TIMBER SUPPLY ANALYSIS
ANALYSIS REPORT

TREE FARM LICENSE 23
TIMBER SUPPLY REVIEW 2008

International Forest Products Limited

Nakusp, B.C.

Prepared by:

Timberline Natural Resource Group Ltd.

Kelowna, B.C.

Reference: BC 040 8515

January 2009

Timberline
Natural Resource Group

May, 2009

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International Forest Products Limited.

Attention: Chris Shelly

Reference: Tree Farm License23 Timber Supply Analysis Report

Please find enclosed the timber supply analysis report for Tree Farm License 23. Do not hesitate to call if you have any questions or comments related to the document or any other aspect of the analysis.

Yours truly,

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DOCUMENT HISTORY

Revision Number	Description	Submitted Date	Submitted by:
1	Analysis Report	January 2009	Kelly Sherman
2	Analysis Report	May 2009	Kelly Sherman

EXECUTIVE SUMMARY

International Forest Products Limited has contracted Timberline Natural Resource Group Ltd. to the complete the 2008 timber supply review for Tree Farm License 23.

Two documents are supplied as part of this process:

- An Information Package which is a summary of the inputs and assumptions made in preparing the timber supply analysis data model; and
- An Analysis Report which documents the results from modeling the current management practices (basecase) and a number of sensitivity analyses.

The timber supply analysis provides the technical basis for the Chief Forester of British Columbia, or his designate, to determine an allowable annual cut for Tree Farm License 23 for the next five years.

Table 1 presents the results of the landbase classification process. The timber harvestable landbase is 144,623ha.

Table 1 Timber Harvesting Landbase Determination

Land Classification	HLPO Reduction (ha)	Gross / Productive Area (ha)	TSR Reduction (ha)
Gross MoF TFL Boundary	**551,485**		**551,471**
Private, non-TFL	0	6,483	6,456
Parkland	269	177	20
BCTS	0	157,393	157,363
Non-productive , Non-forest	182,890	182,153	121,469
Road	4,214	6,307	4,294
Non-commercial brush	190	188	167
Non-productive Reductions	**187,563**		**289,770**
Productive Forest	**363,922**		**261,701**
Inoperable	100,798	71,258	71,258
Low Productivity	3,132	8,459	2,163
Uneconomic	4,104	13,957	3,834
Deciduous	1,744	1,860	1,160
Riparian	9,934	9,133	6,069
Soils (Terrain IV, V)	9,588	33,736	6,819
Regeneration ESA	3,350	21,742	2,121
Wildlife Tree Patches	0	1,313	1,199
Trails and Landings	2,957	66,358	2,489
OGMA	0	41,832	11,279
Caribou	0	34,135	8,687
Total Productive Reductions	135,607		117,078
Current Timber Harvesting Landbase	**228,315**		**144,623**

The basecase reflects current management performance as of the date of commencement for the preparation of this timber supply analysis. This analysis incorporates the following factors:

- Landbase summary (netdown) has been updated;
- Managed AUs have been created using BEC and leading site series;
- Managed stand yield assumptions have been revisited by Interfor;
- Updated inventory and disturbances;
- New visuals database;
- New caribou dataset;
- New Ungulate Winter Range (UWR);
- Draft Spatial OGMAs;
- Mountain pine beetle (MPB) modeling; and
- Incorporating natural disturbances in the non-timber harvesting landbase (non-THLB).

Figure 1 shows the harvest level and timber availability for the basecase. The 20 year initial harvest level is 450,000m^3/year which then steps down to 402,000m3/year. After 100 years, the long term harvest level can increase to 518,000m^3/year.

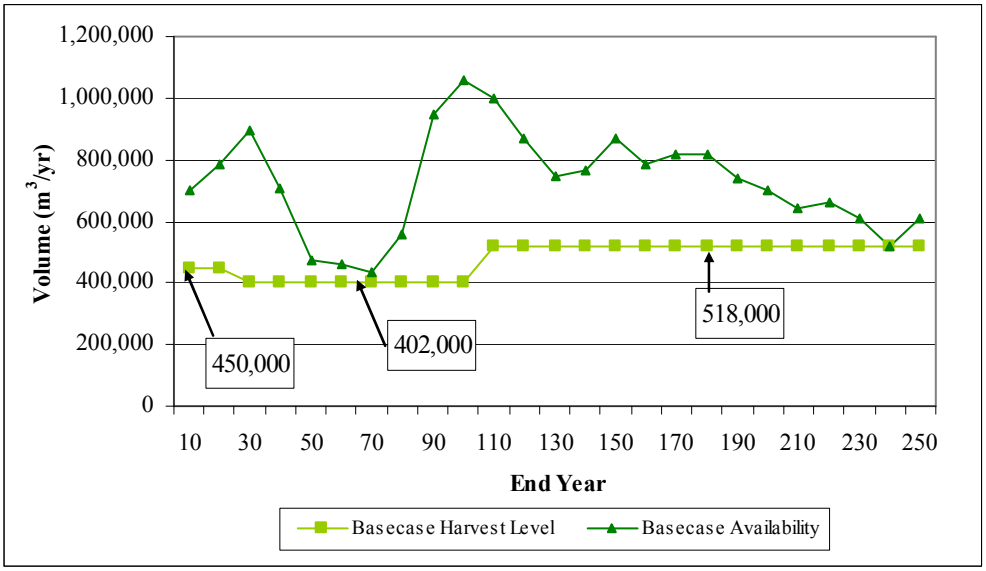

Figure 1 Harvest Level and Availability- Basecase

Table 2 shows a summary of the short, mid and long term harvest levels for the sensitivities.

Table 2 Summary of Sensitivities

Scenario Name	Harvest Level (m3/year)			Change from Basecase		
	1-20	21-100	101-250	1-20	21-100	101-250
Basecase	450,000	402,000	518,000	N/A	N/A	N/A
THLB - 10%	413,000	365,000	467,000	-8%	-9%	-10%
THLB + 10%	488,000	440,000	561,000	8%	9%	8%
Natural Yields -10%	415,000	367,000	507,000	-8%	-9%	-2%
Natural Yields+10%	483,000	435,000	497,000	7%	8%	-4%
Managed Yields -10%	442,000	394,000	444,000	-2%	-2%	-14%
Managed Yields+10%	458,000	410,000	559,000	2%	2%	8%
MHA -10%	480,000	432,000	435,000	7%	7%	-16%
MHA +10%	411,000	363,000	544,000	-9%	-10%	5%
Managed SI-1m	436,000	388,000	452,000	-3%	-3%	-13%
Managed SI+1m	454,000	406,000	579,000	1%	1%	12%
Natural SI-1m	438,000	390,000	515,000	-3%	-3%	-1%
Natural SI+1m	472,000	424,000	515,000	5%	5%	-1%
Green-up -1m	450,000	402,000	516,000	0%	0%	0%
Green-up +1m	448,000	400,000	515,000	0%	0%	-1%
Aspatial Seral	463,000	415,000	524,000	3%	3%	1%
No Visuals	460,000	412,000	516,000	2%	2%	0%
SARCO Caribou	454,000	406,000	516,000	1%	1%	0%
Relative Oldest First	451,000	403,000	512,000	0%	0%	-1%
Maximum Volume First	451,000	403,000	516,000	0%	0%	0%
No IRM	451,000	403,000	512,000	0%	0%	-1%
No Disturbing the non-THLB	450,000	402,000	517,000	0%	0%	0%
No Genetic Gains	449,000	401,000	487,000	0%	0%	-6%
Spatial Adjacency	451,000	403,000	512,000	0%	0%	-1%
Optimized OGMAs	467,000	419,000	505,000	4%	4%	-3%
No Prioritized MPB	440,000	392,000	513,000	-2%	-2%	-1%
Slower MPB Spread	452,000	404,000	513,000	0%	0%	-1%

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1.0 INTRODUCTION

This report documents the timber supply analysis that has been completed as a component of TSR 2008 for International Forest Products Limited (Interfor) Tree Farm License (TFL) 23. The analysis evaluates how current management, including management of non-timber resources, affects the supply of harvestable timber over a 250-year period. The uncertainty associated with modeling inputs is quantified through sensitivity analyses.

The analytical methodology employs a forest level simulation model, which is used to forecast the long-term development of the forest given:

- A description of the initial forest conditions;
- Expected patterns of stand growth;
- A specified set of rules for harvesting and regenerating the forest; and
- Consideration of non-timber values.

The process enables forest managers to evaluate timber availability under a range of alternative scenarios. Furthermore, the timber supply analysis provides the technical basis for the Chief Forester of British Columbia, or his designate, to determine an allowable annual cut (AAC) for TFL 23 for the next five (5) years.

2.0 GENERAL DESCRIPTION OF LANDBASE & TENURE

TFL 23 is situated in the Kootenay Region of British Columbia's south east and runs north-south along both sides of the Arrow lakes. Glacier National Park and Revelstoke are at the northern extent of the TFL and Valhalla National Park and TFL 3 near the south. Communities in the vicinity of TFL 23 include Castlegar, Nakusp and Revelstoke. TFL 23 is in the Southern Interior Forest Region in the Arrow Boundary timber supply area (TSA).

TFL 23 lies within the interior wet-belt and includes interior cedar-hemlock (ICH), interior douglas-fir (IDF) and englemann spruce sub-alpine fir (ESSF) biogeoclimatic (BEC) zones.

Harvesting has occurred on TFL 23 since the 1950's with multiple ownership changes. Recent changes include the Forest Revitalization Act (Bill 28) takebacks and Interfor purchasing the TFL from Pope and Talbot in 2008. An overview of the TFL is shown in Figure 2.1.

The current TFL 23 total area is approximately 551,471 ha, of which 261,701 ha is classed as productive land and 144,623 ha as timber harvest landbase (THLB). The AAC is currently set at 680,000 (m^3/yr) prior to the bill 28 takebacks.

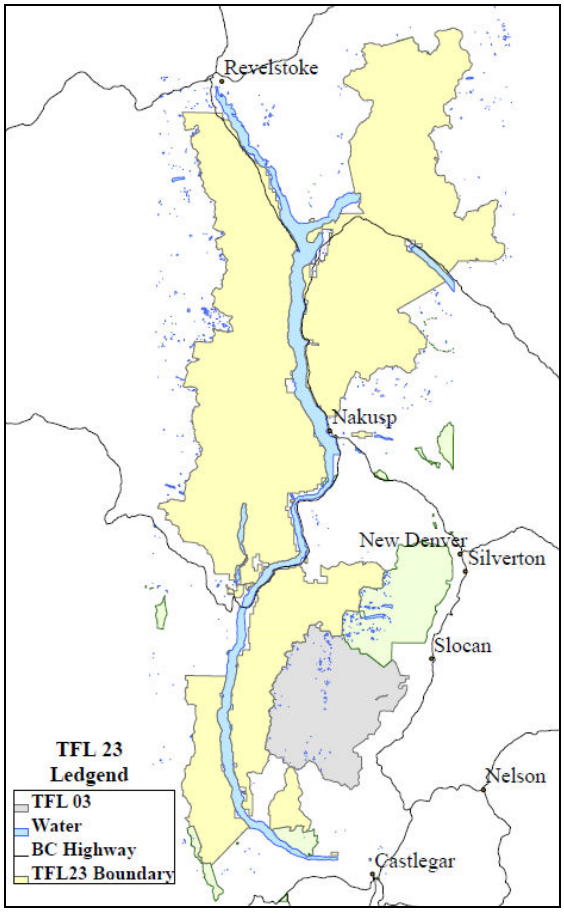

Figure 2.1 Location Map

3.0 TIMBER FLOW OBJECTIVES

Forest cover objectives and biological capacity of the net operable landbase will dictate timber availability and harvest level options that are available. The choice of harvest flow will reflect the following objectives:

- Maintain the initial harvest level of 450,000m3/year for 20 years;
- Limit the rate of decadal decline to a maximum of 10%;
- Maintain a mid-term harvest level that represents the basic productivity of the landbase; and
- Achieve a stable long-term harvest level over a 250 year planning horizon.

4.0 FOREST INFORMATION

A complete description of the information used in this timber supply analysis is contained in the document Timber Supply Analysis, Information Package, Tree Farm License 23, TSR 2008 (Timberline, 2008).

4.1 Landbase Classification

Land is classified into one of the following four broad categories:

1. Unproductive for forest management purposes;
2. Inoperable, either currently or in the future, under the assumptions of the analysis;
3. Unavailable for harvest for other reasons (e.g. wildlife habitat or sensitive soils); or
4. Available for integrated use (including harvesting).

The classification of the TFL 23 landbase area is summarized in the following two figures. Figure 4.1 illustrates the distribution of the total TFL area. Area that is unproductive for forest management is shown as non productive. This includes areas removed as bill 28 takeback areas, and is therefore large at 53% of the total TFL 23 area. The remaining productive area is classified as productive non-THLB (treed but unavailable for harvesting) or THLB.

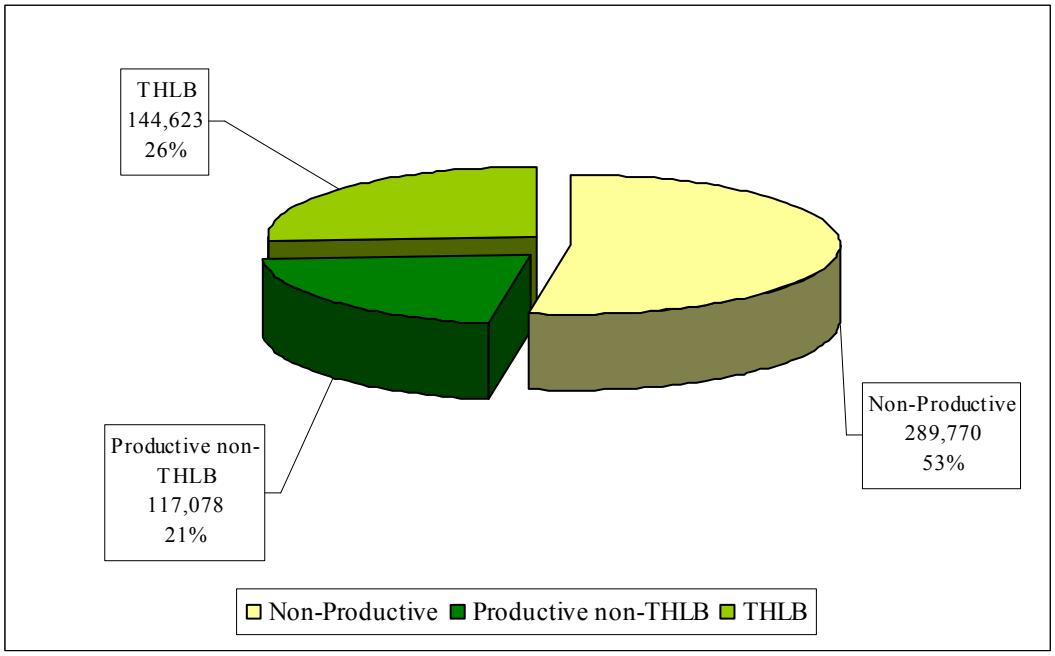

Figure 4.1 Distribution of Total TFL Area

Figure 4.2 illustrates the process by which the productive landbase is classified in terms of its contribution to non-timber uses. The non-THLB productive area is broken down by netdown classification e.g. inoperable, low productivity. The inoperable netdown is the first netdown and

accounts for 61% of the productive area removed. For more detail on the netdown, refer to the I*nformation Package* (Timberline, 2008).

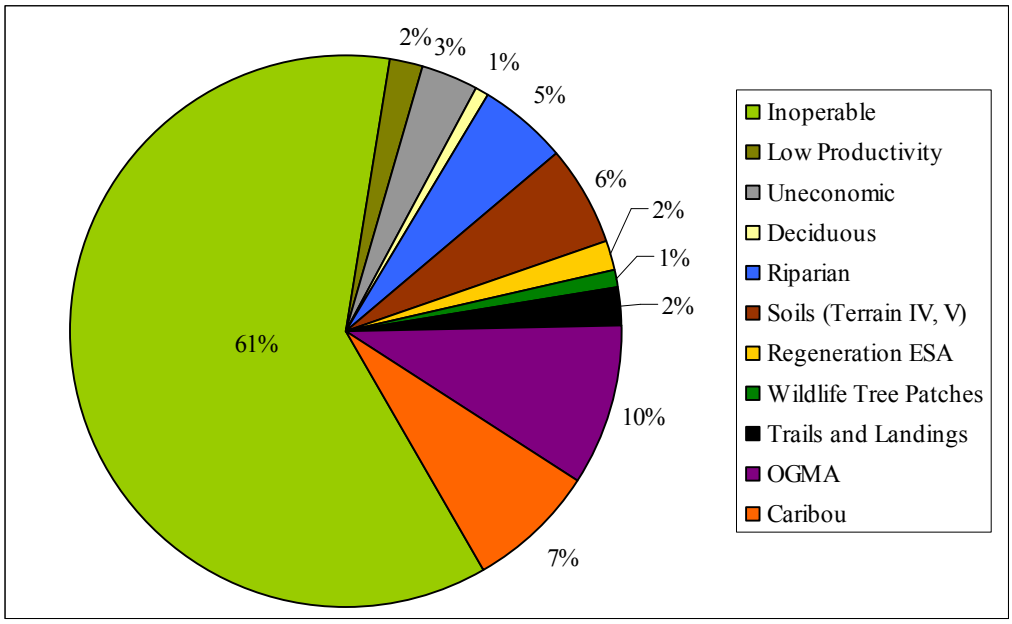

Figure 4.2 Classification of non-THLB Productive Landbase

4.2 Forest Inventory

The TFL 23 forest cover inventory has been updated for disturbance to 2008 and projected to 2008. Figure 4.3 shows the distribution of net landbase area by ageclass (the oldest age in each 10-year age class is shown on the x-axis).

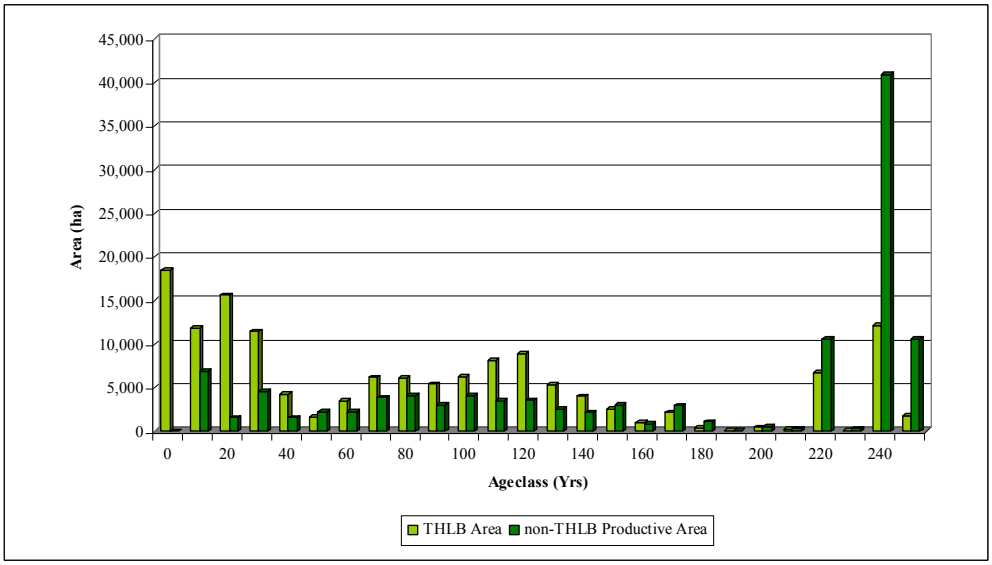

Figure 4.3 Distribution of TFL 23 by Ageclass

Figure 4.4 shows the THLB and non-THLB area by leading species. The THLB is 35% douglas-fir leading and 21% is hemlock leading.

