TFL 39, MP #7
Timber Supply Analysis

Information
Package

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1.0 Introduction

This information package documents the assumptions and describes the modelling procedures that will be used in the Timber Supply Analysis (TSA) for Management Plan No. 7 of TFL 39.

2.0 Options

The TSA is designed to provide information on the impacts of various forest management issues. These issues include:

☐ Management for Non-Timber Resources.

☐ Assumptions on the Operable Landbase.

☐ Different Levels of Silviculture.

☐ Yield Assumptions.

☐ Site Productivity (Site Index).

☐ Specific Landbase Variations.

The following summarizes assumptions by options for each issue. Shading is used in the tables to highlight differences between options.

The specific landbase options involve individual working circles. All other options will be run separately for each working circle.

2.1 Non-Timber Resources

Option 1: Sensitive Soils Only. Portrays a view of timber as the dominant forest use with area netdowns to safeguard sensitive soils.

Option 2: Current Procedures. Reflects current mapping for non-timber resources, with netdowns and cover class constraints applied according to MoF procedures (refer to Section 8.0).

Options 3 and 4: Visual Landscape. Examines variations in visual landscape cover class constraints (refer to Section 8.3).

Option 5: Biodiversity. As requested by the Chief Forester the net old-growth area from Option 2 is reduced by 4% as a further allowance for biodiversity.

TABLE 2.1.1. Non-Timber Resource Options

Characteristics	**Sensitive Soils 1**	**Current Proced. 2**	**Visual (1) 3**	**Visual (2) 4**	**Biodiversity 5**
Physically Inoperable Areas	E	E	E	E	E
Economic Operability/ Harvest Method					
• Uneconomic	I	E	E	E	E
• Marginal	I	I	I	I	I
• Nonconventional	I	I	I	I	I
ESAs	S	E	E	E	E + 4% biodiversity
Cover Class Constraints for VQO Classes	None	A	B	C	A
Silviculture	Current	Current	Current	Current	Current
Yield Tables	ADJ	ADJ	ADJ	ADJ	ADJ
Site Index	INV	INV	INV	INV	INV

1) E means that the landbase component is excluded from the option. I is for inclusion.
2) VQO Cover Class Constraint
   - A. Base Situation.
   - B. Practical Interpretation.
   - C. Less stringent visual landscape constraints.
3) Yield Tables
   - Y-X. Unadjusted. Y-XENO Yields.
   - ADJ. Yields with MoF Adjustments.
4) Site Index
   - INV. As described in inventory.
   - REV. Revised site indexes.
5) ESAs
   - S Landbase reductions for sensitive soils.

2.2 Economic Operability and Harvest Method

Option 6: Working Landbase. Includes all harvest method and economic operability types (refer to Section 5.42).

Option 2: Currently Economic and Marginal. The landbase is reduced by an estimate of stands currently classified as uneconomic.

Option 7: Currently Economic (Conventional and Nonconventional). The landbase is further reduced by an estimate of stands currently classified as marginally economic.

Option 8: Currently Conventional Economic. The landbase is further reduced to that which can be economically harvested today by conventional means.

***TABLE 2.2.1.* Economic Operability and Harvest Method Options**

Characteristics	Working Landbase 6	Economic & Marginal 2	Economic 7	Conventional 8
Physically Inoperable Areas	E	E	E	E
Economic Operability/ Harvest Method				
• Uneconomic	I	E	E	E
• Marginal	I	I	E	E
• Nonconventional	I	I	I	E
ESAs	E	E	E	E
Cover Class Constraints for VQO Classes	A	A	A	A
Silviculture	Current	Current	Current	Current
Yield Tables	ADJ	ADJ	ADJ	ADJ
Site Index	INV	INV	INV	INV

1) E means that the landbase component is excluded from the option. I is for inclusion.
2) VQO Cover Class Constraint
    A. Base Situation.
    B. Practical Interpretation.
3) Yield Tables
    Y-X. Unadjusted. Y-XENO Yields.
    ADJ. Yields with MoF Adjustments.
4) Site Index
    INV. As described in inventory.
    REV. Revised site indexes.

2.3 Level of Silviculture

Option 9: Basic Silviculture. Initial stocking standards applicable to basic silviculture exclusive of spacing (refer to Section 6.1).

Option 2: Current Silviculture. Based on current initial stocking levels, levels of spacing and conversion of alder to conifer.

Option 10: Enhanced Silviculture. Primarily increased stocking standards.

***TABLE 2.3.1.* Levels of Silviculture Management Options**

Characteristics	Basic Silviculture 9	Current Silviculture 2	Enhanced Silviculture 10
Physically Inoperable Areas	E	E	E
Economic Operability/ Harvest Method			
• Uneconomic	E	E	E
• Marginal	I	I	I
• Nonconventional	I	I	I
ESAs	E	E	E
Cover Class Constraints for VQO Classes	A	A	A
Silviculture	Base	Current	Enhanced
Yield Tables	ADJ	ADJ	ADJ
Site Index	INV	INV	INV

1) E means that the landbase component is excluded from the option. I is for inclusion.

2) VQO Cover Class Constraint
   - A. Base Situation.
   - B. Practical Interpretation.

3) Yield Tables
   - Y-X. Unadjusted. Y-XENO Yields.
   - ADJ. Yields with MoF Adjustments.

4) Site Index
   - INV. As described in inventory.
   - REV. Revised site indexes.

2.4 Yield Assumptions

Comparison of MB assumptions and MoF adjustments.

Option 11: Y-XENO Yields. Without the MoF adjustments made in Option 2 (refer to Section 6.6).

TABLE 2.4.1. **Yield Assumptions Options**

Characteristics	**Adjusted Yields 2**	**Y-XENO Yields 11**
Physically Inoperable Areas	E	E
Economic Operability/ Harvest Method		
• Uneconomic	E	E
• Marginal	I	I
• Nonconventional	I	I
ESAs	E	E
Cover Class Constraints for VQO Classes	A	A
Silviculture	Current	Current
Yield Tables	ADJ	Y-X
Site Index	INV	INV

1) E means that the landbase component is excluded from the option. I is for inclusion.

2) VQO Cover Class Constraint
   - A. Base Situation.
   - B. Practical Interpretation.

3) Yield Tables
   - Y-X. Unadjusted. Y-XENO Yields.
   - ADJ. Yields with MoF Adjustments.

4) Site Index
   - INV. As described in inventory.
   - REV. Revised site indexes.

2.5 Site Productivity (Site Index)

Option 12: Revised Site Indexes. It is generally agreed that our estimates of site index for old growth and younger stands are conservative. MB's biophysical selection tree approach to assigning site index is used in this option (refer to Section 6.56).

TABLE 2.5.1. **Site Productivity (Site Index) Options**

Characteristics	**Inventory Site Indexes 2**	**Revised Site Indexes 12**
Physically Inoperable Areas	E	E
Economic Operability/ Harvest Method		
• Uneconomic	E	E
• Marginal	I	I
• Nonconventional	I	I
ESAs	E	E
Cover Class Constraints for VQO Classes	A	A
Silviculture	Current	Current
Yield Tables	ADJ	ADJ
Site Index	INV	REV

1) E means that the landbase component is excluded from the option. I is for inclusion.
2) VQO Cover Class Constraint
   A. Base Situation.
   B. Practical Interpretation.
3) Yield Tables
   Y-X. Unadjusted. Y-XENO Yields.
   ADJ. Yields with MoF Adjustments.
4) Site Index
   INV. As described in inventory.
   REV. Revised site indexes.

2.6 Specific Landbase Options

Options 13 to 17 reduce the landbase as follows (refer to Section 5.43):

❑ Option 13. Yakoun Lake Basin, Block 6.

❑ Option 14. Yakoun River Corridor, Block 6.

❑ Option 15. Koeye River, Block 7.

❑ Option 16. Lower Tsitika River, Block 2.

❑ Option 17. Lower Tsitika River plus adjacent areas (wings) draining directly to Johnstone Strait, but logically accessible through the Lower Tsitika, Block 2.

A third lower Tsitika Option (described in the SMOOP) designed to examine a trade off with Ecological Reserves and Schoen Lake Park is not included because of information difficulties.

***TABLE 2.6.1.* Landbase Options**

	No Adjust.	**Yakoun B. Block 6**	**Yakoun R. Block 6**	**Koeye R. Block 7**	**Tsitika R. Block 2**	
Characteristics	**2**	**13**	**14**	**15**	**16**	**17**
Physically Inoperable Areas	E	E	E	E	E	E
Economic Operability/ Harvest Method						
• Uneconomic	E	E	E	E	E	E
• Marginal	I	I	I	I	I	I
• Nonconventional	I	I	I	I	I	I
ESAs	E	E	E	E	E	E
Cover Class Constraints for VQO Classes	A	A	A	A	A	A
Silviculture	Current	Current	Current	Current	Current	Current
Yield Tables	ADJ	ADJ	ADJ	ADJ	ADJ	ADJ
Site Index	INV	INV	INV	INV	INV	INV
Landbase Variations	--	Less Yakoun Basin	Less Yakoun River	Less Koeye Watershed	Less Lower Tsitika	Less Lower Tsitika + less wings

1) E means that the landbase component is excluded from the option. I is for inclusion.
2) VQO Cover Class Constraint
A. Base Situation.
B. Practical Interpretation.
3) Yield Tables
Y-X. Unadjusted. Y-XENO Yields.
ADJ. Yields with MoF Adjustments.
4) Site Index
INV. As described in inventory.
REV. Revised site indexes.

3.0 Model

The Forest Estate Model (FEM) is used in this analysis. FEM, an inventory projection simulation model, was used in the TFL 44, MP #2 and July 1993 analyses.

It was designed for strategic Timber Supply Analysis, to examine the impact of forest management and harvest schedules on long-term timber supply.

Ongoing changes to FEM are focused on improving links between operational and strategic planning, i.e., on better reflecting operational realities in the forest level analysis. Recent changes include cover class constraints (specifying rate-of-harvest rules for defined portions of the forest) and using operational plans (e.g., 5-Year Plans or 20-Year Plans) as the first part of a projection.

4.0 Inventory Aggregation

The TFL 39 forest inventory is aggregated at three levels to meet the objectives of the analysis and to utilize the large amounts of data in a practical way.

The three levels are discussed in sequence from the broadest to the more specific level of aggregation.

4.1 Working Circles

TFL 39 consists of seven blocks dispersed over a wide geographic area of the coast. Blocks 2, 4 and 6 in particular are important locally for community stability.

The TFL is divided into six working circles. Each is analyzed separately. The working circles are as follows:

	Block #	**Operating Division (1994)**
❑	Block 1:	Stillwater.
❑	Block 2:	Menzies Bay, Kelsey Bay and Eve River.
❑	Blocks 3 and 4:	Port McNeill.
❑	Block 5:	Stillwater.
❑	Block 6:	Queen Charlotte Islands.
❑	Block 7:	Port McNeill

4.2 Management Zones

Management Zones are assigned to areas within each working circle as defined by specific management objectives:

- ☐ Visual landscape.
- ☐ Community water supply.
- ☐ Avalanche run-out zones.

Management Zones for these three different forest use objectives may overlap. Cover class constraints are used to model the objectives in these zones (refer to Section 8.3).

4.3 Analysis Units

Within each working circle and management zone, areas are aggregated into analysis units to ease computation in the Timber Supply Analysis. Aggregation variables are:

- ☐ Three-metre Site Index Classes 12 to 42
    - Site index is based on the leading species in each stand.
- ☐ Two Species Associations
    - Douglas-fir species association, consisting of stands where the primary species is Douglas-fir, cypress or lodgepole pine.
    - Western hemlock species association, consisting of stands where the primary species is western hemlock, mountain hemlock, Sitka spruce, true firs or red cedar.
    - The yield model Y-XENO has growth equations for the two species, Douglas-fir and western hemlock. Other species are grouped with these two for yield prediction.
- ☐ Five-year age classes for the younger forest. Old growth (areas greater than 100 years-of-age at time of inventory, completed in 1964) is not differentiated by age.
- ☐ Regeneration Models
    - Regeneration models have been developed for the range of regeneration situations in the forest, including natural stocking and incidence of brush. For each regeneration model, a family of yield curves represent a range of management opportunities. For more information (refer to Section 6.2).

5.0 Description of Landbase

5.1 Current Timber Inventory

The first forest inventory was completed in 1964 (1964 for the original TFL 39 and 1964 for the previous TFL 7 added to TFL 39 in 1988). Since then, it has been maintained and improved by new cruises of both old growth and the immature forest. The figures used in this analysis are updated to December 31, 1991, and cover changes in landbase and ownership, logging, fire and reforestation.

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

- ❑ A measure of site productivity: expressed by 3 m site index classes.
- ❑ Age of immature by year established.
- ❑ Up to three species: in descending order of basal area.
- ❑ A measure of stocking:
  - Volume class in old growth.
  - Basal area in stands of pole size, as percent of normal stocking.
  - Number of stems per hectare and distribution in younger stands.

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

5.11 The Old-Growth Inventory

Since the original cruise in 1964/1965, the inventory has been upgraded and updated as follows:

- ❑ In 1966, old-growth volumes were recompiled, as required by MoF, to close utilization standards (15 cm top diameter for trees 22.5 cm and larger).
- ❑ In 1972, old-growth volumes were recompiled using new MB decay factors.
- ❑ In 1988, the inventory was improved by replacing the less intensive original inventory with operational cruising on 95 000 ha.
- ❑ In the remaining area (excluding in the operational cruise), average lines were recompiled to exclude samples that have been logged to December 31, 1988.

In addition, the inventory has been updated annually to reflect areas and volumes logged.

During 1993, the accuracy of the 1964 portion (original cruise) of the TFL 39 inventory was tested in three blocks:

Block 6. 200 samples randomly established in 1993.

Block 4. 69 samples systematically established in 1988.

Block 2. 116 samples systematically established in 1992.

Results of the three tests were:

Block	Average Volume (m^3 per ha) 1964 Inventory Cruise	Test Cruise
6	749	616
4	844	826
2	784	816

The Blocks 2 and 4 results show inventory volumes close to those of the tests, within the magnitude that could be reasonably expected due to sampling variance.

In Block 6, there was a significant difference between 64 inventory volumes and the test volumes. Hence, in this TSA, the 1964 cruise portion of the Block 6 inventory is reduced to an average of 616 m^3 per ha.

The current, old-growth volume less estimates of decay, before any other deductions, is 202 176 000 m^3 growing on 301 881 ha. Breakdown by ownership is shown below:

Ownership	Area (ha)	Volume (000 m^3)
Crown	252 291	166 202
Timber Licence	44 790	32 688
Crown Grant	4 800	3 286
TOTAL	301 881	202 176

5.12 Inventory of the New Forest

During the 1964/1965 forest inventories, all the immature forest was cruised and mapped. Each stand was described according to age, species, site index class and stocking.

The new forest inventory is updated by a two-stage process. First, the stand information for new, planted and natural stands is added into the inventory yearly. Any changes found by assessment of survival and free-growing status are also made annually.

Second, as the new stands reach “pole size”, generally between 20 and 35 years, they are reinventoried; site index is measured based on the growth of the new crop; and basal area is obtained as the measure of stocking.

5.13 Not Satisfactorily Restocked (NSR) Inventory

Areas logged or otherwise rendered unstocked, e.g., fire kill, are recorded in the inventory annually. For planning and control purposes, all NSR areas are categorized and summarized to show areas prescribed for site preparation, planting or natural regeneration, and the target date for achievement.

The minimum stocking standard is 600 stems per hectare at least 2 m apart and 80% distribution, i.e., 80% of all plots of 2.4 m radius on productive ground will have at least one established tree of an ecologically acceptable species.

5.2 Determination of the Working Landbase

Section 5.2, 5.3 and 5.4 document area and volume changes made for the various options in the analysis. They have been made in the order described in the following subsections. The working landbase is the productive forest area and mature volume available for timber management after allowances are made for areas classified as physically inoperable and for areas classified as sensitive sites and for non-timber resource values according to current MoF procedures. Results are summarized by working circle in Tables 5.2.1 and 5.2.2. Section 5.3 documents mature volume deductions and Section 5.4 describes variations in landbase assumptions for the different options.

5.21 Non-Forest Areas

Non-forest areas of alpine, rock, water, swamp and roads occupy 81 272 ha.

Roads are included in the annual inventory update. An area allowance is made for all mapped roads (regardless of whether or not they are maintained). Major roads, e.g., highways, are handled as discrete polygons. An average width of 13 m is allowed for other roads, i.e., they are buffered at a width of 13 m in the GIS.

5.22 Nonproductive Forest

Nonproductive forest areas, mainly areas classified as scrub (defined as having inventory volume of less than 211 m^3 per ha) and totaling 173 333 ha are excluded from the analysis.

5.23 Low Site

600 ha of Site Index 10 and less are excluded from the working landbase.

Areas with site index in the three-metre Classes 12 and 15 are well represented in recent harvest statistics. Of the area logged during 1990 and 1991, more than 3%

was from Site Index Class 12 and 13% was from Site Index Class 15, proportions comparable to their occurrences in the old-growth inventory

Analyses in other management units have made reductions for low site index as an allowance for operability concerns.

A more direct approach has been taken in this analysis. TFL 39 has now been mapped for physical operability (see Section 5.24). The issue of economic operability is addressed in several options with classification largely based on species, cruised volume per hectare and the proportion of pulp quality logs (see Section 5.42).

5.24 Physically Inoperable Areas

Operability classification differs in Block 6 from the other blocks.

❑ For Blocks 1, 2, 3, 4, 5 and 7

The mature productive forest has recently been assessed for physical operability and for broad classes of logging. Three classes have been mapped:

- Physically Inoperable Timber

  Timber on productive land that is so steep and/or rocky, that it cannot be safely felled or yarded or a significant proportion of the volume could not be recovered.

- Conventional Harvest Systems

  Includes timber on productive, physically operable land that is loggable by conventional methods, i.e., grapple, high-lead, hoechuck, skidder, etc.

- Nonconventional Harvest Systems

  Includes timber on productive, physically operable land that is loggable only by nonconventional methods. These include helicopter, balloon or long-line cable systems.

❑ For Block 6, the operability classification is not consistent with that of the other blocks as it includes assessments made during the early 1960s and early 1980s. In summary, it includes:

- Inaccessible

  Includes areas that were viewed as physically inoperable or economically inoperable during the TFL 39 inventory, completed in 1964.

- Conventional and Nonconventional Harvest Systems

  Accessible, mature productive forest was classified as conventional or nonconventional during the Block 6 Operability Study of the early 1980s. The basis for these two categories is the same as that used in the recent assessment of conventional and nonconventional areas in other blocks.

For TFL 39, 24 973 ha with 11 987 000 m^3 of timber are excluded from the working landbase as physically inoperable or in the case of Block 6, inaccessible.

5.25 Sensitive Sites and Non-Timber Resources (NTRs)

Mapping of environmentally sensitive areas (ESAs) and other management constraint areas have occurred for the following concerns:

☐ Avalanche areas (Ea).

☐ Unstable soils (Es).

☐ Fish streams, lakes and estuaries (Ef).

☐ Wildlife areas for deer, elk, grizzly bear and goat (Ew).

☐ Difficult regeneration areas (Ep).

☐ Community watersheds (Eh).

☐ Recreation (Er).

☐ Heritage areas and other special reserves.

☐ Visual landscape (VQOs).

Refer to Section 8.0 for procedures and results. Significant areas of TFL 39 have been identified and mapped as important for the above resources. Visual Quality Objective (VQO) classes have been identified and mapped on more than a third of the TFL forested area of 722 000 ha. Sensitive soils occupy more than 130 000 ha, and recreation and wildlife values have been mapped on 27 000 ha and 11 000 ha of forest area respectively.

Some of these areas are in non-forest, nonproductive or physically inoperable areas where harvesting will not occur. For others, e.g., visual landscape, management is modified to meet cover class constraints. These are discussed in Section 8.3.

The net impact of exclusions for sensitive sites and non-timber resources on the productive operable landbase is 59 205 ha and 31 695 m^3 of mature volume.

5.26 Deciduous

The net forest area after making allowances for sensitive sites and non-timber resources includes 9 995 ha of deciduous forest.

The working landbase is defined with current silvicultural practices. On average, 52 ha of deciduous forest were converted to conifer stands annually during the period of 1987 to 1991; most of it in Block 1 and a little in Block 2. This will be modeled to occur at the same rate until 50% of the deciduous area in Blocks 1 and 2 are converted to coniferous stands. 3 711 ha of deciduous remains in the landbase and 6 284 ha are removed.

The conversion of deciduous areas to coniferous varies in the other two silvicultural options:

- Option 9: Basic Silviculture. No conversion of deciduous areas. All 9 995 ha are excluded from the landbase.
- Option 10: Enhanced Silviculture. In addition to converting 50% of the deciduous area in Blocks 1 and 2, 50% of that in Blocks 3, 4 and 6 are also converted. This totals 4 965 ha. The balance of 5 030 ha is excluded from the landbase.

5.27 Block 1, 30-Year Reserve

The remaining timber sales expired at the end of 1992 and reverted to Schedule B land as part of TFL 39. Forest cover information is available on the timber sales area. To be conservative, the area classified as mature at the end of 1991 will be considered NSR with an establishment date of 1993. The net operable, productive forest area, of the remaining 30-Year Reserve timber sales is added to Block 1 after making allowances for sensitive sites and non timber resources, is 2 967 ha.

5.3 Mature Volume Deductions

5.31 Waste and Breakage

Since the start of residue surveys in 1967, MB has measured all residue components including breakage and W2, resulting in an unique data set. Actual measured breakage and W2 are applied to the inventory as a netdown for analysis purposes. The average for the period from 1985 to 1989 of 7.82% is applied in he TSA.

5.32 Dead Pulp Grades

The mature timber inventory includes dead or down trees viewed as usable. This includes lumber grades that are recovered and pulp grades that are uneconomic to recover.

