APPENDIX V(b)

Timber Supply Analysis Report

LP

SELKIRK TREE FARM LICENCE 55
MANAGEMENT PLAN 3

TIMBER SUPPLY ANALYSIS

July 2000

Prepared for

Evans Forest Products

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1 INTRODUCTION

This report describes the timber supply analysis for TFL 55, which is part of the new management plan 3, scheduled to take effect in 2001. The results of this analysis will be considered by the Chief Forester in his determination of the allowable annual cut for the five year period 2001 – 2006.

There are four main sections in this report:

1. Landbase assumptions,
2. Yield assumptions,
3. Harvesting assumptions,
4. Results.

2 LANDBASE ASSUMPTIONS

The landbase information came from both timber and non-timber inventories completed by Evan Forest Products between 1998 – 1999. The information package for the TFL 55 Management Plan 3 has a detailed description of the landbase that we used to forecast a rate of timber harvest.

The 19,783 hectares (including 555 hectares NSR) in table 1 represent the current timber harvesting landbase. Table 1 shows the steps of the landbase determination.

In TFL 55, the total land area is 92,700 hectares. Of this area, 45,400 hectares (49%) is productive forest landbase. Not all the areas of productive forest are included in the timber harvesting landbase. For example, riparian buffers are withdrawn from harvesting. In total, 56% of the total productive forest on TFL 55 is withdrawn from harvesting and, in addition, 6% of the current timber harvesting (to be used for future roads) must be removed from the future timber harvesting landbase.

Five management zones have been identified for TFL 55. These are Caribou habitat in ESSF zone, Caribou habitat in ICH zone, Ungulate winter habitat zone, Riparian and Integrated resource management zone.

Table 2 shows the area summary for the overlapped management zones. The NSR, 555 ha was not included in the net area in table 2. The detailed area summary was presented in the information package.

Table 1: Operable Landbase Determination for Current Management Methods

Description	Area of Schedule B (ha)	Total Area (ha)	Volume of Schedule B (m^3)	Total Volume (m^3)
Total Landbase	92,700	92,700	14,512,110	14,512,110
Non-Forest	34,373	34,373	140,064	140,064
Non-Productive Forest	12,927	12,927	445,119	445,119
Total Productive Forest	45,400	45,400	13,926,928	13,926,928
Less:				
NC (Non Commercial	5	5	0	0
Inoperable/Inaccessible	22,551	22,551	6,813,381	6,813,381
Alpine Tundra Area	40	40	9,490	9,490
Unclassified Roads, trails and Landings	858	858	173,854	173,854
Terrain	551	551	198,030	198,030
Riparian Reserves	433	433	200,746	200,746
Low Site	121	121	22,000	22,000
Deciduous	164	164	13,936	13,936
Non-merchantable	508	508	253,826	253,826
NSR	555	555	0	0
Wildlife Tree Patch	386	386	147,496	147,496
Total Current Reduction	26,173	26,173	7,832,759	7,832,759
Initial Timber Harvesting Landbase	19,227	19,227	6,094,169	6,094,169
Additions:				
NSR	555	555	0	0
Total Additions	555	555	0	0
Current Timber Harvesting Landbase	19,783	19,783	6,094,169	6,094,169
Future Reductions:				
Future roads, trails, landings	1,154	1,154	0	0
Future Timber Harvesting Landbase	18,629	18,629	6,094,169	6,094,169

No Schedule A in TFL 55

Table 2: Management Zones (some areas overlap)

Management Zone	Productive Forest	Net Area
Caribou in ESSF zone	10,854	6,531
Caribou in ICH zone	8,308	5,842
Ungulate Winter Range	4,098	2,325
Riparian	2,231	797
Integrated Resource Management	22,260	4,840

* Numbers may not add up exactly due to rounding.

Figure 1 presents an area summary of the timber harvesting landbase by leading species. The area distribution is 55 % for Spruce leading, 19% for Hemlock, 15% for Western Cedar, 6% for Douglas Fir and 4% for Balsam leading stands. In the timber harvest landbase, 65 percent of the area is old growth as shown in figure 2.

Figure 1: Area Distribution by Leading Species, Timber Harvesting Landbase

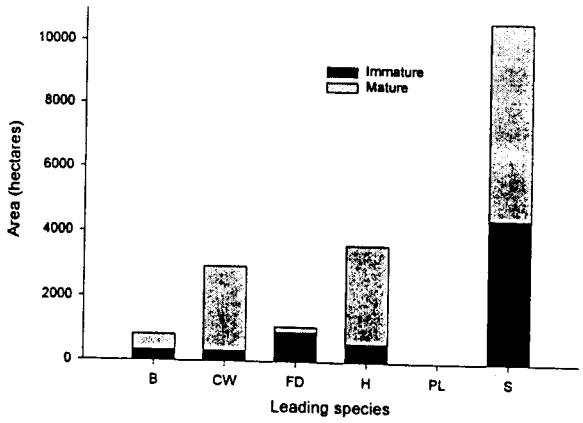


Figure 2: Area Distribution by Age Class, Timber Harvesting Landbase

3 YIELD ASSUMPTIONS

The areas in the productive forest were assigned to four productivity classes (productive site class 1 representing the highest productivity). The four productivity classes were defined using site index values as follows:

Productive site class 1:	BH50 SI > 20
Productive site class 2:	15 < BH50 SI <= 20
Productive site class 3:	10 < BH50 SI <= 15
Productive site class 4:	8 <= BH50 SI <=10

BH50 SI is site index using a tree reference age of 50 years at breast height. Site index is an expression of productivity based on the height, at a specific age, of dominant and co-dominant trees in a stand. Figure 3 shows the productive site class distribution based on the timber harvesting landbase.

For these productivity classes, different forest types were identified and are listed in table 3. For each forest type, yield tables were prepared which describe the average timber yields expected to be produced at different ages. Two computer models were used to calculate timber yields. The Variable Density Projection (VDYP) system was used to model existing stands. The Table Interpolation Projection System for Yields (TIPSY) was used to model forest stands regenerated after logging. The BC Forest Service maintains both models.

Figure 3: Productive Site Class Distribution

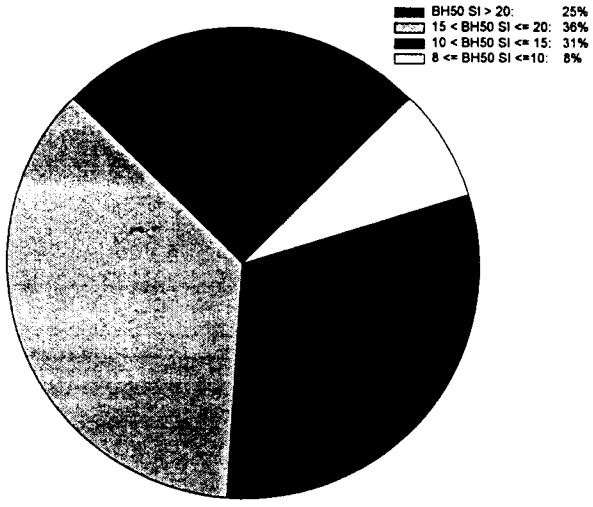


Table 3: Definition of Analysis Units

Analysis Unit	Species (leading and second)	Inventory Type Group	Site Index Range	Age Range	Net Area (ha)
1	Douglas Fir/Pine	1-8, 27-32	1	All	323
2	Douglas Fir/Pine	1-8, 27-32	2	All	714
3	Douglas Fir/Pine	1-8, 27-32	3	All	71
4	Western Cedar	9-11	1	<=140	200
5	Western Cedar	9-11	2	<=140	78
6	Western Cedar	9-11	3	<=140	68
7	Western Cedar	9-11	1	140+	848
8	Western Cedar	9-11	2	140+	1,436
9	Western Cedar	9-11	3	140+	330
10	Hemlock	12-17	1	<=140	106
11	Hemlock	12-17	2	<=140	379
12	Hemlock	12-17	3, 4	<=140	123
13	Hemlock	12-17	1, 2	140+	2,452
14	Hemlock	12-17	3	140+	513
15	Hemlock	12-17	4	140+	69
16	Balsam	18-19	2, 3	All	81
17	Balsam	20	1, 2	All	225
18	Balsam	20	3	All	537
19	Spruce	21-26	1	<=140	1,478
20	Spruce	21-26	2	<=140	1,565
21	Spruce	21-26	3	<=140	1,065
22	Spruce	21-26	4	<=140	378
23	Spruce	21-26	1	140+	1,873
24	Spruce	21-26	2	140+	59
25	Spruce	21-26	3	140+	3,237
26	Spruce	21-26	4	140+	1,021
Total					19,227

* Site index class is merged when its area is less than 50 ha.

3.1 OLD GROWTH SITE INDEX ADJUSTMENTS

It has been widely demonstrated that the site index of new stands regenerated after logging existing old growth is usually higher than the old growth site index. In this timber supply analysis, adjusted Old Growth Site Indices (OGSI) are from MoF published equations (1998). The adjusted site index is applied to new stands regenerated after logging existing stands older than 140 years. Adjustments for lodgepole pine and spruce were made using MoF paired plot equations (1998) and OGSI adjustments for all other leading species were made using MoF equations derived from veteran tree studies (1998). The regeneration yield curves with OGSI adjustment for all leading species were applied to the basecase and its sensitivity analyses on the current management landbase.

4 HARVESTING ASSUMPTIONS

In this analysis, all logging is assumed to use the clearcut system. Adjacency and green-up requirements, and stand level and landscape level biodiversity requirements were modeled in the timber supply analysis. Tables 4 and 5 show the landscape level biodiversity requirements in the 1997 Ministers Advisory Committee (MAC) report.

Table 4: Seral Stage Constraints for Landscape Level Biodiversity

Group No	Landscape Unit	Biogeoclimatic			BEO	Management Zones	Applied to Area	Seral Stage	Minimum Retention Area (%)		Minimum Age
		Zone	Subzone	Variant					MAC	45% 45% 10%[1]	
1	N/A	N/A	N/A	N/A	N/A	Caribou ESSF	94 Operable	Mature + Old	40	40	140
2	N/A	N/A	N/A	N/A	N/A	Caribou ICH	94 Operable	Mature + Old	40	40	140
3	N/A	N/A	N/A	N/A	N/A	Caribou ESSF	94 Operable	Old	10	10	250
4	N/A	N/A	N/A	N/A	N/A	Caribou ICH	94 Operable	Old	10	10	250
5	N/A	N/A	N/A	N/A	N/A	UWR ICH	94 Operable	N/A	34	34	100
6	R17	ESSF	vc		I	N/A	97 Operable	Mature + Old	36	36	120
7	R17	ICH	vk	1	I	N/A	97 Operable	Mature + Old	34	34	100
8	R18	ESSF	vc		I	N/A	97 Operable	Mature + Old	36	36	120
9	R18	ICH	vk	1	I	N/A	97 Operable	Mature + Old	34	34	100
10	R19	ESSF	vc		I	N/A	97 Operable	Mature + Old	36	36	120
11	R19	ICH	vk	1	I	N/A	97 Operable	Mature + Old	34	34	100
12	R19	ICH	wk	1	I	N/A	97 Operable	Mature + Old	34	34	100
13	R17	ESSF	vc		I	N/A	97 Operable	Old	19	19.9	250
14	R17	ESSF	vc		L[2]	N/A	97 Operable	Old	19	19.9	250
15	R17	ESSF	wc	2	L[2]	N/A	97 Operable	Old	19	19.9	250
16	R17	ICH	vk	1	I	N/A	97 Operable	Old	13	13.6	250
17	R17	ICH	vk	1	L[2]	N/A	97 Operable	Old	13	13.6	250
18	R18	ESSF	vc		I	N/A	97 Operable	Old	19	19.9	250
19	R18	ESSF	vc		L[2]	N/A	97 Operable	Old	19	19.9	250
20	R18	ICH	vk	1	I	N/A	97 Operable	Old	13	13.6	250
21	R18	ICH	vk	1	L[2]	N/A	97 Operable	Old	13	13.6	250
22	R19	ESSF	vc		I	N/A	97 Operable	Old	19	19.9	250
23	R19	ESSF	vc		L[2]	N/A	97 Operable	Old	19	19.9	250
24	R19	ICH	vk	1	I	N/A	97 Operable	Old	13	13.6	250
25	R19	ICH	vk	1	L[2]	N/A	97 Operable	Old	13	13.6	250
26	R19	ICH	wk	1	I	N/A	97 Operable	Old	13	13.6	250
27	R19	ICH	wk	1	L[2]	N/A	97 Operable	Old	13	13.6	250
28	R17	ESSF	vc		I	N/A	Forested	Mature + Old	36	36	120
29	R17	ICH	vk	1	I	N/A	Forested	Mature + Old	34	34	100
30	R18	ESSF	vc		I	N/A	Forested	Mature + Old	36	36	120
31	R18	ICH	vk	1	I	N/A	Forested	Mature + Old	34	34	100
32	R19	ESSF	vc		I	N/A	Forested	Mature + Old	36	36	120
33	R19	ICH	vk	1	I	N/A	Forested	Mature + Old	34	34	100
34	R19	ICH	wk	1	I	N/A	Forested	Mature + Old	34	34	100
35	R17	ESSF	vc		I	N/A	Forested	Old	19	19.9	250
36	R17	ESSF	vc		L[2]	N/A	Forested	Old	19	19.9	250
37	R17	ESSF	wc	2	L[2]	N/A	Forested	Old	19	19.9	250
38	R17	ICH	vk	1	I	N/A	Forested	Old	13	13.6	250
39	R17	ICH	vk	1	L[2]	N/A	Forested	Old	13	13.6	250
40	R18	ESSF	vc		I	N/A	Forested	Old	19	19.9	250
41	R18	ESSF	vc		L[2]	N/A	Forested	Old	19	19.9	250
42	R18	ICH	vk	1	I	N/A	Forested	Old	13	13.6	250
43	R18	ICH	vk	1	L[2]	N/A	Forested	Old	13	13.6	250
44	R19	ESSF	vc		I	N/A	Forested	Old	19	19.9	250
45	R19	ESSF	vc		L[2]	N/A	Forested	Old	19	19.9	250
46	R19	ICH	vk	1	I	N/A	Forested	Old	13	13.6	250
47	R19	ICH	vk	1	L[2]	N/A	Forested	Old	13	13.6	250
48	R19	ICH	wk	1	I	N/A	Forested	Old	13	13.6	250
49	R19	ICH	wk	1	L[2]	N/A	Forested	Old	13	13.6	250
50	N/A	ESSF	N/A	N/A	N/A	N/A	ESSF Area[3]	N/A	70	70	140