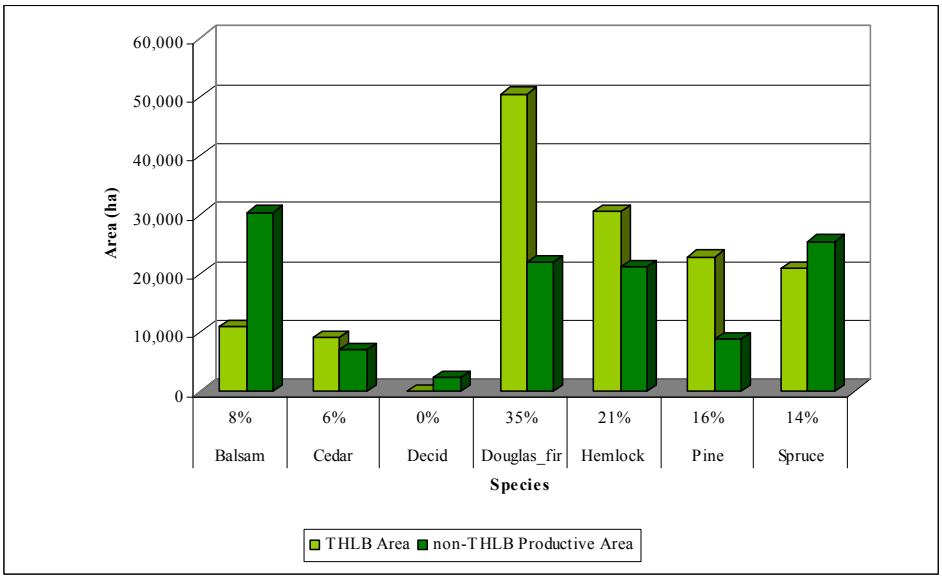

Figure 4.4 Distribution of TFL 23 by Leading Species

4.3 Growth and Yield

4.3.1 Natural Stands

Natural stands were defined as all stands in the current forest cover inventory with age greater than 35 years. Natural stand yield tables (NSYTs) for the timber supply analysis were developed using the batch version of the Ministry of Forests (MoFR) program *Batch*VDYP (version 6.6d). For more details, refer to the *Information Package* (Timberline, 2008).

4.3.2 Managed Stands

Managed stand yield tables (MSYTs) were developed using *Batch*TIPSY *(version 4.1)*. Managed stand yields were split into existing managed and future managed stands. Existing managed stands were defined as all stands in the current forest cover inventory with age less than or equal to 35 years. Genetic gains were not applied to existing managed stand yields but were applied to future managed. For more details, refer to the *Information Package* (Timberline, 2008).

4.3.3 Theoretical Productivity Estimates

Table 4.1 provides average theoretical productivity estimates for the TFL 23 landbase, derived from both natural and managed stand yield tables. The actual long-term harvest level will always be below the theoretical long run sustained yield (LRSY), which is attainable only if all stands are harvested at the age of maximum mean annual increment (MAI). This is unattainable due to the imposition of minimum harvest ages and forest cover requirements, which alter the time of harvest.

Table 4.1 Theoretical Long-Term Productivity Estimates

	Natural	Managed
Average CMAI	2.37	4.29
Average MAI Age	118	105
Total THLB Area	144,758	144,758
LRSY (before NRLs)	343,371	620,822
LRSY (after NRLs @ 16,500)	**327,000**	**604,500**

4.3.4 Analysis Units

In order to reduce the complexity of the forest description for the purposes of timber supply simulation, considerable aggregation of individual stands is necessary. However, it is critical that these aggregations obscure neither biological differences in forest productivity, nor differences in management objectives and prescriptions. Aggregation based on similarities in forest productivity and management prescriptions results in the assignment of each individual stand to a particular analysis unit (AU) as described below.

For natural stands, AUs are defined as combinations of age, site index, MPB infection level and timing, lead species and BEC zone. This method of aggregation resulted in 636 natural analysis AUs. Managed stands were aggregated by BEC zone and leading site series which resulted in 20 managed stand AU combinations. See the *Information Package* for detailed information.

4.4 Inventory Aggregation

Stands are also grouped into landscape units (LUs) and resource management zones (RMZs) to recognize similarities in management focus.

4.4.1 Landscape Units

In the timber supply analysis, most forest cover requirements must be met within the spatial units defined by the intersection of LUs and BEC variant. Table 4.2 summarizes the distribution of productive and THLB area by "LU – BEC".

Table 4.2 Distribution by LU - BEC

LU-BEC	Area (ha)			LU-BEC	Area (ha)		
	THLB	non-THLB Productive	Total Productive		THLB	non-THLB Productive	Total Productive
N510-ESSFwc1	3,205	818	4,023	**N528-ESSFwc1**	0	1	1
N510-ESSFwc4	3,121	957	4,078	**N528-ESSFwc4**	1	9	10
N510-ESSFwcp	1	7	8	**N528-ICHmw2**	416	64	480
N510-ICHdw	7,822	5,678	13,499	**N528-ICHwk1**	0	0	0
N510-ICHmw2	7,363	2,556	9,920	**N529-ESSFwc1**	532	5,775	6,306
N510-IDFun	0	2	3	**N529-ESSFwc4**	288	13,066	13,355
N511-ESSFwc1	1,593	504	2,097	**N529-ESSFwcp**	8	1,011	1,019
N511-ESSFwc4	1,969	947	2,916	**N529-ICHmw2**	12,561	7,948	20,509
N511-ESSFwcp	0	54	54	**N529-ICHvk1**	3	21	25

LU-BEC	Area (ha)			LU-BEC	Area (ha)		
	THLB	non-THLB Productive	Total Productive		THLB	non-THLB Productive	Total Productive
N511-ICHdw	3,026	1,296	4,322	**N529-ICHwk1**	2,627	6,130	8,757
N511-ICHmw2	2,604	719	3,323	**N530-ESSFwc1**	217	1,225	1,442
N511-IDFun	383	77	460	**N530-ESSFwc4**	91	3,215	3,306
N516-ESSFwc1	0	0	0	**N530-ESSFwcp**	1	747	747
N516-ESSFwc4	0	6	6	**N530-ICHmw2**	700	258	958
N516-ESSFwcp	0	4	4	**N530-ICHmw3**	0	0	0
N516-ICHmw2	0	2	2	**N530-ICHvk1**	588	429	1,016
N518-ESSFwc1	1,711	1,513	3,224	**N530-ICHwk1**	881	1,824	2,705
N518-ESSFwc4	2,913	5,807	8,720	**N531-Atun**	0	3	3
N518-ESSFwcp	25	550	574	**N531-ESSFwc1**	701	2,083	2,784
N518-ICHdw	3,137	2,512	5,649	**N531-ESSFwc4**	476	6,699	7,175
N518-ICHmw2	6,936	2,457	9,394	**N531-ESSFwcp**	6	793	799
N520-ESSFwc1	1,188	791	1,979	**N531-ICHmw2**	1,063	391	1,454
N520-ESSFwc4	1,071	2,434	3,505	**N531-ICHmw3**	1	2	3
N520-ESSFwcp	7	29	36	**N531-ICHvk1**	3,370	4,960	8,330
N520-ICHmw2	9,203	1,635	10,838	**N531-ICHwk1**	1,454	2,374	3,828
N520-ICHwk1	538	223	762	**R1-ESSFwc1**	4	25	28
N521-Atun	0	4	4	**R1-ESSFwc4**	45	13	59
N521-ESSFwc1	1,098	768	1,866	**R1-ICHmw2**	105	64	170
N521-ESSFwc4	1,940	2,635	4,575	**R1-ICHwk1**	35	20	55
N521-ESSFwcp	1	137	138	**R2-ESSFwc1**	0	1	1
N521-ICHdw	3	11	15	**R2-ESSFwc4**	0	5	5
N521-ICHmw2	4,172	1,727	5,899	**R2-ESSFwcp**	0	0	0
N526-ESSFwc1	856	636	1,491	**R2-ICHmw2**	0	0	0
N526-ESSFwc4	504	1,455	1,959	**R2-ICHmw3**	31	27	58
N526-ESSFwcp	2	27	29	**R2-ICHwk1**	41	11	52
N526-ICHmw2	22,317	5,291	27,608	**R4-ESSFwc1**	3	2	5
N526-ICHwk1	19	31	50	**R4-ESSFwc4**	2	1	3
N527-ESSFwc1	3,545	1,790	5,335	**R4-ESSFwcp**	0	0	1
N527-ESSFwc4	4,756	5,441	10,197	**R4-ICHmw3**	158	27	185
N527-ESSFwcp	1	68	69	**R4-ICHvk1**	79	16	95
N527-ICHmw2	16,343	3,363	19,705	**R4-ICHwk1**	425	34	459
N527-ICHwk1	4,438	2,237	6,675	**Total**	144,723	116,473	261,195

4.4.2 Resource Management Zones

The landbase has been divided into RMZs to facilitate the application of forest cover requirements. RMZs in TFL 23 can be summarized as:

- Integrated Resource Management (IRM);
- Community Watersheds (CWS);
- Domestic Watersheds (DWS):
- Visual Quality Objectives (VQOs);
- Moose winter range (MWR);
- Mule deer winter range (MDWR); and
- Disturbing the non-THLB productive landbase (DIST_INOP).

The distribution of productive landbase area among the RMZs is shown in Table 4.3. For more information on modeling assumptions, please see the *Information Package*.

Table 4.3 Resource Management Zones

RMZ	Area (ha)		
	THLB	non-THLB Productive	Total Productive
CWS	964	851	1,815
IRM	40,667	0	40,667
VQO	52,777	22,810	75,588
DWS	25,114	15,440	40,554
MDWR	16,351	6,170	22,521
MOOSE	18,571	2,890	21,461
DIST_INOP	0	116,644	116,644

5.0 ANALYSIS METHODS

5.1 Forest Harvest Modelling

Timberline's proprietary simulation model CASH6 (Critical Analysis by Simulation of Harvesting, version 6.2l) was used to develop all harvest schedules and growing stock profiles included in the TFL 23 timber supply analysis.

This model uses either an aspatial or spatial geographic approach to landbase and inventory definition in order to adhere as closely as possible to the intent of forest cover requirements on harvesting. CASH6 can simulate the imposition of overlapping forest cover objectives on timber harvesting and resultant forest development. These objectives are addressed by placing restrictions on the distribution of age classes, defining maximum or minimum limits on the amount of area in young and old age classes found in specified components of the forest. For the purposes of this analysis, objectives are of the following two types:

1. **Disturbance (green-up)**

The disturbance category is defined as the total area below a specified green-up height or age. This disturbed area is to be maintained below a specified maximum percent. The effect is to ensure that at no time will harvesting cause the disturbed area to exceed this maximum percent. This category is typically used to model adjacency, visual, wildlife or hydrological green-up requirements in resource management zones, and early seral stage requirements at the landscape unit level; and

2. **Retention (old growth)**

The retention category is defined as the total area above a specified age. This retention area is to be maintained above a specified minimum percent. The effect is to ensure that at no time will harvesting cause the retention area to drop below this minimum percent. This category is typically used to model thermal cover and/or old growth requirements in wildlife management areas, and mature and old growth seral stage requirements at the landscape unit level.

The model projects the development of a forest, allowing the analyst to impose different harvesting/silviculture strategies on its development, in order to determine the impact of each strategy on long-term resource management objectives. CASH6 was used to determine harvest schedules that incorporate all integrated resource management considerations including spatial feasibility factors, for example, silviculture block green-up.

In these analyses, timber availability is forecast in decadal time steps (periods). The main output from each analysis is a projection of the amount of future growing stock, given a set of growth and yield assumptions, and planned levels of harvest and silviculture activities. Growing stock is characterized in terms of total growing stock (total volume on the timber harvesting landbase), operable growing stock (volume in stands at or above minimum harvest age), and available growing stock (maximum operable volume that can be harvested in any given decade without violating forest cover objectives).

A 250-year time horizon was employed in these analyses, to ensure that short and medium term harvest targets do not compromise long-term growing stock stability. Also, modeled harvest

levels included allowances for non-recoverable losses (NRLs). Harvest figures reported here exclude this amount unless otherwise stated.

5.2 Interpreting Timber Availability

Traditionally harvest flow has been the primary indicator used to evaluate the timber supply impacts of various management scenarios. However the harvest flow for a given scenario does not necessarily reveal the complete timber supply picture. Another useful indicator is timber availability, which is the total volume of merchantable timber that could be harvested in any given period without violating any forest cover requirements. The profile of timber availability provides valuable insights into the timber supply dynamics of a given scenario. In general, the periods with the least amount of timber available control the resulting harvest flow. Standard TSR harvest flows are generally controlled by 'pinch points', which are periods in which there is virtually no surplus timber available beyond the forecast harvest level.

5.3 Comparing Management Scenarios

Although a stand-alone timber availability profile can provide valuable information, they have greater utility when comparing management scenarios. When comparing different management scenarios using timber availability profiles, it is critical to use the same harvest request in both scenarios. In doing so the differences in the timber availability profiles can be entirely attributed to differences in the management scenarios. In every case when two timber availability profiles are displayed on the same graph, the profiles are created using the same harvest flow. Generally the harvest flow requested is the basecase harvest flow unless otherwise specified. Figure 5.1 shows an example that compares the timber availability profiles of an alternative management scenario to the basecase. The difference between the two availability profiles (slashed region) can be entirely attributed the differences between the management scenario and the basecase.

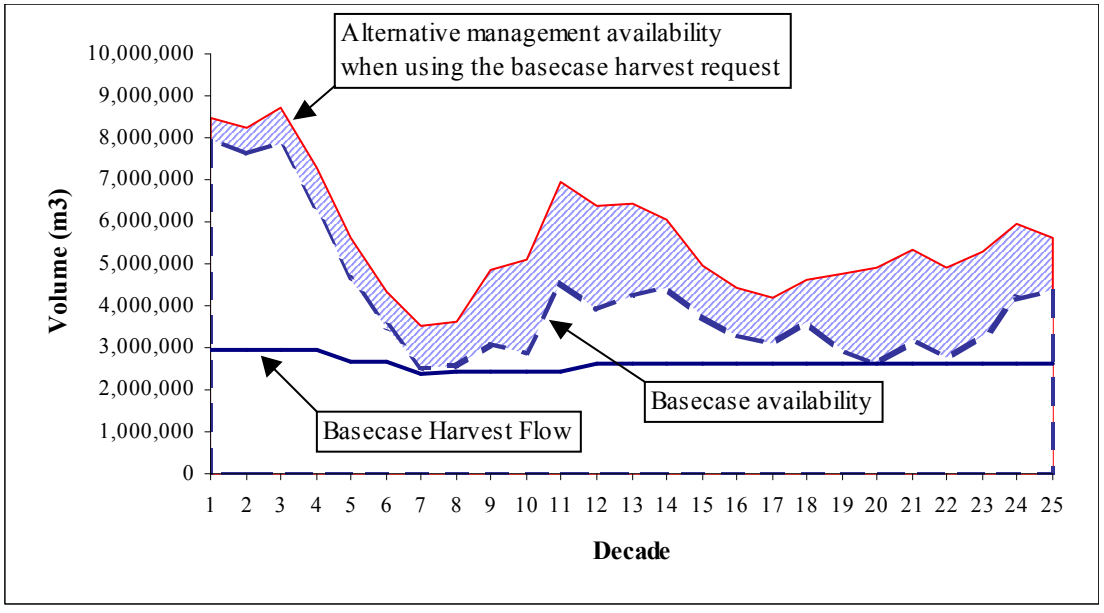

Figure 5.1 Comparing Management Scenarios Using Availabilities

6.0 BASECASE

The basecase reflects current management performance as of the date of commencement for the preparation of this timber supply analysis. This analysis incorporates the following factors:

- Landbase summary (netdown) has been updated;
- Managed AUs have been created using BEC and leading site series;
- Managed stand yield assumptions have been revisited by Interfor;
- Updated inventory and disturbances;
- New visuals database;
- New caribou dataset;
- New Ungulate Winter Range (UWR);
- Draft Spatial OGMAs;
- Mountain pine beetle (MPB) modeling; and
- Incorporating natural disturbances in the non-timber harvesting landbase (non-THLB).

6.1 Harvest Forecast

Table 6.1 and Figure 6.1 present the harvest level for the basecase. All volumes are shown net of non recoverable losses (NRLs). The 20 year initial harvest level is 450,000m^3/year which then steps down to 402,000m3/year. After 100 years, the long term harvest level can increase to 518,000m^3/year.

Table 6.1 Harvest Level- Basecase

Year	Basecase Harvest Level
1-20	450,000
21-100	402,000
101-250	518,000

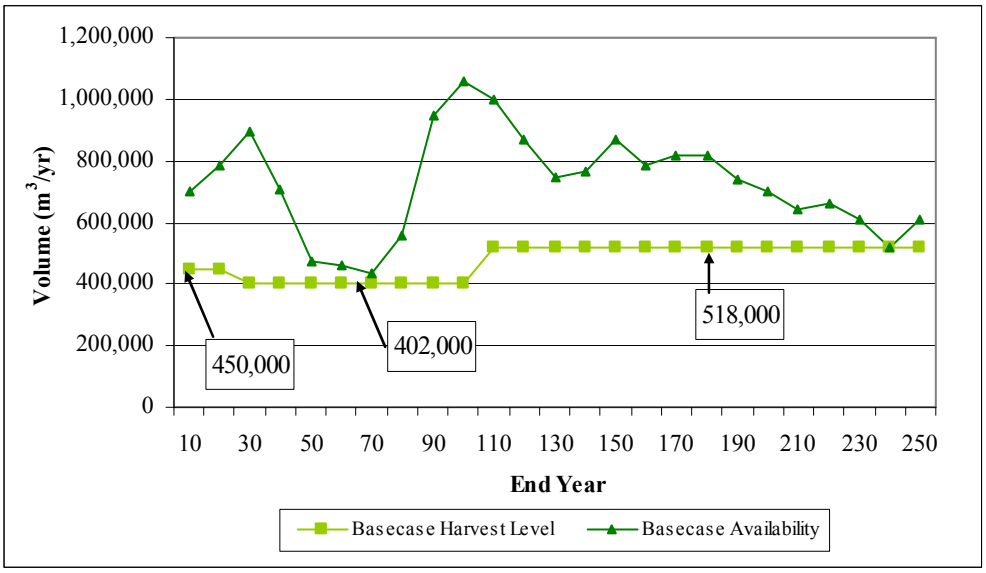

Figure 6.1 Harvest Level and Availability- Basecase

Figure 6.2 shows the total stock, operable stock and available timber for the TFL 23 basecase. Total stock is initially at ~23 million m^3 and declines to a mid term trough in year 50 before peaking around year 110. Operable stock (that which is able to be harvested), is significantly lower that total stock but follows a similar pattern of dipping and peaking. The available timber stock increases slightly after the first 20 years because of easing disturbance requirements and then reaches a pinch point in decade 5, 6 and 7. These pinch points control the harvest level in the first 100 years (mid term).

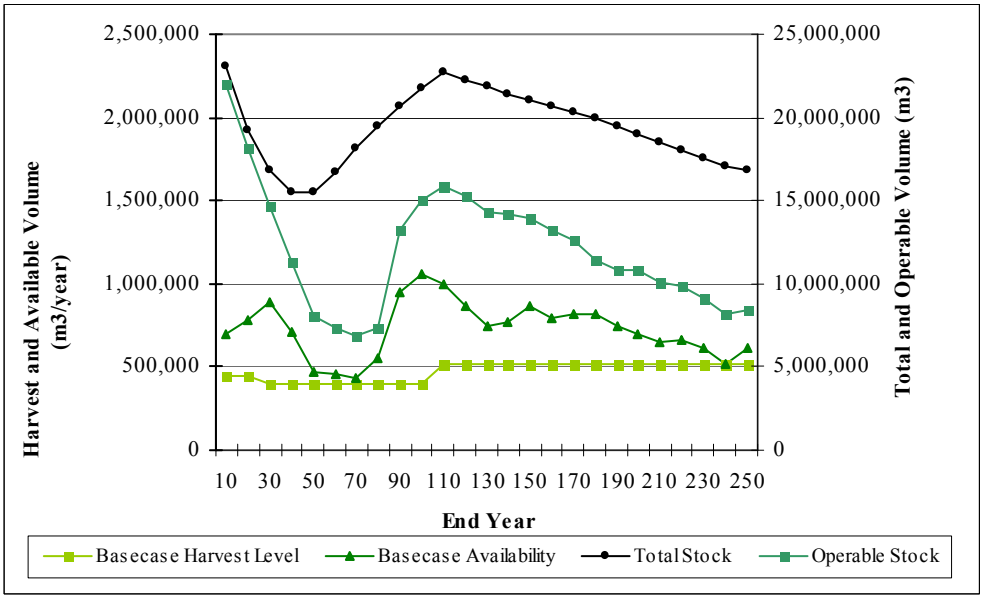

Figure 6.2 Stock Profiles for Basecase

Over the 250 year planning horizon, the total stock appears to be gradually declining and never settles into a stable long term level. In order to find an alternative long term harvest level that allows for a stable total stock profile, the analysis was run for 400 years at a reduced long term harvest level. Figure 6.3 shows that to produce a stable total stock profile over 400 years, the long term harvest level must be dropped from 518,000m^3/year to 492,000m^3/year (a 5% decrease).