MP #7 volume deductions (by block) for dead pulp grades were determined as follows:

- ☐ Cruised volumes from the 1991 inventory were segregated as to “alive and dead”.
- ☐ All grades were converted to B to Z Alpha Grades.
- ☐ Volumes in the dead Y and Z Grades were expressed as a percentage of the total block volume and deducted from the mature inventory.

Block	**Dead Pulp (%)**
1	1.1
2	1.9
3	5.6
4	2.2
5	2.6
6 (inventory)	4.9
6 (operational cruise)	3.5
7	4.2
AVERAGE	3.6

For Block 6, the dead pulp allowance was calculated and applied separately to 1964 inventory volumes and to the more recently measured operational cruise volumes.

5.33 Total Volume Reductions

In aggregate, the volume deductions for waste, breakage and dead pulp grades, applied to the mature working landbase inventory, amount to 17 022 000 m^3.

TABLE 5.2.1. Adjustments to Obtain Working Landbase by Working Circle (ha)

	Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Total TFL Landbase	182 609	208 050	67 509	47 571	241 585	56 403	803 727
Less Non-Forest	35 264	9 476	4 481	12 918	12 932	6 201	81 272
	147 345	198 574	63 028	34 653	228 653	50 202	722 455
Less Nonproductive	57 959	28 546	8 630	19 854	37 883	20 461	173 333
	89 386	170 028	54 398	14 799	190 770	29 741	549 122
Less Low Site	64	161	71	--	265	39	600
	89 322	169 867	54 327	14 799	190 505	29 702	548 522
Less Physically Inoperable	2 868	6 717	445	1 742	10 788	2 413	24 973
	86 454	163 150	53 882	13 057	179 717	27 289	523 549
Less Sensitive Sites and Non-Timber Values	6 866	19 808	3 361	1 994	23 117	4 059	59 205
	79 588	143 342	50 521	11 063	156 600	23 230	464 344
Less Deciduous	2 852	858	351	59	2 157	7	6 284
	76 736	142 484	50 170	11 004	154 443	23 223	458 060
Add 30-Year Reserve	2 967	--	--	--	--	--	2 967
Working TFL Landbase	79 703	142 484	50 170	11 004	154 443	23 223	461 027

TABLE 5.2.2. Adjustments to Obtain Mature Volume by Working Circle (000 m^3)

	Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Total Productive Forest	12 479	73 269	13 557	7 180	78 152	17 539	202 176
Less Low Site	19	108	41	--	102	14	284
	12 460	73 161	13 516	7 180	78 050	17 525	201 892
Less Physically Inoperable	848	3 972	311	1 197	4 353	1 306	11 987
	11 612	69 189	13 205	5 983	73 697	16 219	189 905
Less Sensitive Sites and Non-Timber Values	1 737	12 503	1 579	1 106	12 295	2 475	31 695
	9 875	56 686	11 626	4 877	61 402	13 744	158 210
Less Breakage, Waste 2 and Dead Pulp	873	5 424	1 207	498	7 414	1 606	17 022
Working Landbase	9 002	51 262	10 419	4 379	53 988	12 138	141 188

Inventory dated: December 31, 1991

5.4 Landbase Options

5.41 Option 1. Specific Allowances for Sensitive Soils

Timber is the dominant forest use with safeguards of basic resources to ensure sustainability. The productive landbase is reduced for areas that are physically inoperable and for sensitive soils.

5.42 Economic Operability

Interpretation of economic operability differs from that of the MoF. MB's view is that over the next 100+ years, all of the mature timber, physically safe to fell and extract without unacceptable environmental damage, will be economically available for harvest. This is consistent with the definition of the working landbase (see Section 5.2).

It differs from the MoF position that the economically operable landbase for the TSA should be based on the last price cycle. The MoF's view is examined by classifying the working landbase for "economic" operability as follows:

❑ First, the inventory and logging method characteristics shown in Table 5.42.1 were used to classify the forest.

TABLE 5.42.1. **Inventory Operability Criteria Harvestable(1) Volume (m^3 per ha)**

	Harvest Method			
	Conventional		Nonconventional	
Stand Type	Uneconomic	Marginal	Uneconomic	Marginal
Fir, Fir-hem Fir-cedar	<271	271-380	<434	434-542
Hemlock Hem-balsam	<325	325–434	<488	488-597
Hem-bal-cyp				
<=40% X,Y,Z	<325	325-434	<434	434-542
>40% X,Y,Z	<434	434-542	<542	542-651
Cedar				
<=40% X,Y,Z	<271	271-380	<380	380-488
>40% X,Y,Z	<380	380-488	<542	542-651

❑ Second, some changes were made after review by MB and MoF field personnel of the mapped results from the first step.

Tables 5.42.2 and 5.42.3 show the resulting composition of the working landbase according to the two logging methods (conventional and nonconventional) and the three economic classes (economic, marginal and uneconomic). The economic operability/harvest method descriptions for the options in Section 2.0 relate to the classification in these tables.

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(1) Breakage and Waste 2 are included; volumes are as shown on MB forest cover maps.

TABLE 5.42.2. Working Landbase(1) by Working Circle, Logging Method and Economic Class (ha)

	Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Conventional Economic	68 107	124 307	44 385	7 097	137 453	12 593	393 942
Nonconventional Economic	8 732	9 342	3 732	2 454	5 355	2 296	31 911
Conventional Marginal	433	2 879	1 028	195	6 636	1 344	12 515
Nonconventional Marginal	911	1 728	521	624	723	1 524	6 031
Conventional Uneconomic	293	1 714	216	52	3 515	1 960	7 750
Nonconventional Uneconomic	1 227	2 514	288	582	761	3 506	8 878
TOTAL	79 703	142 484	50 170	11 004	154 443	23 223	461 027

TABLE 5.42.3. Working Landbase Mature Volumes by Working Circle, Logging Method and Economic Class (000 m^3)

	Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Conventional Economic	5 064	41 136	6 784	2 117	47 192	7 765	110 058
Nonconventional Economic	2 873	6 968	2 863	1 701	3 038	1 549	18 992
Conventional Marginal	168	1 038	360	62	2 281	455	4 364
Nonconventional Marginal	427	801	247	296	284	642	2 697
Conventional Uneconomic	78	490	62	13	942	629	2 214
Nonconventional Uneconomic	392	829	103	190	251	1 098	2 863
TOTAL	9 002	51 262	10 419	4 379	53 988	12 138	141 188

Inventory dated: December 31, 1991

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(1) Includes both mature and immature areas.

5.43 Specific Landbase Options

Hectare and mature volume changes to the working landbase are summarized for currently uneconomic and for economic and marginal areas by option in Table 5.43.1.

***TABLE 5.43.1.* Net Area and Mature Volume Reductions for Specific Landbase Options**

Option **Description**	**13** **Yakoun Lake Basin Block 6**	**14** **Yakoun River Corridor Block 6**	**15** **Koeye River Block 7**	**16** **Lower Tsitika River Block 2**	**17** **Lower Tsitika River and Wings Block 2**
Hectares					
Econ & Marg	3 270	605	6 009	1 766	3 577
Uneconomic	5	0	752	21	62
Total	3 275	605	6 761	1 787	3 639
Mature Volume ($000\ m^3$)					
Econ & Marg	1 855	204	3 535	1 274	2 602
Uneconomic	2	0	240	8	21
Total	1 857	204	3 775	1 282	2 623

5.5 Adjustments to Determine the Long-Term Landbase

Area reductions for future roads:

❑ Old-Growth Areas

For conventional harvesting areas, a 6% reduction in productive area is made after initial harvest. This is based on areas occupied by roads in recent survey results.

No reductions will be made for future roads in nonconventional harvest areas. By definition, these areas will be harvested by aerial systems and they will be accessed by roads developed for conventional harvest areas.

❑ Second-Growth Areas

For areas established prior to 1940, the productive area is reduced by 5% after the initial harvest. These areas were logged before truck logging. They are often of relatively easy terrain, with partial access provided by existing road systems.

Allowances for future roads reduces the working landbase by 14 185 ha resulting in a long-term landbase of 446 842 ha for TFL 39. Table 5.5.1 presents results by working circle.

TABLE 5.5.1. Long-Term Working Landbase (after allowances for future roads) (hectares)

	Block 1	Block 2	Blk 3/4	Block 5	Block 6	Block 7	Total
Working Landbase	79 703	142 484	50 170	11 004	154 443	23 223	461 027
Less Future Roads	2 189	4 053	990	209	5 828	916	14 185
Long-Term Landbase	77 514	138 431	49 180	10 795	148 615	22 307	446 842

6.0 Silvicultural Assumptions and Yield Projection

6.1 Silvicultural Scenarios

Appendix 3 describes in more detail the differences between the three scenarios.

6.11 Basic Silviculture

Basic silvicultural standards that relate to MoF stocking targets are applied in Option 9.

This scenario excludes spacing, conversion of deciduous stands to conifer and other incremental silviculture activities.

6.12 Current Silviculture

This is the silviculture scenario used in most of the options. It portrays recent practices including stocking densities at establishment and levels of spacing and conversion of deciduous areas to conifer.

6.13 Enhanced Silviculture

Used in Option 10, this scenario portrays increased silviculture effort relative to recent practices (current silviculture scenario). In particular, it includes:

- Higher stocking densities on some areas through increased planting, fill planting and/or brush control.
- Increased area spaced.
- Increased area of deciduous stands converted to conifer.

6.2 Forest Regeneration Models

In the course of a TSA, the entire TFL is progressively “harvested” and “reforested” one or more times with the computer model. This requires a series of assumptions about the ground conditions after “harvesting”, how each area will restock, and what silvicultural practices will be applied so that a volume can be assigned for the next “harvest”.

MB has devised a set of “regeneration models” based on recent results tempered by the knowledge and experience of the local foresters. Each model comprises a natural stocking condition which may also involve the presence of a slash and/or brush condition. Some level of natural regeneration, which we have divided into tree broad categories, occurs on every site:

- ❑ Some sites regenerate sparsely, but quickly.
- ❑ On some, regeneration is delayed several years due to brush, slash or slash burning.
- ❑ Some sites restock fully and quickly.

The first two categories require planting to meet stocking and yield targets.

Yield at harvest is a function of the species, number and timing of the natural regeneration, and the number and species of seedlings if also planted; yield estimates are provided by a series of yield tables reflecting the initial stand condition, the numbers of trees planted and other silvicultural practices, e.g., spacing. Yield tables are described in Appendix 2.

The first step in applying the regeneration models to the inventory was to define “regeneration types” on a block basis. Two procedures were used according to block:

- ❑ Blocks 1, 2 and 5

  Regeneration types were defined according to species association, biogeoclimatic grouping and broad site index class.

  - Two Species Associations
    - ◊ Douglas-fir type.
    - ◊ Western hemlock type.
  - Five Biogeoclimatic Groupings

Blocks 1 and 5	**Block 2**
CDF (CWHxm2)	
CWHa2 (CWHxm2)	CWHa1 (CWHxm2)
CWHb1 (CWHvm1)	CWHb1 (CWHvm1)
CWHb2 (CWHvm2)	CWHb2 (CWHvm2) and MH (Mhmm 1)
Mh (Mhmm1)	CWHb3 (CWHmm1)
	CWHb4 (CWHmm2)

- Two Site Index Groups

  Poor (P) and Medium (M). <28.5 m at 50 years breast height age.
  High (H). >28 m at 50 years breast height age.

❑ Blocks 3, 4, 6 and 7

Regeneration types were defined according to leading species:

- Douglas-fir and pines.
- Red cedar.
- Yellow cypress.
- Sitka spruce.
- Western hemlock and true firs.

The second step in applying regeneration models to the inventory was to allocate the area of each “regeneration type” according to estimated occurrence of each regeneration model.

Tables in Appendix 1 shows, for each block, the percentage of each “regeneration type” that is assigned to the various regeneration models.

6.3 Yield Adjustments

6.31 Utilization Levels

❑ Old growth

- Minimum dbh: 22.5 cm.
- Stump height: 30 cm.
- Top dib: 15 cm.

❑ Second Growth

- Minimum dbh: 17.5 cm.
- Stump height: 30 cm.
- Top dib: 10 cm.

6.32 Regeneration Delay Following Logging

The TSA assumes an average two-year regeneration delay for all harvested areas. Establishment of the new stand (for growth purposes) occurs in the year of harvest plus two years.

NSR statistics support this assumption:

- ❑ The area classified as NSR is close to three years of harvest. For example, at the end of 1991, there were 14 722 ha of NSR in TFL 39, while there was 14 064 ha logged during the three-year period (1989 to 1991).
- ❑ Most seedlings are one-year-old or greater when an area is described as satisfactorily stocked (no longer NSR). Many areas are stocked naturally at completion of logging. Also, planting immediately after harvest is occurring more frequently, particularly on brush-prone sites, to accelerate green-up to meet visual landscape requirements and more generally for meeting free-to-grow standards.

6.33 Growth Impacts of Brush Competition

Brush competition impacts, additional to those reflected in the yield tables, are modeled through growth delays, a horizontal shifting in yield curves. For example, with a 15-year growth delay, it takes 85 years to attain a 70-year yield table volume.

Recent management practices have emphasized prompt planting in brush-prone areas to reduce brush competition. Site preparation and brush treatments may also affect the impact of brush competition. On some areas, treatment may not be practical. The procedure used to model these effects is discussed under the headings of prescribed burning, brush treatments and salal sites.

- ❑ Prescribed Burning

  Correctly prescribed burning results improved reforestation through removal of accumulations of slash and/or reduction of salal, salmonberry or other brush problems. Benefits are modelled when calculating yield as:

  - Improved distribution and sometimes higher levels of natural regeneration.
  - Improved distribution of planted trees.
  - Reduced growth delay from brush competition. If untreated, an average growth delay of ten years is assumed for low and poor sites (typically salal competing with cedar or hemlock). On medium and high sites where competing brush is often salmonberry, an average growth delay of five years is assumed.

- If treated, a growth delay of two years allows for treatments that may not be fully effective or are delayed.

These delays are carried in FEM.

Any burning is prescribed in accordance with MoF guidelines to minimize site impacts.

Recent trends show a decrease in prescribed burning and a greater emphasis on prompt planting in brush-prone areas. Allowances for impacts of brush treatment are also appropriate for this change in management strategy.

Brush Treatments

The impact of weeds invading established conifer stands is portrayed as a growth delay in harvest scheduling as follows:

- If untreated, 15 years, for example, it takes 85 years to attain a 70-year yield table volume.
- If treated, four years to allow for growth already lost to weeds and missed areas.

❑ Salal

On some sites, salal has been observed to impact tree growth, particularly before crown closure. Two general situations occur in TFL 39:

- On drier sites (often Douglas-fir sites) in Blocks 1, 2, and 5.
- On redcedar sites (often poor sites) in the northern Blocks 3, 4, 6, and 7.

The intent is to assign a growth delay to recognize and account for some of the impacts of salal competition. To some extent, the impacts are already accounted for in the determination of site index, particularly in cruised second growth.

Various treatments are available:

- The trend is away from prescribed burning.
- Mechanical site preparation is commonly applied by Menzies Bay Division in Block 2.
- Port McNeill Division has achieved dramatic results with fertilization at time of planting.

Growth delays are modelled as:

- Douglas-fir salal areas in Blocks 1 and 2:
    - ◊ Untreated. Five years delay.
    - ◊ Treated. Two years delay.
- Redcedar salal areas in Blocks 3, 4, 6, and 7:
    - ◊ Untreated (Blocks 3 and 4). Ten years delay.
    - ◊ Untreated (Blocks 6 and 7). Five years delay.
    - ◊ Treated. Two years delay.

6.34 Tree Improvement

MB's seed procurement strategy includes maintaining an inventory of improved seed through supply from our own seed orchard and purchase from orchards on the Coast.

An average yield gain of 3% is attributed to improved seed for Douglas-fir type from 1990 onwards and for western hemlock type from 1995 onwards. This is based on the average gain of 5%, as agreed by the Tree Improvement Council in 1990, reduced by 40% according to recent records of the proportion of planting with seedlings developed from wild seed. Expectations are that the proportion of planted seedlings from improved seed and the gains from further selection will increase with time. These additional benefits are not modelled in this analysis.

The 3% gain from tree improvement is only assigned to those areas that are planted with 600 sph or more. Gain is calculated during the analysis by the Forest Estate Model (FEM).

6.35 Nonrecoverable Losses

Loss of timber to fire has been small. Records for the last 20 years indicate that standing old-growth timber and of growth in second growth has been about 10 000 m^3 per year (0.25% of the AAC for MP No. 6). MB has always emphasized immediate fire suppression and maintained the resources to do the job.

Timber loss (not salvaged) to epidemic outbreaks of disease and insects has been insignificant. MB, through it's own patrols, has supplemented Forestry Canada insect patrols. Any areas of epidemic outbreaks will be salvaged.

MB is committed to salvaging windthrow. An allowance for patch windthrow that is not recovered is included in the following.

In this analysis, an allowance of 0.75% of the harvest volume is made for non-recoverable losses.

6.36 Operational Adjustment Factors (OAFs)

OAFs are applied to account for a range of possibilities which might impact on future yields during the life of a stand and which may not be represented in the yield models. MB procedures are somewhat different from those of the Ministry of Forests.

Some OAFs are already included in the development and application of Y-XENO yield tables and regeneration models:

- ☐ The permanent sample plots (PSPs) used to develop and calibrate Y-XENO have been measured for periods averaging at least 20 years and up to 60 years. Thus at least some of the random losses to wind, snow, ice and death to other causes are represented in Y-XENO. Sampling in the late 1960s and early 1970s showed that *Heterobasidion annosa* was widespread amongst hemlock PSPs. In a recent study of Douglas-fir PSPs, *Phellinus weirii* was found in 35% of 212 plots surveyed (G. Beale, pers. Comm.).

- ☐ The regeneration models recognize differences in stocking and impacts of brush competition on growth.

Additional allowances are made for unmappable nonproductive land, pest and disease. Most stands include small areas of nonproductive land, e.g., rock and wet areas smaller than the mapped minimum of 2 ha.

Beginning in the early 1980s, a measure of nonproductive land as a percent of the total number of assessment plots has been made during stocking surveys and entered into the inventory database. On average, the non-productive area for the 66 000 ha so assessed is less than 2.5%.

A greater percentage of small nonproductive areas was recorded for Blocks 1 and 5. Therefore, a higher reduction allowance has been applied to these working circles (6%) than the 4% applied to the other working circles.

An allowance of 2% is made for pests and disease losses over and above those experienced within the PSPs and considered expressed in the yield tables.

The total additional volume reduction factors by working circle applied in FEM to future forests to cover the minor nonproductive areas and insect and disease losses are:

Working Circle	
Blocks 1 and 5	8%
Blocks 2, 3, 4 , 6 and 7	6%

6.37 Decay, Waste and Breakage

Y-XENO yield table volumes are compiled to close utilization. Factors used to obtain AAC utilization are based on the 1976 BC MoF, Decay, Waste and Breakage Factors for F1Z B (Vancouver Island), ages 81 years to 120 years:

	Species Association	
	Douglas-fir	**Western Hemlock**
Decay and Waste	0.99	0.975
Breakage	0.96	0.960
Combined	0.95	0.935
	(5%)	(6.5%)

6.38 Example of Applying Adjustments to Yield Tables

The yield table volumes (shown in Appendix 2) are estimated for close utilization. Items discussed in Sections 6.33 to 6.37 above are applied to derive volumes used in the TSA. The following example illustrates the procedure for calculating a net volume.

The example is a western hemlock stand in Block 1, with a site index of 27 and regeneration model of 122. What is the net volume at age 80.

Item Description	Volume Adjustment
Brush competition. Treated but still impacts	Reduce yield table age by four years
Tree improvement. Planted with 1200 sph	Multiply by 1.03
OAFs for Block 1	Multiply by 0.92
Breakage and decay	Multiply by .935

Refer to Yield Table 33 in Appendix 2. The close utilization volume at 76 years (80-4) is 894 m^3 per hectare. To obtain the net volume multiply:

$$894 \times 1.03 \times 0.92 \times 0.935 = 792 \text{ m}^3 \text{ per hectare}$$

This volume is 84% of the yield table volume at 80 years.

6.4 Application of Yield Projection to the Inventory

6.41 Old Growth

Estimate of volume is assumed to be static over time, i.e., growth of old trees and in growth of understory trees is balanced by decay and death. This is supported by measurement and analysis of permanent sample plots established by MB in the early 1970s and similar results reported from Washington(1).

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(1) DeBell, D.S. and J.F. Franklin. 1987. *Old Growth Douglas-fir and Western Hemlock: A 36-Year Record of Growth and Mortality.* Western Journal of Applied Forestry 2(4):111-114.

6.42 Cruised Second Growth

MB reinventories second growth when it reaches pole size, generally between 20 years and 40 years of age. The resulting stocking information (basal area or volume estimates) is used to assign yield tables to these stands.

One set of six yield tables (700 series for Douglas-fir and 800 series for hemlock) has been developed for each species association. The yield tables cover the range of stocking within the present inventory.

The calculated site height and volume (for stands of 25 m site height or greater at time of inventory) or basal area (for stands down to 12 m at time of inventory) is used to assign the closest yield table.

The working landbase (after reduction for sensitive sites and non-timber resources) has 76 904 ha that are assigned yield tables in this manner.

6.43 Uncruised Second Growth and All Future Stands

The regeneration models and associated yield tables are assigned according to the procedures described above in Section 6.2. Note that the yield tables listed in Section 6.7 are for close utilization and that the adjustments described in Section 6.3 are applied in the analysis.

6.44 Note on Use of Douglas-fir and Hemlock Species Associations for Projecting Yields

Following past MB practice, the yield tables are nominally for stands of Douglas-fir and western hemlock, but are used for all conifers. This is because there has been insufficient data available to MB to derive separate models for each of the other species, and because relatively few MB sample plots are composed of only one species.