[1] is used in the sensitivity analysis

[2] 1/3 of the old seral goals required in the first rotation, with the full goal requirements achieved in three rotations

[3] is the area between 1991 Operability line and ESSF Parkland

Table 4 shows two sets of numbers for minimum retention areas. One set was created by using the Biodiversity Emphasis Option from the MAC and another assuming an area distribution rule of 45 % for both low (L) and intermediate (I) and 10 % for high (H) Biodiversity Emphasis Area (BEA). In our basecase analysis we use the MAC's Biodiversity Emphasis Option. One of the sensitivity analyses uses the area distribution by the rule of 45%, 45% and 10%. Table 5 presents forest cover constraints from the MAC. The ages at green-up height were calculated by area-weighting ages from yield curves.

Table 5: MAC's Forest Cover Requirements by Management Zones

Group Number	Management Zone	Green-up Height (meters)	Age at Green-up Height	Timber Harvest Landbase Maximum Allowable cut Area %
51	Riparian	2	16	25
52	Caribou ESSF	2	18	25
53	Caribou ICH	2	17	25
54	Ungulate Winter Range	2	16	25
55	Integrated Resource Management	2	16	25

The stand level biodiversity requirements are shown in table 6. Riparian reserve and management zone requirements were also met in the analysis, by using a GIS exercise to record the area of reserve and management zone to be found in each polygon. Riparian reserve areas were allowed to contribute to wildlife tree patches. In this analysis, the areas of wildlife tree patches were removed from the timber harvesting landbase. The details of these allowances for stand level biodiversity are shown in the information package.

Table 6: Stand Level Biodiversity Requirements -Wildlife Tree Patches

Landscape Units	Zone	Subzone	Variant	% area for row on Table(20)	% area column on Table(20)	Percent
R17	ESSF	vc		22.54	23.16	1.70
R18	ESSF	vc		28.83	64.10	6.29
R19	ESSF	vc		12.01	19.50	0.62
R17	ESSF	wc	2	38.12	44.80	5.29
R17	ICH	vk	1	33.15	57.82	6.10
R18	ICH	vk	1	37.37	76.48	8.39
R19	ICH	vk	1	17.64	54.29	4.19
R19	ICH	wk	1	38.91	55.73	6.46

The initial harvest profile was hemlock leading, 38%, cedar leading, 36%, spruce leading, 20%, balsam leading, 4%, and Douglas-fir leading, 2%.

At the start of the simulation model runs, this harvest was concentrated in old growth stands. As simulated time progressed, increasing amounts of timber were harvested from younger stands. The minimum requirements for a stand to be considered for harvest were a timber harvest volume of 250 cubic metres per hectare and 80 years of age.

5 RESULTS

Harvest forecasts were made for the following options:

1. gross productive landbase option,
2. current management landbase option,
3. MoF option.

The objective of the gross productive landbase option is to define an even flow timber harvest that is close to the biological potential and is free from green-up, adjacency and seral stage constraints. One, even flow basecase was produced for this option. No sensitivity analyses were run for option 1.

Option 2 (current management) and option 3 (MoF) include the same landbase. These two options differ only by their treatment of old growth site index (OGSI) adjustments for new stands that are regenerated after logging existing old growth. The current management option includes all OGSI adjustments in the basecase run. The MoF option excludes all OGSI adjustments from its basecase run.

For option 2, 22 sensitivity analyses were run. For option 3, 21 sensitivity analyses were run. The complete set of computer model runs is listed in table 7.

Table 7: The Complete Set of Harvest Forecasts

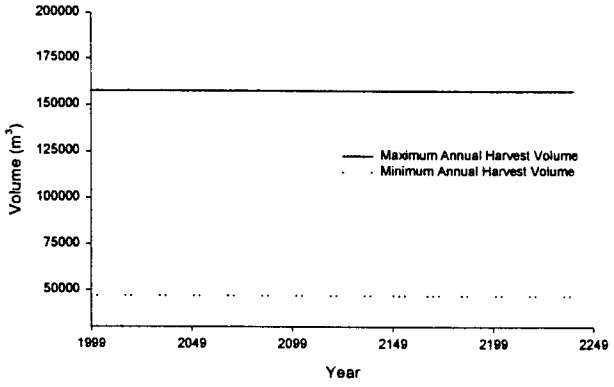
Option	Run Description	Run #
Gross Productive Landbase	Basecase	1
Current Management	Basecase	2
	Conventional landbase	3
	Alternative initial harvest level	4
	Biodiversity emphasis with 45% 45% 10%	5
	Existing stand volume +10%	6
	Existing stand volume -10%	7
	Regenerated stand volume +10%	8
	Regenerated stand volume -10%	9
	Minimum cover constraint percentages +10%	10
	Minimum cover constraint percentages -10%	11
	Minimum harvest age +10 years	12
	Minimum harvest age -10 years	13
	Green-up heights +2 metres	14
	Green-up heights –2 metres	15
	Landbase increased by 10%	16
	Landbase decreased by 10%	17
	Add marginal area to timber harvesting landbase	18
	No wildlife tree patches	19
	No OGSI adjustment	20
	Reducing old seral stage by 50 years	21
	Combined effects of factors shown on run #s 8, 11, 16 and OGSI adjusted	22
	Combined effect of factors shown on run #s 9, 10, 18 and OGSI non-adjusted	23
	TSR 1998 requirements	24
MoF	Basecase	25
	Conventional landbase	26
	Alternative initial harvest level	27
	Biodiversity emphasis with 45% 45% 10%	28
	Existing stand volume +10%	29
	Existing stand volume -10%	30
	Regenerated stand volume +10%	31
	Regenerated stand volume -10%	32
	Minimum cover constraint percentages +10%	33
	Minimum cover constraint percentages -10%	34
	Minimum harvest age +10 years	35
	Minimum harvest age -10 years	36
	Green-up heights +2 metres	37
	Green-up heights –2 metres	38
	Landbase increased by 10%	39
	Landbase decreased by 10%	40
	Add marginal area to timber harvesting landbase	41
	No wildlife tree patches	42
	Reducing old seral stage by 50 years	43
	Combined effects of factors shown on run #s 31, 34, 38 and OGSI adjusted	44
	Combined effect of factors shown on run #s 32, 33, 37 and OGSI non-adjusted	45
	TSR 1998 requirements	46

5.1 THE THEORETICAL RANGE OF HARVESTS

In TFL 55 there is a very wide range of harvest rates from which to choose. The highest long run harvest level produced in this analysis was 157,710 cubic metres per year, from run number 1. The lowest was 47,010 cubic metres per year from run number 45.

Figure 4 shows this range from lowest to highest rates of harvest.

Figure 4: TFL 55 – Theoretical Range of Annual Harvests



As figure 4 shows, there is a wide theoretical range of choices setting the rate of harvest for TFL 55. Each choice is supported by a different combination of landbase and assumptions.

5.2 OPTION 1 - THE GROSS PRODUCTIVE LANDBASE

The gross productive landbase includes all the land under continuous forest cover plus recently logged land. To calculate a potential/theoretical timber supply, non-commercial, deciduous areas and existing and future roads were excluded from the gross productive landbase. In predicting yields for this landbase, site index adjustments were made for all species of which adjustments have been derived. When no cover constraints are applied to this landbase, the annual maximum even flow harvest is 157,710 cubic meters. This is run #1 in table 7. This number represents a theoretical maximum harvest schedule.

5.3 OPTION 2 – CURRENT MANAGEMENT

5.3.1 Basecase

The current management landbase includes the land on which logging can take place, after removals from the timber harvesting landbase have been made. The removals in this analysis includes inoperable areas, non-commercial cover, low sites, deciduous areas, non-merchantable areas, terrain, alpine tundra, riparian reserves and management zones, unclassified roads, trails and landings, wildlife tree patches, and not sufficiently restocked areas.

Under the green-up, adjacency and biodiversity rules applied in this analysis, and shown in table 29A and 29b in the information package, the basecase harvest pattern was calculated with an initial harvest target for the first 10 years, of 90,000 cubic meters per year. After that it was followed by a step down in harvest levels to a long run harvest level, 64,410 cubic meters per year. Figure 5 shows the current harvest pattern and its comparison with the basecase in the previous yield analysis.

The current management basecase run included all the structures and constraints contained in the MAC report. An important result of this run is:

The initial harvest level can be no higher than 90,000 cubic metres per year, if future stepdowns are limited to 10% per decade.

This initial rate of harvest is 10,000 cubic metres per year lower than the present allowable annual cut. In this basecase, all OGSI adjustments were applied.

Figure 5: Comparison of Previous and Current Basecase Runs

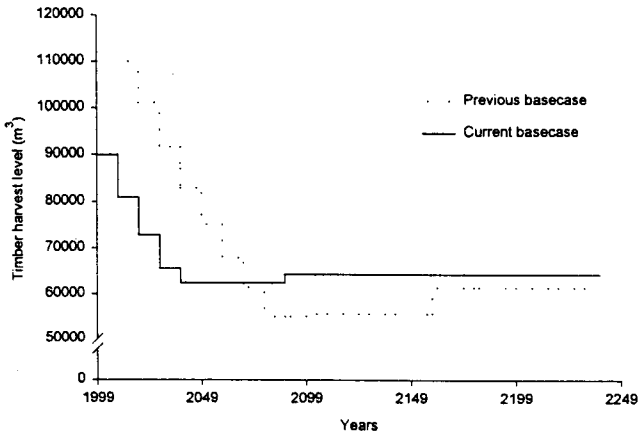


Table 8: Comparison of Previous and Current Basecase Runs – cubic metres harvested per year (net of non-recoverable losses)

Decade	Previous Basecase (a)	Basecase		
		Current (b)	Difference (a-b)	% change (a-b)/a*100
1	110,000	90,000	20,000	18.2
2	110,000	81,000	29,000	26.4
3	101,113	72,900	28,213	27.9
4	91,618	65,610	26,008	28.4
5	82,985	62,460	20,525	24.7
6	75,138	62,460	12,678	16.9
7	68,004	62,460	5,544	8.2
8	61,518	62,460	-942	-1.5
9	55,036	62,460	-7,424	-13.5
10	55,036	64,410	-9,374	-17.0
11	55,662	64,410	-8,748	-15.7
12	55,662	64,410	-8,748	-15.7
13	55,662	64,410	-8,748	-15.7
14	55,662	64,410	-8,748	-15.7
15	55,662	64,410	-8,748	-15.7
16	55,662	64,410	-8,748	-15.7
17	61,487	64,410	-2,923	-4.8
18	61,487	64,410	-2,923	-4.8
19	61,487	64,410	-2,923	-4.8
20	61,487	64,410	-2,923	-4.8
21	61,487	64,410	-2,923	-4.8
22	61,487	64,410	-2,923	-4.8
23	61,487	64,410	-2,923	-4.8
24	61,487	64,410	-2,923	-4.8
25	61,487	64,410	-2,923	-4.8
250 Year Total	**1,697,803**	**1,652,370**	**45,433**	**2.7**

5.3.1.1 Distributions of Harvested Age, Area and Volume

This section displays statistical results, from the basecase harvest on the current management landbase. The figures presented are:

Figure 6: Harvested average age per decade.
Figure 7: Distribution of harvested area by age class per decade.
Figure 8: Distribution of predicted inventory area by age class per decade.
Figure 9: Total harvested area per decade.
Figure 10: Harvested average volume per hectare for each decade.

