

Tree Farm Licence 43

Timber Supply Analysis

Information Report / Analysis Report

December 8, 2009

Prepared for:

Kruger Products Limited



Prepared by:

Forsite Consulting Ltd.



Record of Changes since the September 21, 2009 Version

Change	Who	Date
Changed Port McNeil District to North Island – Central Coast district on page 2, last paragraph.	Jeremy Hachey	December 1, 2009
Corrections made to Table 9 in Section 2.5.4.	Jeremy Hachey	December 1, 2009
Map Legend fixed for Figure 3.	Jeremy Hachey	December 1, 2009
S1 – Large River and S1 in Table 10 changed to S1-A and S1-B. Footnote added to clarify text around effective reserve width.	Jeremy Hachey	December 1, 2009
Corrections made to text in Section 3.4, paragraph 1 regarding AAC reference.	Jeremy Hachey	December 1, 2009
Footnote added to clarify where inventory volumes used to derive volume equivalents came from in Section 3.4.	Jeremy Hachey	December 1, 2009
A section with associated text was added to detail how erosion and accretion was dealt with for this analysis (Section 2.7)	Phil O'Connor	December 8, 2009
First Nation Contact list added as APPENDIX B	Phil O'Connor	January 6 2010

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Contributions from the following people were instrumental in the completion of this document:

Kruger Products Limited

Phil O'Connor

Key Forsite members that contributed to this project include Jeremy Hachey, Cam Brown, and Stephen Smyrl.

Executive Summary

Kruger Products Limited, the holder of Tree Farm Licence (TFL) #43 has completed this timber supply analysis in support of a new Annual Allowable Cut (AAC) determination. The AAC for this unique, predominately deciduous TFL is volume-based. It has been assessed here using an area-based approach, and subsequently converted to a yearly volume. This is largely due to the management objective of converting existing, previously harvested valley bottom deciduous stands to thrifty Hybrid Poplar. In the 2000 rationale, a volume based analysis was requested for the next TSR however this requirement is no longer necessary¹ and as such, this analysis has been completed using an area-based approach.

This combined report is being made available to the Public and First Nation for a period of sixty days. Although this represents a static time period for review and comment, communications with First Nations outside of this current process are ongoing and reflective of commitments to continued dialogue in approved Forest Stewardship Plans (FSP).

Unique to the current process has been the submission of both the Information and Analysis Reports as a single document. In the past both these documents were submitted with each receiving individual approval. In discussions with staff from the MoFR it was recognized that the relatively simplistic nature of the area based analysis / timber supply modeling greatly reduced the need of producing each document as a separate entity. Combining both documents does not increase the uncertainty or risk associated with the determination of a new AAC. The resulting process is however more streamlined representing a significant saving of both time and money for all parties involved in the new determination.

The Base Case analysis has a proposed harvest level for Management Plan 5 of 117.8 ha/year. The current AAC of TFL 43 is 108.2 ha/year. The Base Case harvest level represents an increase of 9.6 ha/year or 8.9% in annual harvest area in comparison to the AAC for MP 4. This results from a larger THLB area (less ESA and riparian reductions) and slightly shorter rotation ages in the Homathko and Kingcome Blocks (shorter regeneration delays assumed).

The table below shows the recommended annual harvest level for each of the three TFL Blocks.

Block	Proposed AAC (ha/year)	Wtd. Avg. Volume/ha (m ³ /ha)	Approximate Volume Equivalent of Proposed AAC (m ³ /year)
Fraser	44.9	287	12,886
Homathko	57.1	332	18,957
Kingcome	15.8	514	8,121
Total	117.8		39,965

¹ Mike Clarkson, letter sent to Phil O'Connor. 19 November 2008. Ref: 19710-40/43

Table of Contents

RECORD OF CHANGES SINCE THE SEPTEMBER 21, 2009 VERSION	I
ACKNOWLEDGEMENTS	II
EXECUTIVE SUMMARY	III
TABLE OF CONTENTS	IV
LIST OF TABLES	VI
LIST OF FIGURES	VII
1.0 INTRODUCTION	1
1.1 DESCRIPTION OF THE LAND BASE	2
1.2 INTEGRATED RESOURCE MANAGEMENT CONSIDERATIONS	3
1.3 CURRENT ATTRIBUTES OF TFL 43	4
1.3.1 Species Distribution	8
1.3.2 Age Class Structure	9
1.3.3 Site Index Profile	10
2.0 TIMBER SUPPLY ANALYSIS METHODS	12
2.1 DATA SOURCES	13
2.2 FOREST COVER INVENTORY	13
2.3 TIMBER HARVESTING LAND BASE DETERMINATION	13
2.4 EXCLUSIONS FROM THE PRODUCTIVE FORESTED LAND BASE	16
2.4.1 Non-forest and non-productive forest	16
2.4.2 Roads, trails, and landings	16
2.4.2.1 Existing classified roads	16
2.4.2.2 Existing unclassified roads	16
2.4.2.3 Future Roads, Trails, and Landings	17
2.5 EXCLUSIONS FROM THE TIMBER HARVESTING LAND BASE	17
2.5.1 Homathko Estuary Park	17
2.5.2 Non-commercial land	17
2.5.3 Inoperable/inaccessible	18
2.5.4 Environmentally sensitive areas	18
2.5.5 Low productivity sites	20
2.5.6 Riparian reserves	20
2.5.7 Wildlife Habitat Areas – Grizzly	20
2.5.8 Old Growth Management Areas	21
2.5.8.1 Fraser River Block	21
2.5.8.2 Homathko River Block	21
2.5.8.3 Kingcome River Block	21
2.5.9 Cultural Heritage Resources	21
2.6 NON RECOVERABLE LOSSES	22
2.7 EROSION AND ACCRETION	22
2.8 ROTATION LENGTHS	22
2.8.1 Merchantability Criteria	22
2.8.2 Regeneration Delays	22
2.8.3 Espacement Trial	23
2.8.4 Permanent Sample Plot Data	24
2.8.4.1 PSPs associated with Historic Management Practices	25
2.8.4.2 PSPs associated with Current Management Practices	26
2.8.5 Kruger's Operational Experience	28
2.8.6 Selected Rotation Lengths	28

2.9	INTEGRATED RESOURCE MANAGEMENT	28
2.10	Green-up/adjacency	29
2.11	Visual resources.....	29
2.12	Wildlife – Grizzly Bear	29
2.13	Biodiversity.....	30
2.13.1	Landscape-level biodiversity.....	30
2.13.2	Stand-level biodiversity — Wildlife Tree Retention	31
2.14	CHANGES FROM MP4	31
3.0	TIMBER SUPPLY ANALYSIS RESULTS.....	33
3.1	FRASER BLOCK HARVEST LEVEL AND PROPOSED AAC CALCULATION	33
3.2	HOMATHKO BLOCK HARVEST LEVEL AND PROPOSED AAC CALCULATION	34
3.3	KINGCOME BLOCK HARVEST LEVEL AND PROPOSED AAC CALCULATION	35
3.4	TOTAL TFL AREA.....	36
3.5	SENSITIVITY ANALYSIS	36
3.5.1	Rotation Lengths	36
3.5.1.1	Sensitivity (-2 years)	36
3.5.1.2	Sensitivity (+2 years)	37
3.5.2	Size of the timber Harvesting Land Base (THLB)	37
3.5.2.1	Sensitivity (THLB -5%).....	37
3.5.2.2	Sensitivity (THLB +5%).....	37
3.6	CONCLUSIONS / RECOMMENDED HARVEST LEVELS.....	38
4.0	20 YEAR PLAN	39
4.1	INTRODUCTION	39
4.2	INTRODUCTION	39
4.3	GUIDELINES AND OBJECTIVES	39
4.4	MAPS.....	40
4.5	PLAN DISCUSSION AND RESULTS	40
4.5.1	Fraser Block.....	40
4.5.2	Homathko Block	42
4.5.3	Kingcome Block.....	45
5.0	REFERENCES	47
6.0	GLOSSARY	48
7.0	ACRONYMS	52
	APPENDIX A - 20 YEAR PLAN MAPS	53
	APPENDIX B – FIRST NATION CONTACT LIST.....	54

List of Tables

TABLE 1. DATA INPUTS.....	13
TABLE 2. TIMBER HARVESTING LAND BASE AREA NETDOWN SUMMARY	14
TABLE 3. LAND BASE REDUCTIONS FOR NON-FOREST AND NON-PRODUCTIVE AREA	16
TABLE 4. LAND BASE REDUCTIONS FOR EXISTING CLASSIFIED ROADS	16
TABLE 5. LAND BASE REDUCTIONS FOR EXISTING UNCLASSIFIED ROADS.....	17
TABLE 6. LAND BASE REDUCTIONS FOR THE HOMATHKO ESTUARY PARK	17
TABLE 7. LAND BASE REDUCTIONS FOR NON-COMMERCIAL COVER	17
TABLE 8. LAND BASE REDUCTIONS FOR INOPERABLE AREAS	18
TABLE 9. LAND BASE REDUCTIONS FOR ENVIRONMENTALLY SENSITIVE AREAS	19
TABLE 10. LAND BASE REDUCTIONS FOR RIPARIAN RESERVE AND MANAGEMENT ZONES.....	20
TABLE 11. LAND BASE REDUCTIONS FOR IDENTIFIED WILDLIFE	21
TABLE 12. LAND BASE REDUCTIONS FOR SPATIAL OGMA'S IN TFL: 43.	21
TABLE 13. INFERRED HARVEST AGES BASED ON FRASER BLOCK RESULTS AND AVERAGE SITE INDICES.....	24
TABLE 14. SELECTED ROTATION LENGTHS FOR TIMBER SUPPLY ANALYSIS.....	28
TABLE 15. TIMBER HARVESTING LAND BASE AREA NETDOWN SUMMARY - FRASER BLOCK.....	33
TABLE 16. TIMBER HARVESTING LAND BASE AREA NETDOWN SUMMARY - HOMATHKO BLOCK	34
TABLE 17. TIMBER HARVESTING LAND BASE AREA NETDOWN SUMMARY - KINGCOME BLOCK	35
TABLE 18. SUMMARY OF PROPOSED ALLOWABLE ANNUAL CUT CALCULATIONS FOR TFL 43.	36
TABLE 19. SENSITIVITY - ROTATION LENGTH DECREASED BY 2 YEARS.....	36
TABLE 20. SENSITIVITY - ROTATION LENGTH INCREASE BY 2 YEARS.	37
TABLE 21. SENSITIVITY – THLB AREA DECREASED BY 5%.	37
TABLE 22. SENSITIVITY – THLB AREA INCREASED BY 5%.	37
TABLE 23. RECOMMEND HARVEST LEVELS (HA/YEAR) FOR MANAGEMENT PLAN 5.....	38
TABLE 24. FRASER BLOCK – 20 YEAR PLAN HARVEST AREA SUMMARY	42
TABLE 25. HOMATHKO BLOCK – 20 YEAR PLAN HARVEST AREA SUMMARY	44
TABLE 26. KINGCOME BLOCK – 20 YEAR PLAN HARVEST AREA SUMMARY	46

List of Figures

FIGURE 1. TFL 43 LOCATION MAP	2
FIGURE 2. TFL 43 LAND BASE DEFINITION MAP – FRASER.....	5
FIGURE 3. TFL 43 LAND BASE DEFINITION MAP – HOMATHKO BLOCK.....	6
FIGURE 4. TFL 43 LAND BASE DEFINITION MAP – KINGCOME BLOCK.....	7
FIGURE 5. TFL 43 AREA BY LEADING SPECIES - FRASER BLOCK	8
FIGURE 6. TFL 43 AREA BY LEADING SPECIES - HOMATHKO BLOCK	8
FIGURE 7. TFL 43 AREA BY LEADING SPECIES - KINGCOME BLOCK	9
FIGURE 8. TFL 43 CURRENT AGE CLASS STRUCTURE (2009) - FRASER BLOCK.....	9
FIGURE 9. TFL 43 CURRENT AGE CLASS STRUCTURE (2009) - HOMATHKO BLOCK.....	10
FIGURE 10. TFL 43 CURRENT AGE CLASS STRUCTURE (2009) - KINGCOME BLOCK.....	10
FIGURE 11. TFL 43 SITE INDEX PROFILE - FRASER BLOCK THLB	11
FIGURE 12. TFL 43 SITE INDEX PROFILE - HOMATHKO BLOCK THLB	11
FIGURE 13. TFL 43 SITE INDEX PROFILE - KINGCOME BLOCK THLB	12
FIGURE 14. TFL 43 LAND BASE SUMMARY.....	15
FIGURE 15. AVERAGE DIAMETER BREAST HEIGHT (CM) FOR 4 CLONES PLANTED AT THE HARRISON MILL NURSERY ESPACEMENT TRIAL ESTABLISHED IN 1987 WITH 4.5M X 4.5M SPACING.	24
FIGURE 16. PSP DATA ASSOCIATED WITH 'HISTORICAL' MANAGEMENT PRACTICES – FRASER BLOCK	26
FIGURE 17. PSP DATA ASSOCIATED WITH 'CURRENT' MANAGEMENT PRACTICES – FRASER BLOCK	27
FIGURE 18. PSP DATA ASSOCIATED WITH 'CURRENT' MANAGEMENT PRACTICES – KINGCOME AND HOMATHKO BLOCKS.....	27
FIGURE 19. TFL 43 FRASER BLOCK LAND BASE BREAKDOWN.....	41
FIGURE 20. TFL 43 FRASER BLOCK THLB AGE CLASS DISTRIBUTION.....	41
FIGURE 21. TFL 43 HOMATHKO BLOCK LAND BASE BREAKDOWN.....	43
FIGURE 22. TFL 43 HOMATHKO BLOCK THLB AGE CLASS DISTRIBUTION	44
FIGURE 23. TFL 43 KINGCOME BLOCK LAND BASE BREAKDOWN.....	45
FIGURE 24. TFL 43 KINGCOME BLOCK THLB AGE CLASS DISTRIBUTION	46

1.0 Introduction

Kruger Products Limited, the holder of Tree Farm Licence (TFL) 43 has completed this timber supply analysis / modeling in support of a new Annual Allowable Cut (AAC) determination. The purpose of timber supply analysis is to examine the short- and long-term effects of current forest management practices on the availability of timber for harvesting. The Timber Supply Modeling in this report consisted of determining an average area harvest flow. The volume was estimated and converted to an average expected volume harvest in five year periods. The 20 Year Plan is used to validate that volumes exist and therefore the methods used are appropriate for the Deputy Chief Forester to make a volume based AAC determination.

The Annual allowable cut determination for this TFL is by statute volume-based. It is unique however in that the AAC is first determined utilizing an area-based approach subsequently converted into a yearly volume. This is largely due to the management objective of converting existing, previously harvested valley bottom stands into thrifty Hybrid Poplar stands. In the 2000 rationale, a volume based analysis was requested for the next TSR however this requirement is no longer necessary² and as such, this analysis has been completed using an area-based approach.

A review of this type is normally completed at least once every five years to capture changes in data, practices, policy, or legislation influencing forest management in the TFL. The previous review (MP4) was completed in May, 1999 with a final Annual Allowable Cut (AAC) determination on March 1, 2000. Through legislation, a new timber supply review process should have been initiated in 2005. On May 14, 2004 the Deputy Chief Forester on a request from Kruger Products Limited postponed a new determination for 5 years (until 2010). This postponement by the Deputy Chief Forester was based on his Ministry's belief that a new AAC determination would not result in a significant change in the AAC. Considering this direction the goal is to have a new AAC determination in place by January 31, 2010.

Unique to the current process has been the submission of both the Information and Analysis Reports as a single document. In the past both these documents were submitted with each receiving individual approval. In discussions with staff from the MoFR it was recognized that the relatively simplistic nature of the area based analysis / timber supply modeling greatly reduced the need of producing each document as a separate entity. Combining both documents does not increase the uncertainty or risk associated with the determination of a new AAC. The resulting process is however more streamlined representing a saving of both time and money to all parties involved in the new determination. An updated 20 Year Plan is included in this report confirming the availability of the timber resource in support of our recommended AAC.

This combined report is being made available to the Public and First Nation for a period of sixty days. Although this represents a static time period for review and comment, communications with First Nations outside of this current process are ongoing and reflective of commitments to continued dialogue in approved Forest Stewardship Plans (FSP).

² Mike Clarkson, letter sent to Phil O'Connor. 19 November 2008. Ref: 19710-40/43

1.1 Description of the Land Base

TFL 43 is located in 3 geographically distinct Blocks within the coastal mountains in the southern portion of British Columbia. The TFL lands are situated on the flood plains of the Lower Fraser, Homathko and Kingcome Rivers (Figure 1). The total area of the TFL is 10,183 hectares of which 7,859 hectares are Crown land and 2,324 hectares are fee simple lands owned by Kruger Products.