As the basis for allocation, volumes on MB sample plots, where *amabilis fir*, western redcedar and Sitka spruce were dominant, were compared with the Douglas-fir and hemlock yield tables. All these species were closer to the hemlock than the Douglas-fir model. With no data for yellow cypress and coastal lodgepole pine, these species were allocated to the lower yielding Douglas-fir model. The site index used for assigning yield is that of the leading species.

6.5 Assignment of Site Index to Coniferous Inventory

6.51 Inventory Completed in 1964

All productive and accessible coniferous areas were assigned site indexes in the 1960s inventory. These have subsequently been converted to a base of breast height age 50 years and to metric. Site indexes are based on:

- King (1966) for the Douglas-fir species association which includes Douglas-fir, pines and cypress.
- Barnes (Bulletin 1273) for the hemlock species association which includes western hemlock, mountain hemlock, sitka spruce, true fires and redcedar.

These site index assignments apply to 44% of the productive coniferous inventory for TFL 39 (1991 inventory). Of this, 34% is in old growth and 10% is in second growth.

6.52 More Recent Cruising

Information from areas cruised during the last 15 years has been added to the inventory.

These areas comprise 19% of the total productive coniferous area (1990 inventory), 13% in old growth (from Operational Cruising) and 6% in second growth (from 21+ Cruising).

The following table shows the site index curves assigned. All are based on 50 years breast height age:

Species	Operational Cruise	21+ Cruise
Douglas-fir Pine Cypress	King (1966)	King (1966)
Hemlock Sitka spruce	Wiley (1978) MB adjustment	Wiley (1978) BC adjustment
True firs	Kurucz (1982) with adjustment	Kurucz (1982)
Western redcedar	Kurucz (1985) with adjustment	MB (1978)

6.53 Younger Second Growth and NSR

Operational foresters assign site index to these areas based on the site index of the previous crop and examination of site factors.

This category is 28% of the productive coniferous areas (1990 inventory).

6.54 Areas Classified as Inaccessible in the 1960s Inventory

Areas classified as inaccessible in the 1960s inventory were not cruised.

Since then, photocoding has been used to estimate volumes and site indexes for these areas.

They are 9% of the 1990 inventory of productive coniferous area.

6.55 Site Index and Species Conversion

Site index has been assigned according to the leading species in each stand. This TSA includes the conversion of existing deciduous (mainly alder) stands to conifer and on drier sites the conversion of existing stands with primary species western hemlock to Douglas-fir stands.

In the TSA, site index is not changed with conversion from deciduous to conifer. This is a “conservative” assumption as evidence from cruise plots show for the same area, that conifer (Douglas-fir and western hemlock) site indexes are typically higher than that for alder.

Measurements show on drier sites that the site index for Douglas-fir is usually higher than that for western hemlock. In the analysis, when western hemlock on these sites is converted to Douglas-fir, site index is increased by an average of 2 m (one third of the area stays at the same 3-meter site index class and two thirds is increased by one 3-meter site index class). The working forest area affected by this species change is 20 526 ha.

6.56 Review of Site Index Estimates

Site index curves developed for coastal species and used do not work in very old stands (perhaps from age 120 years up). In these stands many of the dominant trees have been suppressed for parts of their lives and ages are difficult to measure. When existing site index curves are used in these old stands, the growth potential of the area is underestimated.

In young stands (generally less than 20 years of age) the relationship between age and height is often unstable as the trees compete for light, water and nutrients. In very young stands, the trees may not have reached a sufficient height to register on the site index curve.

In summary, estimates of site index in young and old stands are often inaccurate.

MB has developed a biophysical decision tree to improve site index estimates for strategic (forest level) analyses. The basic idea is to relate a known series of second growth site indices to biophysical site attributes, such as geographic location and elevation. Once the relationship is established, site index may be estimated for all stands in the forest based on specific biophysical site factors.

MB has a large database of second growth permanent sample plots and cruise plots as well as research plots established for this purpose. These have permitted the development, calibration and validation of the Decision Tree.

The decision tree is based on species, geographic location (longitude, latitude) and a broad ecological classification. It is proposed that slope, slope shape and aspect will be added to the operational tree over the next three years as these variables become available within MB’s G.I.S. system. The addition of narrow elevation bands, slope, slope shape and aspect makes the site specific estimates more precise but does not improve the overall average accuracy of the predictions.

The MB biophysical decision tree has been presented to MoF Research Branch and has met with informal scientific and technical approval. Criticisms and suggestion have been incorporated into the procedure.

Option 12 incorporates application of MB's biophysical decision tree for estimating site index for young and old stands. A distribution of site indexes has been developed for each end node in the decision tree and applied all stands in the inventory except for 21+ Cruised second growth (measured site indexes used for these stands).

6.6 MoF Adjustments to Yield Estimates

After the MoF reviewed MB yield assumptions, adjustments were made to better reflect MoF estimates. These yield adjustments are applied in most options. An exception is Option 11, designed to show the impact of the changes. The adjustments are as follows:

- All "pure" Douglas-fir association yield table volumes are reduced by 10%. "Pure" is defined as those yield tables that have a component of up to 400 sph of species other than Douglas-fir. This includes regeneration model numbers 10 to 50 and 1010 to 1028 and yield table numbers 710 to 760 applied to cruised stands in the current inventory.
- All western hemlock association yields are increased by 5%. This includes regeneration model numbers between 100 and 200 and yield table numbers 810 to 860, applied to cruised stands.
- OAFs are increased by reducing volumes for all regeneration model yield tables (numbers 10 to 200 and 1010 to 1050) by 5%.

7.0 Harvesting Assumptions

7.1 Harvest Flow Constraints

- For most options, the TFL harvest is not allowed to fall below LRSY. In the TSA, LRSY is such that the total forest volume (volume in stands of 14 m site height and greater) exhibits minimal long-term trends.
- Where consistent with integrated resource management requirements, harvest levels will be constrained to ensure that harvest reductions of more than 10% per decade are avoided unless such reductions are necessitated by timberland reallocation to higher land use. In Blocks 5 and 7 (which do not directly support communities), the transition to LRSY may require harvest reductions in excess of 10% per decade.

7.2 Minimum Merchantability Standards

In the TSA, second growth (new forest) is not considered for harvest until it has attained minimum merchantability standards (maturity).

Objectives for developing these standards include volume production, flexibility to work with harvest scheduling constraints and harvest economics:

- ❑ As a first step, maturity is defined as the age at which MAI is first within 0.2 m^3 per hectare per year of culmination MAI. This is consistent with the objective of capturing near maximum volumes. MAI curves, particularly for lower sites, are relatively flat near their peak. Maturity may be 5 to 20+ years earlier than the age of culmination MAI, providing flexibility for harvesting areas over an extended period (harvest portions before, at, and beyond culmination of MAI).

- ❑ For some low sites, the maturity age resulting from the first step may result in stands of very low volume and/or piece size. As a second step, a minimum volume of 250 m^3 per hectare and a minimum average dbh of 25 cm is required for “maturity”.

  These limits have rarely been tested recently in TFL 39 as second-growth harvesting is from the readily available, older (larger tree size and higher volume) stands.

  Southern Vancouver Island thinning operations (which occur below the above limits) and other second-growth harvesting indicate for the longer term that these limits are reasonable.

Merchantability ages are included with the yield tables in Appendix 2 under the heading of merchantable age.

Within FEM, all stands must meet these merchantability ages before becoming eligible for “harvesting”. Note that in the TSA, areas are often harvested well beyond their merchantability ages, depending on the availability of “merchantable” timber, harvest priority rules and cover class constraints.

7.3 Harvest Priority

7.31 Transition from Old Growth to Second Growth

- The working circles vary in timber harvesting history. Blocks 1, 3 and 4 have experienced more timber harvesting activity than the other blocks.
- Introduction of forest cover constraints for the management of non-timber values will also affect the transition to second growth. In some second-growth areas, harvesting will commence earlier and continue over an extended period to achieve the desired forest structure.
- Accordingly, in Blocks 1, 3 and 4, second-growth harvests are scheduled to occur during the first period and to increase over time. The transition to second growth may occur at a later date in the other blocks.
- Results of the 20-Year Harvest Plan exercises will assist in defining, for each working circle, the transition from second growth to old growth.

7.32 Old Growth

The initial priority is to harvest proportionally (according to volume) across the site index and regeneration model ranges. The bias towards higher-site indexes used in previous analyses has been dropped as an increase in spatial harvest schedule constraints (block size, adjacency and cover class constraints) has reduced planning flexibility.

Harvest priority rules for both second growth and old growth are secondary to forest cover constraints, e.g., restrictions to meet visual landscape, community watershed and avalanche area management requirements.

7.33 Second Growth

A two-level ranking procedure is used in assigning areas for harvest:

- First priority is to cut any area that exceeds “maximum” age (when MAI drops more than 0.5 m^3 per hectare per year below culmination MAI subject to an absolute maximum of 200 years for areas of Site Index 18 and greater and 300 years for lower sites).

- ☐ Second priority is to cut those areas between "maturity" (minimum merchantability standards) age and "maximum" age following the order above.

Again, as described in Section 7.32, these rules are secondary to forest cover constraints.

7.4 Initial Harvest Levels

Initial harvest levels for this TSA assume continuation of the strategy outlined in MP #6. That is to gradually adjust harvest levels towards our best estimate of the long-run sustainable yield (LRSY) of the forest. Such gradual change in harvest levels over time encourages stability in communities dependent on forest management in TFL 39.

The initial harvest level is 3 733 000 m^3/year or 85 000 m^3/year less than the AAC of 3 818 000 m^3/year for MP #6. This decrease includes 22 000 m^3/year reduction during the moratorium on the lower Tsitika River.

There is some reallocation of harvest between blocks (compared to MP #6), partly based on the increasing availability of merchantable second growth particularlly in Blocks 1 and 3.

TABLE 7.4.1 **Harvest Levels (000 m^3/year)**

Block	MP #6	Initial Harvest Levels MP #7 TSA
1	424	450
2(1)	1 404	1 348
3 & 4	410	420
5	150	100
6	1 250	1 220
7	180	195
Total	3 818	3 733

1) Includes 22 000 m^3/year reduction for moratorium in Lower Tsitika.

8.0 INTEGRATED RESOURCE MANAGEMENT

This TSA explicitly recognizes a wide range of sensitive sites and non-timber resource concerns.

This section describes the status of non-timber resource inventories, and the approaches taken to consider these values in the TSA, reductions to the working landbase and the application of cover class (rate of harvest) constraints.

8.1 Status of Non-Timber Resource Inventories

Forested areas by non-timber resource category are shown in Table 8.1.1. All category areas are from inventory maps except for Ef2 areas which are estimated as described in Section 8.12. The Table shows that significant portions of TFL 39 have been mapped as important for fisheries, wildlife, recreation and visual landscape values and as unstable sites.

Note that the areas in Table 8.1.1 do not recognize any overlap that may occur between resource values.

Management implications of these sensitive sites and non-timber resource concerns are modelled in the TSA as either a reduction in the timber management working landbase or as a cover class constraint. The cover class constraints for avalanche zones, community watersheds and visual landscapes are described in Section 8.3. Area reductions are discussed in Section 8.2. Sections 8.11 to 8.13 provide more details on community watersheds and Ef2 and Es2 Areas.

TABLE 8.1.1. Forested Areas (1)(2) of Sensitive Sites and Non-Timber Resources (ha)

		Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Avalanche	(Ea1)	5 028	591	1 109	559	--	474	7 761
Soils	(Es1)	13 220	16 464	2 097	3 560	27 019	4 883	67 243
	(Es2)	15 632	19 324	5 590	3 525	16 225	5 483	65 779
Total		28 852	35 788	7 687	7 085	43 244	10 366	133 022
Fisheries								
Streams and Estuaries	(Ef1)	753	2 205	719	329	2 874	298	7 178
Lakes	(Ef1)	1 441	323	254	94	758	413	3 283
	(Ef2)	301	1 475	511	223	1 952	233	4 695
Total		2 495	4 003	1 484	646	5 584	944	15 156
Wildlife								
Deer and Elk	(Ew1)		6 895	422				7 317
	(Ew2)		652	43				695
Bear	(Ew1)				852		191	1 043
	(Ew2)						882	882
Goats	(Ew1)				681			681
Birds	(Ew1)					19		19
Total			7 547	465	1 533	19	1 073	10 637
Regeneration	(Ep1)	4			3			7
	Tsitika		3 469					3 469
Water Supply	(Eh1)	29	234	15				278
Community Watersheds		159	1 063	304				1 526
Recreation	(Er1)	3 032	2 106	26	56	1 435	685	7 340
	(Er2)	12 071	2 408	314	888	3 837	410	19 928
Total		15 103	4 514	340	944	5 272	1 095	27 268
Heritage						309		309
Visual Landscape								
Retention		4 134	1 855	471	853	1 244	625	9 182
Partial Retention		48 103	17 584	6 218	3 011	69 575	7 031	151 522
Modification		37 388	34 648	9 506	5 884		4 412	91 838
Total		89 625	54 087	16 195	9 748	70 819	12 068	252 542
TOTAL FOREST AREA		**147 345**	**198 574**	**63 028**	**34 653**	**228 653**	**50 202**	**722 455**

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(1) Includes productive and nonproductive (scrub) forest land.

(2) Information as of March 31, 1994.

8.11 Community Watersheds

TABLE 8.11.1. Description of Community Watersheds

		Restrictions on Timber Management	
Working Circle	Name	Netdowns	Cover Class Constraints
Block 1	Jeffered Creek	Yes	Yes
Block 1	Lang Creek	Yes	No
Block 1	Myrtle Creek	Yes	No
Block 2	Newcastle Creek	Yes	Yes

8.12 Ef2 Areas

Ef2 Areas are fisheries sensitive zones which include off-channel rearing habitats, flood prone areas, islands and side channels. They occur outside the streamside management zones (Ef1).

TFL 39 has only been partially mapped for Ef2 Areas. An allowance has been developed based on detailed mapping in the following sample watersheds:

Watershed	Block
Memekay	2
Survey	6
Security	6
Koeye	7

Ef2 Areas and length of Ef1 Stream were determined for the sample watersheds. The resulting average relationship of hectares of Ef2 to kilometers of Ef1 Stream was then applied to length of Ef1 Stream by block to estimate Block Ef2 allowances.

8.13 ES2 Areas

Netdown factors were developed for three subregions in TFL 39:

Subregion 1: Blocks 2, 3 and 4 and the southern part of Block 1.

Subregion 2: Blocks 5 and 7 and the northern part of Block 1.

Subregion 3: Block 6.

A detailed examination of sample areas in each subregion determined the anticipated high-risk areas and hence the netdown factors for the mapped Es2 Areas. The resulting Es2 netdown factors which are used in this analysis are:

Subregion 1: 13.5%.

Subregion 2: 18.2%.

Subregion 3: 18.3%

8.2 Reductions to the Working Landbase For Sensitive Sites and Non-Timber Resource Values

These area reductions are made after deductions for non-forest, nonproductive, low sites and physically inoperable areas. Table 8.2.1 shows the reduction in area and Table 8.2.2 the reduction in mature (old growth) volume. Note that area reductions include old growth, second growth and NSR, i.e., they do not directly relate to old growth volumes.

The reduction factors have been applied to the total mapped area (after allowance for physically inoperable areas) to obtain the areas and volumes in the tables. For example the 2 766 ha of Es1 in Block 1 is multiplied by 0.9 to obtain the 2 489 ha in Table 8.2.1.

The totals in Tables 8.2.1 and 8.2.2 are simple additions across the categories in the tables. The item "Net" at the end of each table excludes any area overlap that may occur between resource values. These "Net" areas and volumes are included in Section 5.2 on "Determination of the Working Landbase".

TABLE 8.2.1. Reductions to the Productive Operable Area for Sensitive Sites and Non-Timber Resources (ha)

		Reduction Factor	**Block 1**	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Avalanche	(Ea1)	0.2	164	101	38	37	--	48	388
Soils	(Es1)	0.9	2 489	6 615	1 320	543	15 656	1 940	28 563
	(Es2)	0.135-0.183(1)	1 281	1 806	575	279	2 068	576	6 585
Total			3 770	8 421	1 895	822	17 724	2 516	35 148
Fisheries									
Streams & Estuaries	(Ef1)	0.9	598	1 862	618	143	2 465	255	5 941
Lakes	(Ef1)	0.9	933	239	185	14	535	243	2 149
	(Ef2)	0.5	146	715	247	108	946	113	2 275
Total			1 677	2 816	1 050	265	3 946	611	10 365
Wildlife									
Deer & Elk	(Ew1)	1.0		6 330	388				6 718
	(Ew2)	0.5		318	16				334
Bear	(Ew1)	0.9				650		155	805
	(Ew2)	0.5						416	416
Goats	(Ew1)	0.9				409			409
Birds	(Ew1)	0.9					17		17
Total				6 648	404	1 059	17	571	8 699
Regeneration	(Ep1)	0.9	4						4
	(Tsitika)	0.9		2 091					2 091
Water Supply	(Eh1)	0.9	25	148	13				186
Recreation	(Er1)	0.9	140	753	23	50	717	532	2 215
	(Er2)	0.5	1 400	1 030	146	179	1 228	131	4 114
Total			1 540	1 783	169	229	1 945	663	6 329
Heritage Sites		0.9					278		278
TOTAL			**7 180**	**22 008**	**3 569**	**2 412**	**23 910**	**4 409**	**63 488**
NET			**6 866**	**19 808**	**3 361**	**1 994**	**23 117**	**4 059**	**59 205**

---

(1) Netdown factors varied as follows:

- Blocks 2, 3 and 4 and southern part of Block 1: 13.5%.
- Blocks 5 and 7 and northern part of Block 1: 18.2%.
- Block 6: 18.3%.

TABLE 8.2.2. Reductions to Mature Volumes for Sensitive Sites and Non-Timber Resources (000 m^3)

		Reduction Factor	**Block 1**	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**TOTAL**
Avalanche	(Ea1)	0.2	78	75	26	21	--	32	232
Soils	(Es1)	0.9	707	4 064	708	304	8 821	1 136	15 740
	(Es2)	0.135-0.183(1)	341	1 072	301	158	1 085	335	3 292
Total			1 048	5 136	1 009	462	9 906	1 471	19 032
Fisheries									
Streams & Estuaries	(Ef1)	0.9	104	760	125	74	1 082	172	2 317
Lakes	(Ef1)	0.9	49	100	69	4	267	158	647
	(Ef2)	0.5	19	303	69	49	388	67	895
Total			172	1 163	263	127	1 737	397	3 859
Wildlife									
Deer & Elk	(Ew1)	1.0		4 867	305				5 172
	(Ew2)	0.5		228	16				244
Bear	(Ew1)	0.9				327		97	424
	(Ew2)	0.5						294	294
Goats	(Ew1)	0.9				290			290
Birds	(Ew1)	0.9					11		11
Total				5 095	321	617	11	391	6 435
Regeneration	(Ep1)	0.9	2						2
	(Tsitika)	0.9		1 391					1 391
Water Supply	(Eh1)	0.9		50					50
Recreation	(Er1)	0.9	25	493	6	15	292	352	1 183
	(Er2)	0.5	426	466	42	88	556	78	1 656
Total			451	959	48	103	848	430	2 839
Heritage Sites		0.9					194		194
TOTAL			**1 751**	**13 869**	**1 667**	**1 330**	**12 696**	**2 721**	**34 034**
NET			**1 737**	**12 503**	**1 579**	**1 106**	**12 295**	**2 475**	**31 695**

---

(1) Netdown factors varied as follows:

- Blocks 2, 3 and 4 and southern part of Block 1: 13.5%.
- Blocks 5 and 7 and northern part of Block 1: 18.2%.
- Block 6: 18.3%.

8.3 Forest Cover requirements

8.31 Adjacent Cutblocks and Greenup

- ❑ After an area is harvested, adjacent areas cannot be harvested until a “free-to-grow” status is achieved. An allowance is made for the harvest scheduling impacts of this constraint by recognizing the average period to achieve free-to-grow and the number of harvest passes required to harvest all areas once.
- ❑ The average period to achieve free-to-grow is 10 years.
- ❑ It is estimated that four harvest passes would be required to harvest all areas once.
- ❑ The forest cover constraint used to model adjacency is then at a maximum of 25% (four harvest passes) of the working forest area and may be younger than 10 years of age.
- ❑ This cover constraint is applied to the total working forest areas of each working circle that are not included in more stringent visual landscape cover class constraints.

8.32 Visual Landscape

Visual Quality Objectives (VQOs) have been mapped in TFL 39 on areas where visual quality was of potential significance.

In the TSA, forest cover constraints are applied separately to each VQO class within a working circle. The constraints limit the rate of harvest by defining the maximum area that may be below a certain height at any given time.

The procedure used to define these constraints generally follows that laid out in "Procedures for factoring recreation Resources into Timber Supply Analyses", Recreation branch Technical report 1993:1, Province of British Columbia Ministry of Forests.

The two main variables used to define the constraints are the Visually Effective Greenup age (VEG) and the allowable visible alteration.

8.321 Visually Effective Greenup Age (VEG)

VEG was defined for the base options of this TSA as the average age to reach a site height of 5m . Regeneration delay, assumed for most options to average 2 years, must be added to VEG to obtain years from harvest.

TABLE 8.321.1. **Visually Effective Greenup Ages (years) for 5 m Site Height**

Working Circle	VQO Class		
	Retention	Partial Retention	Modification
Block 1	16	16	16
Block 2	16	16	15
Blocks 3 and 4	13	16	15
Block 5	22	16	16
Block 6	17	17	N/A
Block 7	19	18	18

Option 4 shows the impact of reducing VEG to the average age to achieve a site height of 3 m. This option also portrays a reduction in average regeneration delay in visual landscape areas from two years to one year. Operations are beginning to put more emphasis on earlier re-establishment in visually sensitive areas.