Figure 6: Harvested Average Age Per Decade

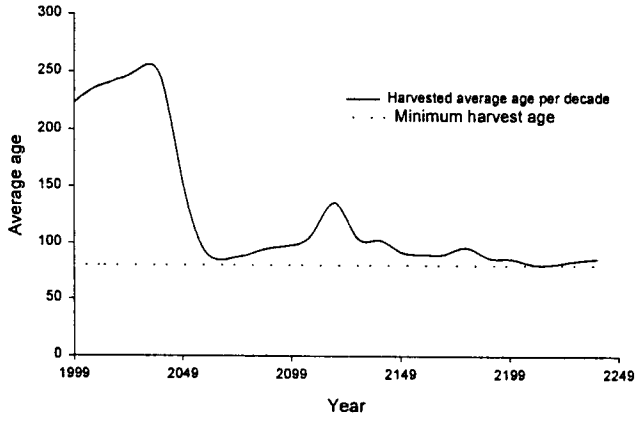


Figure 7: Distribution of Harvested Area by Age Class Per Decade

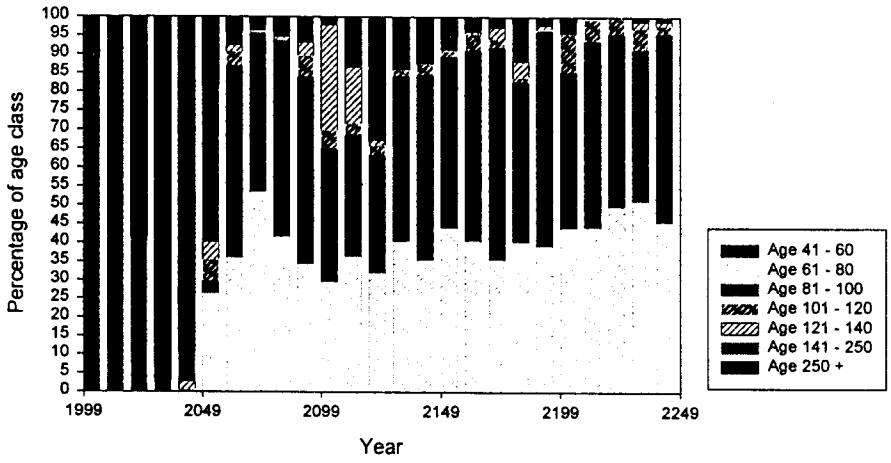


Figure 8: Distribution of Predicted Inventory Area by Age Class Per Decade

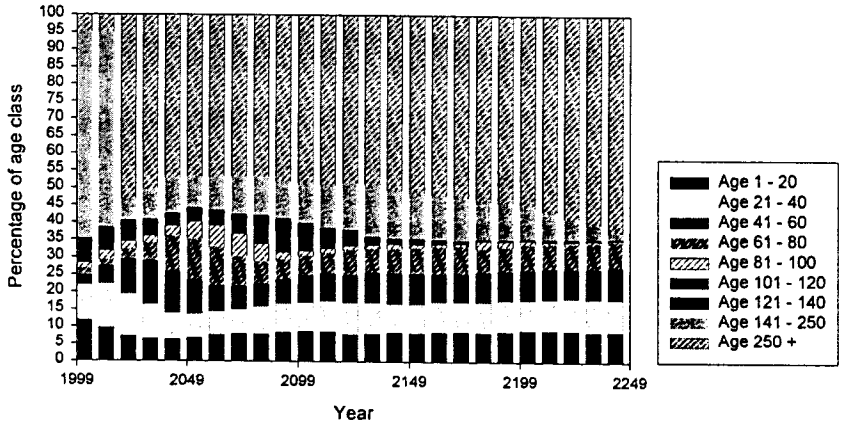


Figure 9: Total Harvested Area Per Decade

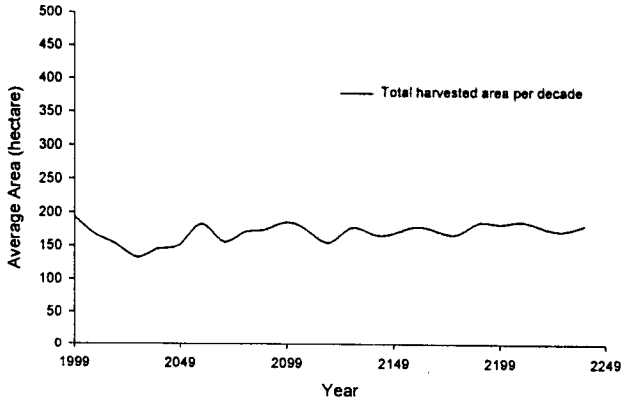
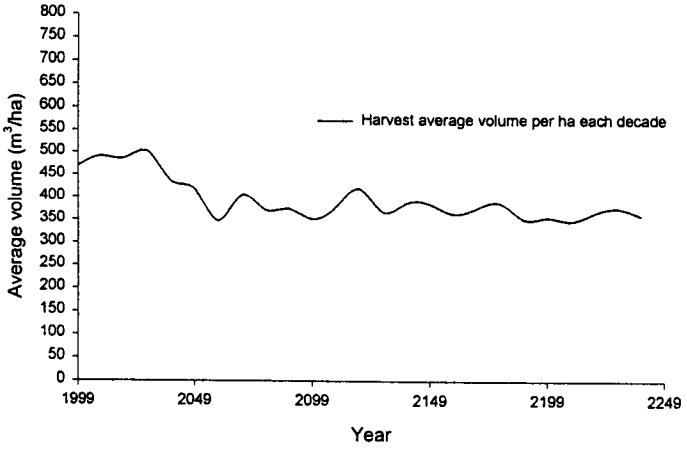


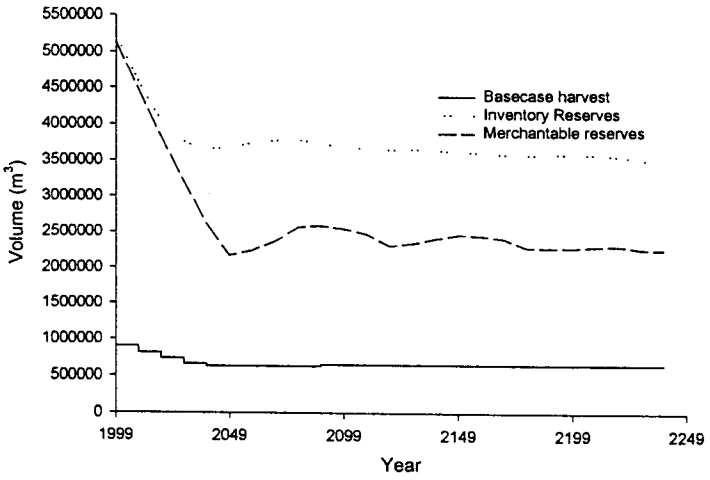
Figure 10: Harvested Average Volume Per Hectare for Each Decade



5.3.1.2 Standing Reserves of Green Timber

The trees that are not harvested are continually growing and provide standing reserves of green timber. Figure 11 provides information on these timber reserves.

Figure 11: Current Management Basecase: Projected Inventory and Merchantable Volume Reserves compared with the Basecase Harvest Removals



The top line in figure 11 shows the standing volume of timber at any time in the timber harvesting landbase for all age classes. This volume includes timber not yet ready for harvest and harvestable timber. The second line presents the merchantable timber volume. The bottom line shows the total volume of timber harvested in each decade.

Figure 11 shows that, for the option 2 basecase, over the 250 year time horizon standing reserves of merchantable timber always represent at least 40 years of harvest.

5.3.1.3 Distribution of Seral Stages

In TFL 55 there are three resource landscape units, four biogeoclimatic subzones and one natural disturbance type. Table 4 presents the landscape biodiversity requirements used in the timber supply analysis.

Appendix I shows the results of meeting the MAC's requirements of seral stages for both the forested area and the operable landbase, when the basecase harvest is taken from the current management landbase. There are 50 groups that represent landscape biodiversity requirements detailed in table 4. For each group there is a graph showing the proportion of mature plus old and old growth on the forested area and the operable landbase, respectively, maintained by the computer model. The proportions achieved during the base run can be compared with the minimum targets listed in table 4.

5.3.1.4 Green-up Constraints

In the computer model, green-up and adjacency constraints are modelled as follows:

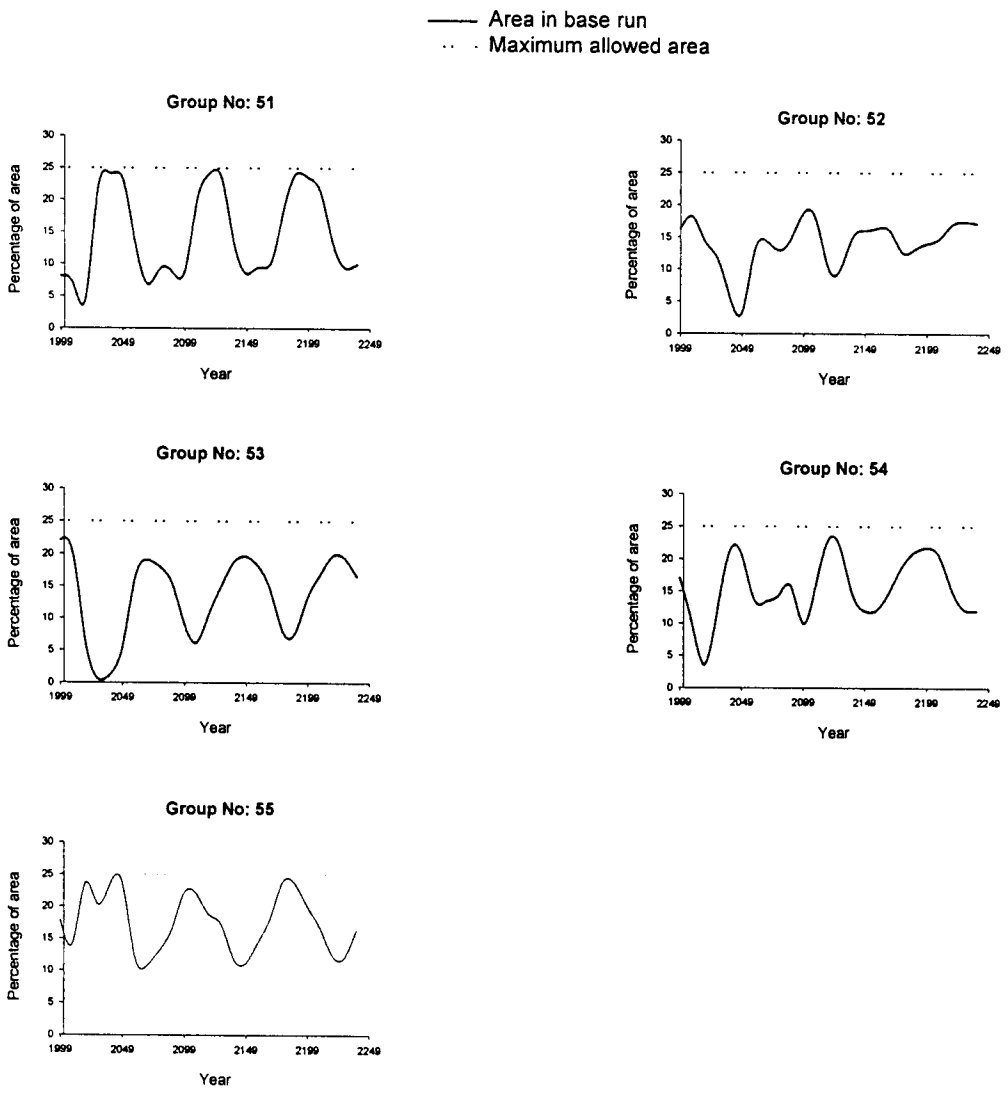
1. a green-up period after logging is defined during which time the new replacement stands are expected to reach a specified height.

2. a maximum allowable area is defined for replacement stands that are below the green-up height specified in (1) above.