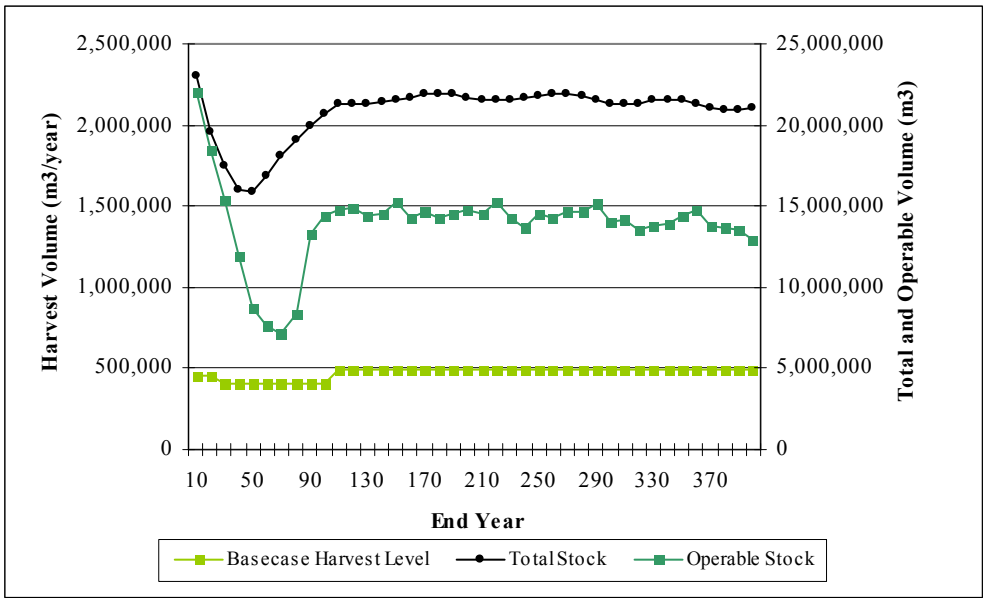

Figure 6.3 Stock Profiles over 400 years- Basecase

6.2 Harvest Trends

Figure 6.4 shows the natural to managed conversion of harvested wood over time in the basecase. The conversion from natural stands to second growth managed stands happens from year 50 to 70.

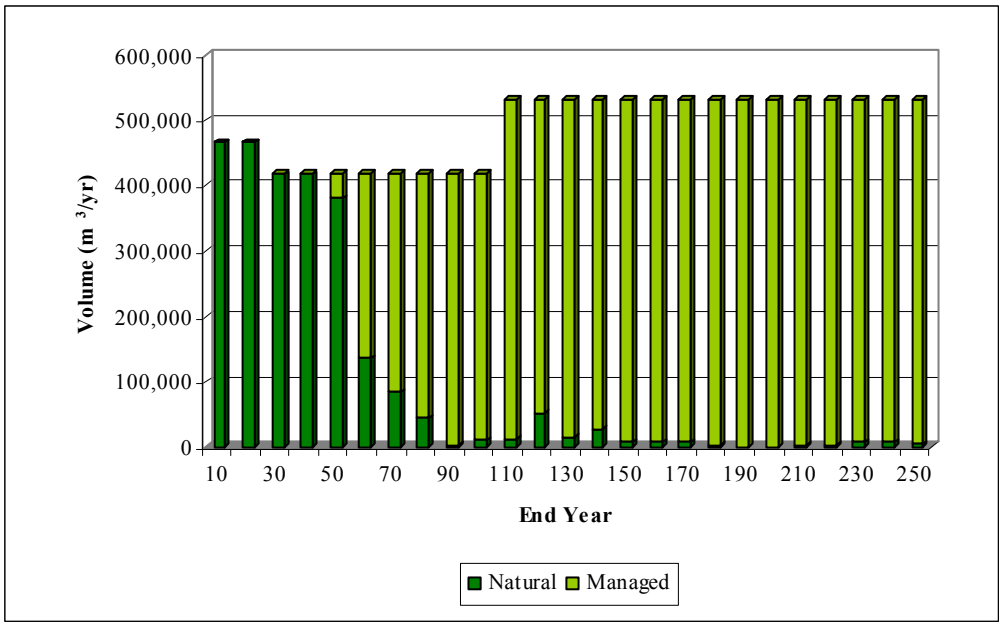

Figure 6.4 Harvest Volume by Natural and Managed Stand Types

Table 6.2 shows the harvest volume by species for the first 10 years and Figure 6.5 shows this across the whole planning horizon. There is initially, 31% harvest of douglas-fir and 17% harvest of pine. Across the whole planning horizon, there is a consistent harvest of douglas-fir, spruce and pine. Balsam and cedar harvest declines slightly and hemlock stands are shown to be converted into larch (because of the managed stand species composition assumptions).

Table 6.2 Harvest by Species in the First 10 Years

Species	Volume Harvested (m3)	% of Total
Balsam	48,422	11%
Cedar	48,902	11%
Deciduous	1,268	0%
Douglas-fir	138,853	31%
Larch	0	0%
Hemlock	72,341	16%
Pine	77,333	17%
Spruce	63,091	14%
Total	450,209	100%

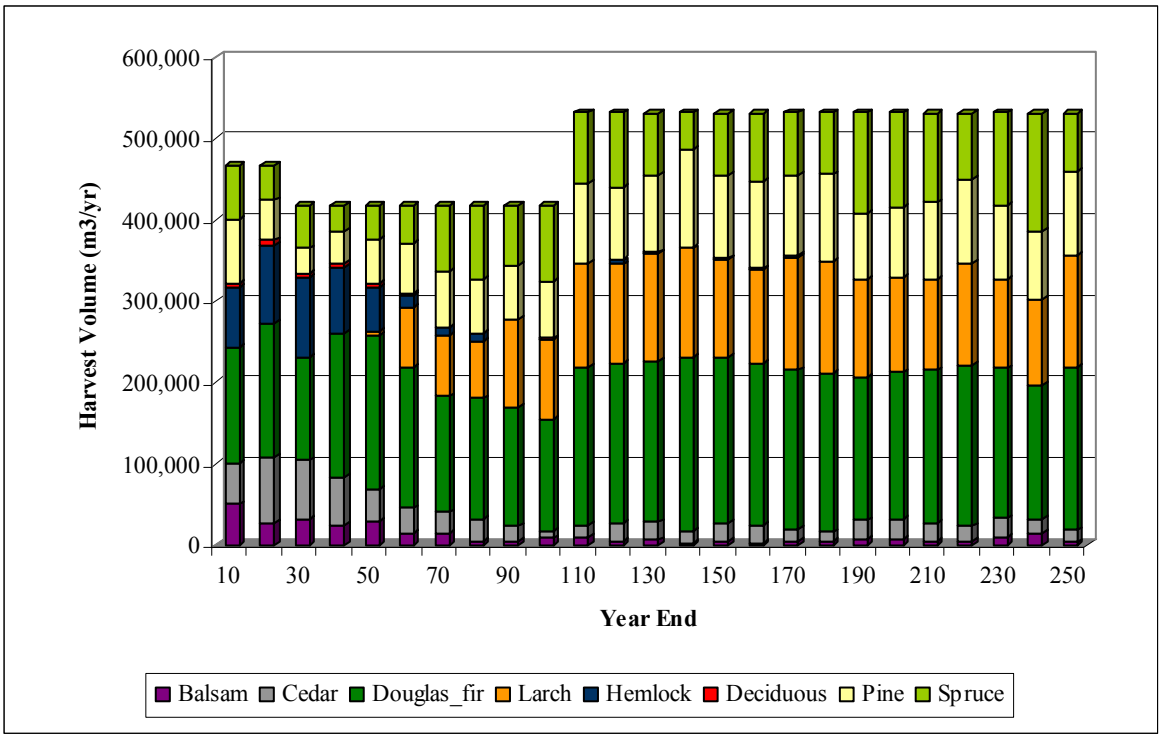

Figure 6.5 Harvest Volume by Species

Table 6.3 shows the volume of pine that is harvested and lost from the TFL 23 THLB in the basecase. Approximately 1 million m^3 of pine is harvested and 998,000 m^3 of pine is lost to MPB mortality. This is the sum of all types of MPB infestation and volume loss modeling (i.e. pine leading mortality and non-pine leading volume reduction).

Table 6.3 Pine Loss

Type	Amount of Pine (Other Species Not Counted)	
	Area (ha)	Volume (m3)
Harvested	4,583	1,021,399
MPB Mortality	4,022	998,159
Total	8,605	2,019,558

Figure 6.6 shows selected statistics for harvested stands by decade- the average DBH, average volume per hectare, average age and average area harvested. The average DBH is initially at 33 cm before dropping to a long term average of 25 cm. The average harvested age drops from the initial 150 years to between 80 and 100 years by year 70 as the conversion from natural to managed stands occurs. The volume harvested by decade initially starts at just below 300 m^3/ha and fluctuates around but does not decrease significantly below this across the rest of the planning horizon. The area harvested follows a mirrored pattern to that of the average volume/ha, averaging 1,560 ha/year across the planning horizon.

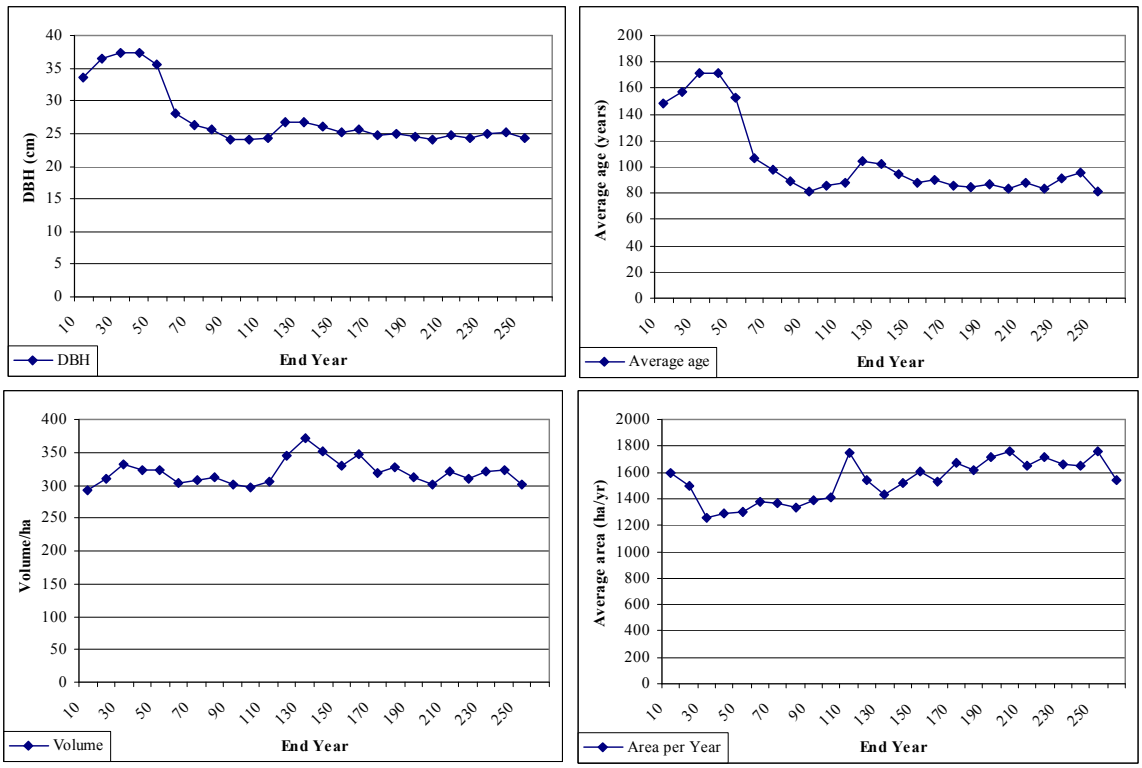

Figure 6.6 Average DBH, Volume/Ha, Harvest Age and Area Harvested

Piece size categories were created using DBH thresholds. The relationship between piece size and DBH was calculated by running average yield curve values through a bucking prototype calculator. Using this, a piece size of 0.25m^3 corresponded to a DBH of 22.5cm and a piece size of 0.3m^3 corresponded to a DBH of 24.5cm. Figure 6.7 shows the volume harvested by piece size category (<0.25m^3, 0.25 m^3 – 0.3 m^3, >0.3 m^3).

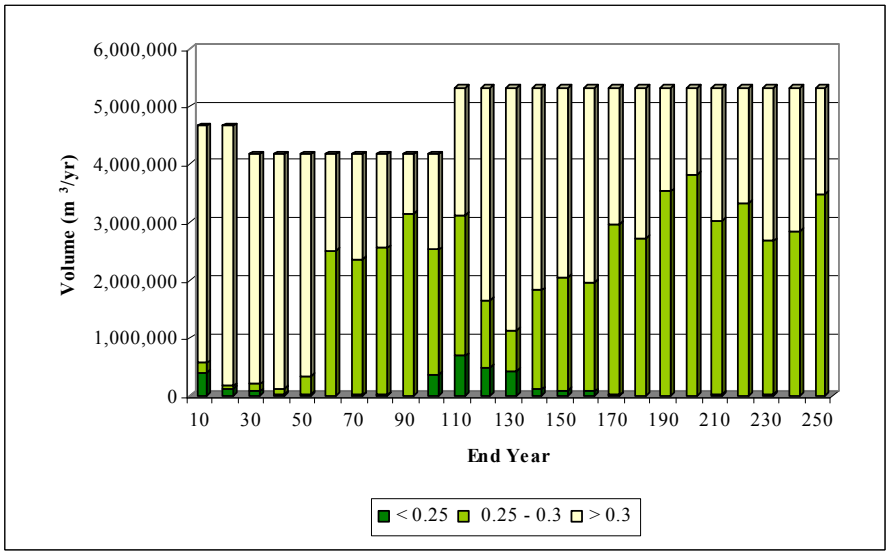

Figure 6.7 Piece Size by Category

6.2.1 Age class distributions

Figure 6.8 shows the dynamic behaviour of the residual forest age class structure over the planning horizon. The initial ageclass distribution is quite uniform with a small dip in the 50 to 60 year age range. It can be seen that the residual forest is reaching a uniform age class distribution by decade 10 where the bulk of the THLB stands are less than or equal 90 years old. In all cases, there is significant area retained in stands greater than 250 years old. This steadily increases to ~40,000 ha in 250 years (roughly 35% of the non-THLB productive landbase).

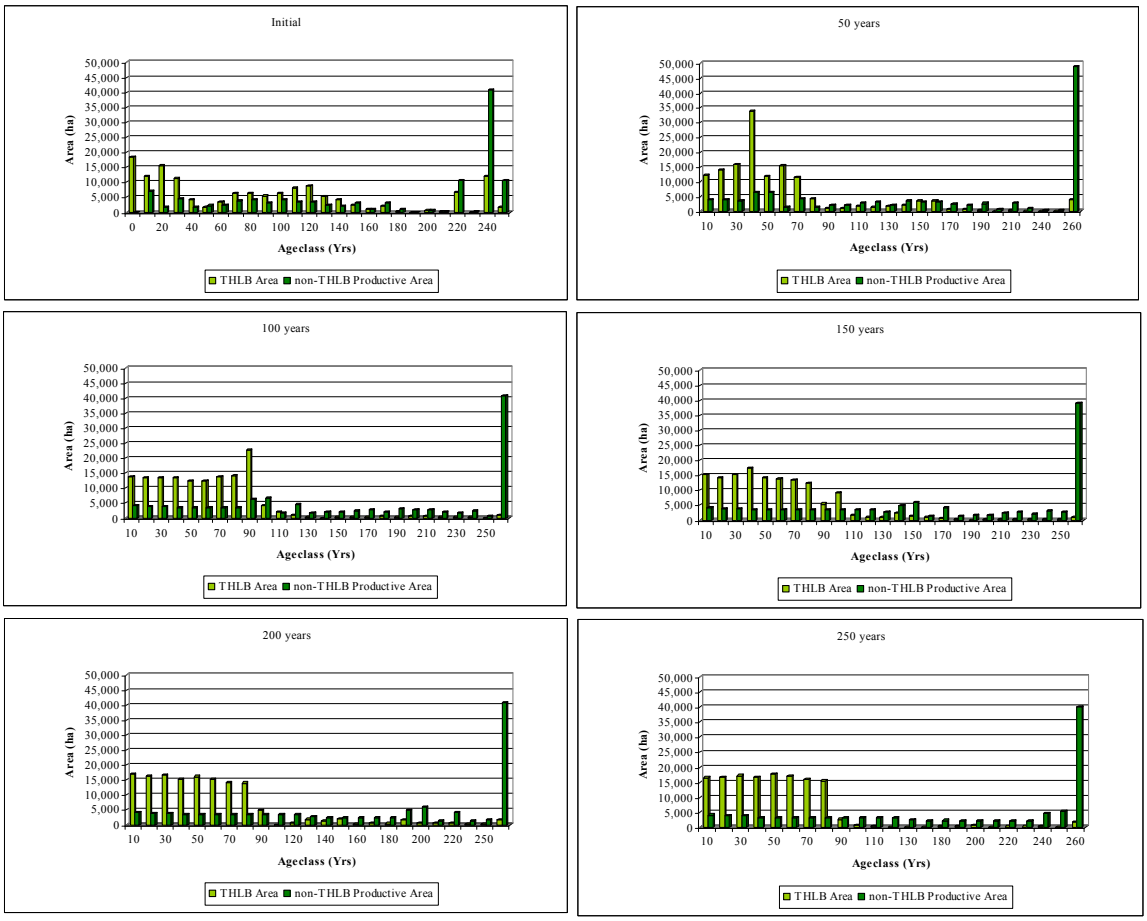

Figure 6.8 Forest Age Structure Through Time

7.0 SENSITIVITY ANALYSES

Timber supply analysis generally integrates a large number of measured or estimated inputs, model parameters and simplifying assumptions, all of which are subject to varying degrees of uncertainty and imprecision. Sensitivity analysis is intended to assess the stability of a given timber supply forecast in light of these uncertainties by evaluating the response to systematic alterations of model assumptions and input parameters. By developing and testing a number of sensitivity issues, it is possible to determine which variables most affect results. This in turn facilitates the management decisions that must be made in the face of uncertainty.

Each sensitivity analysis tests the impact of changes to a single variable or specific assumption while holding all other factors constant. The impact of this change is measured by looking at the area and volume impacted (if applicable) along with the harvest level and timber availability implications. Each sensitivity will be compared to the basecase. A summary of the following sensitivities are shown below in Table 7.1.