TABLE 8.321.2. **Visually Effective Greenup Ages (years) for 3 m Site Height**

Working Circle	VQO Class		
	Retention	Partial Retention	Modification
Block 1	12	12	12
Block 2	12	11	11
Blocks 3 and 4	10	12	11
Block 5	16	11	12
Block 6	12	12	N/A
Block 7	14	14	13

8.322 Allowable Visual Alteration

The Recreation Branch MoF procedures define ranges of percent visual alteration by VQO class. Further they recommend that where a detailed visual landscape inventory is lacking (as in TFL 39) that the mid- range values for each class are used.

The percent visual alterations were developed for operational application from a perspective viewpoint. The TSA is done from a planimetric viewpoint. The perspective percents are more constraining when applied planimetrically. The use of the "practical " percent visual alterations in Options 3 and 4 make an allowance for this perspective/planimetric effect.

The ranges, mid range and "practical" percent visual alteration are shown in Table 8.322.1.

TABLE 8.322.1.

VQO Class	Percent Visual Alteration		
	Range	**Mid-Range**	**Practical**
Retention	1 to 5	3.0	4.00
Partial retention	6 to 15	10.0	12.50
Modification	16 to 25	20.5	22.75

The percent visual alteration values are adjusted to express them relative to the area available for timber management and to account for the pattern of dispersal of available and unavailable areas within visual landscape units.

The first step is to determine the G/O ratio, the ratio of available (operable) area to the total green area (includes all productive and non-productive forest). G/O ratios vary with definition of the available landbase. Those described in Table 8.322.2 below relate to the working landbase. The percent visual alteration value is multiplied by the G/O ratio to express it relative to the available area instead of relative to the green area.

The second adjustment step is to estimate dispersion, that is the relative distribution of available and unavailable areas in a visual landscape unit. Of interest is whether the available area is concentrated in a few portions of is more evenly distributed throughout the landscape units.

Maps were produced of each Block in TFL 39 showing visual landscape units overlaid with available and unavailable forest types. The maps showed that the distribution of available and unavailable varies considerably, but that on average a semi-dispersed classification is appropriate. For semi-dispersed, only half of the green area that is unavailable is recognized in calculation of the percent visual alteration. In other words the G/O ratio is adjusted as follows: (G/O+1)/2.

This is the same rule as used for “clustered areas” in the Recreation Branch, MoF Report. Semi-dispersed is not, however, defined the same as clustered. It is recognized that the maximum number of immediately adjacent blocks for a semi-dispersed classification varies with the situation and with the number of harvest passes. There will also be more harvest passes and, hence, more “allowed” adjacent cut blocks for a semi-dispersed situation with a lower proportion of available timber.

The resulting percent visual alterations by working circle and VQO type are shown in Table 3.322.2. Note that the table includes values for both the mid-range and "practical" percent visual alteration and also lists VEG for both 5m and 3m site heights.

TABLE 8.322.2. Definition of Visual Landscape Constraints

Working Circle	VQO Class	Green (ha)	Working Landbase (ha)	G:O	Percent* Visual Alteration		VEG (years)	
					Mid-Range	Practical	5 m	3 m
Blk 1	Retention	4 134	1 539	2.7	5.5	7.4	16	12
1	Partial Retention	48 103	28 280	1.7	13.5	16.9	16	12
1	Modification	37 388	16 719	2.2	33.2	36.8	16	12
Blk 2	Retention	1 855	344	5.4	9.6	12.8	16	12
2	Partial Retention	17 584	11 654	1.5	12.5	15.7	16	11
2	Modification	34 648	27 374	1.3	23.2	25.8	15	11
Blk 3&4	Retention	471	414	1.1	3.2	4.3	13	10
3&4	Partial Retention	6 218	5 533	1.1	10.6	13.3	16	12
3&4	Modification	9 506	8 538	1.1	21.7	24.0	15	11
Blk 5	Retention	853	38	22.4	35.2	46.9	22	16
5	Partial Retention	3 011	1 381	2.2	15.9	19.9	16	11
5	Modification	5 884	3 088	1.9	29.8	33.0	16	12
Blk 6	Retention	1 244	964	1.3	3.4	4.6	17	12
6	Partial Retention	69 575	46 509	1.5	12.5	15.6	17	12
Blk 7	Retention	625	296	2.1	4.7	6.2	19	14
7	Partial Retention	7 031	3 425	2.1	15.3	19.1	18	14
7	Modification	4 412	2 175	2.0	31.0	34.4	18	13
TFL 39	Retention	9 182	3 595	2.6				
	Partial Retention	151 522	96 782	1.6				
	Modification	91 938	57 894	1.6				
TOTAL		**252 542**	**158 271**	**1.6**				

* Percent visual alteration relates to the available area, e.g., Block 1, Retention, Mid-Range.
Percent visual alteration = (G/O +1)/2 X 3 = (2.7+1)/2 X 3= 5.5%

8.33 Community Watersheds

A forest cover constraint is applied to the net working landbase in Newcastle Creek of Block 2 and in Jeffered Creek in Block 1. It allows no more than 30% of the green area of each watershed to have regeneration less than 7 m (20 years) at any given time.

TABLE 8.33.1. Community Watershed Cover Class Areas

Working Circle	Green Area (ha)	Net Working Landbase (ha)
Newcastle Creek Block 2	1 063	370
Jeffered Creek Block 1	128	108

8.34 Avalanche Areas

Avalanche runout zones have been mapped as Ea1 areas (Refer to Section 8.1). In addition to the 20% reduction in area (Section 8.2),a cover class constraint is applied by working circle to the Ea1 areas remaining in the working forest.

The constraint allows no more than 20% of the green area to be less than 30 years of age at any time.

TABLE 8.34.1. **Avalanche Cover Class Areas**

Working Circle	Green Area (ha)	Net Working Landbase (ha)
Block 1	5 028	599
Block 2	591	322
Blocks 3 and 4	1 109	147
Block 5	559	131
Block 7	474	150

There is no Ea1 in Block 6.

The net working landbase for Ea1 Areas is relatively small because of substantial reductions for non-productive and inoperable areas and for sensitive soils and other ESAs (including the 20% applied specifically to Ea1 Areas.

APPENDIX 1. Assignment of Regeneration Models to the Inventory

Refer to Section 6.2 for a discussion on Regeneration Models. Tables on Pages 2 to 11 of this appendix show, on a block basis, the percentage of each "regeneration type" that is assigned to the various regeneration models. The tables are:

Block 1	Old Growth	Page 2
Block 1	Second Growth	Page 3
Block 2	Old Growth	Page 4
Block 2	Second Growth	Page 5
Block 3		Page 6
Block 4		Page 7
Block 5	Old Growth	Page 8
Block 5	Second Growth	Page 9
Block 6		Page 10
Block 7		Page 11

Two tables are included (separately for old growth and second growth) for Blocks 1, 2 and 5 to allow for species conversion from western hemlock to Douglas-fir in some regeneration types.

Refer to the Block 1 old growth table on Page 2. Regeneration types are defined by the biogeo, species and site index descriptions. For example, the first one at the top left of the table (underlined) is described as:

Biogeo: CDF.
Species: Douglas-fir (Douglas-fir species association).
Site Index: P & M (poor and medium).

Note that regeneration types for Blocks 3, 4, 6 and 7 are described only by leading species in the inventory.

Back to the Block 1 Table on Page 2. The regeneration model 1018 is highlighted by underlining. The description 101/S/B indicates that there is both a slash and brush problem and that 101 natural seedlings will come in after burning and planting. First (after old growth) and later refer to rotations. The following columns show the percentage allocation within each regeneration type.

The Regeneration Model 1018 occurs on two rows. For the CDF/D.fir/P&M regeneration type, it occurs on 20% (10+10) of the area for the first rotation. In later rotations, however, only 10% will require prescribed burning (still Model 1018) as the other 10% is allocated to Model 1012 (101 sph and B for brush problems).

BLOCK 1 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR OlDGROWTH

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
1012	1012	101\B	101\B	0	40	0	20	0	30	0	0	0	0
1013	1013	101\Sa	101\Sa	20	0	10	0	10	0	0	0	0	0
1018	1012	101\S\B	101\B	10	0	0	0	10	10	0	0	0	0
1018	1018	101\S\B	101\S\B	10	10	10	10	10	10	10	10	0	0
1020	1020	400	400	10	10	10	0	40	20	20	30	30	30
1022	1022	400\B	400\B	30	20	0	20	10	20	10	10	0	0
1023	1023	400\Sa	400\Sa	10	0	20	0	10	0	10	0	10	10
1028	1022	400\S\B	400\B	0	10	10	10	0	0	0	0	0	0
1030	1030	800	800	10	10	20	20	10	10	30	30	30	30
1032	1032	800\B	800\B	0	0	20	20	0	0	0	0	0	0
1040	1040	1500	1500	0	0	0	0	0	0	20	20	30	30

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
118	118	300\S\B	300\S\B	0	0	0	0	10	10	0	0	0	0
120	120	500	500	20	0	10	20	20	10	20	20	10	10
122	122	500\B	500\B	0	20	0	0	20	40	5	5	0	0
130	130	1200	1200	0	0	5	5	0	5	10	10	20	20
132	132	1200\B	1200\B	0	0	0	0	10	20	5	5	0	0
140	140	1500	1500	0	0	10	10	0	0	5	5	15	15
150	150	3000	3000	0	0	15	5	20	10	25	25	25	25
160	160	6000	6000	0	0	0	0	15	5	20	20	20	20
170	170	9000	9000	0	0	0	0	5	0	10	10	10	10
1020	1020	400	400	30	20	20	10	0	0	0	0	0	0
1022	1022	400\B	400\B	10	40	10	30	0	0	0	0	0	0
1023	1023	400\Sa	400\Sa	20	0	10	0	0	0	0	0	0	0
1028	1028	400\S\B	400\S\B	10	10	10	10	0	0	0	0	0	0
1032	1032	800\B	800\B	10	10	10	10	0	0	0	0	0	0

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl193D.reh, sq3993.des
05-13-1994

BLOCK 1 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR SECONDGROWTH

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
1012	1012	101\B	101\B	0	40	0	20	0	30	0	0	0	0
1013	1013	101\Sa	101\Sa	20	0	10	0	10	0	0	0	0	0
1018	1012	101\S\B	101\B	10	0	0	0	10	10	0	0	0	0
1018	1018	101\S\B	101\S\B	10	10	10	10	10	10	10	10	0	0
1020	1020	400	400	10	10	10	0	40	20	20	30	30	30
1022	1022	400\B	400\B	30	20	0	20	10	20	10	10	0	0
1023	1023	400\Sa	400\Sa	10	0	20	0	10	0	10	0	10	10
1028	1022	400\S\B	400\B	0	10	10	10	0	0	0	0	0	0
1030	1030	800	800	10	10	20	20	10	10	30	30	30	30
1032	1032	800\B	800\B	0	0	20	20	0	0	0	0	0	0
1040	1040	1500	1500	0	0	0	0	0	0	20	20	30	30

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
118	118	300\S\B	300\S\B	0	0	0	0	10	10	0	0	0	0
120	120	500	500	20	0	10	20	20	10	20	20	10	10
122	122	500\B	500\B	0	20	0	0	20	40	5	5	0	0
130	130	1200	1200	0	0	5	5	0	5	10	10	20	20
132	132	1200\B	1200\B	0	0	0	0	10	20	5	5	0	0
139	1020	1200	400	30	20	20	10	0	0	0	0	0	0
139	1022	1200	400\B	10	40	10	30	0	0	0	0	0	0
139	1023	1200	400\Sa	20	0	10	0	0	0	0	0	0	0
139	1028	1200	400\S\B	10	10	10	10	0	0	0	0	0	0
140	140	1500	1500	0	0	10	10	0	0	5	5	15	15
141	1032	1500\B	800\B	10	10	10	10	0	0	0	0	0	0
150	150	3000	3000	0	0	15	5	20	10	25	25	25	25
160	160	6000	6000	0	0	0	0	15	5	20	20	20	20
170	170	9000	9000	0	0	0	0	5	0	10	10	10	10

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl1930.reh, sq3993.des
05-13-1994

BLOCK 2 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR OLDGROWTH

BIOGEO:				CWHa1	CWHa1	CWHb1	CWHb1	CWHb3	CWHb3	CWHb2	CWHb2	CWHb4	CWHb4
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
20	20	300	300	0	0	0	0	0	0	20	20	20	20
30	30	600	600	0	0	0	0	0	0	40	40	40	40
40	40	1500	1500	0	0	0	0	0	0	20	20	20	20
50	50	3000	3000	0	0	0	0	0	0	20	20	20	20
1020	1020	400	400	15	25	25	20	15	30	0	0	0	0
1022	1022	400\B	400\B	0	15	5	10	5	0	0	0	0	0
1024	1024	400\Sa	400\Sa	15	0	0	0	10	0	0	0	0	0
1030	1030	800	800	35	40	25	30	35	35	0	0	0	0
1032	1032	800\B	800\B	5	10	10	10	5	15	0	0	0	0
1033	1033	800\Sa	800\Sa	10	0	0	0	5	0	0	0	0	0
1040	1040	1500	1500	15	10	20	20	20	15	0	0	0	0
1050	1050	3000	3000	5	0	15	10	5	5	0	0	0	0

BIOGEO:				CWHa1	CWHa1	CWHb1	CWHb1	CWHb3	CWHb3	CWHb2	CWHb2	CWHb4	CWHb4
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
120	120	500	500	0	0	10	0	0	15	0	0	20	20
122	122	500\B	500\B	0	0	0	20	5	0	10	10	0	0
130	130	1200	1200	5	15	0	0	20	25	10	10	10	10
132	132	1200\B	1200\B	0	0	10	20	0	0	0	0	10	10
150	150	3000	3000	20	10	40	30	25	20	30	30	30	30
160	160	6000	6000	0	0	20	20	10	10	30	30	20	20
170	170	9000	9000	0	0	20	10	10	0	20	20	10	10
1020	1020	400	400	5	10	0	0	5	0	0	0	0	0
1022	1022	400\B	400\B	0	10	0	0	0	15	0	0	0	0
1024	1024	400\Sa	400\Sa	10	0	0	0	5	0	0	0	0	0
1030	1030	800	800	25	40	0	0	5	10	0	0	0	0
1032	1032	800\B	800\B	5	10	0	0	10	5	0	0	0	0
1033	1033	800\Sa	800\Sa	10	0	0	0	5	0	0	0	0	0
1040	1040	1500	1500	20	5	0	0	0	0	0	0	0	0

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:

Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl293.reh, sq3993.des
05-13-1994

BLOCK 2 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR SECONDGROWTH

BIOGEO:				CWHa1	CWHa1	CWHb1	CWHb1	CWHb3	CWHb3	CWHb2	CWHb2	CWHb4	CWHb4
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
20	20	300	300	0	0	0	0	0	0	20	20	20	20
30	30	600	600	0	0	0	0	0	0	40	40	40	40
40	40	1500	1500	0	0	0	0	0	0	20	20	20	20
50	50	3000	3000	0	0	0	0	0	0	20	20	20	20
1020	1020	400	400	15	25	25	20	15	30	0	0	0	0
1022	1022	400\B	400\B	0	15	5	10	5	0	0	0	0	0
1024	1024	400\Sa	400\Sa	15	0	0	0	10	0	0	0	0	0
1030	1030	800	800	35	40	25	30	35	35	0	0	0	0
1032	1032	800\B	800\B	5	10	10	10	5	15	0	0	0	0
1033	1033	800\Sa	800\Sa	10	0	0	0	5	0	0	0	0	0
1040	1040	1500	1500	15	10	20	20	20	15	0	0	0	0
1050	1050	3000	3000	5	0	15	10	5	5	0	0	0	0

BIOGEO:				CWHa1	CWHa1	CWHb1	CWHb1	CWHb3	CWHb3	CWHb2	CWHb2	CWHb4	CWHb4
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
120	120	500	500	0	0	10	0	0	15	0	0	20	20
122	122	500\B	500\B	0	0	0	20	5	0	10	10	0	0
130	130	1200	1200	5	15	0	0	20	25	10	10	10	10
132	132	1200\B	1200\B	0	0	10	20	0	0	0	0	10	10
139	1020	1200	400	5	10	0	0	5	0	0	0	0	0
139	1022	1200	400\B	0	10	0	0	0	15	0	0	0	0
139	1024	1200	400\Sa	10	0	0	0	5	0	0	0	0	0
139	1030	1200	800	25	40	0	0	5	10	0	0	0	0
140	1040	1500	1500	20	5	0	0	0	0	0	0	0	0
141	1032	1500\B	800\B	5	10	0	0	10	5	0	0	0	0
141	1033	1500\B	800\Sa	10	0	0	0	5	0	0	0	0	0
150	150	3000	3000	20	10	40	30	25	20	30	30	30	30
160	160	6000	6000	0	0	20	20	10	10	30	30	20	20
170	170	9000	9000	0	0	20	10	10	0	20	20	10	10

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl293.reh, sq3993.des
05-13-1994

BLOCK 3 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area)

BIOGEO:				all	all	all
SPECIES:				D.fir	Pines	Y.C.
S.INDEX(3):				all	all	all
REGENERATION MODEL						
Number(1)		Description(2)				
First	Later	First	Later			
20	20	300	300	0	0	20
30	30	600	600	0	0	40
40	40	1500	1500	0	0	20
50	50	3000	3000	0	0	20
1020	1020	400	400	30	30	0
1022	1022	400\B	400\B	20	20	0
1030	1030	800	800	20	20	0
1032	1032	800\B	800\B	20	20	0
1040	1040	1500	1500	10	10	0

BIOGEO:				all	all	all	all
SPECIES:				W.R.C.	Spruce	W.hem	Balsam
S.INDEX(3):				all	all	all	all
REGENERATION MODEL							
Number(1)		Description(2)					
First	Later	First	Later				
112	112	300\B	300\B	0	35	0	0
120	120	500	500	0	35	10	10
122	122	500\B	500\B	0	0	5	5
124	124	500\Sa	500\Sa	20	0	0	0
126	126	600\S	600\S	5	0	0	0
130	130	1200	1200	0	30	20	20
132	132	1200\B	1200\B	0	0	5	5
134	134	1200\Sa	1200\Sa	35	0	0	0
140	140	1500	1500	0	0	10	10
144	144	1500\Sa	1500\Sa	10	0	0	0
150	150	3000	3000	0	0	30	30
153	153	3000\Sa	3000\Sa	15	0	0	0
154	154	3000\Sa	3000\Sa	5	0	0	0
160	160	6000	6000	10	0	15	15
170	170	9000	9000	0	0	5	5

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:

Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl393D.reh, sq3993.des
05-13-1994

BLOCK 4 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area)

BIOGEO:				all	all	all
SPECIES:				D.fir	Pines	Y.C.
S.INDEX(3):				all	all	all
REGENERATION MODEL						
Number(1)		Description(2)				
First	Later	First	Later			
20	20	300	300	0	0	20
30	30	600	600	0	0	40
40	40	1500	1500	0	0	20
50	50	3000	3000	0	0	20
1020	1020	400	400	30	30	0
1022	1022	400\B	400\B	20	20	0
1030	1030	800	800	20	20	0
1032	1032	800\B	800\B	20	20	0
1040	1040	1500	1500	10	10	0

BIOGEO:				all	all	all	all
SPECIES:				W.R.C.	Spruce	W.hem	Balsam
S.INDEX(3):				all	all	all	all
REGENERATION MODEL							
Number(1)		Description(2)					
First	Later	First	Later				
112	112	300\B	300\B	0	35	0	0
120	120	500	500	0	35	10	10
122	122	500\B	500\B	0	0	5	5
124	124	500\Sa	500\Sa	20	0	0	0
126	126	600\S	600\S	5	0	0	0
130	130	1200	1200	0	30	20	20
132	132	1200\B	1200\B	0	0	5	5
134	134	1200\Sa	1200\Sa	35	0	0	0
140	140	1500	1500	0	0	10	10
143	143	1500\Sa	1500\Sa	10	0	0	0
150	150	3000	3000	15	0	30	30
153	153	3000\Sa	3000\Sa	5	0	0	0
160	160	6000	6000	10	0	15	15
170	170	9000	9000	0	0	5	5

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl493D.reh, sq3993.des
05-13-1994

BLOCK 5 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR OlDGROWTH

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
1012	1012	101\B	101\B	0	40	0	30	20	20	0	0	0	0
1013	1013	101\Sa	101\Sa	20	0	10	0	0	0	0	0	0	0
1018	1012	101\S\B	101\B	10	0	0	0	0	0	0	0	0	0
1018	1018	101\S\B	101\S\B	10	10	10	10	10	10	10	10	0	0
1020	1020	400	400	10	10	40	20	30	20	20	30	40	40
1022	1022	400\B	400\B	30	20	10	30	10	20	10	10	0	0
1023	1023	400\Sa	400\Sa	10	0	20	0	0	0	10	0	0	0
1028	1022	400\S\B	400\B	0	10	10	10	0	0	0	0	0	0
1030	1030	800	800	10	10	0	0	30	20	30	30	30	30
1032	1032	800\B	800\B	0	0	0	0	0	10	0	0	0	0
1040	1040	1500	1500	0	0	0	0	0	0	20	20	30	30