The allowable area, expressed as a percentage, implies a specific multipass logging system. The green up period is the time between passes. A green-up period of 15 years with a four pass logging system implies a 60-year period in which to harvest presently mature timber.

Maximum age or green-up constraints were expressed in terms of the net landbase. The five groups of maximum age constraints with equivalent green-up heights are shown in table 5. Figure 12 shows the actual compared with the maximum allowable areas less than green-up age that were produced by the computer model during the basecase harvest run for the current management landbase. The group numbers in figure 12 correspond with those shown in table 5. In no case was the maximum allowable area to be harvested exceeded.

Figure 12: Option 2 – Percentages of Areas Below Green-up Age for Basecase



5.3.2 Sensitivity Analyses for the Current Management Option

Sensitivity analysis is a way to see how sensitive the harvest schedule is to assumptions about landbase, forest yield and other assumptions that affect the projected harvest levels.

Tables 9 - 13 summarize the sensitivity analysis results and also show that projected harvests are most sensitive to:

- changes in the regenerated stand volume estimates including those caused by OGSI adjustments,
- changes in the landbase,
- changes in forest cover constraints.

In this section sensitivity analyses are first done by varying only one factor at a time. Then, using those single factors which proved to have significant impacts on the results, sensitivity runs combining several factors are presented.

A difference (%) between the basecase (a) and each option (b) is calculated by using a formula of difference (%) = 100*(a-b)/a.

5.3.2.1 Sensitivity Analyses for Different Yield Assumptions

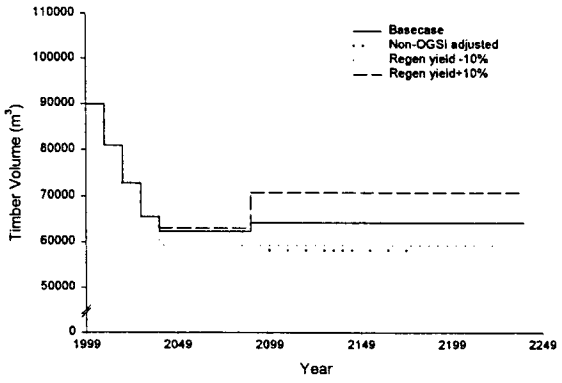
Sensitivity analyses of yield options in table 9 show that projected harvests are significantly impacted by old growth site index adjustments and ±10% changes to regeneration yields. Changes to existing yields have impact on short term of timber harvests. Figure 13 shows a comparison of the basecase and yield options.

Table 9: Sensitivity Analyses for Different Yield Assumptions (m^3 per year)

Decade	Base case	No OGSI Adjustment	Existing Stand Volume +10%	Existing Stand Volume -10%	Regen stand Volume +10%	Regen stand volume-10%
1	90,000	90,000	90,000	81,000	90,000	90,000
2	81,000	81,000	90,000	72,900	81,000	81,000
3	72,900	72,900	81,000	65,610	72,900	72,900
4	65,610	65,610	72,900	59,310	65,610	65,610
5	62,460	59,049	65,610	59,310	63,210	59,310
6	62,460	58,260	64,810	59,310	63,210	59,310
7	62,460	58,260	64,810	60,610	63,210	59,310
8	62,460	58,260	64,810	60,610	63,210	59,310
9	62,460	58,260	64,810	60,610	63,210	59,310
10	64,410	58,260	64,810	64,410	70,910	59,310
11	64,410	58,260	64,810	64,410	70,910	59,310
12	64,410	58,260	64,810	64,410	70,910	59,310
13	64,410	58,260	64,810	64,410	70,910	59,310
14	64,410	58,260	64,810	64,410	70,910	59,310
15	64,410	58,260	64,810	64,410	70,910	59,310
16	64,410	58,260	64,810	64,410	70,910	59,310
17	64,410	58,260	64,810	64,410	70,910	59,310
18	64,410	58,260	64,810	64,410	70,910	59,310
19	64,410	58,260	64,810	64,410	70,910	59,310
20	64,410	58,260	64,810	64,410	70,910	59,310
21	64,410	58,260	64,810	64,410	70,910	59,310
22	64,410	58,260	64,810	64,410	70,910	59,310
23	64,410	58,260	64,810	64,410	70,910	59,310
24	64,410	58,260	64,810	64,410	70,910	59,310
25	64,410	58,260	64,810	64,410	70,910	59,310
Total	**1,652,370**	**1,533,759**	**1,695,710**	**1,609,830**	**1,760,120**	**1,555,020**
Diff (%)*		**7.2**	**-2.6**	**2.6**	**-6.5**	**5.9**

* diff(%) is a difference between the basecase and the result of each option

Figure 13: Comparison of Basecase and Varying Yield Assumptions



5.3.2.2 Sensitivity Analyses of Harvest Assumptions

Table 10 shows that increasing the minimum harvest age by ten years causes a drop in the short term harvest level.

Table 10: Sensitivity Analyses of Harvest Method Options

Decade	Base case	Minimum harvest age +10 years	Minimum harvest age -10 years	Maximum Initial Level
1	90,000	81,000	90,000	90,000
2	81,000	72,900	81,000	81,000
3	72,900	65,610	72,900	72,900
4	65,610	60,310	65,610	65,610
5	62,460	60,310	63,210	62,460
6	62,460	60,310	63,210	62,460
7	62,460	60,310	63,210	62,460
8	62,460	60,310	63,210	62,460
9	62,460	60,310	63,210	62,460
10	64,410	67,810	63,210	64,410
11	64,410	67,810	63,210	64,410
12	64,410	67,810	63,210	64,410
13	64,410	67,810	63,210	64,410
14	64,410	67,810	63,210	64,410
15	64,410	67,810	63,210	64,410
16	64,410	67,810	63,210	64,410
17	64,410	67,810	63,210	64,410
18	64,410	67,810	63,210	64,410
19	64,410	67,810	63,210	64,410
20	64,410	67,810	63,210	64,410
21	64,410	67,810	63,210	64,410
22	64,410	67,810	63,210	64,410
23	64,410	67,810	63,210	64,410
24	64,410	67,810	63,210	64,410
25	64,410	67,810	63,210	64,410
Total	**1,652,370**	**1,666,330**	**1,636,920**	**1,652,370**
Diff(%)*		**-0.8**	**0.9**	**0.0**

* diff(%) is a difference between the basecase and the result of each option

5.3.2.3 Sensitivity analyses of landbase options

Changing the harvesting landbase areas significantly impacts on the short and long term timber harvests. In table 11, changes to the landbase cause more significant impacts than other changes such as non-wildlife tree patches, adding marginal area in the timber harvest landbase, or confining harvesting to the conventional landbase.

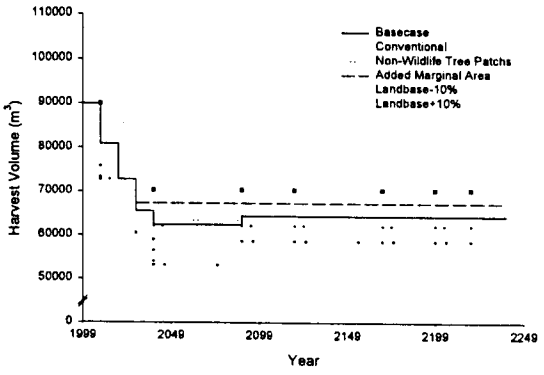
Figure 14 presents a comparison of the results from table 11.

Table 11: Sensitivity Analyses of Different Landbase Assumptions (m^3 per year)

Decade	Base case	Landbase +10%	Landbase -10%	Non-Wildlife Tree Patches	Added in Marginal	Conventional only
1	90,000	90,000	81,000	90,000	90,000	81,000
2	81,000	90,000	72,900	81,000	81,000	72,900
3	72,900	81,000	65,610	72,900	72,900	65,610
4	65,610	72,900	59,049	65,610	67,410	62,210
5	62,460	70,410	53,144	63,510	67,410	62,210
6	62,460	70,410	53,144	63,510	67,410	62,210
7	62,460	70,410	53,144	63,510	67,410	62,210
8	62,460	70,410	53,144	63,510	67,410	62,210
9	62,460	70,410	53,144	63,510	67,410	62,210
10	64,410	70,410	58,710	64,510	67,410	62,210
11	64,410	70,410	58,710	64,510	67,410	62,210
12	64,410	70,410	58,710	64,510	67,410	62,210
13	64,410	70,410	58,710	64,510	67,410	62,210
14	64,410	70,410	58,710	64,510	67,410	62,210
15	64,410	70,410	58,710	64,510	67,410	62,210
16	64,410	70,410	58,710	64,510	67,410	62,210
17	64,410	70,410	58,710	64,510	67,410	62,210
18	64,410	70,410	58,710	64,510	67,410	62,210
19	64,410	70,410	58,710	64,510	67,410	62,210
20	64,410	70,410	58,710	64,510	67,410	62,210
21	64,410	70,410	58,710	64,510	67,410	62,210
22	64,410	70,410	58,710	64,510	67,410	62,210
23	64,410	70,410	58,710	64,510	67,410	62,210
24	64,410	70,410	58,710	64,510	67,410	62,210
25	64,410	70,410	58,710	64,510	67,410	62,210
Total	**1,652,370**	**1,812,510**	**1,483,639**	**1,659,220**	**1,726,920**	**1,588,130**
Diff(%)*		**-9.7**	**10.2**	**-0.4**	**-4.5**	**3.9**

* diff(%) is a difference between the basecase and the result of each option

Figure 14: Comparison of Basecase and Different Landbase Assumptions



5.3.2.4 Sensitivity Analyses of Different Forest Cover Constraint Assumptions

Forest cover assumptions were varied in four ways:

1. changing green-up height,
2. changing the % area allowed,
3. changing seral stage requirements,
4. replacing MAC forest cover requirements with those used in the previous TSR for the Arrow Lake TSA.

Changing the % area less than green-up height had moderate effect on projected harvests. However, replacing the MAC forest cover constraints with those of the previous TSA had a huge effect. **Of all sensitivity analyses, using the TSR cover constraints had by far the largest impact on projected harvests**. As table 12 shows, using TSR cover constraints:

- increased the harvest in the first two decades by 17%,
- increased the long term harvest level by 26%.

Figure 16 graphs the results of table 12.

Table 12: Sensitivity Analyses of Different Forest Cover Constraint Assumptions

Decade	Basecase	Green-up Height +2m	Green-up Height -2m	Forest Cover Area Percent +10%	Forest Cover Area Percent -10%	Seral Stage 45%45%10%	Old Seral Stage –50 years	TSR's forest cover constraints
1	90,000	77,516	90,000	81,000	90,000	90,000	90,000	100,000
2	81,000	81,000	81,000	72,900	90,000	81,000	81,000	100,000
3	72,900	72,900	72,900	65,610	81,000	72,900	72,900	90,000
4	65,610	65,610	66,110	61,210	72,900	65,610	65,610	81,010
5	62,460	59,049	66,110	61,210	65,610	62,210	64,110	81,010
6	62,460	51,521	66,110	61,210	63,710	62,210	64,110	81,010
7	62,460	53,144	66,110	61,210	63,710	62,210	64,110	81,010
8	62,460	53,144	66,110	61,210	63,710	62,210	64,110	81,010
9	62,460	53,144	66,110	61,210	63,710	62,210	64,110	81,010
10	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
11	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
12	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
13	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
14	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
15	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
16	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
17	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
18	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
19	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
20	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
21	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
22	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
23	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
24	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
25	64,410	64,410	66,110	61,810	67,810	64,410	64,510	81,010
Total	1,652,370	1,597,588	1,698,320	1,575,730	1,739,310	1,651,120	1,662,220	2,072,220
Diff(%)*		3.3	-2.8	4.6	-5.3	0.1	-0.6	-25.4

* diff(%) is a difference between the basecase and the result of each option

Figure 15 below shows that the impact of MAC cover constraints is to lock up harvestable timber that is available for harvest under TSR cover constraints.

