	27.7	-	4	8	4	13
553201	1,000	3	58	2	8	29	-	29.2	20.1	17.5	33.3	32.6	-	4	8	4	53
553204	1,000	52	3	-	5	40	-	21.0	22.8	-	27.9	32.7	-	4	8	4	27
561200	1,000	32	10	7	-	51	-	25.8	22.8	22.8	-	21.2	-	-	-	-	37
562201	1,000	2	56	-	1	41	-	21.0	21.5	-	34.3	27.7	-	-	-	-	49
562202	1,000	14	5	52	-	29	-	25.1	22.8	17.7	-	27.7	-	-	-	-	25
562204	1,000	62	-	1	-	37	-	21.6	-	22.8	-	27.7	-	-	-	-	30
563201	1,000	5	51	2	17	25	-	24.7	20.7	22.8	33.2	32.4	-	-	-	-	18
Block 5 Total		**21**	**29**	**7**	**4**	**39**	**-**	**24.7**	**21.7**	**20.3**	**32.6**	**27.7**	**-**	**2**	**5.3**	**1.8**	**289**

Yield curves for each existing managed age 1 – 14 years analysis unit are listed and shown in Appendix F: Existing Managed Aged 1 – 14 Years Yield Tables.

9.6.5 Future Stand Volumes

Ecologically-based silviculture strategies for future stands were developed by Western Forest Products staff based on current practices (Table 47). Stand density is represented by planting at 900 to 1,100 sph to reflect the continued practice to plant almost all harvested areas and natural in-growth experienced on many sites. Species and stocking levels are portrayed at a broad average level to simplify modelling. It is recognized that this includes a range of specific prescriptions that might include establishment of alder on a small percentage of the land base (for further discussion on this see *Hardwood Management in the Coast Forest Region* (MoFR, 2009)) or a greater reliance on natural regeneration in some areas.

9.6.5.1 Regeneration Delay

Regeneration delay refers to the average time between harvesting and the establishment of the next rotation. Nearly all of the harvested area is planted and prompt establishment after harvesting continues to be practiced in the TFL. Planted seedlings are typically one year old. The regeneration delay from harvest until germination of the next crop of planted trees is generally less than one year. Early seedling growth is assisted on some sites (e.g., cedar-salal sites) by the practice of fertilization at time of planting.

A one year regeneration delay is appropriate for future managed stands and is incorporated into yield tables used in the analyses.

9.6.5.2 <u>Genetic Worth</u>

Projections of Genetic Worth (GW) were developed from WFP's Saanich Forestry Centre seed inventory, development plans and the Forest Genetics Council business plans. GW is projected to increase somewhat over the period from 2008-2012 to 2018-2028. Expected GW values for Hw are reduced 30 percent to reflect a component of natural regeneration expected in harvested stands (e.g., GW for Hw in CWHxm2 is reduced from 14 percent for pure planted stock to 10 percent to reflect natural regeneration presence). Average values for GW by species and BEC variant listed in Table 47 will be applied to future managed stands. Note that in the MHmm1 variant, mountain hemlock (Hm) is assumed rather than western hemlock (Hw) so no GW value is applied.

9.6.5.3 <u>Yields</u>

Yield tables generated for the base case used inventory and BSIM site index estimates for input into Batch TIPSY 4.1 (Appendix G: Future Managed Yield Tables).

In the timber supply model, yields for these stands are reduced to account for the impact on growth by trees retained in the previous harvest to meet stand-level retention targets (see Sections 9.4.2 and 11.3.3 for more details).

Table 47 - TIPSY Inputs for Future Managed Stands

Future AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Genetic Gain %				THLB Area (ha)
												Cw	Cy	Fd	Hw[1]	
111100	1,000	-	10	-	90	-	-	22.8	-	23.3	-	12	-	14	-	2,607
112100	1,000	-	20	-	80	-	-	23.0	-	30.7	-	12	-	14	-	3,816
113100	1,100	-	20	-	80	-	-	23.4	-	35.1	-	12	-	14	-	16,721
121100	1,000	-	5	-	95	-	-	22.8	-	22.2	-	12	-	14	-	303
122100	1,000	-	5	-	95	-	-	23.4	-	28.7	-	12	-	14	-	267
123100	1,100	-	5	-	95	-	-	23.0	-	36.4	-	12	-	14	-	182
151100	1,000	5	15	-	15	65	29.9	22.8	-	34.5	19.3	12	-	14	10	330
152100	1,000	10	15	-	15	60	28.4	22.8	-	33.2	26.4	12	-	14	10	3,563
153100	1,100	15	10	-	15	60	29.2	22.7	-	33.3	32.5	12	-	14	10	1,630
161100	1,000	5	15	10	10	60	25.0	22.7	22.7	30.9	20.3	-	10	7	6	1,202
162100	1,000	10	15	5	15	55	24.5	22.8	22.5	30.2	27.6	-	10	7	6	11,408
163100	1,100	20	10	5	10	55	29.2	22.7	22.7	33.3	33.0	-	10	7	6	346
171100	1,000	10	-	20	-	70	23.4	-	22.8	-	19.2	-	10	-	-	345
172100	1,000	30	5	15	-	50	22.7	22.8	22.7	-	26.5	-	10	-	-	5,314
Block 1 Total		**7**	**15**	**3**	**46**	**28**	**25.1**	**23.0**	**22.6**	**32.2**	**27.0**	**7**	**10**	**12**	**6**	**48,033**
221100	900	-	-	-	95	5	-	-	-	24.6	26.5	-	-	14	10	1,051
222100	1,000	-	-	-	95	5	-	-	-	31.0	26.8	-	-	14	10	13,282

[1] GW for Hw reduced from 14% in CWHdm,CWHxm2, CWHmm1, and CWHvm1 variants and from 9% in CWHmm2 and CWHvm2 variants to reflect expected natural regeneration component in future harvested stands.

Future AU	SPH	Ba %	Cw %	Cy %	Fd %	Hw %	Ba SI	Cw SI	Cy SI	Fd SI	Hw SI	Genetic Gain %				THLB Area (ha)
												Cw	Cy	Fd	Hw[1]	
223100	1,100	-	-	-	95	5	-	-	-	35.8	26.9	-	-	14	10	1,838
231100	900	10	-	-	60	30	22.8	-	-	22.5	26.2	-	-	14	10	71
232100	1,000	30	10	-	25	35	22.5	22.8	-	31.1	25.1	12	-	14	10	4,024
233100	1,100	30	10	-	25	35	22.6	22.8	-	34.0	26.3	12	-	14	10	16
242100	1,000	40	-	20	-	40	22.6	-	22.8	-	23.4	-	10	-	6	185
251100	900	10	5	-	-	85	22.7	22.6	-	-	21.3	12	-	-	10	4,926
252100	1,000	10	5	-	-	85	23.0	22.5	-	-	27.3	12	-	-	10	19,437
253100	1,100	10	5	-	5	80	22.3	22.6	-	36.4	32.4	12	-	14	10	12,164
261100	900	-	5	5	-	90	-	22.7	22.8	-	19.5	-	10	-	6	7,069
262100	1,000	15	5	5	-	75	23.3	22.9	22.4	-	26.8	-	10	-	6	19,636
263100	1,100	15	5	5	-	75	22.1	22.7	22.8	-	32.2	-	10	-	6	898
271100	1,000	40	-	20	-	40	21.8	-	22.7	-	19.2	-	10	-	-	4,844
272100	1,000	40	-	20	-	40	23.1	-	22.7	-	26.4	-	10	-	-	2,225
Block 2 Total		**12**	**4**	**3**	**19**	**62**	**22.8**	**22.6**	**22.6**	**33.1**	**26.3**	**7**	**10**	**14**	**8**	**91,666**
351100	1,000	-	60	-	20	20	-	18.5	-	33.2	21.2	12	-	14	10	152
352100	1,000	-	50	-	20	30	-	18.6	-	33.2	27.9	12	-	14	10	1,995
353100	1,000	30	50	-	20	-	18.5	18.5	-	33.2	-	12	-	14	-	81
Block 3 Total		**1**	**51**	**-**	**20**	**28**	**18.5**	**18.6**	**-**	**33.2**	**27.4**	**12**	**-**	**14**	**10**	**2,227**
451100	1,000	-	60	10	-	30	-	18.6	19.1	-	20.7	12	-	-	10	1,108
452100	1,000	10	20	-	5	65	18.9	18.6	-	33.3	29.5	12	-	14	10	15,474
453100	1,100	-	5	-	5	90	-	18.2	-	33.2	34.2	12	-	14	10	2,496
461100	1,000	20	10	40	-	30	20.9	20.6	20.7	-	17.9	-	10	-	6	562
462100	1,000	20	15	15	-	50	20.4	20.6	20.2	-	26.7	-	10	-	6	5,340
471100	1,000	25	-	50	-	25	18.6	-	18.5	-	17.3	-	10	-	-	50
472100	1,000	25	-	50	-	25	18.9	-	18.6	-	26.4	-	10	-	-	823
Block 4 Total		**11**	**18**	**6**	**4**	**61**	**19.3**	**19.0**	**19.9**	**33.3**	**28.6**	**9**	**9**	**14**	**9**	**25,854**
513100	1,000	-	20	-	80	-	-	18.5	-	33.2	-	12	-	14	-	1
551100	1,000	-	70	-	30	-	-	22.8	-	33.2	-	12	-	14	-	111
552100	1,000	20	50	-	20	10	24.5	22.2	-	27.8	21.2	12	-	14	10	122
553100	1,000	30	50	-	20	-	28.7	22.6	-	33.3	-	12	-	14	-	1,904
561100	1,000	-	50	20	-	30	-	22.8	22.8	-	20.4	-	10	-	6	52
562100	1,000	30	30	20	-	20	24.5	22.4	22.0	-	27.7	-	10	-	6	640
563100	1,000	30	50	20	-	-	19.2	21.5	22.8	-	-	-	10	-	-	53
572100	1,000	40	-	60	-	-	23.1	-	22.7	-	-	-	10	-	-	135
Block 5 Total		**28**	**44**	**8**	**15**	**5**	**27.1**	**22.5**	**22.2**	**33.0**	**26.3**	**9**	**10**	**14**	**7**	**3,017**

9.6.6 Not Satisfactorily Restocked Areas

The data set prepared for analysis includes 5,394 ha described as not satisfactorily restocked (NSR) and 4,759 ha of the “NSR” area is in the timber harvesting land base. The “NSR” area is significantly larger than in operational records as it includes areas planted in 2011 and other licensees’ (e.g., First Nations, BCTS) cutblocks for which WFP had no planting data available. NSR areas will be regenerated to the appropriate future Analysis Unit in the model in the first planning period.

Table 48 - NSR Area

TFL Block	NSR Area (ha)	
	Productive	**THLB**
Block 1	1,741	1,540
Block 2	3,537	3,127
Block 3	0	0
Block 4	106	92
Block 5	12	0
TFL 39 Total	**5,394**	**4,759**

10 NON-RECOVERABLE LOSSES

Windthrow, insects, disease and fire can cause catastrophic losses of whole stands of trees. Over the long-term, the probability of losses to such natural causes can be predicted. Where losses occur in merchantable stands some dead or dying timber may be salvageable. When modelling timber supply, unsalvaged losses are added to the desired harvest forecast and subtracted from the forecast upon completion of the modelling exercise.

10.1 Windthrow

Loss of single trees or small groups of trees are mostly accounted for in inventory sampling for existing timber yield estimates and OAFs applied to young stands. A great deal of research has been undertaken during the past ten years to determine the variables that affect the amount of expected windthrow along cutblock edges following harvest and the effectiveness of various edge treatment techniques (e.g., pruning, topping, and feathering) to reduce the amount of windthrow experienced. Research results have aided in cutblock design and treatment prescriptions so that the amount of windthrow experienced from endemic winds has been greatly reduced.

With a reduction in the use of the retention silviculture system planned (see Section 11.3.3) less windthrow is expected in the future. To date estimates of unrecovered windthrown timber varies between less than 0.5 percent to 1 percent of the annual harvest.

10.2 Insects and Disease

The forests of TFL 39 have been relatively free of major insect or disease infestations so there are no associated losses. There have been no major catastrophic outbreaks causing significant unsalvaged mortality or volume losses. The main active agents have been various defoliators such as Conifer sawfly (*Neodiprion spp.*) in Block 2 and 5, Western blackheaded budworm (*Acleris gloverana*) in Blocks 2 and 4, and Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) in Block 1.

Most of TFL 39 is within the hazard zones for Sitka spruce weevil (*Pissodes strobe*). The rules for planting Sitka spruce are followed to reduce damage by the weevil and weevil resistant seedlings are being bred.

Hemlock dwarf mistletoe is widespread throughout mature stands. Sanitation treatments of advanced regeneration are sometimes required to prevent the spread in newly regenerated western hemlock stands. Usually regenerated stands are not significantly impacted by hemlock dwarf mistletoe.

Root diseases, mostly *Phellinus weirii*, sometimes result in small pockets of mortality. These losses are assumed accounted for by the operational adjustment factors (OAFs) applied to yield curves.

10.3 Fire

The risk of timber loss due to fire is relatively low within the TFL. The bulk of the TFL has a wet climate characterized by cool, wet summers and fire suppression has been efficient; therefore, the likelihood of loss to forest fire is small. The last analysis factored in an average loss due to fire of 8,000 m^3/year. With the TFL currently approximately one-half the size it was for the last analysis, losses due to fire are estimated to be 4,000 m^3/year.

10.4 Total Non-recoverable Losses

An allowance of one percent of the harvest volume will be made for non-recoverable losses. This volume will be added to the annual harvest target in order to remove this volume from the THLB and transition an applicable amount of stand area to age zero. The volume of unrecovered timber will not be included in the reported harvest volumes.

11 INTEGRATED RESOURCE MANAGEMENT

The intent of this section is to provide an overview of resource inventories available and used for the timber supply review. This section also describes other resource management information utilized for planning within TFL 39.

11.1 Forest Resource Inventory

Table 49 summarizes the forest resource inventories currently being maintained for the TFL.

Table 49 - Forest Resource Inventory Status

Item	Status
Forest Inventory	TFL 39 cruise-based inventory from 1960s. Augmented since with operational and second-growth cruising. Also inventory audits during the late 1990s.
Ecosystems	TEM (level 4 survey intensity) funded by FRBC was done in several separate projects being completed in 2002 / 2003.
Terrain Stability	Various inventories to different standards. Most recently, FRBC/FIA funded projects were completed to create DTSM and landslide inventories in the Phillips watershed (Block 5) and DTSM within the northern half of Block 1.
Recreation Inventory	Completed in 1998 for Blocks 2, 3, 4 and 5. Block 1 updated in 2001. 2006 GAR Order established to identify designated recreation resource features within Campbell River District (Blocks 2 and 5).
Visual Landscape Inventory	Completed in 1998 for Blocks 2, 3, 4 and 5. Block 1 updated in 2005. WFP inventories formed the basis for GAR Orders to establish Visual Quality Objectives for the Sunshine Coast and Campbell River Districts.
Ungulate Winter Ranges (UWRs)	Established and draft UWRs maintained on an on-going basis.
Wildlife Habitat Areas (WHAs)	Established and draft WHAs maintained on an on-going basis.
Old Growth Management Areas (OGMAs)	Established and draft OGMAs maintained on an on-going basis.
Stream Classification	Operational stream inventories.
Archaeological	Archaeological Overview Assessments (AOAs) for Blocks 2, 3 and 4 available via FLNRO. Registered features and sites available via GeoBC.
Operability	Physical operability updated in a 1999 project.

11.2 Forest Cover Requirements

11.2.1 Deer Winter Ranges in Block 1

Rather than 100 percent reserved from harvesting, proposed ungulate winter ranges for deer within Block 1 will have the following forest cover constraints modeled:

- A maximum of 20 percent of the productive forest within a polygon will be comprised of stands less than 20 years old; and
- A minimum of 20 percent of the productive forest within a polygon will be comprised of stands at least 80 years old.

These UWR are managed utilizing a third constraint: at least one patch of at least 20 hectares in area with trees at least 80 years old will be retained within each polygon. Woodstock does not maintain the spatial relation of polygons so this constraint cannot be modeled. Omitting this constraint will have an insignificant timber supply impact since at least 20 percent of each polygon will be maintained with trees at least 80 years old (the second constraint listed above).

11.2.2 Visual Quality

District Managers of the Campbell River and Sunshine Coast Districts established Visual Quality Objectives (VQOs) for the districts on December 14, 2005 and June 19, 2009 respectively. These include VQOs in TFL 39. The TFL visual landscape inventories form the basis for managing visual quality within the North Island – Central Coast District.

Visual Quality Objectives to be modelled in the timber supply analysis include Retention (R), Partial Retention (PR) and Modification (M). The amount of area that can be disturbed (i.e., has not achieved visually effective green-up) is 5, 15 and 25 percent for each VQO, respectively. These levels are set at the upper end of the percentile disturbance range for use in timber supply analyses as visual landscape design during cutblock layout has become common practice in sensitive viewscapes. Cutblock designs that follow the lines and forms of the viewscape allow more timber to be removed and still meet the VQO when compared to unnatural cutblock shapes. Additionally, the use of the retention silviculture system can result in more timber removal in visually sensitive areas by strategically placing retention patches to act as visual screens. A sensitivity analysis in which these percentages are reduced to the mid-point of the range for each VQO (2.5, 10 and 20 percent, respectively) will indicate the sensitivity of timber supply to management of visual quality objectives and the design of cutblocks within visually sensitive areas.

A 5 m visually effective green-up (VEG) height is proposed for TFL 39. TIPSY height curves by analysis unit will be used to track total area less than 5 m tall within VQO polygons.

Table 50 outlines management assumptions for dealing with visual quality within the TFL.

Table 50 - Visual Quality Management Assumptions

TFL Block	Visual Quality Objective	Productive Forest (ha)	THLB Area (ha)	Disturbance %
Block 1	M	8,708	4,927	25%
	PR	21,550	16,198	15%
Block 2	M	7,476	5,991	25%
	PR	8,590	5,852	15%
	R	1,024	646	5%
Block 4	M	418	352	25%
Block 5	M	38	11	25%
	PR	1,193	403	15%

11.2.3 Adjacent Cutblock Green-up

A 3 m green-up height in VILUP General and Special Management Zones and areas not subject to VILUP will be used for areas without visual quality objectives. A 1.3 m green-up height in VILUP Enhanced Forestry Zones will be used for areas without established VQOs. For the initial forest conditions, areas within 100 m of recently harvested cutblocks (logged between 2005 and 2011) in General and Special Management Zones are "locked" in the model for 1 or 2 periods to address adjacency requirements.

Since Woodstock does not have the capability to spatially model adjacency requirements beyond the initial forest conditions, a proxy will be used with a maximum of 25 percent of the THLB within a zone but outside of VQO polygons being permitted to be less than the green-up height. TIPSY height curves by analysis unit will be used to track total area not greened-up.

11.2.4 FRPA Landscape Level Biodiversity

Landscape Units and Biodiversity Emphasis Options (BEOs) were designated through the *Order Establishing Provincial Non-Spatial Old Growth Objectives* effective June 30, 2004 (NSOG order). This order is in effect until Old Growth Management Areas (OGMAs) are spatially determined through Landscape Unit planning. OGMAs have been established in ten landscape units and draft OGMAs have been identified in three others that meet the NSOG order (see Section 6.10). These draft OGMAs will be used in the timber supply analysis but a public and First Nations' review process must be completed before becoming legal.

For forest types within TFL 39, old forest is defined as stands >250 years old. The old seral target is based on a combination of BEO, BEC variant, and variant natural disturbance type (NDT). In some cases, the OGMAs for landscape units with a Low BEO identify enough area to meet the old seral target reduced by as much as 2/3 for the first rotation (i.e., 80 years) as permitted by the NSOG order. To ensure the long term old forest targets are met, forest cover constraints will be applied in the model for variants in landscape units with a Low BEO. The target for the end of the second rotation (i.e., 160 years) will be 2/3 of the full target, with the full old seral target having been achieved by the end of the third rotation (i.e., 240 years). Where the OGMAs identify the full target, or there is sufficient old forest within the non-contributing land base to meet the full target, these forest cover constraints will have no impact on timber supply.

For a breakdown of the current forest age by landscape unit and variant see Table 34.

11.2.5 SCCO Landscape Level Biodiversity

Objective 14 of SCCO requires maintenance of old forest and limits the amount of mid-seral forest. Old forest constraints are addressed though a spatial netdown (see Section 6.17) and mid-seral limits are dealt with by a forest cover constraint (see Section 11.2.8.2.3).

11.2.6 Community Watersheds

A total of five designated community watersheds (CWS) are either completely or partially within TFL 39 (see Table 51).

Table 51 - Community Watersheds

TFL Block	Watershed	Area (ha)	
		Total	Within TFL 39
Block 1	Silver Creek (CWS 900.059)	5.1	1.3
Block 1	Jefferd Creek (CWS 900.031)	315.5	79.7
Block 1	Sliammon Lake (CWS 900.060)	4,431	66.5
Block 1	Haslam / Lang Creek (CWS 900.034)	13,074	506.0
Block 2	Newcastle Creek (CWS 920.044)	911.7	911.7

Due to the small size of the Silver Creek watershed and the relatively small proportion of the Sliammon Lake and Haslam / Lang Creek watersheds within TFL 39, no cover constraints will be applied to these watersheds. A cover constraint will be applied for the other two watersheds (Jefferd and Newcastle) so that no more than 5 percent of the productive area within each watershed will be covered with stands less than five years old.

11.2.7 Fisheries Sensitive Watersheds

A GAR order effective December 28, 2005 established Fisheries Sensitive Watersheds (FSWs) on Vancouver Island. FSWs are defined as watersheds with significant downstream fisheries values and significant watershed sensitivity such that the area requires special management to protect fish. Within TFL 39 Block 2, the Memekay River watershed was established as a FSW. To address this designation the approved FSP contains results and strategies, including rate-of-cut limits based on ECA limits, which will be included in the analysis.

For the analysis, stands are assumed to contribute to the ECA value based on the "recovery curve" shown in Figure 3 (modified from the *Coastal Watershed Assessment Procedure Guidebook*, April 1999).

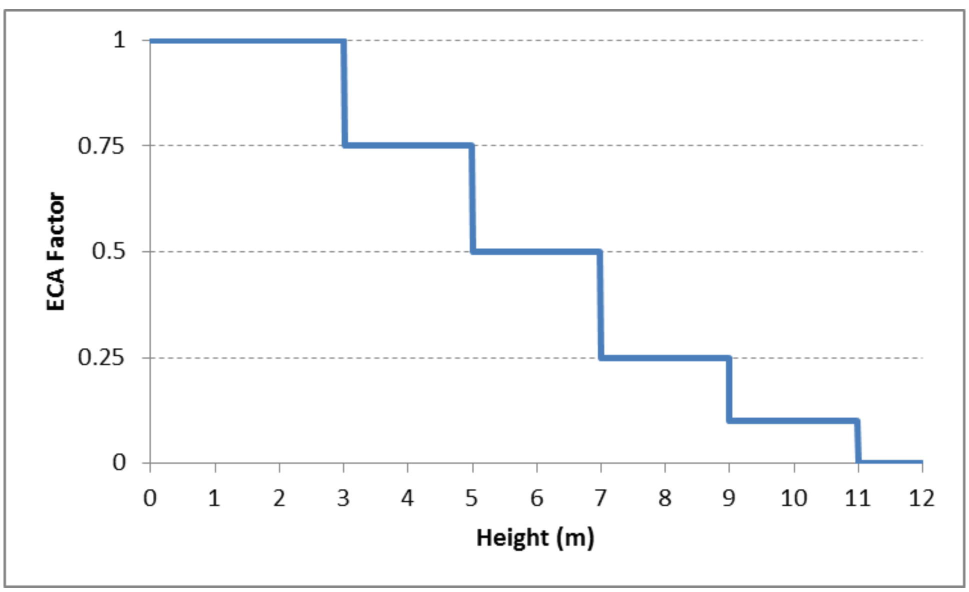

Figure 3 – ECA Recovery Curve

The curve indicates that stands less than 3m tall contribute 100 percent to ECA whereas only 50 percent of the area of stands with a height between 5 and 7m contributes. Once a stand reaches 11m tall, the stand no longer contributes to ECA.

Analysis Unit specific height curves are assigned to each immature stand so that the model can calculate ECA dynamically within each planning period. The ECA constraints listed in Table 52 will be applied in the timber supply model.

Table 52 - Fisheries Sensitive Watersheds Constraints

Watershed	Rate-of-cut criteria	Rate-of-cut constraint
Memekay Basin 1 (Main)	ECA	30%
Memekay Basin 2 (Middle)	ECA	25%
Memekay Basin 3 (North)	ECA	25%

11.2.8 Higher Level Plans

11.2.8.1 VILUP

The order establishing Resource Management Zones and Resource Management Zone objectives within the area covered by the Vancouver Island Land Use Plan came into effect December 1, 2000. Each Special Management Zone (SMZ) established by the order has an objective of maintaining mature seral forest over one quarter to one third of the forested area in the SMZ.

A portion of SMZ 11 (Schoen-Strathcona) falls within Block 2 of TFL 39. For this analysis, a constraint will be incorporated that maintains 25 percent of the productive forest land base in mature and/or old seral stage within this SMZ.

11.2.8.2 SCCO

The South Central Coast Order has three objectives that are addressed via forest cover constraints, i.e., important fisheries watersheds, upland streams, and a component of landscape-level biodiversity. These constraints are detailed below.

11.2.8.2.1 Important Fisheries Watersheds

Objective 8 of the SCCO requires maintenance of the “equivalent clearcut area” (ECA) in applicable watersheds to less than 20 percent. For TFL 39, this applies to part of Block 5. ECA is an indicator that quantifies the percentage of productive forest area within a watershed where the hydrologic response resulting from disturbance is equivalent to the hydrologic response of a clearcut. Stands are assumed to contribute to the ECA value based on the “recovery curve” shown in Figure 3.

A maximum 20 percent ECA constraint will be applied in the model to the productive forest area of applicable watersheds.

11.2.8.2.2 Upland Streams

Objective 12 of the SCCO requires maintenance of 70 percent or more of the forest in the portion of a watershed identified in Schedule 3 (Important Fisheries Watersheds) that is drained by upland streams as functional riparian forest. In practice this requirement dictates that no more than 30 percent of the upland portion of an applicable watershed can be covered by stands less than 9m tall, the height at which the Coastal Watershed Assessment Procedure Guidebook assumes stands are 90 percent hydrologically recovered (i.e., the maximum recovery stated in the guidebook).

For the analysis, it is assumed that the 20 percent ECA constraint for important fisheries watersheds also addresses the upland streams objective; therefore, no additional constraint will be applied within the model.

11.2.8.2.3 Landscape-level Biodiversity

A component of Objective 14 of the SCCO limits the amount of mid-seral forest to less than 50 percent of each site series or site series surrogate for each landscape unit. This requirement will be applied in the model by tracking the area of each LU/SSS in the mid-seral age class based on the following age ranges by biogeoclimatic zone:

- CWH: 40-80 years old
- MH: 40-120 years old

The SSS applicable to Blocks 3 and 5 are listed in Appendix B: South Central Coast Order Site Series Surrogates Targets.

11.3 Timber Harvesting

11.3.1 Minimum Harvestable Age

Minimum harvestable ages are the minimum criteria for use in the timber supply model. While actual harvesting may occur in stands at or below the minimum requirements in order to meet forest level objectives (e.g., maintaining overall timber flows), many stands will not be harvested until well past the minimum ages because consideration of other resource values may take precedence or timber may be in ample supply. A minimum harvestable volume of 350 m^3/ha and minimum age of 35 years was used in the last analysis.

The data set prepared for analysis includes logging system (e.g., ground, cable or heli) based on a combination of operability class (see Section 6.6) and slope class. Conventionally operable areas with a slope between 0 and 30 percent are assumed harvestable by ground-based systems and conventionally operable areas on steeper slopes are assumed harvestable by cable systems. Helicopter operable areas are found across all slope classes.

This analysis will use minimum harvest ages based on average stand diameters that vary by harvesting system - the notion being larger diameters in general reflect higher values and cable and heli yarding costs are sensitive to piece (log) size. To have an economically sustainable harvesting program, average stand values must be greater than average harvesting costs. Average harvesting costs are lowest for ground-based systems (e.g., skidder and “hoe-chucking”) and highest for helicopter, while cable systems (e.g., grapple yarding) costs fall between these. Table 53 indicates the minimum stand-average DBH that will be used in the analysis and the resulting age range. Younger ages are on higher productivity sites while older ages are on lower productivity sites.

Table 53 - Minimum Harvest Criteria

TFL Block	Harvest System	Minimum Average DBH	Age range (years)	Area-weighted Average Age (years)
Block 1	Ground	30 cm	40 – 95	57
	Cable	37 cm	60 -150	86
	Heli	42 cm	70 – 215	116
Block 2	Ground	30 cm	45 – 100	60
	Cable	37 cm	60 – 165	94
	Heli	42 cm	75 – 230	142
Block 3	Ground	30 cm	50 – 105	68
	Cable	37 cm	65 – 180	93
	Heli	N/A	N/A	N/A
Block 4	Ground	30 cm	45 – 105	59
	Cable	37 cm	60 – 185	94
	Heli	42 cm	80 – 265	160
Block 5	Ground	30 cm	50 – 80	58
	Cable	37 cm	70 -125	90
	Heli	42 cm	90 – 180	127
TFL 39 TOTAL	**Ground**	**30 cm**	**40 – 105**	**60**
	Cable	**37 cm**	**60 – 185**	**91**
	Heli	**42 cm**	**70 – 265**	**125**

11.3.2 Harvest Rules

Analysis will be undertaken with the Woodstock model, using optimization to project harvest schedules. With optimization the model determines harvest order to achieve the defined objective. This differs from a simulation approach where rules are specified for harvest priority. Harvest constraints will, however, be applied to model the transition from old-growth to second-growth harvest.

Recent harvest numbers and short-term plans indicate significant harvesting of immature stands (i.e., <141 years old) in TFL 39. Immature harvest in the base case option will commence at the levels indicated in Table 54 and gradually increase over time until the transition to managed stands is largely complete. Small volumes of old-growth harvest may continue because of the scheduling impacts of cover class constraints.