Table 7.1 Summary of Sensitivities

	Sensitivity
THLB Definition	Basecase +/- 10% THLB
Growth and yield	+/- 10% Natural stand yields +/- 10% Managed stand yields +/- 10% Minimum harvest ages +/- 1m managed site index +/- 1m natural site index No genetic gains
REA assumptions	+/- 1m green-up heights No IRM Adjacency instead of IRM No visuals Old caribou- SARCO requirements
Biodiversity Assumptions	Model aspatial seral Use optimized OGMAs No disturbances in the non-THLB
MPB Assumptions	No MPB Harvest Prioritization Slower MPB Spread
Alternate Harvest Conventions	Relative oldest harvest rule Maximum volume harvest rule Maximum 10 year harvest level

7.1 Landbase Definition

7.1.1 Adjust Timber Harvesting Landbase by +/– 10%

To test the sensitivity to uncertainty in the landbase classification assumptions, the size of the THLB was decreased by 10%. The change in landbase classification was accomplished by shifting the appropriate number of hectares between the THLB and non-THLB productive areas of the landbase. Table 7.2 shows that the THLB is reduced / increased by 14,476 ha, the non-THLB productive area is inversely changed by this amount and the total area remains constant at 261,664 ha.

Table 7.2 Area Change- THLB +/- 10%

	Basecase	THLB - 10%	THLB + 10%
THLB	144,758	130,282	159,234
Non-THLB Productive	116,906	131,382	102,430
Total Productive	261,664	261,664	261,664

Table 7.3 and Figure 7.1 show the harvest level for the basecase and this sensitivity. Both the mid and long term harvest levels are increased and decreased by 8-10% from the basecase.

Table 7.3 Harvest Level- THLB +/- 10%

Year	Basecase Harvest Level	THLB + 10% Harvest Level	Change from Basecase	THLB - 10% Harvest Level	Change from Basecase
1-20	450,000	488,000	8%	413,000	-8%
21-100	402,000	440,000	9%	365,000	-9%
101-250	518,000	561,000	8%	467,000	-10%

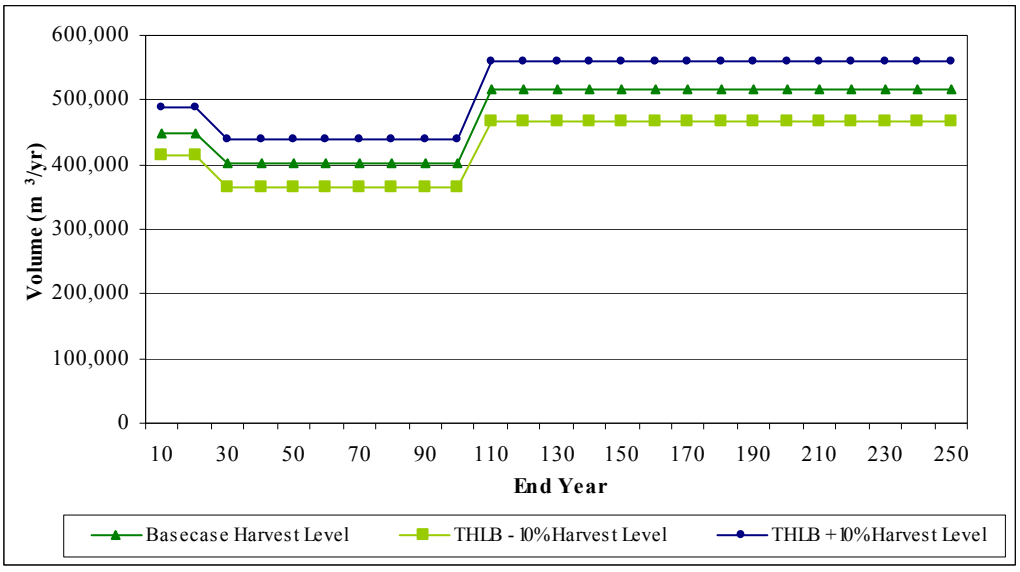

Figure 7.1 Harvest Level- THLB +/- 10%

The resulting changes in timber availability are shown in Figure 7.2.

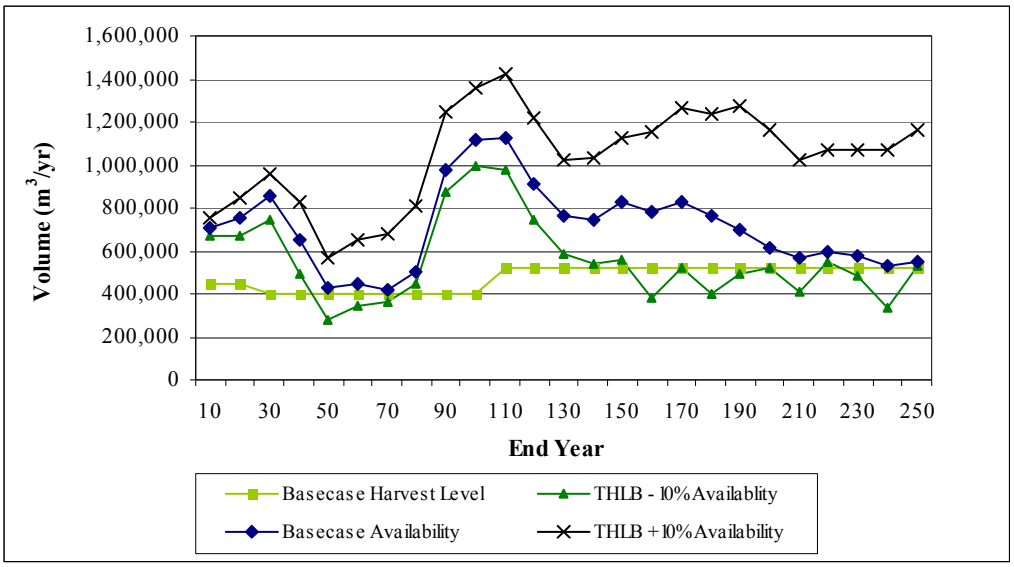

Figure 7.2 Timber Availability- THLB +/- 10%

7.2 Growth and Yield Assumptions

7.2.1 Adjust Natural Stand Yields by ± 10%

The sensitivity to uncertainties in natural stand yield estimates was tested by alternately increasing and decreasing all the natural stand yield curves (from VDYP) by 10%. Table 7.4 shows the harvest level for the basecase and these sensitivities. If natural stand yields are increased by 10%, the mid term harvest level is increased by 8% from 402,000m^3/year to 435,000m^3/year. In this case, because of the increased harvest in the mid term, the long term is decreased by 4% from 518,000m^3/year to 497,000m3/year.

If natural stand yields are decreased by 10%, the mid term harvest level is decreased by 9% from 402,000m^3/year to 367,000m^3/year and the long term harvest level is decreased by 2% to 507,000m^3/year.

Table 7.4 Harvest Level- Natural Stand Yield ± 10%

Year	Basecase Harvest Level	Natural Yields+10% Harvest Level	Change from Basecase	Natural Yields - 10% Harvest Level	Change from Basecase
1-20	450,000	483,000	7%	415,000	-8%
21-100	402,000	435,000	8%	367,000	-9%
101-250	518,000	497,000	-4%	507,000	-2%

Figure 7.3 shows the harvest levels of the basecase scenario and these sensitivities.

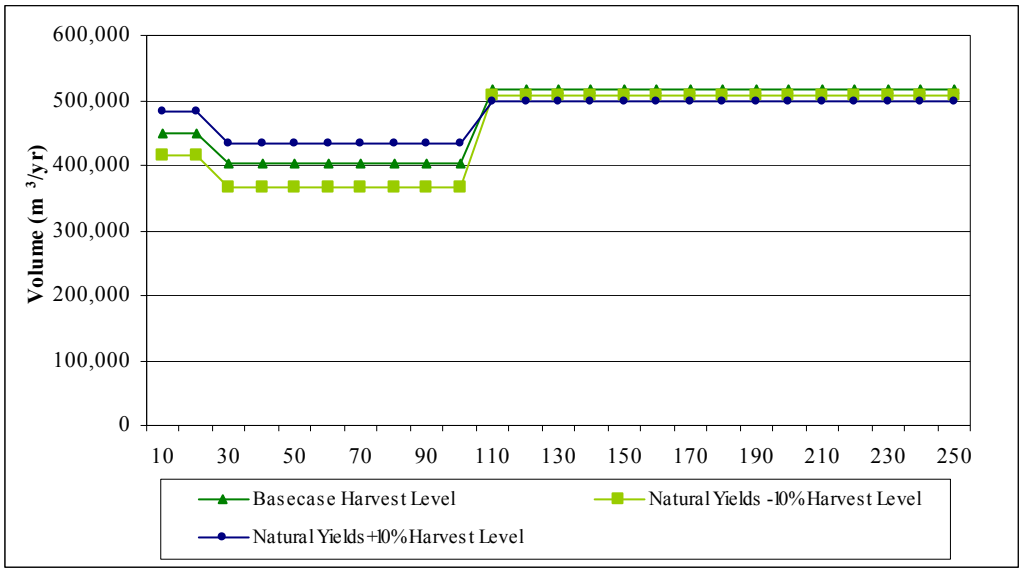

Figure 7.3 Harvest Level- Natural Stand Yields ± 10 %

The impact of these input modifications on timber availability is presented in Figure 7.4. The initial volume of timber available was ± 11% for the two sensitivities. There is a big difference in mid term availability between the three sensitivities but in the long term (which is dependent on managed stand yields), there is a relatively small difference in available timber.

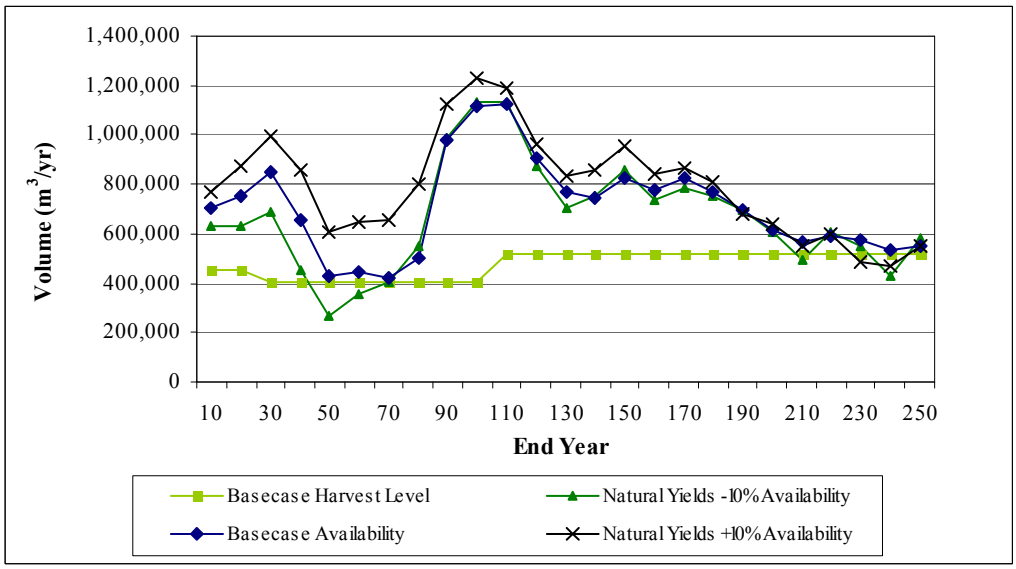

Figure 7.4 Timber Availability- Natural Stand Yields ± 10 %

7.2.2 Adjust Managed Stand Yields by ± 10%

Managed stand yield curves (from TIPSY) were alternately increased and decreased by 10% to evaluate the sensitivity of the basecase forecast to uncertainties in the estimates of managed stand yields.

Table 7.5 and Figure 7.5 show the harvest level for the basecase and these sensitivities. If managed stand yields are increased by 10%, the mid term harvest level is increased by 2% from 402,000m^3/year to 410,000m^3/year. In the long term, which is almost totally dependent on managed stand yields, the harvest level is increased by 8% from 518,000m^3/year to 559,000m^3/year.

If managed stand yields are decreased by 10%, the mid term harvest level is decreased by 2% from 402,000m^3/year to 394,000m^3/year. In the long term, the harvest level is decreased by 14% to 444,000m^3/year.

Table 7.5 Harvest Level- Managed Stand Yields ± 10 %

Year	Basecase Harvest Level	Managed Yields+10% Harvest Level	Change from Basecase	Managed Yields -10% Harvest Level	Change from Basecase
1-20	450,000	458,000	2%	442,000	-2%
21-100	402,000	410,000	2%	394,000	-2%
101-250	518,000	559,000	8%	444,000	-14%

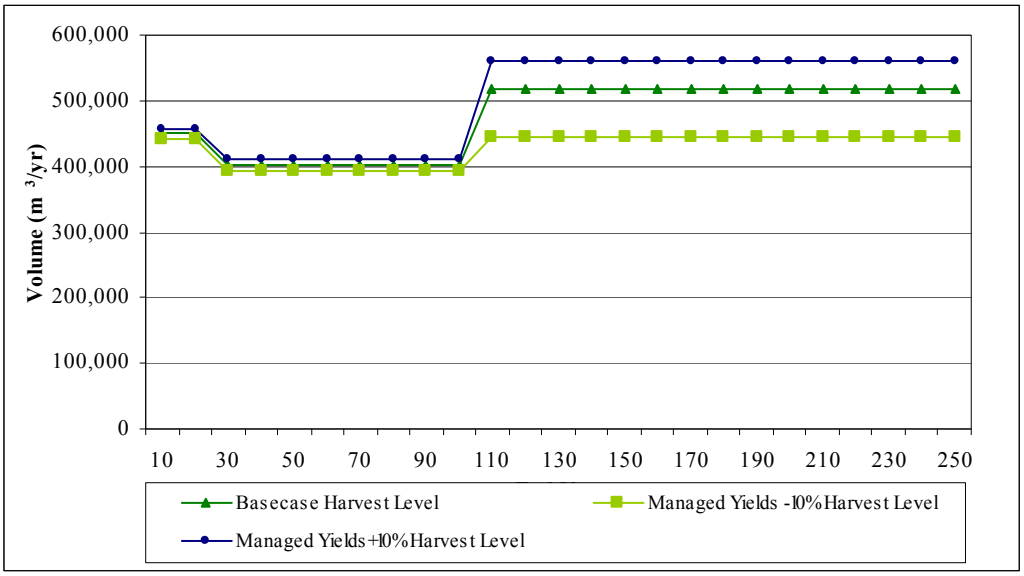

Figure 7.5 Harvest Level- Managed Stand Yields ± 10 %

Figure 7.6 shows the timber availability for the basecase and these sensitivities. There is a large divergence in timber availability in the long term which reflects the altering of managed stand yield curves in this sensitivity.

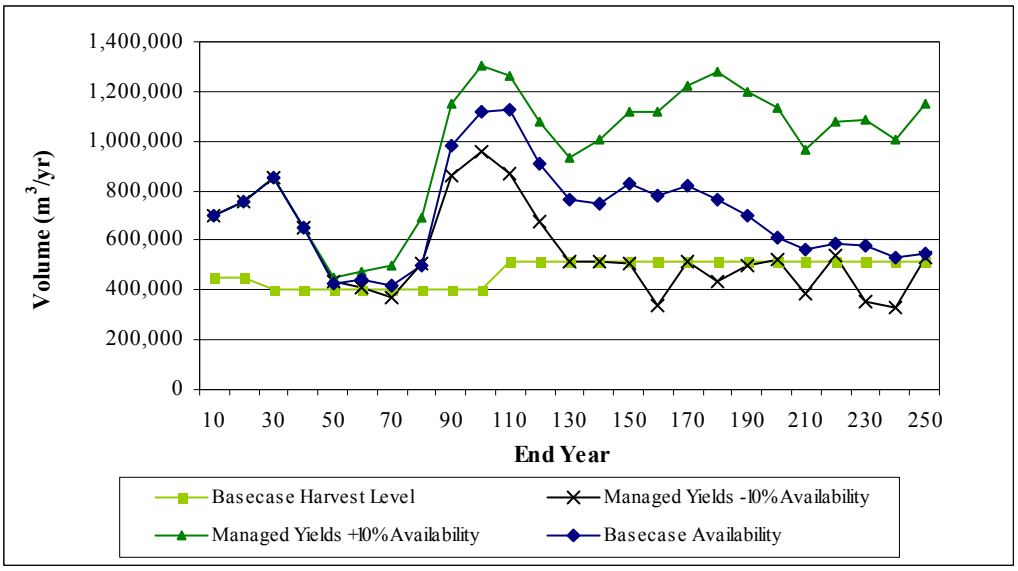

Figure 7.6 Timber Availability- Managed Stand Yields ± 10 %

7.2.3 Adjust Managed Stand Minimum Harvest Ages ± 10 %

To assess the sensitivity of the basecase forecast to uncertainties in assumptions about merchantability criteria, minimum harvest ages (MHAs) for all yield tables were alternately increased and decreased by 10%.

Table 7.6 and Figure 7.7 show the harvest level for the basecase and these sensitivities. If MHAs are increased by 10%, the mid term harvest level is decreased by 10% from 402,000m^3/year to 363,000m^3/year. In the long term, the harvest level is increased from 518,000m^3/year to 544,000m3/year.

If MHAs are decreased by 10%, the mid term harvest level is increased by 7% from 402,000m^3/year to 432,000m^3/year. In the long term, the harvest level is decreased by 16% to 435,000m^3/year. The long term harvest level is lower than the basecase long term harvest level because lowering the MHA allows harvesting to occur below the maximum mean annual increment (MAI) age where growth is maximized.

Table 7.6 Harvest Level- MHA ± 10 %

Year	Basecase Harvest Level	MHA +10% Harvest Level	Change from Basecase	MHA -10% Harvest Level	Change from Basecase
1-20	450,000	411,000	-9%	480,000	7%
21-100	402,000	363,000	-10%	432,000	7%
101-250	518,000	544,000	5%	435,000	-16%

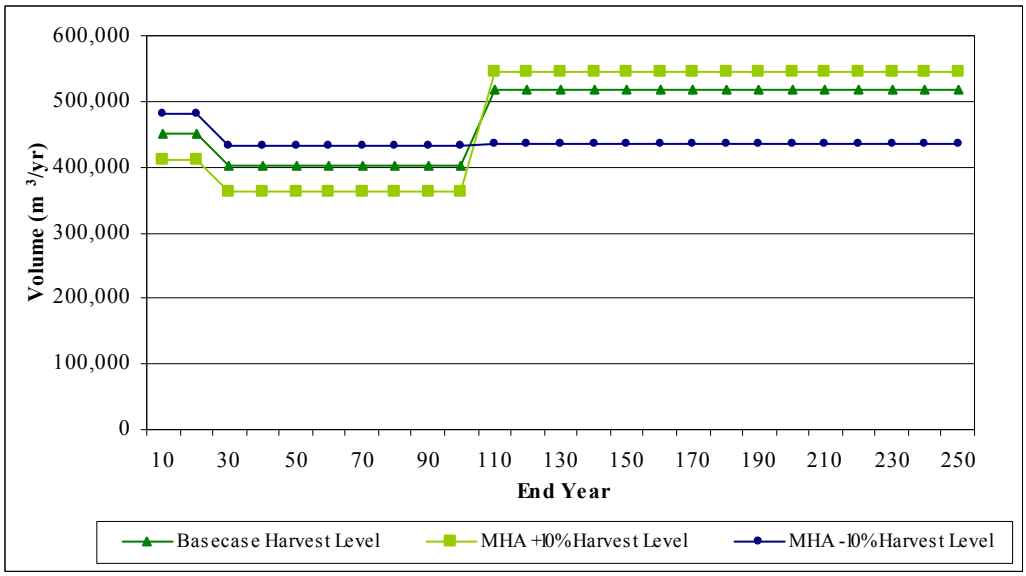

Figure 7.7 Harvest Level- MHA ± 10%

Figure 7.8 shows the timber availability of the basecase and the two MHA sensitivities.