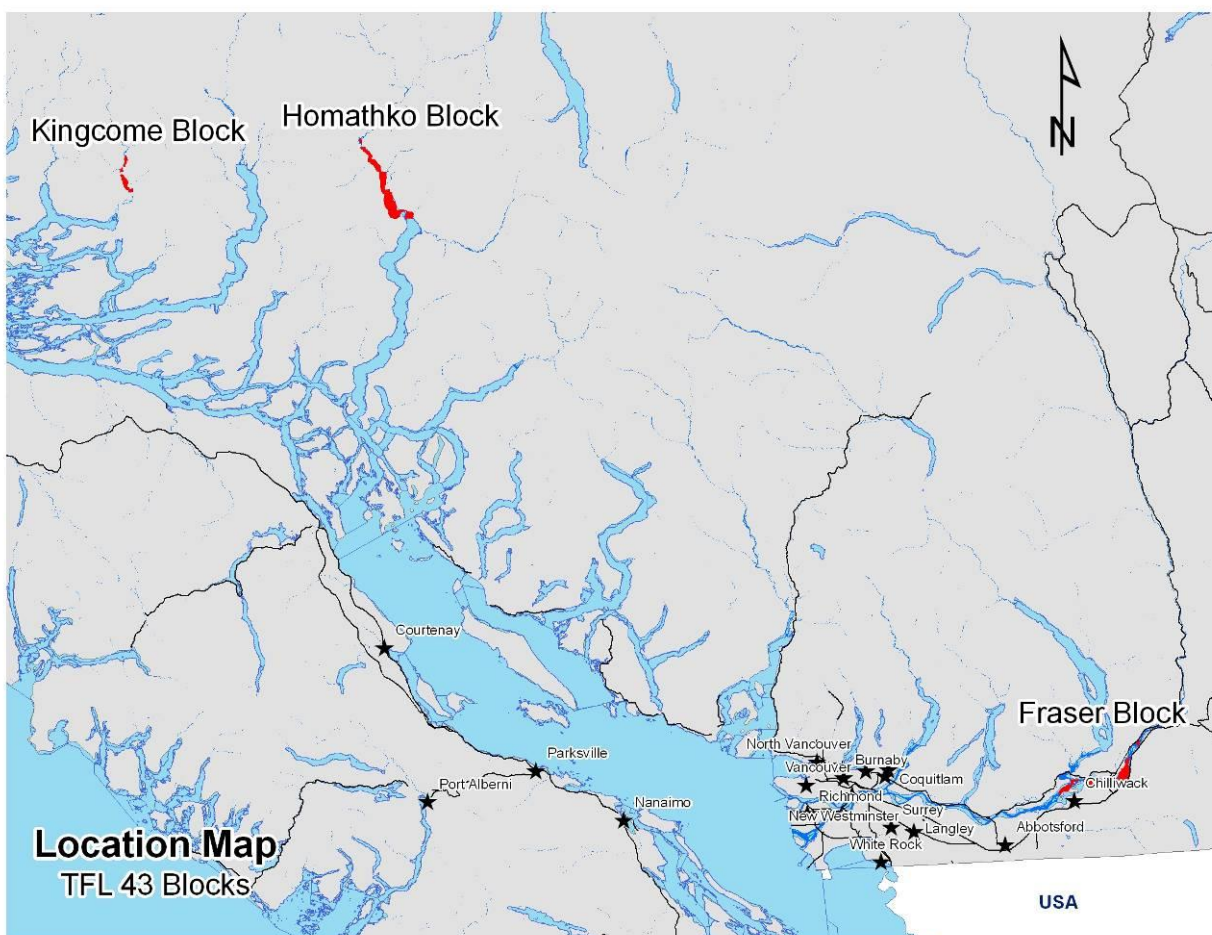


Figure 1. TFL 43 Location Map

The Lower Fraser Block is situated between Chilliwack and Laidlaw along the Fraser River in the Chilliwack Forest District. The communities adjacent to this portion of the TFL are Agassiz, Chilliwack and Rosedale.

The Homathko Block is the largest by area and is located within the Homathko River valley at the head of Bute Inlet in the Sunshine Coast Forest District. There are no communities close to this Block except for existing logging camps. The nearest population service centers are Powell River and Campbell River.

The Kingcome Block is the smallest in area and is situated beside the Kingcome River at the head of Kingcome Inlet in the North Island – Central Coast Forest District. The closest

community is the native settlement at Gwa Yee Village in Kingcome Inlet while the nearest population service centre is Port McNeill.

All three Blocks of the TFL are located within the Coastal Western Hemlock (CWH) biogeoclimatic zone. The CWH zone, on average, receives the highest amount of rainfall in BC. The climate within this zone is characterized by cool summers (although hot dry spells can be frequent) and mild winters. Specifically, the Lower Fraser Block is found within the dry maritime coastal western hemlock subzone (CWHdm) which is characterized by warm, relatively dry summers and moist, mild winters with little snowfall. Growing seasons are quite long with plants experiencing minor water deficits throughout the year. The Homathko Block is located within the southern dry submontane coastal western hemlock subzone (CWHds) with a climate transitional between the coast and interior, characterized by warm, dry summers and moist, cool winters with moderate snowfall. The Kingcome Block is situated within the most extensive biogeoclimatic subzone found on the coast, submontane very wet maritime coastal western hemlock variant (CWHvml). It has a wet, humid climate with cool summers and mild winters featuring relatively little snow.

1.2 Integrated Resource Management Considerations

Since the last analysis a number of land use planning processes have been completed. Where the results of these planning processes have impacted the landbase of TFL 43 they have been incorporated into this analysis by way of spatial reductions.

The Central Coast Land and Resources Management Plan (CCLRMP) was by far the largest planning process completed since the last analysis. A series of Legal Objectives guiding management of the landbase covered by the plan were established. It was recognized that operations in the Kingcome portion of TFL 43 would be severely restricted by these Legal Objectives, as such the Legal Order establishing the Objectives exempted the Kingcome block of TFL 43. The impacts of the CCLRMP Legal Objectives were therefore not factored into this analysis.

Integrated resource management is a basic premise for the practice of forestry in TFL 43. Timber harvesting is planned and managed in such a way that allows a wide range of other values to co-exist on the land base. The manner in which each value is considered is dictated by federal or provincial legislation or BC government policy and described by Kruger's Management Plans. Examples of these are the Federal Fisheries Act, the Forest and Range Practices Act, and approved Wildlife Habitat Area Orders.

These documents address the legislated requirements for a wide range of non-timber issues. The most significant issues influencing forest management in TFL 43 are:

- Biodiversity
- Grizzly Bear
- Riparian / Fish Habitat

The areas affected by each of these non-timber resource values and the specific forest management practices required to address them are discussed in Section 2.9.

1.3 Current Attributes of TFL 43

This section of the document describes the current state of the TFL and provides descriptions and statistics useful for understanding the timber supply analyses presented later in the document. The Timber Harvesting Land Base (THLB) and the Productive Forest Land Base (PFLB) are referenced in this section and defined in detail in Section 2.3.

Approximately 62% of the total area of the TFL is considered productive forest land. The remaining 38% is considered non productive (i.e. water, rock, ice, alpine, etc.). Within the TFL's productive land base, 58.6% (36.5% of the total TFL area) is considered available for timber harvesting. Coarse maps illustrating the locations of PFLB and THLB in the TFL are shown in Figure 2, Figure 3, and Figure 4 for the Fraser, Homathko, and Kingcome Blocks, respectively.

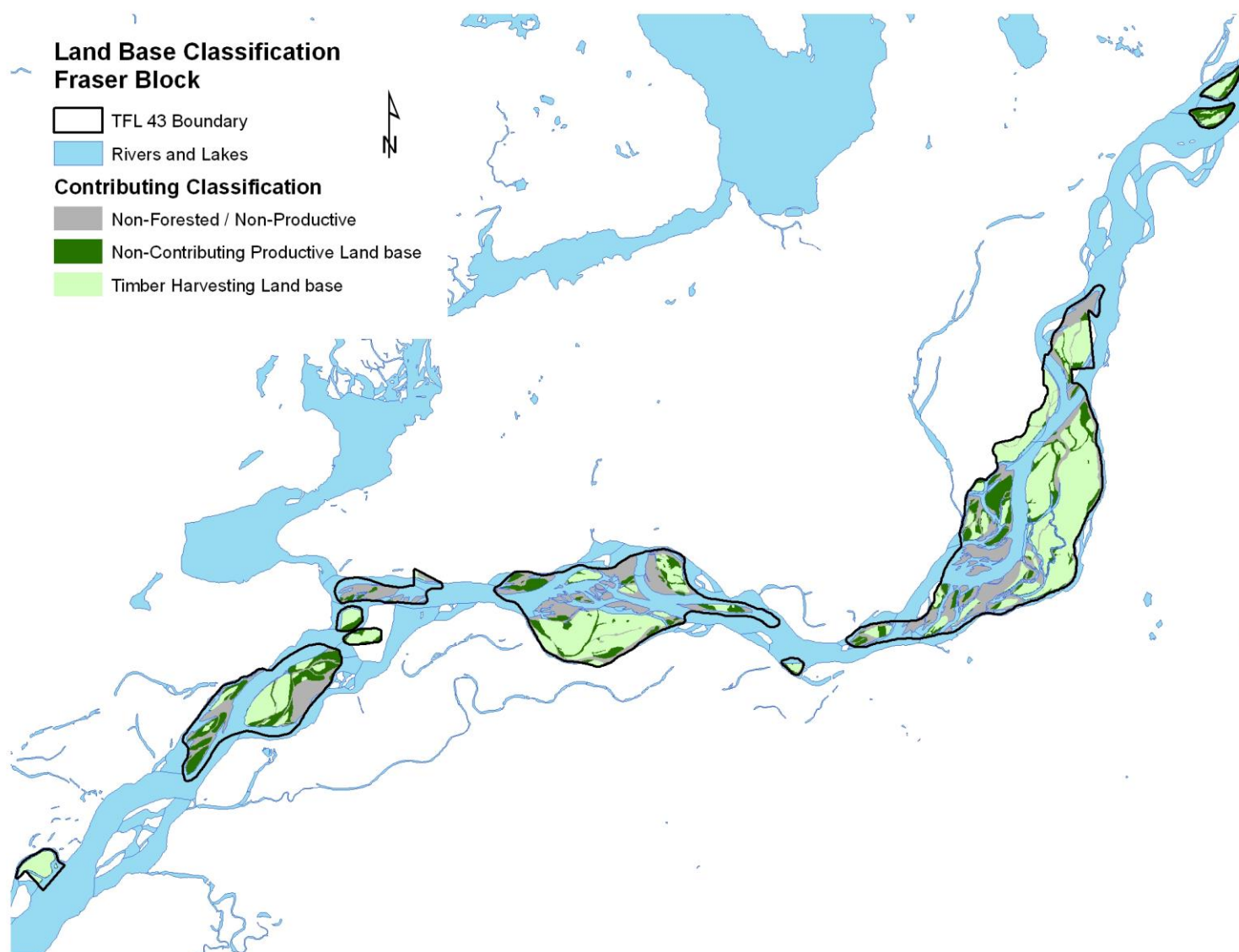


Figure 2. TFL 43 Land Base Definition Map – Fraser

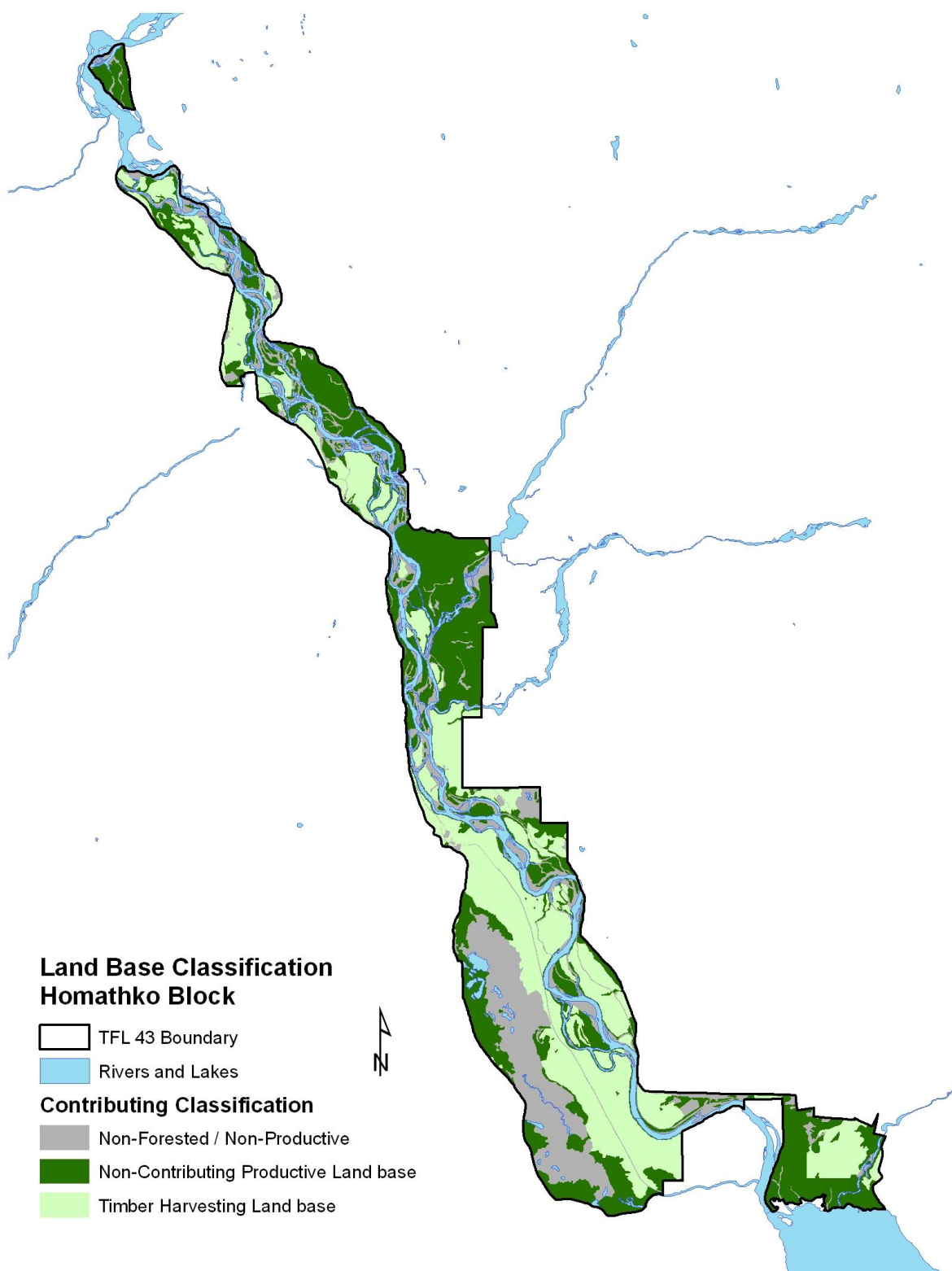


Figure 3. TFL 43 Land Base Definition Map – Homathko Block

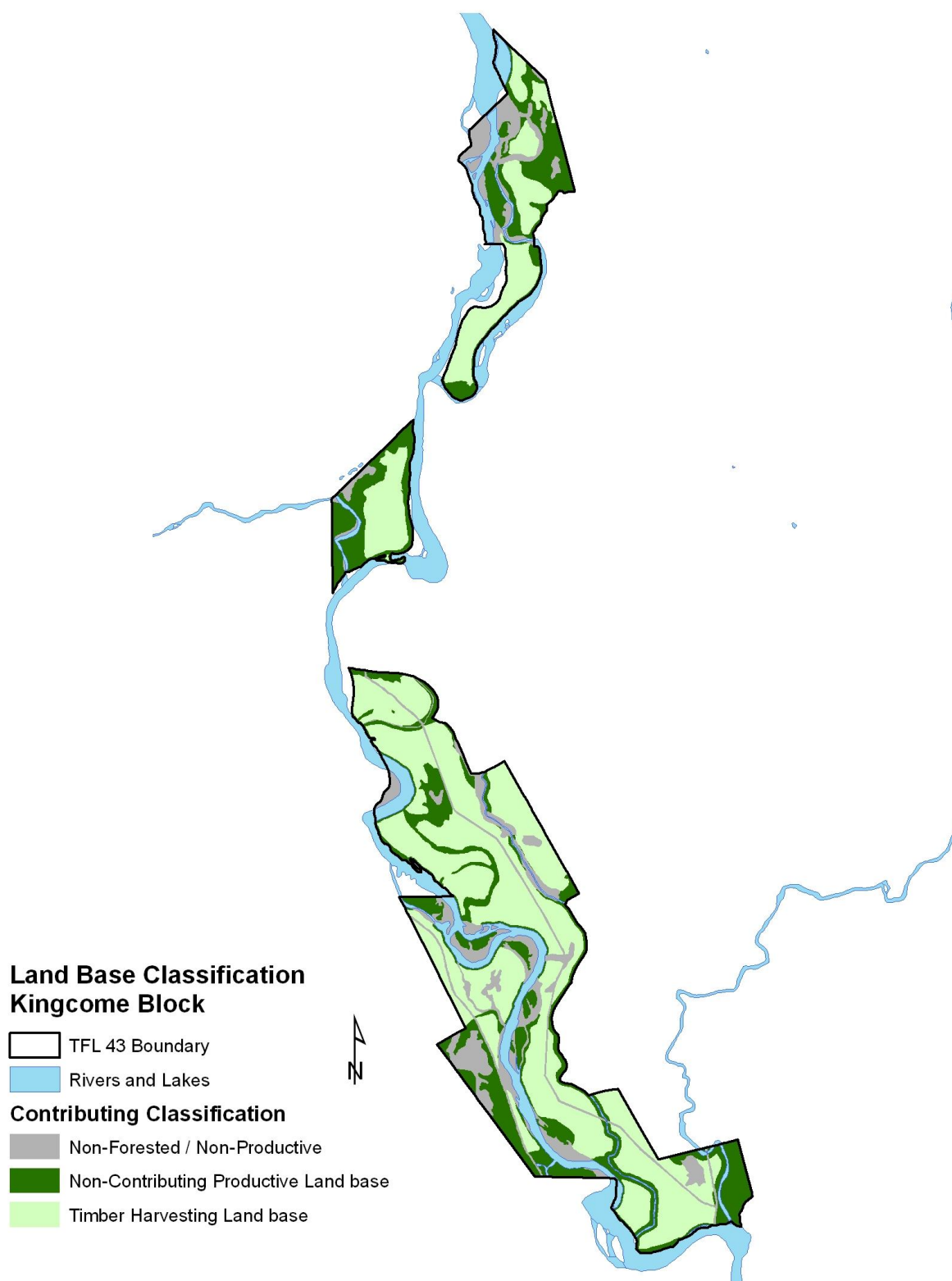


Figure 4. TFL 43 Land Base Definition Map – Kingcome Block

1.3.1 Species Distribution

The forests of the TFL are dominated by Cottonwood and Alder. An overview of the area by leading species for TFL 43 in 2009 is provided in Figure 5, Figure 6, and Figure 7, for the Fraser, Homathko, and Kingcome blocks respectively.