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
112	112	300\B	300\B	0	0	0	0	0	20	10	10	0	0
118	118	300\S\B	300\S\B	0	0	0	0	10	10	0	0	0	0
120	120	500	500	20	0	0	0	10	0	20	20	10	10
122	122	500\B	500\B	0	20	10	20	20	40	0	0	0	0
130	130	1200	1200	0	0	5	10	10	0	15	15	20	20
132	132	1200\B	1200\B	0	0	0	0	10	10	0	0	0	0
140	140	1500	1500	0	0	10	10	10	0	15	15	15	15
150	150	3000	3000	0	0	15	0	15	10	20	20	25	25
160	160	6000	6000	0	0	0	0	10	10	10	10	20	20
170	170	9000	9000	0	0	0	0	5	0	10	10	10	10
1020	1020	400	400	30	20	0	0	0	0	0	0	0	0
1022	1022	400\B	400\B	10	40	40	40	0	0	0	0	0	0
1023	1023	400\Sa	400\Sa	20	0	0	0	0	0	0	0	0	0
1028	1028	400\S\B	400\S\B	10	10	0	0	0	0	0	0	0	0
1032	1032	800\B	800\B	10	10	20	20	0	0	0	0	0	0

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:

Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl593D.reh, sq3993.des
05-13-1994

BLOCK 5 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area) FOR SECONDGROWTH

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir	D.fir
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
1012	1012	101\B	101\B	0	40	0	30	20	20	0	0	0	0
1013	1013	101\Sa	101\Sa	20	0	10	0	0	0	0	0	0	0
1018	1012	101\S\B	101\B	10	0	0	0	0	0	0	0	0	0
1018	1018	101\S\B	101\S\B	10	10	10	10	10	10	10	10	0	0
1020	1020	400	400	10	10	40	20	30	20	20	30	40	40
1022	1022	400\B	400\B	30	20	10	30	10	20	10	10	0	0
1023	1023	400\Sa	400\Sa	10	0	20	0	0	0	10	0	0	0
1028	1022	400\S\B	400\B	0	10	10	10	0	0	0	0	0	0
1030	1030	800	800	10	10	0	0	30	20	30	30	30	30
1032	1032	800\B	800\B	0	0	0	0	0	10	0	0	0	0
1040	1040	1500	1500	0	0	0	0	0	0	20	20	30	30

BIOGEO:				CDF	CDF	CWHa2	CWHa2	CWHb1	CWHb1	CWHb2	CWHb2	Mh	Mh
SPECIES:				W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem	W.hem
S.INDEX(3):				P+M	High	P+M	High	P+M	High	P+M	High	P+M	High
REGENERATION MODEL													
Number(1)		Description(2)											
First	Later	First	Later										
112	112	300\B	300\B	0	0	0	0	0	20	10	10	0	0
118	118	300\S\B	300\S\B	0	0	0	0	10	10	0	0	0	0
120	120	500	500	20	0	0	0	10	0	20	20	10	10
122	122	500\B	500\B	0	20	10	20	20	40	0	0	0	0
130	130	1200	1200	0	0	5	10	10	0	15	15	20	20
132	132	1200\B	1200\B	0	0	0	0	10	10	0	0	0	0
139	1020	1200	400	30	20	0	0	0	0	0	0	0	0
139	1022	1200	400\B	10	40	40	40	0	0	0	0	0	0
139	1023	1200	400\Sa	20	0	0	0	0	0	0	0	0	0
139	1028	1200	400\S\B	10	10	0	0	0	0	0	0	0	0
140	140	1500	1500	0	0	10	10	10	0	15	15	15	15
141	1032	1500\B	800\B	10	10	20	20	0	0	0	0	0	0
150	150	3000	3000	0	0	15	0	15	10	20	20	25	25
160	160	6000	6000	0	0	0	0	10	10	10	10	20	20
170	170	9000	9000	0	0	0	0	5	0	10	10	10	10

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl593D.reh, sq3993.des
05-13-1994

BLOCK 6 of TFL 39

REGENERATION MODEL ALLOCATION (percentage of area)

BIOGEO:				all	all	all
SPECIES:				D.fir	Pines	Y.C.
S.INDEX(3):				all	all	all
REGENERATION MODEL						
Number(1)		Description(2)				
First	Later	First	Later			
20	20	300	300	10	10	10
30	30	600	600	10	10	10
40	40	1500	1500	40	40	40
50	50	3000	3000	40	40	40

BIOGEO:				all	all	all	all
SPECIES:				W.R.C.	Spruce	W.hem	Balsam
S.INDEX(3):				all	all	all	all
REGENERATION MODEL							
Number(1)		Description(2)					
First	Later	First	Later				
112	112	300\B	300\B	0	25	0	0
120	120	500	500	0	20	0	0
122	122	500\B	500\B	0	10	5	5
125	125	500\Sa	500\Sa	15	0	0	0
126	126	600\S	600\S	5	0	0	0
130	130	1200	1200	5	30	0	0
132	132	1200\B	1200\B	0	0	5	5
135	135	1200\Sa	1200\Sa	20	0	0	0
136	130	1200\S	1200	5	0	0	0
140	140	1500	1500	15	0	20	20
150	150	3000	3000	25	10	40	40
160	160	6000	6000	10	5	20	20
170	170	9000	9000	0	0	10	10

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
Number is sph of natural regeneration
'\S' indicates benefits are available from site preparation
'\B' indicates benefits are available from brush treatment(s)
'\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl6930.reh, sq3993.des
05-13-1994

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REGENERATION MODEL ALLOCATION (percentage of area)

BIOGEO:				all	all	all
SPECIES:				D.fir	Pines	Y.C.
S.INDEX(3):				all	all	all
REGENERATION MODEL						
Number(1)		Description(2)				
First	Later	First	Later			
20	20	300	300	0	0	20
30	30	600	600	0	0	40
40	40	1500	1500	0	0	20
50	50	3000	3000	0	0	20
1020	1020	400	400	30	30	0
1022	1022	400\B	400\B	20	20	0
1030	1030	800	800	20	20	0
1032	1032	800\B	800\B	20	20	0
1040	1040	1500	1500	10	10	0

BIOGEO:				all	all	all	all
SPECIES:				W.R.C.	Spruce	W.hem	Balsam
S.INDEX(3):				all	all	all	all
REGENERATION MODEL							
Number(1)		Description(2)					
First	Later	First	Later				
112	112	300\B	300\B	0	35	0	0
120	120	500	500	0	35	10	10
122	122	500\B	500\B	0	0	5	5
124	124	500\Sa	500\Sa	20	0	0	0
126	126	600\S	600\S	5	0	0	0
130	130	1200	1200	15	30	20	20
132	132	1200\B	1200\B	0	0	5	5
134	134	1200\Sa	1200\Sa	10	0	0	0
135	135	1200\Sa	1200\Sa	10	0	0	0
140	140	1500	1500	10	0	10	10
150	150	3000	3000	20	0	30	30
160	160	6000	6000	10	0	15	15
170	170	9000	9000	0	0	5	5

(1) First and later refer to rotation. It is expected that prescribed burning will decrease in future rotations due to lower slash loads. In some situations there will be a species change in future managed rotations

(2) The Regeneration Description refers to:
- Number is sph of natural regeneration
- '\S' indicates benefits are available from site preparation
- '\B' indicates benefits are available from brush treatment(s)
- '\Sa' indicates growth impacts from salal; potential benefits from treatment

(3) Poor (P), Medium (M), and High (H) refer to site index groups:

P	less than or equal to SI 22
M	between SI 23 and SI 28
H	greater than or equal to SI 29

Regeneration Model Allocation and Description Files : bl793D.reh, sq3993.des
05-13-1994

APPENDIX 2. Y-XENO Yield Tables

Each yield table may be used for eleven 3-metre site index classes (12 to 42).

OAFs, as described in the body of the report, have to be applied for breakage and decay, tree improvement, brush impacts, regeneration delays and allowance for losses, etc., to arrive at the net yields.

An index to the tables indicates the conditions each table represents and in what management level they are used.

The yields in the tables do not include the effects of regeneration or growth delays, tree improvement, breakage, decay, or nonproductive areas. These are handled with FEM as described in Section 6.3. Including these effects would greatly increase the number of tables, as several different sets are applied to each table.

Definition of Yield Table Terms

The following are explanations of the headings and entries in the accompanying index:

Natural Condition—spp The species are Douglas-fir, hemlock or a mixture (refer to Section 6.44).

Natural Condition—estab density This is the number of natural seedlings initially established. They are tabulated in numbers per hectare.

Natural Condition—dist This is the distribution of the natural seedlings. It is a measure of clumpiness based on stocked 1/550 hectare plots.

Natural Condition—age range This is the age range over which the bulk of the seed-in takes place.

Planting—spp The species are Douglas-fir or hemlock (refer to Section 6.44).

Planting—density This is the number of planted trees per hectare.

Planting—surv This is the percent survival of planted trees prior to competition-induced mortality.

Planting—lag This is the time lag between the establishment of the planted trees and the bulk of the natural seed-in. A negative value indicates seed-in before planting.

Spacing—trt ht This is the site height of the stand when spacing occurs, expressed in meters.

Spacing—leave This is the number per hectare of trees left after spacing.

Silv—trt This indicates any silvicultural treatments performed on the stand.

Regen Model Set A common number indicates possible management options for the same stand. The numbers are used by the Forest Estate Model.

Man Opt by Site This refers to the yield table number (and level of silviculture) for a regeneration model set by poor, medium and high sites.

YT Page This is the page number of the described yield table.

Yield Table Entries

The following are explanations of the headings and entries in the yield tables:

Regen Model Set Reference number.

File Refers to the Y-XENO output file.

Site Index Each table covers a range of site indices by making use of Eichorn's Principle. Site index affects the time a stand takes to grow to a particular site height, but not its structure when it has achieved it.

King's (1966) site index curves are used for Douglas-fir. Wiley's (1978) curves with the BC correction are used for hemlock. The site indices are in meters at 50 years breast height age.

Site Height The site heights, in meters, are the average heights of the dominant and codominant trees in the stand.

Volume The volumes, in cubic meters per hectare, are inside bark to a 10 cm top diameter, a 30 cm stump, with no allowance for decay, waste or breakage. Only trees greater than 17.5 cm dbh are included.

Diameter The diameters, in centimeters, are quadratic means for stems greater than 17.5 cm dbh.

Number of Stems The number of stems per hectare are for trees greater than 17.5 cm dbh.

Total Age The ages are for the average tree of the main component. For consistency with the inventory, King's (1966) years-to-breast-height are used for both species. Ages are tabulated in years since germination.

Culmination Mean Annual Increment (MAI) The mean annual increments, in cubic meters per hectare per year, are to the same utilization standards as the volumes. They are the maximum values from the ages and volumes in the table A “+” is appended to the tabulated value where the culmination is outside the range of the table.

Culmination Age Culmination age is the age corresponding to the culmination mean annual increment. A blank is left where the culmination is outside the range of the table. The values are tabulated in years since germination.

Merchantable Age The earliest age that an area with this yield table and site index is considered for harvest in FEM. Ages are included only for site index classes that reference the yield table in this analysis. Refer to Section 7.2 in this report for the procedure for determining merchantable ages.

Component Initial characteristics are given for the main and secondary component. The secondary component is any natural seed-in occurring within a plantation.

Species The species are Douglas-fir or hemlock/balsam (refer to Section 6.44).

Site Index This is the site index value with which the original Y-XENO run was made to derive the yield table. It is in meters at 50 years breast height age.

Establishment Density This is the number of seedlings naturally established. They are tabulated in numbers per hectare.

Seedling Source The seedlings may come from natural seed-in or planting.

Survival or Distribution In planted trees, the tabulated figure is percent survival. It represents random mortality after establishment and before competition-induced mortality.

In seed-in trees, the tabulated figure is percent distribution. It is a measure of clumpiness, using the percent of 1/550 hectare plots containing at least one tree.

Delay or Lag In the main component, this is the years of regeneration delay. In the secondary component, this is the average time lag between the establishment of the plantation and the natural seed-in (a negative value indicates seed-in before planting).

Age Range This is the number of years over which the bulk of the seed-in takes place.

Biogeoclimatic Variant The table is applicable to this specific variant.

Site Treatment Site preparation and tending treatments are tabulated.

APPENDIX 2. Yield Table Index

Natural Condition(1)				Planting				Spacing		Silv	Regen Model Set	Man Opt by Site(2)			
spp	Estab Density	Dist	Age Range	spp	Density	Surv	Lag	Trt Ht	Leave	Trt		p	m	h	YT Page
Df	300	50	4	Df	900	85	-2				20-22	C(3)			1
Df	300	50	4	Df	1200	85	-2				20-22		C	C	2
Hem/Df	600	70	8	Df	600	85	-2				30-32	C			3
Hem/Df	600	70	8	dF	900	85	-2				30-32		C	C	4
Df	1500	85	4								40-42	C	C	C	5
Df	3000	100	4								50-52	C	C		6
Df	3000	100	4					6	1100	spaced	50-52			C	7
Hem/Bal	101	15	15	Df	900	85	-3				1010-1013	C			8
Hem/Bal	101	15	15	Df	1200	85	-3				1010-1013		C	C	9
Hem/Bal	101	15	6	Df	900	90	3				1016-1018	C			10
Hem/Bal	101	15	6	Df	1200	90	3				1016-1018		C	C	11
Hem/Bal	400	40	15	Df	900	85	-3				1020-1024	C			12
Hem/Bal	400	40	15	Df	1200	85	-3				1020-1024		C	C	13
Hem/Bal	400	40	6	Df	900	90	3				1026-1028	C			14
Hem/Bal	400	40	6	Df	1200	90	3				1026-1028		C	C	15
Hem/Bal	800	60	15	Df	900	85	-3				1030-1033	C			16
Hem/Bal	800	60	15	Df	1200	85	-3				1030-1033		C	C	17
Hem/Bal	1500	80	15	Df	900	85	-3				1040-1043	C			18
Hem/Bal	1500	80	15	Df	1200	85	-3				1040-1043		C	C	19
Hem/Bal	3000	90	15	Df	900	85	-3				1050-1053	C			20
Hem/Bal	3000	90	15	Df	1200	85	-3				1050-1053		C	C	21
Df	101	15	5								710	X(3)	X	X	22
Df	300	30	3								720	X	X	X	23
Df	300	50	4								730	X	X	X	24
Df	600	70	4								740	X	X	X	25
Df	1500	85	4								750	X	X	X	26
Df	3000	100	4								760	X	X	X	27

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(1) No allowance is made for tree improvement, breakage, decay, nonproductive area, regeneration delay, brush or browse impacts.

(2) "P" is SI ≤22. "M" is 23 ≤SI ≤28. "H" is 29 ≤SI.

(3) Application of Yield Tables:
"X" is existing cruised stands. "C" current silviculture option.

Natural Condition(1)				**Planting**				**Spacing**		**Silv**	Regen **Model Set**	**Man Opt by Site**(2)			
spp	Estab Density	Dist	Age Range	spp	Density	Surv	Lag	Trt Ht	Leave	Trt		p	m	h	YT Page
Hem	300	50	5	Hem	900	85	-2				110-112	C(3)			28
Hem	300	50	5	Hem	1200	85	-2				110-112		C	C	29
Hem	300	50	5	Hem	900	90	2				116-118	C			30
Hem	300	50	5	Hem	1200	90	2				116-118		C	C	31
Hem	500	50	4	Hem	900	85	-2				120-125	C			32
Hem	500	50	4	Hem	1200	85	-2				120-125		C	C	33
Hem	600	70	4	Hem	900	90	2				126-128	C			34
Hem	600	70	4	Hem	1200	90	2				126-128		C	C	35
Hem	1200	70	8	Hem	600	85	-2				130-135	C	C	C	36
Hem	1200	80	6	Hem	600	90	4				136-138	C	C	C	37
Hem	1200	70	8								139	C	C	C	38
Hem	1500	80	5								140-144	C			39
Hem	1500	80	5	Hem	600	85	-2				140-144		C	C	40
Hem	3000	100	6								150-154	C	C	C	41
Hem	6000	100	6								160-162	C			42
Hem	6000	100	6					6	1500	spaced	160-162		C	C	43
Hem	9000	100	6								170	C			44
Hem	9000	100	6					6	1500	spaced	170		C	C	45
Hem	300	30	3								810	X(3)	X	X	46
Hem	500	50	4								820	X	X	X	47
Hem	600	70	4								830	X	X	X	48
Hem	1200	80	6								840	X	X	X	49
Hem	2000	90	6								850	X	X	X	50
Hem	3000	100	6								860	X	X	X	51

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(1) No allowance is made for tree improvement, breakage, decay, nonproductive area, regeneration delay, brush or browse impacts.

(2) "P" is SI ≤22. "M" is 23 ≤SI ≤28. "H" is 29 ≤SI.

(3) Application of Yield Tables:
“X” is existing cruised stands. “C” current silviculture option.

Douglas-fir Yield Table

Regen Model Set 20-22 ***File f33a4***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	14	4	38	32	28	25	23	21	19	18	17	16	14
10	4	19	31	48	38	33	29	26	24	22	20	19	18	16
12	14	19	108	62	46	38	33	30	27	25	23	21	20	18
14	30	20	200	79	56	44	38	34	30	27	25	23	22	20
16	51	21	279	106	67	52	43	38	34	30	28	26	24	22
18	83	22	383	149	82	60	49	42	37	34	30	28	26	24
20	125	23	486	235	103	71	56	47	41	37	33	30	28	26
22	178	24	572	484	132	84	64	53	46	40	36	33	30	28
24	241	25	636		179	101	74	60	51	44	40	36	33	30
26	314	26	674		263	123	85	67	56	49	43	39	36	33
28	394	27	695			154	99	75	62	53	47	42	38	35
30	482	29	690			200	116	85	69	58	51	46	41	38
32	578	31	678			277	139	97	77	64	56	49	44	40
34	687	33	660				170	112	86	70	60	53	48	43
36	798	35	632				214	129	96	78	66	58	51	46
38	921	38	602				282	152	108	86	72	62	55	50
40	1047	40	571					181	122	95	78	67	59	53
42	1183	43	542					222	140	105	85	72	63	56
44	1323	46	511					280	162	117	93	78	68	60
46	1461	48	479						189	131	102	85	73	64
48	1602	51	447						226	148	113	92	79	69
50	1715	54	412						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.6	1.4	2.6	4.2	6.2	8.6	11.4	14.3	17.5	20.4	23.5 +
			culm age years	172	155	137	129	121	116	112	104	92	79	
			merch age years	300	279	106	99							

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	Df	33	300	seedin	50	-2	4		

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Douglas-fir Yield Table

Regen Model Set 20-22 ***File f33a5***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	9	3	38	32	28	25	23	21	19	18	17	16	14
10	3	19	28	48	38	33	29	26	24	22	20	19	18	16
12	14	19	116	62	46	38	33	30	27	25	23	21	20	18
14	33	20	228	79	56	44	38	34	30	27	25	23	22	20
16	60	21	341	106	67	52	43	38	34	30	28	26	24	22
18	97	21	457	149	82	60	49	42	37	34	30	28	26	24
20	146	22	575	235	103	71	56	47	41	37	33	30	28	26
22	208	23	668	484	132	84	64	53	46	40	36	33	30	28
24	280	24	744		179	101	74	60	51	44	40	36	33	30
26	360	26	786		263	123	85	67	56	49	43	39	36	33
28	444	27	799			154	99	75	62	53	47	42	38	35
30	539	29	793			200	116	85	69	58	51	46	41	38
32	644	31	772			277	139	97	77	64	56	49	44	40
34	755	32	744				170	112	86	70	60	53	48	43
36	869	35	703				214	129	96	78	66	58	51	46
38	991	37	661				282	152	108	86	72	62	55	50
40	1114	40	615					181	122	95	78	67	59	53
42	1250	42	575					222	140	105	85	72	63	56
44	1382	45	537					280	162	117	93	78	68	60
46	1508	48	495						189	131	102	85	73	64
48	1628	51	456						226	148	113	92	79	69
50	1734	54	417						276	169	125	100	84	74
culm mai m^3/ha/yr				0.7	1.6	3.0	4.7	6.8	9.2	12.0	14.8	17.9	20.7	23.8
culm age years				174	152	131	127	115	109	104	93	84	78	69
merch age years								95	92	91	84	77	71	65

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	85	0	0		
secondary	Df	33	300	seedin	50	-2	4		

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Douglas-fir Yield Table

Regen Model Set 30-32 **File f33h3**

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	4	1	30	26	23	21	20	18	17	16	14	14	13
8	1	16	7	38	32	28	25	23	21	19	18	17	16	14
10	3	18	28	48	38	33	29	26	24	22	20	19	18	16
12	11	19	85	62	46	38	33	30	27	25	23	21	20	18
14	23	20	159	79	56	44	38	34	30	27	25	23	22	20
16	42	21	245	106	67	52	43	38	34	30	28	26	24	22
18	68	21	337	149	82	60	49	42	37	34	30	28	26	24
20	102	22	430	235	103	71	56	47	41	37	33	30	28	26
22	146	23	522	484	132	84	64	53	46	40	36	33	30	28
24	197	24	590		179	101	74	60	51	44	40	36	33	30
26	256	25	630		263	123	85	67	56	49	43	39	36	33
28	320	27	646			154	99	75	62	53	47	42	38	35
30	393	28	648			200	116	85	69	58	51	46	41	38
32	470	30	629			277	139	97	77	64	56	49	44	40
34	555	32	607				170	112	86	70	60	53	48	43
36	646	34	581				214	129	96	78	66	58	51	46
38	743	36	556				282	152	108	86	72	62	55	50
40	853	39	530					181	122	95	78	67	59	53
42	977	41	512					222	140	105	85	72	63	56
44	1103	44	489					280	162	117	93	78	68	60
46	1232	46	466						189	131	102	85	73	64
48	1359	49	440						226	148	113	92	79	69
50	1496	52	418						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.1	2.1	3.4	5.0	7.0	9.5	12.1	15.0 +	17.6 +	20.5 +
culm age years	172	154	136	128	122	132	120	109			
merch age years	300	300	125	96							

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	600	planted	85	0	0		
secondary	hem	27	600	seedin	70	-2	8		