Table 54 – Initial Immature Harvest Levels

TFL Block	Initial Immature Harvest (% of total)
Block 1	80%
Block 2	30%
Block 3/5	50%
Block 4	30%

As discussed in Section 6.12 recent harvest within the non-conventional portion of the THLB has been significantly less than its contribution to the merchantable THLB. The level of performance in the non-conventional THLB is not anticipated to increase significantly in the near future; therefore, the contribution of this economically challenging timber will be constrained in the Base Case for Blocks 1, 2 and 4 to amounts consistent with recent performance. Due to the limited THLB within Block 5, the need to apply a constraint will be reviewed after initial model results are available. There is no non-conventional THLB within Block 3. Sensitivity analyses will explore the timber supply contribution from the non-conventional THLB (refer to Section 3.2).

11.3.3 Silviculture Systems

Nearly all of the harvest within TFL 39 over the past ten years was done using the retention silviculture system (mainly group retention). This is the result of the policies of WFP predecessor companies (i.e., MacMillan Bloedel, Weyerhaeuser and Cascadia Forest Products).

WFP reviewed its Forest Strategy, which includes a program for conserving biodiversity on company tenures. The approach is to vary the use of retention systems and the amount of stand level retention by Resource Management Zones in the Vancouver Island Land Use Plan and by ecosection. Since Block 1 is not subject to VILUP, former stewardship zones were transformed into their closest equivalent: “Timber Zone” became “Enhanced Zone”; “Habitat Zone” became “General Zone”; and “Old Growth Zone” became “Special Zone”. The Forest Strategy does not apply to Blocks 3 and 5 as the SCCO objectives address conserving biodiversity (see Sections 6.17 and 6.18.3). For this analysis it is assumed that the WFP strategy is fully implemented since the beginning of the analysis period.

In Enhanced Management Zones the retention system will be used for between 30 and 60 percent (depending on the ecosection with lower levels being used in windy areas and higher levels being used in leeward areas) of the harvested area with minimum long-term stand-level retention targets of 10 and 15 percent (depending on variant with the higher target being used in drier variants). In General Management Zones the retention system will be used for between 40 and 70 percent of the harvested area utilizing minimum long-term stand-level retention targets of 15 and 20 percent. In Special Management Zones the VILUP Higher Level Plan Order specifies: “applying a variety of silvicultural systems, patch sizes and patch shapes across the zone, subject to a maximum cutblock size of 5 ha if clearcut, clearcut with reserves or seed tree silvicultural systems are applied, and 40 ha if shelterwood, selection or retention silvicultural systems are applied.” A minimum of 20 percent long-term stand-level retention is recommended for SMZs in the Western Forest Strategy based on social and biological criteria. These targets are summarized in Table 55 below.

Table 55 – Western Forest Strategy Targets

TFL Block	Ecosection	Resource Management Zone	Variants	THLB Area (ha)	Retention Strategy Use (% of harvest area)	Long Term Retention (% of cutblock area)
Block 1 and Block 2	All	Special	All	5,377	100%	20%
		General	CWHdm, CWHxm2, CWHmm1	7,849	70%	20%
		General	All others	23,366	60%	15%
		Enhanced	CWHdm, CWHxm2, CWHmm1	36,478	60%	15%
		Enhanced	All others	66,549	50%	10%
Block 4	Nahwitti Lowland	General	All	664	40%	15%
		Enhanced	All	4,212	30%	10%
	Northern Island Mountains / Windward Island Mountains	General	All	16,398	60%	15%
		Enhanced	All	4,579	50%	10%
TOTAL				**165,553**	**56.6%**	**13.1%**

This retention is long-term and it must remain in place for at least one rotation. Applying retention system targets to the Ecosection/Management Zone/BEC variant combinations within TFL 39 Blocks 1, 2 and 4 will result in 56.6 percent of the total harvest area being in retention system cutblocks (with the remaining being clearcut or clearcut-with-reserves) and an area-weighted average overall minimum stand level retention requirement of 13.1 percent.

11.3.4 Initial Harvest Rate

The current AAC for the analysis area (1,907,980 m^3) includes 57,478 m^3 that is associated with areas removed from TFL 39 or areas soon to be removed from the TFL (refer to footnote 2 to Table 5). Of the remaining 1,850,502 m^3, WFP has 1,848,671 m^3 and 1,831 m^3 is allocated for First Nations. Table 56 shows how the AAC is allocated by block within TFL 39 and MP #8's forecasted change (percentage).

Table 56 – Current AAC by TFL Block and MP #8 Forecasted Changes

TFL Block	MP#9 Land base AAC – June 2012 (m^3/year)	MP #8 Forecasted Change by 2012 (%)
Block 1	408,019	+11.4%
Block 2	1,068,793	-7.6%
Block 3[1]	30,000	0%
Block 4[1]	248,690	0%
Block 5	95,000	-9%
Total	**1,850,502**	**-3.8%**

The MP #8 forecasted changes for Blocks 1 and 2 will be used to derive the first attempt at initial harvest levels for these blocks; however, since there have been significant changes to the land base and management assumptions, it will not be surprising to conclude different initial harvest levels.

In MP#8 Blocks 3 and 4 were analysed, and the AAC determined, for the combined area. The resulting harvest schedule was a non-declining even flow. Given the age class distribution of the respective forests, if these blocks had been analysed separately the AAC for Block 3 would likely have shown an increase and Block 4 would have shown a decline over time. Now that Block 3 is subject to the EBM objectives of the SCCO, a different timber supply schedule is expected. The same can be said for Block 5 as it is also subject to the EBM objectives of the SCCO. In this analysis, Blocks 3 and 5 are combined because they are subject to the same land use objectives and the resulting small THLB for each suggests that operationally they will be managed as one supply unit. Therefore the initial harvest level for Blocks 3 and 5 will be determined through trial and error and be guided by the objectives listed in Section 11.3.5. A sensitivity analysis will explore the timber supply impact of managing these two blocks as separate supply units. The initial harvest level for Block 4 will also be determined through trial and error and is expected to be lower than the current AAC.

An allowance will be made for the additional harvest of unused volumes (i.e., undercut) from the 2006 to 2008 cut control period within Block 2. A volume of 122,285 m^3 (24,457 m^3/year for the first 5-year period) will be added to the harvest request for the first planning period as it is committed to the N<u>a</u>nwa<u>k</u>olas First Nations in an amendment (dated November 28, 2011) to the N<u>a</u>nwa<u>k</u>olas Reconciliation Protocol between the First Nations and the provincial government. An additional 277,715 m^3 is listed in the FLNRO unused volume ledger within Block 2 (for a total of 400,000 m^3); however there are currently no commitments to dispose of this timber so this volume will not be accounted for in the

[1] Blocks 3 and 4 were combined for the MP #8 AAC. This split is based on THLB proportions.

analysis. There is no volume listed in the FLNRO unused volume ledger for any of the other blocks within TFL 39.

11.3.5 Harvest Flow Objectives

Harvest level projections will maximize volumes harvested over the entire analysis period (i.e., 250 years) subject to the following constraints:

- Gradually adjust harvest levels toward the best estimate of the long-term stable harvest level; and
- Achieve a stable long-term growing stock.

12 Glossary

Allowable Annual Cut (AAC)	The rate of timber harvest permitted each year from a specified area of land, usually expressed as cubic metres per year.
Analysis Unit (AU)	A grouping of forest types – for example, by biogeoclimatic zone, site productivity, leading tree species, and age - done to simplify analysis and the generation of timber yield tables.
Base case harvest forecast (Current Management Option)	The timber supply forecast which illustrates the effect of current forest management practices on the timber supply using the best available information, and which forms the reference point for sensitivity analysis.
Biodiversity (biological diversity)	The diversity of plants, animal and other living organisms in all their forms and levels of organization, including the diversity of genes, species and ecosystems, as well as the evolutionary and functional processes that link them.
Biogeoclimatic zones and variants (BEC)	A large geographic area with broadly homogeneous climate and similar dominant tree species.
Cutblock	A specific area, with defined boundaries, authorized for harvest.
Cutblock adjacency	The desired spatial relationship among cutblocks. Most adjacency restrictions require that recently harvested cutblocks must achieve a desired condition (green-up) before nearby or adjacent areas can be harvested.
Equivalent Clearcut Area (ECA)	An indicator that quantifies the percentage of the productive forest area within a watershed where the hydrologic response resulting from disturbance is equivalent to the hydrologic response of a clearcut.
Forest inventory	An assessment of timber resources. It includes computerized maps, a database describing the location and nature of forest cover, including size, age, timber volume, and species composition, and a description of other forest values such as recreation and wildlife habitat.
Forest and Range Practices Act	Legislation that governs forest and range practices and planning, with a focus on ensuring management of all forest values.
Forest type	The classification or label given to a forest stand, usually based on tree species composition.

12 Glossary

Free-growing	An established seedling of an acceptable species that is free from growth-inhibiting brush, weeds and excessive tree competition.
Geographic Information System (GIS)	A geographic information system, also known as a geographical information system or geospatial information system, is a system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to the Earth.
Green-up	The time needed after harvesting for a stand of trees to reach a desired condition (usually expressed as a specific height) - to ensure maintenance of water quality, wildlife habitat, soil stability, or aesthetics – before harvesting is permitted in adjacent areas.
Growing stock	The volume estimate for all standing timber at a particular time.
Harvest forecast	The potential flow of timber harvest over time. A harvest forecast is usually a measure of the maximum timber supply that can be realized over time for a specified land base and a set of management practices. It is a result of forest planning models and is affected by the size and productivity of the land base, the current growing stock, and management objectives, constraints and assumptions.
Inoperable areas	Areas defined as unavailable for timber harvest for terrain-related or economic reasons. Operability can change over time as a function of changing harvesting technology and economics.
Integrated resource management (IRM)	The identification and consideration of all resource values, including social, economic and environmental needs in resource planning and decision-making.
Karst features	Karst is a distinctive topography that develops as a result of the dissolving action of water on carbonate bedrock (usually limestone, dolomite or marble). Karst features include fluted rock surfaces, vertical shafts, sinkholes, sinking streams, springs, complex sub-surface drainage systems and caves.
Landscape-level biodiversity	The *Landscape Unit Planning Guide* and the *Order Establishing Provincial Non-Spatial Old Growth Objectives* provide objectives for maintaining biodiversity at the landscape level and stand level. At the landscape level, objectives are provided for the maintenance of old growth.

12 Glossary

Landscape unit	A planning area based on topographic or geographic features, that is appropriately sized (up to 100,000ha), and designed for application of landscape-level biodiversity objectives.
Long-term harvest level	A harvest level that can be maintained indefinitely given a particular forest management regime (which defines the timber harvesting land base, and objectives and guidelines for non-timber values) and estimates of timber growth and yield.
Management assumptions	Approximations of management objectives, priorities, constraints and other conditions needed to represent forest management actions in a forest planning model. These include, for example, the criteria for determining the timber harvesting land base, the specifications for minimum harvestable ages, utilization levels, and integrated resource management and silviculture and pest management programs.
Model	An abstraction and simplification of reality constructed to help understand an actual system. Forest managers and planners have made extensive use of models, such as maps, classification systems and yield projections, to help management activities.
Natural disturbance type (NDT)	An area that is characterized by a natural disturbance regime, such as wildfires and wind, which affects the natural distribution of seral stages. For example areas subject to less frequent stand-initiating disturbances usually have more old forests.
Non-recoverable losses	The volume of timber killed or damaged annually by natural causes (e.g., fire, wind, insects and disease) that is not harvested.
Operability	Classification of an area considered available for timber harvesting. Operability is determined using the terrain characteristics of the area as well as the quality and quantity of timber on the area.
Riparian area	Areas of land adjacent to wetlands or bodies of water such as swamps, streams, rivers or lakes.
Riparian habitat	The stream bank and flood plain area adjacent to streams or water bodies.

12 Glossary

Sensitivity analysis	A process used to examine how uncertainties about data and management practices could affect timber supply. Inputs to an analysis are changed and the results are compared to a baseline or the base case.
Site index	A measure of site productivity. The indices are reported as the average height, in metres, that the tallest trees in a stand are expected to achieve at 50 years (age is measured at 1.3 metres above the ground).
Site Index by Biogeoclimatic Ecosystem Classification site series (SIBEC)	Site index estimates for tree species according to site units of the Biogeoclimatic Ecosystem Classification system of British Columbia.
Site Series	Sites capable of producing similar late seral or climax plant communities within a biogeoclimatic subzone or variant.
Stocking	The proportion of an area occupied by trees, measured by the degree to which the crowns of adjacent trees touch, and the number of trees per hectare.
TIPSY (Table Interpolation Program for Stand Yields)	A BC Forest Service computer program used to generate yield projections for managed stands based on interpolating from yield tables of a model (TASS) that simulates the growth of individual trees based on internal growth processes, crown competition, environmental factors and silvicultural practices.
Timber harvesting land base (THLB)	Crown forest land within the TFL where timber harvesting is considered both acceptable and economically feasible, given objectives for all relevant forest values, existing timber quality, market values and harvesting technology.
Timber supply	The amount of timber that is forecast to be available for harvesting over a specified time period, under a particular management regime.
Tree farm licence (TFL)	Provides rights to harvest timber, and outlines responsibilities for forest management, in a particular area.
Ungulate	A hoofed herbivore, such as a deer.
Volume estimates (yield projections)	Estimates of yields from forest stands over time. Yield projections can be developed for stand volume, stand diameter or specific products.

12 Glossary

Watershed	An area drained by a stream or river. A large watershed may contain several smaller watersheds (basins).
Wildlife tree	A standing live or dead tree with special characteristics that provide valuable habitat for wildlife.

13 References

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Order to Identify Karst Resource Features for the Campbell River Forest District, effective June 30, 2007;

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An Order to Establish a Landscape Unit and Objectives – Lois Landscape Unit, effective December 2, 2002;

An Order to Establish a Landscape Unit and Objectives – Powell-Daniels Landscape Unit, effective January 25, 2000;

An Order to Establish a Landscape Unit and Objectives – Powell Lake Landscape Unit, effective December 2, 2002;

An Order to Establish a Landscape Unit and Objectives – Sayward Landscape Unit, effective July 1, 2003;

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APPENDICES

Appendix A: Detailed Age Class Distributions by Block

Appendix B: South Central Coast Order Site Series Surrogates Targets

Appendix C: Mature Stand Yield Tables

Appendix D: Unmanaged Immature Yield Tables

Appendix E: Existing Managed Aged 15 – 50 Years Yield Tables

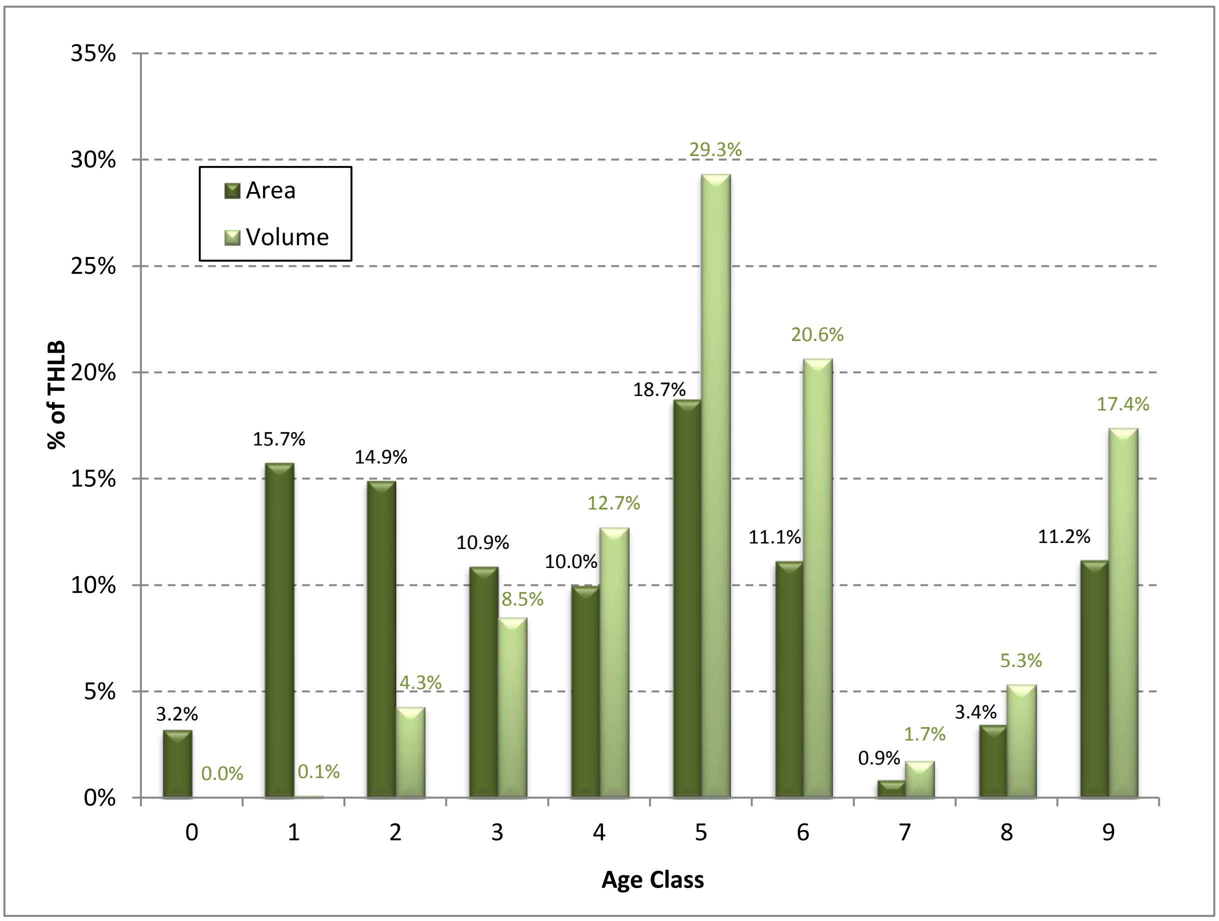
Appendix F: Existing Managed Aged 1 – 14 Years Yield Tables

Appendix G: Future Managed Yield Tables

Appendix A: Detailed Age Class Distributions by Block

Block 1

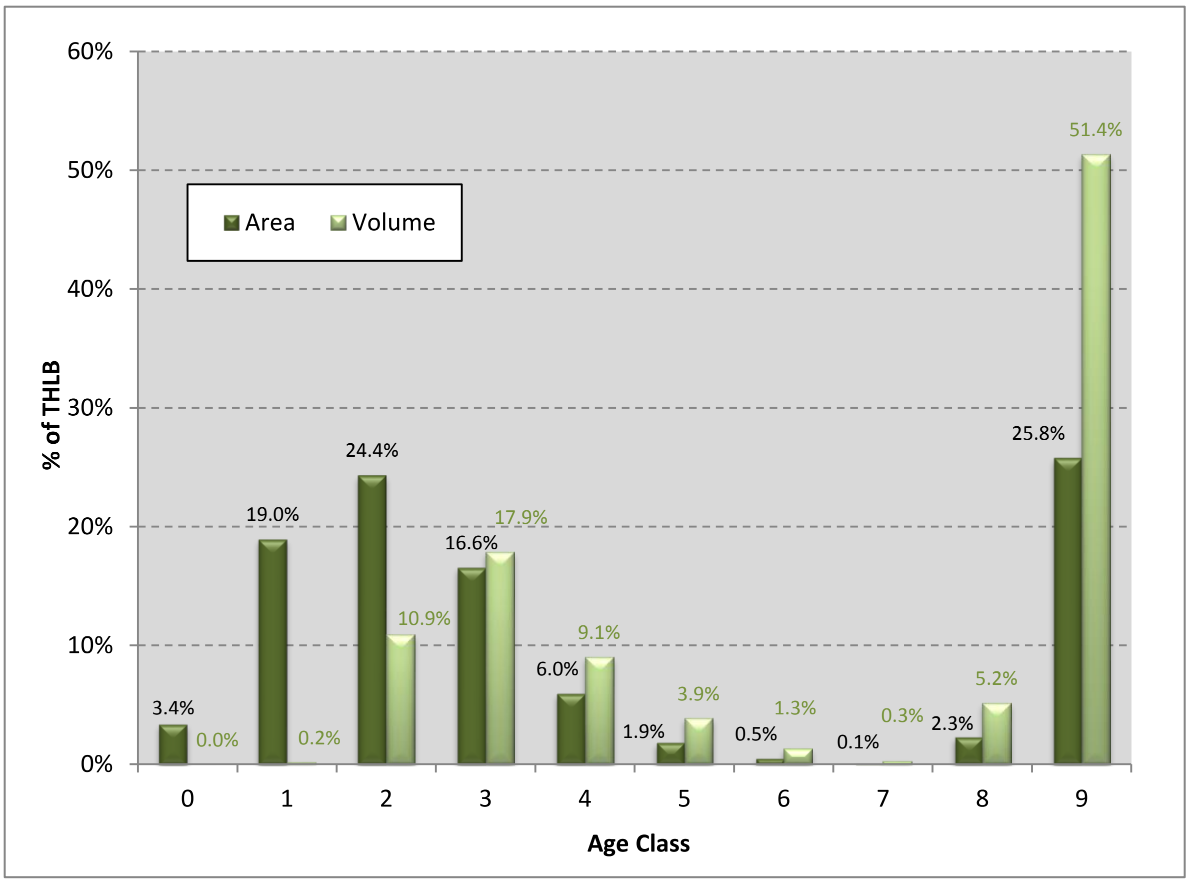
Age Class	Age (years)	Productive Forest		Current THLB		% Productive in THLB	
		Area (ha)	Volume ('000 m^3)	Area (ha)	Volume ('000 m^3)	Area	Volume
0	0	1,741	0	1,540	0	88.5%	N/A
1	1 - 20	8,865	27.9	7,560	22.8	85.3%	81.7%
2	21 - 40	9,284	1,227.2	7,154	912.4	77.1%	74.4%
3	41 - 60	6,788	2,386.5	5,220	1,811.5	76.9%	75.9%
4	61 - 80	6,249	3,518.8	4,786	2,714.2	76.6%	77.1%
5	81 - 100	12,277	8,464.9	8,995	6,264.6	73.3%	74.0%
6	101 - 120	8,238	6,772.8	5,346	4,406.4	64.9%	65.1%
7	121 - 140	570	503.0	414	368.6	72.8%	73.3%
8	141 - 250	2,815	1,870.9	1,656	1,136.8	58.8%	60.8%
9	>250	12,278	7,764.7	5,362	3,709.7	43.7%	47.8%
TOTAL		**69,104**	**32,536.7**	**48,033**	**21,346.9**	**69.5%**	**65.6%**



Block 1 THLB Age Class Distribution

Block 2

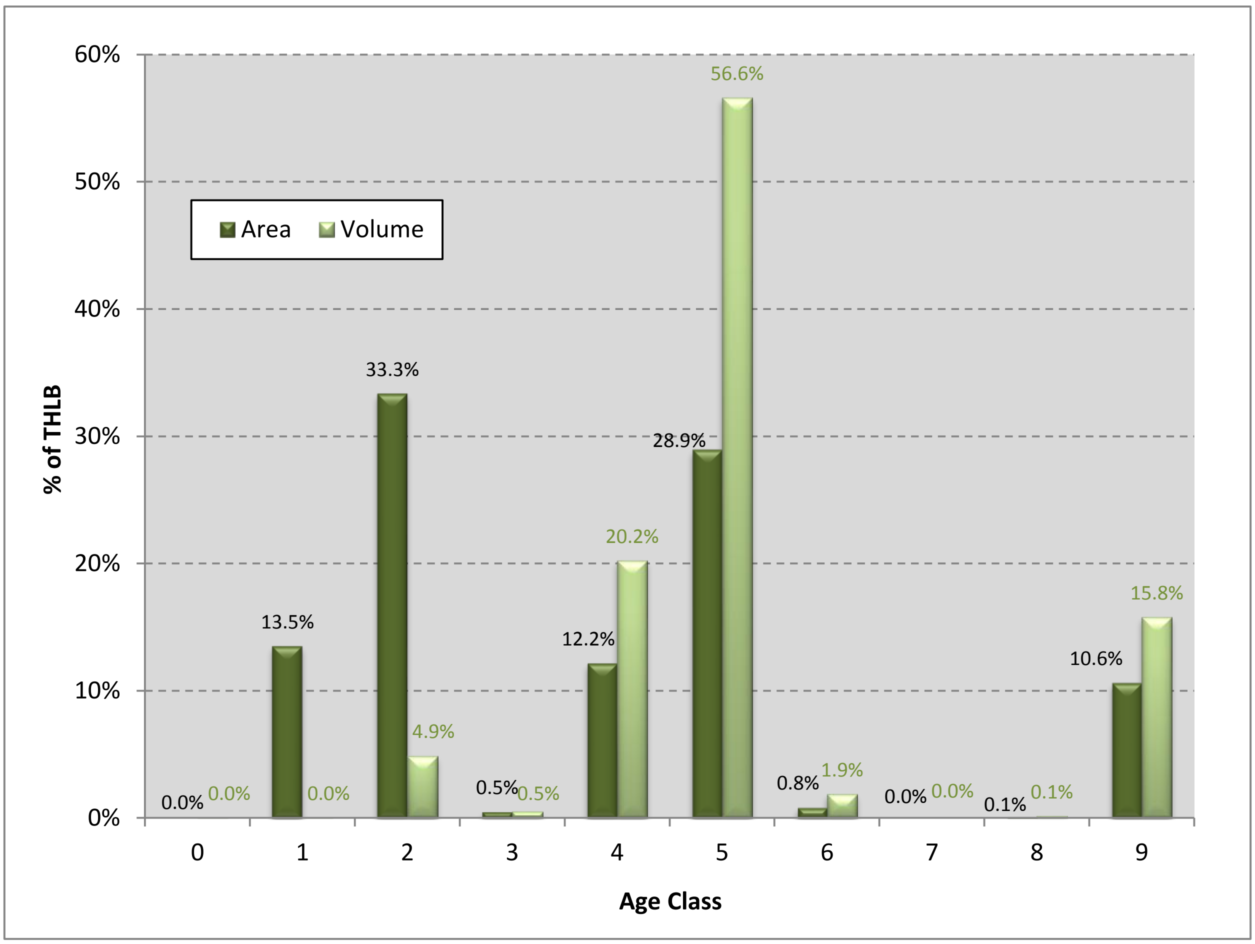
Age Class	Age (years)	Productive Forest		Current THLB		% Productive in THLB	
		Area (ha)	Volume ('000 m^3)	Area (ha)	Volume ('000 m^3)	Area	Volume
0	0	3,537	0	3,127	0	88.4%	N/A
1	1 - 20	19,484	58.3	17,400	51.0	89.3%	87.5%
2	21 - 40	26,016	3,967.3	22,339	3,384.5	85.9%	85.3%
3	41 - 60	18,703	6,796.2	15,225	5,546.8	81.4%	81.6%
4	61 - 80	7,370	3,731.0	5,495	2,812.9	74.6%	75.4%
5	81 - 100	2,444	1,712.6	1,714	1,211.4	70.2%	70.7%
6	101 - 120	729	637.4	482	418.3	66.1%	65.6%
7	121 - 140	195	189.4	82	78.1	42.0%	41.2%
8	141 - 250	3,345	2,474.3	2,135	1,605.4	63.8%	64.9%
9	>250	46,119	31,324.7	23,667	15,957.1	51.3%	50.9%
TOTAL		**127,941**	**50,891.2**	**91,666**	**31,065.6**	**71.6%**	**61.0%**



Block 2 THLB Age Class Distribution

Block 3

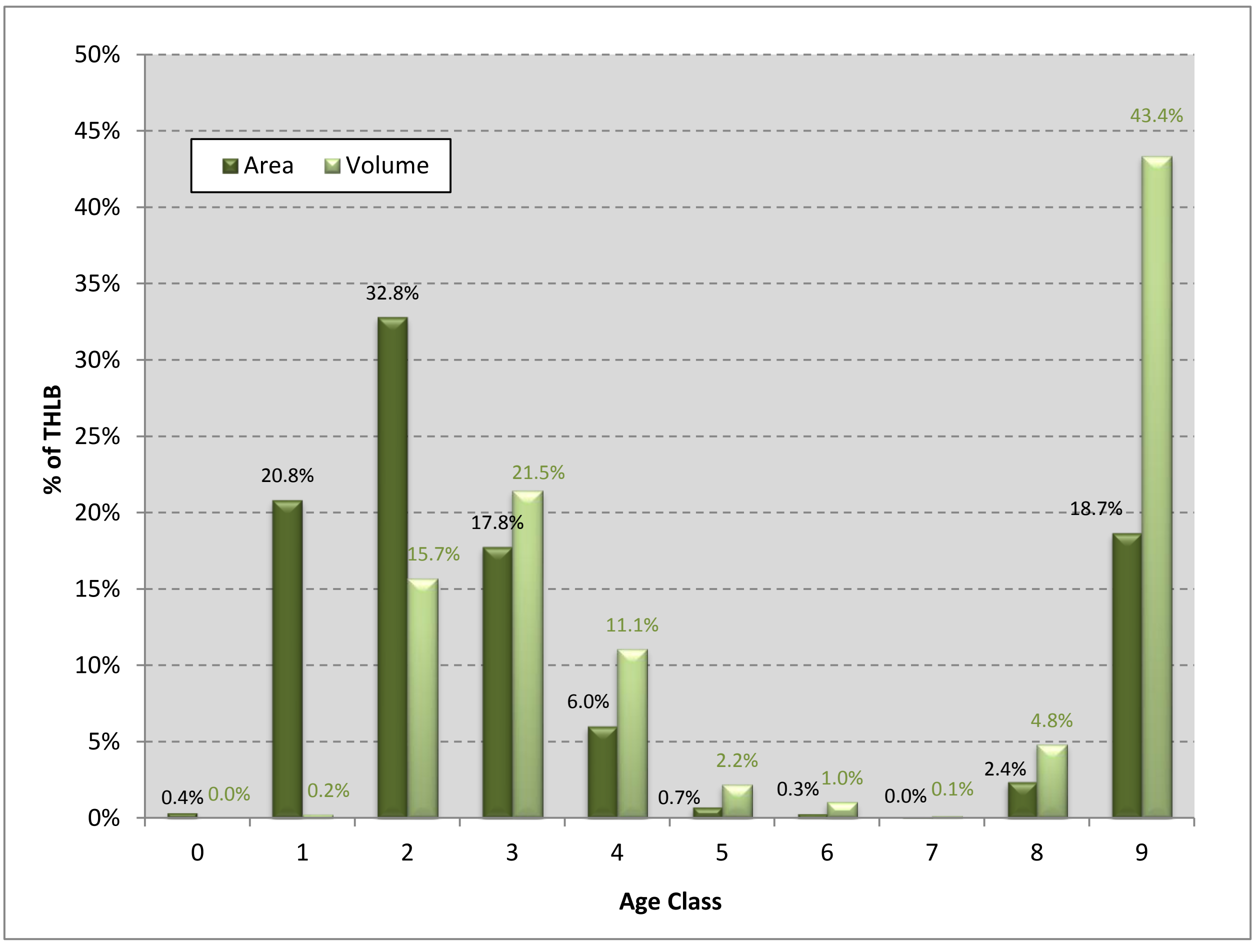
Age Class	Age (years)	Productive Forest		Current THLB		% Productive in THLB	
		Area (ha)	Volume ('000 m^3)	Area (ha)	Volume ('000 m^3)	Area	Volume
0	0	0	0	0	0	N/A	N/A
1	1 - 20	401	0	301	0	75.0%	10.5%
2	21 - 40	1,288	77.0	742	40.6	57.6%	52.7%
3	41 - 60	18	6.5	11	4.0	61.4%	61.9%
4	61 - 80	456	271.5	271	168.4	59.5%	62.0%
5	81 - 100	997	736.6	644	471.3	64.6%	64.0%
6	101 - 120	27	22.8	19	15.7	69.0%	68.8%
7	121 - 140	0	0	0	0	N/A	N/A
8	141 - 250	2	1.3	2	1.2	94.0%	94.0%
9	>250	928	465.2	236	131.4	25.5%	28.3%
TOTAL		**4,117**	**1,580.8**	**2,227**	**832.6**	**54.1%**	**52.7%**