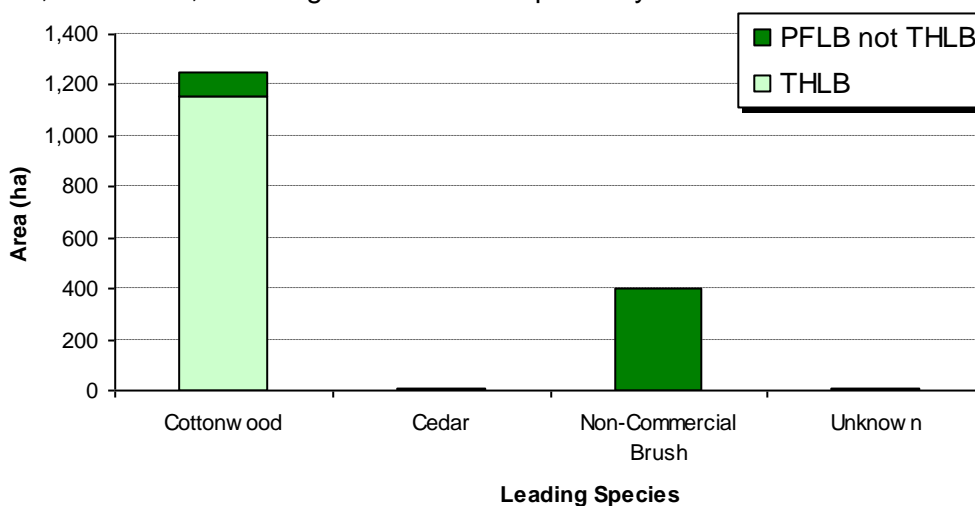


Figure 5. TFL 43 Area by Leading Species - Fraser block

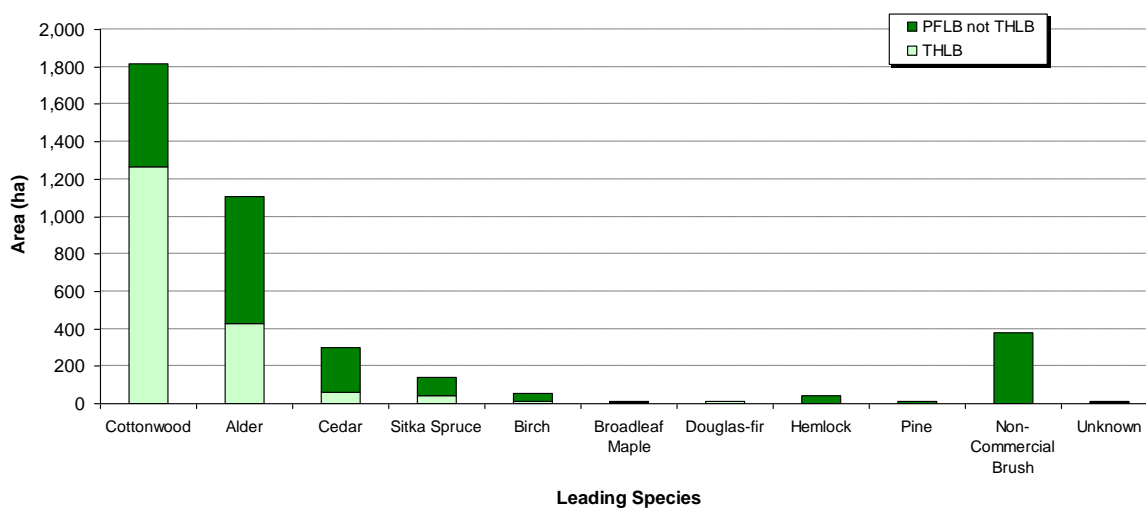


Figure 6. TFL 43 Area by Leading Species - Homathko Block

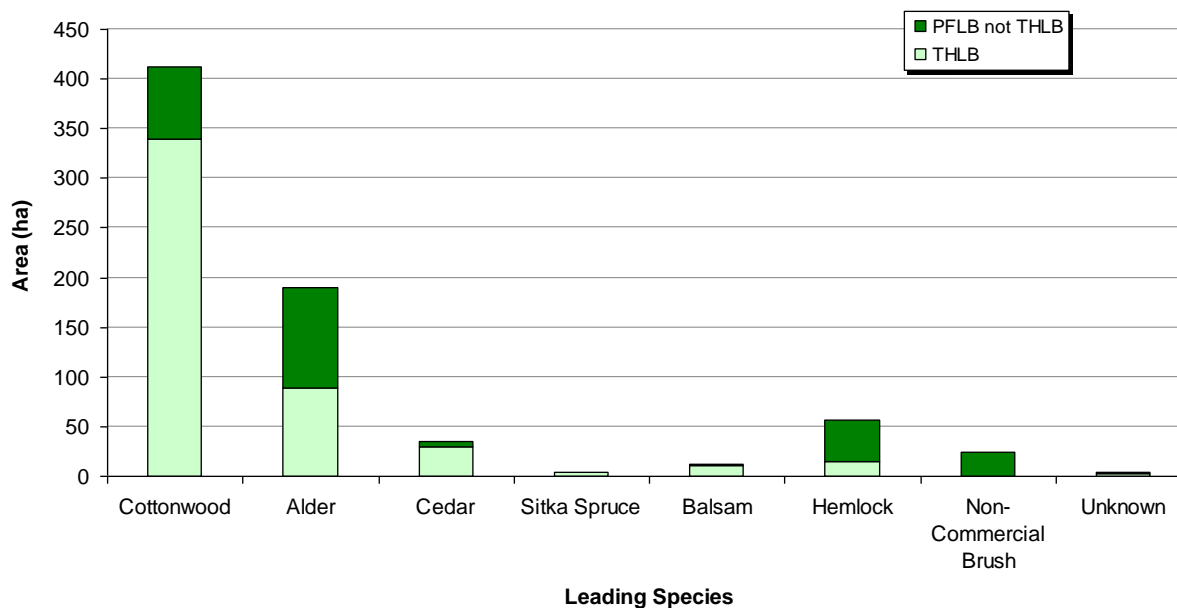


Figure 7. TFL 43 area by Leading Species - Kingcome Block

1.3.2 Age Class Structure

The age class structures of each of the three blocks is shown in Figure 8, Figure 9, and Figure 10 for the Fraser, Homathko, and Kingcome blocks respectively.

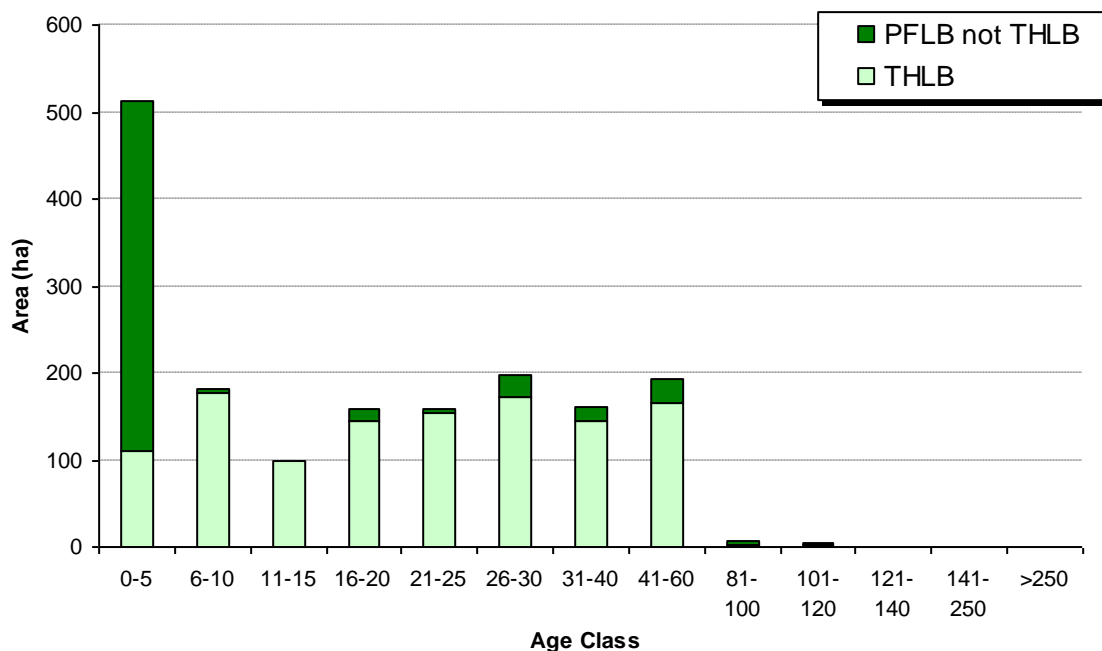


Figure 8. TFL 43 current age class structure (2009) - Fraser Block

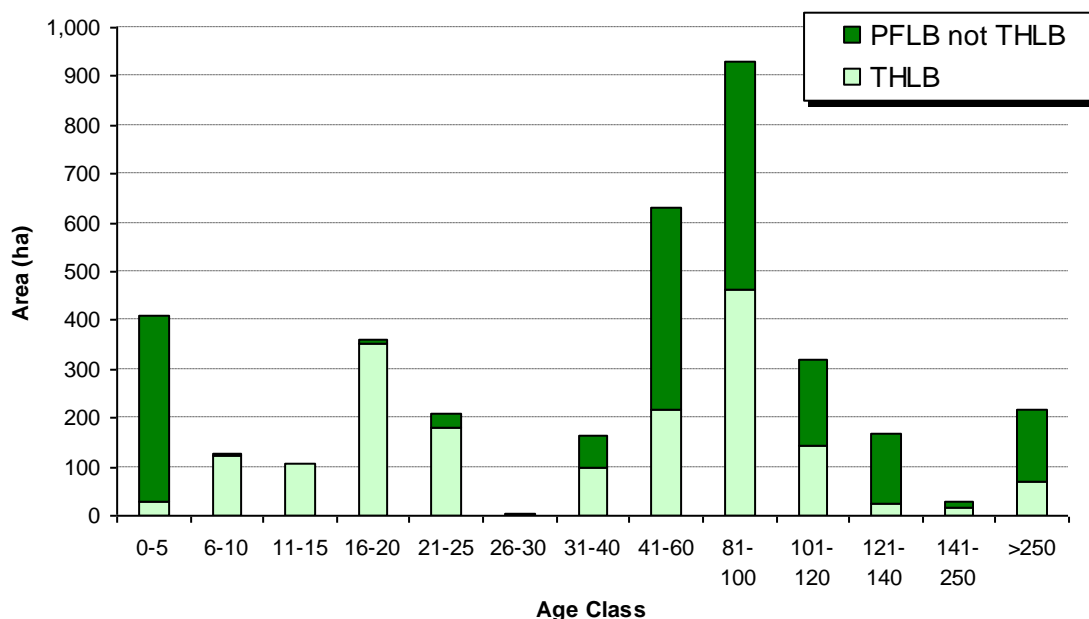


Figure 9. TFL 43 current age class structure (2009) - Homathko Block

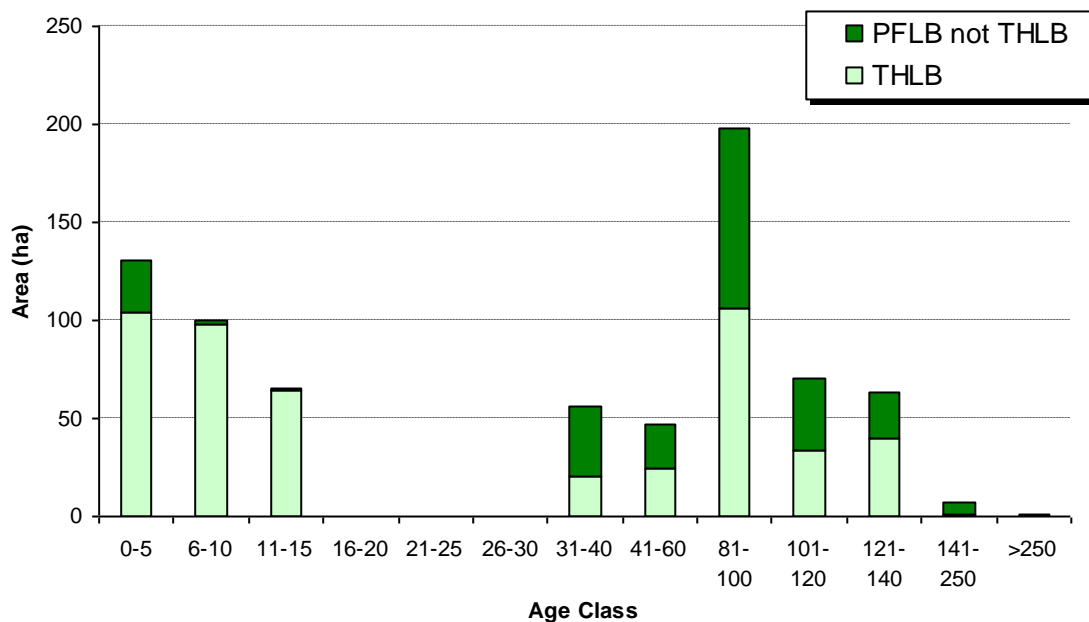


Figure 10. TFL 43 current age class structure (2009) - Kingcome Block

1.3.3 Site Index Profile

Site index values were primarily obtained from the forest cover inventory file used for MP#4. At the time, site index values were assigned using a combination of field reconnaissance data, permanent sample plot data and field observations. In cases where better information was available, that information was used (i.e. from regeneration surveys). The site index distribution for the TFL 43 THLB is shown in Figures Figure 11, Figure 12, and Figure 13 for the Fraser, Homathko, and Kingcome blocks, respectively. The Fraser block has an area weighted average

site index of 44.1 while the weighted average site index on the THLB for the Homathko and Kingcome blocks is 33.7 and 35.3, respectively.

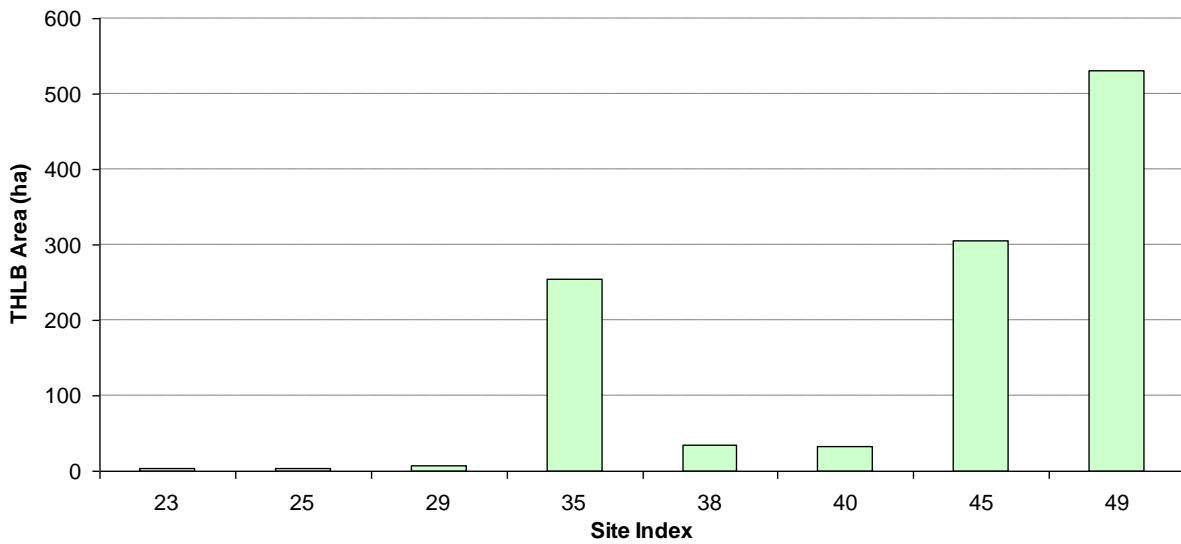


Figure 11. TFL 43 Site Index profile - Fraser Block THLB

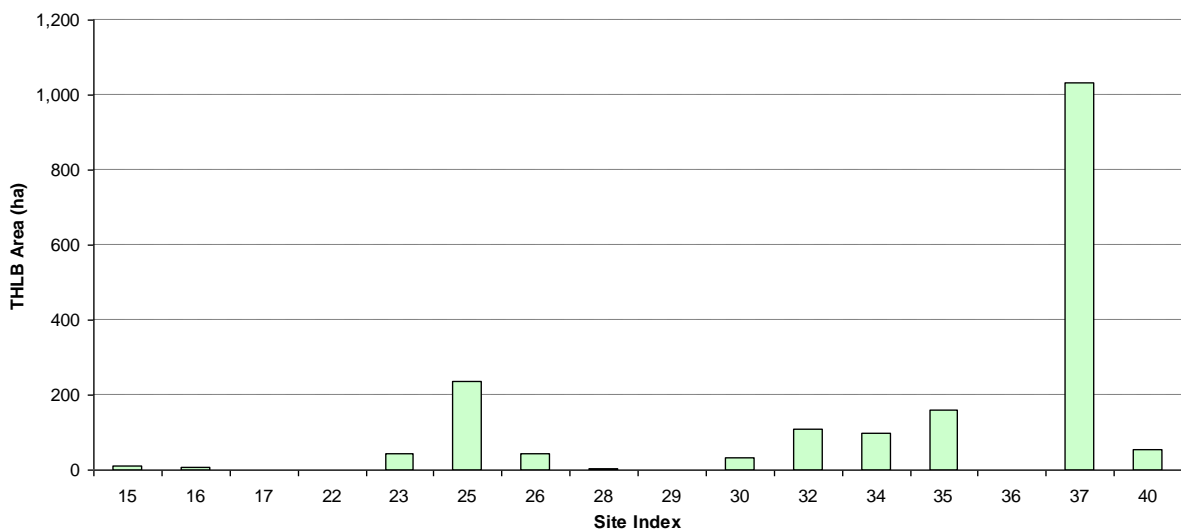


Figure 12. TFL 43 Site Index profile - Homathko Block THLB

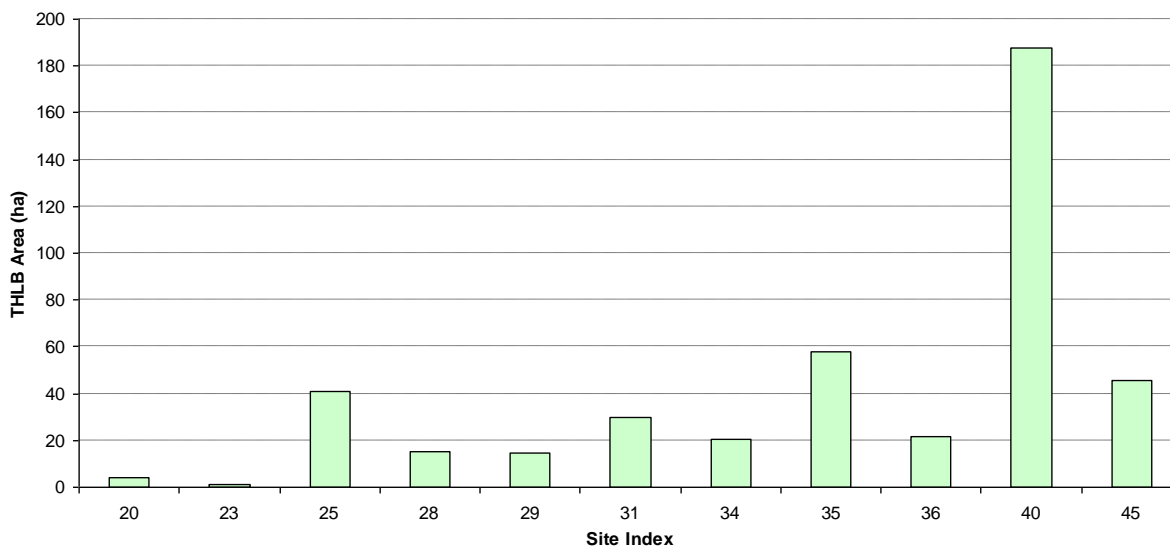


Figure 13. TFL 43 Site Index profile - Kingcome Block THLB

2.0 Timber Supply Analysis Methods

Since the issuance of TFL 43 in the early 80's, Kruger Products has utilized an analysis method focused on providing an area based equivalent harvest in contrast to the more conventional volume based approach. This is due to the company's management objective of converting previously harvested, deciduous valley bottom sites to Hybrid Poplar.