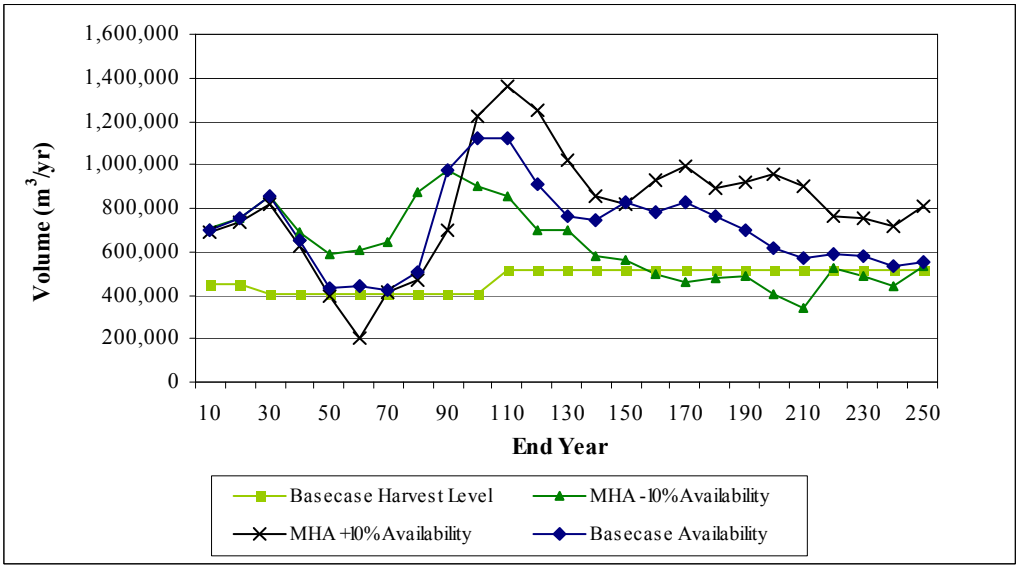

Figure 7.8 Timber Availability- MHA ± 10%

7.2.4 Adjust Managed Stand Site Index by ± 1 meter

Managed stand site index (SI) estimates were increased and decreased by 1 meter to test the sensitivity to this parameter. Table 7.7 and Figure 7.9 show the harvest level for the basecase and these sensitivities. If managed SI is increased by 1m, the mid term harvest level is increased by 1% from 402,000m^3/year to 406,000m^3/year. In the long term, the harvest level is increased from 518,000m^3/year to 579,000m^3/year.

If managed SI is decreased by 1m, the mid term harvest level is decreased by 3% to 388,000m^3/year and the long term harvest level is decreased by 13% to 452,000m^3/year.

Table 7.7 Harvest Level- Managed SI ± 1m

Year	Basecase Harvest Level	Managed SI+1m Harvest Level	Change from Basecase	Managed SI-1m Harvest Level	Change from Basecase
1-20	450,000	454,000	1%	436,000	-3%
21-100	402,000	406,000	1%	388,000	-3%
101-250	518,000	579,000	12%	452,000	-13%

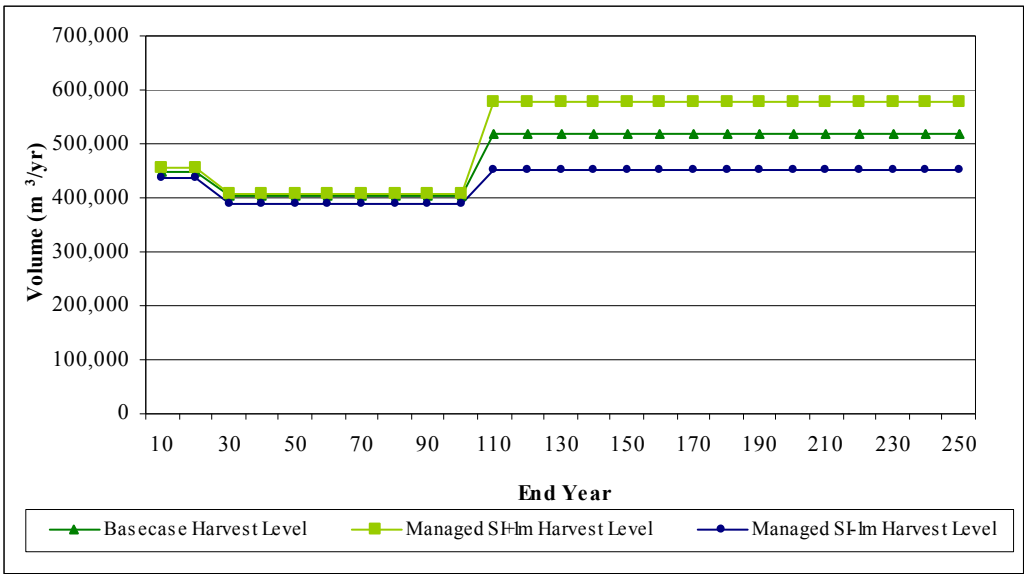

Figure 7.9 Harvest Level- Managed SI ± 1m

Figure 7.15 shows the timber availability of the basecase and the two managed SI sensitivities. There is a large divergence in timber availability in the long term which reflects the altering of managed stand yield curves in this sensitivity.

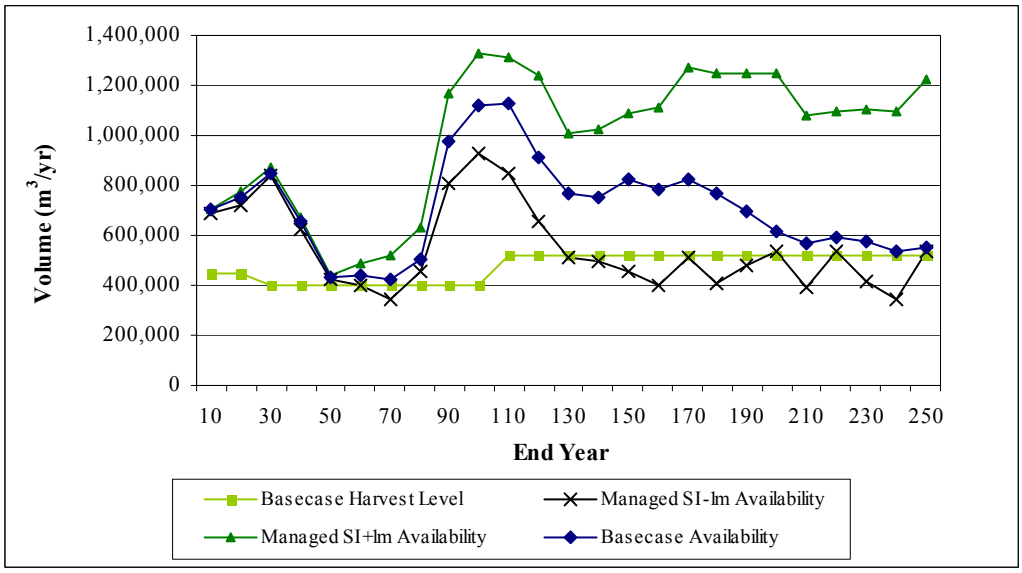

Figure 7.10 Timber Availability- Managed SI ± 1m

7.2.5 Natural Stand Site Index ± 1m

This sensitivity tests the timber supply impact of changing the natural stand site index ±1m. Table 7.8 and Figure 7.11 show the harvest level for the basecase and these sensitivities. If the natural stand site index is increased by 1m, the mid term harvest level is increased by 5% from 402,000m^3/year to 424,000m^3/year. In the long term, the harvest level is decreased slightly to 515,000m^3/year. If the natural stand site index is decreased by 1m, the mid term harvest level is decreased by 3% from 402,000m^3/year to 390,000m^3/year. In the long term, the harvest level is decreased slightly to 515,000m^3/year.

Table 7.8 Harvest Level- Natural SI ± 1m

Year	Basecase Harvest Level	Natural SI+1m Harvest Level	Change from Basecase	Natural SI-1m Harvest Level	Change from Basecase
1-20	450,000	472,000	5%	438,000	-3%
21-100	402,000	424,000	5%	390,000	-3%
101-250	518,000	515,000	-1%	515,000	-1%

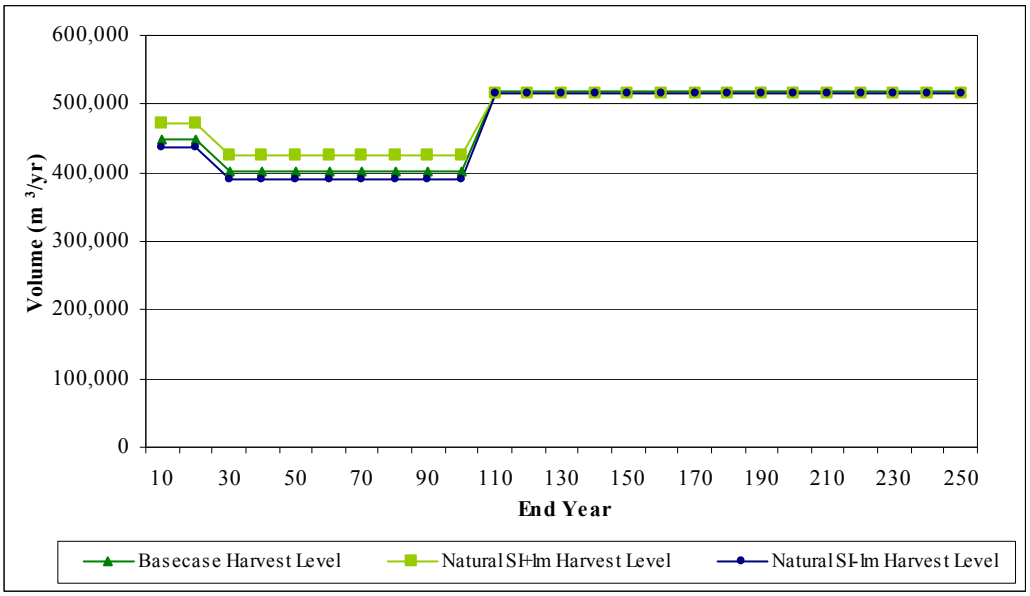

Figure 7.11 Harvest Level- Natural SI ± 1m

Figure 7.12 shows the timber availability of the basecase and these sensitivities.

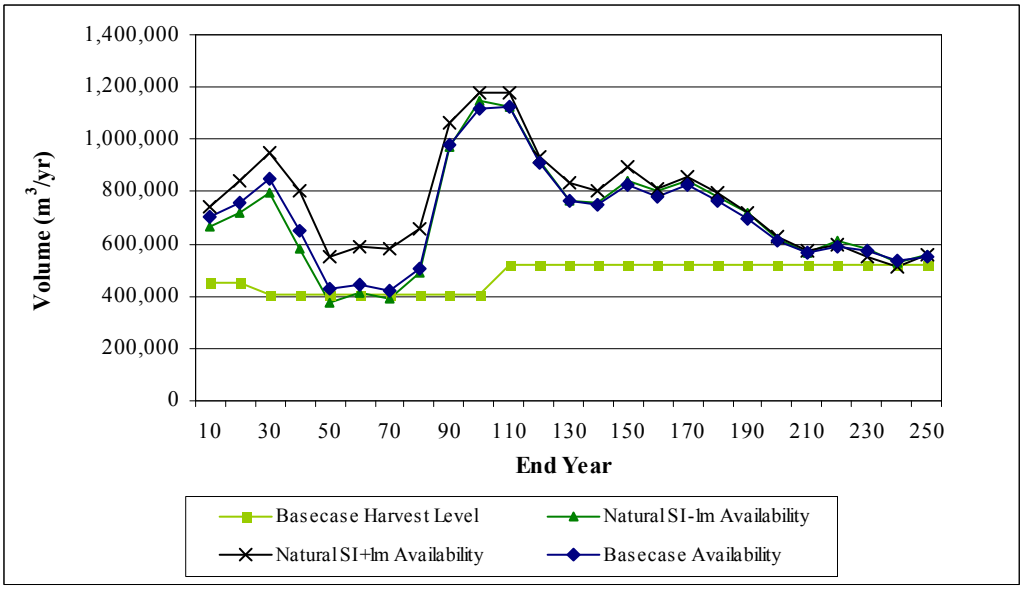

Figure 7.12 Timber Availability- Natural SI ± 1m

7.2.6 No Genetic Gains

This sensitivity tests the timber supply impact of assuming no genetic gains for managed stands. The full managed stand assumptions including genetic gains that are used in the basecase are found in the *Information Package* (Timberline, 2007).

Table 7.9 and Figure 7.13 show the harvest level for the basecase and this sensitivity. The mid term harvest level is decreased slightly to 401,000m3/year and the long term the harvest level is reduced by 6% from 518,000m^3/year to 487,000m^3/year.

Table 7.9 Harvest Level- No Genetic Gains

Year	Basecase Harvest Level	No Genetic Gains Harvest Level	Change from Basecase
1-20	450,000	449,000	0%
21-100	402,000	401,000	0%
101-250	518,000	487,000	-6%

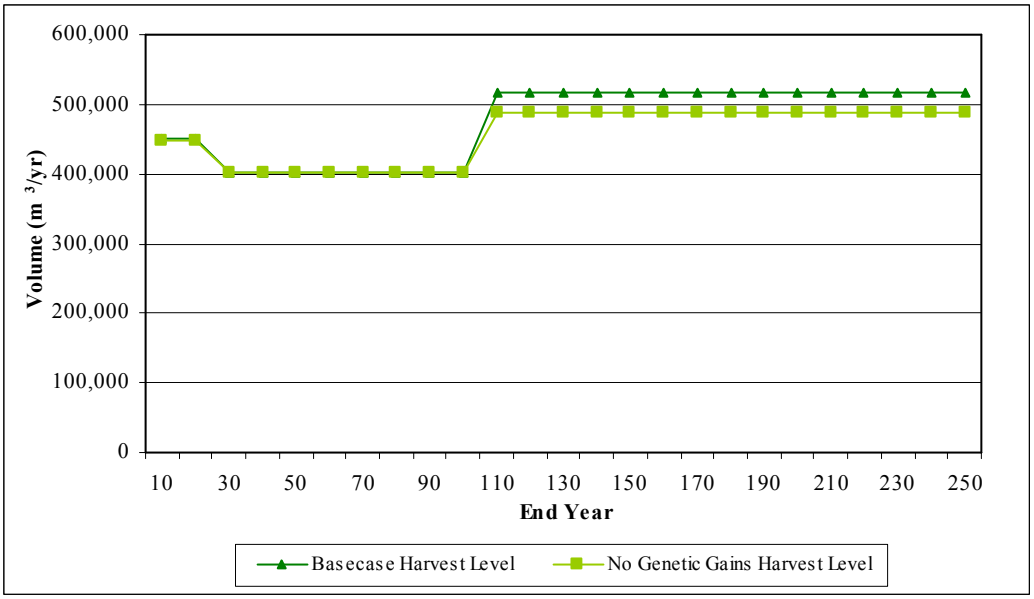

Figure 7.13 Harvest Level- No Genetic Gains

Figure 7.14 shows the timber availability of the basecase and this sensitivity.

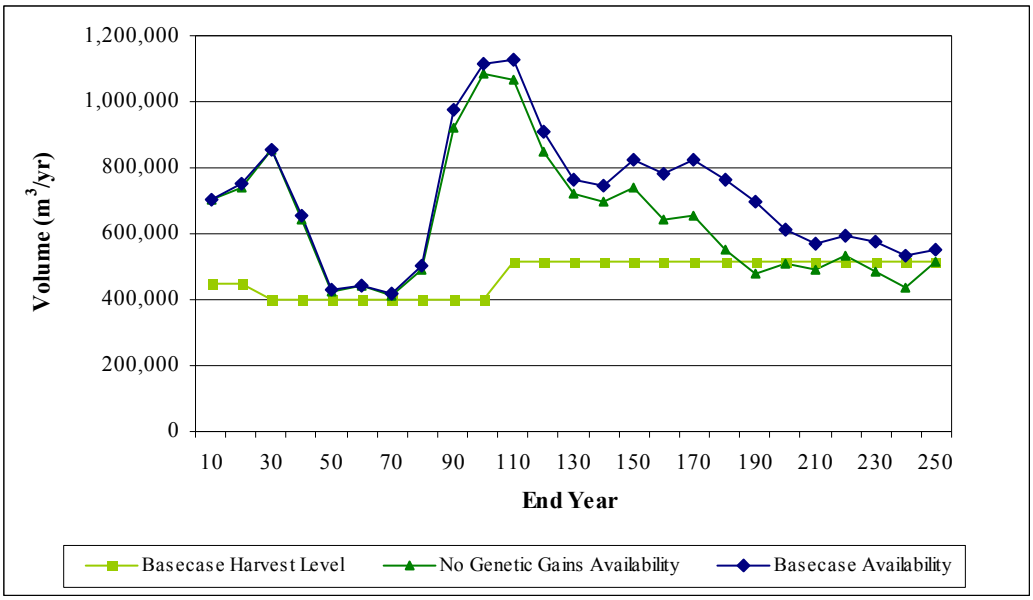

Figure 7.14 Timber Availability- No Genetic Gains

7.3 Resource Emphasis Assumptions

7.3.1 Adjust IRM Green-Up Heights by ± 1 Meter

Integrated resource management (IRM) is used to approximate the green-up requirements for cutblock adjacency. It is a disturbance requirement that indicates the maximum area that can be younger than a specified age or shorter than a specified height. In the basecase, an IRM requirement of a maximum 25% shorter than 2.5 meters height is applied by BEC-LU on the THLB that is not covered by any other RMZ.

The height of 2.5m was alternately increased and decreased by 1 meter to test the sensitivity to green-up height. Table 7.10 shows the harvest level for the basecase and these sensitivities. If green-up heights are increased or decreased by 1m, there is no significant change in mid or long term harvest level.

Table 7.10 Harvest Level- Green-up Height ± 1m

Year	Basecase Harvest Level	Green-up +1m Harvest Level	Change from Basecase	Green-up -1m Harvest Level	Change from Basecase
1-20	450,000	448,000	0%	450,000	0%
21-100	402,000	400,000	0%	402,000	0%
101-250	518,000	515,000	-1%	516,000	0%

Figure 7.15 shows the timber availability for the basecase and the two green-up height sensitivities. There is no significant change in the timber availabilities.

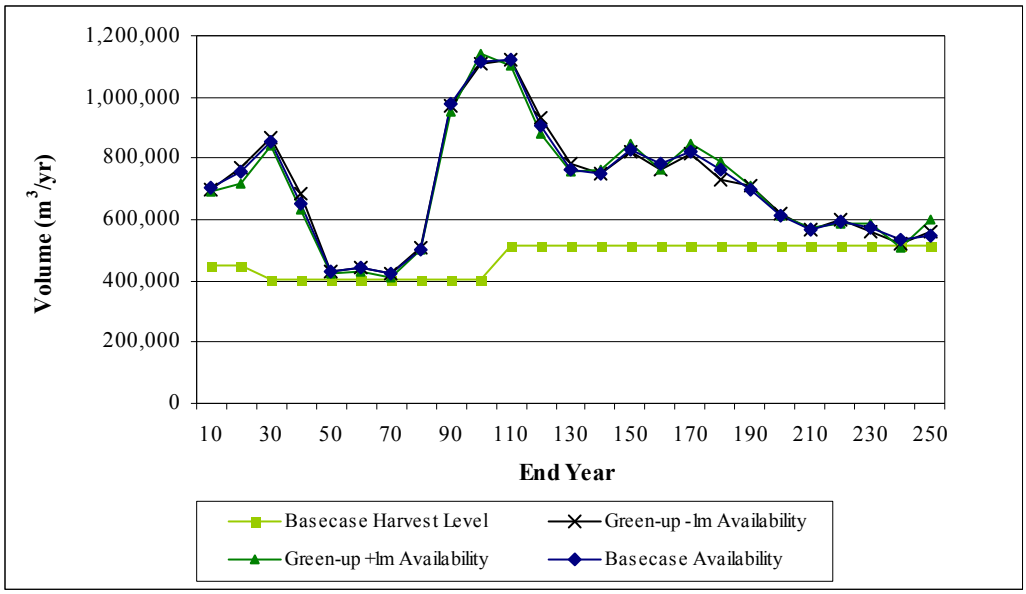

Figure 7.15 Timber Availability- Green-up Height ± 1m

7.3.2 No Visuals

The sensitivity of the TFL 23 timber supply to the visuals is tested in this sensitivity by removing the visual disturbance requirements completely (see the *Information Package* 2008 for more detail).