Block 3 THLB Age Class Distribution

Block 4

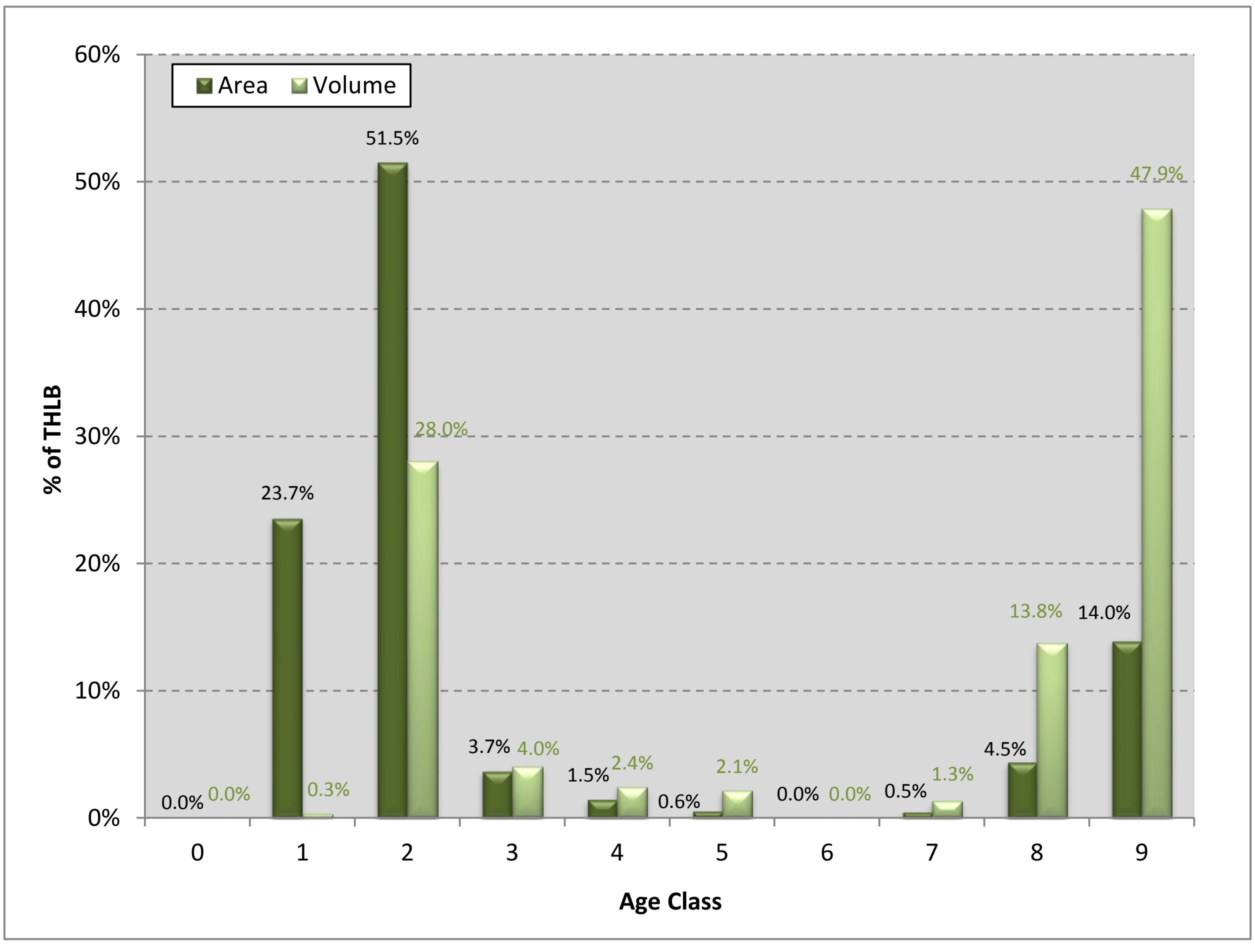
Age Class	Age (years)	Productive Forest		Current THLB		% Productive in THLB	
		Area (ha)	Volume ('000 m^3)	Area (ha)	Volume ('000 m^3)	Area	Volume
0	0	106	0	92	0	87.3%	N/A
1	1 - 20	6,299	22.0	5,389	18.5	85.5%	84.1%
2	21 - 40	10,387	1,603.2	8,484	1,305.6	81.7%	81.4%
3	41 - 60	5,566	2,164.0	4,598	1,784.1	82.6%	82.4%
4	61 - 80	2,108	1,244.4	1,562	921.1	74.1%	74.0%
5	81 - 100	281	271.0	192	182.9	68.4%	67.5%
6	101 - 120	107	116.2	79	86.7	73.8%	74.6%
7	121 - 140	13	11.4	12	10.1	88.5%	88.5%
8	141 - 250	998	634.8	618	410.9	61.9%	64.7%
9	>250	8,457	6,156.1	4,828	3,606.8	57.1%	58.6%
TOTAL		**34,322**	**12,208.2**	**25,855**	**8,317.0**	**75.3%**	**68.1%**



Block 4 THLB Age Class Distribution

Block 5

Age Class	Age (years)	Productive Forest		Current THLB		% Productive in THLB	
		Area (ha)	Volume ('000 m^3)	Area (ha)	Volume ('000 m^3)	Area	Volume
0	0	12	0	0	0	4.1%	N/A
1	1 - 20	2,035	15.9	714	2.5	35.1%	15.5%
2	21 - 40	3,126	457.3	1,555	202.5	49.7%	44.3%
3	41 - 60	244	76.3	113	29.1	46.2%	38.1%
4	61 - 80	114	43.0	45	17.6	39.7%	41.0%
5	81 - 100	139	84.9	17	15.5	12.5%	18.2%
6	101 - 120	0	0	0	0	N/A	N/A
7	121 - 140	40	24.4	14	9.6	36.5%	39.4%
8	141 - 250	477	340.6	135	100.4	28.3%	29.5%
9	>250	8,090	5,844.2	423	346.0	5.2%	5.9%
TOTAL		**14,276**	**6,882.8**	**3,017**	**722.0**	**21.1%**	**10.5%**



Block 5 THLB Age Class Distribution

Appendix B: South Central Coast Order Site Series Surrogates Targets

The following table lists by Landscape Unit the site series surrogates (SSS) found within Blocks 3 and 5. Note that some area is not assigned to a SSS due to different ecological inventories being used to develop the SSS than was used to create the timber supply analysis data sets: provincial overview data was used to create the SSS whereas detailed terrestrial ecosystem mapping (TEM) was used in this analysis. The “default” old growth target percentages are listed (based on 30% RONV for Broughton and 70% RONV for Phillips) and the corresponding old growth target area will be used in a sensitivity analysis that will test the impact of using the Strategic Level Reserve Design in the Base Case rather than applying an aspatial constraint to meet Objective 14 of the SCCO. Two other sensitivity analyses are proposed:

- Use the risk-managed old growth targets: these are the same for Broughton and based on 30% RONV for Phillips.
- Apply 50% RONV targets for Phillips.

A mid-seral forest constraint of 50% will be applied for each SSS as described in Section 11.2.8.2.3.

SCCO SSS Old Growth Targets

TFL Block	Landscape Unit	Site Series Surrogate	Productive Forest (ha)	Old Growth Target %	Old Growth Target (ha)	Current Old Growth (ha)	Surplus / Deficit
3	Broughton	None	244	-	-	7	-
		CWHvm1 Cw Good	539	25	135	2	-133
		CWHvm1 Cw Med	921	28	258	305	47
		CWHvm1 Cw Poor	324	28	91	296	205
		CWHvm1 Decid	2	-	-	0	-
		CWHvm1 HB Good	1,448	25	362	5	-357
		CWHvm1 HB Med	623	25	156	297	141
		CWHvm1 HB Poor	16	25	4	16	12
	Broughton Total		***4,117***	***24***	***1,005***	***928***	***-85***
5	Phillips	None	116	-	-	44	-
		ATunp HB Good	1	-	-	1	-
		ATunp HB Med	14	-	-	14	-
		CWHdm Cw Good	57	53	30	27	-3
		CWHdm Cw Med	16	53	9	9	0
		CWHdm Cw Poor	13	61	8	10	2
		CWHdm Decid	60	-	-	-	-
		CWHdm Fd Good	7	53	4	0	-4
		CWHdm Fd Med	91	41	38	0	-38
		CWHdm HB Good	350	53	186	16	-170
		CWHdm HB Med	38	53	20	0	-20
		CWHvm1 Cw Good	1,250	58	725	432	-293
		CWHvm1 Cw Med	480	65	312	395	85
		CWHvm1 Cw Poor	70	65	46	48	2
		CWHvm1 Decid	102	-	-	-	-
		CWHvm1 Fd Good	13	49	6	2	-4
		CWHvm1 Fd Med	303	49	148	30	-118
		CWHvm1 HB Good	3,207	58	1,860	612	-1,248
		CWHvm1 HB Med	1,144	58	663	935	271
		CWHvm1 HB Poor	10	58	6	10	4
		CWHvm1 S Good	92	58	53	16	-37
		CWHvm1 S Med	20	58	12	13	1
		CWHvm1 S PoorPl	1	29	0	1	1
		CWHvm2 Cw Good	533	58	309	451	142
		CWHvm2 Cw Med	732	65	476	649	173
		CWHvm2 Cw Poor	147	65	96	136	40
		CWHvm2 Fd Med	15	49	8	4	-4
		CWHvm2 HB Good	1,571	59	927	698	-229
		CWHvm2 HB Med	2,286	59	1,349	2,049	700
		MHmm1 Cw Good	27	59	16	27	11
		MHmm1 Cw Med	168	65	109	167	59
		MHmm1 Cw Poor	46	65	30	46	16
		MHmm1 HB Good	167	59	98	132	33
		MHmm1 HB Med	1,118	59	660	1,108	449
		MHmm1 HB Poor	8	59	5	8	3
	Phillips Total		***14,276***	***58%***	***8,209***	***8,090***	***-119***

Appendix C: Mature Stand Yield Tables

Block 1 Mature Stands Yield Tables

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m³/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
112503	53	614	32,624	1%	15%	1%	71%	13%	0%
113501	82	708	58,260	10%	34%	15%	1%	40%	0%
113503	252	582	146,772	0%	14%	0%	67%	17%	2%
113504	70	691	48,093	34%	5%	3%	7%	44%	8%
151500	9	806	6,972	9%	33%	0%	44%	14%	0%
152501	394	736	289,685	8%	51%	2%	6%	32%	1%
152504	146	686	100,376	32%	10%	3%	0%	50%	5%
152510	32	382	12,313	32%	10%	11%	1%	42%	4%
153500	126	671	84,764	14%	32%	6%	11%	37%	0%
161500	20	728	14,597	43%	9%	13%	4%	32%	0%
162501	781	710	554,275	10%	43%	3%	2%	43%	0%
162502	517	619	320,244	11%	6%	38%	2%	43%	1%
162503	118	696	81,825	2%	17%	1%	51%	30%	0%
162504	931	796	740,513	44%	4%	6%	1%	45%	1%
162511	43	390	16,950	15%	36%	17%	4%	25%	2%
162512	108	402	43,527	6%	2%	42%	0%	51%	0%
162513	11	386	4,119	0%	30%	0%	62%	8%	0%
162514	53	429	22,522	33%	1%	5%	0%	62%	0%
163500	39	588	23,048	24%	19%	11%	2%	44%	0%
172501	395	800	315,807	5%	40%	2%	0%	53%	0%
172502	723	676	488,898	15%	3%	37%	1%	44%	0%
172504	1,729	745	1,288,199	40%	4%	6%	1%	49%	1%
172510	437	440	192,244	20%	3%	21%	0%	55%	0%
Block 1 Total	**7,067**	**691**	**4,886,626**	**24%**	**15%**	**11%**	**5%**	**44%**	**1%**

Block 2 Mature Stands Yield Tables

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m^3/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
222501	153	642	98,302	14%	41%	2%	3%	39%	1%
222503	101	626	63,138	2%	15%	2%	46%	33%	1%
222504	53	660	35,037	40%	11%	3%	1%	44%	0%
222511	46	349	16,152	0%	40%	10%	6%	44%	0%
222513	20	377	7,353	1%	5%	6%	47%	39%	2%
223500	121	794	95,886	25%	35%	1%	6%	32%	0%
232501	90	708	63,467	20%	31%	1%	4%	44%	1%
232502	51	764	39,244	20%	0%	38%	0%	42%	0%
232503	118	604	71,567	4%	13%	2%	47%	34%	0%
232504	61	634	38,710	40%	10%	8%	1%	40%	0%
232510	21	411	8,516	8%	11%	6%	32%	42%	1%
242500	94	591	55,605	15%	10%	6%	25%	44%	0%
251500	107	766	82,246	21%	25%	10%	4%	40%	0%
251504	301	792	238,780	43%	11%	5%	1%	40%	0%
251510	28	419	11,836	8%	28%	9%	3%	52%	0%
252501	689	707	487,471	16%	38%	4%	2%	38%	0%
252502	910	582	529,526	6%	6%	50%	0%	38%	0%
252503	110	769	84,746	4%	13%	2%	40%	42%	0%
252504	1,292	751	970,538	40%	8%	4%	1%	48%	0%
252510	246	412	101,485	8%	8%	29%	1%	54%	1%
253501	399	689	274,875	13%	36%	4%	2%	44%	1%
253502	155	634	98,328	7%	2%	54%	0%	37%	0%
253503	213	662	140,852	2%	12%	2%	36%	45%	3%
253504	915	763	698,155	38%	9%	4%	1%	46%	2%
253510	95	449	42,793	6%	15%	11%	6%	60%	1%
261501	79	548	43,329	12%	33%	4%	1%	50%	0%
261502	773	662	511,713	16%	1%	41%	0%	42%	0%
261504	1,353	772	1,044,915	37%	3%	9%	2%	48%	0%
261510	353	450	158,891	17%	1%	27%	0%	55%	0%
262501	606	709	429,265	10%	33%	3%	3%	51%	0%
262502	3,424	611	2,090,541	9%	2%	44%	0%	45%	0%
262503	97	687	66,773	6%	10%	4%	43%	36%	1%
262504	5,756	755	4,344,166	38%	4%	6%	1%	51%	0%
262510	39	423	16,518	0%	48%	4%	6%	40%	2%
262512	794	416	330,785	5%	2%	32%	0%	60%	0%
262514	247	408	100,898	35%	2%	7%	0%	56%	0%
263500	96	653	62,467	9%	14%	15%	9%	53%	0%
263504	216	723	156,099	36%	5%	7%	1%	51%	0%
263510	50	416	20,647	16%	2%	14%	7%	61%	0%

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m³/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
271500	57	728	41,610	5%	20%	1%	21%	52%	0%
271502	1,291	667	861,223	11%	0%	41%	0%	47%	0%
271504	2,309	778	1,797,022	46%	1%	6%	0%	46%	0%
271512	327	422	137,804	11%	1%	34%	0%	53%	1%
271514	100	420	42,103	30%	0%	10%	0%	60%	0%
272500	80	635	51,081	5%	34%	1%	13%	47%	0%
272502	441	595	262,533	14%	0%	47%	0%	39%	0%
272504	1,392	743	1,034,045	39%	3%	4%	0%	54%	0%
272510	186	445	82,607	22%	2%	19%	0%	56%	0%
Block 2 Total	**26,458**	**682**	**18,041,647**	**28%**	**7%**	**16%**	**2%**	**47%**	**0%**

Block 3 Mature Stands Yield Tables

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m³/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
352500	206	581	119,898	3%	57%	8%	0%	31%	0%
352510	32	394	12,696	2%	43%	27%	0%	26%	2%
Block 3 Total	**238**	**556**	**132,593**	**3%**	**56%**	**10%**	**0%**	**31%**	**0%**

Block 4 Mature Stands Yield Tables

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m^3/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
452501	790	671	529,768	11%	36%	7%	1%	45%	0%
452502	146	625	91,350	12%	14%	30%	1%	44%	0%
452504	817	817	667,319	35%	5%	4%	1%	54%	1%
452510	93	380	35,255	12%	23%	18%	3%	43%	1%
453500	75	751	56,121	26%	27%	0%	2%	43%	3%
462501	295	925	272,495	11%	27%	9%	0%	53%	0%
462502	687	647	444,439	17%	4%	35%	0%	43%	0%
462504	1,610	812	1,307,251	41%	2%	6%	0%	52%	0%
462512	148	428	63,434	7%	5%	38%	2%	48%	0%
462514	72	609	43,976	43%	0%	2%	0%	55%	0%
472502	185	681	125,739	22%	9%	30%	0%	38%	0%
472504	396	770	304,519	50%	1%	3%	0%	46%	0%
472512	50	468	23,281	1%	0%	40%	0%	60%	0%
472514	76	493	37,501	54%	0%	1%	0%	45%	0%
Block 4 Total	**5,440**	**736**	**4,002,447**	**30%**	**10%**	**11%**	**0%**	**49%**	**0%**

Block 5 Mature Stands Yield Tables

Analysis Unit	THLB Area (ha)	Weighted Avg Volume/ha (m^3/ha)	Analysis Unit Volume (m^3)	Ba %	Cw %	Cy %	Fd %	Hw %	Other %
552501	18	852	15,142	7%	39%	9%	9%	36%	0%
552504	16	775	12,096	37%	11%	4%	0%	48%	0%
553501	41	794	32,301	5%	39%	2%	1%	53%	0%
553504	34	908	30,657	43%	7%	1%	3%	45%	1%
553510	1	535	755	23%	5%	21%	0%	43%	8%
562501	68	822	55,814	3%	49%	1%	0%	46%	0%
562502	59	710	41,864	11%	8%	42%	4%	34%	1%
562504	125	913	114,257	43%	2%	2%	0%	52%	0%
562510	31	494	15,082	10%	11%	31%	0%	46%	2%
563501	9	691	6,205	2%	22%	19%	7%	49%	2%
563504	11	946	10,373	41%	12%	1%	2%	44%	0%
563510	0	579	233	19%	23%	4%	0%	55%	0%
572501	23	859	20,159	8%	26%	15%	0%	51%	0%
572504	72	902	65,212	45%	6%	1%	0%	48%	0%
572510	27	658	17,805	31%	18%	1%	0%	49%	1%
Block 5 Total	**535**	**819**	**437,953**	**27%**	**16%**	**8%**	**1%**	**47%**	**0%**

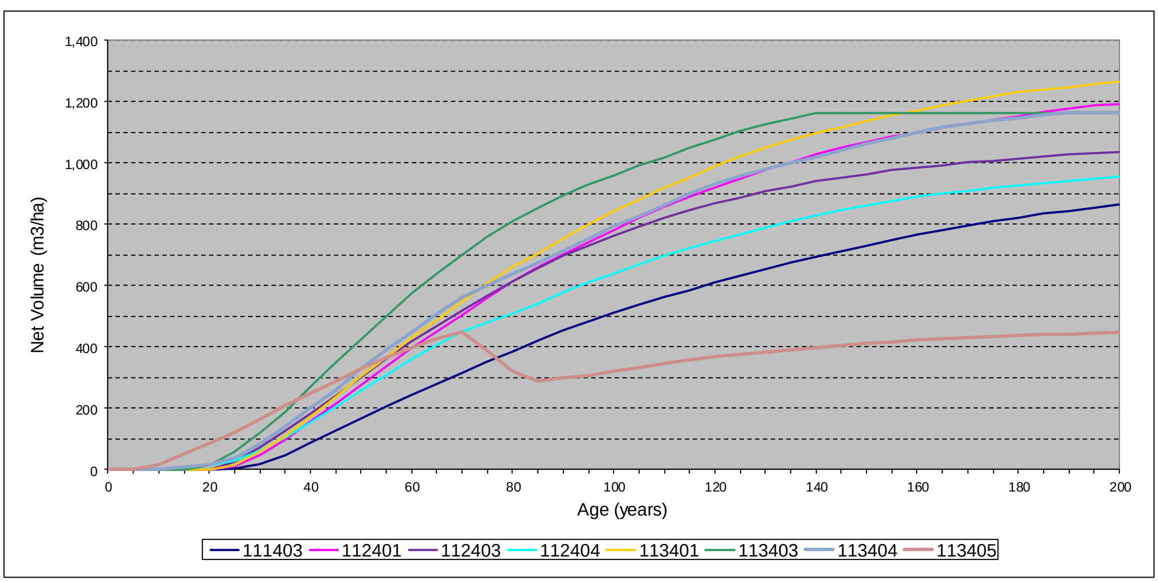
Appendix D: Unmanaged Immature Yield Tables

Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 1 CWHdm Variant – All Sites

	Analysis Units							
Age	**111403**	**112401**	**112403**	**112404**	**113401**	**113403**	**113404**	**113405**
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	1	0	0	3	16
15	0	0	0	7	0	0	8	52
20	0	1	1	13	1	13	15	83
25	2	11	25	27	15	56	37	120
30	19	47	71	60	56	120	83	164
35	47	98	127	105	110	190	139	208
40	86	154	182	153	170	268	200	249
45	127	214	240	204	236	347	261	287
50	168	276	301	257	304	424	328	328
55	206	338	362	309	367	501	391	364
60	242	395	416	360	429	573	447	396
65	279	451	468	407	488	639	506	426
70	316	506	519	450	549	701	560	448
75	351	560	568	480	607	757	601	386
80	386	612	614	509	659	808	638	320
85	421	659	658	541	706	854	675	290
90	452	702	696	577	752	892	715	298
95	482	742	731	610	798	928	754	307
100	510	782	762	640	841	960	792	321
105	537	820	792	669	880	990	827	333
110	562	856	819	697	917	1018	863	346
115	586	888	845	722	953	1048	897	357
120	610	919	866	746	987	1076	930	367
125	632	949	887	767	1019	1103	955	376
130	654	977	907	789	1050	1125	977	384
135	674	1003	924	809	1074	1143	999	391
140	694	1028	939	827	1097	1161	1020	397
145	713	1048	952	845	1116	1161	1040	404
150	731	1067	964	862	1135	1161	1061	410
155	749	1084	975	875	1153	1161	1080	416
160	766	1098	985	888	1171	1161	1099	421
165	782	1113	993	899	1188	1161	1117	427
170	796	1126	1001	909	1203	1161	1128	431
175	809	1140	1007	918	1217	1161	1137	434
180	822	1152	1014	926	1230	1161	1146	438
185	834	1164	1020	934	1239	1161	1155	440
190	844	1175	1026	941	1247	1161	1163	442
195	854	1186	1031	949	1255	1161	1163	445
200	864	1192	1035	956	1263	1161	1163	447

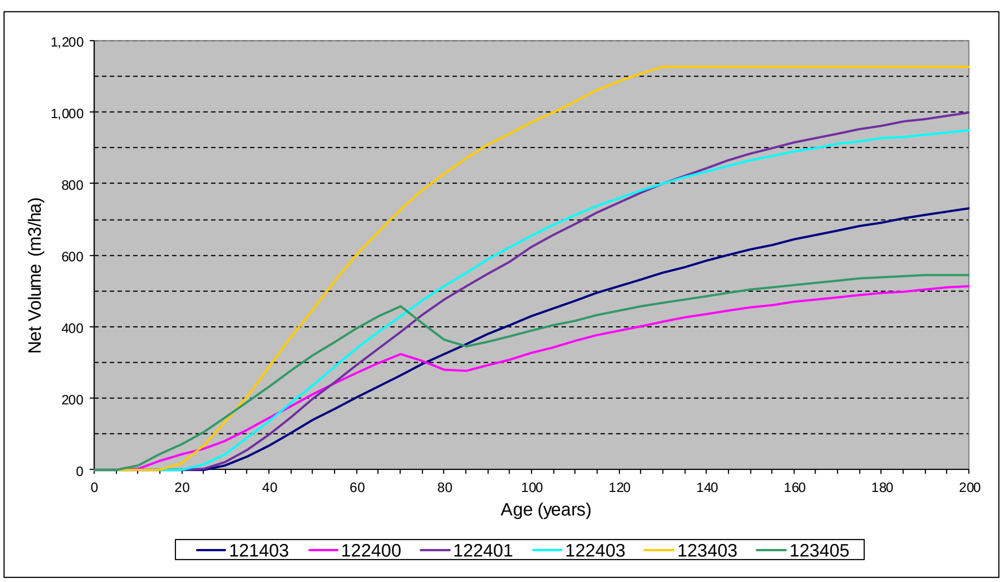


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

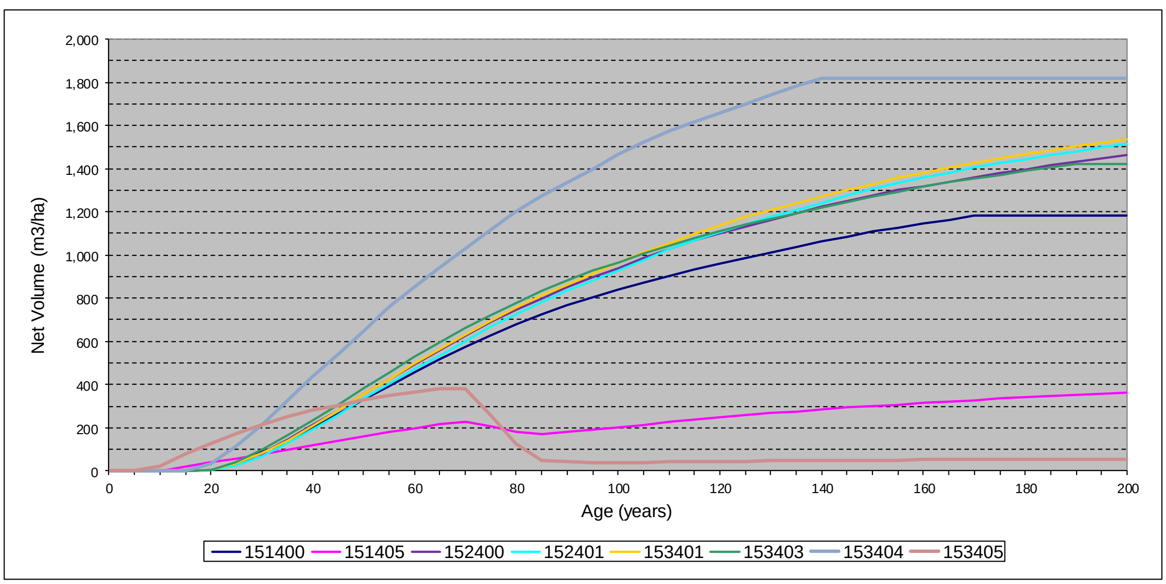
Block 1 CWHxm2 Variant – All Sites

	Analysis Units					
Age	121403	122400	122401	122403	123403	123405
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	3	0	0	0	13
15	0	24	0	0	0	44
20	0	42	0	0	18	70
25	1	60	4	14	69	104
30	12	82	21	43	134	146
35	37	113	56	89	206	190
40	67	146	98	138	288	233
45	103	177	146	185	369	276
50	139	210	198	237	449	319
55	172	242	245	288	528	359
60	203	271	292	338	601	395
65	233	299	339	385	667	429
70	263	323	386	429	727	456
75	294	304	433	472	782	411
80	323	281	477	513	829	364
85	351	277	514	552	871	346
90	378	293	548	588	908	359
95	404	308	583	622	940	372
100	428	325	621	654	970	388
105	452	343	656	684	1000	404
110	474	360	689	712	1031	418
115	494	375	719	738	1061	432
120	514	389	748	760	1086	445
125	532	402	775	781	1108	456
130	550	413	800	801	1128	467
135	567	425	823	820	1128	477
140	584	435	844	835	1128	486
145	600	444	864	850	1128	495
150	615	453	884	864	1128	503
155	629	461	900	877	1128	510
160	643	469	914	890	1128	517
165	656	476	927	901	1128	524
170	669	483	940	911	1128	529
175	680	489	952	919	1128	534
180	692	494	963	926	1128	538
185	702	499	974	932	1128	542
190	713	505	982	938	1128	546
195	723	509	991	943	1128	546
200	732	514	998	948	1128	546



Net Merchantable Volume Yield Tables
Unmanaged Immature Stands
Block 1 CWHvm1 Variant – All Sites