Figure 15: Merchantable Timber Unavailable for Harvest Under MAC and TSR Constraints

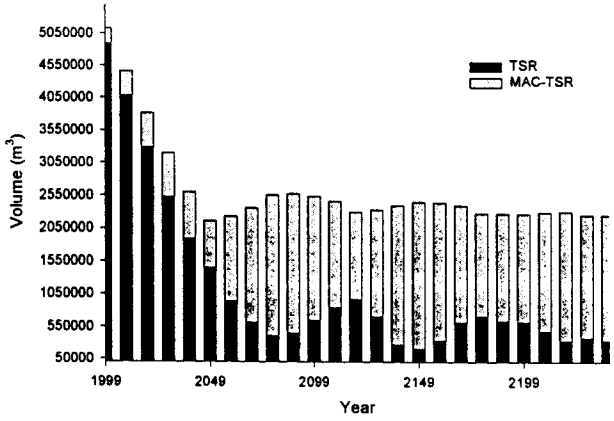
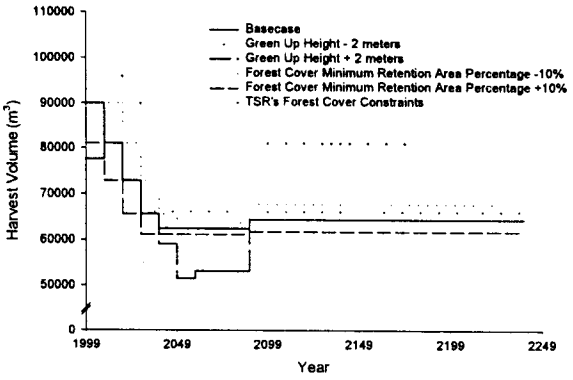


Figure 16: Comparison of Basecase and Different Forest Cover Constraint Assumptions



5.3.2.5 Sensitivity Analyses of Combined Effects of the Factors

Table 13 shows that, including OGSI adjustments, increasing regenerated yields and the timber harvesting landbase by 10% each, and reducing the minimum forest cover requirements by 10%, produced increased harvests vary similar to those obtained simply by using TSR cover

constraints. Under MAC, this result may represent the maximum projected harvest that could be expected.

Table 13 also shows the effect of excluding OGSI adjustments, reducing regenerated yields and the timber harvesting landbase by 10% each, and raising the minimum forest cover requirements by 10%. The result is a 19% reduction in harvest for the first two decades and a 27% reduction in the long term harvest relative to the basecase. This result may represent the minimum harvest level that could be expected under MAC.

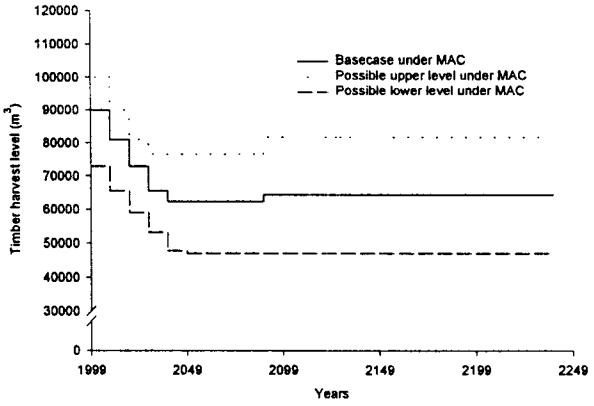
Figure 17 graphs the results of table 13.

Table 13: Sensitivity Analyses of Combined Effects of the Factors

Decade	Basecase	Landbase+10% Forest Cover Area –10% Regeneration Yield +10% OGSI adjusted	Landbase-10% Forest Cover Area +10% Regeneration Yield -10% No OGSI adjusted
1	90,000	100,000	72,900
2	81,000	90,000	65,610
3	72,900	81,000	59,049
4	65,610	76,610	53,144
5	62,460	76,610	47,830
6	62,460	76,610	47,010
7	62,460	76,610	47,010
8	62,460	76,610	47,010
9	62,460	76,610	47,010
10	64,410	81,760	47,010
11	64,410	81,760	47,010
12	64,410	81,760	47,010
13	64,410	81,760	47,010
14	64,410	81,760	47,010
15	64,410	81,760	47,010
16	64,410	81,760	47,010
17	64,410	81,760	47,010
18	64,410	81,760	47,010
19	64,410	81,760	47,010
20	64,410	81,760	47,010
21	64,410	81,760	47,010
22	64,410	81,760	47,010
23	64,410	81,760	47,010
24	64,410	81,760	47,010
25	64,410	81,760	47,010
Total	1,652,370	2,038,820	1,238,733
Diff(%)*		-23.4	25.0

* diff(%) is a difference between the basecase and the result of each option

Figure 17: Comparison of Basecase Harvest and Varying Several Assumptions Together



5.4 OPTION 3 - MOF OPTION

5.4.1 Basecase

All the assumptions of the MoF option are the same as those of the current management except that no OGSI adjustments were made to its regenerated yield curves. Figures 18 and table 14 present a comparison of basecases for the previous yield analysis, and the current management and MoF options from the yield analysis described in this report.

Figure 18: Comparison of Previous and Current and MoF Basecases

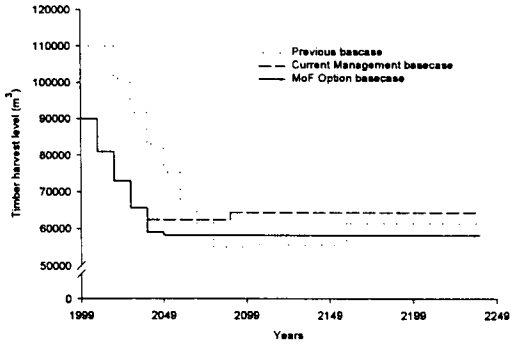


Table 14: Comparison of Previous, Current and MoF Basecase Runs (m^3/year) (net of non-recoverable losses)

Decade	MoF basecase (a)	Previous (b)	Difference (b-a)	% change (b-a)/b*100	Current (c)	Difference (c-a)	% change (c-a)/c*100
1	90,000	110,000	20,000	18.2	90,000	0	0.0
2	81,000	110,000	29,000	26.4	81,000	0	0.0
3	72,900	101,113	28,213	27.9	72,900	0	0.0
4	65,610	91,618	26,008	28.4	65,610	0	0.0
5	59,049	82,985	23,936	28.8	62,460	3,411	5.5
6	58,260	75,138	16,878	22.5	62,460	4,200	6.7
7	58,260	68,004	9,744	14.3	62,460	4,200	6.7
8	58,260	61,518	3,258	5.3	62,460	4,200	6.7
9	58,260	55,036	-3,224	-5.9	62,460	4,200	6.7
10	58,260	55,036	-3,224	-5.9	64,410	6,150	9.5
11	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
12	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
13	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
14	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
15	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
16	58,260	55,662	-2,598	-4.7	64,410	6,150	9.5
17	58,260	61,487	3,227	5.2	64,410	6,150	9.5
18	58,260	61,487	3,227	5.2	64,410	6,150	9.5
19	58,260	61,487	3,227	5.2	64,410	6,150	9.5
20	58,260	61,487	3,227	5.2	64,410	6,150	9.5
21	58,260	61,487	3,227	5.2	64,410	6,150	9.5
22	58,260	61,487	3,227	5.2	64,410	6,150	9.5
23	58,260	61,487	3,227	5.2	64,410	6,150	9.5
24	58,260	61,487	3,227	5.2	64,410	6,150	9.5
25	58,260	61,487	3,227	5.2	64,410	6,150	9.5
250 Year Total	**1,533,759**	**1,697,803**	**164,044**	**9.7**	**1,652,370**	**118,611**	**7.2**

The basecase run in the previous yield analysis projected a short term harvest level of 110,000 cubic metres per year. This declined to 55,662 cubic metres in the ninth decade, rising to a long run harvest level of 61,487. In this analysis, the basecase runs for both current management and MoF options start at 90,00 cubic metres per year. By the fourth decade the projected harvests in both decline to 65,610 cubic metres per year. The current management option eventually produces a long term harvest level of 64,410 cubic metres per year. The MoF option declines further, eventually producing a long term harvest level of 58,260 cubic metres per year; ten percent below the current management option. This difference is caused by not using OGSI adjustments in the MoF option.

5.4.1.1 Distributions of Harvested Age, Area and Volume

This section displays statistical results, from the basecase in the MoF option. The figures presented are:

Figure 19: Average harvest age.
Figure 20: Areas harvested by age class.
Figure 21: Areas remaining in the inventory by age class.
Figure 22: Total harvested area per decade.
Figure 23: Harvested average volume per hectare each decade.

Figure 19: Average Harvest Age

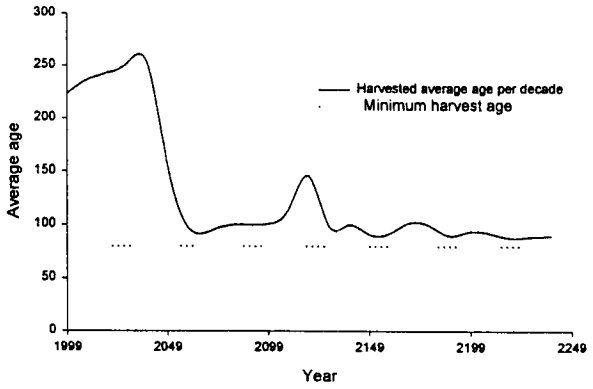


Figure 20: Areas Harvested by Age Class

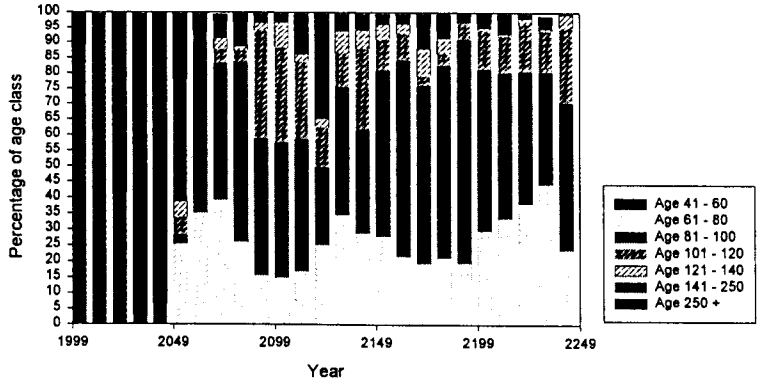


Figure 21: Areas Remaining in the Inventory by Age Class

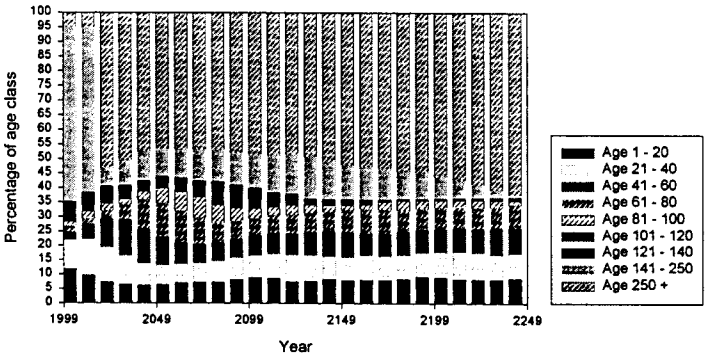


Figure 22: Total Harvested Area Per Decade

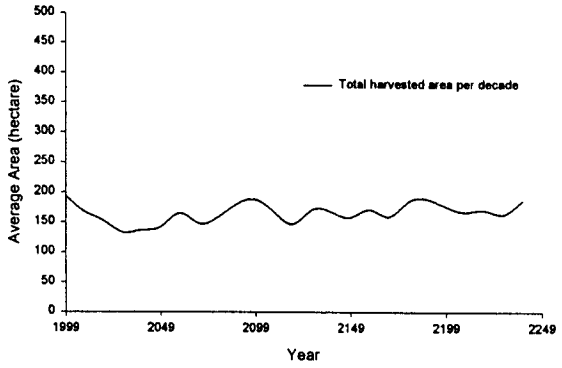
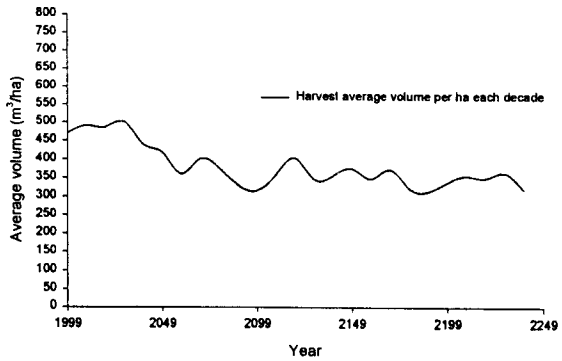


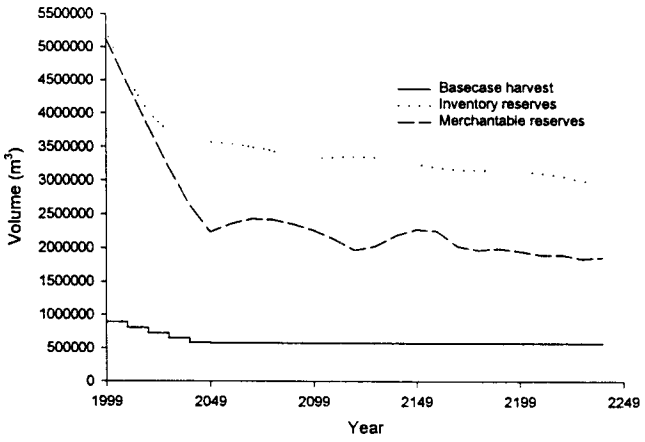
Figure 23: Harvested Average Volume Per Hectare Each Decade



5.4.1.2 Standing Reserves of Green Timber

Figure 24 provides information on the timber reserves that the trees are not harvested and are continuing to grow.