Table 7.11 and Figure 7.16 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased by 2% from 402,000m^3/year to 412,000m^3/year. In the long term, the harvest level is decreased slightly to 516,000m^3/year.

Table 7.11 Harvest Level- No Visuals

Year	Basecase Harvest Level	No Visuals Harvest Level	Change from Basecase
1-20	450,000	460,000	2%
21-100	402,000	412,000	2%
101-250	518,000	516,000	0%

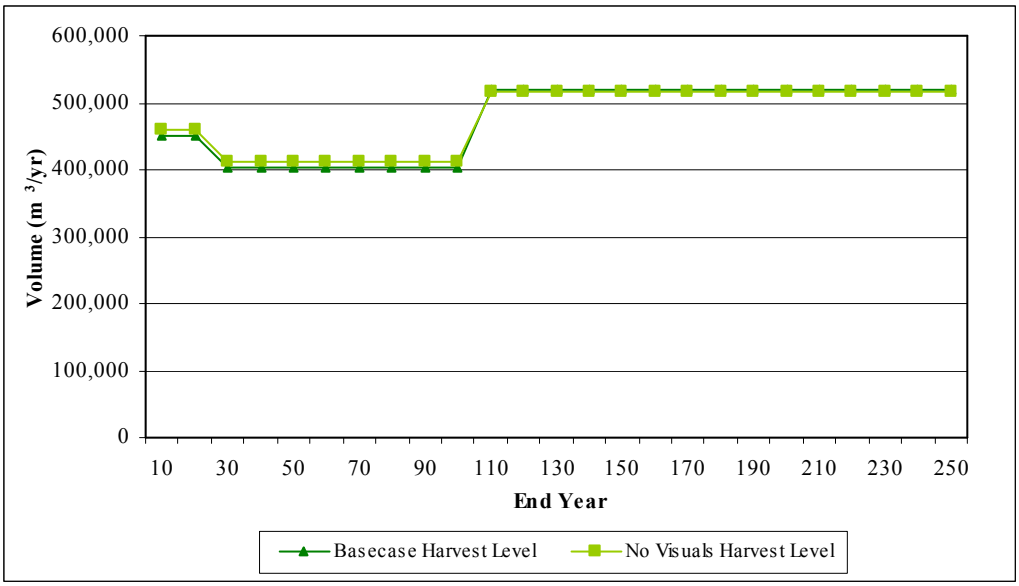

Figure 7.16 Harvest Level- No Visuals

Figure 7.17 shows the timber availability of the basecase and this sensitivity.

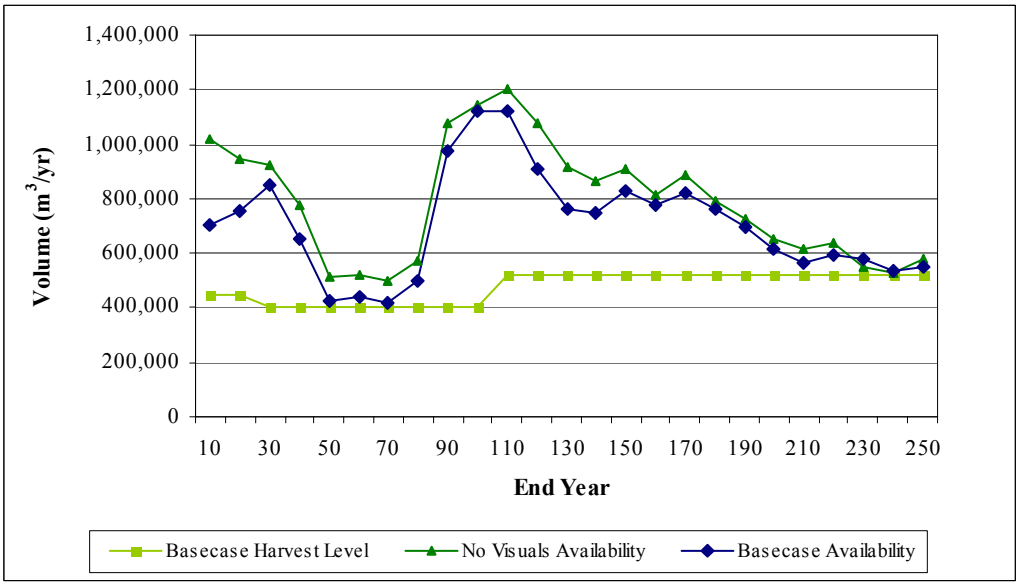

Figure 7.17 Timber Availability- No Visuals

7.3.3 Old Caribou Requirements

The basecase has caribou netdown areas to account for caribou forest cover requirements. Prior to these areas being identified, there were aspatial caribou requirements. This sensitivity tests the timber supply impact of moving the caribou netdown areas into the THLB and applying caribou retention requirements as described below.

A total of 2,474 ha of caribou priority areas 1 and 1a were removed from the THLB. Caribou priority 2 areas have retention and disturbance requirements were implemented by LU. The areas in each LU and the requirements imposed are shown in Table 7.12.

Table 7.12 Priority 2 Caribou Disturbance and Retention Requirements by LU

Priority 2 Caribou by LU	Disturbance Requirement		Retention Requirements		Area (ha)		
	%	Height	%	Age	THLB	Non-THLB Productive	Total
Fish	25	3	40	140	1,110	2,094	3,204
Halfway	25	3	40	140	12,213	15,610	27,823
Kuskanax	25	3	40	140	421	50	472
Trout	25	3	40	140	4,125	4,237	8,362
Total					**17,870**	**21,991**	**39,861**

Table 7.13 and Figure 7.18 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased by 1% from 402,000m^3/year to 406,000m^3/year. In the long term, the harvest level is decreased slightly to 516,000m^3/year.

Table 7.13 Harvest Level- Aspatial Caribou

Year	Basecase Harvest Level	SARCO Caribou Harvest Level	Change from Basecase
1-20	450,000	454,000	1%
21-100	402,000	406,000	1%
101-250	518,000	516,000	0%

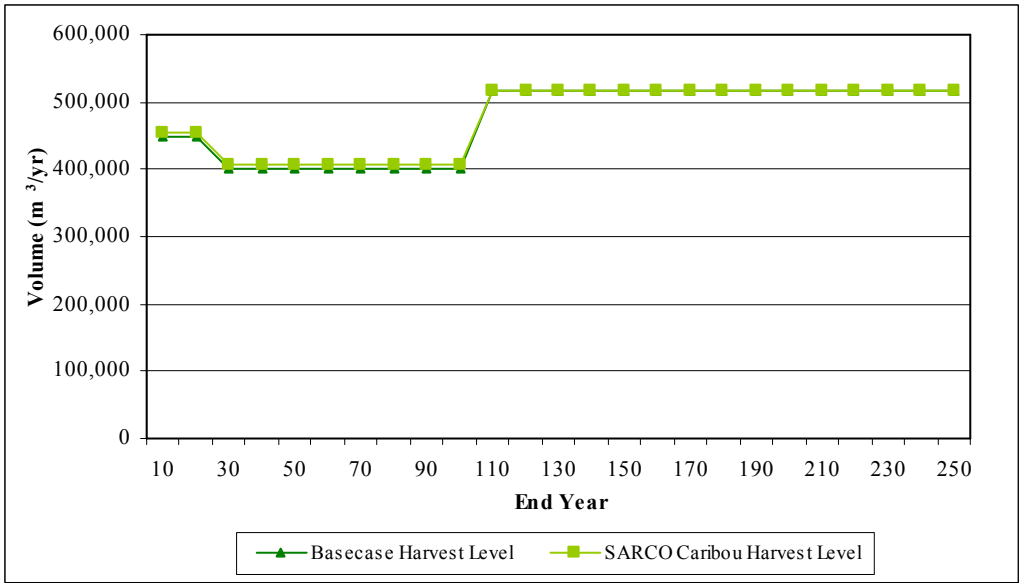

Figure 7.18 Harvest Level- Aspatial Caribou

Figure 7.17 shows the timber availability of the basecase and this sensitivity.

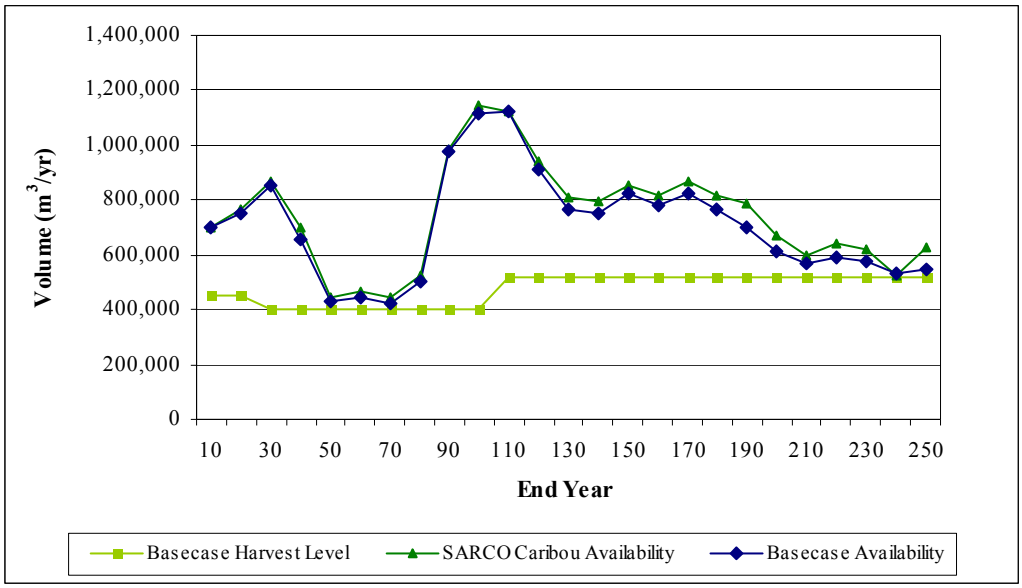

Figure 7.19 Timber Availability- Aspatial Caribou

7.4 Biodiversity Assumptions

7.4.1 No IRM

In the basecase, IRM was applied through the whole planning horizon. This sensitivity tests the timber supply impact of removing the IRM requirement. Table 7.14 and Figure 7.20 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased slightly with the removal of IRM to 403,000m^3/year and because of this, the long term harvest level is decreased slightly to 512,000m^3/year.

Table 7.14 Harvest Level- No IRM

Year	Basecase Harvest Level	No IRM Harvest Level	Change from Basecase
1-20	450,000	451,000	0%
21-100	402,000	403,000	0%
101-250	518,000	512,000	-1%

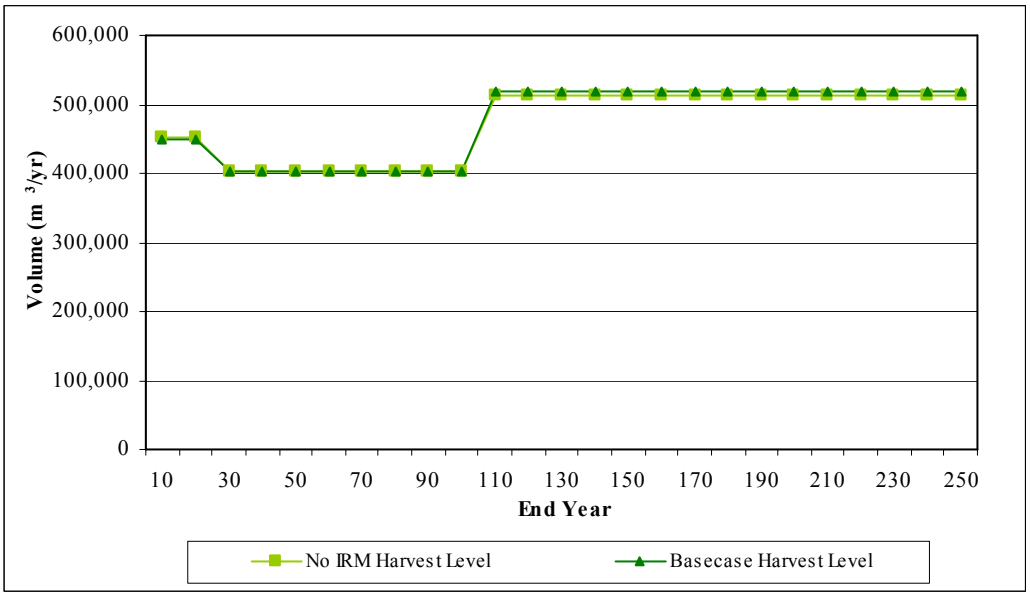

Figure 7.20 Harvest Level- No IRM

Figure 7.21 shows the timber availability of the basecase and this sensitivity.

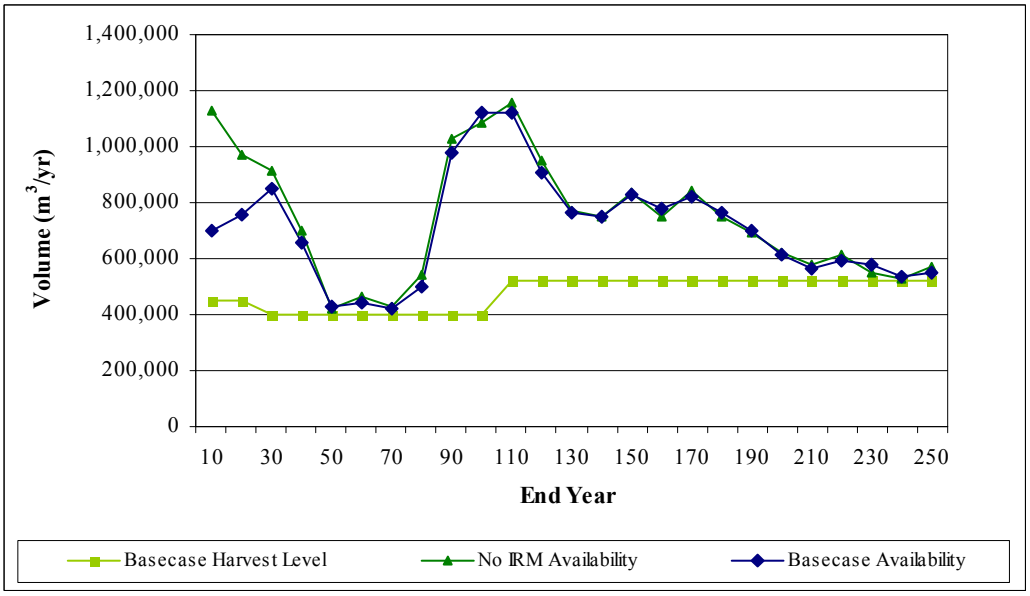

Figure 7.21 Timber Availability- No IRM

7.4.2 Spatial Adjacency Replaces IRM

In the basecase, IRM was applied through the whole planning horizon. This sensitivity tests the timber supply impact of removing the IRM requirement and applying spatial adjacency for the first 20 years. Table 7.15 and Figure 7.22 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased slightly with the removal of IRM to

403,000m^3/year and because of this, the long term harvest level is decreased slightly to 512,000m^3/year.

Table 7.15 Harvest Level- Spatial Adjacency

Year	Basecase Harvest Level	Spatial Adjacency Harvest Level	Change from Basecase
1-20	450,000	451,000	0%
21-100	402,000	403,000	0%
101-250	518,000	512,000	-1%

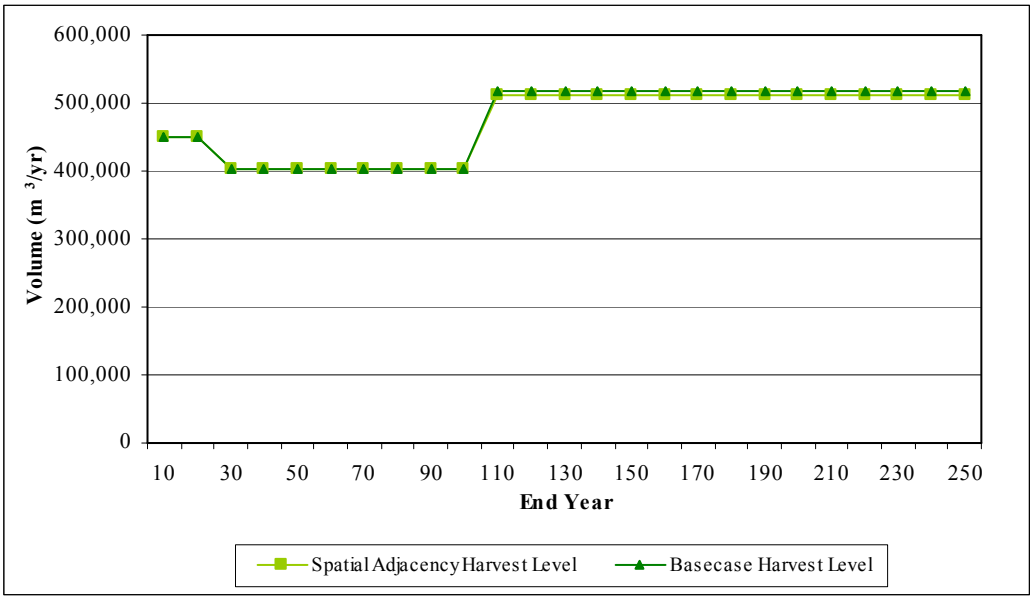

Figure 7.22 Harvest Level- Spatial Adjacency

Figure 7.23 shows the timber availability of the basecase and this sensitivity.

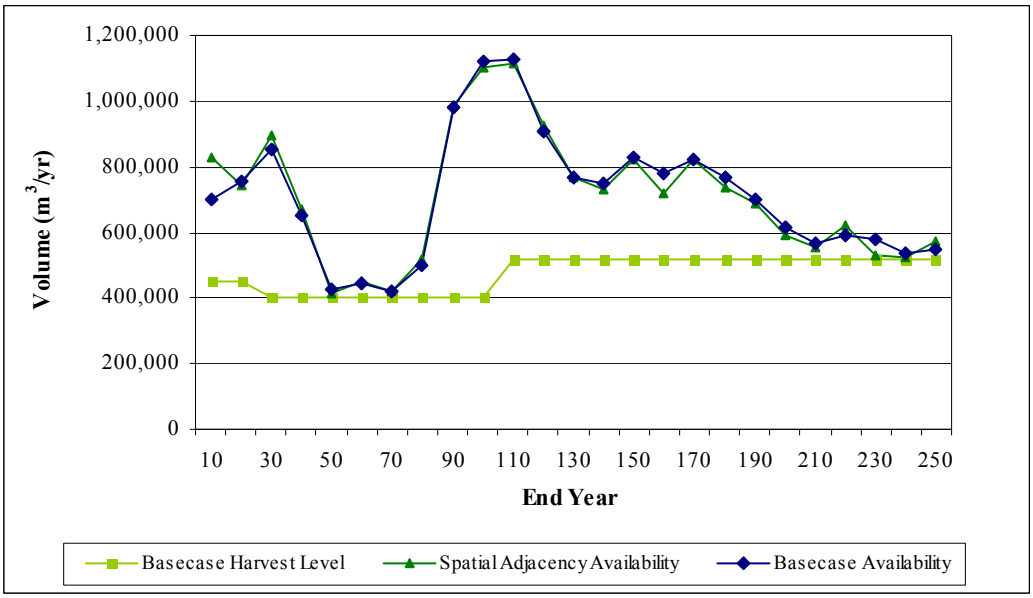

Figure 7.23 Timber Availability- Spatial Adjacency

7.4.3 No Disturbances in the Non-THLB

In the basecase, natural death and disturbances in the non-THLB are modeled by imposing disturbance and retention regime (by BEC) based on the natural range of variation (NROV) found in the *Biodiversity Guidebook*. The purpose of this is to address the issue of continuous aging of the non-THLB throughout the planning horizon and therefore unrealistic contribution to fulfilling various landbase requirements.

This sensitivity tests the timber supply impact of removing these disturbances in the non-THLB and letting it age continuously. For more information about the disturbance and retention regime imposed, please see the *Information Package.*

Table 7.16 shows the harvest level for the basecase and this sensitivity. The mid term harvest level is unchanged and the long term harvest level is reduced slightly to 517,000m^3/year.