	Analysis Units							
Age	**151400**	**151405**	**152400**	**152401**	**153401**	**153403**	**153404**	**153405**
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	1	0	0	0	0	0	24
15	0	22	0	0	0	0	1	81
20	6	42	3	2	5	6	35	128
25	37	58	29	24	33	42	117	173
30	85	77	82	68	80	100	216	213
35	136	97	146	128	141	165	322	249
40	197	117	211	191	208	234	436	280
45	263	138	281	259	282	308	540	305
50	329	159	357	336	358	385	647	329
55	393	179	427	405	427	456	757	349
60	455	198	493	470	496	527	854	367
65	517	216	559	536	566	595	943	382
70	574	229	625	603	632	661	1030	383
75	627	205	688	667	697	721	1117	255
80	677	180	746	727	758	779	1203	124
85	724	172	800	783	812	833	1273	51
90	766	181	850	834	863	882	1334	42
95	803	191	897	881	914	926	1398	37
100	838	202	941	927	963	965	1464	38
105	871	214	987	977	1010	1005	1525	40
110	902	226	1029	1025	1054	1041	1573	41
115	931	237	1068	1069	1097	1077	1616	43
120	959	247	1102	1107	1137	1111	1658	44
125	984	257	1133	1142	1176	1141	1701	45
130	1010	267	1163	1175	1209	1169	1743	46
135	1036	276	1193	1209	1242	1194	1782	47
140	1062	285	1223	1242	1272	1219	1820	48
145	1086	293	1250	1275	1302	1244	1820	49
150	1108	301	1276	1306	1330	1269	1820	50
155	1128	308	1300	1334	1357	1293	1820	51
160	1147	315	1320	1359	1381	1316	1820	52
165	1164	322	1340	1382	1405	1337	1820	53
170	1181	328	1359	1404	1427	1355	1820	54
175	1181	335	1378	1424	1448	1372	1820	54
180	1181	341	1396	1443	1468	1388	1820	55
185	1181	346	1414	1462	1486	1404	1820	56
190	1181	352	1431	1480	1504	1419	1820	56
195	1181	357	1448	1497	1521	1419	1820	56
200	1181	362	1463	1514	1537	1419	1820	56

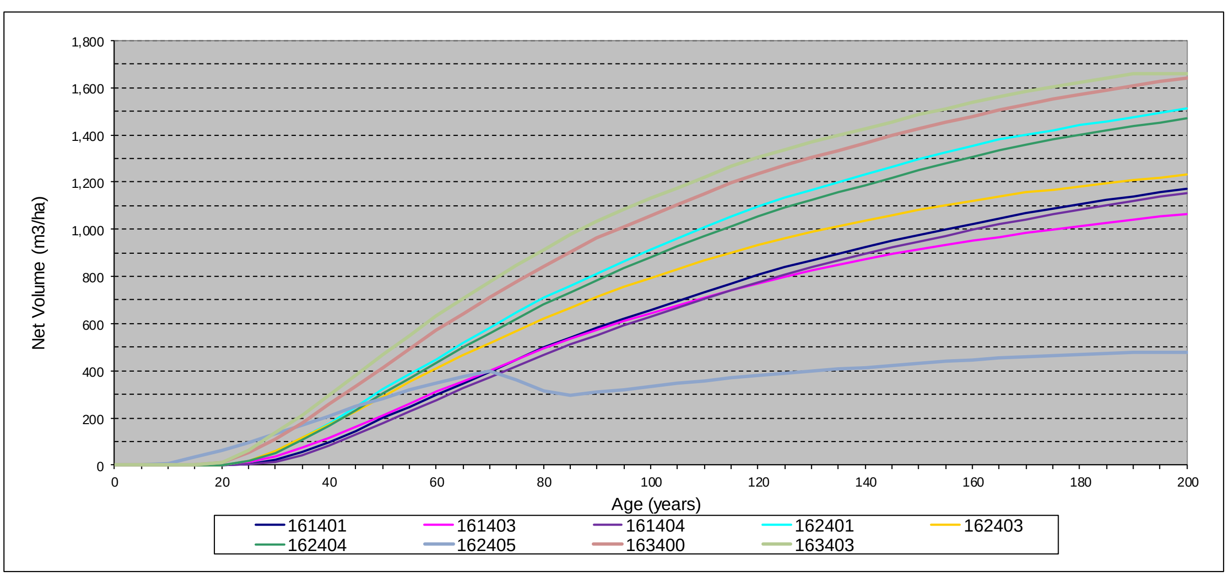


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 1 CWHvm2 Variant – All Sites

	Analysis Units								
Age	161401	161403	161404	162401	162403	162404	162405	163400	163403
0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	5	0	0
15	0	0	0	0	0	0	33	0	0
20	0	0	0	1	1	1	61	11	13
25	5	12	2	18	20	16	93	51	64
30	21	36	13	59	61	52	133	110	135
35	55	72	43	116	117	106	170	179	212
40	96	115	83	178	173	168	208	257	297
45	144	161	129	245	228	232	247	334	381
50	198	210	179	320	291	302	284	415	467
55	249	262	227	387	352	368	317	494	549
60	298	310	277	450	409	432	348	570	632
65	347	356	324	518	465	498	377	642	708
70	398	401	374	582	517	560	400	710	779
75	448	447	422	648	571	621	359	777	848
80	497	493	468	710	622	680	315	841	913
85	541	535	511	763	669	734	297	905	977
90	581	574	551	812	713	784	308	962	1,036
95	619	609	591	862	754	834	319	1010	1,085
100	657	643	630	913	793	882	333	1055	1,130
105	696	678	668	961	831	927	346	1102	1,176
110	734	710	705	1009	868	972	358	1151	1,222
115	771	740	741	1054	902	1015	370	1196	1,266
120	806	770	775	1096	934	1056	380	1236	1,304
125	839	798	808	1133	963	1091	390	1271	1,337
130	870	824	839	1168	989	1124	398	1304	1,368
135	898	849	868	1201	1014	1156	407	1335	1,397
140	925	872	895	1232	1036	1186	415	1366	1,427
145	951	894	922	1265	1059	1217	424	1396	1,456
150	976	914	948	1297	1081	1249	432	1426	1,485
155	1001	933	973	1326	1102	1279	440	1454	1,512
160	1024	951	997	1354	1122	1308	447	1480	1,538
165	1047	968	1021	1380	1140	1336	454	1506	1,562
170	1068	984	1042	1401	1156	1360	460	1529	1,584
175	1087	1000	1062	1421	1169	1380	466	1551	1,604
180	1106	1014	1081	1441	1183	1399	470	1572	1,624
185	1123	1028	1100	1459	1196	1418	475	1591	1,643
190	1141	1041	1119	1477	1208	1436	480	1609	1,661
195	1157	1053	1137	1494	1220	1454	480	1627	1,661
200	1174	1065	1155	1511	1232	1471	480	1643	1,661

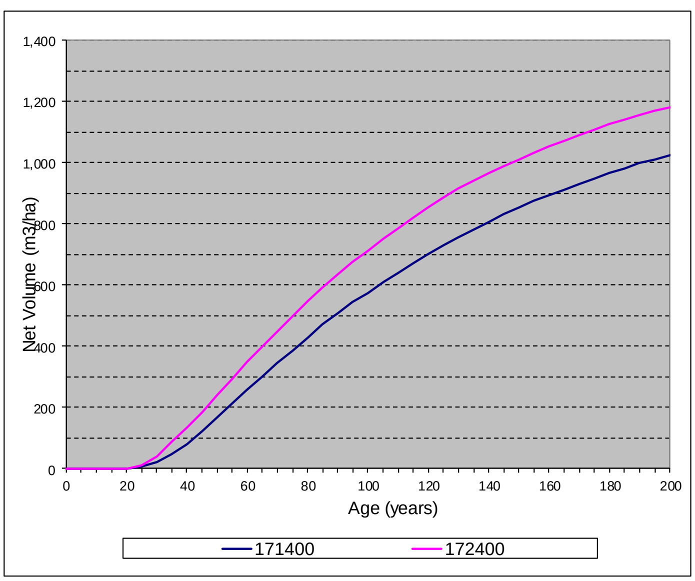


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 1 MHmm1 Variant – All Sites

	Analysis Units	
Age	171400	172400
0	0	0
5	0	0
10	0	0
15	0	0
20	1	1
25	7	12
30	22	41
35	45	85
40	81	134
45	122	183
50	168	238
55	213	293
60	257	347
65	300	398
70	344	448
75	385	497
80	429	547
85	470	593
90	508	635
95	543	675
100	575	713
105	608	751
110	640	786
115	671	820
120	700	853
125	728	885
130	754	914
135	780	940
140	806	965
145	830	988
150	852	1010
155	874	1031
160	894	1052
165	913	1072
170	931	1091
175	948	1109
180	965	1127
185	981	1142
190	997	1155
195	1011	1168
200	1025	1181

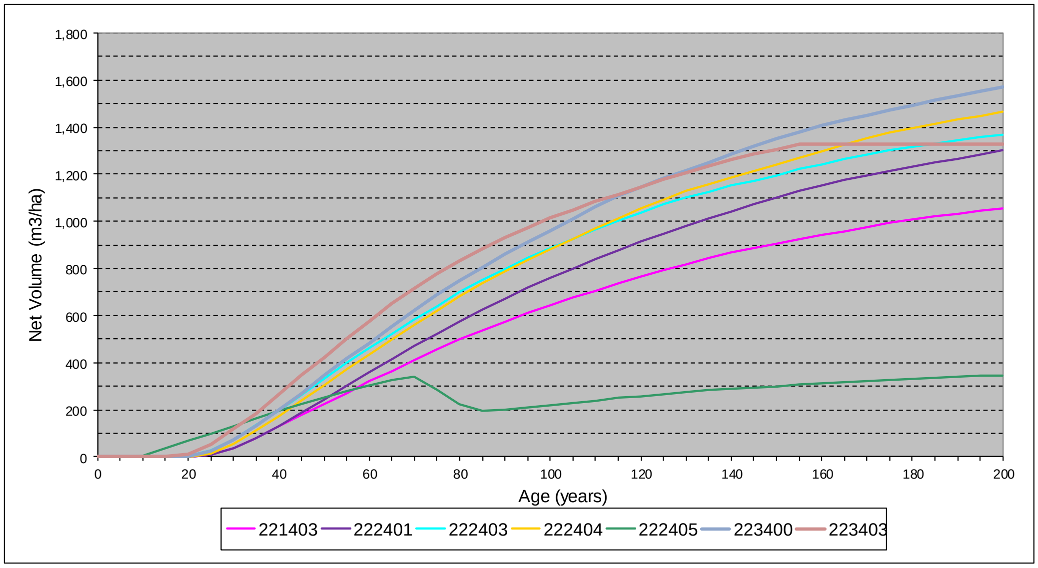


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 2 CWHxm2 Variant – All Sites

	Analysis Units						
Age	221403	222401	222403	222404	222405	223400	223403
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	5	0	0
15	0	0	0	0	38	0	0
20	0	0	2	1	69	2	10
25	7	8	25	15	97	25	51
30	37	36	74	55	130	73	118
35	79	80	135	111	162	134	186
40	128	131	196	173	194	200	264
45	177	185	261	236	224	269	347
50	225	244	330	304	253	347	423
55	272	303	399	373	280	416	503
60	320	361	460	435	303	484	578
65	364	416	521	497	325	552	649
70	411	470	581	560	340	622	715
75	455	521	641	621	284	689	776
80	498	575	698	680	224	750	834
85	538	625	751	736	196	805	886
90	575	674	798	787	202	859	932
95	609	719	843	834	209	911	975
100	642	761	886	881	220	961	1013
105	675	800	926	926	230	1012	1050
110	706	840	965	969	240	1062	1083
115	735	877	1003	1012	249	1108	1114
120	765	914	1038	1053	259	1147	1144
125	793	948	1072	1093	267	1183	1177
130	819	980	1101	1129	276	1216	1208
135	844	1011	1127	1159	282	1248	1237
140	866	1042	1151	1188	289	1284	1262
145	886	1072	1174	1216	295	1317	1284
150	905	1101	1197	1242	300	1350	1305
155	923	1129	1221	1271	306	1381	1326
160	941	1154	1243	1299	312	1407	1326
165	959	1175	1263	1326	317	1429	1326
170	976	1196	1283	1352	323	1451	1326
175	993	1215	1301	1377	328	1472	1326
180	1007	1233	1315	1398	332	1493	1326
185	1021	1250	1330	1416	336	1513	1326
190	1033	1267	1343	1433	340	1533	1326
195	1044	1285	1357	1449	343	1552	1326
200	1055	1301	1370	1464	346	1571	1326

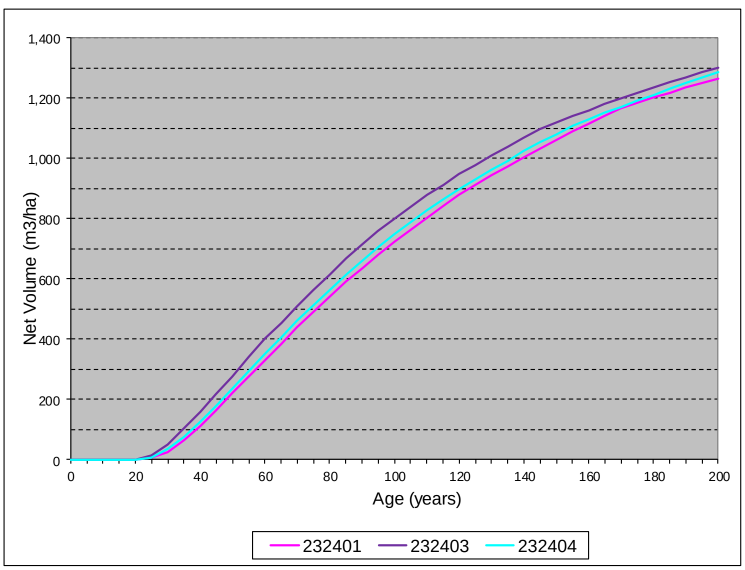


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 2 CWHmm1 Variant – All Sites

	Analysis Units		
Age	232401	232403	232404
0	0	0	0
5	0	0	0
10	0	0	0
15	0	0	0
20	0	1	0
25	5	14	8
30	24	52	34
35	64	105	76
40	112	161	126
45	164	217	179
50	221	276	236
55	276	340	294
60	331	401	352
65	386	455	407
70	440	509	461
75	490	563	513
80	541	615	564
85	590	667	612
90	635	716	661
95	680	760	706
100	722	800	748
105	764	839	789
110	804	877	827
115	842	912	864
120	877	946	898
125	911	978	931
130	943	1010	962
135	974	1040	993
140	1003	1069	1023
145	1032	1097	1052
150	1061	1119	1080
155	1088	1140	1106
160	1115	1160	1128
165	1140	1179	1150
170	1164	1197	1171
175	1184	1216	1191
180	1201	1235	1211
185	1218	1252	1230
190	1235	1269	1250
195	1250	1285	1268
200	1265	1300	1286

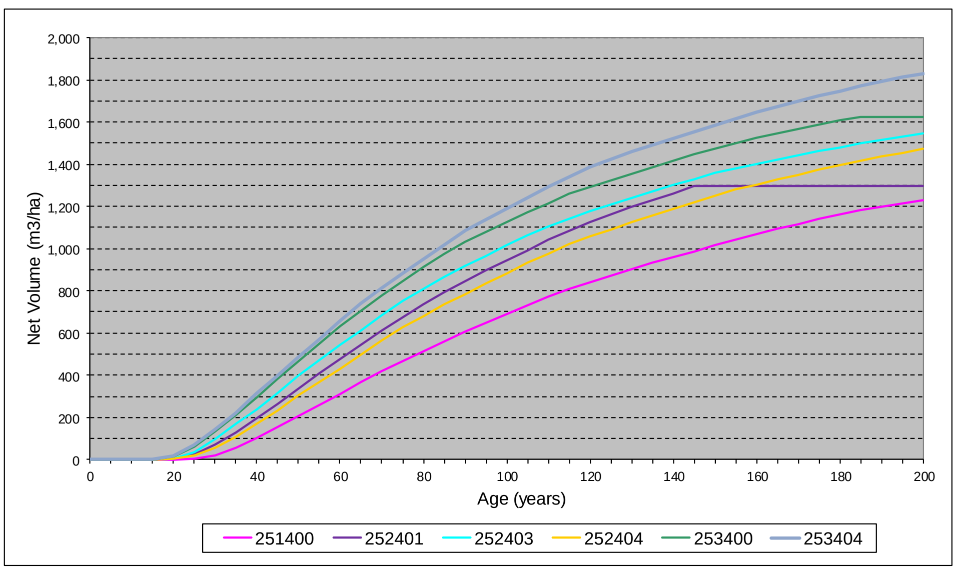


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 2 CWHvm1 Variant – All Sites

	Analysis Units					
Age	251400	252401	252403	252404	253400	253404
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	0	0	0
20	0	2	4	2	13	16
25	4	24	38	20	64	71
30	19	70	100	57	135	142
35	55	130	169	110	211	221
40	102	195	240	169	296	311
45	153	262	317	233	382	398
50	205	339	397	304	467	484
55	258	410	469	369	548	570
60	309	475	542	432	630	658
65	367	543	613	497	707	737
70	420	610	684	563	778	811
75	468	676	750	625	847	883
80	513	737	809	681	912	950
85	560	793	864	734	973	1020
90	605	845	918	785	1030	1087
95	648	895	967	835	1078	1141
100	692	942	1016	882	1125	1191
105	733	991	1062	931	1171	1240
110	772	1040	1107	977	1216	1293
115	808	1086	1143	1021	1258	1342
120	841	1128	1177	1057	1294	1388
125	872	1164	1208	1091	1325	1424
130	902	1197	1239	1123	1356	1458
135	932	1229	1271	1155	1385	1490
140	960	1262	1301	1188	1416	1523
145	987	1295	1330	1220	1445	1556
150	1014	1295	1357	1251	1473	1587
155	1040	1295	1380	1280	1499	1617
160	1067	1295	1402	1304	1524	1645
165	1092	1295	1423	1328	1546	1672
170	1117	1295	1443	1351	1567	1698
175	1141	1295	1461	1373	1588	1723
180	1163	1295	1480	1394	1608	1747
185	1182	1295	1498	1415	1626	1770
190	1199	1295	1515	1436	1626	1792
195	1215	1295	1531	1455	1626	1812
200	1230	1295	1547	1472	1626	1831

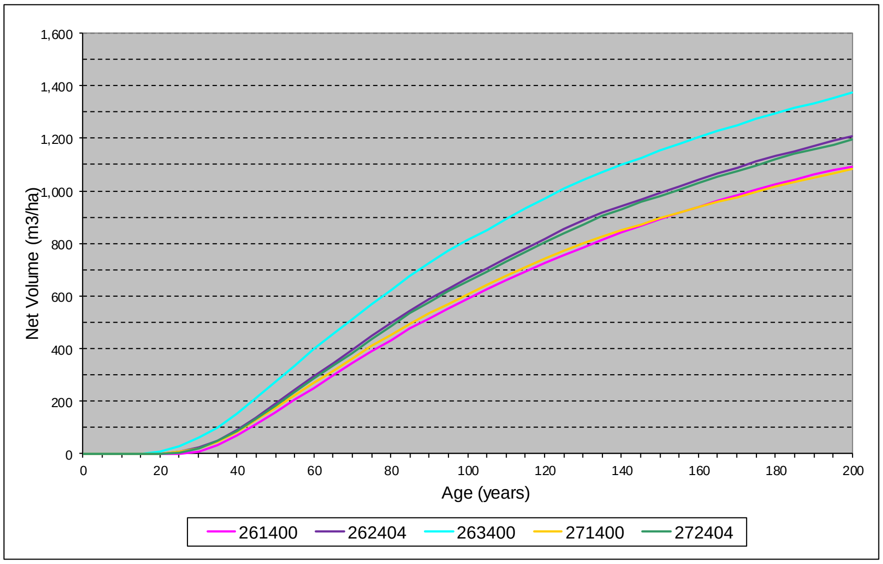


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

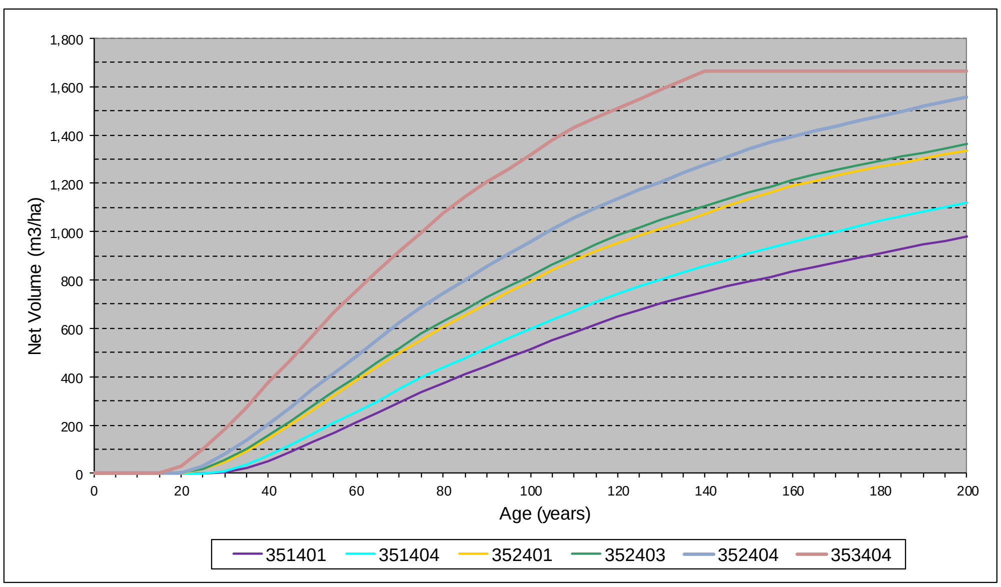
Block 2 CWHvm2 and MHmm1 Variants – All Sites

	Analysis Units				
Age	261400	262404	263400	271400	272404
0	0	0	0	0	0
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
20	0	0	6	0	0
25	1	6	29	6	5
30	9	23	61	19	22
35	34	49	100	46	48
40	70	91	155	82	87
45	113	138	213	127	131
50	159	189	272	174	181
55	206	243	335	222	234
60	250	294	396	269	284
65	298	344	456	314	334
70	344	395	511	362	383
75	389	448	569	410	434
80	433	499	623	454	485
85	475	545	676	495	533
90	515	587	725	533	576
95	551	626	770	570	616
100	587	668	812	607	655
105	625	707	852	642	694
110	661	743	893	677	731
115	694	781	933	709	766
120	726	818	972	741	803
125	757	853	1008	771	839
130	786	886	1040	799	872
135	815	915	1070	825	904
140	842	942	1098	850	931
145	868	968	1125	873	957
150	892	992	1152	895	981
155	916	1017	1178	917	1005
160	938	1042	1203	938	1029
165	961	1066	1227	958	1052
170	983	1089	1250	977	1075
175	1004	1111	1272	996	1097
180	1024	1132	1293	1015	1119
185	1043	1151	1314	1033	1140
190	1061	1170	1334	1051	1158
195	1078	1189	1354	1068	1176
200	1093	1208	1374	1085	1194



Net Merchantable Volume Yield Tables
Unmanaged Immature Stands
Block 3 All Variants – All Sites

Age	Analysis Units					
	351401	351404	352401	352403	352404	353404
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	0	0	1
20	0	0	1	2	3	28
25	0	1	16	19	29	98
30	6	9	47	56	79	183
35	23	38	92	103	139	274
40	52	75	144	157	203	377
45	89	117	199	214	273	469
50	128	163	261	279	348	566
55	168	208	322	339	415	665
60	209	253	382	397	484	756
65	251	300	441	460	552	838
70	294	350	497	520	622	919
75	336	396	551	578	687	997
80	374	437	605	630	745	1076
85	409	477	655	678	800	1146
90	445	519	702	726	855	1205
95	480	559	749	773	907	1260
100	515	597	794	818	958	1321
105	549	636	838	862	1010	1379
110	582	674	881	906	1058	1430
115	615	710	919	948	1100	1472
120	647	744	954	986	1137	1511
125	677	774	984	1019	1172	1550
130	704	803	1013	1049	1205	1589
135	728	831	1043	1076	1242	1627
140	751	857	1074	1105	1277	1663
145	773	884	1105	1134	1311	1663
150	794	909	1135	1161	1343	1663
155	814	933	1163	1188	1369	1663
160	834	956	1190	1213	1393	1663
165	855	978	1211	1235	1415	1663
170	874	1001	1231	1255	1437	1663
175	893	1023	1250	1274	1457	1663
180	911	1044	1269	1293	1477	1663
185	928	1065	1286	1310	1498	1663
190	946	1084	1303	1327	1518	1663
195	962	1104	1320	1344	1537	1663
200	978	1122	1336	1361	1555	1663

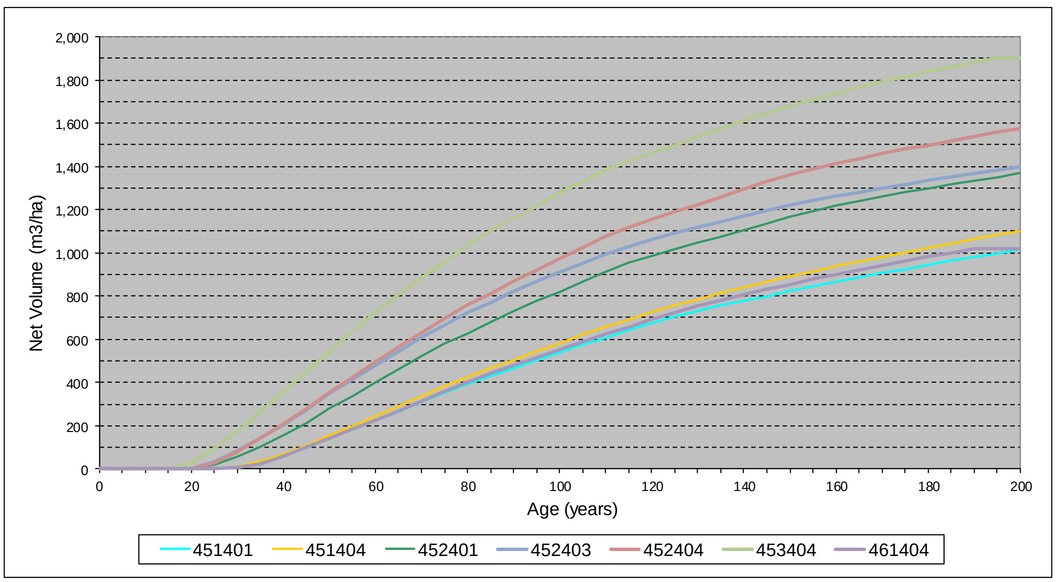


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 4 All Variants – All Sites

	Analysis Units						
Age	451401	451404	452401	452403	452404	453404	461404
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0
20	0	0	2	3	3	27	0
25	1	1	19	32	29	94	0
30	7	8	55	84	81	175	6
35	28	34	101	144	143	262	25
40	59	69	156	206	208	358	58
45	97	109	213	274	279	447	98
50	138	154	278	347	355	541	140
55	179	198	337	413	424	637	183
60	222	243	400	477	493	724	227
65	265	289	463	542	562	804	269
70	312	337	522	607	632	882	314
75	354	382	578	668	699	959	361
80	392	424	629	722	758	1035	404
85	428	464	680	772	814	1103	443
90	465	505	729	821	869	1161	480
95	503	545	776	867	922	1216	516
100	539	582	821	911	973	1276	553
105	573	620	868	953	1025	1332	589
110	609	657	912	993	1074	1381	623
115	642	692	954	1030	1118	1422	658
120	674	725	987	1061	1155	1461	691
125	704	756	1017	1090	1190	1499	723
130	730	785	1046	1117	1223	1538	753
135	755	813	1075	1145	1260	1575	781
140	778	839	1105	1172	1296	1611	806
145	801	865	1136	1197	1330	1645	831
150	822	890	1166	1221	1362	1677	854
155	843	914	1194	1243	1390	1707	877
160	864	937	1218	1262	1414	1736	899
165	885	959	1240	1281	1436	1764	921
170	905	981	1261	1299	1458	1790	942
175	924	1002	1280	1317	1479	1814	962
180	944	1023	1299	1334	1499	1837	981
185	962	1044	1316	1351	1519	1860	1000
190	980	1063	1334	1368	1539	1882	1019
195	997	1082	1351	1382	1558	1902	1019
200	1014	1100	1367	1396	1576	1902	1019

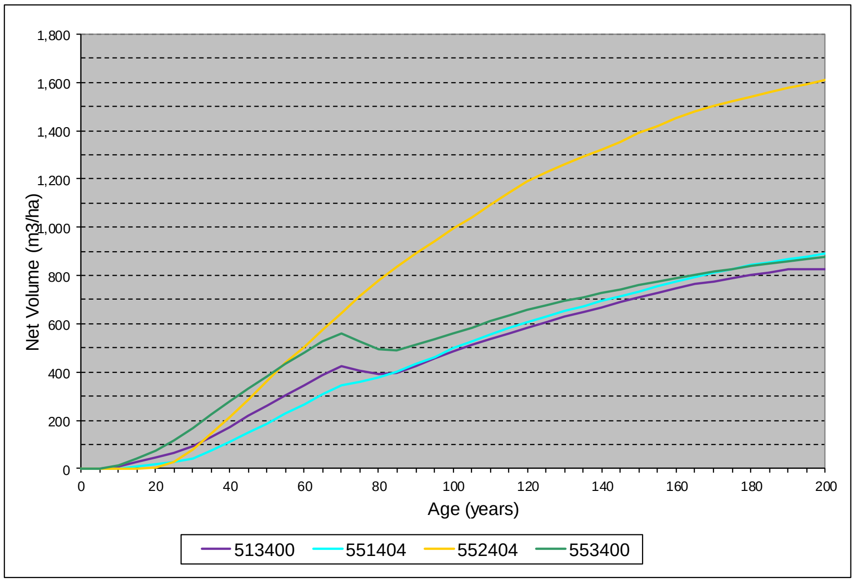


Net Merchantable Volume Yield Tables

Unmanaged Immature Stands

Block 5 All Variants – All Sites

	Analysis Units			
Age	513400	551404	552404	553400
0	0	0	0	0
5	0	0	0	0
10	9	1	0	13
15	29	9	0	42
20	46	18	2	73
25	64	26	25	118
30	92	42	78	168
35	131	73	144	222
40	173	111	214	278
45	217	149	284	330
50	261	187	364	383
55	301	227	438	434
60	346	266	505	482
65	389	308	576	526
70	423	344	645	561
75	407	361	714	528
80	392	377	779	493
85	398	402	837	489
90	426	434	891	514
95	455	464	945	537
100	485	497	995	560
105	513	528	1043	584
110	538	556	1094	610
115	562	582	1143	635
120	584	606	1189	658
125	607	629	1226	677
130	629	652	1260	695
135	649	674	1292	711
140	669	695	1323	728
145	690	715	1356	744
150	710	734	1389	760
155	729	755	1421	775
160	747	774	1451	789
165	764	793	1480	803
170	777	811	1502	816
175	790	828	1522	828
180	802	843	1541	839
185	814	855	1559	849
190	825	868	1577	859
195	825	879	1594	869
200	825	890	1612	878