Figure 24: MoF Basecase Projected Inventory and Merchantable Volume Reserves compared with the Basecase Harvest Removals



The top line in the graphs in figure 24 shows the standing volume of timber at any time in the timber harvesting landbase for all age classes. This volume includes timber not yet ready for harvest and harvestable timber. The second line presents the merchantable timber volume. The bottom line shows the total volume of timber harvested in each decade. Over the 250 year horizon, there is always at least 34 years of timber harvest in merchantable reserves of timber.

5.4.1.3 Distribution of Seral Stages / Green-up Constraints

In the MoF option, assumptions of forest cover constraints are the same as those on the current management.

The details of the distribution of both seral stages and green-up constraints can be described in the same way as those at section 5.3.13, section 5.3.14 and appendix I. These constraints were all met by the computer model, just as they were in the current management option. It is not necessary to repeat the detail of appendix I for the MoF option.

5.4.2 Sensitivity Analyses of the MoF Option

The sensitivity analyses for the MoF option are the same runs for the current management option. Tables 15 - 19 summarize the sensitivity analysis results that show most sensitive to:

- changes in the stand volume estimates including OGSI adjustments,
- changes in the landbase,
- changes in forest cover constraints, and
- combined effects of the factors shown on the above three changes.

5.4.2.1 Sensitivity Analyses of Yield Options

Table 15 shows the results of the sensitivity analyses of different yield assumptions. Figure 25 shows a comparison of the basecase and the sensitivity analyses.

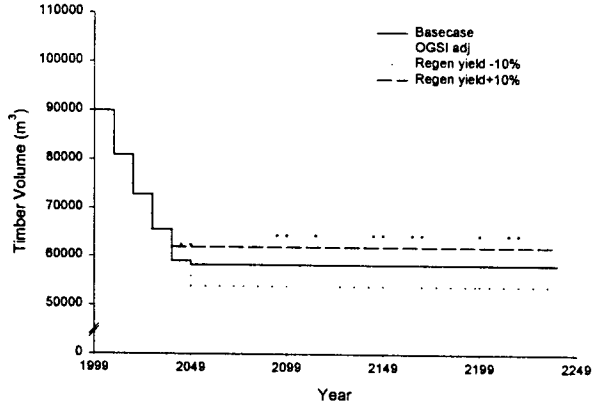
Table 15: Sensitivity Analyses of Different Yield Assumptions (m^3/year)

Decade	Base case	OGSI Adjustment	Existing stand volume+10%	Existing stand volume-10%	Regen stand volume+10%	Regen stand volume-10%
1	90,000	90,000	90,000	81,000	90,000	90,000
2	81,000	81,000	90,000	72,900	81,000	81,000
3	72,900	72,900	81,000	65,610	72,900	72,900
4	65,610	65,610	72,900	59,049	65,610	65,610
5	59,049	62,460	65,610	57,910	62,010	59,049
6	58,260	62,460	59,049	57,910	62,010	53,910
7	58,260	62,460	58,910	57,910	62,010	53,910
8	58,260	62,460	58,910	57,910	62,010	53,910
9	58,260	62,460	58,910	57,910	62,010	53,910
10	58,260	64,410	58,910	57,910	62,010	53,910
11	58,260	64,410	58,910	57,910	62,010	53,910
12	58,260	64,410	58,910	57,910	62,010	53,910
13	58,260	64,410	58,910	57,910	62,010	53,910
14	58,260	64,410	58,910	57,910	62,010	53,910
15	58,260	64,410	58,910	57,910	62,010	53,910
16	58,260	64,410	58,910	57,910	62,010	53,910
17	58,260	64,410	58,910	57,910	62,010	53,910
18	58,260	64,410	58,910	57,910	62,010	53,910
19	58,260	64,410	58,910	57,910	62,010	53,910
20	58,260	64,410	58,910	57,910	62,010	53,910
21	58,260	64,410	58,910	57,910	62,010	53,910
22	58,260	64,410	58,910	57,910	62,010	53,910
23	58,260	64,410	58,910	57,910	62,010	53,910
24	58,260	64,410	58,910	57,910	62,010	53,910
25	58,260	64,410	58,910	57,910	62,010	53,910
Total	**1,533,759**	**1,652,370**	**1,577,849**	**1,494,669**	**1,611,720**	**1,446,759**
Diff (%)*		**-7.7**	**-2.9**	**2.5**	**-5.1**	**5.7**

* diff(%) is a difference between the basecase and the result of each option

Table 15 shows the results are sensitive to OGSI adjustments and changing regenerated stand volumes. As expected, including OGSI adjustments is the same as the basecase for the current management option.

Figure 25: Comparison of Basecase and Yield Assumption Sensitivity Analyses



5.4.2.2 Sensitivity Analyses of Harvest Method Assumptions

Table 16 shows that increasing the minimum harvest age by ten years reduces the short and mid term harvests.

Table 16: Sensitivity Analyses of Harvest Method Options

Decade	Base case	Minimum harvest age +10 years	Minimum harvest age -10 years	Maximum Initial Level
1	90,000	81,000	90,000	90,000
2	81,000	72,900	81,000	81,000
3	72,900	65,610	72,900	72,900
4	65,610	59,049	65,610	65,610
5	59,049	58,210	59,049	59,049
6	58,260	58,210	58,010	58,260
7	58,260	58,210	58,010	58,260
8	58,260	58,210	58,010	58,260
9	58,260	58,210	58,010	58,260
10	58,260	58,210	58,010	58,260
11	58,260	58,210	58,010	58,260
12	58,260	58,210	58,010	58,260
13	58,260	58,210	58,010	58,260
14	58,260	58,210	58,010	58,260
15	58,260	58,210	58,010	58,260
16	58,260	58,210	58,010	58,260
17	58,260	58,210	58,010	58,260
18	58,260	58,210	58,010	58,260
19	58,260	58,210	58,010	58,260
20	58,260	58,210	58,010	58,260
21	58,260	58,210	58,010	58,260
22	58,260	58,210	58,010	58,260
23	58,260	58,210	58,010	58,260
24	58,260	58,210	58,010	58,260
25	58,260	58,210	58,010	58,260
Total	**1,533,759**	**1,500,969**	**1,528,759**	**1,533,759**
Diff(%)*		**2.1**	**0.3**	**0.0**

* diff(%) is a difference between the basecase and the result of each option

5.4.2.3 Sensitivity Analyses of Landbase Assumptions

Table 17 shows that, of the different landbase assumptions examined, increasing or decreasing the landbase by ten percent has the largest impact.

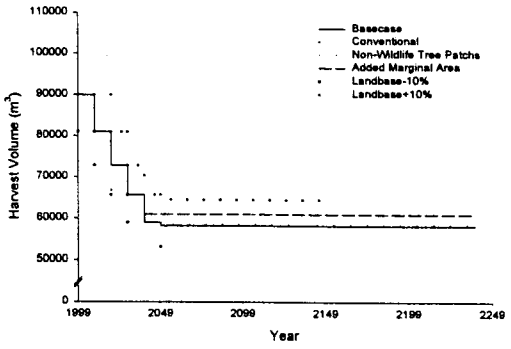
Figure 26 presents a comparison of the results from table 17.

Table 17: Sensitivity Analyses of Landbase Options

Decade	Basecase	Landbase +10%	Landbase -10%	Non-Wildlife Tree Patches	Added in Marginal	Conventional only
1	90,000	90,000	81,000	90,000	90,000	81,000
2	81,000	90,000	72,900	81,000	81,000	72,900
3	72,900	81,000	65,610	72,900	72,900	65,610
4	65,610	72,900	59,049	65,610	65,610	59,049
5	59,049	65,610	53,144	59,049	60,910	56,510
6	58,260	64,410	52,310	58,610	60,910	56,510
7	58,260	64,410	52,310	58,610	60,910	56,510
8	58,260	64,410	52,310	58,610	60,910	56,510
9	58,260	64,410	52,310	58,610	60,910	56,510
10	58,260	64,410	52,310	58,610	60,910	56,510
11	58,260	64,410	52,310	58,610	60,910	56,510
12	58,260	64,410	52,310	58,610	60,910	56,510
13	58,260	64,410	52,310	58,610	60,910	56,510
14	58,260	64,410	52,310	58,610	60,910	56,510
15	58,260	64,410	52,310	58,610	60,910	56,510
16	58,260	64,410	52,310	58,610	60,910	56,510
17	58,260	64,410	52,310	58,610	60,910	56,510
18	58,260	64,410	52,310	58,610	60,910	56,510
19	58,260	64,410	52,310	58,610	60,910	56,510
20	58,260	64,410	52,310	58,610	60,910	56,510
21	58,260	64,410	52,310	58,610	60,910	56,510
22	58,260	64,410	52,310	58,610	60,910	56,510
23	58,260	64,410	52,310	58,610	60,910	56,510
24	58,260	64,410	52,310	58,610	60,910	56,510
25	58,260	64,410	52,310	58,610	60,910	56,510
Total	**1,533,759**	**1,687,710**	**1,377,903**	**1,540,759**	**1,588,620**	**1,465,269**
Diff(%)*		**-10.0**	**10.2**	**-0.5**	**-3.6**	**4.5**

* diff(%) is a difference between the basecase and the result of each option

Figure 26: Comparison of Basecase and Landbase Assumptions



5.4.2.4 Sensitivity Analyses of Forest Cover Constraint Assumptions

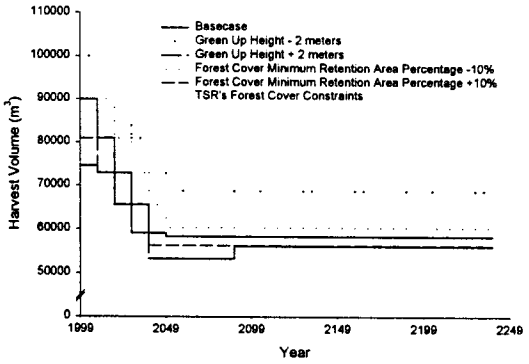
Table 18 shows the results of sensitivity analyses for different forest cover constraint assumptions. Reducing the definition of old seral stage by 50 years has a negligible effect. Using the previous TSR cover constraints has a large positive effect on short and long term harvests.

Table 18: Sensitivity Analyses of Forest Cover Constraint Assumptions

Decade	Basecase	Green-up Height +2m	Green-up Height -2m	Forest Cover Area Percent +10%	Forest Cover Area Percent -10%	Seral Stage 45%45%10 %	Old Seral Stage –50 years	TSR's forest cover constraints
1	90,000	74,572	90,000	81,000	90,000	90,000	90,000	100,000
2	81,000	72,900	81,000	72,900	90,000	81,000	81,000	100,000
3	72,900	65,610	72,900	65,610	81,000	72,900	72,900	90,000
4	65,610	59,049	65,610	59,049	72,900	65,610	65,610	81,000
5	59,049	53,144	59,049	56,210	65,610	59,049	59,049	72,900
6	58,260	53,144	58,310	56,210	60,310	58,310	58,310	68,810
7	58,260	53,144	58,310	56,210	60,310	58,310	58,310	68,810
8	58,260	53,144	58,310	56,210	60,310	58,310	58,310	68,810
9	58,260	53,144	58,310	56,210	60,310	58,310	58,310	68,810
10	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
11	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
12	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
13	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
14	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
15	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
16	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
17	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
18	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
19	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
20	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
21	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
22	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
23	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
24	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
25	58,260	56,010	58,310	56,210	60,310	58,310	58,310	68,810
Total	**1,533,759**	**1,434,011**	**1,534,759**	**1,458,969**	**1,605,710**	**1,534,759**	**1,534,759**	**1,820,100**
Diff(%)*		**6.5**	**-0.1**	**4.9**	**-4.7**	**-0.1**	**-0.1**	**-18.7**

* diff(%) is a difference between the basecase and the result of each option

Figure 27: Comparison of the Basecase and Different Forest Cover Constraint Assumptions



6 SUMMARY

The net timber harvesting landbase under current management on TFL 55 is 19,783 hectares, or 44% of the productive forest area. The present allowable annual cut is 100,000 cubic metres.