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Douglas-fir Yield Table

Regen Model Set 30-32 ***File f33h4***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	8	4	38	32	28	25	23	21	19	18	17	16	14
10	3	17	24	48	38	33	29	26	24	22	20	19	18	16
12	10	19	83	62	46	38	33	30	27	25	23	21	20	18
14	25	20	172	79	56	44	38	34	30	27	25	23	22	20
16	45	20	269	106	67	52	43	38	34	30	28	26	24	22
18	74	21	369	149	82	60	49	42	37	34	30	28	26	24
20	113	22	488	235	103	71	56	47	41	37	33	30	28	26
22	163	23	591	484	132	84	64	53	46	40	36	33	30	28
24	223	24	680		179	101	74	60	51	44	40	36	33	30
26	290	25	738		263	123	85	67	56	49	43	39	36	33
28	365	26	764			154	99	75	62	53	47	42	38	35
30	448	27	768			200	116	85	69	58	51	46	41	38
32	543	29	762			277	139	97	77	64	56	49	44	40
34	646	31	741				170	112	86	70	60	53	48	43
36	757	33	713				214	129	96	78	66	58	51	46
38	876	35	681				282	152	108	86	72	62	55	50
40	998	38	643					181	122	95	78	67	59	53
42	1128	40	606					222	140	105	85	72	63	56
44	1255	43	569					280	162	117	93	78	68	60
46	1383	45	531						189	131	102	85	73	64
48	1499	48	487						226	148	113	92	79	69
50	1606	51	450						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.5	1.3	2.4	3.9	5.9	8.2	10.8	13.5	16.4	19.1	22.0
			culm age years	179	156	138	133	126	118	108	101	87	79	73
			merch age years					101	99	95	88	80	73	67

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	hem	27	600	seedin	70	-2	8		

April 1994

Douglas-fir Yield Table

Regen Model Set 40-42 ***File f33n1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	14	4	38	32	28	25	23	21	19	18	17	16	14
10	3	17	23	48	38	33	29	26	24	22	20	19	18	16
12	11	19	86	62	46	38	33	30	27	25	23	21	20	18
14	25	20	161	79	56	44	38	34	30	27	25	23	22	20
16	44	21	237	106	67	52	43	38	34	30	28	26	24	22
18	74	21	343	149	82	60	49	42	37	34	30	28	26	24
20	113	22	451	235	103	71	56	47	41	37	33	30	28	26
22	163	23	548	484	132	84	64	53	46	40	36	33	30	28
24	219	24	610		179	101	74	60	51	44	40	36	33	30
26	282	25	644		263	123	85	67	56	49	43	39	36	33
28	353	27	655			154	99	75	62	53	47	42	38	35
30	427	29	643			200	116	85	69	58	51	46	41	38
32	506	31	616			277	139	97	77	64	56	49	44	40
34	593	33	583				170	112	86	70	60	53	48	43
36	682	35	549				214	129	96	78	66	58	51	46
38	782	38	514				282	152	108	86	72	62	55	50
40	883	40	481					181	122	95	78	67	59	53
42	990	43	451					222	140	105	85	72	63	56
44	1103	46	424					280	162	117	93	78	68	60
46	1218	49	398						189	131	102	85	73	64
48	1336	52	372						226	148	113	92	79	69
50	1445	55	345						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.3	2.3	3.7	5.3	7.2	9.5	11.9	14.6	17.1 +	19.8 +
culm age years	177	150	136	123	115	112	109	104	92		
merch age years	300	300	118	92	91	91	89	88	83	76	71

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1500	seedin	85	0	4		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 50-52 ***File f33n2***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	4	17	34	48	38	33	29	26	24	22	20	19	18	16
12	17	19	140	62	46	38	33	30	27	25	23	21	20	18
14	40	20	272	79	56	44	38	34	30	27	25	23	22	20
16	75	20	426	106	67	52	43	38	34	30	28	26	24	22
18	122	21	588	149	82	60	49	42	37	34	30	28	26	24
20	180	22	729	235	103	71	56	47	41	37	33	30	28	26
22	246	22	838	484	132	84	64	53	46	40	36	33	30	28
24	320	23	917		179	101	74	60	51	44	40	36	33	30
26	401	24	960		263	123	85	67	56	49	43	39	36	33
28	486	26	970			154	99	75	62	53	47	42	38	35
30	578	27	965			200	116	85	69	58	51	46	41	38
32	679	28	945			277	139	97	77	64	56	49	44	40
34	783	30	893				170	112	86	70	60	53	48	43
36	891	32	838				214	129	96	78	66	58	51	46
38	1005	34	781				282	152	108	86	72	62	55	50
40	1131	37	731					181	122	95	78	67	59	53
42	1262	39	681					222	140	105	85	72	63	56
44	1381	42	627					280	162	117	93	78	68	60
46	1515	44	578						189	131	102	85	73	64
48	1647	47	534						226	148	113	92	79	69
50	1760	50	491						276	169	125	100	84	74

culm mai m^3/ha/yr	0.8	1.9	3.3	5.0	7.1	9.3	12.1	14.8	18.0	21.0	24.1
culm age years	150	130	123	111	106	102	103	98	90	79	70
merch age years	300	300	150	87	87	84					

component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	53	3000	seedin	100	0	4		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 50-52 ***File f33n3***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	7	4	38	32	28	25	23	21	19	18	17	16	14
10	4	17	33	48	38	33	29	26	24	22	20	19	18	16
12	18	19	140	62	46	38	33	30	27	25	23	21	20	18
14	45	20	301	79	56	44	38	34	30	27	25	23	22	20
16	81	21	450	106	67	52	43	38	34	30	28	26	24	22
18	128	22	574	149	82	60	49	42	37	34	30	28	26	24
20	184	23	666	235	103	71	56	47	41	37	33	30	28	26
22	249	24	726	484	132	84	64	53	46	40	36	33	30	28
24	319	25	753		179	101	74	60	51	44	40	36	33	30
26	393	27	749		263	123	85	67	56	49	43	39	36	33
28	481	29	737			154	99	75	62	53	47	42	38	35
30	573	31	711			200	116	85	69	58	51	46	41	38
32	675	33	687			277	139	97	77	64	56	49	44	40
34	787	35	656				170	112	86	70	60	53	48	43
36	902	37	618				214	129	96	78	66	58	51	46
38	1027	40	587				282	152	108	86	72	62	55	50
40	1156	42	561					181	122	95	78	67	59	53
42	1296	45	532					222	140	105	85	72	63	56
44	1436	48	498					280	162	117	93	78	68	60
46	1570	50	465						189	131	102	85	73	64
48	1694	53	433						226	148	113	92	79	69
50	1816	56	401						276	169	125	100	84	74

culm mai m^3/ha/yr	0.7	1.9	3.2	4.9	7.1	9.5	12.4	15.4	18.6	21.6	24.9
culm age years	145	127	112	119	111	111	105	95	84	79	73
merch age years							90	85	78	71	66

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	3000	seed in	100	0	4		spaced
secondary									

Douglas-fir Yield Table

Regen Model Set 1010–1013 ***File h33jb4***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	2	17	19	48	38	33	29	26	24	22	20	19	18	16
12	9	18	73	62	46	38	33	30	27	25	23	21	20	18
14	20	20	144	79	56	44	38	34	30	27	25	23	22	20
16	39	21	231	106	67	52	43	38	34	30	28	26	24	22
18	70	21	354	149	82	60	49	42	37	34	30	28	26	24
20	111	22	481	235	103	71	56	47	41	37	33	30	28	26
22	162	23	580	484	132	84	64	53	46	40	36	33	30	28
24	220	24	643		179	101	74	60	51	44	40	36	33	30
26	285	26	665		263	123	85	67	56	49	43	39	36	33
28	358	28	667			154	99	75	62	53	47	42	38	35
30	438	29	656			200	116	85	69	58	51	46	41	38
32	539	32	636			277	139	97	77	64	56	49	44	40
34	639	34	609				170	112	86	70	60	53	48	43
36	748	36	583				214	129	96	78	66	58	51	46
38	865	39	554				282	152	108	86	72	62	55	50
40	984	41	525					181	122	95	78	67	59	53
42	1105	44	492					222	140	105	85	72	63	56
44	1230	47	463					280	162	117	93	78	68	60
46	1360	50	435						189	131	102	85	73	64
48	1499	52	409						226	148	113	92	79	69
50	1618	56	378						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.2	2.3	3.9	5.8	8.0	10.5	13.3	16.3	19.1	22.1
culm age years	185	154	138	139	125	117	109	108	92	84	83
merch age years	300	300	113	103	99	98	92	90	86	77	72

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	WH-Ba	27-24	101	seedin	15	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1010–1013 ***File h33jb5***

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	2	16	21	48	38	33	29	26	24	22	20	19	18	16
12	11	18	91	62	46	38	33	30	27	25	23	21	20	18
14	25	20	175	79	56	44	38	34	30	27	25	23	22	20
16	45	20	367	106	67	52	43	38	34	30	28	26	24	22
18	77	21	385	149	82	60	49	42	37	34	30	28	26	24
20	122	22	525	235	103	71	56	47	41	37	33	30	28	26
22	178	23	636	484	132	84	64	53	46	40	36	33	30	28
24	244	24	717		179	101	74	60	51	44	40	36	33	30
26	317	25	759		263	123	85	67	56	49	43	39	36	33
28	406	27	770			154	99	75	62	53	47	42	38	35
30	497	29	757			200	116	85	69	58	51	46	41	38
32	596	31	733			277	139	97	77	64	56	49	44	40
34	707	33	709				170	112	86	70	60	53	48	43
36	824	35	674				214	129	96	78	66	58	51	46
38	945	38	634				282	152	108	86	72	62	55	50
40	1073	40	593					181	122	95	78	67	59	53
42	1208	43	562					222	140	105	85	72	63	56
44	1338	45	523					280	162	117	93	78	68	60
46	1462	48	486						189	131	102	85	73	64
48	1581	51	448						226	148	113	92	79	69
50	1690	54	410						276	169	125	100	84	74
culm mai m^3/ha/yr				0.5	1.4	2.6	4.3	6.4	8.8	11.5	14.3	17.2	20.1	23.0
culm age years				184	157	145	128	123	116	106	94	86	79	72
merch age years				300	300	103	99	100	96	95	85	78	72	66

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	8.5	0	0		
secondary	WH-Ba	27-24	101	seedin	15	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1016–1018 ***File h33jbb4***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	2	18	16	48	38	33	29	26	24	22	20	19	18	16
12	7	19	62	62	46	38	33	30	27	25	23	21	20	18
14	18	20	128	79	56	44	38	34	30	27	25	23	22	20
16	36	21	215	106	67	52	43	38	34	30	28	26	24	22
18	67	21	339	149	82	60	49	42	37	34	30	28	26	24
20	108	22	463	235	103	71	56	47	41	37	33	30	28	26
22	158	23	561	484	132	84	64	53	46	40	36	33	30	28
24	216	24	625		179	101	74	60	51	44	40	36	33	30
26	280	26	655		263	123	85	67	56	49	43	39	36	33
28	354	27	667			154	99	75	62	53	47	42	38	35
30	432	29	651			200	116	85	69	58	51	46	41	38
32	519	32	628			277	139	97	77	64	56	49	44	40
34	631	34	605				170	112	86	70	60	53	48	43
36	738	36	580				214	129	96	78	66	58	51	46
38	854	39	550				282	152	108	86	72	62	55	50
40	976	41	519					181	122	95	78	67	59	53
42	1103	44	491					222	140	105	85	72	63	56
44	1228	47	459					280	162	117	93	78	68	60
46	1346	50	427						189	131	102	85	73	64
48	1477	52	401						226	148	113	92	79	69
50	1602	55	374						276	169	125	100	84	74

culm mai m^3/ha/yr	.5	1.2	2.3	3.7	5.7	8.0	10.5	13.2	16.0	19.0	22.0
culm age years	188	156	140	129	125	120	110	97	94	87	82
merch age years	300	300	113	99	104	99	95	86	84	78	73

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	90	0	0		
secondary	WH-Ba	27-24	101	seedin	15	3	6		

April 1994

Douglas-fir Yield Table

Regen Model Set 1016–1018 ***File h33jbb5***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	2	18	16	48	38	33	29	26	24	22	20	19	18	16
12	9	19	80	62	46	38	33	30	27	25	23	21	20	18
14	23	20	165	79	56	44	38	34	30	27	25	23	22	20
16	44	20	255	106	67	52	43	38	34	30	28	26	24	22
18	76	21	383	149	82	60	49	42	37	34	30	28	26	24
20	121	22	525	235	103	71	56	47	41	37	33	30	28	26
22	179	22	655	484	132	84	64	53	46	40	36	33	30	28
24	246	24	745		179	101	74	60	51	44	40	36	33	30
26	320	25	786		263	123	85	67	56	49	43	39	36	33
28	402	27	794			154	99	75	62	53	47	42	38	35
30	503	28	780			200	116	85	69	58	51	46	41	38
32	604	30	756			277	139	97	77	64	56	49	44	40
34	709	33	717				170	112	86	70	60	53	48	43
36	822	35	677				214	129	96	78	66	58	51	46
38	941	37	637				282	152	108	86	72	62	55	50
40	1073	40	602					181	122	95	78	67	59	53
42	1207	42	569					222	140	105	85	72	63	56
44	1339	45	528					280	162	117	93	78	68	60
46	1471	48	489						189	131	102	85	73	64
48	1582	51	447						226	148	113	92	79	69
50	1697	54	410						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.4	2.6	4.4	6.4	8.8	11.5	14.4	17.3	20.1	23.1
culm age years	185	157	138	129	120	118	107	99	85	76	73
merch age years	300	300	130	103	97	98	94	88	80	72	67

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	90	0	0		
secondary	WH-Ba	27-24	101	seedin	15	3	6		

April 1994

Douglas-fir Yield Table

Regen Model Set 1020–1024 ***File h33ib4***

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	1	18	10	38	32	28	25	23	21	19	18	17	16	14
10	4	18	33	48	38	33	29	26	24	22	20	19	18	16
12	11	19	87	62	46	38	33	30	27	25	23	21	20	18
14	25	20	179	79	56	44	38	34	30	27	25	23	22	20
16	44	21	259	106	67	52	43	38	34	30	28	26	24	22
18	72	21	367	149	82	60	49	42	37	34	30	28	26	24
20	111	22	487	235	103	71	56	47	41	37	33	30	28	26
22	159	23	585	484	132	84	64	53	46	40	36	33	30	28
24	215	24	657		179	101	74	60	51	44	40	36	33	30
26	281	25	701		263	123	85	67	56	49	43	39	36	33
28	360	27	720			154	99	75	62	53	47	42	38	35
30	443	28	716			200	116	85	69	58	51	46	41	38
32	532	30	698			277	139	97	77	64	56	49	44	40
34	628	32	670				170	112	86	70	60	53	48	43
36	730	35	637				214	129	96	78	66	58	51	46
38	849	37	613				282	152	108	86	72	62	55	50
40	965	39	580					181	122	95	78	67	59	53
42	1091	42	545					222	140	105	85	72	63	56
44	1215	45	510					280	162	117	93	78	68	60
46	1343	47	478						189	131	102	85	73	64
48	1462	50	441						226	148	113	92	79	69
50	1565	53	403						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.5	1.2	2.3	3.8	5.7	7.9	10.4	13.1	15.9	18.6	21.3
			culm age years	178	153	145	129	122	116	110	102	91	79	73
			merch age years	300	300	102	99	97	99	95	89	81	74	67

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	WH-Ba	27-24	400	seedin	40	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1020–1024 ***File h33ib5***

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	1	17	6	38	32	28	25	23	21	19	18	17	16	14
10	4	17	30	48	38	33	29	26	24	22	20	19	18	16
12	11	19	91	62	46	38	33	30	27	25	23	21	20	18
14	26	20	178	79	56	44	38	34	30	27	25	23	22	20
16	47	20	281	106	67	52	43	38	34	30	28	26	24	22
18	79	21	412	149	82	60	49	42	37	34	30	28	26	24
20	122	22	542	235	103	71	56	47	41	37	33	30	28	26
22	178	23	664	484	132	84	64	53	46	40	36	33	30	28
24	244	24	759		179	101	74	60	51	44	40	36	33	30
26	327	25	816		263	123	85	67	56	49	43	39	36	33
28	409	26	837			154	99	75	62	53	47	42	38	35
30	497	28	826			200	116	85	69	58	51	46	41	38
32	594	30	795			277	139	97	77	64	56	49	44	40
34	697	32	764				170	112	86	70	60	53	48	43
36	804	34	724				214	129	96	78	66	58	51	46
38	925	36	683				282	152	108	86	72	62	55	50
40	1044	38	636					181	122	95	78	67	59	53
42	1173	41	598					222	140	105	85	72	63	56
44	1293	44	552					280	162	117	93	78	68	60
46	1406	47	503						189	131	102	85	73	64
48	1526	50	465						226	148	113	92	79	69
50	1627	52	426						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.4	2.7	4.3	6.3	8.6	11.2	13.8	16.5	19.4	22.2
culm age years	179	157	136	127	117	112	105	93	85	79	69
merch age years	300	300	125	96	95	96	91	83	76	73	66

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	85	0	0		
secondary	WH-Ba	27-24	400	seedin	40	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1026-1028 **_File h33ibb4_**

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	1	16	11	48	38	33	29	26	24	22	20	19	18	16
12	6	18	56	62	46	38	33	30	27	25	23	21	20	18
14	17	19	123	79	56	44	38	34	30	27	25	23	22	20
16	32	20	192	106	67	52	43	38	34	30	28	26	24	22
18	58	21	299	149	82	60	49	42	37	34	30	28	26	24
20	95	22	420	235	103	71	56	47	41	37	33	30	28	26
22	142	22	530	484	132	84	64	53	46	40	36	33	30	28
24	196	24	617		179	101	74	60	51	44	40	36	33	30
26	260	25	676		263	123	85	67	56	49	43	39	36	33
28	333	26	704			154	99	75	62	53	47	42	38	35
30	415	28	709			200	116	85	69	58	51	46	41	38
32	517	30	701			277	139	97	77	64	56	49	44	40
34	617	32	679				170	112	86	70	60	53	48	43
36	726	34	652				214	129	96	78	66	58	51	46
38	838	36	618				282	152	108	86	72	62	55	50
40	962	39	586					181	122	95	78	67	59	53
42	1092	42	554					222	140	105	85	72	63	56
44	1217	44	516					280	162	117	93	78	68	60
46	1348	47	482						189	131	102	85	73	64
48	1475	50	445						226	148	113	92	79	69
50	1593	53	412						276	169	125	100	84	74

culm mai m^3/ha/yr	0.4	1.1	2.2	3.7	5.6	7.9	10.4	13.2	16.0	18.8	21.7
culm age years	191	159	145	142	128	126	110	103	92	84	78
merch age years	300	300	129	111	102	100	96	90	83	76	70

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	90	0	0		
secondary	WH-Ba	27-24	400	seedin	40	3	6		

April 1994

Douglas-fir Yield Table

Regen Model Set 1026-1028 ***File h33ibb5***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	2	18	15	48	38	33	29	26	24	22	20	19	18	16
12	7	19	60	62	46	38	33	30	27	25	23	21	20	18
14	20	19	147	79	56	44	38	34	30	27	25	23	22	20
16	38	20	228	106	67	52	43	38	34	30	28	26	24	22
18	65	21	332	149	82	60	49	42	37	34	30	28	26	24
20	104	22	457	235	103	71	56	47	41	37	33	30	28	26
22	157	22	590	484	132	84	64	53	46	40	36	33	30	28
24	221	23	706		179	101	74	60	51	44	40	36	33	30
26	297	24	779		263	123	85	67	56	49	43	39	36	33
28	390	26	819			154	99	75	62	53	47	42	38	35
30	477	27	813			200	116	85	69	58	51	46	41	38
32	575	29	798			277	139	97	77	64	56	49	44	40
34	678	31	758				170	112	86	70	60	53	48	43
36	790	34	714				214	129	96	78	66	58	51	46
38	909	36	672				282	152	108	86	72	62	55	50
40	1035	39	624					181	122	95	78	67	59	53
42	1167	41	581					222	140	105	85	72	63	56
44	1299	44	540					280	162	117	93	78	68	60
46	1430	47	501						189	131	102	85	73	64
48	1564	50	463						226	148	113	92	79	69
50	1679	53	422						276	169	125	100	84	74
culm mai m^3/ha/yr				0.5	1.2	2.5	4.1	6.1	8.5	11.1	14.0	17.0	19.9	22.8
culm age years				187	164	153	131	123	117	109	100	92	79	73
merch age years				300	300	137	99	99	99	96	89	84	76	68

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	90	0	0		
secondary	WH-Ba	27-24	400	seedin	40	3	6		

April 1994

Douglas-fir Yield Table

Regen Model Set 1030-1033 ***File h33hb4***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	1	12	6	30	26	23	21	20	18	17	16	14	14	13
8	2	16	15	38	32	28	25	23	21	19	18	17	16	14
10	5	18	40	48	38	33	29	26	24	22	20	19	18	16
12	12	19	90	62	46	38	33	30	27	25	23	21	20	18
14	26	20	186	79	56	44	38	34	30	27	25	23	22	20
16	46	20	285	106	67	52	43	38	34	30	28	26	24	22
18	74	21	392	149	82	60	49	42	37	34	30	28	26	24
20	113	22	515	235	103	71	56	47	41	37	33	30	28	26
22	161	22	622	484	132	84	64	53	46	40	36	33	30	28
24	217	23	707		179	101	74	60	51	44	40	36	33	30
26	283	25	752		263	123	85	67	56	49	43	39	36	33
28	353	26	780			154	99	75	62	53	47	42	38	35
30	430	27	784			200	116	85	69	58	51	46	41	38
32	515	29	775			277	139	97	77	64	56	49	44	40
34	609	30	758				170	112	86	70	60	53	48	43
36	706	32	725				214	129	96	78	66	58	51	46
38	820	35	692				282	152	108	86	72	62	55	50
40	928	37	649					181	122	95	78	67	59	53
42	1047	39	603					222	140	105	85	72	63	56
44	1153	42	558					280	162	117	93	78	68	60
46	1268	45	517						189	131	102	85	73	64
48	1379	47	480						226	148	113	92	79	69
50	1488	50	440						276	169	125	100	84	74
	culm mai m^3/ha/yr			0.5	1.2	2.3	3.7	5.5	7.6	10.0	12.4	15.0	17.6	20.2
	culm age years			176	152	135	128	120	114	105	99	90	84	73
	merch age years			300	300	140	95	96	97	92	83	80	74	69