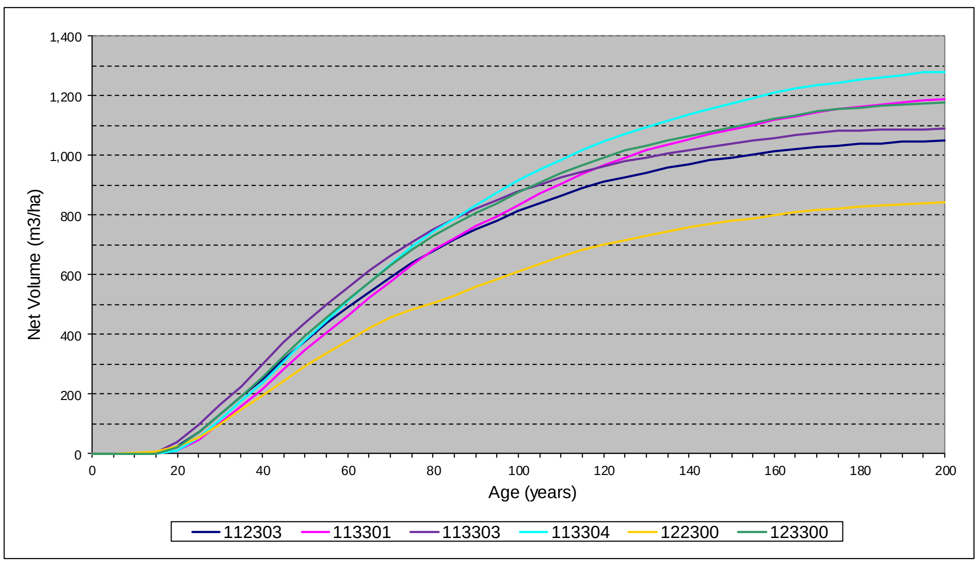
Appendix E: Existing Managed Aged 15 – 50 Years Yield Tables

Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

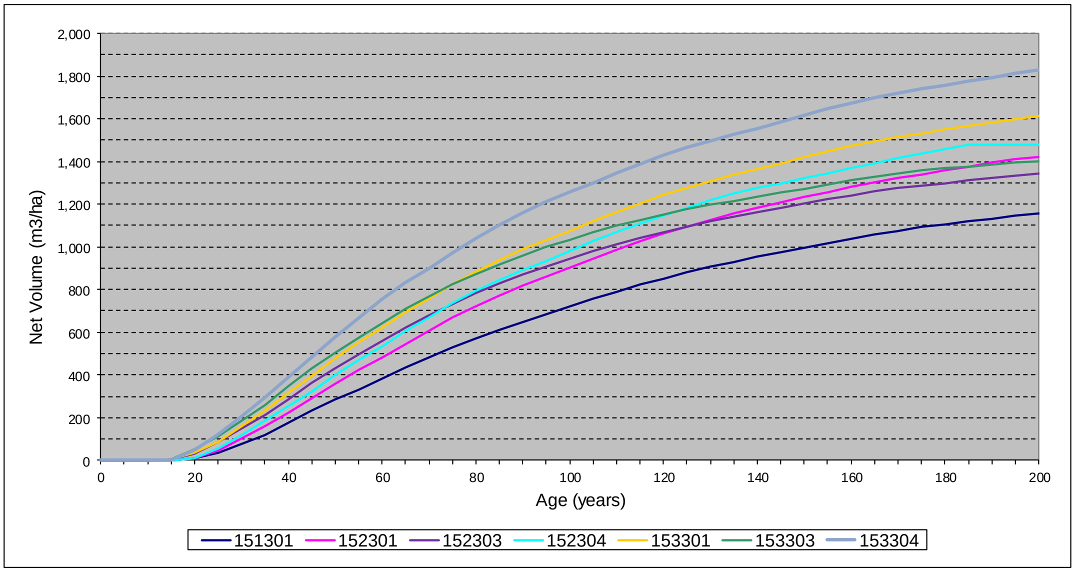
Block 1 CWHdm and CWHxm2 Variants – All Sites

	Analysis Units					
Age	112303	113301	113303	113304	122300	123300
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	3	0
15	0	0	2	0	8	1
20	26	10	41	12	24	23
25	72	47	98	53	54	71
30	132	101	162	113	99	131
35	191	158	226	176	147	192
40	249	218	300	241	194	259
45	314	282	373	309	243	327
50	379	347	438	380	292	396
55	438	406	499	446	337	456
60	490	461	557	511	379	514
65	542	521	612	575	421	574
70	592	578	663	635	458	631
75	638	631	709	692	483	682
80	680	681	751	744	505	730
85	718	724	787	789	531	770
90	750	761	821	832	558	806
95	782	796	850	874	585	840
100	813	833	877	914	610	874
105	840	870	902	950	635	908
110	865	905	925	984	659	939
115	889	938	945	1017	681	967
120	910	966	963	1047	699	992
125	927	992	980	1071	716	1016
130	942	1015	993	1093	731	1033
135	957	1034	1005	1115	745	1050
140	971	1053	1016	1135	757	1065
145	983	1070	1027	1155	769	1080
150	993	1086	1037	1173	779	1094
155	1003	1102	1048	1192	789	1108
160	1013	1117	1057	1209	799	1121
165	1022	1131	1067	1223	808	1134
170	1029	1145	1075	1233	816	1146
175	1033	1155	1081	1243	821	1155
180	1037	1163	1082	1252	827	1160
185	1040	1170	1084	1261	831	1164
190	1044	1177	1085	1269	835	1169
195	1047	1183	1087	1277	839	1173
200	1050	1189	1088	1277	843	1178



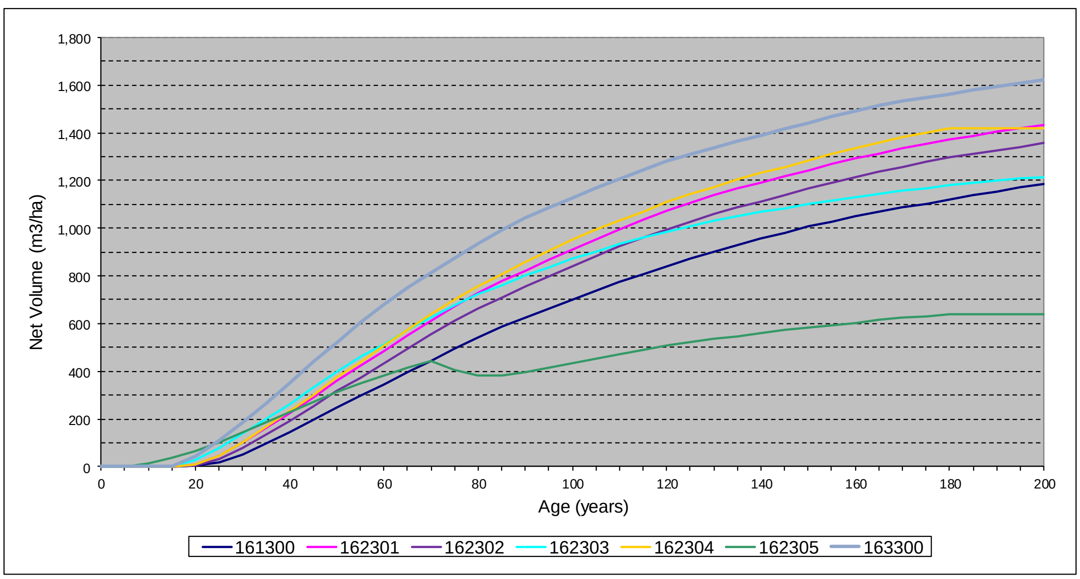
Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 15 – 50 Years Old
Block 1 CWHvm1 Variant – All Sites

	Analysis Units						
Age	151301	152301	152303	152304	153301	153303	153304
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	1	0	2	0	2	3	3
20	11	9	32	12	33	49	46
25	37	47	85	58	89	115	122
30	77	103	149	120	158	187	204
35	121	162	214	185	232	260	291
40	174	224	287	252	314	345	389
45	231	292	362	323	395	429	483
50	285	359	430	398	476	504	577
55	333	423	496	470	552	575	667
60	381	484	559	536	624	645	754
65	433	546	620	604	693	709	832
70	481	609	679	671	757	767	902
75	528	668	733	734	822	822	973
80	571	723	783	793	882	872	1039
85	612	773	828	846	938	918	1100
90	649	818	869	892	989	961	1159
95	683	859	906	936	1034	999	1210
100	719	900	942	980	1076	1034	1256
105	756	945	978	1025	1120	1067	1300
110	790	987	1011	1068	1164	1097	1345
115	823	1027	1042	1109	1205	1126	1389
120	851	1063	1070	1147	1243	1152	1430
125	879	1096	1096	1183	1276	1176	1464
130	905	1128	1119	1217	1307	1196	1496
135	929	1158	1142	1248	1336	1216	1526
140	953	1185	1163	1274	1364	1235	1555
145	975	1210	1182	1298	1392	1253	1586
150	997	1234	1202	1321	1419	1273	1616
155	1018	1257	1222	1345	1446	1292	1645
160	1038	1279	1240	1368	1471	1311	1672
165	1058	1300	1258	1392	1494	1328	1699
170	1076	1321	1274	1415	1514	1344	1720
175	1092	1340	1287	1437	1532	1357	1739
180	1107	1358	1299	1457	1549	1367	1758
185	1120	1376	1310	1476	1565	1376	1776
190	1133	1393	1321	1476	1581	1385	1794
195	1145	1409	1332	1476	1596	1394	1811
200	1156	1423	1342	1476	1611	1402	1829



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 15 – 50 Years Old
Block 1 CWHvm2 Variant – All Sites

	Analysis Units						
Age	161300	162301	162302	162303	162304	162305	163300
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	13	0
15	0	0	0	0	0	38	3
20	2	9	4	29	9	65	43
25	16	45	32	77	46	100	110
30	50	101	80	139	104	144	185
35	96	161	135	200	167	185	263
40	144	223	192	262	232	228	352
45	195	290	253	329	299	271	439
50	246	360	317	398	371	312	522
55	296	423	374	460	440	348	602
60	346	484	432	515	507	381	679
65	396	550	495	572	574	417	749
70	443	613	553	625	637	441	814
75	494	673	609	675	700	407	877
80	542	729	662	722	758	380	935
85	586	778	711	763	809	380	990
90	626	822	755	801	857	396	1041
95	664	866	796	837	905	413	1086
100	701	909	839	871	951	433	1128
105	739	954	883	903	993	454	1168
110	775	996	923	933	1033	473	1208
115	809	1037	961	961	1071	491	1246
120	842	1074	996	986	1109	508	1280
125	873	1108	1028	1009	1144	523	1310
130	903	1137	1058	1031	1174	535	1338
135	931	1165	1086	1051	1203	548	1365
140	958	1192	1113	1069	1231	560	1390
145	982	1218	1139	1085	1258	572	1417
150	1006	1244	1165	1102	1285	583	1442
155	1028	1269	1189	1117	1312	594	1467
160	1049	1292	1213	1132	1337	604	1491
165	1068	1314	1236	1146	1360	614	1513
170	1086	1335	1258	1158	1381	623	1532
175	1104	1354	1278	1169	1399	631	1549
180	1121	1371	1296	1179	1417	638	1564
185	1138	1387	1312	1189	1417	638	1580
190	1154	1403	1327	1198	1417	638	1594
195	1171	1419	1342	1207	1417	638	1608
200	1186	1434	1357	1216	1417	638	1623

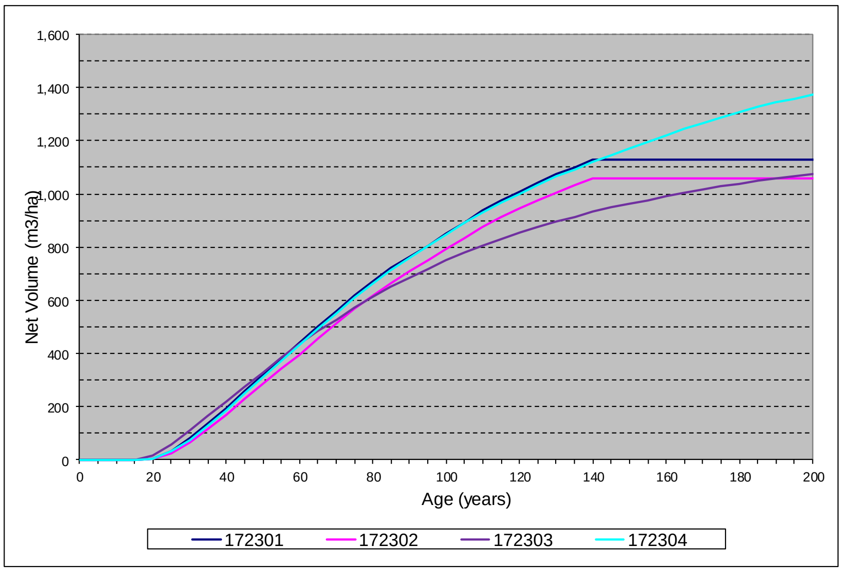


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 1 MHmm1 Variant – All Sites

	Analysis Units			
Age	172301	172302	172303	172304
0	0	0	0	0
5	0	0	0	0
10	0	0	0	0
15	0	0	0	0
20	5	3	17	5
25	34	24	58	31
30	82	65	112	75
35	137	116	166	130
40	195	170	218	187
45	257	227	272	247
50	321	286	329	309
55	380	342	385	371
60	438	395	437	430
65	501	455	484	493
70	561	513	528	553
75	617	567	572	609
80	671	617	613	662
85	720	664	651	713
90	764	708	686	760
95	805	750	719	804
100	849	791	750	847
105	894	834	779	890
110	936	874	806	931
115	975	912	831	968
120	1009	946	855	1002
125	1042	977	876	1034
130	1073	1006	896	1065
135	1100	1034	914	1093
140	1127	1059	932	1120
145	1127	1059	949	1146
150	1127	1059	963	1171
155	1127	1059	977	1195
160	1127	1059	991	1219
165	1127	1059	1004	1243
170	1127	1059	1016	1265
175	1127	1059	1028	1287
180	1127	1059	1039	1307
185	1127	1059	1048	1327
190	1127	1059	1057	1344
195	1127	1059	1065	1359
200	1127	1059	1073	1374

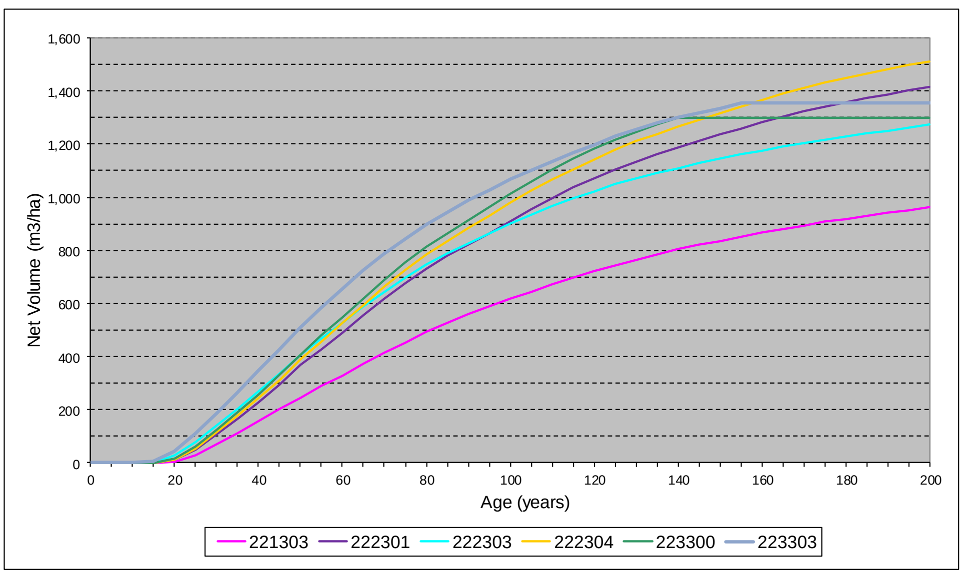


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 CWHxm2 Variant – All Sites

	Analysis Units					
Age	221303	222301	222303	222304	223300	223303
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	0	0	5
20	3	11	29	12	14	43
25	29	50	78	55	61	111
30	69	107	141	115	123	184
35	111	167	203	179	190	264
40	156	229	268	245	258	348
45	202	296	337	312	330	427
50	246	367	408	388	408	508
55	289	429	470	458	479	584
60	329	488	528	525	547	654
65	371	555	587	595	620	723
70	414	617	643	662	689	787
75	454	676	696	724	754	845
80	492	732	745	784	813	898
85	528	779	788	836	864	945
90	559	823	827	883	912	988
95	589	865	864	930	962	1028
100	617	909	899	978	1011	1067
105	645	954	933	1023	1057	1103
110	672	996	965	1065	1102	1136
115	698	1036	994	1105	1144	1167
120	721	1072	1022	1143	1183	1198
125	743	1105	1048	1180	1218	1230
130	765	1134	1071	1210	1246	1256
135	785	1160	1091	1237	1274	1281
140	803	1186	1110	1264	1300	1300
145	820	1210	1128	1289	1300	1317
150	836	1235	1145	1315	1300	1335
155	852	1259	1161	1341	1300	1353
160	866	1282	1176	1365	1300	1353
165	880	1303	1190	1389	1300	1353
170	894	1324	1203	1412	1300	1353
175	907	1342	1216	1432	1300	1353
180	919	1358	1228	1449	1300	1353
185	931	1373	1240	1466	1300	1353
190	942	1388	1251	1482	1300	1353
195	952	1403	1262	1497	1300	1353
200	962	1417	1273	1512	1300	1353

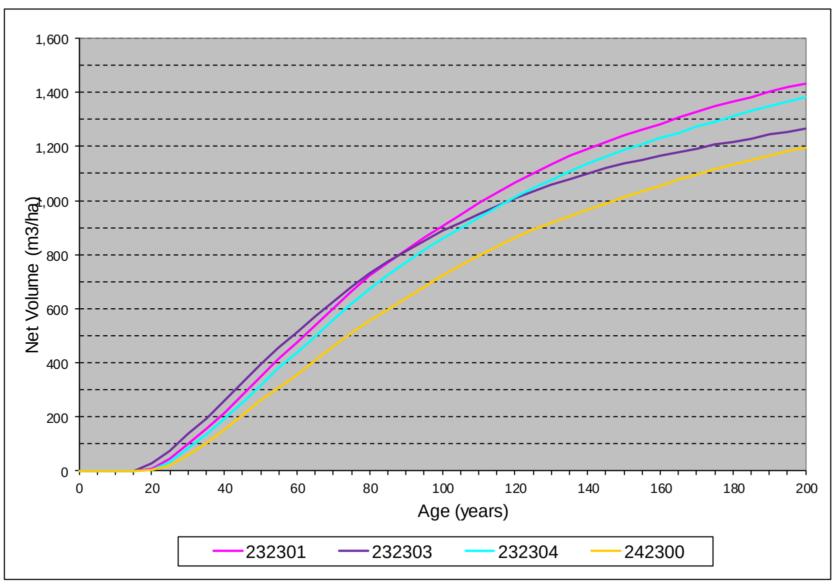


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 CWHmm1 and CWHmm2 Variants – All Sites

	Analysis Units			
Age	232301	232303	232304	242300
0	0	0	0	0
5	0	0	0	0
10	0	0	0	0
15	0	0	0	0
20	8	27	5	5
25	43	73	33	22
30	98	135	81	57
35	157	196	136	104
40	217	259	194	154
45	282	327	254	207
50	349	395	315	259
55	415	458	380	308
60	477	516	440	357
65	538	572	499	410
70	603	628	560	462
75	663	681	618	511
80	720	730	672	556
85	773	774	724	599
90	819	815	773	640
95	862	851	816	681
100	903	886	857	721
105	947	919	897	760
110	990	951	938	796
115	1030	980	976	831
120	1066	1008	1011	862
125	1101	1034	1045	891
130	1134	1058	1076	917
135	1166	1080	1106	941
140	1193	1100	1136	965
145	1218	1119	1163	989
150	1241	1136	1186	1012
155	1263	1151	1209	1035
160	1284	1165	1231	1056
165	1306	1179	1251	1077
170	1327	1192	1272	1097
175	1347	1206	1292	1116
180	1366	1218	1312	1133
185	1384	1230	1331	1150
190	1402	1243	1349	1167
195	1418	1255	1366	1182
200	1432	1267	1382	1197

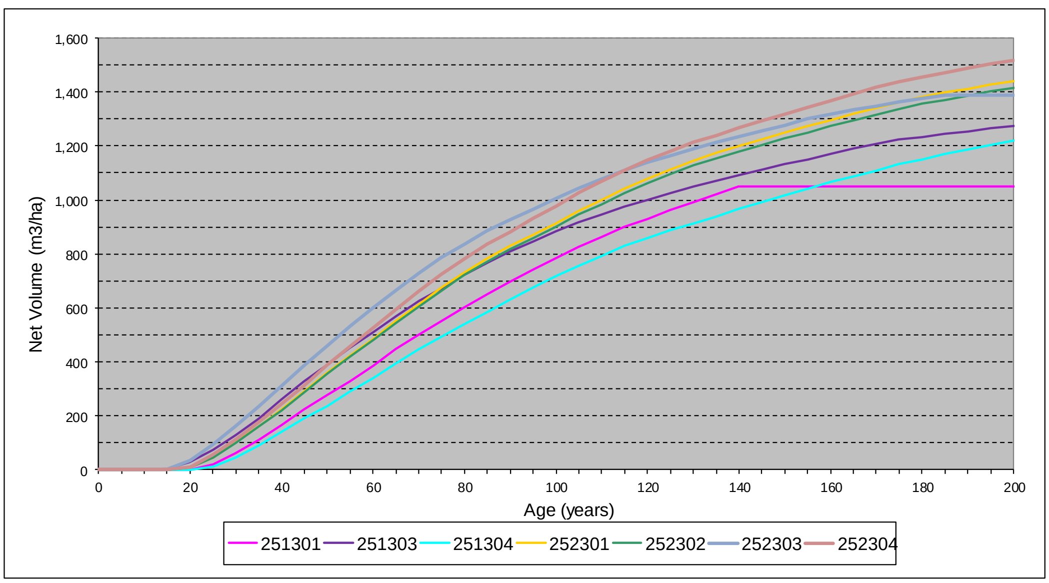


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 CWHvm1 Variant – Poor and Medium Sites

	Analysis Units						
Age	251301	251303	251304	252301	252302	252303	252304
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	2	0	0	0	2	0
20	1	29	1	9	9	35	11
25	20	73	13	46	46	94	54
30	63	130	45	102	101	162	113
35	113	190	90	162	160	232	177
40	166	259	140	223	221	309	243
45	222	327	189	289	286	386	311
50	277	390	238	359	356	460	387
55	329	450	289	424	420	532	457
60	387	511	338	486	479	599	523
65	446	570	394	551	544	665	594
70	500	625	447	614	606	727	661
75	550	674	495	675	665	785	724
80	602	722	540	732	721	837	783
85	652	767	584	783	772	884	835
90	698	808	631	828	816	927	883
95	741	847	675	871	858	966	931
100	784	883	716	914	900	1006	979
105	826	918	756	960	944	1043	1025
110	863	948	793	1002	985	1077	1067
115	899	976	829	1042	1025	1109	1108
120	930	1001	859	1079	1062	1138	1146
125	962	1026	887	1114	1096	1166	1182
130	993	1049	914	1147	1127	1190	1212
135	1022	1070	939	1175	1154	1212	1240
140	1051	1091	966	1201	1180	1235	1266
145	1051	1111	992	1226	1204	1257	1292
150	1051	1131	1018	1249	1227	1278	1318
155	1051	1151	1042	1272	1251	1299	1344
160	1051	1171	1066	1296	1274	1318	1369
165	1051	1189	1089	1318	1296	1333	1393
170	1051	1207	1110	1340	1317	1348	1416
175	1051	1223	1131	1360	1337	1363	1437
180	1051	1234	1150	1380	1356	1375	1456
185	1051	1244	1170	1397	1371	1387	1472
190	1051	1254	1188	1412	1386	1387	1488
195	1051	1264	1205	1427	1401	1387	1504
200	1051	1273	1221	1441	1415	1387	1519

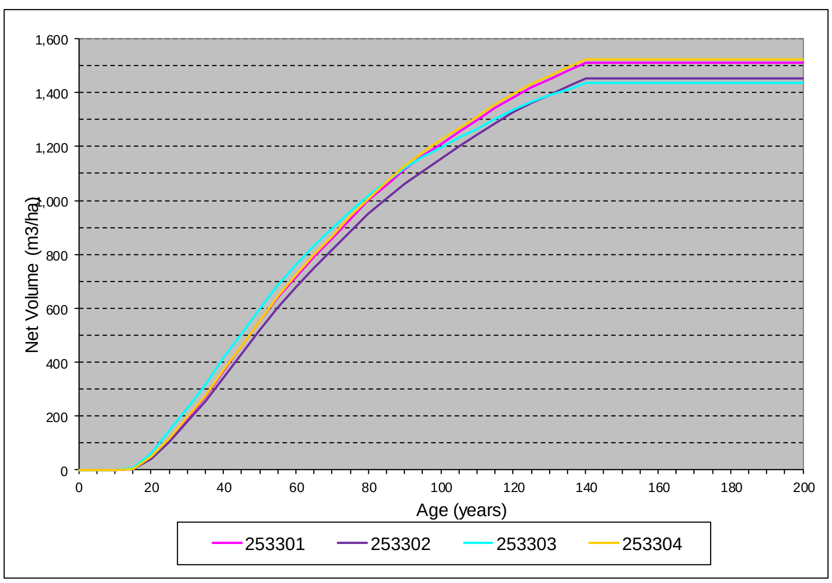


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 CWHvm1 Variant – Good Sites

	Analysis Units			
Age	**253301**	**253302**	**253303**	**253304**
0	0	0	0	0
5	0	0	0	0
10	0	0	0	0
15	4	3	7	4
20	46	41	63	48
25	114	104	143	116
30	192	178	226	193
35	275	257	318	277
40	370	346	418	373
45	459	432	507	462
50	550	519	597	553
55	637	601	683	642
60	719	679	763	726
65	792	750	834	801
70	860	817	897	869
75	931	885	960	940
80	998	949	1017	1006
85	1060	1009	1070	1070
90	1117	1064	1119	1130
95	1165	1110	1160	1180
100	1209	1154	1197	1225
105	1253	1198	1231	1267
110	1300	1244	1265	1313
115	1343	1287	1302	1356
120	1384	1326	1336	1396
125	1418	1360	1367	1430
130	1450	1392	1392	1462
135	1481	1422	1413	1493
140	1511	1451	1434	1522
145	1511	1451	1434	1522
150	1511	1451	1434	1522
155	1511	1451	1434	1522
160	1511	1451	1434	1522
165	1511	1451	1434	1522
170	1511	1451	1434	1522
175	1511	1451	1434	1522
180	1511	1451	1434	1522
185	1511	1451	1434	1522
190	1511	1451	1434	1522
195	1511	1451	1434	1522
200	1511	1451	1434	1522

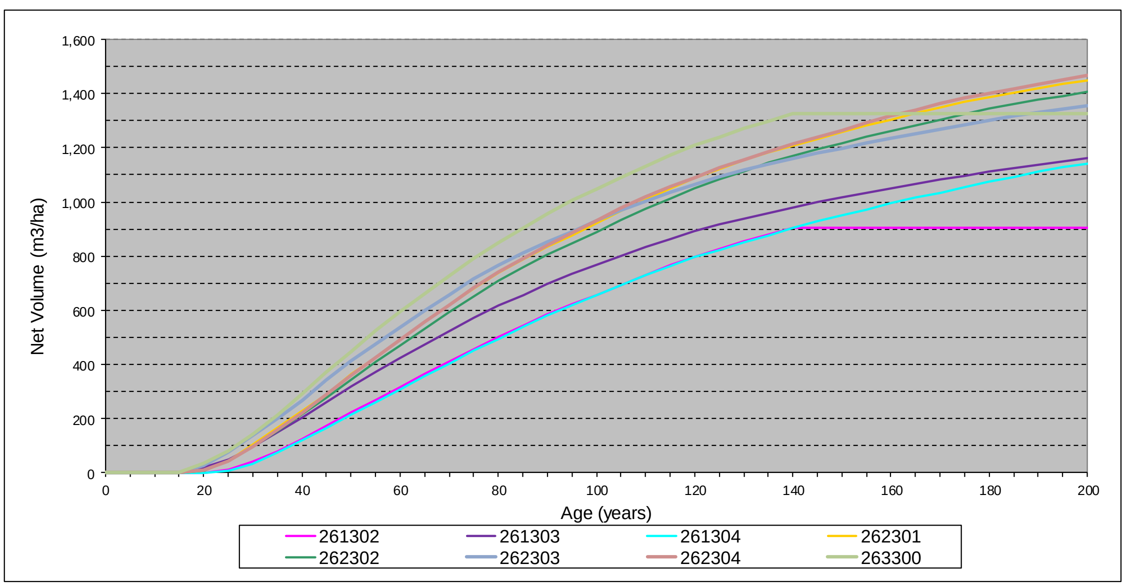


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 CWHvm2 Variant – All Sites

	Analysis Units							
Age	261302	261303	261304	262301	262302	262303	262304	263300
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0	3
20	1	19	1	9	8	27	8	33
25	11	49	8	47	43	76	44	82
30	40	95	33	103	96	138	99	142
35	80	148	75	164	154	201	160	213
40	125	203	120	226	214	269	223	294
45	174	261	167	292	279	340	288	370
50	222	318	214	363	346	411	359	446
55	268	371	261	428	409	475	424	523
60	313	422	306	489	469	537	490	595
65	363	473	356	555	532	599	559	663
70	410	524	404	619	594	659	622	726
75	455	572	451	680	653	714	681	789
80	500	616	495	737	708	765	739	848
85	544	656	538	788	760	812	791	904
90	584	695	579	832	804	853	839	958
95	621	733	618	874	845	892	885	1006
100	657	768	656	920	887	931	932	1049
105	694	802	694	966	932	968	977	1089
110	731	834	730	1009	974	1002	1017	1131
115	766	863	764	1049	1013	1034	1055	1171
120	797	890	795	1087	1049	1064	1091	1208
125	826	916	823	1122	1083	1092	1126	1240
130	854	938	851	1154	1114	1118	1156	1270
135	880	959	877	1181	1144	1140	1184	1298
140	906	979	903	1207	1169	1161	1212	1325
145	906	998	928	1232	1194	1180	1238	1325
150	906	1017	951	1257	1217	1198	1265	1325
155	906	1035	973	1281	1240	1216	1291	1325
160	906	1051	995	1305	1262	1234	1316	1325
165	906	1067	1015	1328	1284	1251	1340	1325
170	906	1083	1035	1349	1305	1269	1363	1325
175	906	1097	1055	1369	1325	1286	1384	1325
180	906	1111	1074	1387	1344	1302	1402	1325
185	906	1125	1093	1403	1362	1316	1419	1325
190	906	1138	1111	1419	1377	1330	1435	1325
195	906	1151	1127	1434	1392	1343	1450	1325
200	906	1164	1142	1448	1406	1353	1466	1325