The Analysis Methods and Timber Supply Modeling in this report consist of determining an average area harvest flow. The volume was estimated and converted to an average expected volume harvest in five year periods. The 20 Year Plan is used to validate that volumes exist and therefore the methods used are appropriate for the Deputy Chief Forester to make a volume based AAC determination.

The timber supply will be calculated for each Block of the TFL as each Block is managed as an individual operating unit. The following formula is used to calculate the TFL allowable annual cut:

$$\begin{aligned}
 \text{Total TFL AAC (ha)} = & \frac{\text{THLB of the Fraser Block (ha)}}{\text{Rotation Length of the Fraser Block}} \\
 & + \\
 & \frac{\text{THLB of the Homathko Block (ha)}}{\text{Rotation Length of the Homathko Block}} \\
 & + \\
 & \frac{\text{THLB of the Kingcome Block (ha)}}{\text{Rotation Length of the Kingcome Block}}
 \end{aligned}$$

Rotation length and the size of the Timber Harvesting Land Base (THLB) are the two main drivers of any area-based timber supply analyses. Supporting rationalization for the choice of rotation lengths are found in Section 2.8 and detailed THLB calculations can be found in Section 3.0.

2.1 Data Sources

Several resource inventories are used in this analysis and are summarized in Table 1.

Table 1. Data inputs

Issue or Data	Description, Source	Coverage Name	Version or Date Stamp
Administrative Line Work			
TFL Boundary	Defines the boundaries of the TFL, Extracted and converted from 1998-1999 Forest Cover (CAD Based)	TFL_43_bdy	2009
Ownership	Identifies and distinguished between Schedule A and B lands, Extracted from CAD based linework from MP4	Schedule	2009
Lower Homathko Estuary Protected Area	Lower Homathko Estuary Protected Area, Extracted from 1998-1999 Forest Cover inventory	Lower_Homthko_Estuary	2009
Inventories			
Forest Cover	1998-1999 Forest Cover inventory converted from Microstation (DGN) with ages projected to 2009 and depletions (harvesting) updated to 2009 using RESULTS data.	Forest_Cover	2009
BGC Variants	Provincial Biogeoclimatic mapping – Version 7, LRDW	BEC	2008
Logged Blocks	RESULTS Forest Cover Inventory, LRDW	RSLT_FCIVN	2009
ESA's	Extracted from 1998-1999 Forest Cover inventory	Forest_Cover	2009
Archaeology Sites	Identifies recorded Archaeological sites, Archaeology Branch. Ministry of Tourism, Culture and the Arts	Arch_Sites_TFL_43	2009
Roads	Classified roads extracted from 1998-1999 Forest Cover inventory, Unclassified roads extracted from Kruger data (CAD linework), buffered by Forsite	Roads_Buffer	2009
Management Guidelines			
OGMAs	Legal established Old Growth Management Area, LRDW	OGMA	2009
WHAs	Legally established Wildlife Habitat Areas, LRDW	WHA	2009

2.2 Forest Cover Inventory

The original forest inventory for TFL 43 was completed in the 1980s to facilitate the issuance of the TFL. Since then, it has been maintained and updated by new operational cruises and other operational assessments. The forest cover data was updated on September 30, 1998 in preparation for the timber supply analysis for MP#4 and has been updated again in 2009 for this latest timber supply analysis. Updates for harvest depletions were made using RESULTS spatial and attribute information in conjunction with aerial photography flown in 2002 (to verify location of blocks) as well as Kruger staff input.

2.3 Timber Harvesting Land Base Determination

The Productive Forest Land Base (PFLB) is the subset of the TFL that is considered forested and able to contribute toward non-timber values such as biodiversity. The PFLB excludes non-crown land, woodlots, non-forest and non-productive areas. TFL 43 is largely composed of Schedule B land (provincial land in TFL) but also contains some Schedule A land in the Fraser Block.

The Timber Harvesting Land Base (THLB) is the subset of the TFL where timber harvesting is anticipated to occur now or in the future. The THLB excludes areas that are inoperable or uneconomic for timber harvesting, or are otherwise reserved for non-timber values. The THLB is contained entirely within the PFLB. Table 2 summarizes the land base for TFL 43 and includes both Schedule A and B land. Differences from MP4 are summarized in Section 2.14.

Table 2. Timber harvesting land base area netdown summary

Factor	Effective Area (ha)			% of TFL	% of Productive Forest
	Schedule A	Schedule B	Total Area		
Total TFL Area	1,195	8,981	10,175	100.0%	
Non-forest / Non-productive forest	459	3347	3806	37.4%	
Existing roads, trails and landings	0	92	92	0.9%	
Total Productive Forest	736	5,541	6,277	61.7%	100.0%
Less:	In PFLB:				
Protected Areas	0	212	212	2.1%	3.4%
Non-Commercial Land (NC Br)	92	639	731	7.2%	11.6%
Inoperable/Inaccessible	8	951	960	9.4%	15.3%
Environmentally Sensitive Area 1	5	637	643	6.3%	10.2%
Environmentally Sensitive Area 2	0	0	0	0.0%	0.0%
Low Productivity Sites	0	0	0	0.0%	0.0%
Riparian Reserves	12	116	128	1.3%	2.0%
Wildlife Habitat Areas - Grizzly	0	97	97	1.0%	1.5%
Old Growth Management Areas**	0	16	16	0.2%	0.3%
Cultural heritage resources	0	0	0	0.0%	0.0%
Timber Harvesting Land Base –THLB (ha)	618	2,872	3,490	34.3%	55.6%
Less Other Removals:					
Estimate of Future Roads, Trails, and Landings (1%)	0	5	5	0.0%	0.1%
Effective Long-term THLB (ha)	618	2,868	3,486	34.3%	55.5%

* Effective netdown area represents the area that was actually removed as a result of a given factor. Removals are applied in the order shown above, thus areas removed lower on the list do not contain areas that overlap with factors that occur higher on the list. For example, the parks netdown does not include any non forested area.

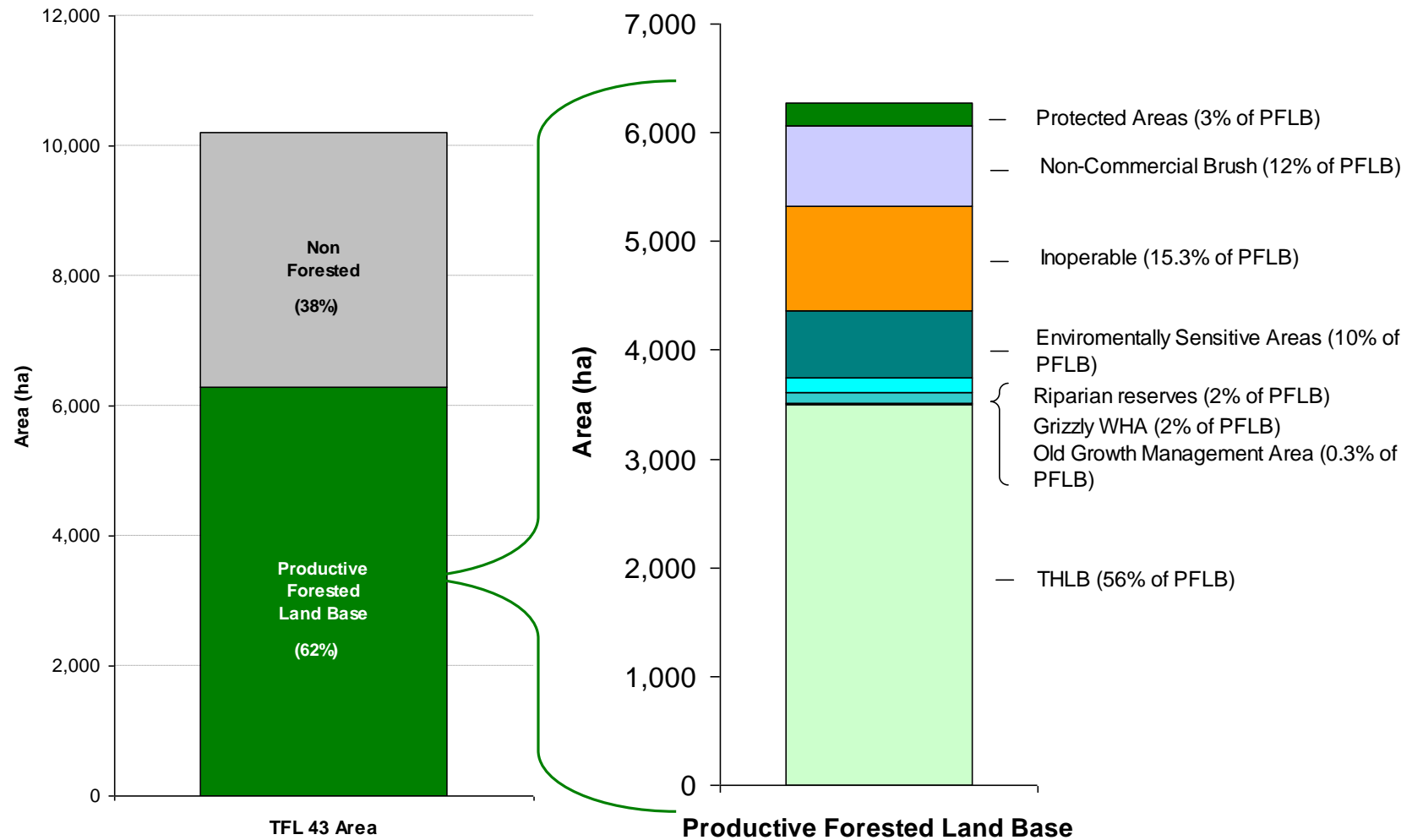


Figure 14. TFL 43 Land Base Summary

2.4 Exclusions from the Productive Forested Land Base

2.4.1 Non-forest and non-productive forest

All land classified as non-forest, non-productive (lakes, swamps, rock, alpine, *etc.*), or non-typed in the forest cover files were excluded from the timber harvesting land base. The non-forest and non-productive areas and descriptions used in the netdown process are listed in Table 3.

Table 3. Land base reductions for non-forest and non-productive area

Description	Total area (ha)			Total Netdown Area (ha)
	Fraser	Homathko	Kingcome	
Lake	0	38	0	38
Mud / Slough	54	25	4	83
Rock / Slide	0	15	2	16
River / Creek / Stream / Side Channel	1,110	520	79	1,708
Sandbar	736	461	64	1,260
Swamp / Treed Swamp	2	644	49	695
Non-Forested	3	10	0	13
Kilby Nursery	6	0	0	6
Total	1,910	1,712	198	3,819

2.4.2 Roads, trails, and landings

Quantifying the area that is, and will be, disturbed by roads, trails, landings (RTLs) and other access features in the TFL is an important part of determining the THLB. Area expected to remain non-productive was removed from the THLB as outlined below.

2.4.2.1 Existing classified roads

Classified roads, trails and landings are those that are mapped as polygons distinctly separate from adjacent polygons. Only the mainline roads have been identified as separate polygons (type "U") on the forest cover maps. Table 8 summarizes the areas of classified roads for each block of the TFL and the subsequent reductions applied to the total area.

Table 4. Land base reductions for existing classified roads

TFL Block	Road Name	Total Netdown Area (ha)
Homathko	Homathko West Mainline	55
	Homathko East Mainline	16
Kingcome	Hoodas Mainline	14
	Kingcome East Mainline	6
	Atlatzi Mainline	2
	Total	92

2.4.2.2 Existing unclassified roads

Roads not represented in the forest cover data are considered unclassified. These roads have been mapped as lineal features. For the purposes of determining the total area of unclassified

roads, all are assumed to occupy a 10 meter wide right-of-way. All roads in the Fraser Block are confined to Schedule 'A' lands; roads in the Homathko and Kingcome Blocks are on Schedule 'B' lands. All trails and landings are rehabilitated and restocked immediately following logging and consequently there is no area reduction associated with these features. Table 5 indicates the area of unclassified roads in the TFL.

Table 5. Land base reductions for existing unclassified roads

TFL Block	Total Area (ha)	Total Netdown Area (ha)
Fraser	25	0
Homathko	67	0
Kingcome	21	0
Total	112	0

2.4.2.3 Future Roads, Trails, and Landings

As the TFL has been completely roaded with Mainlines, Kruger products believes that 5 ha (0.2% of the THLB) is an appropriate area to apply for future roads, trails, and landings. In block roads widths are narrower than the spacing of plantation trees so no area reductions are expected from these roads.

2.5 Exclusions from the Timber Harvesting Land base

2.5.1 Homathko Estuary Park

The Homathko Estuary Park was established as a Class A Park through Section 2 of the Protected Areas of British Columbia Act. The Park contains approximately 225 ha of land within TFL 43. A formal instrument for removing this area from the TFL has not been issued. The area associated with this Park was removed from the TFL landbase prior to the last analysis.

Table 6. Land base reductions for the Homathko Estuary Park

Description	Total Area (ha)	Total Netdown Area (ha)
Homathko Estuary Park	225	212

2.5.2 Non-commercial land

Non-commercial cover is productive forest land that is otherwise occupied by non-commercial tree or shrub species. This area of land does not currently grow commercial sized trees. This area was therefore excluded from the timber harvesting land base.

Table 7. Land base reductions for non-commercial cover

Description	Total Area (ha)			Total Area (ha)	Netdown Area (ha)
	Fraser	Homathko	Kingcome		
Non-Commercial Brush	420	380	25	825	731

2.5.3 Inoperable/inaccessible

There are two categories of inoperable areas defined within the forest inventory. The first category strictly relates to the area being physically inaccessible and thus not available for timber harvesting. The second category uses an economic criterion to determine operability. In the latter case, timber harvesting is not justifiable given the costs of harvesting and the expected value of the timber. Table 8 provides information on the area in the TFL which is classified as inoperable. The majority of this area is in the Homathko Block of TFL 43.

A large portion of the area between the Jewakwa River and Heakamie River drainages is classified as Economically Inoperable (EI). This area was classified as EI during the last MP as a result of the high costs associated with bridge crossings to access low value / low quality timber. If in the future suitable cost-sharing agreements are negotiated with other resource users in the area, the economic viability of harvesting would be greatly enhanced. At this time, Kruger Products considers it appropriate to maintain this strategy of removing the area from the timber harvesting land base. In the event significant improvements are realized in the market value of this timber, a bridge crossing would become a more economically viable option. Kruger Products will pursue future opportunities that would result in the re-inclusion of this area into the THLB of TFL 43.

Table 8. Land base reductions for inoperable areas

Description	Total Area (ha)			Total Area (ha)	Netdown Area (ha)
	Fraser	Homathko	Kingcome		
I - Physically Inoperable	50	264	67	381	381
EI - Economically Inoperable	0	579	0	579	579
Total	50	843	67	960	960

2.5.4 Environmentally sensitive areas

Throughout the history of TFL 43 specific areas have been designated as Environmentally Sensitive Area (ESA). This ESA designation was developed and applied to areas of the land base which exhibited a number of valuable habitat characteristics for both fish and wildlife. The two categories of ESA utilized in past TSR were ESA₁ and ESA₂. ESA₁ areas for all practical purposes were netted down 100 %. ESA₂ areas were netted down 50 %. This resulted in a reduction to the THLB and a spatial accounting of this valuable habitat. Our approach in this analysis has changed slightly in some areas of the TFL as a result of the various planning processes undertaken by Government since our last analysis.

Fraser Block

The application of ESA to the Fraser portion of TFL 43 has not changed. The current designations will continue to protect valuable fish habitat and Bald Eagle nesting habitat wherever designated in the inventory. Slight changes may occur as a result of our land base conversion to a true GIS compatible inventory system.

Homathko Block

The most dramatic changes to ESA designated lands since the last analysis has occurred in the Homathko block of TFL 43. Areas designated as ESA₁ for Wildlife to address habitat values for both Marbled Murrelet and Grizzly Bears have changed as a result of the completion of

Government driven land use planning processes within the Homathko Valley. The preservation of valuable habitat features for both these species has been addressed through the creation of a number of Old Growth Management Areas (OGMA) and Wildlife Habitat Areas (WHA) throughout the Homathko Block of TFL 43. Although this has had little effect on the fisheries ESA in the valley a large percentage of the land base designated as ESA₁ for Wildlife has been reclassified without this designation.

Kingcome River

No changes to the ESA designations have occurred in the Kingcome portion of TFL 43 since the last analysis. Other than the completion of the Central Coast Land and Resource Management Plan, of which TFL 43 is exempt, no other similar land use planning process have been completed which would lead us to change the current ESA designations for either fish or wildlife.

Although extensive areas of moderately sensitive recreation areas have been identified by the recreation inventory due to fisheries and wildlife related activities, only a small portion has been given an ESA designation. This is due to the fact that recreational use in the Fraser Block is dispersed and is generally confined to non-forested areas (sand and gravel bars within the floodplain). A vast majority of this area is included in sensitive fisheries (riparian) and wildlife areas which have already been removed from the productive forest land base. Furthermore, much of the recreationally valuable area in the Kingcome and Homathko Blocks is remote and largely inaccessible therefore no recreation ESA designations have been applied.

Table 9. Land base reductions for Environmentally Sensitive Areas

ESA Category	ESA Description	Total Area (ha)			Total Area (ha)	% Reduction	Netdown Area (ha)
		Fraser	Homathko	Kingcome			
EF ₁	Fisheries Sensitive Zone (high)	5	297	108	411	100	394
EW ₁	Wildlife Sensitive Zone (high)	3	656	9	668	100	12
EF ₁ W ₁	Fisheries Sensitive Zone (high) Wildlife Sensitive Zone (high)	0	189	33	222	100	217
EW ₁ R ₂	Wildlife Sensitive Zone (high) Recreation (moderate)	6	0	0	6	100	6
EF ₁ W ₂	Fisheries Sensitive Zone (high) Wildlife Sensitive Zone (moderate)	0	0	14	14	100	14
Subtotal	All ESA1 Designated Areas	0	1,143	163	1,306		643
EF ₂	Fisheries Sensitive Zone (moderate)	0	61	0	61		0
Subtotal	All ESA2 Designated Areas	0	61	0	61	50	0
Total	All ESA Designated Areas	0	1,204	163	1,367		643

2.5.5 Low productivity sites

No low site cutoff has been used or applied. Although site indices as low as 13 (at breast height age 50) do occur on this TFL, this is not considered low enough to warrant removal from the productive forest land. It is anticipated that much of this area will have higher productivity once fast-growing hybrid poplar stands have replaced the existing inventory.