Table 7.16 Harvest Level- no Disturbances in the non-THLB

Year	Basecase Harvest Level	No Disturbing the non-THLB Harvest Level	Change from Basecase
1-20	450,000	450,000	0%
21-100	402,000	402,000	0%
101-250	518,000	517,000	0%

7.4.4 Aspatial Seral Requirements

In the basecase, landscape level biodiversity is managed through the removal of old growth management areas (OGMAs) from the THLB. Prior to the formation of these draft OGMAs, landscape level biodiversity was controlled by aspatial seral requirements. This sensitivity tests

the timber supply impact of moving the existing proposed OGMAs from the non-THLB landbase into the THLB productive forest and applying seral requirements.

Seral requirements are applied by LU-BEC-NDT-BEO as shown in Table 7.17.

Table 7.17 Aspatial Seral Requirements

LU-BEC-NDT-BEO	Mature Retention Requirements		Old Retention Requirements		Additional Requirements		Area (ha)
	%	Age	%	Age	%	Age	
N510-ESSFwc1-2-MED	28	120	9	250			4,193
N510-ESSFwc4-2-MED	28	120	9	250			3,968
N510-ICHdw-3-MED	23	100	14	140			13,662
N510-ICHmw2-2-MED	31	100	9	250			9,702
N511-ESSFwc1-1-MED	36	120	19	250			2,087
N511-ESSFwc4-1-MED	36	120	19	250			2,908
N511-ICHdw-3-MED	23	100	14	140	23	100	4,343
N511-ICHmw2-2-MED	31	100	9	250			3,267
N511-IDFun-4-MED	34	100	13	250			485
N518-ESSFwc1-1-LOW	19	120	6	250			3,112
N518-ESSFwc4-1-LOW	19	120	6	250			8,805
N518-ICHdw-3-MED	23	100	14	140	23	100	5,604
N518-ICHmw2-2-LOW	15	100	3	250			9,406
N520-ESSFwc1-1-MED	36	120	19	250			2,001
N520-ESSFwc4-1-MED	36	120	19	250			3,545
N520-ICHmw2-2-LOW	15	100	3	250			10,786
N520-ICHwk1-1-LOW	17	100	4	250			747
N521-ESSFwc1-1-MED	36	120	19	250			1,854
N521-ESSFwc4-1-MED	36	120	19	250			4,602
N521-ICHmw2-2-MED	31	100	9	250			5,875
N526-ESSFwc1-1-LOW	19	120	6	250			1,420
N526-ESSFwc4-1-LOW	19	120	6	250			1,880
N526-ICHmw2-2-LOW	15	100	3	250			27,814
N527-ESSFwc1-1-MED	36	120	19	250			5,323
N527-ESSFwc4-1-MED	36	120	19	250			10,225
N527-ICHmw2-2-LOW	15	100	3	250			19,593
N527-ICHwk1-1-LOW	17	100	4	250			6,754
N528-ICHmw2-2-MED	31	100	9	250			490
N529-ESSFwc1-1-HIGH	54	120	28	250			6,171
N529-ESSFwc4-1-HIGH	54	120	28	250	54	120	13,257
N529-ICHmw2-2-MED	31	100	9	250			20,524
N529-ICHwk1-1-MED	34	100	13	250			8,961
N530-ESSFwc1-1-HIGH	54	120	28	250	54	120	1,439
N530-ESSFwc4-1-HIGH	54	120	28	250	54	120	3,346
N530-ICHmw2-2-HIGH	46	100	13	250	46	100	961
N530-ICHvk1-1-HIGH	51	100	19	250	51	100	1,026
N530-ICHwk1-1-HIGH	51	100	19	250	51	100	2,688
N531-ESSFvc-1-LOW	19	120	6	250			720
N531-ESSFwc1-1-LOW	19	120	6	250			2,653

LU-BEC-NDT-BEO	Mature Retention Requirements		Old Retention Requirements		Additional Requirements		Area (ha)
	%	Age	%	Age	%	Age	
N531-ESSFwc4-1-LOW	19	120	6	250			6,916
N531-ICHmw2-2-LOW	15	100	3	250			1,477
N531-ICHvk1-1-LOW	17	100	4	250			7,944
N531-ICHwk1-1-LOW	17	100	4	250			3,842
R1-ICHmw2-2-LOW	15	100	3	250			165
R4-ICHmw3-3-MED	23	100	14	140			182
R4-ICHwk1-1-LOW	17	100	4	250			266
R4-ICHwk1-1-MED	34	100	13	250			215
Total							257,205

Table 7.18 and Figure 7.24 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased by 3% from 402,000m^3/year to 415,000m^3/year. In the long term, the harvest level is increased to 524,000m^3/year.

Table 7.18 Harvest Level- Aspatial Seral

Year	Basecase Harvest Level	Aspatial Seral Harvest Level	Change from Basecase
1-20	450,000	463,000	3%
21-100	402,000	415,000	3%
101-250	518,000	524,000	1%

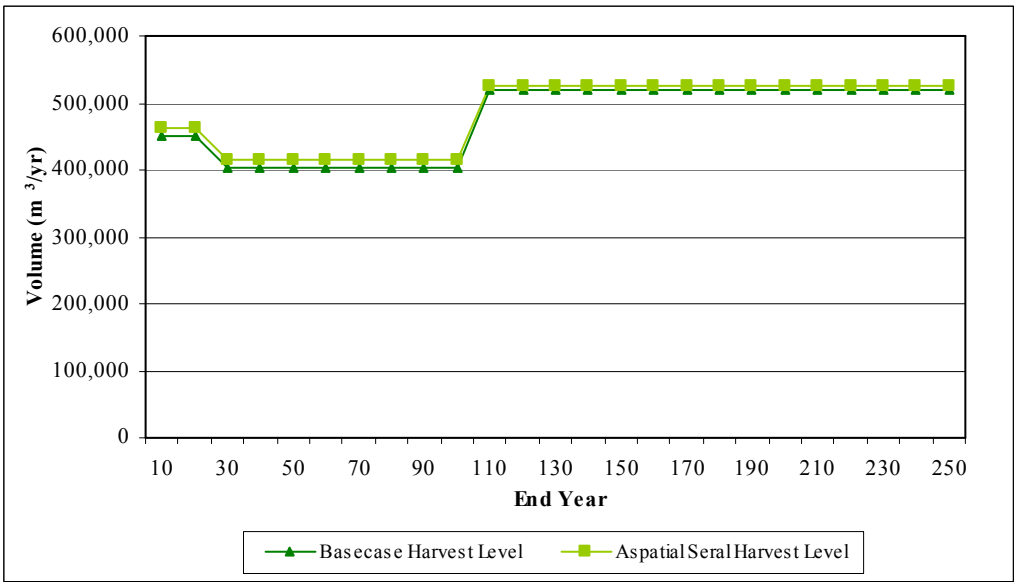

Figure 7.24 Harvest Level- Aspatial Seral

Figure 7.25 shows the timber availability of the basecase and this sensitivity.

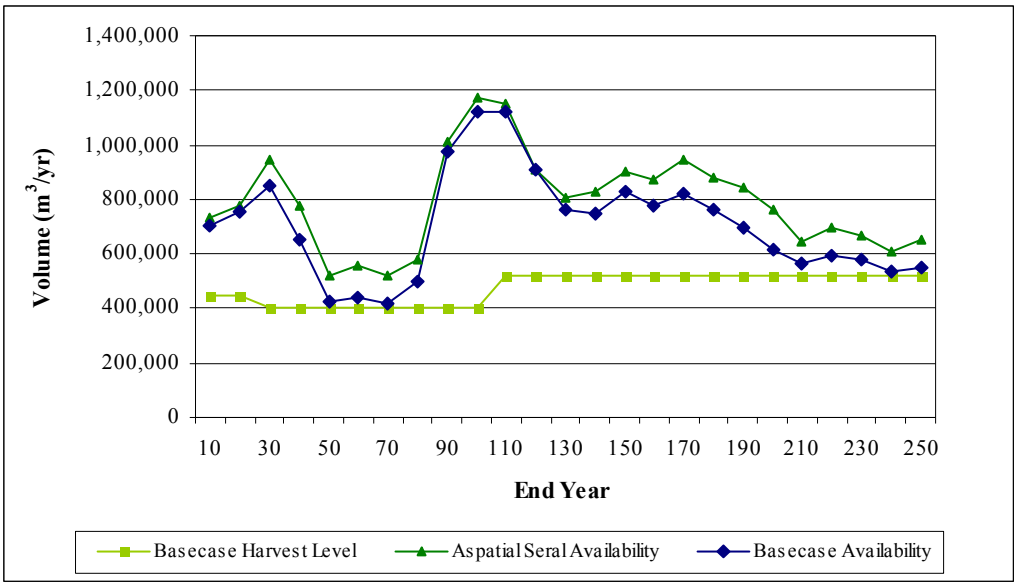

Figure 7.25 Timber Availability- Aspatial Seral

7.4.5 Optimized OGMAs

The Kootenay Boundary Higher Level Plan Order (KBHLPO) requires that old and mature forest is retained to contribute to the conservation of biodiversity. The amount of old and mature forest is specified in the Order for each BEC and are required to be maintained within each LU/BEC. The Integrated Land Management Bureau (ILMB) has developed draft old growth management areas (OGMAs) for TFL 23 following procedures from the Landscape Unit Planning Guide. Selection criteria used for the draft OGMAs include stand age and seral targets (LU and BEC zone area targets).

The "TFL 23 OGMA Optimization" Project (Timberline, 2009) evaluated and provided alternatives for these OGMAs considering economic return, location, and other landbase values that have traditionally been considered such as caribou habitat, visual quality objectives (VQOs), community watersheds (CWS), ungulate winter range (UWR) *etc*.

This sensitivity tests the timber supply impact of using the OGMAs identified in the optimization project instead of the existing draft ILMB OGMAs. Table 7.19 and Figure 7.26 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased by 4% from 402,000m^3/year to 419,000m^3/year. The timber availability shows almost no change; however the harvest level is able to slightly increase more so due to a modeling issue than an actual timber supply change. This sensitivity uses a separate resultant file, which changes the harvest blocks allowing slightly more flexibility.

In the long term, the harvest level is decreased to 505,000m^3/year.

Table 7.19 Harvest Level- Optimized OGMAs

Year	Basecase Harvest Level	Optimized OGMAs Harvest Level	Change from Basecase
1-20	450,000	463,000	3%
21-100	402,000	415,000	3%
101-250	518,000	511,000	-1%

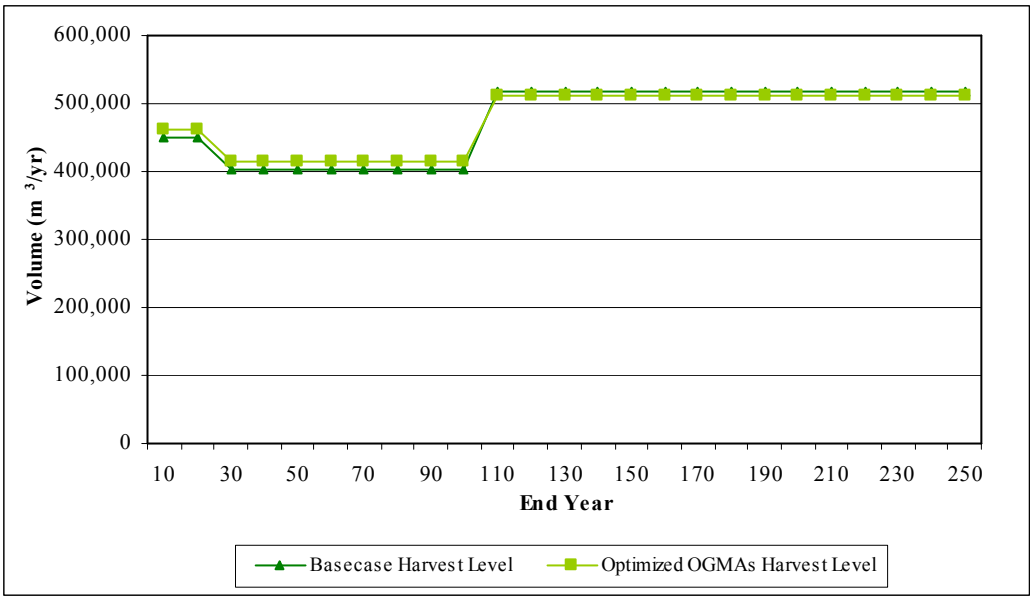

Figure 7.26 Harvest Level- Optimized OGMAs

Figure 7.27 shows the timber availability of the basecase and this sensitivity.

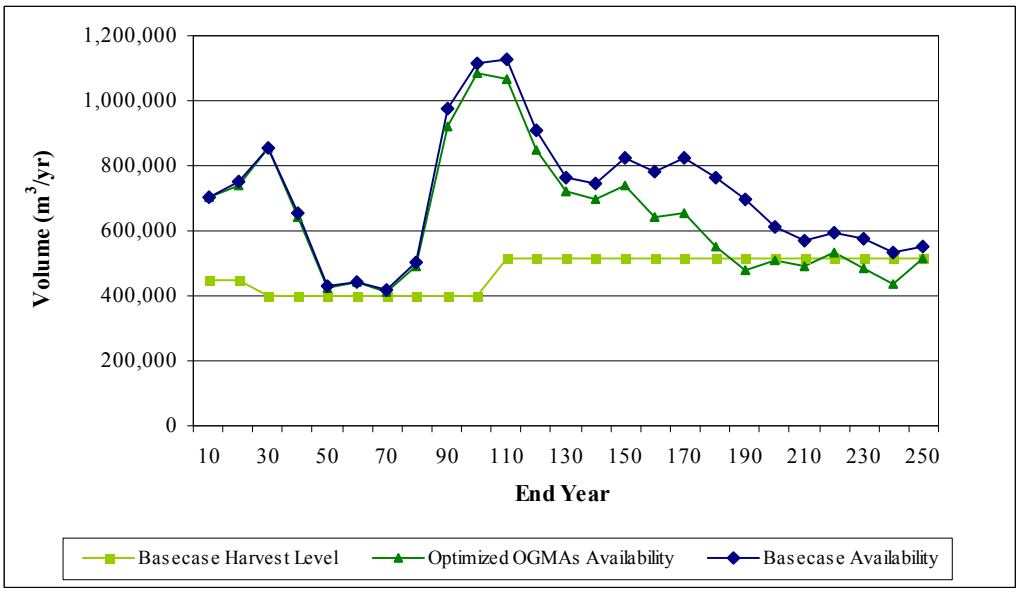

Figure 7.27 Timber Availability- Optimized OGMAs

7.5 Harvest Rules

7.5.1 Maximum Volume Harvest Rule

Table 7.20 and Figure 7.28 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased slightly from 402,000m^3/year to 403,000m^3/year. In the long term, the harvest level is decreased to 516,000m^3/year.

Table 7.20 Harvest Level- Maximum Volume

Year	Basecase Harvest Level	Maximum Volume First Harvest Level	Change from Basecase
1-20	450,000	451,000	0%
21-100	402,000	403,000	0%
101-250	518,000	516,000	0%

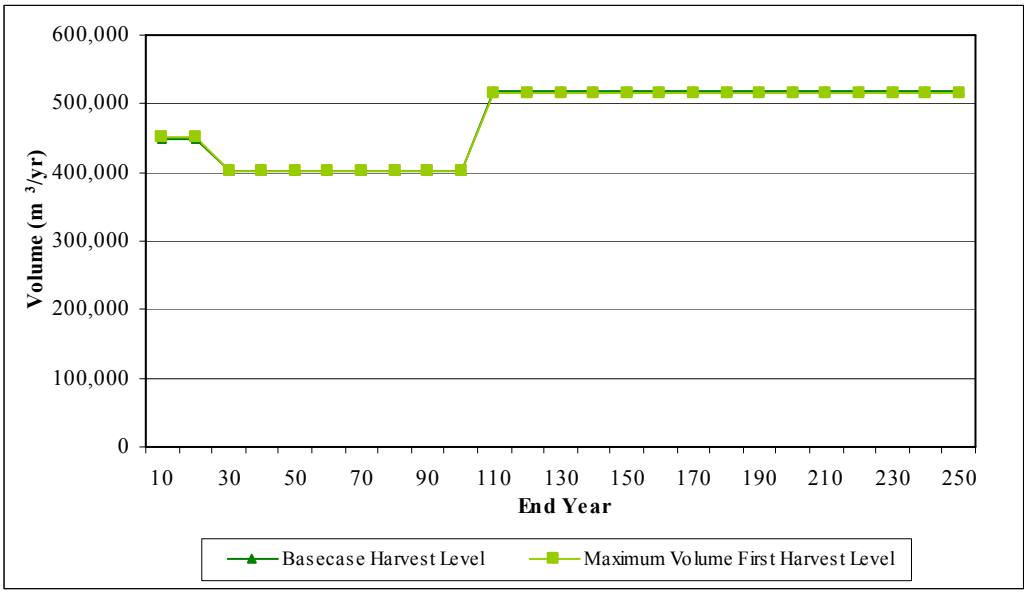

Figure 7.28 Harvest Level- Maximum Volume

Figure 7.29 shows the timber availability of the basecase and this sensitivity.

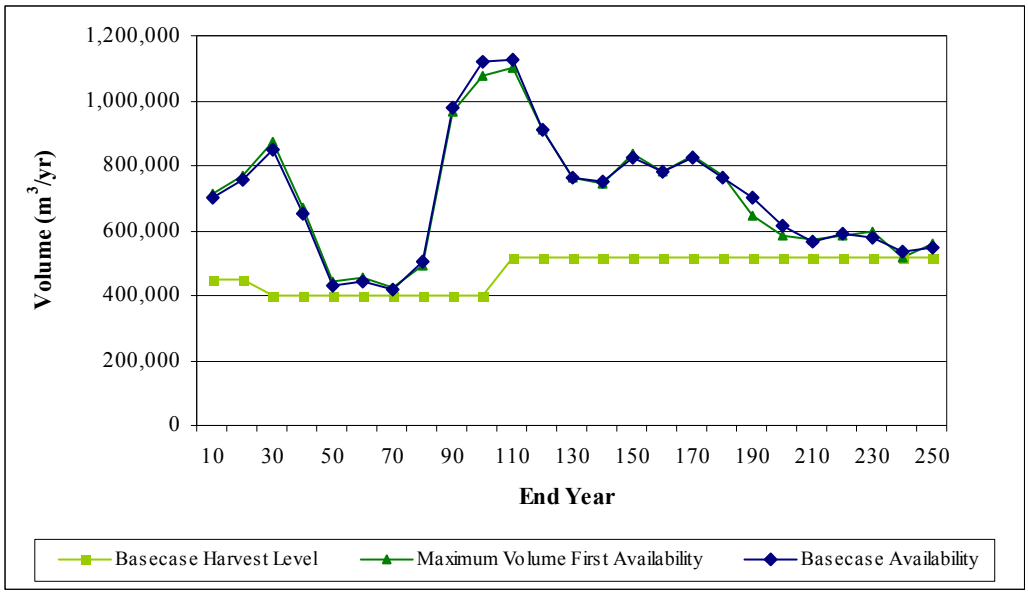

Figure 7.29 Timber Availability- Maximum Volume

7.5.2 Relative Oldest Harvest Rule

Table 7.21 and Figure 7.30 show the harvest level for the basecase and this sensitivity. The mid term harvest level is increased slightly from 402,000m^3/year to 403,000m^3/year. In the long term, the harvest level is decreased by 1% to 512,000m^3/year.