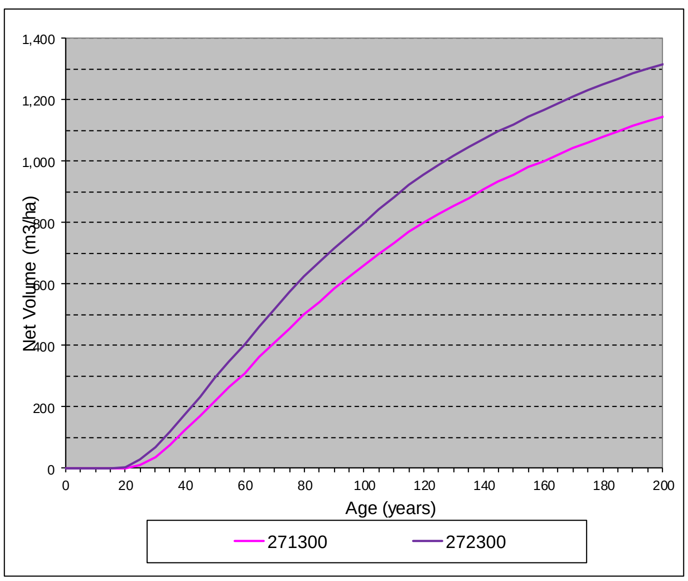


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 2 MHmm1 Variant – All Sites

	Analysis Units	
Age	271300	272300
0	0	0
5	0	0
10	0	0
15	0	0
20	1	4
25	9	27
30	35	68
35	76	120
40	122	174
45	170	233
50	217	293
55	264	349
60	310	402
65	361	462
70	409	520
75	455	575
80	499	626
85	542	673
90	584	716
95	623	757
100	660	798
105	697	842
110	734	882
115	768	921
120	798	956
125	827	988
130	854	1017
135	880	1045
140	906	1070
145	932	1095
150	956	1120
155	979	1143
160	1000	1167
165	1021	1189
170	1041	1211
175	1060	1231
180	1078	1250
185	1097	1268
190	1114	1285
195	1131	1301
200	1145	1316

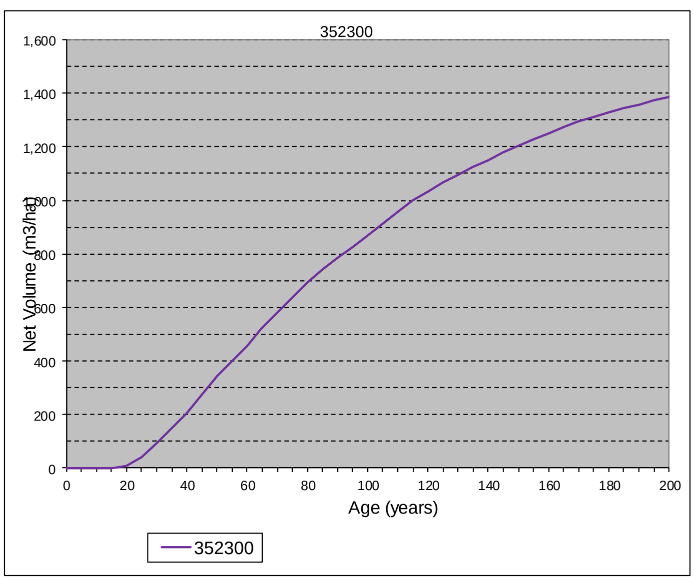


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 3 All Variants – All Sites

	Analysis Units
Age	352300
0	0
5	0
10	0
15	0
20	7
25	40
30	93
35	150
40	209
45	275
50	342
55	400
60	457
65	521
70	582
75	640
80	694
85	741
90	783
95	825
100	868
105	914
110	958
115	999
120	1035
125	1066
130	1096
135	1124
140	1150
145	1177
150	1203
155	1227
160	1251
165	1273
170	1293
175	1310
180	1327
185	1343
190	1359
195	1373
200	1388

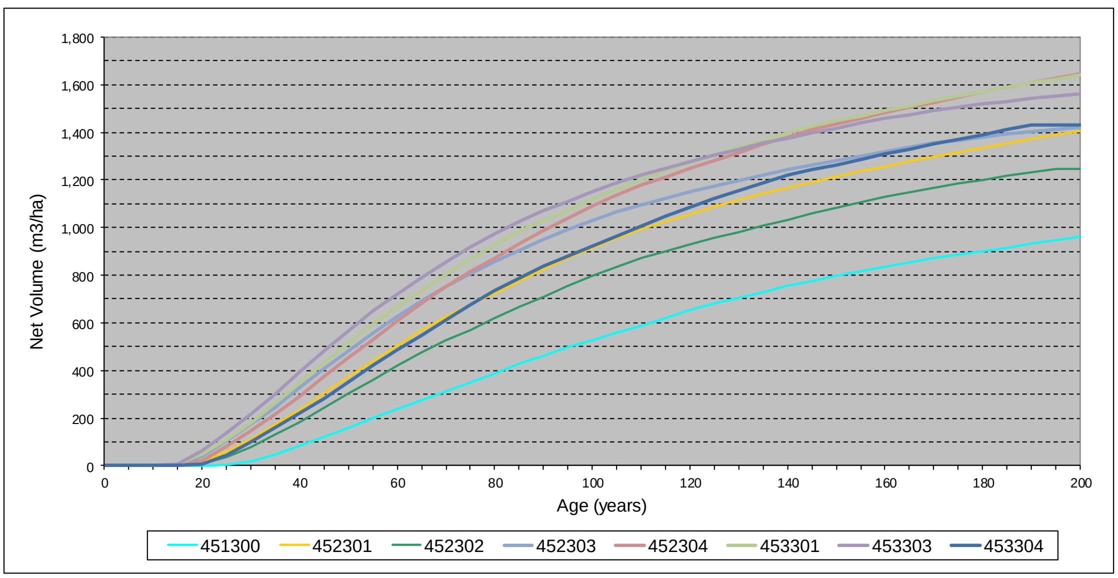


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 4 CWHvm1 Variant – All Sites

	Analysis Units							
Age	**451300**	**452301**	**452302**	**452303**	**452304**	**453301**	**453303**	**453304**
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	0	2	0	6	6	0
20	1	16	8	41	21	50	60	8
25	4	59	37	105	81	111	135	45
30	18	111	78	175	146	181	216	101
35	46	170	129	246	215	262	299	160
40	82	234	183	327	290	348	393	221
45	121	305	243	410	376	430	483	284
50	159	371	301	484	454	516	569	352
55	198	437	360	556	531	597	649	422
60	236	505	420	627	611	671	723	486
65	275	569	475	693	685	736	790	546
70	312	627	525	754	755	803	857	612
75	349	677	571	807	814	865	918	674
80	388	723	619	856	870	925	975	733
85	427	776	665	905	930	982	1026	788
90	463	825	711	950	987	1029	1069	837
95	497	872	754	992	1040	1073	1110	880
100	528	916	796	1030	1091	1118	1149	922
105	558	958	835	1066	1138	1162	1187	965
110	590	993	872	1096	1178	1204	1221	1007
115	621	1026	903	1124	1213	1240	1251	1047
120	651	1057	930	1150	1247	1274	1279	1086
125	679	1086	957	1176	1282	1306	1305	1122
130	705	1115	981	1199	1316	1337	1330	1157
135	730	1142	1007	1221	1350	1367	1354	1190
140	754	1168	1033	1242	1381	1396	1376	1219
145	777	1192	1060	1261	1410	1424	1398	1243
150	799	1214	1085	1281	1435	1449	1419	1265
155	819	1236	1108	1300	1459	1470	1439	1287
160	837	1257	1130	1318	1482	1492	1457	1308
165	855	1278	1150	1336	1504	1512	1475	1329
170	871	1298	1169	1354	1525	1532	1491	1350
175	887	1318	1186	1367	1548	1551	1506	1371
180	903	1337	1202	1380	1569	1570	1518	1391
185	917	1355	1218	1392	1589	1589	1530	1410
190	933	1372	1233	1403	1609	1607	1542	1429
195	948	1389	1248	1414	1628	1624	1553	1429
200	962	1403	1248	1423	1646	1640	1564	1429

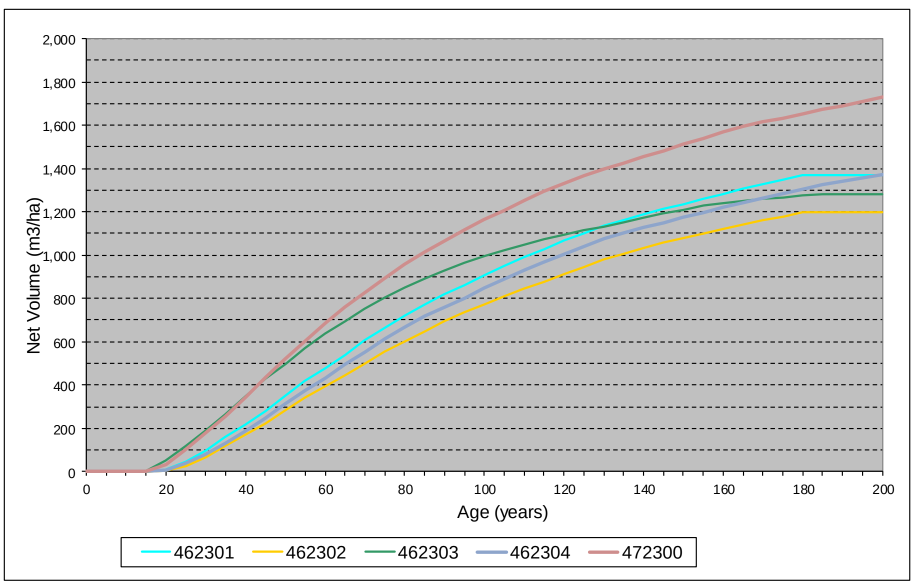


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

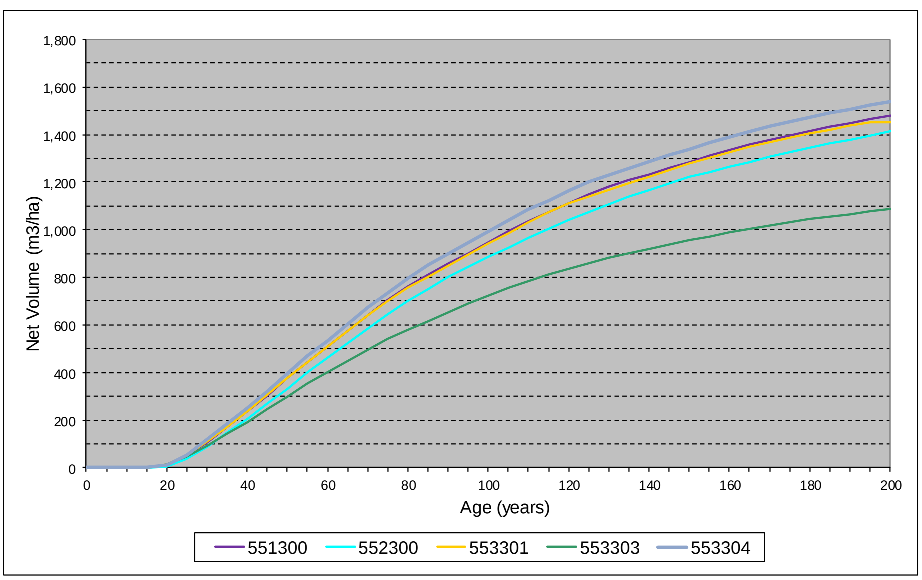
Block 4 CWHvm2 and MHmm1 Variants – All Sites

	Analysis Units				
Age	462301	462302	462303	462304	472300
0	0	0	0	0	0
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	4	0	2
20	9	4	52	7	34
25	45	27	119	36	101
30	99	68	189	80	177
35	158	118	264	133	258
40	219	170	347	189	346
45	281	224	428	248	435
50	352	284	499	313	523
55	419	343	569	375	604
60	479	394	635	434	686
65	541	445	696	493	761
70	605	499	752	554	829
75	665	553	803	612	897
80	722	603	849	667	957
85	773	650	891	717	1013
90	819	693	929	761	1066
95	863	734	964	803	1116
100	907	773	996	847	1162
105	949	810	1024	890	1206
110	990	845	1050	931	1251
115	1028	878	1075	969	1293
120	1066	911	1096	1006	1333
125	1102	946	1115	1041	1365
130	1136	978	1133	1075	1396
135	1163	1006	1151	1102	1425
140	1190	1033	1171	1127	1453
145	1214	1057	1191	1150	1483
150	1237	1079	1209	1173	1512
155	1260	1100	1227	1196	1540
160	1283	1121	1240	1219	1568
165	1305	1141	1249	1241	1593
170	1327	1161	1258	1263	1614
175	1347	1179	1267	1285	1634
180	1367	1197	1275	1305	1654
185	1367	1197	1283	1323	1673
190	1367	1197	1283	1340	1691
195	1367	1197	1283	1356	1709
200	1367	1197	1283	1372	1728



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 15 – 50 Years Old
Block 5 CWHvm1 Variant – All Sites

	Analysis Units				
Age	**551300**	**552300**	**553301**	**553303**	**553304**
0	0	0	0	0	0
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
20	10	5	11	14	11
25	50	35	52	45	55
30	109	89	111	92	117
35	171	147	172	143	182
40	236	207	237	193	249
45	303	270	307	246	317
50	376	333	379	300	395
55	444	400	443	352	467
60	508	463	507	402	534
65	576	523	575	448	605
70	640	582	639	494	673
75	703	643	700	539	737
80	761	700	756	580	798
85	812	752	805	618	850
90	859	801	850	654	899
95	903	844	895	690	946
100	949	885	941	723	994
105	993	924	987	754	1040
110	1035	964	1031	784	1083
115	1075	1002	1072	812	1124
120	1113	1039	1109	837	1163
125	1148	1074	1140	861	1201
130	1180	1107	1169	882	1231
135	1208	1139	1197	902	1259
140	1234	1169	1224	921	1286
145	1260	1197	1251	939	1312
150	1284	1221	1278	956	1338
155	1310	1244	1303	973	1364
160	1334	1266	1327	989	1390
165	1357	1286	1350	1004	1413
170	1378	1305	1369	1019	1435
175	1398	1324	1387	1032	1456
180	1416	1343	1404	1044	1474
185	1433	1361	1420	1055	1491
190	1449	1378	1436	1066	1507
195	1464	1396	1451	1077	1523
200	1479	1413	1451	1087	1539

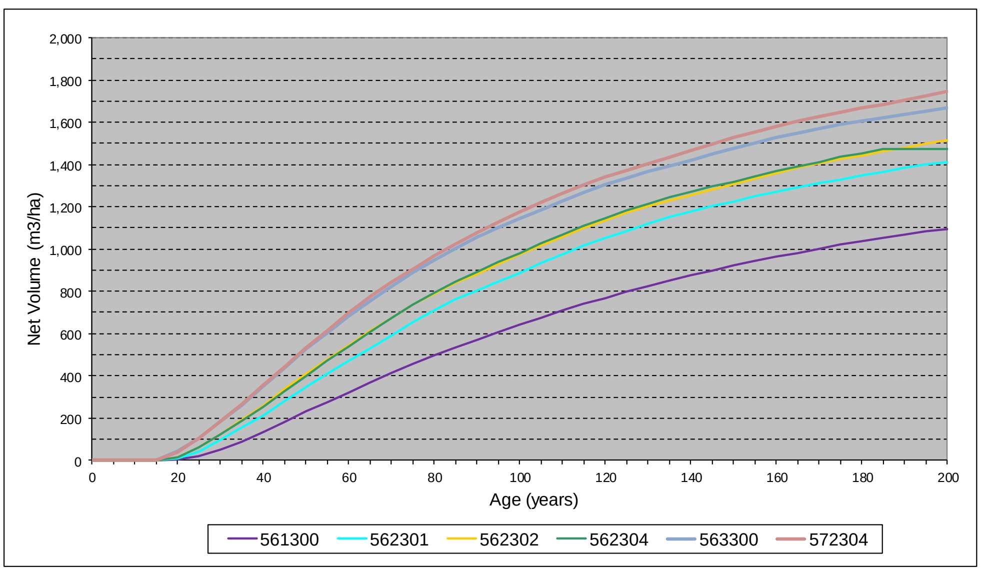


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 15 – 50 Years Old

Block 5 CWHvm2 and MHmm1 Variants – All Sites

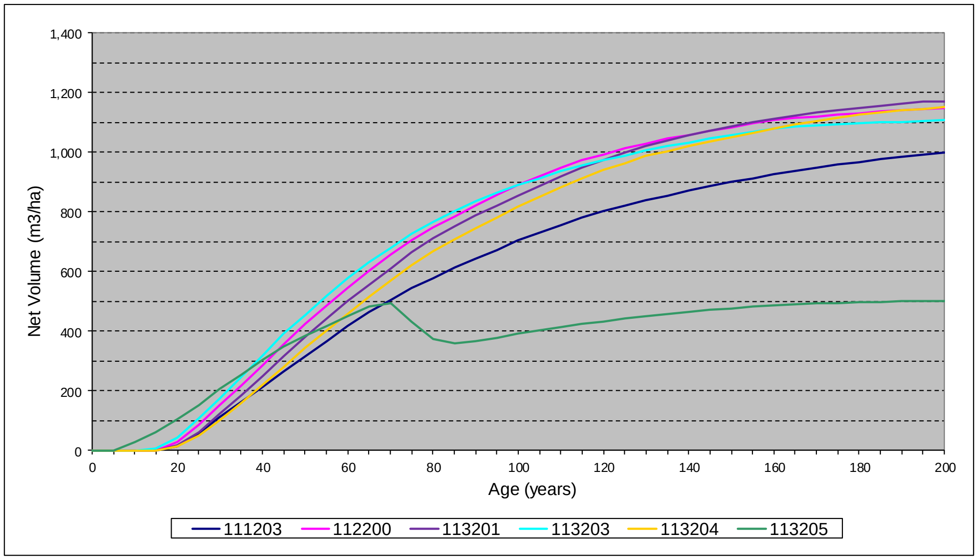
	Analysis Units					
Age	561300	562301	562302	562304	563300	572304
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	0	3	2
20	5	7	14	13	42	37
25	22	42	61	59	108	105
30	51	96	123	122	184	183
35	87	154	189	187	263	264
40	133	214	258	254	352	353
45	181	279	334	326	439	445
50	231	345	408	401	525	532
55	276	409	475	473	606	616
60	322	469	543	540	684	698
65	367	529	611	607	756	773
70	412	592	676	674	821	841
75	455	652	736	737	887	906
80	495	708	790	795	947	965
85	535	760	839	847	1003	1023
90	572	805	884	893	1057	1078
95	607	846	929	937	1103	1128
100	642	887	973	981	1145	1174
105	676	931	1018	1026	1187	1219
110	708	974	1060	1068	1229	1264
115	739	1015	1101	1109	1269	1305
120	767	1051	1138	1147	1305	1341
125	796	1086	1171	1183	1337	1373
130	824	1118	1201	1216	1366	1404
135	851	1149	1229	1247	1394	1435
140	876	1177	1256	1272	1421	1466
145	899	1202	1282	1297	1449	1496
150	921	1225	1309	1320	1476	1526
155	942	1248	1334	1344	1502	1554
160	962	1269	1359	1367	1527	1579
165	982	1290	1383	1391	1550	1604
170	1002	1311	1405	1413	1570	1625
175	1020	1330	1425	1435	1588	1646
180	1038	1349	1444	1455	1604	1666
185	1053	1366	1463	1474	1620	1686
190	1068	1383	1481	1474	1635	1706
195	1082	1399	1499	1474	1650	1726
200	1095	1413	1517	1474	1666	1745



Appendix F: Existing Managed Aged 1 – 14 Years Yield Tables

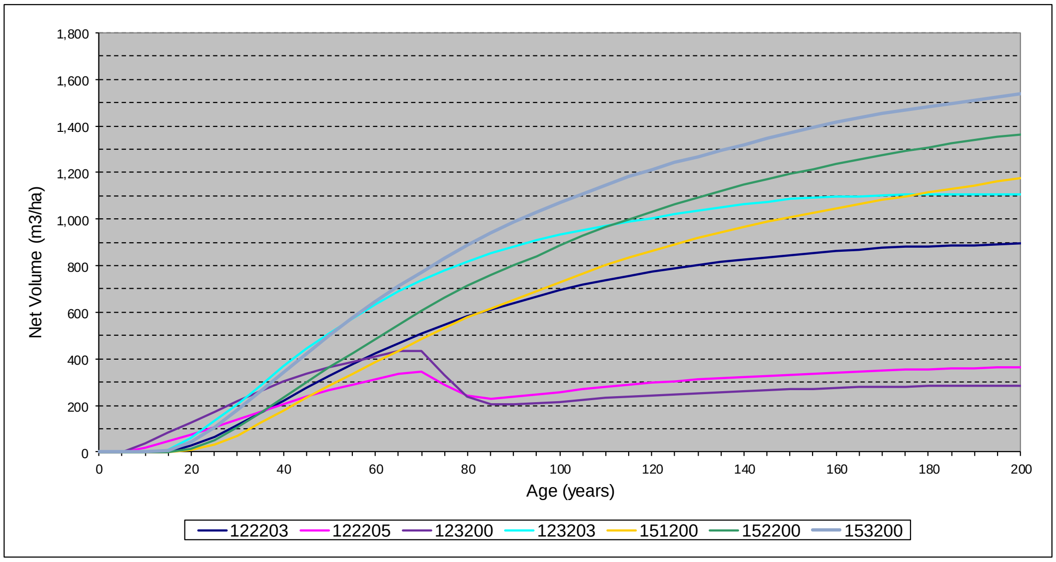
Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 1 CWHdm Variant – All Sites

	Analysis Units					
Age	111203	112200	113201	113203	113204	113205
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	27
15	0	1	1	5	1	62
20	15	29	18	44	14	103
25	59	86	63	107	51	153
30	111	151	123	175	101	205
35	164	217	186	246	160	254
40	214	285	250	320	220	303
45	265	357	316	392	280	347
50	317	425	381	455	345	384
55	367	485	442	519	403	418
60	416	545	499	577	459	451
65	463	603	556	631	515	481
70	505	657	611	679	571	494
75	544	706	663	725	622	430
80	578	748	710	765	669	373
85	612	785	752	802	709	358
90	643	822	787	835	746	368
95	673	856	820	863	781	378
100	703	889	854	891	817	391
105	730	919	887	913	851	403
110	755	948	919	935	883	414
115	779	973	948	955	912	424
120	801	993	973	973	939	433
125	820	1012	997	989	964	441
130	838	1029	1019	1005	987	449
135	854	1044	1040	1019	1004	457
140	870	1058	1057	1033	1021	464
145	886	1071	1071	1046	1036	470
150	900	1083	1086	1058	1051	476
155	913	1095	1099	1069	1065	481
160	925	1107	1112	1078	1079	485
165	937	1113	1123	1087	1092	490
170	947	1119	1133	1091	1103	492
175	957	1125	1141	1094	1114	494
180	967	1130	1148	1097	1125	496
185	976	1136	1156	1099	1133	498
190	984	1140	1163	1101	1139	499
195	993	1145	1168	1104	1144	501
200	999	1148	1168	1106	1150	502



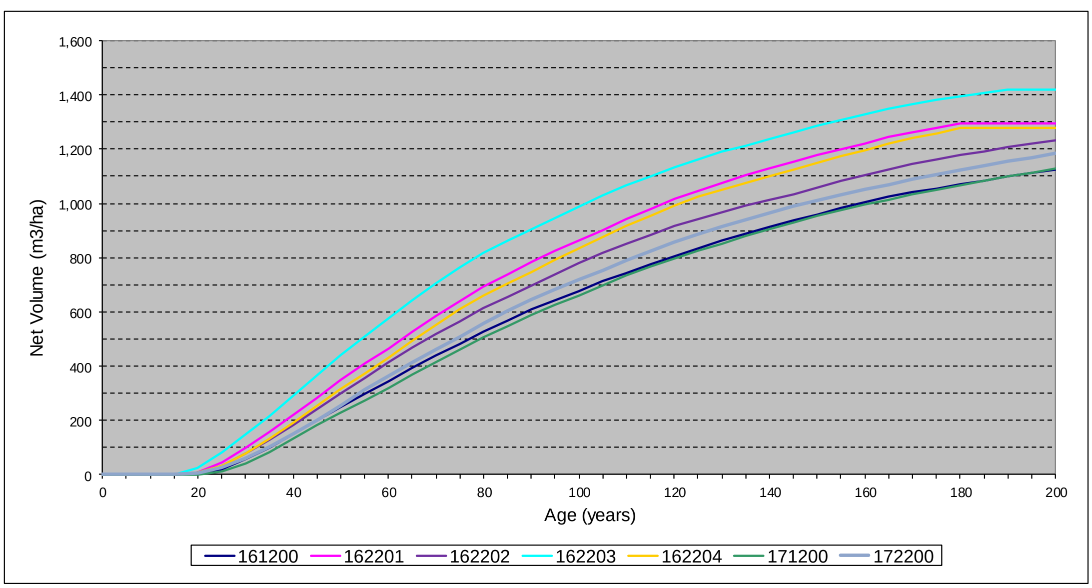
Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 1 CWHxm2 and CWHvm1 Variants – All Sites

	Analysis Units						
Age	122203	122205	123200	123203	151200	152200	153200
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	16	37	0	0	0	0
15	0	47	83	9	1	1	5
20	25	76	126	60	10	12	43
25	63	106	173	133	34	50	106
30	116	141	220	205	71	108	179
35	169	174	262	285	124	169	257
40	220	207	302	367	178	231	342
45	275	238	337	442	233	298	423
50	328	266	365	510	285	363	501
55	379	291	389	575	335	424	576
60	424	313	412	635	386	486	647
65	466	336	434	689	435	546	712
70	507	347	436	736	484	606	773
75	546	291	331	779	532	661	833
80	581	243	238	818	577	714	889
85	612	229	204	852	617	761	941
90	641	237	205	882	655	803	987
95	669	246	208	910	691	842	1027
100	694	258	216	932	730	885	1069
105	717	269	224	953	766	927	1108
110	738	280	232	972	801	965	1146
115	758	289	238	989	834	1000	1182
120	775	297	244	1005	863	1033	1213
125	789	305	249	1020	891	1064	1242
130	803	311	253	1034	918	1094	1269
135	816	317	257	1048	944	1122	1295
140	828	323	261	1062	967	1148	1321
145	837	328	265	1075	988	1171	1347
150	846	333	268	1087	1009	1194	1371
155	854	337	272	1091	1029	1216	1395
160	862	342	275	1095	1047	1237	1417
165	870	346	278	1099	1065	1257	1437
170	876	350	280	1102	1082	1276	1453
175	882	353	281	1105	1099	1293	1468
180	884	355	282	1105	1115	1309	1483
185	887	358	283	1105	1131	1325	1497
190	889	360	284	1105	1146	1339	1510
195	891	362	285	1105	1161	1353	1523
200	894	364	286	1105	1176	1365	1537



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 1 CWHvm2 and MHmm1 Variants – All Sites

	Analysis Units						
Age	161200	162201	162202	162203	162204	171200	172200
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	1	0	0	0
20	5	9	7	26	7	1	5
25	22	44	33	81	34	12	25
30	56	98	77	148	77	42	59
35	98	156	129	217	133	84	101
40	147	218	184	290	191	131	151
45	199	281	240	366	251	180	202
50	249	349	299	440	315	228	256
55	297	409	357	509	374	274	312
60	345	466	413	575	431	321	363
65	392	526	469	642	492	370	413
70	438	585	519	704	552	415	462
75	482	640	566	763	608	460	509
80	526	693	613	816	659	506	557
85	569	740	657	862	704	549	604
90	608	784	698	905	747	588	644
95	644	825	738	948	792	625	682
100	678	865	778	989	835	660	718
105	712	902	816	1029	877	697	754
110	744	941	851	1066	918	733	790
115	775	979	885	1101	956	766	824
120	806	1015	915	1134	991	796	856
125	834	1047	943	1163	1023	825	886
130	862	1076	968	1189	1050	852	915
135	888	1103	991	1213	1076	879	941
140	913	1128	1014	1237	1100	905	965
145	937	1153	1035	1261	1125	930	988
150	960	1177	1059	1285	1149	953	1010
155	982	1201	1082	1307	1173	974	1030
160	1003	1222	1104	1329	1196	994	1050
165	1023	1243	1125	1349	1219	1013	1070
170	1040	1262	1145	1365	1240	1032	1088
175	1055	1280	1162	1380	1259	1049	1107
180	1070	1296	1178	1393	1277	1066	1124
185	1084	1296	1193	1407	1277	1082	1141
190	1098	1296	1207	1419	1277	1098	1156
195	1111	1296	1220	1419	1277	1112	1170
200	1124	1296	1232	1419	1277	1127	1184