2.5.6 Riparian reserves

Kruger's management of riparian reserve zones follows the practices outlined in their approved Forest Stewardship Plans (FSPs). Riparian classifications were assigned to all water features in the TFL and then buffered with a reserve width that represented the reserve zone and the effective width of the management zone³. Riparian classifications were assigned by Kruger's operational staff. This area was then entirely removed from the THLB. Table 10 shows the riparian reserve widths applied to the riparian classes found in the TFL as well as the areas associated with riparian classes within each TFL Block. No retention is assumed to occur in the management zone. The decrease in the Netdown Area for riparian reserves and management zones is primarily as a result of the refinement of data capture in moving from a Microstation to Arc GIS environment.

Table 10. Land base reductions for riparian reserve and management zones

TFL Block	Riparian class*	Reserve Width (m)	Reserve Area (ha)	Productive Forest Area (ha)	Netdown Area (ha)
Fraser	S1-A	10	219	45	28
Homathko	S1-A	20	366	178	68
	S1-B	50	27	23	8
	S2 / S3	30	34	20	3
	W1	10	7	2	0
Kingcome	S1-A	20	58	33	17
	S1-B	50	20	18	1
	S2 / S3	30	22	14	3
Total			751	333	128

* Stream classes are as defined in the FPPR Sec. 47-49.

2.5.7 Wildlife Habitat Areas – Grizzly

The provincial *Identified Wildlife Management Strategy* provides for the creation of wildlife habitat areas (WHAs), to protect key habitat features of listed wildlife species. Since the last TSR, a series of Grizzly Bear WHA have been spatially established within the Homathko portion of TFL 43. The area associated with the creation of these WHA in Homathko River has been excluded from the timber harvesting land base.

³ Effective width is defined as the effective retention within the riparian management zone. For example, reserve 50% of the trees for the first 20 m for the riparian management zone is 10 m.

Table 11. Land base reductions for Identified Wildlife

Description	Total Area (ha)			Total Area (ha)	Netdown Area (ha)
	Fraser	Homathko	Kingcome		
Grizzly Bear WHA	0	828	0	828	97

2.5.8 Old Growth Management Areas

Old Growth Management Areas(OGMA) are spatially defined across the land base to maintain or recruit old growth ecosystem values. Where they were established, they were done so through the Landscape Unit Planning process initiated by Government prior to the last analysis.

2.5.8.1 Fraser River Block

There have been no OGMA established in the Fraser Valley South Landscape Unit that would require a reduction to the land base or THLB of TFL 43. Continuing operations in the Fraser portion of TFL 43 will be guided by the Provincial Non-Spatial Old Growth Order which was effective June 30th 2004.

2.5.8.2 Homathko River Block

Landscape Unit Planning and the creation of a series of OGMA in Homathko River portion of TFL 43 was completed as of September 20 2001. Efforts were made to include forested stands adjacent to high value feeding sites within OGMA wherever possible to maximize the overlap between old growth representation and specific wildlife habitat requirements⁴. The establishment of these OGMA in the Homathko portion of TL 43 resulted in a 26 ha reduction of the THLB

2.5.8.3 Kingcome River Block

There have been no OGMA established in the Lower or Upper Kingcome Landscape Units that would require a reduction to the land base or THLB of TFL 43. Continuing operations in the Kingcome portion of TFL 43 will be guided by the Provincial Non-Spatial Old Growth Order which was effective June 30th 2004.

Table 12. Land base reductions for Spatial OGMA's in TFL: 43.

Description	Total Area (ha)			Total Area (ha)	Netdown Area (ha)
	Fraser	Homathko	Kingcome		
Old Growth Management Areas	0	195	0	195	16

2.5.9 Cultural Heritage Resources

No reductions have been made to the THLB for cultural heritage resources in the TFL. Archaeological impact assessments conducted to date on several cutblocks within the Fraser

⁴ Pg 7, Homathko Landscape Unit Plan, September 27th 2001

Block have not revealed any significant cultural heritage values. The dynamic nature of the flood plains along with extensive history of managing some of these areas has guided the decision not to make specific reductions for cultural heritage resources through the TSR process. Operationally Kruger Products Limited continues to explore avenues by which we could acquire site specific cultural heritage information.

2.6 Non Recoverable Losses

No reductions have been made to the TFL land base as a result of non-recoverable losses. This would include the effects of fire, insect damage and erosion. Although a small amount of erosion has occurred throughout the TFL since the last analysis it represents an insignificant amount of the overall THLB.

2.7 Erosion and Accretion

For the last analysis a detailed Erosion / Accretion survey was conducted at a considerable cost. For this analysis the land base was updated to reflect the effects of erosion / accretion but in a much more practical and cost effective manner. Current oblique and aerial photos, where they existed, were reviewed in house for changes to the land base which were then communicated to our mapping contractor. In cases where photography was dated, such as Kingcome River and Homathko River, satellite imagery was utilized to update the land base for erosion and accretion.

2.8 Rotation Lengths

Rotation length is a critical driver of an area-based timber supply analysis. Rotation lengths are a combination of the regeneration delay (the time it takes to establish a commercial crop of trees after harvest) and the time it takes to achieve a defined set of merchantability requirements after a commercial crop is established (i.e. harvest age). For example, in the previous management plan, a rotation age of 26 years was used for the Fraser Block (harvest age of 25 years and regeneration delay of 1 year).

Several sources of information were considered in the determination of rotation lengths for this Timber Supply Analysis. This section provides detail as to how rotation lengths were determined for this analysis.

2.8.1 Merchantability Criteria

From Kruger's perspective, a merchantable stand is one that has achieved an average diameter at breast height (DBH) of between 30 and 35 cm at a utilization level of 12.5cm DBH. Although height and fiber brightness are important characteristics of our stands, they are not as important as the average diameter.

2.8.2 Regeneration Delays

In the previous Timber Supply Analysis for TFL 43, the regeneration delay for the Fraser and Homathko / Kingcome blocks was set at 1 and 3 years accordingly

Current practices in the Fraser block of TFL 43 virtually eliminate the need to invoke a regeneration delay at all. Harvesting in the Fraser is limited to the winter and spring months as a result of limited access. Harvesting which is limited to the last and first three months of any one year with planting in March eliminates the need to incorporate a regeneration delay.

The same practices hold true for both the Homathko and Kingcome River blocks of the TFL. Although a 3 year regeneration delay was utilized in the last analysis it in no way represents current management practices. A review of silviculture activities since the last analysis clearly indicates a more appropriate regeneration delay for these areas is 1 year is more reflective of current practices. It is in the best interest of the company economically to establish a new plantation as soon after harvesting as possible. Hybrid Poplar is susceptible to competition which a 3 year regeneration delay would exacerbate.

2.8.3 Espacement Trial

In 1987, an espacement trial was established at the Harrison Mills Nursery which is located adjacent to the Fraser Block. The site index for this site is estimated to be 45m and is considered representative of average conditions in the Fraser Block. Four clones were tested at 5 different spacing distances (3.6m, 3.9m, 4.2m, 4.5m, and 4.8m). In 1987, thirty two whips were planted for each clone and spacing combination for a total of 640 trees. Height and diameter at breast height (DBH) measurements were recorded every year starting in 1991 all the way through to 2008.

Operationally, Kruger typically uses a 4.5m spacing (approximately 500 stems per hectare) so for the purposes of this analysis, the trial data was limited to this subset of the data (sample size = ~128 trees). Figure 15 shows the average DBH over time for the 4 clones planted at this density. There is very little variation between the clones. This growth trend indicates that an average DBH of 35 cm will be achieved at an age of 24-25 years old. Thus a rotation length of 26 years for the Fraser block appears reasonable (25 years age to rotation plus 1 year regeneration delay).

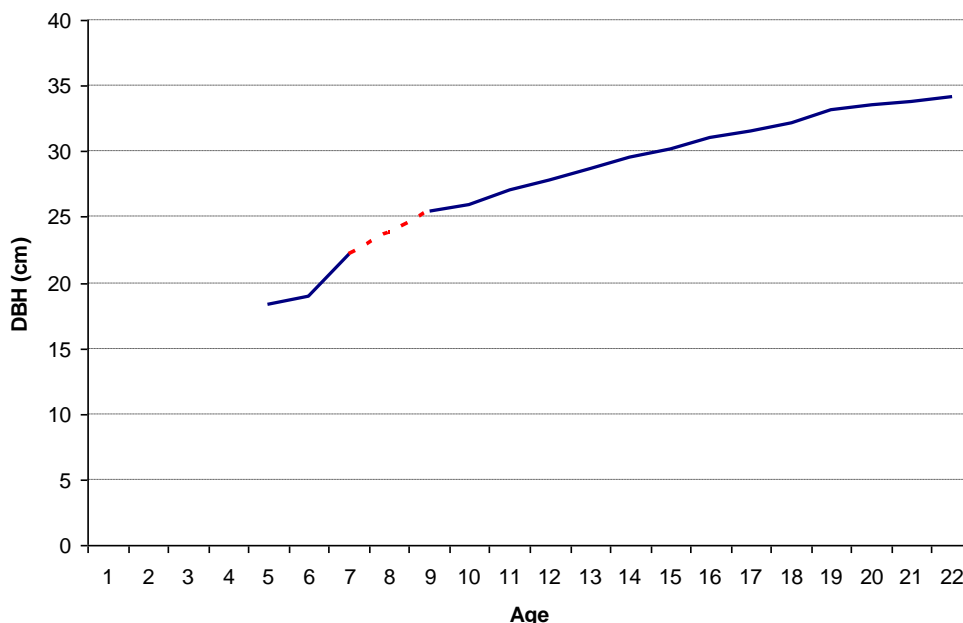


Figure 15. Average Diameter Breast Height (cm) for 4 clones planted at the Harrison Mill Nursery Espacement Trial established in 1987 with 4.5m x 4.5m spacing.⁵

The site index for this espacement trial site has been estimated to be 45m, similar to the weighted average site index of the THLB on the Fraser Block (44.1m). If the weighted average site index of the Homathko and Kingcome blocks is used to proportionally adjust the harvest age, these blocks would have ages of 31 and 29 years respectively (Table 13). This assumes that all things besides site index are equal (i.e. similar management practices) and diameter changes linearly with age.

Table 13. Inferred harvest ages based on Fraser Block results and average site indices.

Block	Area Weighted Average Site Index on the THLB	Approximate Harvest Age	Notes
Fraser	44.1	25	Espacement trial results
Homathko	34.0	31	Inferred as a ratio of SI difference
Kingcome	36.4	29	Inferred as a ratio of SI difference

2.8.4 Permanent Sample Plot Data

Since the last TSR, several new Permanent Sample Plots (PSPs) have been established and several older PSPs have been re-measured. PSP data is stored on Kruger's behalf by the MFR Forest Analysis and Inventory Branch and they provided compiled plot data for this project in June 2009. PSP information is presented here to help support rotation lengths.

Two types of PSP plots have been established in the TFL: type 'T' plots are established in stands influenced by silviculture and type 'G' plots are established in natural stands, unaffected

⁵ Red dotted segment in figure indicate years where no data was collected or available and interpolation between data points was made.

by silvicultural practice (i.e. they have not been harvested previously). Type T plots consist of managed hybrid poplar stands and thus are similar to the stands we are attempting to establish rotation lengths for so only these plots were assessed.

2.8.4.1 PSPs associated with Historic Management Practices

PSPs established prior to 1998 have a longer measurement history associated with them, making it easier to investigate diameter increment trends. However, these plots are also associated with older management practices. Plantations established prior to 1998 were planted at higher planting densities and natural ingress was not as strictly controlled.

In total 6 of these older type 'T' PSPs were assessed from the Fraser Block. The average site index for these six plots is very close to the average site of the THLB area within the Fraser Block (45.4 m average for PSP vs. 44.1 m average for Fraser THLB area). The PSP plot data was filtered to cottonwood (hybrid poplar) and reported at the 12.5 cm utilization level.

The average total stand density including all species and utilization levels at 20 years old for the 6 plots was approximately 980 sph, ranging from 564 sph to 1640 sph. For these older PSPs, it is necessary to look at total stand density since ingress has not been controlled and higher densities will result in a reduced diameter increment. Thus, it is expected that these plots will tend to show slower diameter growth and longer time periods to achieve the minimum diameter targets than stands established under current practices.

Quadratic mean diameter by stand age was plotted. A linear trend line generated for the Fraser Block data indicates that on average, the Fraser PSPs will produce an average DBH of 30cm in about 27 years and 35cm in about 32 years. This is a slightly longer timeframe than the results from the espacement trial results and is likely due to the higher densities associated with the PSP plots.

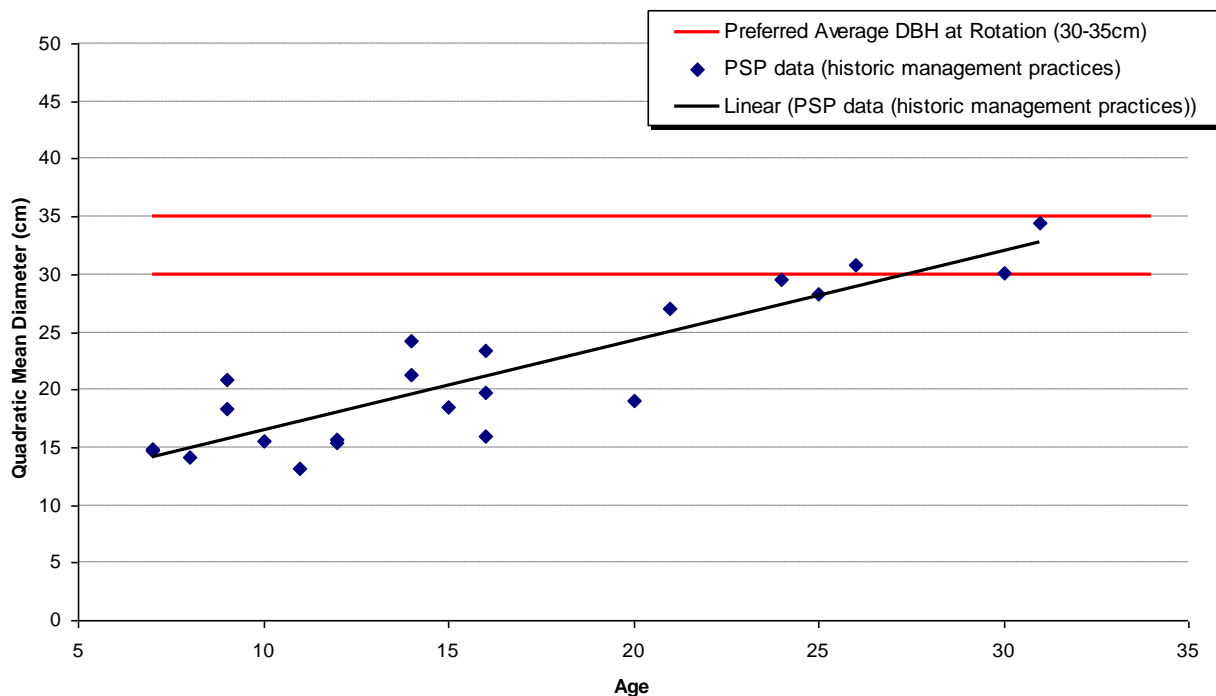


Figure 16. PSP data associated with 'historical' Management Practices – Fraser Block

2.8.4.2 PSPs associated with Current Management Practices

Because of the shorter measurement history associated with the more recently established PSPs (after 1998), it is difficult to extrapolate diameter increment trends into the future. However, early diameter increment trends from these plots indicate much faster diameter increment than from the plots associated with older or historical management strategies (Figure 17 for the Fraser Block and Figure 18 for the Kingcome and Homathko Blocks). This holds especially true in the Fraser block where natural ingress has largely been controlled and minimized through intensive competition control (e.g. mowing between planted rows of trees). The Kingcome and Homathko PSP data were shown on the same graph as management practices and growth conditions are similar for these two blocks.