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	WH-Ba	27-24	800	seedin	60	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1030-1033 ***File h33hb5***

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	1	10	6	30	26	23	21	20	18	17	16	14	14	13
8	2	15	16	38	32	28	25	23	21	19	18	17	16	14
10	6	18	45	48	38	33	29	26	24	22	20	19	18	16
12	14	19	107	62	46	38	33	30	27	25	23	21	20	18
14	31	20	212	79	56	44	38	34	30	27	25	23	22	20
16	54	20	326	106	67	52	43	38	34	30	28	26	24	22
18	88	21	458	149	82	60	49	42	37	34	30	28	26	24
20	130	22	582	235	103	71	56	47	41	37	33	30	28	26
22	185	23	695	484	132	84	64	53	46	40	36	33	30	28
24	250	24	779		179	101	74	60	51	44	40	36	33	30
26	322	25	840		263	123	85	67	56	49	43	39	36	33
28	406	26	888			154	99	75	62	53	47	42	38	35
30	497	27	892			200	116	85	69	58	51	46	41	38
32	596	29	881			277	139	97	77	64	56	49	44	40
34	703	31	843				170	112	86	70	60	53	48	43
36	808	33	789				214	129	96	78	66	58	51	46
38	920	35	735				282	152	108	86	72	62	55	50
40	1039	37	688					181	122	95	78	67	59	53
42	1153	40	639					222	140	105	85	72	63	56
44	1266	42	586					280	162	117	93	78	68	60
46	1370	45	532						189	131	102	85	73	64
48	1478	48	487						226	148	113	92	79	69
50	1566	51	444						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.6	1.4	2.7	4.3	6.3	8.5	11.0	13.6	16.1	18.8	21.5
			culm age years	167	153	139	128	115	112	99	92	81	78	69
			merch age years	300	300	134	99	96	91	87	80	74	69	65

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	85	0	0		
secondary	WH-Ba	27-24	800	seedin	60	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1040-1043 ***File h33gb4***

Site Ht. m	Vol m^3/ha	Diam cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	2	14	14	30	26	23	21	20	18	17	16	14	14	13
8	4	18	32	38	32	28	25	23	21	19	18	17	16	14
10	9	19	68	48	38	33	29	26	24	22	20	19	18	16
12	19	19	139	62	46	38	33	30	27	25	23	21	20	18
14	36	20	243	79	56	44	38	34	30	27	25	23	22	20
16	59	20	345	106	67	52	43	38	34	30	28	26	24	22
18	91	21	461	149	82	60	49	42	37	34	30	28	26	24
20	130	22	573	235	103	71	56	47	41	37	33	30	28	26
22	181	22	694	484	132	84	64	53	46	40	36	33	30	28
24	236	23	776		179	101	74	60	51	44	40	36	33	30
26	298	24	837		263	123	85	67	56	49	43	39	36	33
28	364	25	860			154	99	75	62	53	47	42	38	35
30	436	26	866			200	116	85	69	58	51	46	41	38
32	517	28	859			277	139	97	77	64	56	49	44	40
34	598	29	833				170	112	86	70	60	53	48	43
36	688	31	805				214	129	96	78	66	58	51	46
38	786	33	771				282	152	108	86	72	62	55	50
40	883	35	720					181	122	95	78	67	59	53
42	998	37	681					222	140	105	85	72	63	56
44	1097	39	628					280	162	117	93	78	68	60
46	1194	42	580						189	131	102	85	73	64
48	1282	44	529						226	148	113	92	79	69
50	1370	46	485						276	169	125	100	84	74

culm mai m^3/ha/yr	0.6	1.4	2.4	3.8	5.4	7.3	9.5	11.7	14.0	16.3	18.6
culm age years	141	141	127	123	116	109	105	92	85	75	71
merch age years	300	300	154	88	88	89	91	82	74	68	63

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	WH-Ba	27-24	1500	seedin	80	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1040-1043 ***File h33gb5***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	1	15	10	30	26	23	21	20	18	17	16	14	14	13
8	3	18	23	38	32	28	25	23	21	19	18	17	16	14
10	8	18	62	48	38	33	29	26	24	22	20	19	18	16
12	17	19	125	62	46	38	33	30	27	25	23	21	20	18
14	35	20	239	79	56	44	38	34	30	27	25	23	22	20
16	61	20	372	106	67	52	43	38	34	30	28	26	24	22
18	95	21	497	149	82	60	49	42	37	34	30	28	26	24
20	136	22	611	235	103	71	56	47	41	37	33	30	28	26
22	188	22	719	484	132	84	64	53	46	40	36	33	30	28
24	248	23	813		179	101	74	60	51	44	40	36	33	30
26	316	24	883		263	123	85	67	56	49	43	39	36	33
28	392	25	922			154	99	75	62	53	47	42	38	35
30	479	26	943			200	116	85	69	58	51	46	41	38
32	573	28	947			277	139	97	77	64	56	49	44	40
34	671	29	924				170	112	86	70	60	53	48	43
36	774	31	887				214	129	96	78	66	58	51	46
38	877	33	830				282	152	108	86	72	62	55	50
40	973	35	762					181	122	95	78	67	59	53
42	1073	37	694					222	140	105	85	72	63	56
44	1154	40	627					280	162	117	93	78	68	60
46	1226	42	564						189	131	102	85	73	64
48	1310	45	505						226	148	113	92	79	69
50	1401	48	457						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.6	1.4	2.6	4.1	6.0	8.1	10.3	12.6	14.8	17.0	19.1
			culm age years	159	145	133	127	117	105	92	85	73	67	60
			merch age years	300	300	185	97	94	89	80	76	69	62	57

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	85	0	0		
secondary	WH-Ba	27-24	1500	seedin	80	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1050-1053 ***File h33fb4***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	1	10	6	23	21	19	17	16	15	14	13	12	12	11
6	2	15	20	30	26	23	21	20	18	17	16	14	14	13
8	7	18	53	38	32	28	25	23	21	19	18	17	16	14
10	14	19	106	48	38	33	29	26	24	22	20	19	18	16
12	29	20	204	62	46	38	33	30	27	25	23	21	20	18
14	52	20	347	79	56	44	38	34	30	27	25	23	22	20
16	83	20	492	106	67	52	43	38	34	30	28	26	24	22
18	123	21	640	149	82	60	49	42	37	34	30	28	26	24
20	170	22	768	235	103	71	56	47	41	37	33	30	28	26
22	222	22	870	484	132	84	64	53	46	40	36	33	30	28
24	277	23	936		179	101	74	60	51	44	40	36	33	30
26	336	24	981		263	123	85	67	56	49	43	39	36	33
28	403	25	1015			154	99	75	62	53	47	42	38	35
30	473	26	1021			200	116	85	69	58	51	46	41	38
32	544	27	1001			277	139	97	77	64	56	49	44	40
34	620	28	982				170	112	86	70	60	53	48	43
36	697	29	941				214	129	96	78	66	58	51	46
38	777	31	891				282	152	108	86	72	62	55	50
40	850	33	826					181	122	95	78	67	59	53
42	937	34	772					222	140	105	85	72	63	56
44	1015	36	710					280	162	117	93	78	68	60
46	1081	38	649						189	131	102	85	73	64
48	1171	41	593						226	148	113	92	79	69
50	1224	43	538						276	169	125	100	84	74

culm mai m^3/ha/yr	0.8	1.7	2.8	4.1	5.6	7.3	9.1	11.0	12.9	14.9	16.8
culm age years	134	120	109	106	96	92	85	85	76	68	61
merch age years	300	300	246	107	77	76	73	70	68	62	57

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	900	planted	85	0	0		
secondary	WH-Ba	27-24	3000	seedin	90	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 1050-1053 ***File h33fb5***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	1	9	8	23	21	19	17	16	15	14	13	12	12	11
6	2	12	15	30	26	23	21	20	18	17	16	14	14	13
8	6	16	46	38	32	28	25	23	21	19	18	17	16	14
10	14	19	106	48	38	33	29	26	24	22	20	19	18	16
12	26	19	186	62	46	38	33	30	27	25	23	21	20	18
14	49	20	322	79	56	44	38	34	30	27	25	23	22	20
16	80	20	481	106	67	52	43	38	34	30	28	26	24	22
18	122	21	646	149	82	60	49	42	37	34	30	28	26	24
20	167	21	771	235	103	71	56	47	41	37	33	30	28	26
22	221	22	881	484	132	84	64	53	46	40	36	33	30	28
24	277	23	951		179	101	74	60	51	44	40	36	33	30
26	343	24	1028		263	123	85	67	56	49	43	39	36	33
28	414	24	1063			154	99	75	62	53	47	42	38	35
30	491	25	1078			200	116	85	69	58	51	46	41	38
32	574	26	1088			277	139	97	77	64	56	49	44	40
34	655	28	1062				170	112	86	70	60	53	48	43
36	737	29	1008				214	129	96	78	66	58	51	46
38	815	31	935				282	152	108	86	72	62	55	50
40	883	32	866					181	122	95	78	67	59	53
42	946	34	780					222	140	105	85	72	63	56
44	1008	36	704					280	162	117	93	78	68	60
46	1057	38	628						189	131	102	85	73	64
48	1104	41	557						226	148	113	92	79	69
50	1136	43	494						276	169	125	100	84	74
			culm mai m^3/ha/yr	0.8	1.7	2.8	4.2	5.9	7.7	9.5	11.3	13.2	14.9	16.7
			culm age years	139	123	116	110	101	93	83	72	67	60	57
			merch age years	300	300	295	119	84	77	72	66	60	55	51

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1200	planted	85	0	0		
secondary	WH-Ba	27-24	3000	seedin	90	-3	15		

April 1994

Douglas-fir Yield Table

Regen Model Set 710 **File f33Z1**

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	0	19	4	48	38	33	29	26	24	22	20	19	18	16
12	2	19	12	62	46	38	33	30	27	25	23	21	20	18
14	3	21	20	79	56	44	38	34	30	27	25	23	22	20
16	6	21	32	106	67	52	43	38	34	30	28	26	24	22
18	11	22	50	149	82	60	49	42	37	34	30	28	26	24
20	17	23	69	235	103	71	56	47	41	37	33	30	28	26
22	25	25	81	484	132	84	64	53	46	40	36	33	30	28
24	35	27	87		179	101	74	60	51	44	40	36	33	30
26	46	29	89		263	123	85	67	56	49	43	39	36	33
28	60	32	88			154	99	75	62	53	47	42	38	35
30	75	35	87			200	116	85	69	58	51	46	41	38
32	93	37	86			277	139	97	77	64	56	49	44	40
34	114	40	85				170	112	86	70	60	53	48	43
36	137	43	84				214	129	96	78	66	58	51	46
38	163	46	82				282	152	108	86	72	62	55	50
40	192	49	81					181	122	95	78	67	59	53
42	223	52	80					222	140	105	85	72	63	56
44	257	54	78					280	162	117	93	78	68	60
46	294	57	77						189	131	102	85	73	64
48	332	60	75						226	148	113	92	79	69
50	371	63	73						276	169	125	100	84	74
	culm mai m^3/ha/yr			0.1	0.2	0.4	0.7	1.1	1.6	2.3	3.0+	3.7+	4.4+	5.1+
	culm age years			193	159	160	154	147	148	139				
	merch age years			300	300	300	300	300	187	117	96	97	98	91

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	101	seedin	15	0	5		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 720 ***File f33smn1***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	1	19	6	48	38	33	29	26	24	22	20	19	18	16
12	3	19	23	62	46	38	33	30	27	25	23	21	20	18
14	7	20	45	79	56	44	38	34	30	27	25	23	22	20
16	13	21	70	106	67	52	43	38	34	30	28	26	24	22
18	23	22	110	149	82	60	49	42	37	34	30	28	26	24
20	37	23	152	235	103	71	56	47	41	37	33	30	28	26
22	54	24	179	484	132	84	64	53	46	40	36	33	30	28
24	74	26	194		179	101	74	60	51	44	40	36	33	30
26	97	28	201		263	123	85	67	56	49	43	39	36	33
28	124	30	202			154	99	75	62	53	47	42	38	35
30	154	32	199			200	116	85	69	58	51	46	41	38
32	188	34	194			277	139	97	77	64	56	49	44	40
34	227	37	188				170	112	86	70	60	53	48	43
36	268	40	182				214	129	96	78	66	58	51	46
38	316	43	176				282	152	108	86	72	62	55	50
40	366	45	169					181	122	95	78	67	59	53
42	420	48	163					222	140	105	85	72	63	56
44	478	51	157					280	162	117	93	78	68	60
46	539	54	151						189	131	102	85	73	64
48	602	57	145						226	148	113	92	79	69
50	665	60	138						276	169	125	100	84	74

culm mai m^3/ha/yr	0.2	0.4	0.8	1.4	2.1	3.0	4.1	5.3	6.7+	7.8+	9.1+
culm age years	193	158	142	146	141	133	126	118			
merch age years	300	300	300	255	133	97	97	95	91	92	90

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	300	seed in	30	0	3		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 730 ***File f33a1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	1	19	9	48	38	33	29	26	24	22	20	19	18	16
12	4	19	31	62	46	38	33	30	27	25	23	21	20	18
14	8	20	54	79	56	44	38	34	30	27	25	23	22	20
16	16	21	94	106	67	52	43	38	34	30	28	26	24	22
18	30	22	146	149	82	60	49	42	37	34	30	28	26	24
20	48	23	197	235	103	71	56	47	41	37	33	30	28	26
22	71	24	231	484	132	84	64	53	46	40	36	33	30	28
24	98	26	247		179	101	74	60	51	44	40	36	33	30
26	130	28	254		263	123	85	67	56	49	43	39	36	33
28	166	31	253			154	99	75	62	53	47	42	38	35
30	208	33	250			200	116	85	69	58	51	46	41	38
32	256	36	245			277	139	97	77	64	56	49	44	40
34	311	38	240				170	112	86	70	60	53	48	43
36	372	41	234				214	129	96	78	66	58	51	46
38	437	44	227				282	152	108	86	72	62	55	50
40	508	47	221					181	122	95	78	67	59	53
42	587	50	215					222	140	105	85	72	63	56
44	670	53	208					280	162	117	93	78	68	60
46	755	56	200						189	131	102	85	73	64
48	843	58	192						226	148	113	92	79	69
50	937	61	185						276	169	125	100	84	74

culm mai m^3/ha/yr	0.2	0.6	1.1	1.8	2.9	4.2	5.8	7.5	9.4+	11.0 +	12.8 +
culm age years	192	158	143	151	140	137	127	123			
merch age years	300	300	300	148	101	103	103	99	95	90	87

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	300	seedin	50	0	4		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 740 ***File f33b1***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Dia m	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	9	1	38	32	28	25	23	21	19	18	17	16	14
10	2	19	16	48	38	33	29	26	24	22	20	19	18	16
12	7	19	51	62	46	38	33	30	27	25	23	21	20	18
14	15	20	97	79	56	44	38	34	30	27	25	23	22	20
16	26	21	142	106	67	52	43	38	34	30	28	26	24	22
18	46	22	219	149	82	60	49	42	37	34	30	28	26	24
20	74	23	299	235	103	71	56	47	41	37	33	30	28	26
22	109	24	356	484	132	84	64	53	46	40	36	33	30	28
24	148	25	386		179	101	74	60	51	44	40	36	33	30
26	193	27	400		263	123	85	67	56	49	43	39	36	33
28	245	29	402			154	99	75	62	53	47	42	38	35
30	303	31	395			200	116	85	69	58	51	46	41	38
32	369	34	385			277	139	97	77	64	56	49	44	40
34	442	36	373				170	112	86	70	60	53	48	43
36	521	39	359				214	129	96	78	66	58	51	46
38	605	41	342				282	152	108	86	72	62	55	50
40	697	44	327					181	122	95	78	67	59	53
42	796	47	313					222	140	105	85	72	63	56
44	895	50	297					280	162	117	93	78	68	60
46	991	53	281						189	131	102	85	73	64
48	1093	56	266						226	148	113	92	79	69
50	1196	59	250						276	169	125	100	84	74

culm mai m^3/ha/yr	0.3	0.8	1.6	2.7	4.0	5.7	7.7	9.7	12.0 +	14.1 +	16.4 +
culm age years	190	155	141	134	134	131	115	109			
merch age years	300	300	180	100	99	100	97	90	87	84	80

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	600	seedin	70	0	4		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 750 ***File f33n1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	14	4	38	32	28	25	23	21	19	18	17	16	14
10	3	17	23	48	38	33	29	26	24	22	20	19	18	16
12	11	19	86	62	46	38	33	30	27	25	23	21	20	18
14	25	20	161	79	56	44	38	34	30	27	25	23	22	20
16	44	21	237	106	67	52	43	38	34	30	28	26	24	22
18	74	21	343	149	82	60	49	42	37	34	30	28	26	24
20	113	22	451	235	103	71	56	47	41	37	33	30	28	26
22	163	23	548	484	132	84	64	53	46	40	36	33	30	28
24	219	24	610		179	101	74	60	51	44	40	36	33	30
26	282	25	644		263	123	85	67	56	49	43	39	36	33
28	353	27	655			154	99	75	62	53	47	42	38	35
30	427	29	643			200	116	85	69	58	51	46	41	38
32	506	31	616			277	139	97	77	64	56	49	44	40
34	593	33	583				170	112	86	70	60	53	48	43
36	682	35	549				214	129	96	78	66	58	51	46
38	782	38	514				282	152	108	86	72	62	55	50
40	883	40	481					181	122	95	78	67	59	53
42	990	43	451					222	140	105	85	72	63	56
44	1103	46	424					280	162	117	93	78	68	60
46	1218	49	398						189	131	102	85	73	64
48	1336	52	372						226	148	113	92	79	69
50	1445	55	345						276	169	125	100	84	74

culm mai m^3/ha/yr	0.5	1.3	2.3	3.7	5.3	7.2	9.5	11.9	14.6	17.1 +	19.8 +
culm age years	177	150	136	123	115	112	109	104	92		
merch age years	300	300	118	92	91	91	89	88	83	76	71

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	1500	seedin	85	0	4		
secondary									

April 1994

Douglas-fir Yield Table

Regen Model Set 760 ***File f33n2***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	23	21	19	17	16	15	14	13	12	12	11
6	0	0	0	30	26	23	21	20	18	17	16	14	14	13
8	0	0	0	38	32	28	25	23	21	19	18	17	16	14
10	4	17	34	48	38	33	29	26	24	22	20	19	18	16
12	17	19	140	62	46	38	33	30	27	25	23	21	20	18
14	40	20	272	79	56	44	38	34	30	27	25	23	22	20
16	75	20	426	106	67	52	43	38	34	30	28	26	24	22
18	122	21	588	149	82	60	49	42	37	34	30	28	26	24
20	180	22	729	235	103	71	56	47	41	37	33	30	28	26
22	246	22	838	484	132	84	64	53	46	40	36	33	30	28
24	320	23	917		179	101	74	60	51	44	40	36	33	30
26	401	24	960		263	123	85	67	56	49	43	39	36	33
28	486	26	970			154	99	75	62	53	47	42	38	35
30	578	27	965			200	116	85	69	58	51	46	41	38
32	679	28	945			277	139	97	77	64	56	49	44	40
34	783	30	893				170	112	86	70	60	53	48	43
36	891	32	838				214	129	96	78	66	58	51	46
38	1005	34	781				282	152	108	86	72	62	55	50
40	1131	37	731					181	122	95	78	67	59	53
42	1262	39	681					222	140	105	85	72	63	56
44	1381	42	627					280	162	117	93	78	68	60
46	1515	44	578						189	131	102	85	73	64
48	1647	47	534						226	148	113	92	79	69
50	1760	50	491						276	169	125	100	84	74

culm mai m^3/ha/yr	0.8	1.9	3.3	5.0	7.1	9.3	12.1	14.8	18.0	21.0	24.1
culm age years	150	130	123	111	106	102	103	98	90	79	70
merch age years	300	300	150	87	87	84	88	81	80	74	67

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	Df	33	3000	seedin	100	0	4		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 110-112 **File h33c4**

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	2	18	21	42	35	30	27	24	22	20	18	17	15	14
10	10	19	82	51	42	35	31	28	25	23	21	19	17	16
12	27	20	205	62	49	41	36	31	28	25	23	21	19	17
14	53	21	315	73	57	47	40	35	32	28	26	23	21	19
16	94	22	478	86	65	54	45	40	35	31	28	26	23	21
18	155	22	681	102	75	60	51	44	39	35	31	28	25	23
20	234	23	863	125	86	68	57	49	43	38	34	31	28	25
22	327	25	960	159	101	77	63	54	47	42	37	33	30	27
24	429	27	994	228	120	88	70	60	52	45	40	36	32	29
26	541	28	984		145	101	79	66	56	49	44	39	35	32
28	659	31	944		186	118	90	73	62	54	48	42	38	34
30	775	33	883			139	102	82	68	58	52	46	41	37
32	885	36	810			171	117	91	76	64	56	49	44	40
34	995	39	727			255	137	103	84	71	61	53	48	42
36	1083	41	646				165	118	94	78	67	58	51	46
38	1160	44	570				226	137	105	86	73	63	55	49
40	1218	48	496					164	120	96	81	69	60	53
42	1268	51	433					222	138	108	89	76	66	56
44	1299	54	376						166	122	99	83	72	63
46	1322	57	329						240	142	111	92	79	68
48	1360	60	289							173	127	103	86	74
50	1364	63	251								148	116	96	82

culm mai m^3/ha/yr	2.1	3.7	5.6	7.6	9.7	11.9	14.1	16.3	18.8	21.2	23.7
culm age years	169	144	125	106	95	84	71	61	57	51	46
merch age years	204	115	104	92	81	76	66	57	53	48	44