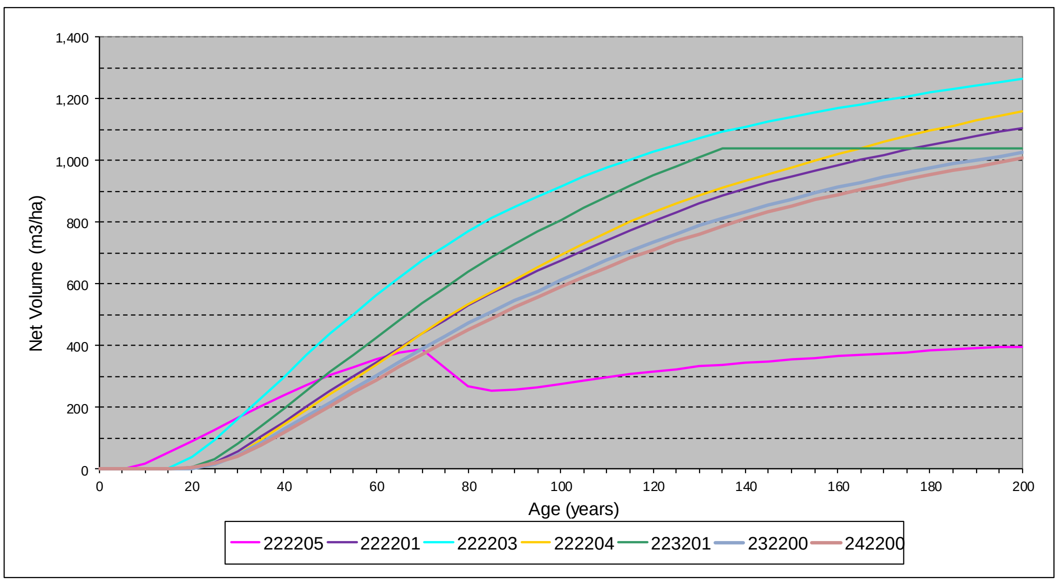


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 1 – 14 Years Old

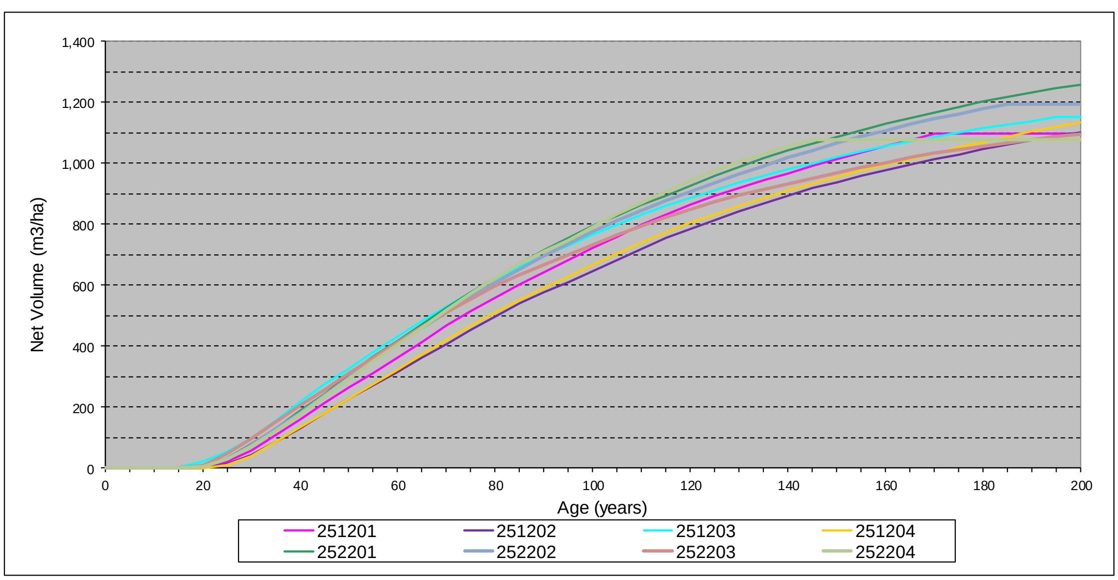
Block 2 CWHxm2, CWHmm1 and CWHmm2 Variants – All Sites

	Analysis Units						
Age	222205	222201	222203	222204	223201	232200	242200
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	18	0	0	0	0	0	0
15	53	0	2	0	1	0	0
20	89	5	38	2	6	3	6
25	128	22	95	15	32	17	19
30	168	56	162	46	83	44	42
35	203	103	227	94	139	83	77
40	239	153	299	143	196	127	116
45	273	203	371	193	255	173	162
50	304	255	440	243	315	217	206
55	331	301	502	290	369	260	248
60	355	346	562	338	425	303	289
65	379	391	619	388	483	347	331
70	389	438	674	440	537	390	371
75	325	484	724	489	588	431	412
80	269	529	770	532	639	472	452
85	252	569	812	572	687	510	489
90	258	607	849	612	729	545	523
95	266	641	883	653	769	577	556
100	277	675	915	693	807	611	589
105	288	708	947	731	847	644	622
110	298	740	976	767	884	676	653
115	307	773	1003	801	918	707	683
120	316	804	1028	832	951	735	711
125	324	833	1051	862	981	762	737
130	332	861	1072	887	1010	788	762
135	338	885	1092	910	1037	812	787
140	344	909	1109	933	1037	833	810
145	349	929	1126	955	1037	854	832
150	355	949	1141	976	1037	875	853
155	360	967	1155	998	1037	894	872
160	365	985	1169	1019	1037	912	889
165	370	1002	1182	1040	1037	929	906
170	374	1018	1194	1059	1037	945	922
175	379	1034	1207	1078	1037	960	938
180	383	1050	1219	1095	1037	974	952
185	387	1065	1230	1112	1037	988	967
190	391	1079	1241	1129	1037	1001	980
195	394	1092	1252	1144	1037	1013	993
200	397	1105	1262	1160	1037	1026	1006



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 2 CWHvm1 Variant – Poor and Medium Sites

	Analysis Units							
Age	**251201**	**251202**	**251203**	**251204**	**252201**	**252202**	**252203**	**252204**
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	0	0	3	0	0	0	0	0
20	3	1	22	1	5	6	9	6
25	20	13	55	11	32	31	49	31
30	58	42	99	39	78	74	96	70
35	107	85	156	85	132	127	151	120
40	158	131	216	133	188	181	204	174
45	212	180	274	182	244	237	257	232
50	264	227	328	230	307	297	311	292
55	313	271	381	276	366	354	360	349
60	361	315	433	323	417	407	411	404
65	414	362	482	372	470	459	461	460
70	467	406	531	420	525	509	510	516
75	515	453	578	467	578	561	555	571
80	560	498	621	512	626	609	597	623
85	603	539	660	553	672	653	633	668
90	643	576	696	592	715	695	666	709
95	683	610	731	629	756	734	699	747
100	721	645	767	668	794	774	732	791
105	760	683	799	706	829	812	763	832
110	797	720	831	741	863	845	794	870
115	832	754	860	775	895	877	822	907
120	864	785	887	805	927	907	848	941
125	893	814	912	833	959	935	873	974
130	919	841	937	860	989	965	894	1004
135	944	868	960	886	1015	991	914	1031
140	967	893	980	910	1042	1017	933	1055
145	990	917	1000	933	1065	1041	951	1078
150	1013	938	1019	954	1087	1064	969	1078
155	1035	958	1037	975	1108	1087	986	1078
160	1056	977	1055	995	1129	1107	1002	1078
165	1076	995	1071	1014	1149	1126	1018	1078
170	1095	1013	1085	1033	1167	1144	1032	1078
175	1095	1029	1099	1052	1185	1161	1045	1078
180	1095	1044	1113	1069	1203	1178	1056	1078
185	1095	1060	1126	1087	1218	1193	1067	1078
190	1095	1075	1138	1103	1232	1193	1077	1078
195	1095	1089	1150	1119	1246	1193	1086	1078
200	1095	1102	1150	1133	1258	1193	1096	1078

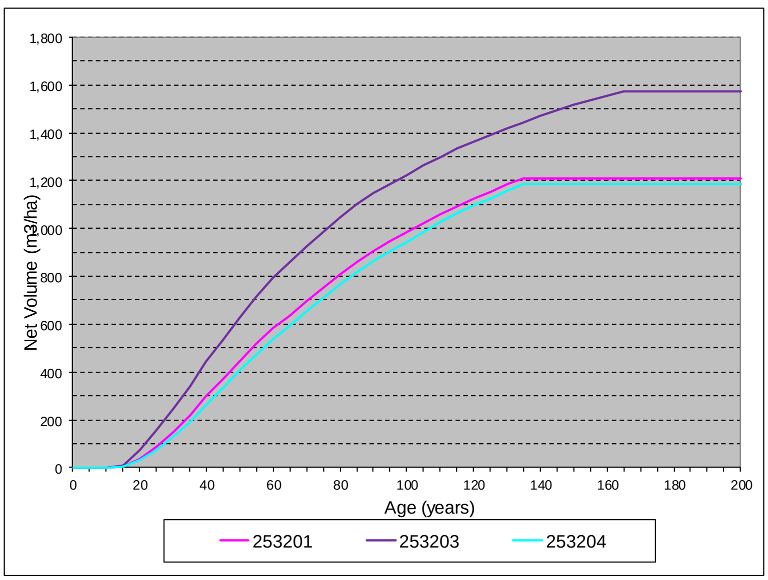


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 1 – 14 Years Old

Block 2 CWHvm1 Variant – Good Sites

	Analysis Units		
Age	253201	253203	253204
0	0	0	0
5	0	0	0
10	0	0	0
15	5	10	4
20	36	72	33
25	86	158	76
30	149	245	128
35	220	341	190
40	297	443	263
45	368	533	333
50	445	626	404
55	518	712	472
60	581	792	536
65	636	859	594
70	695	924	651
75	753	987	710
80	808	1046	766
85	859	1100	817
90	907	1148	864
95	948	1188	904
100	986	1225	944
105	1023	1263	986
110	1058	1299	1025
115	1091	1333	1063
120	1124	1363	1097
125	1155	1391	1127
130	1184	1418	1156
135	1211	1444	1184
140	1211	1471	1184
145	1211	1495	1184
150	1211	1517	1184
155	1211	1538	1184
160	1211	1557	1184
165	1211	1572	1184
170	1211	1572	1184
175	1211	1572	1184
180	1211	1572	1184
185	1211	1572	1184
190	1211	1572	1184
195	1211	1572	1184
200	1211	1572	1184

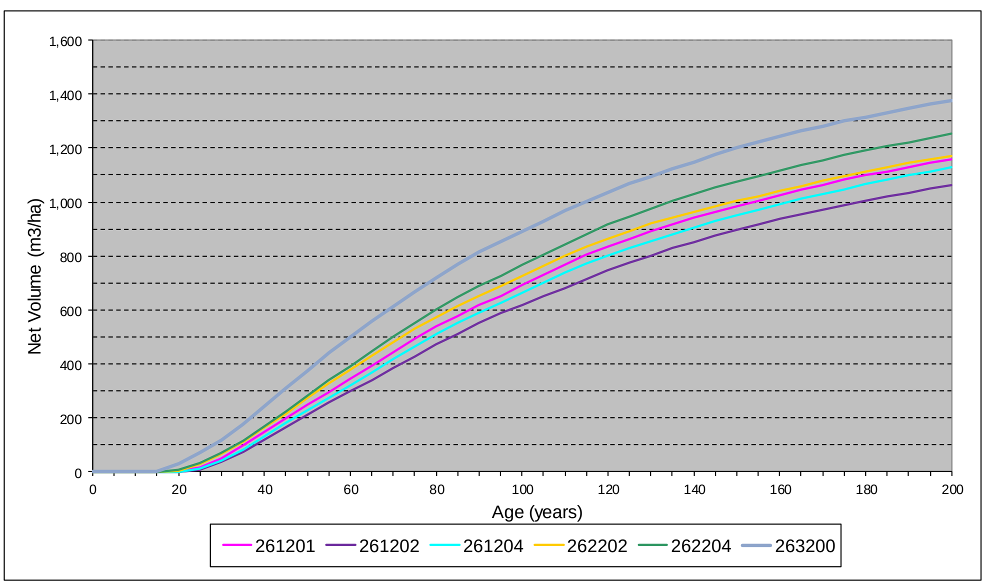


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 1 – 14 Years Old

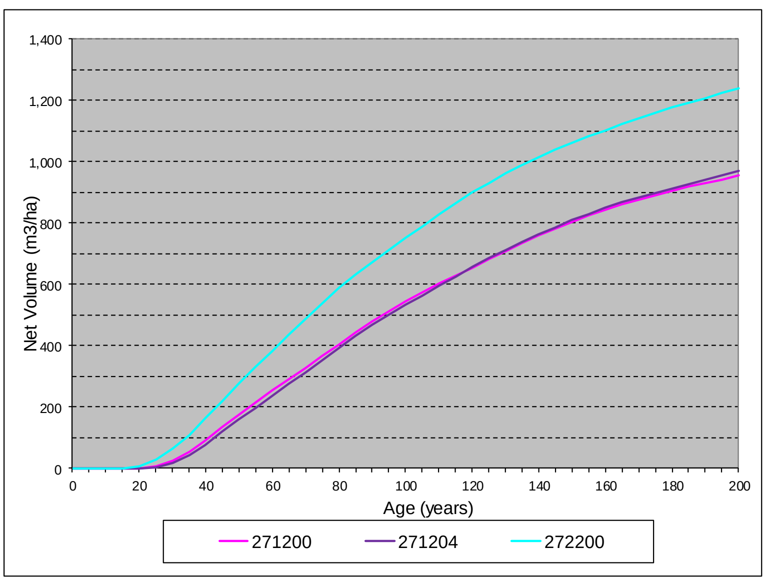
Block 2 CWHvm2 Variant – All Sites

	Analysis Units					
Age	261201	261202	261204	262202	262204	263200
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	0	0	3
20	2	0	1	5	7	29
25	17	9	11	28	32	70
30	51	36	39	65	70	118
35	99	75	84	113	114	174
40	148	119	131	165	168	244
45	200	165	180	217	223	309
50	250	212	228	273	283	377
55	296	257	275	326	338	441
60	345	299	321	378	391	501
65	394	341	370	431	447	557
70	444	385	417	482	500	611
75	492	428	464	529	552	664
80	538	471	508	572	603	718
85	578	512	550	613	648	769
90	616	552	589	653	689	815
95	653	587	626	690	728	854
100	693	619	664	728	767	891
105	732	650	701	764	806	929
110	769	681	737	799	844	967
115	804	714	770	832	881	1003
120	835	745	800	864	915	1037
125	864	774	828	893	947	1067
130	891	802	855	920	976	1095
135	918	828	880	943	1003	1122
140	941	852	906	964	1028	1148
145	964	876	929	984	1052	1175
150	985	898	951	1003	1074	1200
155	1006	919	971	1022	1096	1223
160	1025	938	991	1040	1116	1245
165	1045	956	1011	1059	1136	1264
170	1064	973	1029	1078	1155	1282
175	1081	989	1047	1096	1173	1299
180	1098	1005	1065	1113	1191	1315
185	1114	1020	1082	1130	1207	1331
190	1129	1034	1099	1144	1222	1346
195	1144	1048	1113	1158	1238	1362
200	1158	1061	1127	1171	1252	1377



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 2 MHmm1 Variant – All Sites

	Analysis Units		
Age	271200	271204	272200
0	0	0	0
5	0	0	0
10	0	0	0
15	0	0	0
20	0	0	5
25	6	4	29
30	24	16	66
35	55	42	110
40	92	77	162
45	133	118	217
50	174	158	276
55	215	197	329
60	254	235	380
65	291	275	434
70	327	313	487
75	365	351	538
80	403	390	588
85	442	430	633
90	478	467	673
95	512	501	711
100	543	533	750
105	573	564	789
110	601	595	828
115	628	626	865
120	655	656	899
125	681	685	931
130	708	712	961
135	733	737	987
140	757	762	1013
145	780	785	1037
150	802	808	1060
155	823	829	1082
160	842	848	1102
165	859	866	1122
170	875	882	1141
175	889	897	1159
180	903	912	1176
185	917	927	1192
190	930	941	1207
195	942	955	1222
200	954	969	1237

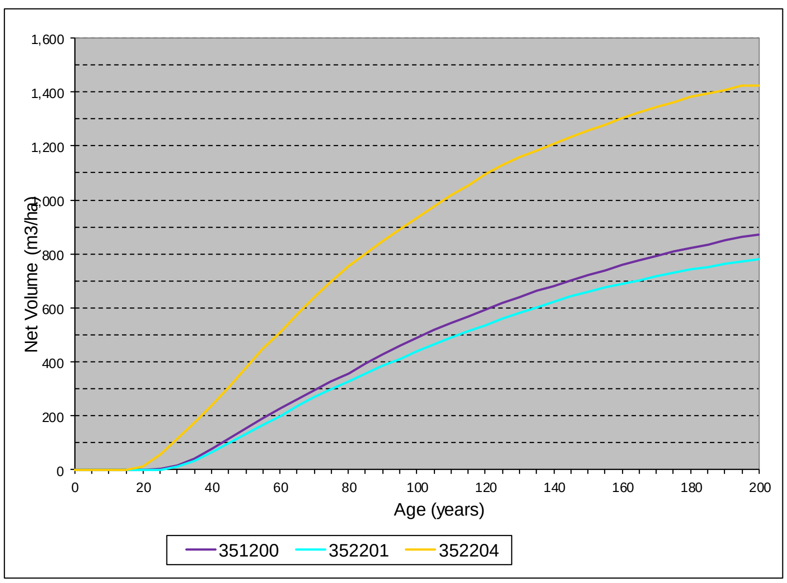


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 1 – 14 Years Old

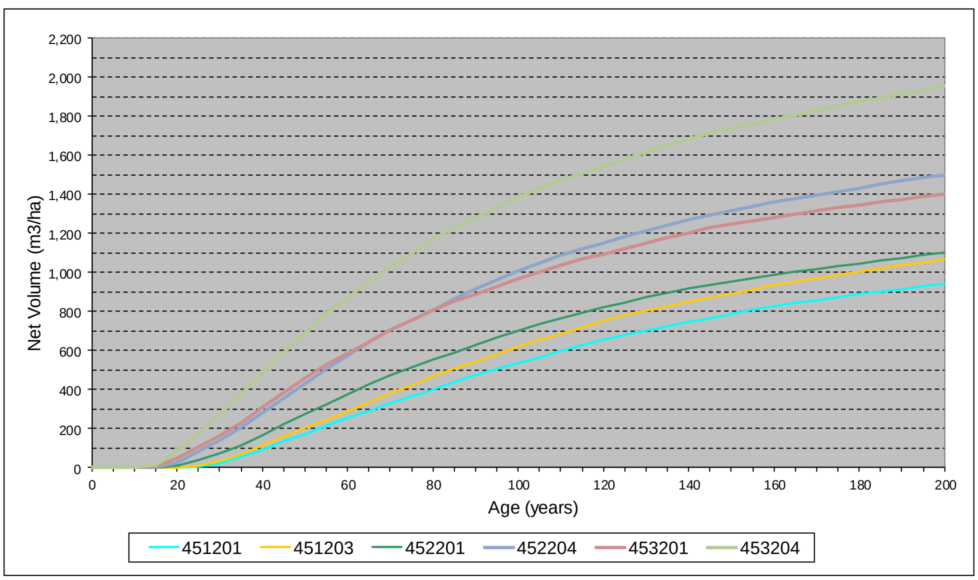
Block 3 All Variants – All Sites

	Analysis Units		
Age	351200	352201	352204
0	0	0	0
5	0	0	0
10	0	0	0
15	0	0	0
20	0	0	13
25	2	1	58
30	17	11	114
35	42	33	175
40	78	66	239
45	115	99	305
50	152	134	379
55	189	167	446
60	227	200	508
65	262	234	575
70	295	268	639
75	326	299	697
80	357	327	754
85	392	356	802
90	427	384	847
95	459	410	891
100	489	439	935
105	518	465	977
110	544	490	1017
115	570	514	1056
120	594	537	1094
125	618	560	1129
130	640	582	1158
135	662	603	1184
140	682	623	1209
145	702	641	1233
150	720	659	1256
155	739	675	1280
160	758	690	1302
165	775	703	1323
170	792	716	1344
175	808	729	1363
180	823	741	1380
185	836	752	1395
190	849	762	1409
195	861	772	1423
200	872	781	1423



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 4 CWHvm1 Variant – All Sites

	Analysis Units					
Age	**451201**	**451203**	**452201**	**452204**	**453201**	**453204**
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	0	0	1	7	13
20	1	1	11	24	49	84
25	5	9	37	80	102	174
30	23	32	71	141	162	269
35	55	69	115	206	233	376
40	93	114	166	279	309	483
45	134	158	221	358	383	588
50	173	202	273	430	456	692
55	215	247	324	502	525	789
60	254	291	377	574	585	869
65	292	335	427	642	644	947
70	328	381	475	704	702	1025
75	362	424	515	758	757	1100
80	400	465	552	809	807	1170
85	438	505	589	863	850	1230
90	474	544	627	913	888	1281
95	507	582	665	961	927	1331
100	538	619	701	1006	966	1381
105	567	654	735	1049	1003	1429
110	597	687	766	1086	1037	1472
115	626	720	794	1120	1067	1509
120	653	750	821	1151	1095	1544
125	678	779	846	1181	1122	1578
130	701	803	872	1212	1151	1615
135	723	827	896	1241	1178	1650
140	745	849	917	1269	1203	1683
145	766	871	937	1295	1228	1715
150	787	892	955	1317	1248	1739
155	807	913	972	1338	1266	1763
160	826	933	988	1358	1283	1785
165	842	952	1002	1377	1299	1806
170	858	970	1016	1395	1315	1827
175	874	988	1030	1414	1331	1850
180	888	1005	1044	1432	1346	1872
185	902	1021	1059	1450	1361	1893
190	915	1037	1073	1468	1375	1913
195	927	1052	1087	1484	1389	1933
200	939	1066	1100	1500	1402	1952

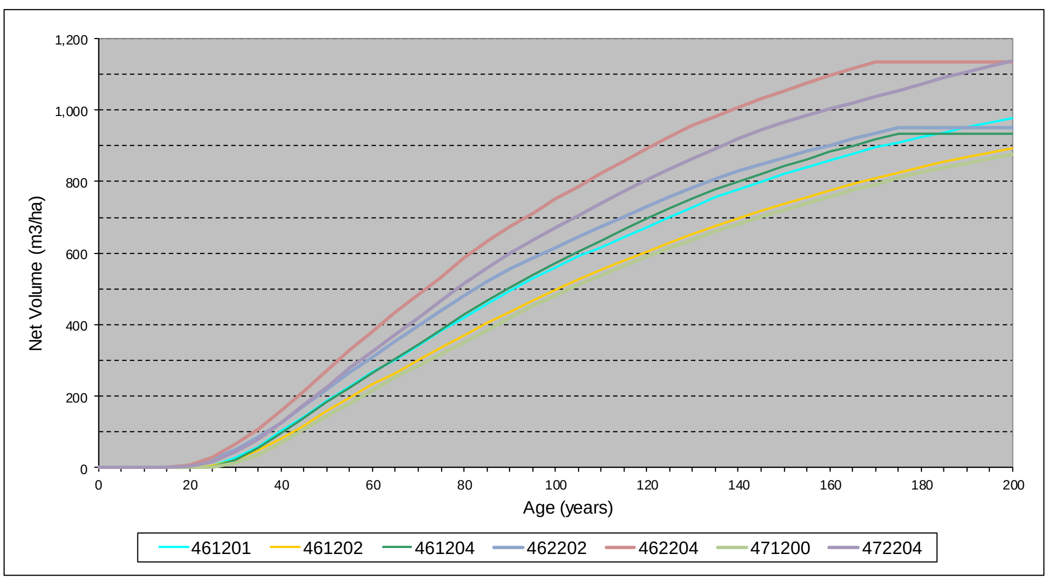


Net Merchantable Volume Yield Tables

Existing Managed Stands Aged 1 – 14 Years Old

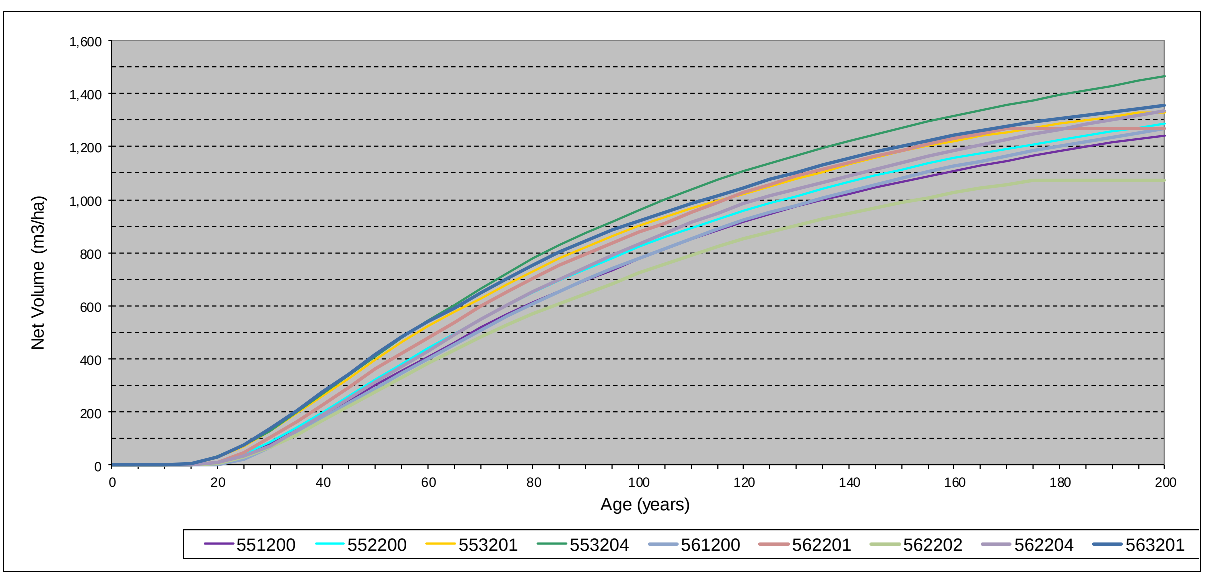
Block 4 CWHvm2 and MHmm1 Variants – All Sites

	Analysis Units						
Age	461201	461202	461204	462202	462204	471200	472204
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
20	0	0	0	5	6	0	3
25	6	5	4	23	30	1	18
30	28	21	22	50	66	13	45
35	60	48	57	84	108	36	80
40	101	80	97	125	161	71	127
45	142	117	140	171	214	107	176
50	186	157	182	219	272	144	225
55	228	197	224	266	328	180	277
60	266	232	264	310	380	217	324
65	302	265	304	353	433	252	371
70	342	301	346	397	485	286	419
75	381	337	386	440	535	318	467
80	420	371	428	481	586	350	515
85	458	405	467	520	632	385	559
90	495	436	504	554	674	419	600
95	530	467	539	585	712	452	636
100	561	498	572	615	751	482	670
105	590	526	604	645	787	511	705
110	617	553	635	673	824	538	740
115	644	579	666	703	859	564	774
120	673	604	696	731	893	589	806
125	701	629	724	758	926	614	836
130	729	653	752	784	957	637	865
135	755	676	777	807	983	660	893
140	779	698	800	828	1008	681	920
145	801	719	822	848	1032	702	944
150	822	738	843	867	1055	721	965
155	841	757	863	885	1076	740	984
160	860	775	883	902	1096	759	1003
165	878	793	901	919	1115	776	1020
170	895	809	918	935	1134	793	1038
175	910	825	934	950	1134	810	1055
180	924	841	934	950	1134	825	1072
185	938	855	934	950	1134	839	1090
190	951	868	934	950	1134	852	1106
195	964	881	934	950	1134	864	1123
200	976	894	934	950	1134	876	1138



Net Merchantable Volume Yield Tables
Existing Managed Stands Aged 1 – 14 Years Old
Block 5 All Variants – All Sites

	Analysis Units								
Age	**551200**	**552200**	**553201**	**553204**	**561200**	**562201**	**562202**	**562204**	**563201**
0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	1	0	3	4	0	0	0	0	4
20	8	9	29	34	2	10	6	8	30
25	34	39	71	76	24	49	30	34	77
30	77	86	129	129	69	105	68	74	138
35	132	142	194	197	122	165	115	131	204
40	188	200	263	270	177	227	167	190	276
45	245	260	328	340	234	293	221	250	343
50	302	324	399	412	289	362	276	313	415
55	356	383	466	480	345	422	328	371	482
60	408	439	524	545	399	479	382	430	541
65	462	494	575	602	454	539	435	490	593
70	517	549	626	664	509	599	484	550	649
75	568	603	681	723	561	654	529	605	703
80	614	650	731	778	609	705	570	654	754
85	656	695	779	829	654	752	607	698	802
90	695	739	823	874	698	796	645	743	846
95	735	782	862	917	739	837	684	789	886
100	775	822	900	959	779	876	722	833	920
105	814	859	933	1000	817	912	757	874	953
110	850	893	965	1039	854	952	790	913	984
115	885	926	995	1076	889	991	822	950	1,013
120	916	957	1021	1108	922	1027	851	984	1,045
125	947	987	1049	1138	952	1058	878	1013	1,075
130	974	1014	1077	1167	979	1088	903	1040	1,103
135	999	1040	1104	1194	1006	1114	927	1065	1,129
140	1022	1065	1131	1220	1032	1138	948	1089	1,156
145	1044	1090	1157	1246	1057	1163	969	1113	1,179
150	1065	1113	1182	1270	1082	1186	989	1138	1,202
155	1087	1135	1204	1294	1104	1208	1008	1162	1,223
160	1108	1156	1222	1315	1125	1229	1026	1185	1,243
165	1128	1175	1239	1336	1145	1248	1043	1207	1,260
170	1147	1193	1255	1356	1165	1266	1057	1227	1,276
175	1165	1209	1270	1375	1183	1266	1072	1246	1,291
180	1182	1226	1285	1393	1201	1266	1072	1265	1,305
185	1199	1241	1298	1411	1219	1266	1072	1283	1,318
190	1214	1256	1312	1429	1236	1266	1072	1300	1,331
195	1228	1270	1326	1447	1252	1266	1072	1317	1,344
200	1242	1285	1326	1464	1268	1266	1072	1334	1,357