From the gross productive forest landbase of 45,400 hectares it is biologically possible to achieve a sustainable, even flow harvest level of about 157,000 cubic metres per year. After landbase netdowns have been applied, and all the management requirements embodied in the Forest Practices code and the report from the Minister's Advisory Committee (MAC), have been applied, the long run harvest level drops by 59% to about 64,000 cubic metres per year. This is the long run harvest level projected by the current management option. In this option, the projected harvest in the first decade drops from the present allowable annual cut (AAC) of 100,000 cubic metres per year to 90,000 cubic metres per year. If old growth site index (OGSI) adjustments are not made for regenerated stands, the long run harvest level drops from 64,000 cubic metres per year to 58,000 cubic metres per year.

In the current management option, when forest cover requirements from the previous TSR (Revelstoke TSA) are used instead of MAC requirements, the current AAC of 100,000 cubic metres can be maintained for two decades, and the long term harvest level increases to about 81,000 cubic metres per year. Clearly, the effect of MAC requirements is to reduce the harvest in the first two decades by 15% and to reduce the long term harvest level by 21%.

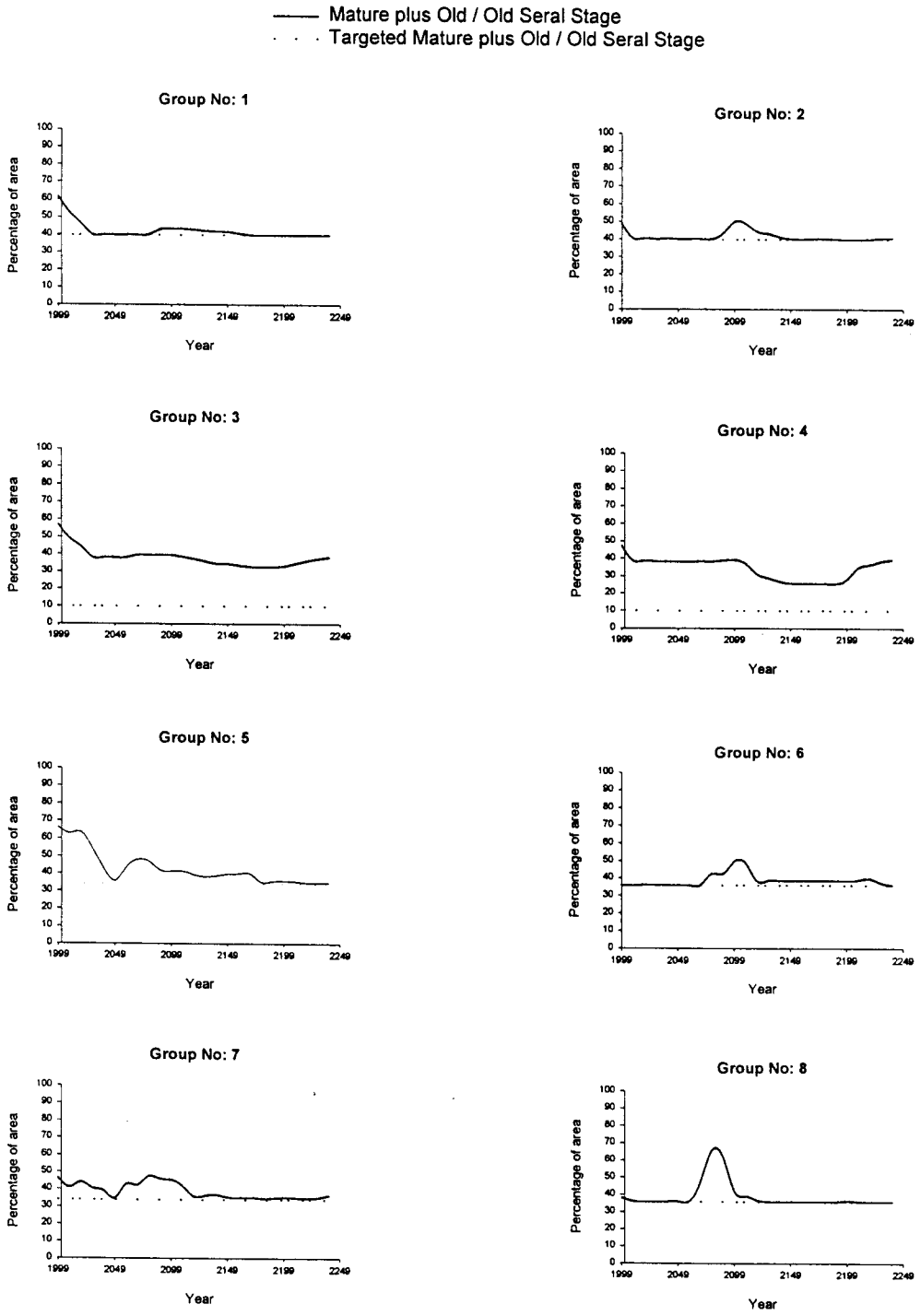
As a result of this timber supply analysis, and assuming the implementation of the MAC requirements; the recommended harvest level for TFL 55 (net of non-recoverable losses) for the period 2001 – 2005 is 90,000 cubic metres per year.

APPENDICES

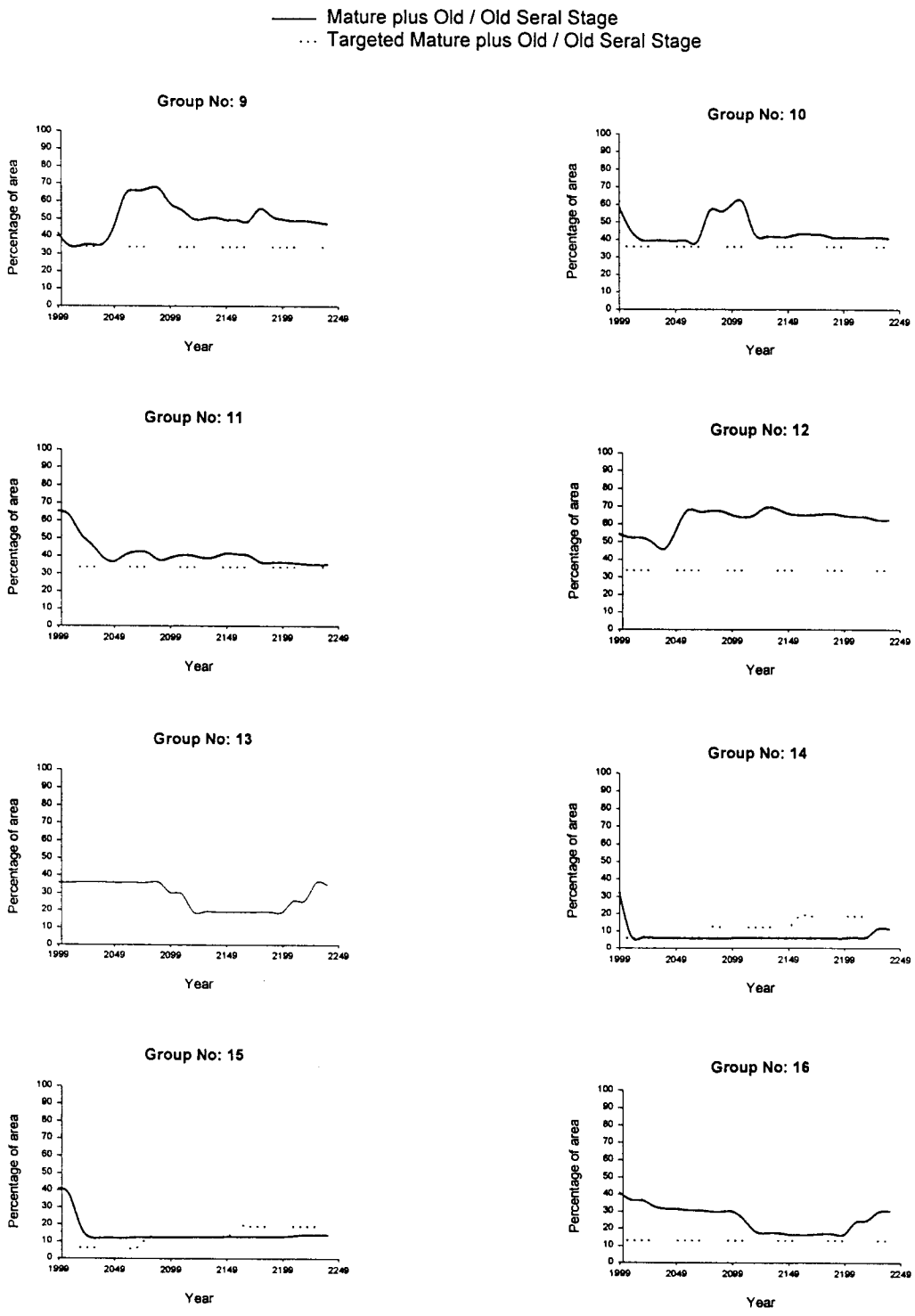
APPENDIX I

DISTRIBUTION OF SERAL STAGES ON THE CURRENT MANAGMENT

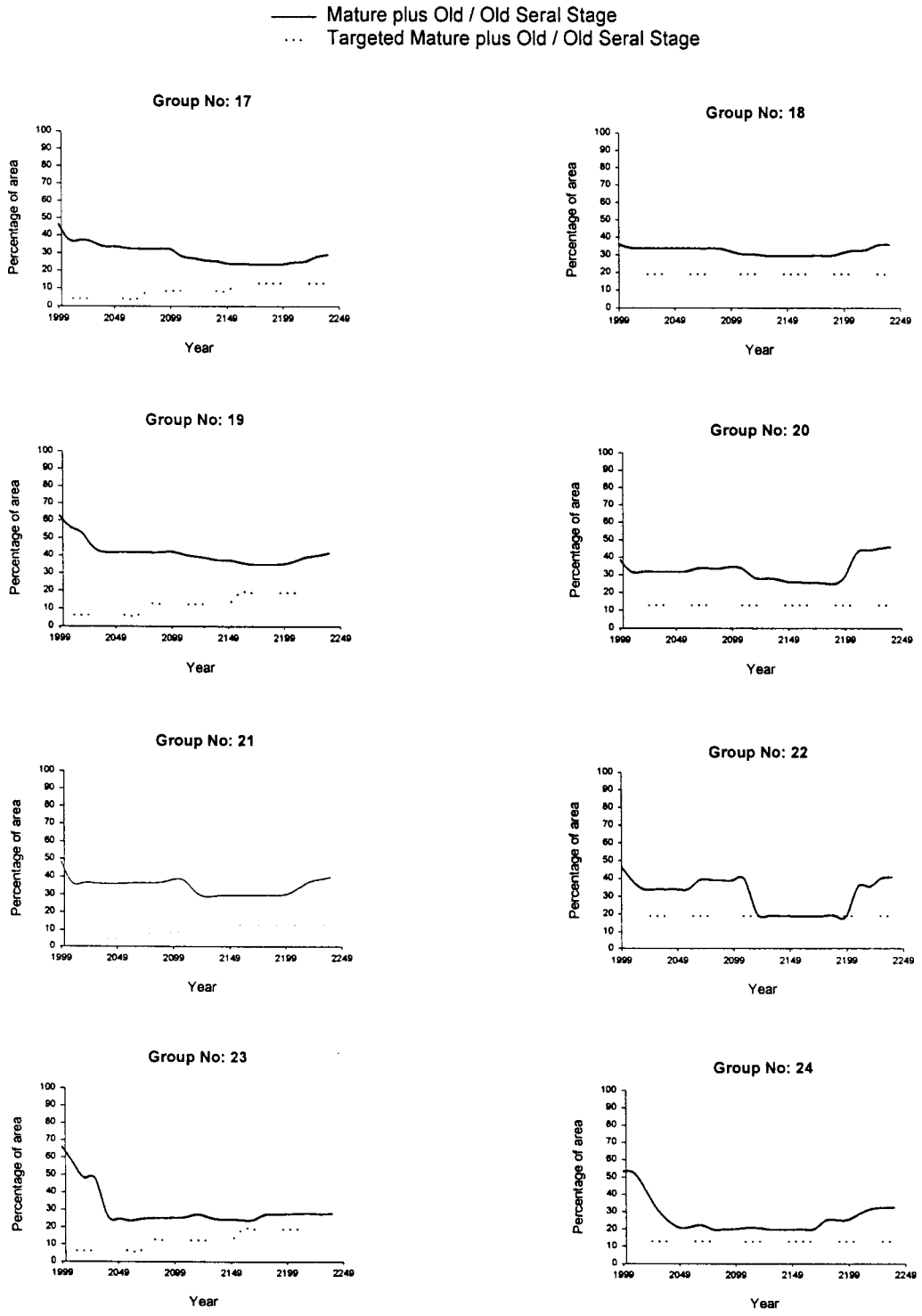
Appendix I-1: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase