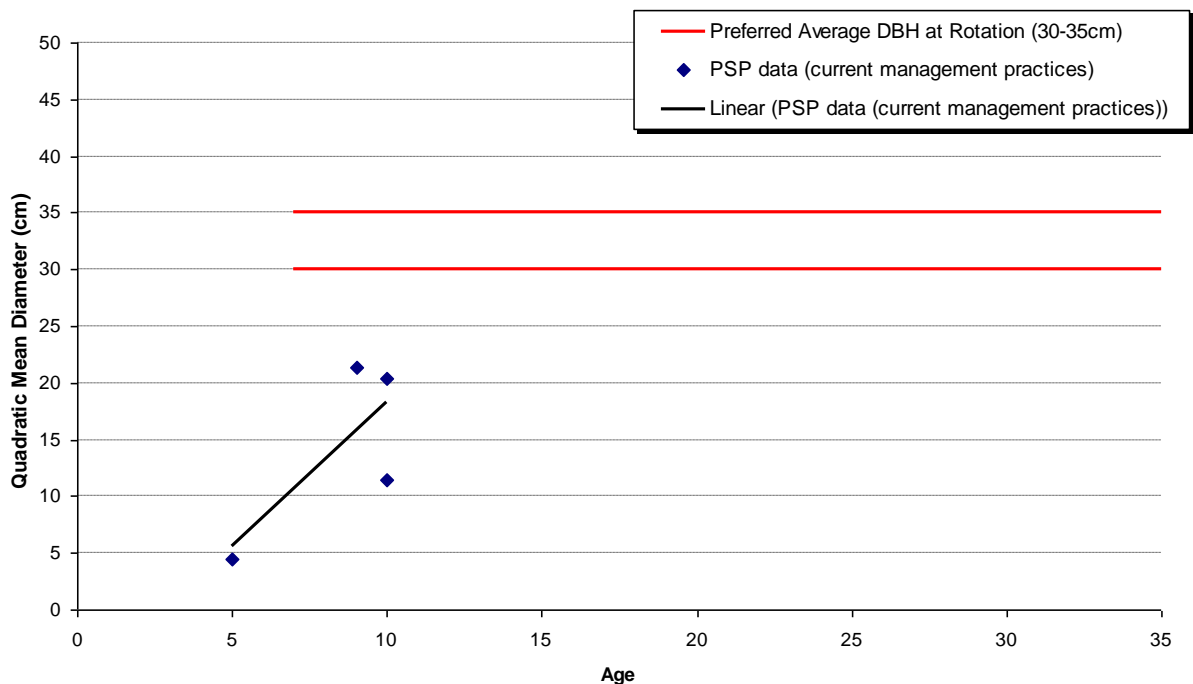


Figure 17. PSP data associated with 'current' management practices – Fraser Block

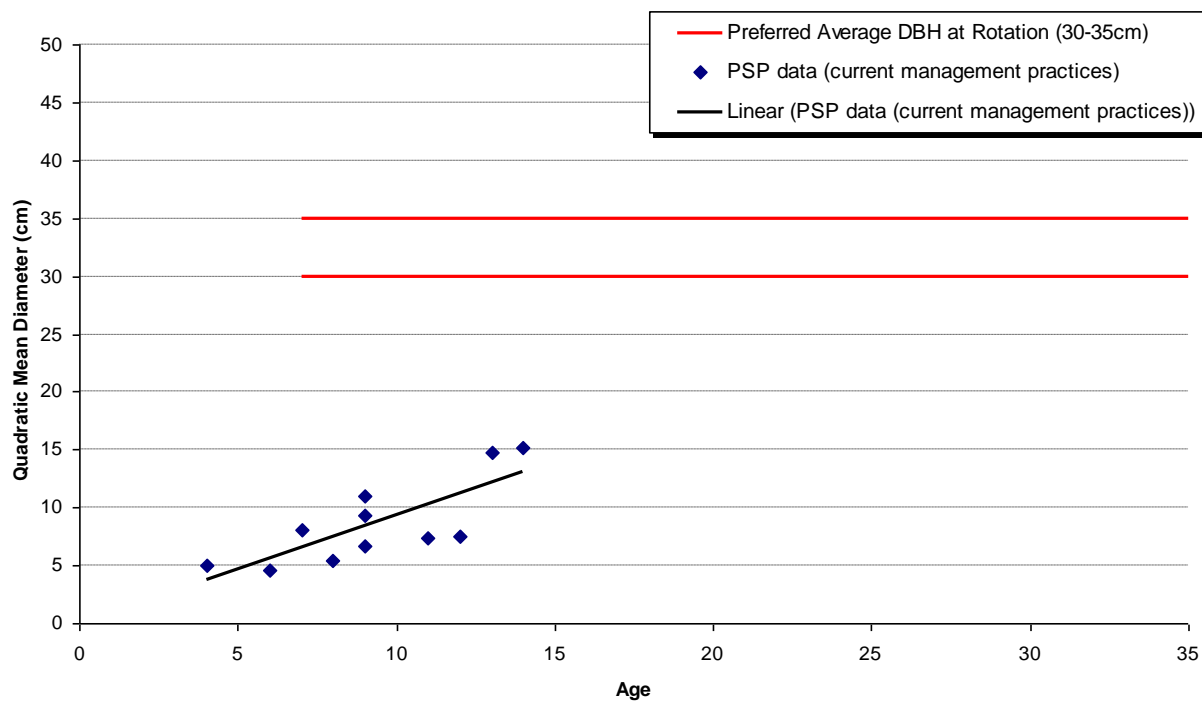


Figure 18. PSP data associated with 'current' management practices – Kingcome and Homathko Blocks

2.8.5 Kruger's Operational Experience

The process of modeling the land base through the application of specific utilization criteria presents a sanitized approach as to how we manage the THLB of TFL 43. For example, although we've used an average stand diameter of between 30 and 35 cm in our modeling, in reality it's not uncommon for us to operate in stands from the 25 to 30 cm DBH class. Activities on the TFL are strongly influenced by logistical and environmental factors such that when an area becomes available to harvest we are typically very flexible at to stand attribute characteristics.

Cheam Island in the Fraser portion of TFL 43 was available to harvest as a direct result of the construction of a bridge associated with gravel extraction activities. This represents an example of a logistically driven harvest that may not have been harvested today had the bridge not been built.

The point of this section is to point out that harvesting activities, stand selection and harvest criteria are influenced by a variety of outside sources and that considerable variability exists between what is modeled and operational realities.

2.8.6 Selected Rotation Lengths

Based on Kruger espacement trial and PSP data presented above, and achieving a preferred stand diameter of 30-35cm dbh at a 12.5cm utilization level, the following rotation lengths will be used in this analysis:

Table 14. Selected Rotation Lengths for Timber Supply Analysis

Block	Approximate Harvest Age	+	Regeneration delay	=	Rotation length
Fraser	25	+	1	=	26
Homathko	31	+	1	=	32
Kingcome	30	+	1	=	31

These rotation lengths were largely influenced by Kruger espacement trial data presented in Section 2.8.3. This data has the longest measurement history and best reflects current management practices (i.e. planting density of ~500 sph and intensive density management). PSP information associated with older management practices suggest slightly longer rotation ages however, these plots are associated with historical management practices no longer implemented (i.e. higher initial planting densities with no subsequent density management).

2.9 Integrated Resource Management

Integrated resource management (IRM) objectives are typically represented in timber supply models through forest cover requirements. Due to the nature of the area-based Allowable Annual Cut calculation, no forest cover requirements have been established for TFL 43. Instead a combination of land base reductions and operational cutblock scheduling were used to fulfil the necessary forest cover requirements. A part of this decision is based on the knowledge that a substantial area – approximately 2,625 ha or 41% of the productive land base – is already withdrawn from the timber harvesting land base to provide riparian, fisheries and wildlife habitat

requirements along with the protection of environmentally sensitive areas and other protected areas. The following sections describe the IRM issues present on the TFL and Kruger's approach to addressing them.

2.10 Green-up/adjacency

A green-up height of 3 meters will be used for both timber supply and operational purposes. Although this height will not be used for area based timber supply purposes, it will be incorporated into operational planning through cutblock scheduling to ensure fulfillment of this height requirement. Harvesting of adjacent cutblocks will proceed once harvested cutblocks have reached 3 metres in height and achieved the required stocking and block coverage as specified in the Operational Planning Regulations. This height, stocking and, block coverage is normally achieved at the age of 3 years by stands of hybrid poplar/cottonwood in TFL 43.

2.11 Visual resources

Fraser Block

Of the three blocks which make up TFL 43 only the Fraser block is considered visually sensitive and it is the only block with established VQOs. On the other hand, the landscape includes large scale agriculture, utility and highway corridors, gravel and sand bars and residential development which all contribute to a highly altered landscape. For this analysis, as with the last, no downward adjustments have been made to the landbase in the Fraser to account for any visually sensitive concerns.

Homathko Block

The isolated nature of the area along with it's valley bottom features (flat) and rapid green-up post harvest has negated the requirement to consider the visual resource in the area. There are no established VQO for the Homathko River portion of TFL 43 and no net downs to the land base in this analysis.

Kingcome Block

The isolated nature of the area along with it's valley bottom features (flat) and rapid green-up post harvest has negated the requirement to consider the visual resource in the area. There are no established VQO for the Kingcome River portion of TFL 43 and no net downs to the land base in this analysis.

2.12 Wildlife – Grizzly Bear

Homathko Block

On December 4th 2006 the Deputy Minister of Environment established a series of Grizzly Bear Wildlife Habitat Areas (WHA) within the Homathko Block of TFL 43. These WHA were established via the Government Actions Regulation (BC Reg 582/04) and brought to a close the Identified Wildlife Management Strategy (IWMS) for the area. The area associated with these newly created Grizzly Bear WHAs has been removed from TFL 43 land base for this analysis (Section 2.5.7).

Kingcome Block

WHA for Grizzly Bears have not been established for the Kingcome block of TFL 43 as part of the completion of governments IWMS. No spatial reductions have been made in this analysis. It should be noted that a significant portion of the land base of TFL 43 in Kingcome River is reserved from harvesting (45 %). These reserved areas represent a variety of functional habitats spread throughout the landbase of TFL 43 in Kingcome River.

2.13 Biodiversity

Biodiversity is managed at both landscape and stand levels. The primary mechanism for landscape-level management is retention of old and mature seral forest. Stand-level biodiversity is protected through retention of wildlife trees and wildlife patches. The following sections outline how retention of old and mature forest are addressed in this analysis.

2.13.1 Landscape-level biodiversity

A Legal Order issued June 30th, 2004 established Non-Spatial Old Growth Objectives for the Province. In areas where Landscape Unit Planning (LUP) is not yet complete this Order is used to address biodiversity issues in the Landscape Unit in which a licence has operations. Once the LUP process is complete in an established Landscape Unit, and OGMA have been spatially established the original Legal Order is no longer applicable to the area.

Fraser Block

It has been recognized by various government agencies over the years that the highly altered nature of the islands associated with the Fraser block of TFL 43 could not provide adequate area at the landscape level to satisfy the current Old Growth Order or LUP process. No OGMA have been established to date in the Fraser Valley South Landscape Unit that would require reductions to the land base for this analysis

Homathko Block

Landscape Unit Planning (LUP) and the establishment of a series of Old Growth Management Area (OGMA) was completed on September 27th 2001. As such the provincial Non-Spatial Old Growth Order issued June 30th 2004 has no relevance in the Homathko Block of TFL 43. The spatial establishment of OGMA in the Homathko block of TFL 43 has satisfied all future landscape level biodiversity requirements. For this analysis the area associated with these OGMA has been netted out of the land base

Kingcome River

A significant portion of the land base within the Kingcome block of TFL 43 has been reserved from harvesting (upwards of 45 %). Throughout the Kingcome block these reserved areas represents a wide range of biologically diverse landscapes, which by default, satisfy the current requirements of the provincial Non-Spatial Old Growth Order. As such, no additional area net downs have been made to the Kingcome block of TFL 43 .

2.13.2 Stand-level biodiversity — Wildlife Tree Retention

Wildlife Tree Retention (WTR) is one of the primary methods of addressing stand level biodiversity objectives. Kruger Products has an extensive history of retaining wildlife trees within the riparian areas as part of normal management practices.

Fraser Block

In the Fraser Block, the Ministry of Environment has exempted the company from fulfilling Wildlife Tree Patch requirements on areas previously planted with hybrid poplar. The objective is to ensure that WTR requirements are met within the natural cottonwood stands in this block of the TFL. With the exception of a few stands, natural cottonwood is found mainly on the smaller islands within this block. A number of these stands have been declared as inoperable and reserved from harvesting. For the operable natural cottonwood stands -approximately 35% of the operable land base - riparian reserves will largely fulfill WTR requirements. Thus, within this block 100% of the WTR requirements will be satisfied through constrained areas.

Homathko Block

Stand level biodiversity in the Homathko block follows Objective # 2 in the Homathko Landscape Unit Plan dated September 27th 2001. As with the provincial Non-Spatial Old Growth Order this Objective establishes Wildlife Tree Retention rates by BEC Subzones. Stand-level biodiversity requirements in Homathko River are captured through Riparian Reserves associated with cut blocks and other net downs to the overall land base. Over 48 percent of the Total Productive Forest is reserved from harvesting which for the size of the landbase is more than enough to satisfy Objective 2 of the Homathko Landscape Unit Plan. No additional net downs to address this issue have been incorporated into this analysis.

Kingcome River

The existing 30 percent reduction to the Kingcome THLB and 45 percent reduction to the Gross Area represent more than enough area to satisfy the legal requirements associated with the provincial Old Growth Order. As with landscape –level biodiversity in Kingcome River no additional area has been removed from the Kingcome landbase in this analysis to address the issue of stand-level biodiversity.

2.14 Changes from MP4

Since the last management plan review for the TFL, several input datasets and assumptions have changed and they are summarized here.

Differences that affect the THLB Definition include:

- CAD based Forest Cover converted to ArcGIS Format, updated for depletions with RESULTS data. Ages have been projected forward and are now current to 2009 – although volumes were not re-projected (not used here).
- OGMA's removed for the Sunshine Coast TSA.
- Grizzly Bear Wildlife Habitat Areas (2-072, 2-208, 2-210, 2-213, 2-214, 2-298) removed – all in the Homathko block
- Operability Reviewed – minor changes where areas previously classes as inoperable have been harvested.
- Some changes to ESA as a result of Grizzly WHAs

- Fully spatial riparian reserves were developed by buffering streams/rivers.
- Wildlife ESA's in Homathko and Kingcome were dropped in favor of using established WHA's.
- Updates to the landbase to account for erosion and accretion since the last analysis.

Other differences include:

- MP4 conducted a volume-based analysis for the Fraser block. This analysis has been entirely conducted as an area-based analysis. MoFR did not request a supplemental volume based analysis.
- The Regeneration delay for the Homathko and Kingcome block has been decreased from 3 years to 1 years to reflect current management practices.
- The harvest age for the Homathko block has been increased by 1 year recognizing the slightly lower Site Indexes in this block compared to the Kingcome Block.
- The changes in regeneration delays and harvest age result in a rotation length for the Fraser, Kingcome, and Homathko Block is now 26, 31, and 32 years, respectively.

3.0 Timber Supply Analysis Results

As a result of the changes in the landbase definition and rotation lengths, the allowable annual cut (AAC) has been re-calculated. The following sections show these calculations for each block. A summary of these calculations is provided in Section 3.4.

3.1 Fraser Block Harvest Level and Proposed AAC Calculation

Table 15. Timber harvesting land base area netdown summary - Fraser Block

	Effective Netdown Area (ha)		Total Effective Netdown Area (ha)
	Schedule 'A'	Schedule 'B'	
Gross Area	1,195	2,361	3,556
Less			
Non-forest / Non-productive forest / Non-TFL	459	1438	1897
Existing roads, trails and landings	0	0	0
Total Productive Forest	736	924	1,660
Less:			
Protected Areas	0	0	0
Non-Commercial Land (NP BR)	92	307	399
Inoperable/Inaccessible	8	42	50
Environmentally Sensitive Area 1	5	9	15
Environmentally Sensitive Area 2	0	0	0
Low Productivity Sites	0	0	0
Riparian Reserves	12	16	28
Wildlife Habitat Areas - Grizzly	0	0	0
Old Growth Management Areas	0	0	0
Cultural heritage resources	0	0	0
Timber Harvesting Land Base –THLB (ha)	618	549	1,167
Less Other Removals:			
Estimate of Future Roads, Trails, and Landings (1%)	0	0	
Effective Long-term THLB (ha)	618	549	1,167

$$\begin{aligned}
 \text{Fraser Block proposed AAC} &= \frac{1167.1 \text{ ha}}{26 \text{ Year Rotation Length}} \\
 &= \mathbf{44.9 \text{ hectares / year}}
 \end{aligned}$$

3.2 Homathko Block Harvest Level and Proposed AAC Calculation

Table 16. Timber harvesting land base area netdown summary - Homathko Block

	Effective Netdown Area (ha)
Gross Area	5,661
Less	
Non-forest / Non-productive forest	1712
Existing roads, trails and landings	71
Total Productive Forest	3,878
Less:	
Protected Areas	212
Non-Commercial Land (NP BR)	307
Inoperable/Inaccessible	843
Environmentally Sensitive Area 1	491
Environmentally Sensitive Area 2	0
Low Productivity Sites	0
Riparian Reserves	79
Wildlife Habitat Areas - Grizzly	97
Old Growth Management Areas	16
Cultural heritage resources	0
Timber Harvesting Land Base –THLB (ha)	1,833
Less Other Removals:	
Estimate of Future Roads, Trails, and Landings (1%)	4
Effective Long-term THLB (ha)	1,829

*All lands in the Homathko Block are Schedule 'B'

$$\begin{aligned}
 \text{Homathko Block proposed AAC} &= \frac{1828.8 \text{ ha}}{32 \text{ Year Rotation Length}} \\
 &= 57.1 \text{ hectares / year}
 \end{aligned}$$

3.3 Kingcome Block Harvest Level and Proposed AAC Calculation

Table 17. Timber harvesting land base area netdown summary - Kingcome Block

	Effective Netdown Area (ha)
Gross Area	958
Less	
Non-forest / Non-productive forest	198
Existing roads, trails and landings	21
Total Productive Forest	740
Less:	
Protected Areas	0
Non-Commercial Land (NP BR)	25
Inoperable/Inaccessible	67
Environmentally Sensitive Area 1	137
Environmentally Sensitive Area 2	0
Low Productivity Sites	0
Riparian Reserves	21
Wildlife Habitat Areas - Grizzly	0
Old Growth Management Areas	0
Cultural heritage resources	0
Timber Harvesting Land Base –THLB (ha)	491
Less Other Removals:	
Estimate of Future Roads, Trails, and Landings (1%)	1
Effective Long-term THLB (ha)	490

*All lands in the Kingcome Block are Schedule 'B'

$$\begin{aligned}
 \text{Kingcome Block proposed AAC} &= \frac{489.8 \text{ ha}}{31 \text{ Year Rotation Length}} \\
 &= 15.8 \text{ hectares / year}
 \end{aligned}$$

3.4 Total TFL Area

Given the net THLB area calculations and the refined rotation lengths for this analysis, the Total TFL AAC is estimated to be 117.8 ha (Table 18). Volume equivalents were approximated by determining the average inventory stand yield (m³/ha)⁶ for stands currently > 30 years old and multiplying this value by the proposed area AAC. Since no attempt was made to project stand volumes since the last management plan, this volume equivalent is likely conservative (i.e. current inventory volumes would be slightly higher).

Table 18. Summary of proposed Allowable Annual Cut Calculations for TFL 43.

Block	Rotation length	Schedule 'A'		Schedule 'B'		Total	
		Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)
Fraser	26	23.8	6,831	21.1	6,055.7	44.9	12,886.3
Homathko	32			57.1	18,957.2	57.1	18,957.2
Kingcome	31			15.8	8,121.2	15.8	8,121.2
Total		23.8	6,831	94	33,134.1	117.8	39,964.7

3.5 Sensitivity Analysis

In an area based analysis, the two factors that impact the harvest levels are rotation lengths and the size of the timber harvesting land base. Both of these factors were adjusted to gauge the sensitivity of changes in these factors and are described below.

3.5.1 Rotation Lengths

The base case scenario uses a rotation age of 26 years for the Fraser Block, 32 years for the Homathko block and 31 years for the Kingcome block. These planned rotation ages are based on the information and experience presented in Section 2.8. The effect of reducing and increasing the rotation by 2 years is shown below:

3.5.1.1 Sensitivity (-2 years)

Table 19. Sensitivity - Rotation length decreased by 2 years.