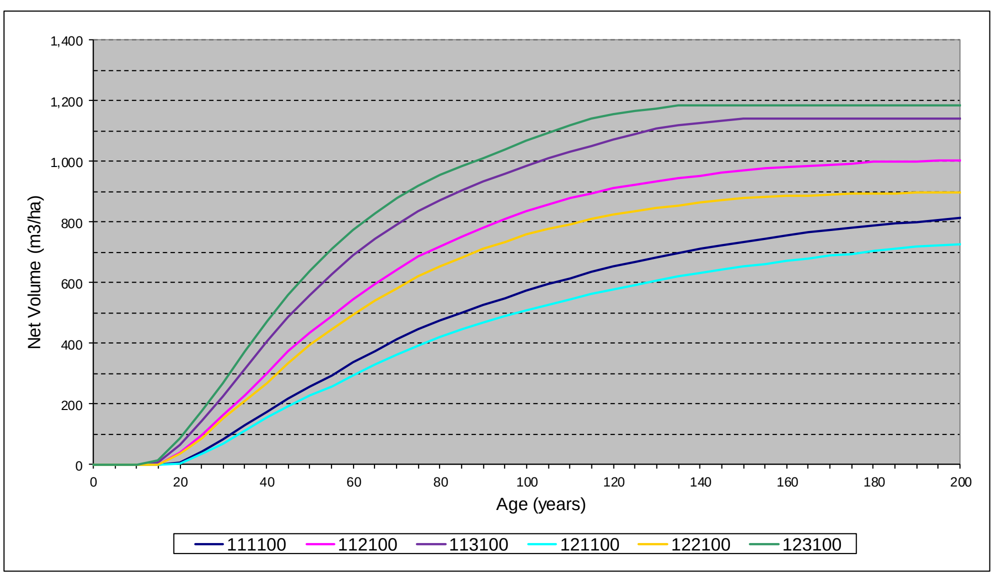
Appendix G: Future Managed Yield Tables

Net Merchantable Volume Yield Tables

Future Managed Stands

Block 1 CWHdm and CWHxm2 Variants – All Sites

	Analysis Units					
Age	111100	112100	113100	121100	122100	123100
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	1	8	0	0	14
20	6	39	64	3	35	87
25	43	97	146	36	86	179
30	82	164	226	68	151	270
35	130	229	317	112	210	374
40	175	301	407	154	270	471
45	217	372	485	191	333	558
50	256	434	560	227	394	640
55	295	489	628	259	448	712
60	337	545	689	295	495	774
65	375	596	743	329	539	829
70	412	643	792	361	581	879
75	445	685	835	392	619	920
80	475	720	871	420	653	956
85	501	752	905	446	684	984
90	526	780	932	469	710	1011
95	549	808	958	490	734	1040
100	573	835	984	509	757	1067
105	595	857	1008	528	776	1092
110	615	877	1030	545	793	1117
115	634	894	1051	562	808	1139
120	652	910	1071	578	823	1155
125	668	923	1089	592	836	1165
130	683	934	1107	606	845	1174
135	697	944	1117	619	854	1184
140	710	953	1126	631	863	1184
145	723	962	1133	643	870	1184
150	735	970	1141	653	878	1184
155	746	976	1141	662	883	1184
160	756	980	1141	671	885	1184
165	765	985	1141	680	887	1184
170	773	989	1141	688	890	1184
175	780	993	1141	695	892	1184
180	787	997	1141	703	893	1184
185	794	999	1141	710	895	1184
190	800	1000	1141	717	897	1184
195	806	1002	1141	723	898	1184
200	812	1003	1141	727	896	1184

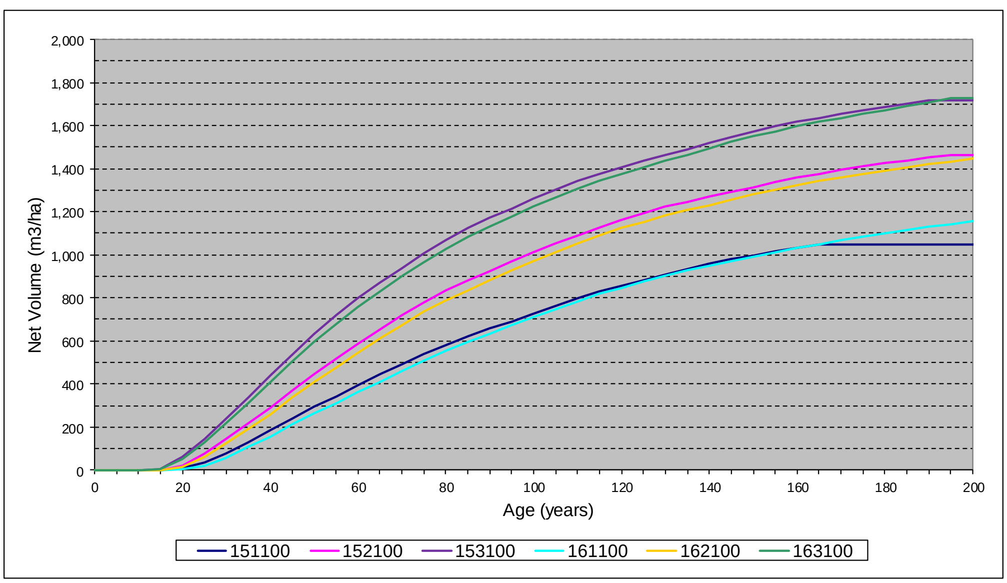


Net Merchantable Volume Yield Tables

Future Managed Stands

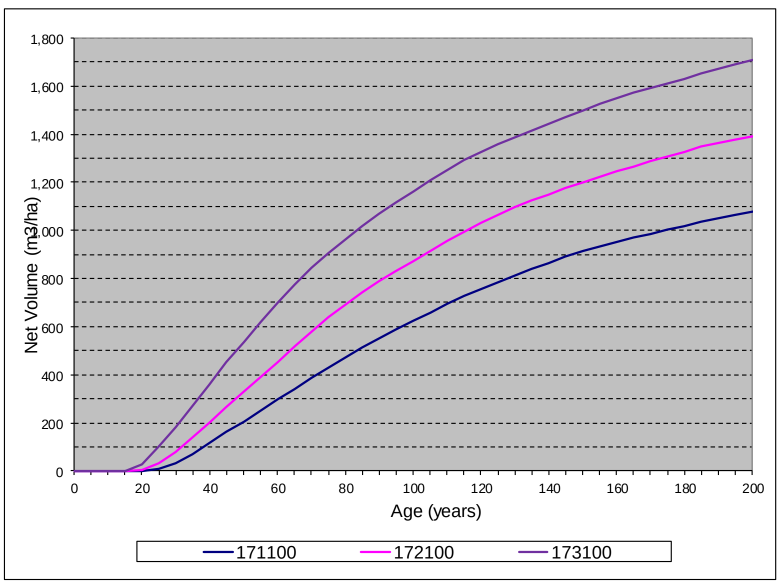
Block 1 CWHvm1 and CWHvm2 Variants – All Sites

	Analysis Units					
Age	151100	152100	153100	161100	162100	163100
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	1	1	5	0	0	3
20	12	20	61	4	14	50
25	37	75	147	20	60	129
30	75	144	239	56	125	217
35	129	217	338	106	192	310
40	185	291	440	157	261	408
45	240	367	536	210	335	501
50	294	445	633	263	410	596
55	343	516	721	311	477	681
60	395	584	800	360	544	759
65	443	654	870	409	612	830
70	491	719	941	461	676	900
75	538	780	1007	510	736	966
80	582	835	1069	555	789	1029
85	621	881	1125	596	837	1086
90	657	924	1172	634	882	1133
95	692	968	1216	672	927	1178
100	728	1012	1260	710	970	1222
105	764	1053	1302	748	1013	1266
110	797	1091	1341	784	1053	1307
115	828	1128	1376	817	1091	1344
120	857	1162	1407	847	1124	1377
125	884	1194	1435	876	1153	1406
130	910	1222	1462	904	1180	1435
135	935	1246	1491	927	1206	1465
140	959	1270	1520	950	1231	1495
145	979	1292	1547	971	1255	1523
150	997	1314	1573	991	1279	1550
155	1014	1336	1597	1011	1302	1574
160	1031	1357	1618	1030	1323	1597
165	1046	1375	1636	1049	1343	1618
170	1046	1393	1654	1066	1360	1636
175	1046	1410	1670	1083	1376	1654
180	1046	1426	1685	1099	1391	1671
185	1046	1439	1701	1114	1405	1690
190	1046	1452	1718	1129	1419	1707
195	1046	1463	1718	1143	1432	1725
200	1046	1463	1718	1156	1445	1725



Net Merchantable Volume Yield Tables
Future Managed Stands
Block 1 MHmm1 Variant – All Sites

	Analysis Units		
Age	171100	172100	173100
0	0	0	0
5	0	0	0
10	0	0	0
15	0	0	1
20	1	3	29
25	9	31	101
30	33	81	183
35	70	140	268
40	115	201	357
45	163	264	451
50	207	329	538
55	251	393	620
60	296	454	702
65	341	516	776
70	385	579	843
75	428	637	905
80	472	691	962
85	513	742	1016
90	550	787	1069
95	587	831	1118
100	623	874	1164
105	658	917	1209
110	694	958	1252
115	726	996	1291
120	757	1031	1326
125	786	1064	1358
130	813	1096	1387
135	840	1124	1415
140	865	1150	1443
145	890	1175	1472
150	913	1199	1500
155	933	1222	1527
160	952	1245	1550
165	969	1267	1573
170	986	1288	1593
175	1003	1309	1612
180	1018	1328	1631
185	1034	1347	1651
190	1049	1363	1671
195	1063	1378	1690
200	1077	1391	1709

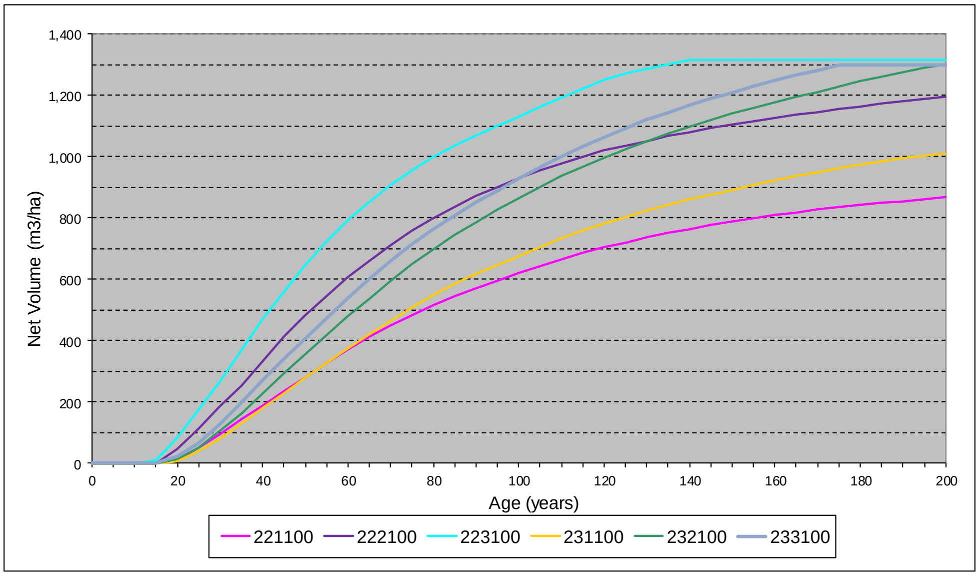


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 2 CWHxm2 and CWHmm1 Variants – All Sites

	Analysis Units					
Age	221100	222100	223100	231100	232100	233100
0	0	0	0	0	0	0
5	0	0	0	0	0	0
10	0	0	0	0	0	0
15	0	1	12	0	0	2
20	10	47	83	5	15	22
25	50	113	175	39	51	68
30	95	185	265	79	104	128
35	144	255	371	131	164	198
40	190	335	471	180	229	270
45	235	413	560	228	294	339
50	279	482	646	279	357	409
55	326	544	724	325	419	475
60	370	605	791	373	479	538
65	412	661	852	420	538	601
70	451	712	908	466	596	660
75	484	758	956	509	649	714
80	514	799	1000	548	698	764
85	543	836	1035	584	743	808
90	571	870	1067	616	786	850
95	597	901	1099	646	827	889
100	621	930	1131	676	864	928
105	644	955	1161	704	900	965
110	665	978	1191	732	935	1000
115	685	1000	1220	757	967	1033
120	703	1019	1248	781	996	1063
125	720	1036	1271	803	1024	1092
130	737	1051	1286	824	1049	1119
135	751	1066	1301	843	1074	1143
140	763	1079	1315	860	1098	1166
145	776	1092	1315	876	1120	1189
150	787	1103	1315	891	1140	1209
155	798	1114	1315	906	1159	1228
160	808	1125	1315	921	1177	1247
165	818	1135	1315	935	1194	1264
170	827	1144	1315	948	1211	1281
175	835	1154	1315	961	1228	1297
180	842	1163	1315	974	1244	1297
185	848	1172	1315	985	1259	1297
190	855	1180	1315	994	1274	1297
195	860	1188	1315	1003	1288	1297
200	866	1195	1315	1011	1301	1297

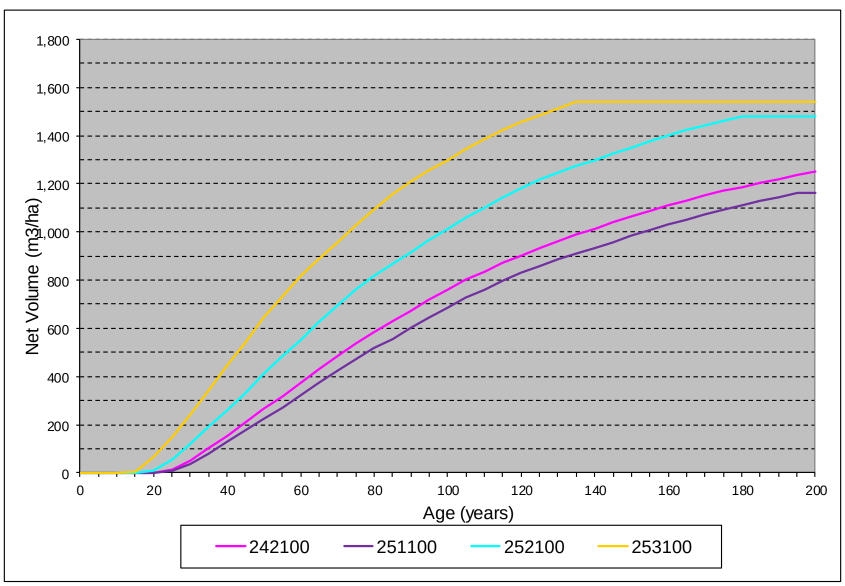


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 2 CWHmm2 and CWHvm1 Variants – All Sites

	Analysis Units			
Age	242100	251100	252100	253100
0	0	0	0	0
5	0	0	0	0
10	0	0	0	0
15	0	0	0	5
20	1	0	10	63
25	15	9	56	148
30	52	36	120	240
35	102	81	189	339
40	155	128	260	446
45	211	176	332	541
50	265	224	412	642
55	316	272	484	734
60	374	320	552	816
65	430	371	627	887
70	484	423	696	959
75	535	472	760	1028
80	584	516	819	1094
85	630	557	869	1156
90	674	601	917	1208
95	718	645	965	1254
100	761	687	1013	1299
105	801	726	1059	1344
110	837	763	1102	1386
115	871	798	1144	1425
120	902	831	1182	1456
125	933	859	1217	1485
130	961	886	1245	1513
135	988	911	1273	1541
140	1014	935	1299	1541
145	1039	958	1324	1541
150	1063	983	1350	1541
155	1087	1007	1375	1541
160	1110	1030	1399	1541
165	1132	1052	1422	1541
170	1152	1072	1444	1541
175	1170	1092	1462	1541
180	1187	1111	1478	1541
185	1204	1129	1478	1541
190	1220	1146	1478	1541
195	1235	1162	1478	1541
200	1250	1162	1478	1541

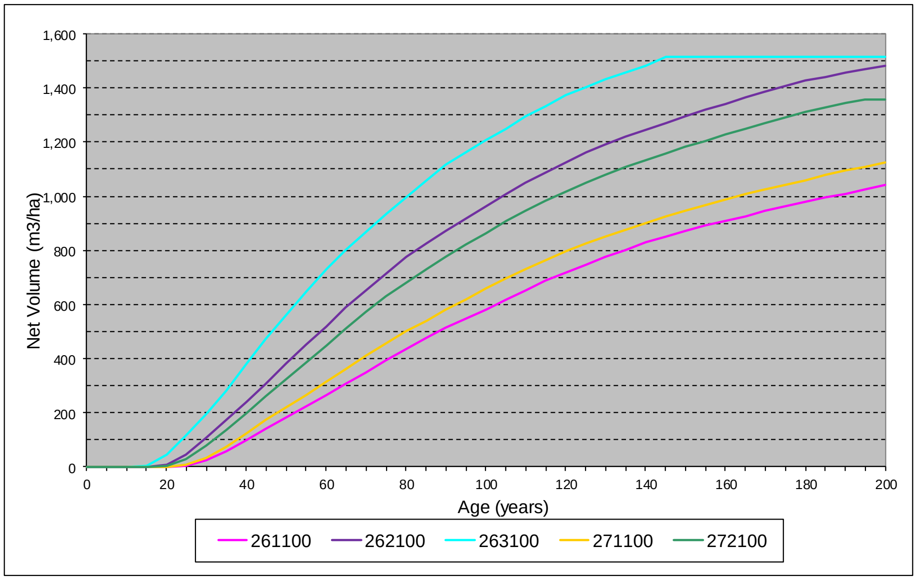


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 2 CWHvm2 and MHmm1 Variants – All Sites

	Analysis Units				
Age	261100	262100	263100	271100	272100
0	0	0	0	0	0
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	2	0	0
20	0	7	43	1	4
25	5	47	116	9	30
30	24	107	196	34	79
35	59	172	283	75	137
40	99	239	381	122	198
45	142	307	471	172	261
50	184	382	561	219	325
55	225	453	648	265	387
60	266	518	730	313	448
65	308	587	801	361	512
70	348	653	866	409	573
75	394	715	934	456	630
80	437	774	997	501	682
85	477	825	1058	541	732
90	513	872	1116	580	777
95	547	915	1164	619	821
100	581	962	1208	658	865
105	618	1007	1251	695	907
110	653	1049	1294	731	947
115	687	1089	1334	765	983
120	718	1126	1372	796	1017
125	747	1161	1402	825	1049
130	775	1193	1430	851	1079
135	802	1220	1457	877	1107
140	828	1246	1483	901	1133
145	851	1271	1513	924	1158
150	871	1294	1513	947	1182
155	891	1319	1513	968	1205
160	909	1342	1513	988	1228
165	927	1365	1513	1008	1250
170	944	1386	1513	1026	1271
175	961	1407	1513	1043	1291
180	978	1426	1513	1060	1310
185	994	1441	1513	1077	1329
190	1010	1456	1513	1094	1344
195	1025	1470	1513	1109	1358
200	1040	1483	1513	1125	1358

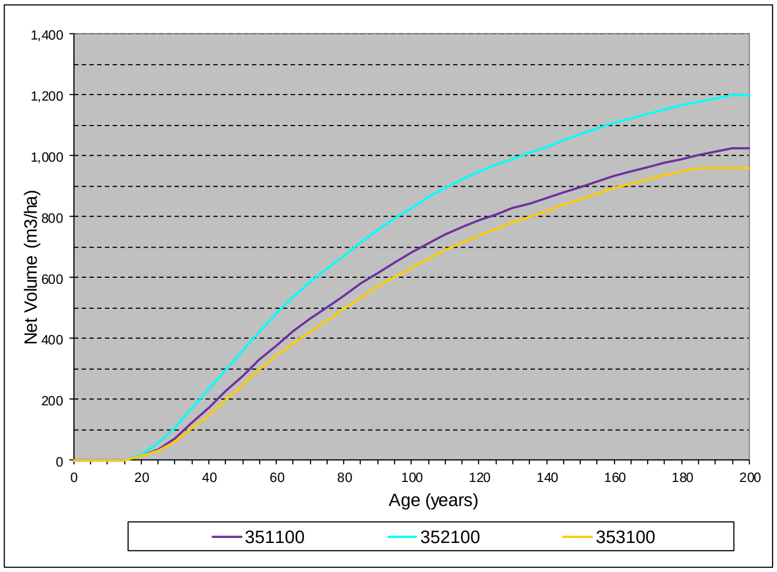


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 3 All Variants – All Sites

	Analysis Units		
Age	351100	352100	353100
0	0	0	0
5	0	0	0
10	0	0	0
15	1	1	1
20	13	19	13
25	35	59	32
30	73	110	61
35	123	171	103
40	175	234	150
45	228	299	199
50	277	360	246
55	330	422	296
60	379	483	343
65	424	536	384
70	464	584	422
75	501	628	458
80	541	673	496
85	579	715	535
90	615	755	570
95	649	794	603
100	681	829	633
105	711	863	662
110	739	894	688
115	765	923	715
120	787	946	738
125	807	968	760
130	826	989	780
135	844	1009	800
140	861	1029	818
145	878	1050	837
150	898	1070	856
155	916	1090	875
160	933	1108	893
165	948	1123	908
170	963	1137	922
175	976	1151	935
180	989	1164	948
185	1002	1176	960
190	1013	1187	960
195	1023	1197	960
200	1023	1197	960

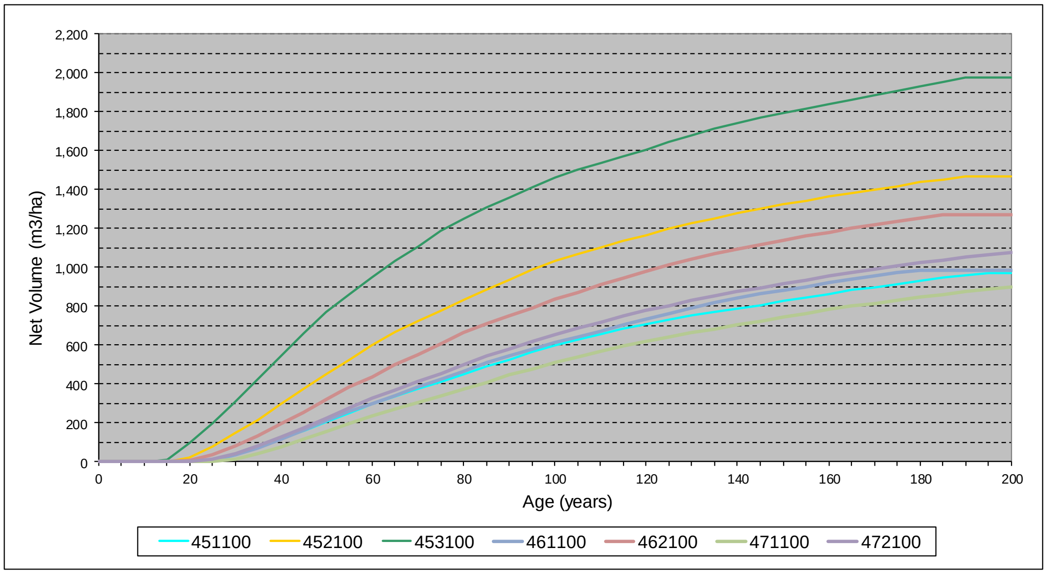


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 4 All Variants – All Sites

Age	Analysis Units						
	451100	452100	453100	461100	462100	471100	472100
0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
15	0	1	12	0	0	0	0
20	0	23	95	0	6	0	1
25	7	81	199	9	35	3	14
30	33	146	308	35	82	16	43
35	74	217	430	72	136	43	83
40	117	294	544	117	194	78	128
45	161	375	660	163	254	116	176
50	205	448	769	211	320	155	224
55	253	526	864	257	383	196	277
60	297	599	945	298	438	236	326
65	338	666	1030	338	496	272	370
70	376	725	1109	382	552	306	414
75	412	778	1186	425	609	338	455
80	451	833	1251	467	662	373	499
85	489	886	1306	508	708	409	542
90	526	937	1358	546	751	445	581
95	562	985	1411	581	792	478	617
100	596	1030	1459	614	834	509	652
105	627	1068	1500	644	872	539	685
110	657	1102	1536	672	909	566	718
115	685	1134	1570	702	943	593	749
120	708	1165	1606	732	977	618	777
125	730	1196	1644	762	1011	641	803
130	750	1225	1680	790	1040	663	828
135	769	1252	1713	817	1068	684	852
140	787	1278	1742	840	1093	704	873
145	806	1300	1767	862	1116	723	893
150	826	1322	1791	882	1138	744	914
155	846	1342	1814	901	1160	763	935
160	864	1361	1836	920	1180	782	954
165	882	1380	1861	938	1200	799	972
170	898	1399	1885	955	1219	815	990
175	914	1417	1908	970	1238	831	1007
180	930	1435	1930	985	1255	846	1023
185	944	1452	1951	985	1270	861	1038
190	956	1468	1972	985	1270	874	1053
195	967	1468	1972	985	1270	886	1065
200	967	1468	1972	985	1270	897	1077

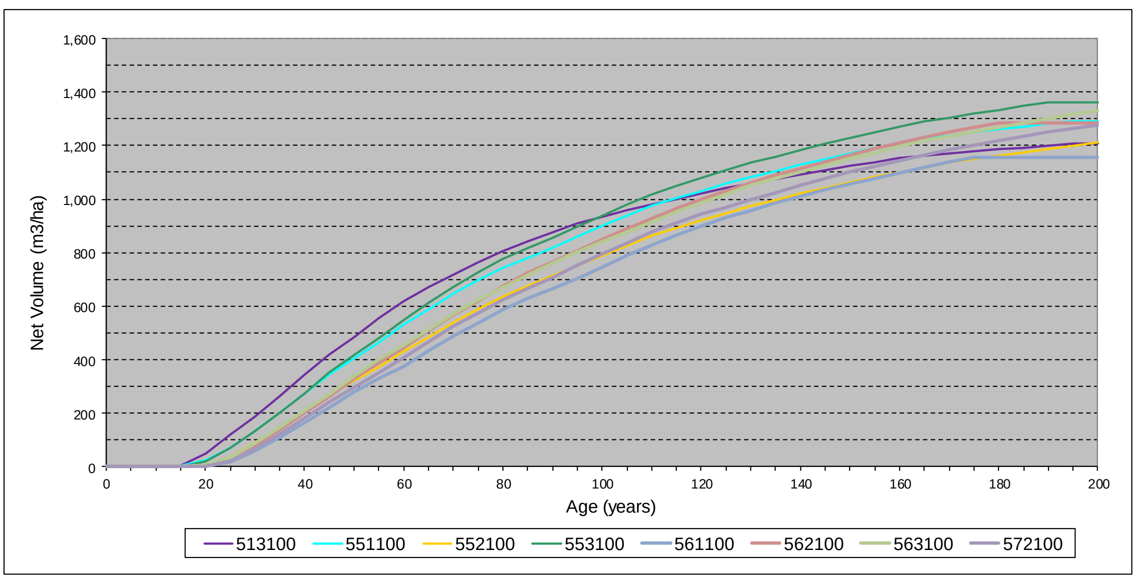


Net Merchantable Volume Yield Tables

Future Managed Stands

Block 5 All Variants – All Sites

	Analysis Units							
Age	513100	551100	552100	553100	561100	562100	563100	572100
0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	4	2	0	1	0	0	0	0
20	51	23	8	19	1	4	6	2
25	118	71	37	69	20	31	36	24
30	187	134	89	134	60	82	88	67
35	264	201	144	203	111	140	147	122
40	345	273	201	275	165	200	208	179
45	420	345	264	351	223	264	272	241
50	487	407	322	420	279	330	339	297
55	555	465	375	482	328	388	399	350
60	616	530	431	549	377	447	456	408
65	671	590	486	612	432	509	511	468
70	719	646	538	672	486	567	569	524
75	762	697	588	727	538	622	624	576
80	804	742	635	775	586	675	672	623
85	842	782	676	817	629	723	717	667
90	875	818	715	856	667	767	760	708
95	907	860	751	897	705	808	802	751
100	934	901	790	939	746	848	841	795
105	958	939	827	979	789	888	878	838
110	981	974	862	1016	829	928	913	877
115	1002	1003	894	1049	866	965	951	911
120	1022	1031	922	1080	899	1000	987	942
125	1040	1057	948	1109	930	1031	1019	970
130	1057	1081	974	1135	958	1060	1050	998
135	1073	1105	997	1159	985	1088	1077	1024
140	1090	1129	1020	1183	1010	1114	1103	1051
145	1106	1150	1042	1206	1034	1140	1127	1076
150	1123	1171	1062	1228	1056	1165	1151	1100
155	1138	1190	1082	1250	1078	1188	1174	1123
160	1153	1209	1101	1270	1099	1211	1196	1145
165	1162	1223	1118	1289	1119	1232	1216	1166
170	1170	1236	1135	1305	1138	1252	1235	1185
175	1178	1249	1150	1320	1155	1269	1252	1203
180	1186	1260	1163	1334	1155	1286	1269	1220
185	1193	1271	1176	1347	1155	1286	1285	1236
190	1200	1282	1188	1360	1155	1286	1301	1251
195	1206	1292	1199	1360	1155	1286	1316	1264
200	1206	1292	1210	1360	1155	1286	1331	1277



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