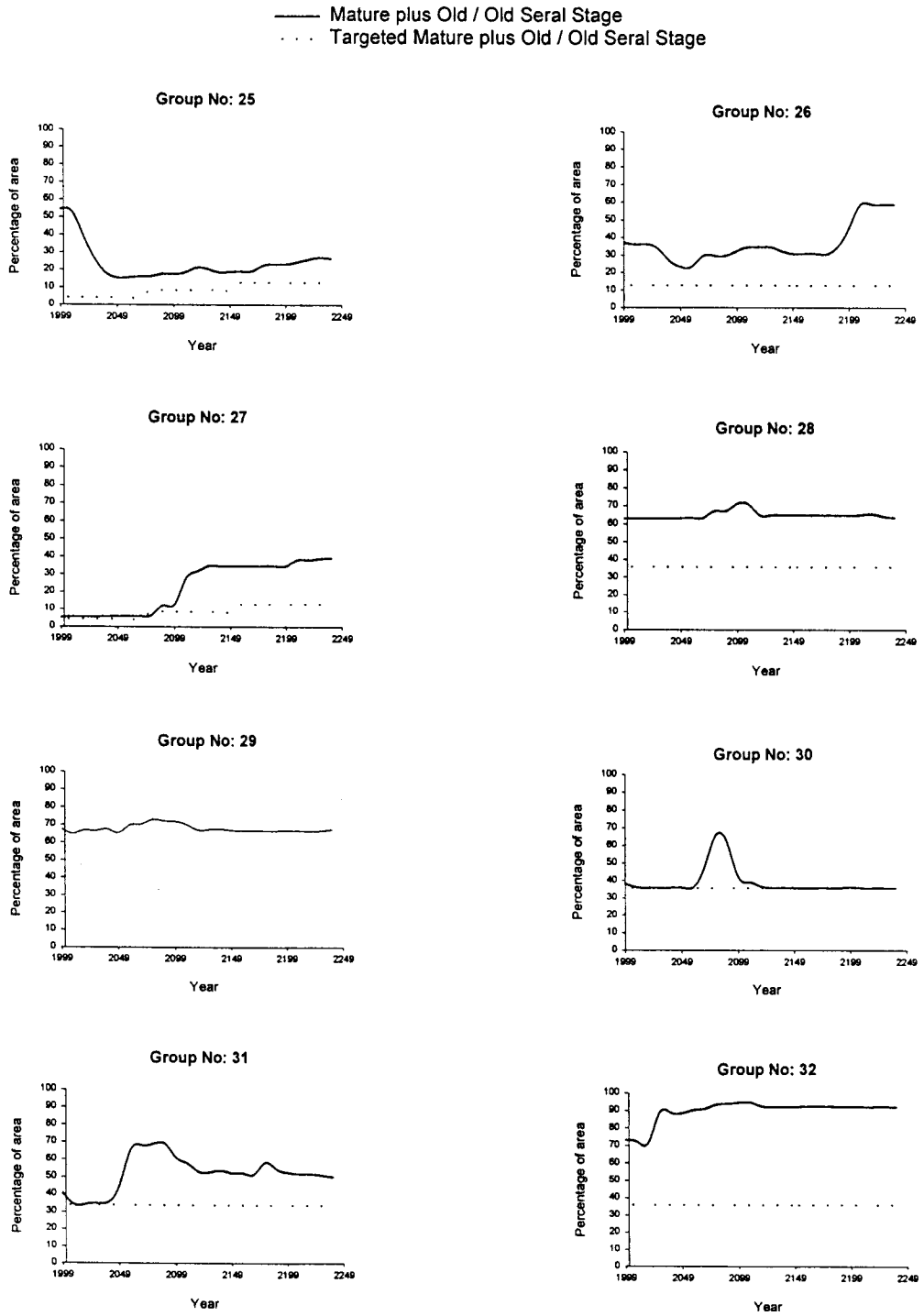
Appendix I-2: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase



Appendix I-3: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase

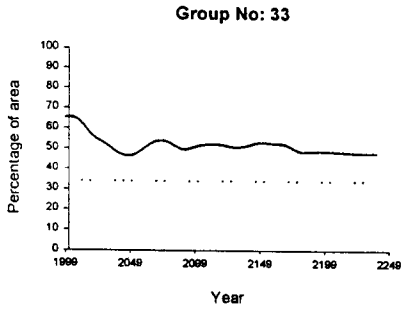


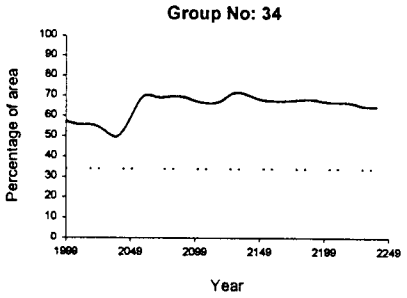
Appendix I-4: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase

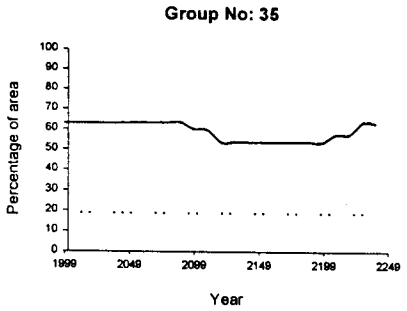


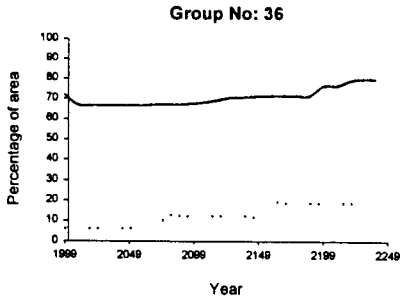
Appendix I-5: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase

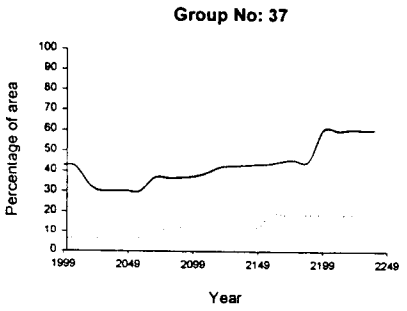
—— Mature plus Old / Old Seral Stage
· ·· Targeted Mature plus Old / Old Seral Stage

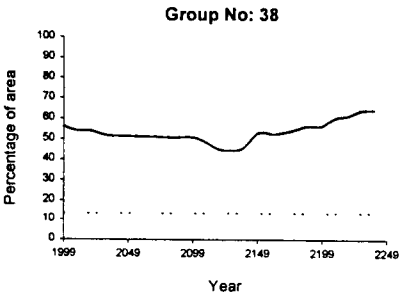


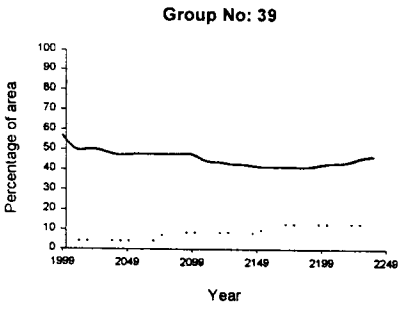


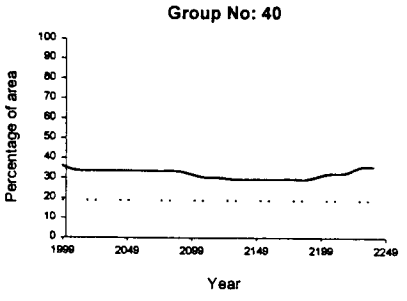






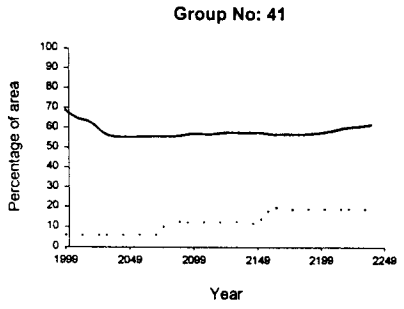


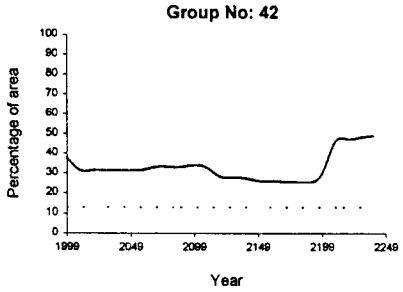


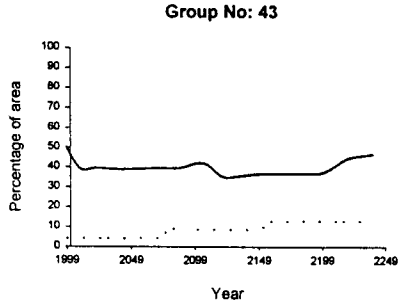


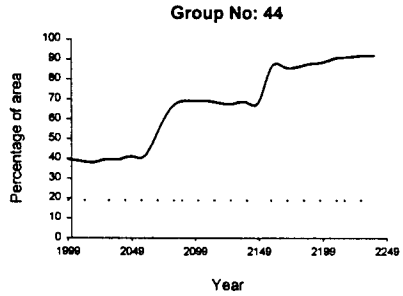
Appendix I-6: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase

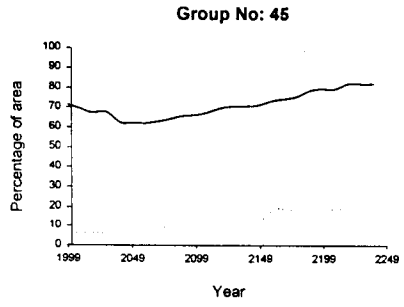
—— Mature plus Old / Old Seral Stage
. . . Targeted Mature plus Old / Old Seral Stage

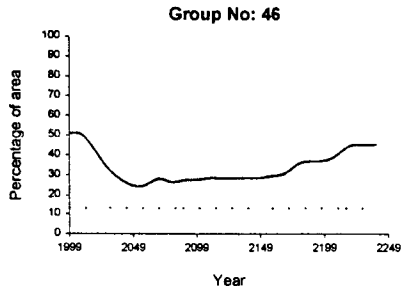


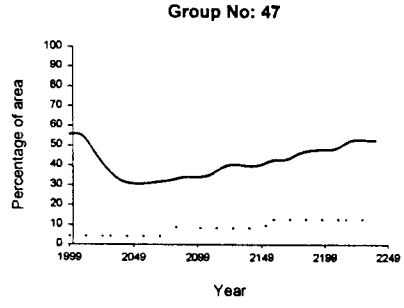


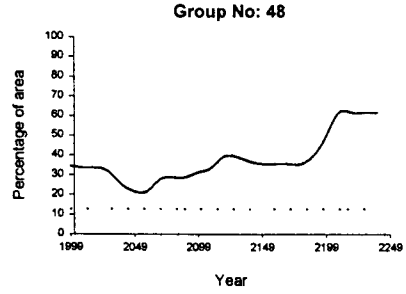




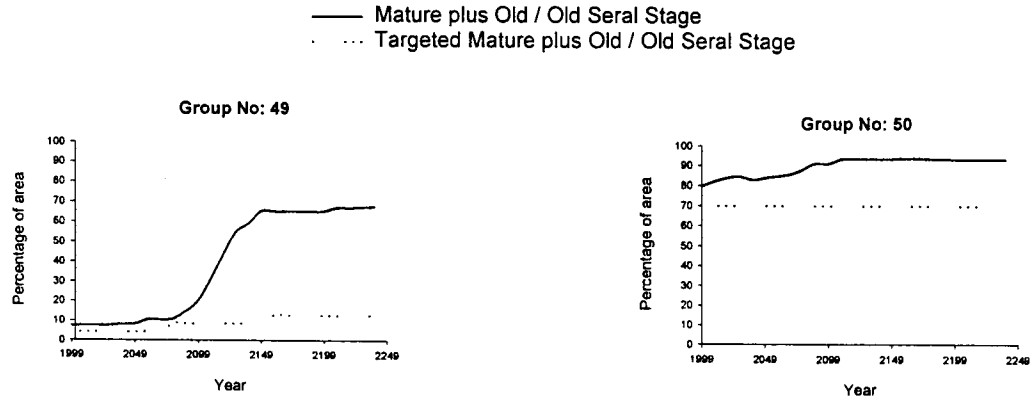








Appendix I-7: Basecase Harvest, Percentages of Mature Plus Old / Old Seral Stages on the Current Management Landbase



APPENDIX II

TFL 55 INFORMATION PACKAGE