Block	Rotation length	Schedule 'A'		Schedule 'B'		Total	
		Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)
Fraser	24	25.8	7,405	22.9	6,572.3	48.7	13,976.9
Homathko	30			60.9	20,218.8	60.9	20,218.8
Kingcome	29			16.8	8,635.2	16.8	8,635.2
Total		25.8	7,405	100.6	35,426.3	126.4	42,830.9

⁶ Inventory stand yield taken from 1999 inventory file that had stand yields calculated with VDYP and then increased by a factor of 1.3 to reflect increased vigor of hybrid poplar plantation yields and high site indexes.

3.5.1.2 Sensitivity (+2 years)

Table 20. Sensitivity - Rotation length increase by 2 years.

Block	Rotation length	Schedule 'A'		Schedule 'B'		Total	
		Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)
Fraser	28	22.1	6,343	19.6	5,625.2	41.7	11,967.9
Homathko	34			53.7	17,828.4	53.7	17,828.4
Kingcome	33			14.8	7,607.2	14.8	7,607.2
Total		22.1	6,343	88.1	31,060.8	110.2	37,403.5

3.5.2 Size of the timber Harvesting Land Base (THLB)

Several factors that determine the size of the THLB have uncertainty around their definitions (e.g. operable area, problem types, low sites, impacts from trails and landings etc.). Different future market conditions or changes in harvesting or milling technology may also serve to reduce or expand the land base considered to be economical.

It is not known if the THLB used in this analysis is over or under-estimated, so two sensitivities have been completed. These scenarios decrease and increase the size of the THLB by 5% and the results are shown below:

3.5.2.1 Sensitivity (THLB -5%)

Table 21. Sensitivity – THLB Area decreased by 5%.

Block	Rotation length	Schedule 'A'		Schedule 'B'		Total	
		Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)
Fraser	26	22.6	6,831	20.1	5,768.7	44.9	12,886.3
Homathko	32			54.2	17,994.4	54.2	17,994.4
Kingcome	31			15	7,710.0	15.0	7,710.0
Total		22.6	6,831	89.3	31,473.1	114.1	38,303.7

3.5.2.2 Sensitivity (THLB +5%)

Table 22. Sensitivity – THLB Area increased by 5%.

Block	Rotation length	Schedule 'A'		Schedule 'B'		Total	
		Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)	Hectares / year	Approximate Volume Equivalent (m ³ /year)
Fraser	26	25	7,175	22.2	7,370.4	47.2	14,545.4
Homathko	32			60	19,920.0	60.0	19,920.0
Kingcome	31			16.5	8,481.0	16.5	8,481.0
Total		25	7,175	98.7	35,771.4	123.7	42,946.4

3.6 Conclusions / Recommended Harvest Levels

The total proposed harvest level for the TFL is 117.8 ha/year or 39,965 m³/yr. The current AAC of TFL 43 is 108.2 ha/year. The Base Case harvest level represents an increase of 9.6 ha/year or 8.9% in annual harvest area in comparison to the AAC for MP 4.

Kruger recommends the continuation of setting the Allowable Annual Cut on an area basis since the conversion process is still in progress and there is still relatively limited growth and yield information available for cottonwood/hybrid poplar. Table 1 shows the recommended annual harvest level for each of the three Blocks of the TFL.

Table 23. Recommend Harvest Levels (ha/year) for Management Plan 5

Block	Proposed AAC (ha/year)	Wtd. Avg. Volume/ha (m ³ /ha)	Approximate Volume Equivalent of Proposed AAC (m ³ /year)
Fraser	44.9	287	12,886
Homathko	57.1	332	18,957
Kingcome	15.8	514	8,121
Total	117.8		39,965

4.0 20 Year Plan

4.1 Introduction

A 20 year plan is a requirement within the tree farm licence management plan planning process. It provides a spatial illustration of the proposed harvest level in the base case scenario of the timber supply analysis.

4.2 Introduction

- In 5 year increments it shows where the projected harvest level in the base case timber supply analysis is achieved while ensuring the defined management practices and harvesting constraints are satisfied.
- Allows the public and agencies to identify areas of concerns that they may have regarding proposed development scenario.
- Provide strategic guidance for future planning in each Block of the TFL.

4.3 Guidelines and Objectives

The objective is to validate the proposed harvest level in the base case of the timber supply analysis. The projected harvest levels represent one possible scenario for attaining the proposed harvest level.

The management practices and harvesting constraints applicable to the 20 year plan are as follows:

- Ensure the requirements of the Forest and Range Practices Act are satisfied.
- Harvest the operable land within each Block of the TFL in accordance with the harvest level in the base case scenario of the timber supply analysis. Minor areas of non-merch and sub-merch stands contiguous to proposed cutblocks may be harvested and subsequently converted to hybrid poplar plantations.
- A separate 20 year plan summary table has been prepared for each Block of the TFL consistent with managing each Block as an individual operating unit.
- Satisfy the requirements with respect to adjacency and green-up (the fast growing nature of hybrid poplar results in green-up in 3 years).
- Ensure consistency with the netdowns used for Environmentally Sensitive Areas (ESAs) within the base case scenario of the timber supply analysis.
- Harvest the profile of the available operable land base within each Block of the TFL. As a first priority the company will salvage harvest dead, damaged stands or stands at risk of erosion and this will be followed by older age stands within each Block. Moreover, the conversion of lower-value (merchantable) alder and coniferous stands will likely coincide with periods of favorable log market conditions.
- The Wildlife Tree Retention requirements will be fulfilled through the utilization of the existing riparian reserves, inoperable areas and environmentally sensitive areas to a large extent.
- Proposed block areas will exclude applicable riparian reserves.. In addition, the final block layout will ensure these areas are set aside during the operational planning stage.

- Blocks larger than 40 ha will be split during operational planning to ensure that not more than 40 ha is denuded at any time prior to green-up of the adjacent area.
- The harvest areas for this plan are based on the following proposed allowable annual cut for each Block:

Fraser	44.9 ha/year
Homathko	57.1 ha/year
Kingcome	15.8 ha/year

4.4 Maps

This plan has been streamlined with the need for separate 20 Year Plan maps eliminated. As a planning tool they are of little value to the 20 Year Plan itself. Our ability to store, manage and query data eliminates the need for this very expensive and time consuming exercise. A single series of updated colour themed maps have been produced that will be accompany and be available to reviewers of this plan.

4.5 Plan Discussion and Results

The plan lists the proposed harvest areas for each Block of the TFL in 4 five year periods. The proposed harvest area for each Block is based on the applicable rotation length and the long term timber harvesting land base. The rotation length used in the current analysis is 26 years for the Fraser Block (including 1 year regeneration delay) and 31 years for Kingcome and 32 years for the Homathko Block (including 1 year regeneration delay).

A specific silviculture system has not been identified with each block but clearcutting is the most appropriate and preferred system for hybrid poplar management. In actuality the management of these alluvial sites is such that riparian and/or wildlife reserves are commonly adjacent to the proposed blocks, and the decision regarding the placement and size of the reserves is appropriately made at the operational planning stage. In addition, Kruger has made an effort to retain advance coniferous regeneration if it does not interfere with regeneration objectives.

4.5.1 Fraser Block

This area is managed at a very intense level because of it's proximity to the manufacturing facility, accessibility, favorable growing conditions, and historical use. The Fraser Block 20 year plan has been prepared using the proposed area-based allowable annual cut calculation as the company considers it to be the most appropriate method until more accurate growth and yield information is available and remaining areas are converted to high yielding poplar pulpwood plantations.

Figure 19 provides the current breakdown of the land base within this Block. The total area for this Block is 3,556 ha. Approximately 33% of the land base is designated as the long term timber harvesting land base and this amounts to 1,167 ha.

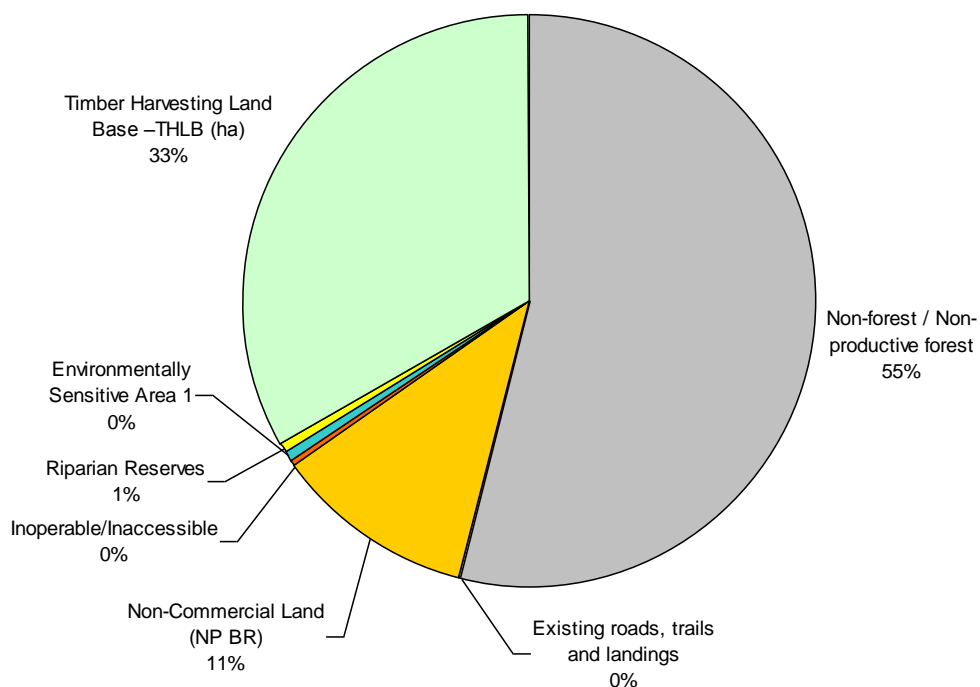


Figure 19. TFL 43 Fraser Block Land Base breakdown

The age class distribution of this available operable land base is shown in Figure 20. A significant proportion of the land base, about 41%, is made up of age classes older than the current planned rotation (26 years) for this Block. The leading species is cottonwood or hybrid poplar for all of stands within this Block.

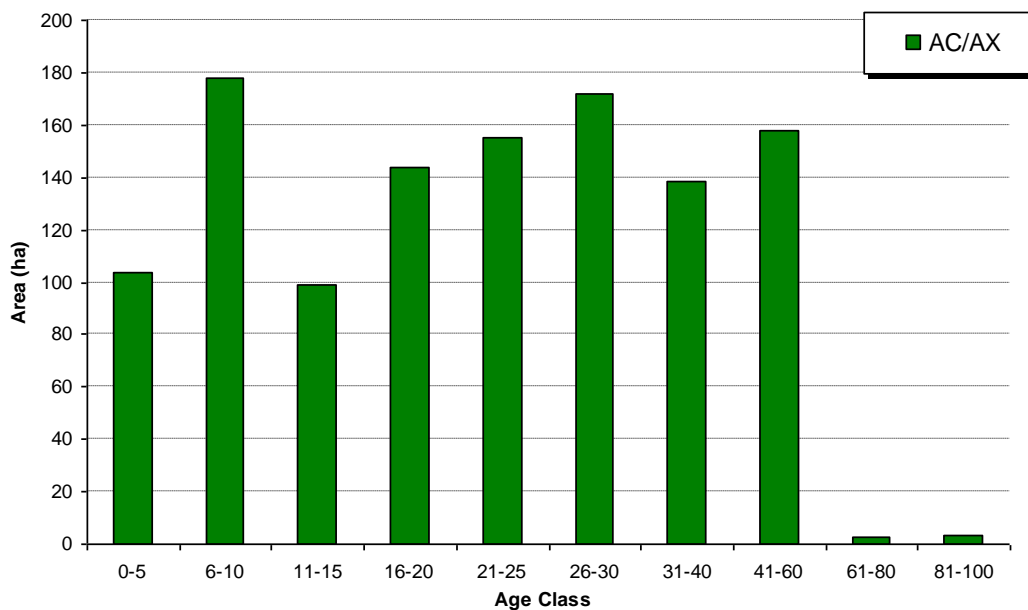


Figure 20. TFL 43 Fraser Block THLB Age Class distribution

Table 24 shows the 20 year plan harvest level by periods for the Fraser Block. The available operable land base within the Fraser Block consists of approximately 53% Schedule "A" lands and 47% Schedule "B" lands. The plan was prepared to harvest at a constant level using the harvest forecast in the base case scenario of the timber supply analysis. Essentially 4/5 (897 ha out of 1,167 total ha) of the available operable land base will be harvested during the plan given the 26 year rotation age. The projected volume has not been shown as it would be meaningless after the first period since these are young stands and volume changes are significant over five year periods. The plan has accommodated bald eagle nest sites through the removal of these areas from the timber harvesting land base.

Table 24. Fraser Block – 20 year plan harvest area summary

Period	Total Area (ha)
2010-2014	224
2015-2019	224
2020-2024	220
2025-2029	223
Total	891

Visual Landscape Management

The plan only dealt with polygons assigned Partial Retention (PR) visual quality objective (VQO) as these are considered the most important from a visual landscape management perspective. The visual quality objective of PR is applicable to approximately 91 ha of the operable available land base which amounts to 5% of the total productive land base. A number of these polygons are small islands (less than 25 ha) and it is impractical to adhere to the percent alteration limit of 15% due to operational considerations such as logistics of mobilizing equipment and achieving cost effectiveness. In these situations the whole island will be harvested in a single entry as it is found that the level topography combined with riparian reserves, highly modified surrounding landscape, sand and gravel bars, deciduous forest cover, and fast green-up mitigates the visual impact of the harvesting. This approach is consistent with current and past approved operational practices carried out on the TFL 43 Fraser Block.

4.5.2 Homathko Block

The Homathko land base breakdown is shown in Figure 21. The total Block area is 5,661 ha. About 33% of the land base is classified as long term timber harvesting land base.

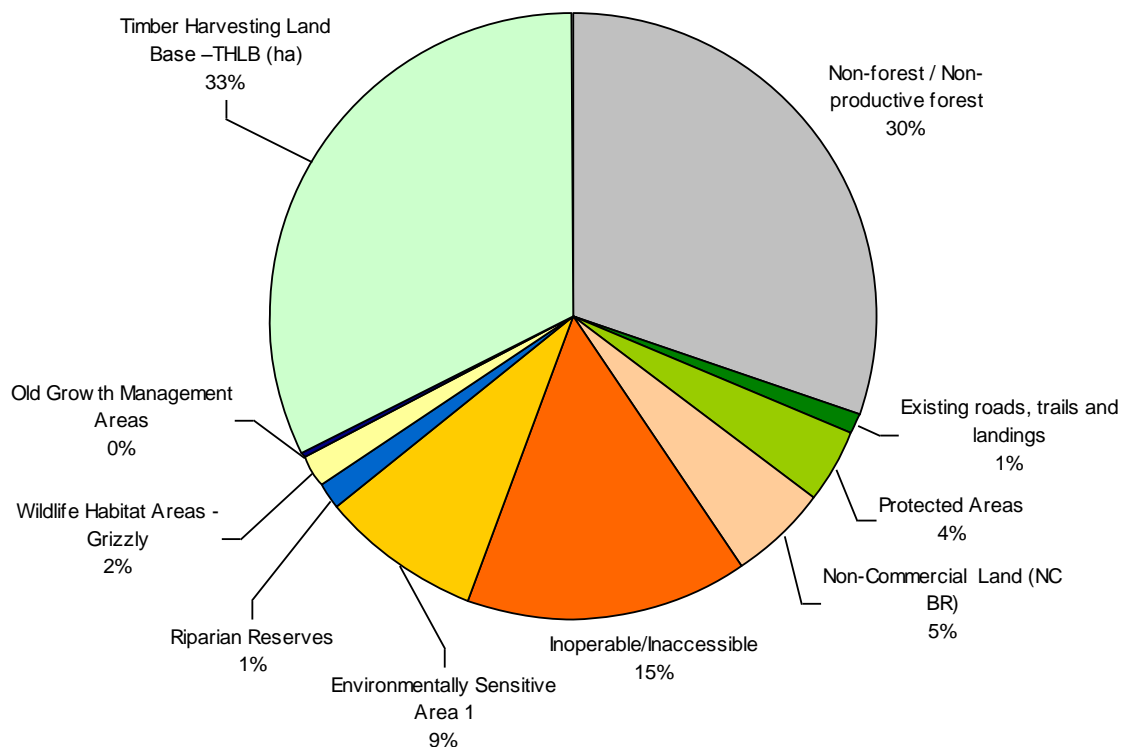


Figure 21. TFL 43 Homathko Block Land Base breakdown

The total long term timber harvesting land base is 1,829 ha. The age class structure of this available operable land base by leading species is shown in Figure 22. The leading species in stands older than 121 years is dominated by conifers whereas 51 to 100 year old stands consisting mainly of cottonwood.

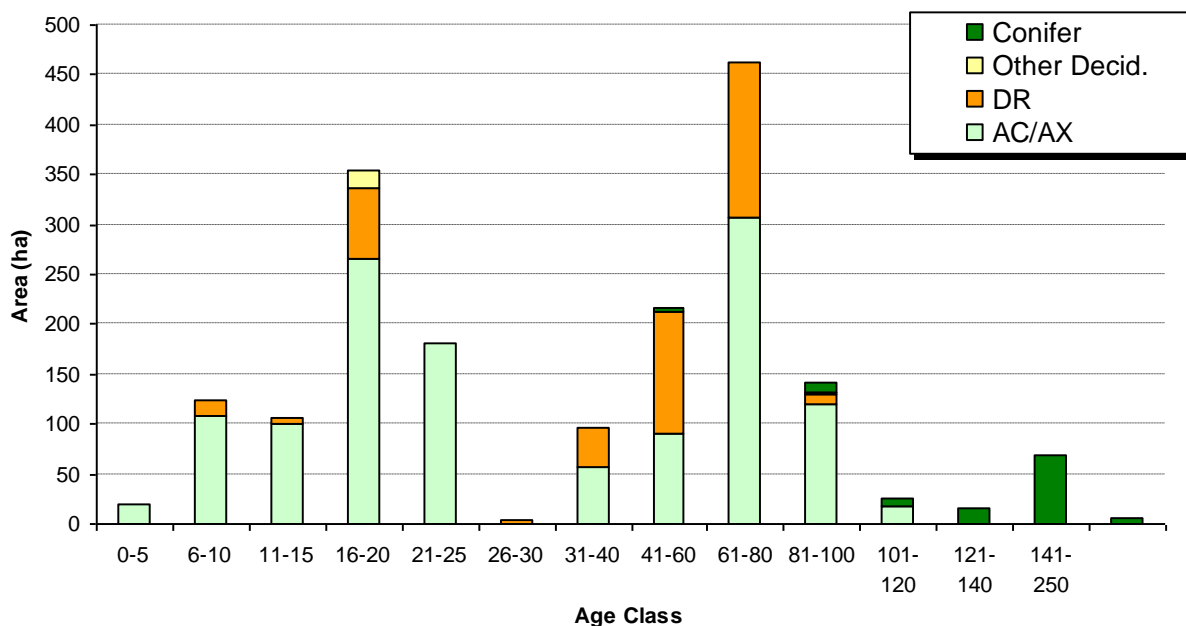


Figure 22. TFL 43 Homathko Block THLB Age Class distribution

The harvest levels for this plan are shown in Table 25. The harvest levels are based on the proposed AAC of 57.1 ha for this Block. A further 3% reduction has been applied to the Timber Harvesting Land Base to account for Wildlife Tree Retention within cutblocks. It is assumed that 75% of stand level reserves will be met through existing constrained areas. The areas listed are net areas excluding reserves. A significant portion of this Block has been reserved from harvesting as shown in Figure 21.