Table 7.21 Harvest Level- Relative Oldest

Year	Basecase Harvest Level	Relative Oldest First Harvest Level	Change from Basecase
1-20	450,000	451,000	0%
21-100	402,000	403,000	0%
101-250	518,000	512,000	-1%

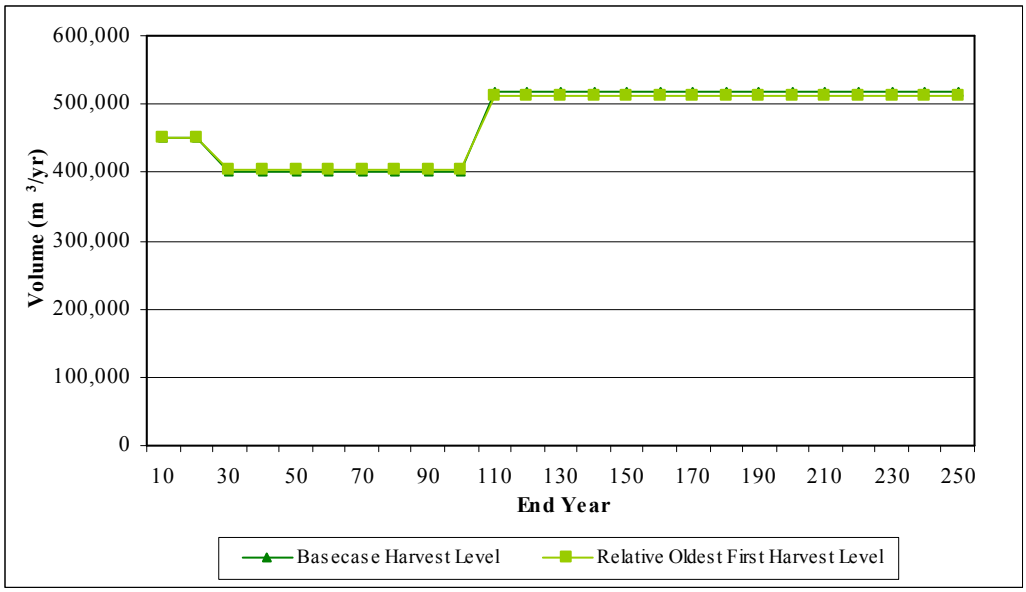

Figure 7.30 Harvest Level- Relative Oldest

Figure 7.31 shows the timber availability of the basecase and this sensitivity.

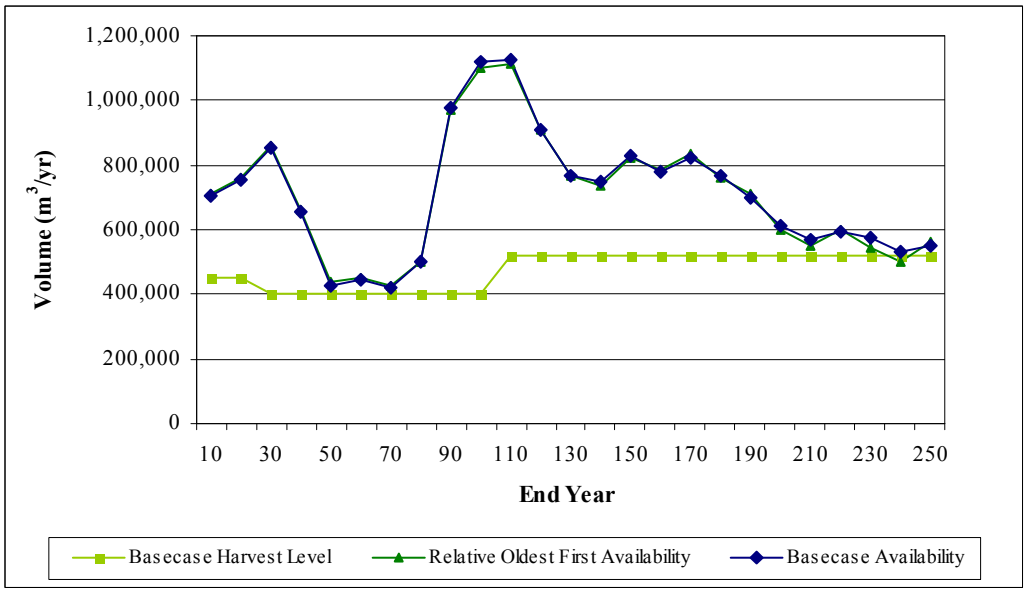

Figure 7.31 Timber Availability- Relative Oldest

7.5.3 10 Year Maximum Harvest

This sensitivity tests the timber supply impact of maximizing the 10 year harvest level while still keeping the mid term harvest level above the natural long run sustainable yield (LRSY) of 343,000m^3/year. There must be no more than a 10% decrease in harvest level each decade.

Table 7.22 and Figure 7.32 show the harvest level for the basecase and this sensitivity. The 10 year maximum harvest level that is attainable was found to be 530,000m^3/year. The mid term harvest level was set at the natural LRSY of 323,000m^3/year. In the long term, the harvest level is changed from 518,000m^3/year to 523,000m^3/year, an increase of 1%. The timber availability for this sensitivity is identical to the basecase because no input assumptions have changed (only harvest level).

Table 7.22 Harvest Level- 10 Year Maximum Harvest

Year	Basecase Harvest Level	Maximum 10 Year Harvest Level	Change from Basecase
1 - 10	450,000	530,000	18%
11 - 20	450,000	475,500	6%
21 - 30	402,000	426,000	6%
31 - 40	402,000	382,500	-5%
41 - 100	402,000	343,000	-15%
101-250	518,000	523,000	1%

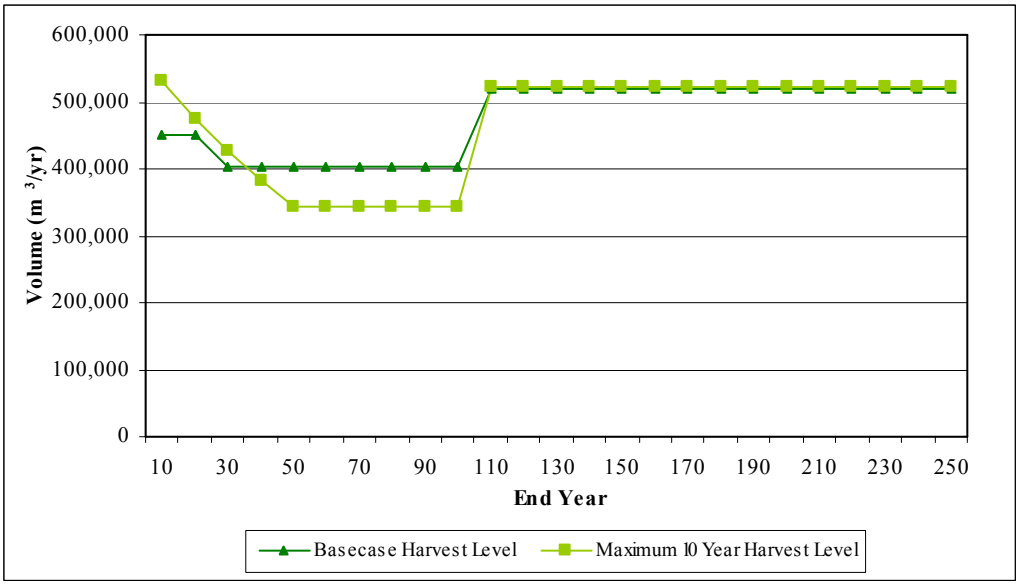

Figure 7.32 Harvest Level- 10 Year Maximum Harvest

7.6 Mountain Pine Beetle Assumptions

7.6.1 No MPB Harvest Prioritization

The basecase prioritizes MPB affected stands according to the severity to which they are affected. See the *Information Package* (Timberline, 2008) for more detail. This sensitivity tests the timber supply impact of not using this MPB prioritization. Table 7.23 shows the volume of pine harvested and lost in the basecase compared to this sensitivity. This sensitivity harvested 72% less of the MPB affected pine that the basecase and loses 71% more pine volume.

Table 7.23 MPB Harvest and Mortality – Basecase and No MPB Prioritization

Type	Area of Pine (ha)	
	Basecase	No MPB Prioritization
Harvested	4,583	1,741
MPB Mortality	4,022	6,864
Total	8,605	8,605

Table 7.24 and Figure 7.33 show the harvest level for the basecase and this sensitivity. The mid term harvest level is decreased by 2% from 402,000m^3/year to 392,000m^3/year. In the long term, the harvest level is decreased to 513,000m^3/year.

Table 7.24 Harvest Level- No MPB Prioritization

Year	Basecase Harvest Level	No Prioritized MPB Harvest Level	Change from Basecase
1-20	450,000	440,000	-2%
21-100	402,000	392,000	-2%
101-250	518,000	513,000	-1%

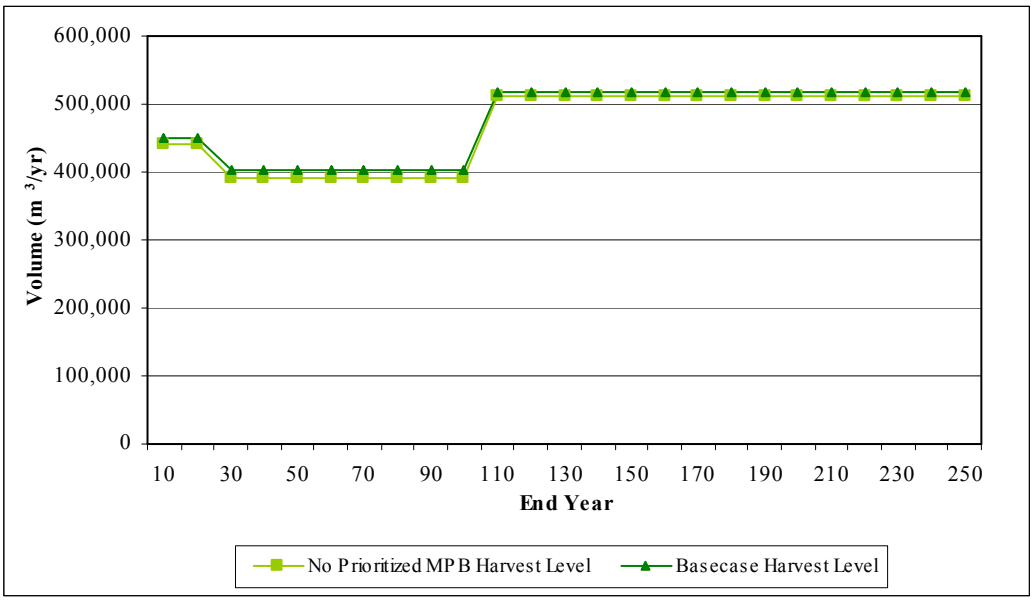

Figure 7.33 Harvest Level- No MPB Prioritization

Figure 7.34 shows the timber availability of the basecase and this sensitivity.

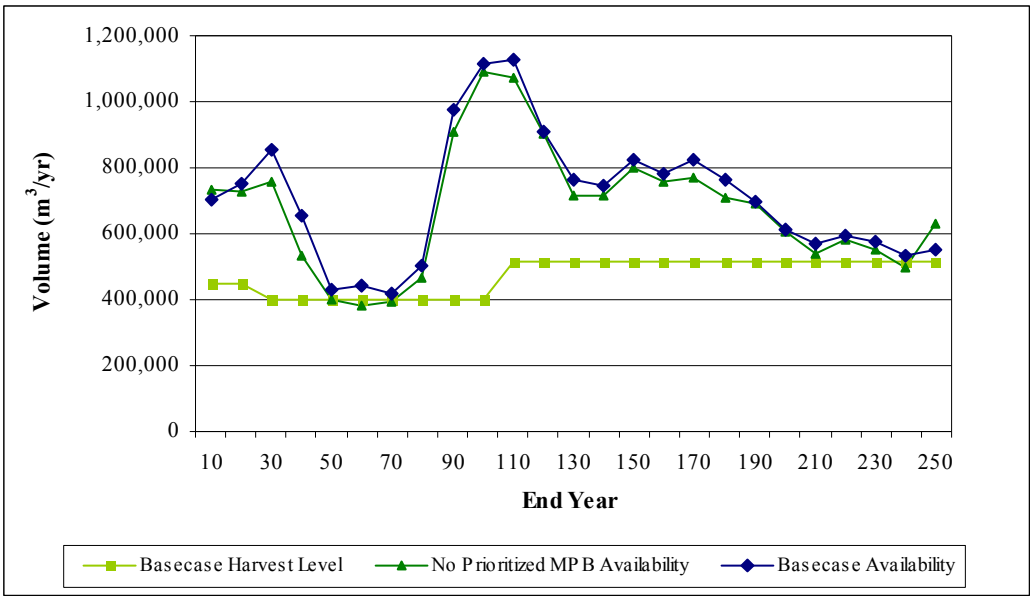

Figure 7.34 Timber Availability- No MPB Prioritization

7.6.2 Slower MPB Spread

The basecase uses MPB spread assumptions based on the provincial MoFR projections. See the *Information Package* (Timberline, 2008) for more detail. This sensitivity tests the timber supply impact of slowing the MPB spread by 5 years. Table 7.25 shows the volume of pine harvested and lost in the basecase compared to this sensitivity. This sensitivity harvested 8% more of the MPB affected pine than the basecase and loses 9% less pine volume.

Table 7.25 MPB Harvest and Mortality – Basecase and Slower MPB Spread

Type	Area of Pine (ha)	
	Basecase	Slower MPB Spread
Harvested	4,583	4,963
MPB Mortality	4,022	3,642
Total	8,605	8,605

The mid term harvest level is increased slightly from 402,000m^3/year to 404,000m^3/year. In the long term, the harvest level is decreased to 516,000m^3/year. Table 7.26 and Figure 7.35 show the harvest level for the basecase and this sensitivity.

Table 7.26 Harvest Level- Slower MPB Spread

Year	Basecase Harvest Level	Slower MPB Spread Harvest Level	Change from Basecase
1-20	450,000	452,000	0%
21-100	402,000	404,000	0%
101-250	518,000	516,000	0%

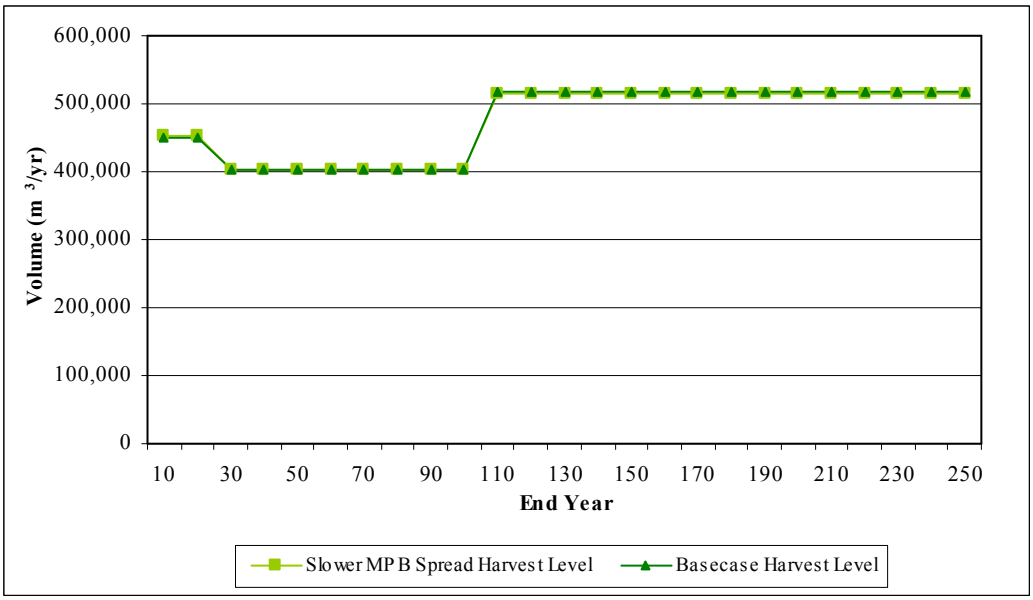

Figure 7.35 Harvest Level- Slower MPB Spread

Figure 7.36 shows the timber availability of the basecase and this sensitivity.

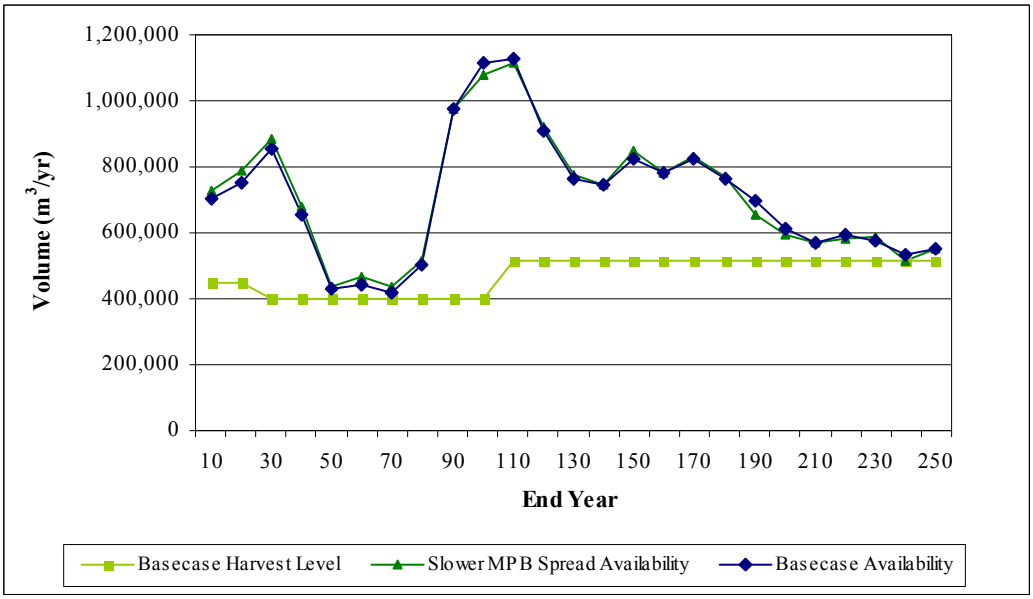

Figure 7.36 Timber Availability- Slower MPB Spread

7.7 Summary of Sensitivities

Table 7.27 shows a summary of mid and long term harvest levels for the above sensitivities.

Table 7.27 Summary of Sensitivities

Scenario Name	Harvest Level (m3/year)			Change from Basecase		
	1-20	21-100	101-250	1-20	21-100	101-250
Basecase	450,000	402,000	518,000	N/A	N/A	N/A
THLB - 10%	413,000	365,000	467,000	-8%	-9%	-10%
THLB + 10%	488,000	440,000	561,000	8%	9%	8%
Natural Yields -10%	415,000	367,000	507,000	-8%	-9%	-2%
Natural Yields+10%	483,000	435,000	497,000	7%	8%	-4%
Managed Yields -10%	442,000	394,000	444,000	-2%	-2%	-14%
Managed Yields+10%	458,000	410,000	559,000	2%	2%	8%
MHA -10%	480,000	432,000	435,000	7%	7%	-16%
MHA +10%	411,000	363,000	544,000	-9%	-10%	5%
Managed SI-1m	436,000	388,000	452,000	-3%	-3%	-13%
Managed SI+1m	454,000	406,000	579,000	1%	1%	12%
Natural SI-1m	438,000	390,000	515,000	-3%	-3%	-1%
Natural SI+1m	472,000	424,000	515,000	5%	5%	-1%
Green-up -1m	450,000	402,000	516,000	0%	0%	0%
Green-up +1m	448,000	400,000	515,000	0%	0%	-1%
Aspatial Seral	463,000	415,000	524,000	3%	3%	1%
No Visuals	460,000	412,000	516,000	2%	2%	0%
SARCO Caribou	454,000	406,000	516,000	1%	1%	0%
Relative Oldest First	451,000	403,000	512,000	0%	0%	-1%
Maximum Volume First	451,000	403,000	516,000	0%	0%	0%
No IRM	451,000	403,000	512,000	0%	0%	-1%
No Disturbing the non-THLB	450,000	402,000	517,000	0%	0%	0%
No Genetic Gains	449,000	401,000	487,000	0%	0%	-6%
Spatial Adjacency	451,000	403,000	512,000	0%	0%	-1%
Optimized OGMAs	467,000	419,000	505,000	4%	4%	-3%
No Prioritized MPB	440,000	392,000	513,000	-2%	-2%	-1%
Slower MPB Spread	452,000	404,000	513,000	0%	0%	-1%