The Homathko plan was prepared by using environmentally sensitive area (ESA's) netdown limits applied within the timber supply analysis. A total of 497 ha of productive forest classified as environmentally sensitive is reserved from harvesting within this plan. Although a 98% netdown has been applied to ESA1 areas in the timber supply analysis, it is expected that on a site specific basis this may vary from 90% to 100%. This arrangement was confirmed in the last analysis with the former Ministry of Environment, Lands and Parks to ensure that critical wildlife habitat polygons are reserved from harvesting while providing flexibility in less critical areas for Kruger products to carry out minor boundary refinements during cutblock layout and engineering.

Table 25. Homathko Block – 20 year plan harvest area summary

Period	Area (ha)
2010-2014	294
2015-2019	287
2020-2024	284
2025-2029	287
Total	1152

4.5.3 Kingcome Block

The total land base breakdown is shown in Figure 23. The total area of this Block is only 958 ha. The long term timber harvesting land base is approximately 51% of this total area.

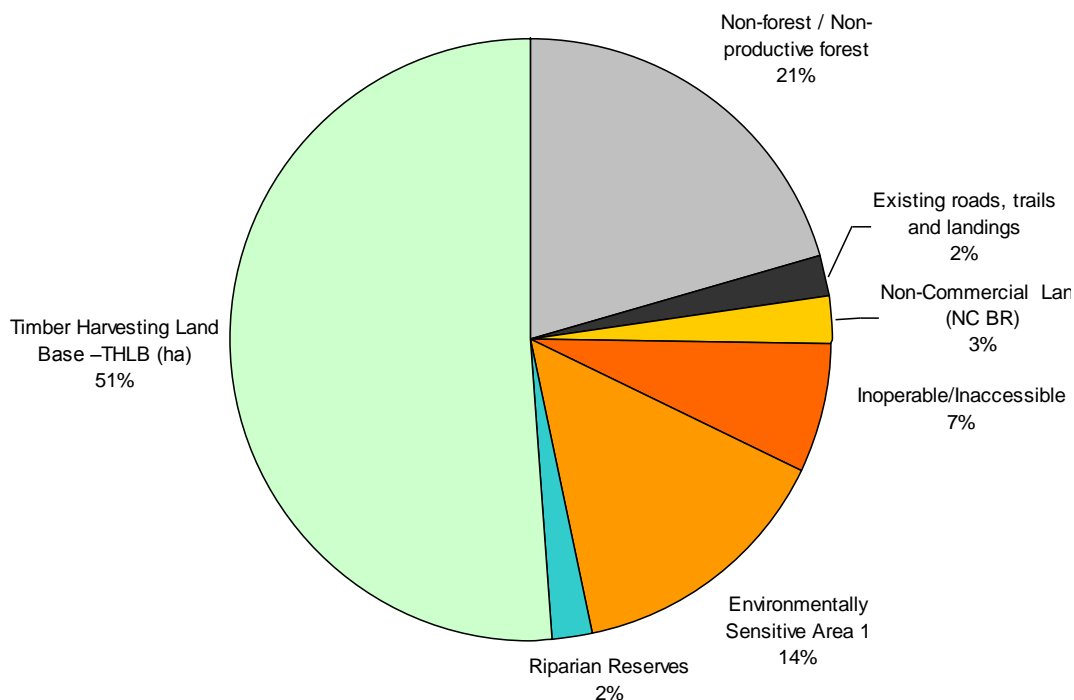


Figure 23. TFL 43 Kingcome Block Land Base breakdown

The age class structure of the long term timber harvesting land base of 490 ha is shown in Figure 24. The older age classes generally consist of conifers as leading species.

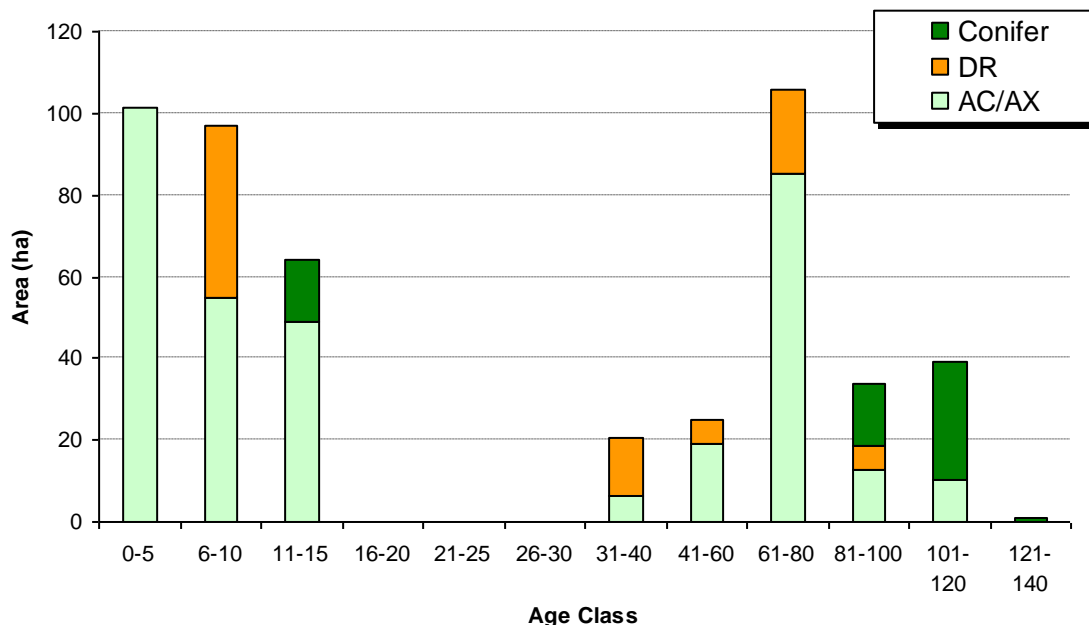


Figure 24. TFL 43 Kingcome Block THLB Age Class distribution

The harvest levels within this plan are listed in Table 26. The harvest levels are based on the proposed AAC of 15.8 ha. An almost constant harvest level is projected over the term of this plan. The harvest areas do not vary significantly in each period of the plan but the company expects a high degree of variance in volumes depending upon the stand composition. The areas have been reduced for riparian reserves found adjacent to the blocks within this plan.

Table 26. Kingcome Block – 20 year plan harvest area summary

Period	Area (ha)
2010-2014	82
2015-2019	81
2020-2024	78
2025-2029	81
Total	279

Approximately 249 ha of productive forest consisting of ESA's, inoperable, riparian and non-productive brush areas are reserved from harvesting within this plan. These constrained areas will largely fulfill the landscape level biodiversity requirement within this Block.

5.0 References

- Scott Paper Limited, 1999. Management Plan No. 4 – Tree Farm Licence 43 – The Broadleaf Tree Farm Licence Including Managed Forest #23.
- Scott Paper Limited and Olympic Resource Management, 1999. Management Plan No. 4 – Tree Farm Licence 43 – Appendix IV – Timber Supply Analysis Information Package.
- Scott Paper Limited and Olympic Resource Management, 1999. Management Plan No. 4 – Tree Farm Licence 43 – Appendix V – Timber Supply Analysis Report.
- Scott Paper Limited and Olympic Resource Management, 1999. Management Plan No. 4 – Tree Farm Licence 43 – Appendix VI – 20 Year Plan.
- Kruger Forest Products, 2007. Forest Stewardship Plan for the Homathko Forest Development Unit – TFL 43. April 1, 2007 to March 31, 2011.
- Kruger Forest Products, 2007. Forest Stewardship Plan for the Fraser Forest Development Unit – TFL 43. April 1, 2007 to March 31, 2012.

6.0 Glossary

Allowable annual cut (AAC)	The rate of timber harvest permitted each year from a specified area of land, usually expressed as cubic meters of wood per year.
Analysis unit	A grouping of types of forest — for example, by species, site productivity, silvicultural treatment, age, and or location — done to simplify analysis and generation of timber yield tables.
Base case harvest forecast	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, animals 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 (BEC) variant	A subdivision of a biogeoclimatic subzone. Variants reflect further differences in regional climate and are generally recognized for areas slightly drier, wetter, snowier, warmer or colder than other areas in the subzone.
Biogeoclimatic zones	A large geographic area with broadly homogeneous climate and similar dominant tree species.
Coniferous	Coniferous trees have needles or scale-like leaves and are usually 'evergreen'.
Cutblock	A specific area, with defined boundaries, authorized for harvest.
Cutblock adjacency	The spatial relationship among cutblocks. Most adjacency restrictions require that recently harvested areas must achieve a desired condition (green-up) before nearby or adjacent areas can be harvested. Specifications for the maximum allowable proportion of a forested landscape that does not meet green-up requirements are used to approximate the timber supply impacts of adjacency restrictions.
Deciduous	Deciduous trees shed their leaves annually and commonly have broad-leaves.
Environmentally sensitive areas (ESA)	Areas with significant non-timber values, fragile or unstable soils, impediments to establishing a new tree crop, or high risk of avalanches.
Forest cover objectives	Specify desired distributions of areas by age or size class groupings. These objectives can be used to reflect desired conditions for wildlife, watershed protection, visual quality and other integrated resource management objectives. General adjacency and green-up guidelines are also specified using forest cover objectives (see Cutblock adjacency and Green-up).
Forest inventory	An assessment of British Columbia's 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 visual quality.
Forest and Range Practices Act (FRPA)	Legislation that govern forest practices and planning, with a focus on ensuring management for all forest values.
Forest type	The classification or label given to a forest stand, usually based on its tree species composition. Pure spruce stands and spruce-balsam mixed stands are two examples.
Free-growing	An established seedling of an acceptable commercial species that is free from growth-inhibiting brush, weed and excessive tree competition.
Green-up	The time needed after harvesting for a stand of trees to reach a desired condition (usually 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 flow of potential timber harvests 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 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.

Higher level plans	Higher level plans establish the broader, strategic context for operational plans, providing objectives that determine the mix of forest resources to be managed in a given area.
Inoperable areas	Areas defined as unavailable for 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.
Landscape-level biodiversity	The <i>Landscape Unit Planning Guide</i> provides objectives for maintaining biodiversity at both the landscape level and the stand level. At the landscape level, guidelines are provided for the maintenance of seral stage distribution, patch size distribution and landscape connectivity.
Landscape unit	A planning area based on topographic or geographic features, that is appropriately sized (up to 100 000 hectares), 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.
Mature seral	Forest stands with trees between 80 and 120 years old, depending on species, site conditions and biogeoclimatic zone.
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 specification of minimum harvestable ages, utilization levels, integrated resource guidelines and silviculture and pest management programs.
Mean annual increment (MAI)	Stand volume divided by stand age. The age at which average stand growth, or MAI, reaches its maximum is called the culmination age (CMAI). Harvesting all stands at this age results in a maximum average harvest over the long term.
Minimum harvestable age (MHA)	The age at which a stand of trees is expected to achieve a merchantable condition. The minimum harvestable age could be defined based on maximize average productivity (culmination of mean annual increment), minimum stand volume, or product objectives (usually related to average tree diameter).
Model	An abstraction and simplification of reality constructed to help understand an actual system or problem. Forest managers and planners have made extensive use of models, such as maps, classification systems and yield projections, to help direct management activities.
Natural disturbance type (NDT)	An area that is characterized by a natural disturbance regime, such as wildfires, which affects the natural distribution of seral stages. For example areas subject to less frequent stand-initiating disturbances usually have more older forests.
Not satisfactorily restocked (NSR)	An area not covered by a sufficient number of well-spaced trees of desirable species. Stocking standards are set by the B.C. Forest Service. Areas harvested prior to October 1987 and not yet sufficiently stocked according to standards are classified as backlog NSR. Areas harvested or otherwise disturbed since October 1987 are classified as current NSR.
Operational Adjustment Factor (OAF)	OAF1 and OAF2 are TIPSYS input parameters that reduce predicted yield to account for factors such as non-productive areas within stands, disease and insects, non-commercial cover, stocking gaps, decay, waste, and breakage.
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.
Productive Forest land base (PFLB)	All forested crown land in a management unit. Used to support the management of non timber resources. The THLB is a subset of this land base.

Protected area	A designation for areas of land and water set aside to protect natural heritage, cultural heritage or recreational values (may include national park, provincial park, or ecological reserve designations).
Riparian area	Areas of land adjacent to wetlands or bodies of water such as swamps, streams, rivers or lakes.
Scenic area	Any visually sensitive area or scenic landscape identified through a visual landscape inventory or planning process carried out or approved by a district manager.
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 base case.
Seral stages	Sequential stages in the development of plant communities that successively occupy a site and replace each other over time.
Site index	A measure of site productivity. The indices are reported as the average height, in meters, that the tallest trees in a stand are expected to achieve at 50 years (age is measured at 1.3 meters above the ground). Site index curves have been developed for British Columbia's major commercial tree species.
Stand-level biodiversity	A stand is a relatively localized and homogeneous land unit that can be managed using a single set of treatments. In stands, objectives for biodiversity are met by maintaining specified stand structure (wildlife trees or patches), vegetation species composition and coarse woody debris levels.
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.
Table Interpolation Program for Stand Yields (TIPSY)	A B.C. 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)	Productive Forest land within the timber supply area where timber harvesting is considered both acceptable and economically feasible, given objectives for all relevant forest values, existing timber quality, market values and applicable 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.
Timber supply area (TSA)	An integrated resource management unit established in accordance with <i>Section 7</i> of the <i>Forest Act</i> .
Tree farm license (TFL)	Provides rights to harvest timber, and outlines responsibilities for forest management, in a particular area.
Ungulate	A hoofed herbivore, such as deer.
Unsalvaged losses	The volume of timber killed or damaged annually by natural causes (e.g., fire, wind, insects and disease) that is not harvested.
Variable Density Yield Prediction (VDYP)	An empirical yield prediction system, supported by the Ministry of Forests and Range, designed to predict average yields and provide forest inventory updates over large areas (i.e., Timber Supply Areas). It is intended for use in unmanaged natural stands of pure or mixed species composition.
Vegetation Resources Inventory (VRI)	An assessment of British Columbia's vegetation resources. It includes computerized maps, a database describing the location and nature of forest information, including timber size, stand age, timber volume, tree species composition, and shrub, herb, and bryoid information. It replaces the older forest inventory.
Visual quality objective (VQO)	Defines a level of acceptable landscape alteration resulting from timber harvesting and other activities. A number of visual quality classes have been defined on the basis of the maximum amount of alteration permitted.
Volume estimates	Estimates of yields from forest stands over time. Yield projections can be developed for stand volume, stand diameter or specific products, and for empirical (average stocking), normal (optimal stocking) or managed stands.
Yield projections	See volume estimates

Watershed	An area drained by a stream or river. A large watershed may contain several smaller watersheds.
Wildlife tree	A standing live or dead tree with special characteristics that provide valuable habitat for conservation or enhancement of wildlife.
Woodlot licence	An agreement entered into under the <i>Forest Act</i> . It allows for small-scale forestry to be practised in a described area (Crown and private) on a sustained yield basis.

7.0 Acronyms

AAC	Allowable Annual Cut
Analysis	Timber Supply Analysis
AU	Analysis Unit
BCTS	British Columbia Timber Sales
BEC	Biogeoclimatic Ecosystem Classification
BEO	Biodiversity Emphasis Option
CF	Chief Forester
DFO	Department of Fisheries and Oceans
DM	District Manager
DP	Data Package
ESA	Environmentally Sensitive Area
FAIB	Forest Analysis and Inventory Branch
FIZ	Forest Inventory Zone
FPC	Forest Practices Code
FPPR	Forest Planning and Practices Regulation
FSP	Forest Stewardship Plan
GAR	Government Action Regulation
GIS	Geographic Information System
HLP	Higher Level Plan
ILMB	Integrated Land Management Bureau (Ministry of Agriculture and Lands)
IRM	Integrated Resource Management
LRMP	Land and Resource Management Plan
LU	Landscape Unit
MHA	Minimum Harvestable Age
MOE	Ministry of Environment
MOGMA	Mature + Old Growth Management Area
MFR	Ministry of Forests and Range
MO	Ministerial Order
NCC	Non-Commercial Cover
NDT	Natural Disturbance Type
NRL	Non-Recoverable Losses
NSR	Not Satisfactorily Restocked
OAF	Operational Adjustment Factor
OGMA	Old Growth Management Area
PSP	Permanent Sample Plot
PFLB	Productive Forest Land Base
PSYU	Public Sustained Yield Unit
RMR	TFL 43 Mountain Resort
RMZ	Riparian Management Zone
RRZ	Riparian Reserve Zone
RVQC	Recommended Visual Quality Class
SI	Site Index
TFL	Tree Farm License
THLB	Timber harvesting land base
VAC	Visual Absorption Capability
VQO	Visual Quality Objective
WHA	Wildlife habitat area

Appendix A - 20 Year Plan Maps

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APPENDIX B – FIRST NATION CONTACT LIST

First Nations in TFL 43 that have overlapping asserted traditional territories.

Chilliwack Forest District – Fraser Block

Aitchelitz Indian Band
Cheam Indian Band
Chehalis Indian Band
Ch-ihl-Kway-uhk Tribes
Kwaw-Kwaw-Apilt
Leq'a:mel First Nation
Peters Band
Popkum Indian Band
Scowlitz First Nation
Seabird Island First Nation
Shxw'ow'hamel First Nation
Skawahlook First Nation
Skowkale First Nation
Skwah First Nation
Squiala First Nation
Sto:lo Nation
Sto:lo Tribal Council
Tzeachten First Nation
Union Bar First Nation
Yakweakwioose Indian Band

Sunshine Coast Forest District – Homathko Block

Wei Wai Kum First Nation
Xmemalhkwu First Nation
Ulkatcho First Nation

North Island – Central Coast Forest District

Dzawada'enuxw First Nation (formerly Tswataineuk First Nation)