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	900	planted	85	0	0		
secondary	WH	33	300	seedin	50	-2	5		

April 1994

Hemlock Yield Table

Regen Model Set 110-112 ***File h33c5***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	2	19	17	42	35	30	27	24	22	20	18	17	15	14
10	11	19	94	51	42	35	31	28	25	23	21	19	17	16
12	33	20	260	62	49	41	36	31	28	25	23	21	19	17
14	64	21	393	73	57	47	40	35	32	28	26	23	21	19
16	111	22	573	86	65	54	45	40	35	31	28	26	23	21
18	183	22	815	102	75	60	51	44	39	35	31	28	25	23
20	275	24	1002	125	86	68	57	49	43	38	34	31	28	25
22	378	25	1105	159	101	77	63	54	47	42	37	33	30	27
24	496	26	1138	228	120	88	70	60	52	45	40	36	32	29
26	617	28	1115		145	101	79	66	56	49	44	39	35	32
28	735	31	1046		186	118	90	73	62	54	48	42	38	34
30	854	33	964			139	102	82	68	58	52	46	41	37
32	940	36	849			171	117	91	76	64	56	49	44	40
34	1031	39	745			255	137	103	84	71	61	53	48	42
36	1115	42	651				165	118	94	78	67	58	51	46
38	1161	45	552				226	137	105	86	73	63	55	49
40	1185	48	466					164	120	96	81	69	60	53
42	1198	51	393					222	138	108	89	76	66	56
44	1201	55	332						166	122	99	83	72	63
46	1213	58	287						240	142	111	92	79	68
48	1234	61	252							173	127	103	86	74
50	1247	64	222								148	116	96	82

culm mai m^3/ha/yr	2.4	4.2	6.2	8.4	10.5	12.5	14.6	17.0	19.4	21.8	24.4
culm age years	173	145	122	102	82	69	62	58	57	51	45
merch age years	300	113	99	90	76	66	58	55	52	48	42

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	1200	planted	85	0	0		
secondary	WH	33	300	seedin	50	-2	5		

April 1994

Hemlock Yield Table

Regen Model Set 116-118 ***File h33cb4***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	13	9	42	35	30	27	24	22	20	18	17	15	14
10	6	18	53	51	42	35	31	28	25	23	21	19	17	16
12	19	20	148	62	49	41	36	31	28	25	23	21	19	17
14	39	21	244	73	57	47	40	35	32	28	26	23	21	19
16	74	21	402	86	65	54	45	40	35	31	28	26	23	21
18	132	22	631	102	75	60	51	44	39	35	31	28	25	23
20	210	23	837	125	86	68	57	49	43	38	34	31	28	25
22	300	24	950	159	101	77	63	54	47	42	37	33	30	27
24	401	26	999	228	120	88	70	60	52	45	40	36	32	29
26	512	28	1000		145	101	79	66	56	49	44	39	35	32
28	634	30	970		186	118	90	73	62	54	48	42	38	34
30	757	32	914			139	102	82	68	58	52	46	41	37
32	869	35	840			171	117	91	76	64	56	49	44	40
34	990	38	757			255	137	103	84	71	61	53	48	42
36	1092	41	672				165	118	94	78	67	58	51	46
38	1183	44	593				226	137	105	86	73	63	55	49
40	1261	47	522					164	120	96	81	69	60	53
42	1321	50	455					222	138	108	89	76	66	56
44	1365	54	396						166	122	99	83	72	63
46	1396	57	342						240	142	111	92	79	68
48	1423	60	298							173	127	103	86	74
50	1433	63	229								148	116	96	82
			culm mai m^3/ha/yr	1.9	3.5	5.5	7.5	9.6	11.8	14.0	16.3	19.0	21.5	24.1
			culm age years	174	154	131	109	101	84	74	67	57	55	49
			merch age years	244	120	109	95	85	77	68	60	55	51	46

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	900	planted	90	0	0		
secondary	WH	33	300	seedin	50	2	5		

April 1994

Hemlock Yield Table

Regen Model Set 116-118 ***File h33cb5***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	9	6	42	35	30	27	24	22	20	18	17	15	14
10	6	17	60	51	42	35	31	28	25	23	21	19	17	16
12	22	19	187	62	49	41	36	31	28	25	23	21	19	17
14	48	21	308	73	57	47	40	35	32	28	26	23	21	19
16	90	21	496	86	65	54	45	40	35	31	28	26	23	21
18	156	22	745	102	75	60	51	44	39	35	31	28	25	23
20	244	23	971	125	86	68	57	49	43	38	34	31	28	25
22	343	24	1095	159	101	77	63	54	47	42	37	33	30	27
24	456	26	1156	228	120	88	70	60	52	45	40	36	32	29
26	580	28	1156		145	101	79	66	56	49	44	39	35	32
28	701	30	1098		186	118	90	73	62	54	48	42	38	34
30	819	32	1014			139	102	82	68	58	52	46	41	37
32	916	34	909			171	117	91	76	64	56	49	44	40
34	1009	37	801			255	137	103	84	71	61	53	48	42
36	1089	40	704				165	118	94	78	67	58	51	46
38	1153	43	609				226	137	105	86	73	63	55	49
40	1200	46	524					164	120	96	81	69	60	53
42	1210	49	440					222	138	108	89	76	66	56
44	1240	52	377						166	122	99	83	72	63
46	1239	56	317						240	142	111	92	79	68
48	1247	59	276							173	127	103	86	74
50	1262	62	241								148	116	96	82
		culm mai m^3/ha/yr		2.2	4.0	6.0	8.0	10.1	12.1	14.3	16.6	18.9	21.3	23.8
		culm age years		173	145	122	102	84	76	68	58	56	51	45
		merch age years		300	118	102	90	77	68	61	56	52	48	43

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	1200	planted	90				
secondary	WH	33	300	seedin	50	2	5		

April 1994

Hemlock Yield Table

Regen Model Set 120-125 ***File h33a4***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	10	3	34	28	25	22	20	19	17	16	14	13	12
8	2	19	22	42	35	30	27	24	22	20	18	17	15	14
10	10	19	82	51	42	35	31	28	25	23	21	19	17	16
12	27	20	201	62	49	41	36	31	28	25	23	21	19	17
14	51	21	307	73	57	47	40	35	32	28	26	23	21	19
16	90	22	463	86	65	54	45	40	35	31	28	26	23	21
18	147	22	643	102	75	60	51	44	39	35	31	28	25	23
20	218	24	783	125	86	68	57	49	43	38	34	31	28	25
22	298	25	852	159	101	77	63	54	47	42	37	33	30	27
24	388	27	873	228	120	88	70	60	52	45	40	36	32	29
26	482	29	854		145	101	79	66	56	49	44	39	35	32
28	584	31	813		186	118	90	73	62	54	48	42	38	34
30	685	34	763			139	102	82	68	58	52	46	41	37
32	786	36	706			171	117	91	76	64	56	49	44	40
34	899	39	649			255	137	103	84	71	61	53	48	42
36	1010	42	597				165	118	94	78	67	58	51	46
38	1117	45	541				226	137	105	86	73	63	55	49
40	1210	48	488					164	120	96	81	69	60	53
42	1284	51	432					222	138	108	89	76	66	56
44	1364	54	390						166	122	99	83	72	63
46	1393	57	344						240	142	111	92	79	68
48	1425	60	303							173	127	103	86	74
50	1451	63	267								148	116	96	82
culm mai m^3/ha/yr				1.9	3.3	5.0	6.7	8.7	10.8	13.0	15.2	17.7	20.4	23.2
culm age years				165	139	123	108	102	92	81	73	63	57	53
merch age years				249	110	102	91							

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	900	planted	85	0	0		
secondary	hem	33	500	seedin	50	-2	4		

April 1994

Hemlock Yield Table

Regen Model Set 120-125 ***File h33a5***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	6	2	34	28	25	22	20	19	17	16	14	13	12
8	2	19	20	42	35	30	27	24	22	20	18	17	15	14
10	11	19	96	51	42	35	31	28	25	23	21	19	17	16
12	31	20	240	62	49	41	36	31	28	25	23	21	19	17
14	61	21	376	73	57	47	40	35	32	28	26	23	21	19
16	106	22	546	86	65	54	45	40	35	31	28	26	23	21
18	172	22	751	102	75	60	51	44	39	35	31	28	25	23
20	253	24	906	125	86	68	57	49	43	38	34	31	28	25
22	344	25	991	159	101	77	63	54	47	42	37	33	30	27
24	447	27	1026	228	120	88	70	60	52	45	40	36	32	29
26	559	28	1013		145	101	79	66	56	49	44	39	35	32
28	676	31	971		186	118	90	73	62	54	48	42	38	34
30	792	33	907			139	102	82	68	58	52	46	41	37
32	894	35	829			171	117	91	76	64	56	49	44	40
34	997	38	740			255	137	103	84	71	61	53	48	42
36	1100	41	664				165	118	94	78	67	58	51	46
38	1182	44	589				226	137	105	86	73	63	55	49
40	1259	47	517					164	120	96	81	69	60	53
42	1299	51	441					222	138	108	89	76	66	56
44	1328	54	378						166	122	99	83	72	63
46	1327	57	322						240	142	111	92	79	68
48	1352	60	282							173	127	103	86	74
50	1336	64	241								148	116	96	82
culm mai m^3/ha/yr				2.2	3.9	5.8	7.8	9.8	11.9	14.2	16.5	19.3	21.5	24.4
culm age years				164	140	122	104	87	82	73	67	57	52	47
merch age years								78	70	65	60	55	50	46

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	1200	planted	85	0	0		
secondary	hem	33	500	seedin	50	-2	4		

April 1994

Hemlock Yield Table

Regen Model Set 126-128 ***File h33d4***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	11	6	42	35	30	27	24	22	20	18	17	15	14
10	6	18	51	51	42	35	31	28	25	23	21	19	17	16
12	18	20	147	62	49	41	36	31	28	25	23	21	19	17
14	37	21	234	73	57	47	40	35	32	28	26	23	21	19
16	70	21	374	86	65	54	45	40	35	31	28	26	23	21
18	120	22	552	102	75	60	51	44	39	35	31	28	25	23
20	189	23	732	125	86	68	57	49	43	38	34	31	28	25
22	272	24	849	159	101	77	63	54	47	42	37	33	30	27
24	362	26	893	228	120	88	70	60	52	45	40	36	32	29
26	458	28	885		145	101	79	66	56	49	44	39	35	32
28	564	30	862		186	118	90	73	62	54	48	42	38	34
30	670	32	810			139	102	82	68	58	52	46	41	37
32	776	35	756			171	117	91	76	64	56	49	44	40
34	890	38	692			255	137	103	84	71	61	53	48	42
36	999	40	636				165	118	94	78	67	58	51	46
38	1105	43	579				226	137	105	86	73	63	55	49
40	1220	46	527					164	120	96	81	69	60	53
42	1319	49	473					222	138	108	89	76	66	56
44	1396	53	419						166	122	99	83	72	63
46	1446	56	370						240	142	111	92	79	68
48	1499	59	329							173	127	103	86	74
50	1508	62	285								148	116	96	82
			culm mai m^3/ha/yr	1.7	3.2	4.9	6.6	8.7	10.7	12.9	15.1	17.7	20.4	23.6
			culm age years	172	151	128	112	103	91	81	78	69	57	56
			merch age years	283	115	106	95							

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	900	planted	90	0	0		
secondary	hem	33	600	seedin	70	2	4		

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Hemlock Yield Table

Regen Model Set 126-128 ***File h33d5***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	13	7	42	35	30	27	24	22	20	18	17	15	14
10	6	18	59	51	42	35	31	28	25	23	21	19	17	16
12	22	19	180	62	49	41	36	31	28	25	23	21	19	17
14	45	21	286	73	57	47	40	35	32	28	26	23	21	19
16	82	22	431	86	65	54	45	40	35	31	28	26	23	21
18	142	22	660	102	75	60	51	44	39	35	31	28	25	23
20	221	23	860	125	86	68	57	49	43	38	34	31	28	25
22	312	24	979	159	101	77	63	54	47	42	37	33	30	27
24	413	26	1026	228	120	88	70	60	52	45	40	36	32	29
26	522	27	1034		145	101	79	66	56	49	44	39	35	32
28	640	30	999		186	118	90	73	62	54	48	42	38	34
30	762	32	941			139	102	82	68	58	52	46	41	37
32	877	34	873			171	117	91	76	64	56	49	44	40
34	985	37	789			255	137	103	84	71	61	53	48	42
36	1087	40	707				165	118	94	78	67	58	51	46
38	1166	43	620				226	137	105	86	73	63	55	49
40	1243	46	543					164	120	96	81	69	60	53
42	1279	49	464					222	138	108	89	76	66	56
44	1318	52	404						166	122	99	83	72	63
46	1345	55	349						240	142	111	92	79	68
48	1349	59	300							173	127	103	86	74
50	1351	62	257								148	116	96	82

culm mai m^3/ha/yr	2.0	3.6	5.5	7.5	9.6	11.7	14.0	16.3	19.1	21.3	24.1
culm age years	170	149	129	109	93	84	73	67	57	52	46
merch age years					84	76	67	61	55	50	45

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	1200	planted	90	0	0		
secondary	hem	33	600	seedin	70	2	4		

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Hemlock Yield Table

Regen Model Set 130-135 ***File h33b3***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	8	3	25	22	20	18	17	15	14	13	12	11	10
6	2	17	20	34	28	25	22	20	19	17	16	14	13	12
8	8	19	65	42	35	30	27	24	22	20	18	17	15	14
10	24	20	173	51	42	35	31	28	25	23	21	19	17	16
12	48	20	320	62	49	41	36	31	28	25	23	21	19	17
14	84	21	456	73	57	47	40	35	32	28	26	23	21	19
16	130	22	594	86	65	54	45	40	35	31	28	26	23	21
18	189	23	731	102	75	60	51	44	39	35	31	28	25	23
20	259	24	829	125	86	68	57	49	43	38	34	31	28	25
22	335	25	877	159	101	77	63	54	47	42	37	33	30	27
24	415	27	873	228	120	88	70	60	52	45	40	36	32	29
26	500	29	844		145	101	79	66	56	49	44	39	35	32
28	585	31	798		186	118	90	73	62	54	48	42	38	34
30	679	33	749			139	102	82	68	58	52	46	41	37
32	770	35	698			171	117	91	76	64	56	49	44	40
34	859	38	637			255	137	103	84	71	61	53	48	42
36	956	41	584				165	118	94	78	67	58	51	46
38	1055	43	539				226	137	105	86	73	63	55	49
40	1166	46	498					164	120	96	81	69	60	53
42	1240	49	452					222	138	108	89	76	66	56
44	1324	52	408						166	122	99	83	72	63
46	1408	55	372						240	142	111	92	79	68
48	1485	58	339							173	127	103	86	74
50	1541	61	306								148	116	96	82
culm ma m^3/ha/yr				2.1	3.5	5.0	6.7	8.5	10.2	12.3	14.5	17.0	19.5	22.3
culm age years				145	127	111	103	90	87	79	79	69	57	53
merch age years				169	98	90	85	78	70	68	66	64	56	51

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	600	planted	85	0	0		
secondary	hem	33	1200	seedin	70	-2	8		

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Hemlock Yield Table

Regen Model Set 136-138 ***File h33f3***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	0	8	4	42	35	30	27	24	22	20	18	17	15	14
10	3	17	30	51	42	35	31	28	25	23	21	19	17	16
12	11	19	94	62	49	41	36	31	28	25	23	21	19	17
14	25	21	158	73	57	47	40	35	32	28	26	23	21	19
16	48	21	263	86	65	54	45	40	35	31	28	26	23	21
18	86	22	419	102	75	60	51	44	39	35	31	28	25	23
20	143	22	603	125	86	68	57	49	43	38	34	31	28	25
22	213	23	731	159	101	77	63	54	47	42	37	33	30	27
24	293	25	809	228	120	88	70	60	52	45	40	36	32	29
26	383	26	842		145	101	79	66	56	49	44	39	35	32
28	477	28	836		186	118	90	73	62	54	48	42	38	34
30	573	30	796			139	102	82	68	58	52	46	41	37
32	663	33	736			171	117	91	76	64	56	49	44	40
34	769	35	673			255	137	103	84	71	61	53	48	42
36	870	38	614				165	118	94	78	67	58	51	46
38	979	41	565				226	137	105	86	73	63	55	49
40	1083	44	520					164	120	96	81	69	60	53
42	1199	47	473					222	138	108	89	76	66	56
44	1310	51	435						166	122	99	83	72	63
46	1409	54	395						240	142	111	92	79	68
48	1523	57	364							173	127	103	86	74
50	1587	60	329								148	116	96	82

culm mai m^3/ha/yr	1.3	2.7	4.1	5.7	7.5	9.3	11.4	13.5	15.9	18.3	21.4
culm age years	179	155	132	112	105	99	87	86	76	70	56
merch age years	300	121	108	96	92	84	79	73	70	64	55

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	600	planted	90	0	0		
secondary	hem	33	1200	seedin	80	4	6		

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Hemlock Yield Table

Regen Model Set 139 ***File h33b1***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	1	18	12	34	28	25	22	20	19	17	16	14	13	12
8	5	19	37	42	35	30	27	24	22	20	18	17	15	14
10	13	20	99	51	42	35	31	28	25	23	21	19	17	16
12	30	20	207	62	49	41	36	31	28	25	23	21	19	17
14	54	21	303	73	57	47	40	35	32	28	26	23	21	19
16	87	22	414	86	65	54	45	40	35	31	28	26	23	21
18	132	23	531	102	75	60	51	44	39	35	31	28	25	23
20	186	24	619	125	86	68	57	49	43	38	34	31	28	25
22	249	26	673	159	101	77	63	54	47	42	37	33	30	27
24	314	27	675	228	120	88	70	60	52	45	40	36	32	29
26	381	29	648		145	101	79	66	56	49	44	39	35	32
28	450	32	606		186	118	90	73	62	54	48	42	38	34
30	518	34	558			139	102	82	68	58	52	46	41	37
32	587	37	510			171	117	91	76	64	56	49	44	40
34	652	40	458			255	137	103	84	71	61	53	48	42
36	719	43	413				165	118	94	78	67	58	51	46
38	787	46	373				226	137	105	86	73	63	55	49
40	864	49	340					164	120	96	81	69	60	53
42	926	52	307					222	138	108	89	76	66	56
44	987	55	278						166	122	99	83	72	63
46	1061	58	257						240	142	111	92	79	68
48	1129	61	237							173	127	103	86	74
50	1204	64	221								148	116	96	82

culm mai m^3/ha/yr	1.6	2.6	3.8	5.1	6.4	7.8	9.2	10.8	12.5	14.5	16.4
culm age years	154	131	115	101	91	79	74	69	57	57	53
merch age years	192	101	90	82	75	68	62	57	54	54	51

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	1200	seedin	70	0	8		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 140-144 ***File SICC1***

Site Ht.	Vol	Diam	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	2	19	18	42	35	30	27	24	22	20	18	17	15	14
10	11	19	89	51	42	35	31	28	25	23	21	19	17	16
12	28	20	212	62	49	41	36	31	28	25	23	21	19	17
14	54	21	322	73	57	47	40	35	32	28	26	23	21	19
16	91	22	454	86	65	54	45	40	35	31	28	26	23	21
18	144	23	614	102	75	60	51	44	39	35	31	28	25	23
20	210	24	746	125	86	68	57	49	43	38	34	31	28	25
22	286	25	812	159	101	77	63	54	47	42	37	33	30	27
24	362	27	809	228	120	88	70	60	52	45	40	36	32	29
26	440	29	777		145	101	79	66	56	49	44	39	35	32
28	517	31	715		186	118	90	73	62	54	48	42	38	34
30	590	34	641			139	102	82	68	58	52	46	41	37
32	657	39	574			171	117	91	76	64	56	49	44	40
34	731	40	513			255	137	103	84	71	61	53	48	42
36	802	42	460				165	118	94	78	67	58	51	46
38	874	46	413				226	137	105	86	73	63	55	49
40	957	49	377					164	120	96	81	69	60	53
42	1033	52	344					222	138	108	89	76	66	56
44	1109	55	313						166	122	99	83	72	63
46	1170	58	284						240	142	111	92	79	68
48	1244	61	262							173	127	103	86	74
50	1316	64	242								148	116	96	82

culm mai m^3/ha/yr	1.8	3.0	4.4	5.8	7.2	8.7	10.3	12.0	13.9	16.1	18.3
culm age years	158	132	113	97	82	80	71	65	57	57	56
merch age years	228	102	91	80	71	64	60	56	54	54	53

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	1500	seedin	80	0	5		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 140-144 ***File SICC3***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	2	18	15	42	35	30	27	24	22	20	18	17	15	14
10	7	19	55	51	42	35	31	28	25	23	21	19	17	16
12	22	20	169	62	49	41	36	31	28	25	23	21	19	17
14	51	20	355	73	57	47	40	35	32	28	26	23	21	19
16	89	21	507	86	65	54	45	40	35	31	28	26	23	21
18	140	22	669	102	75	60	51	44	39	35	31	28	25	23
20	202	23	800	125	86	68	57	49	43	38	34	31	28	25
22	274	24	903	159	101	77	63	54	47	42	37	33	30	27
24	353	25	950	228	120	88	70	60	52	45	40	36	32	29
26	433	26	946		145	101	79	66	56	49	44	39	35	32
28	517	28	917		186	118	90	73	62	54	48	42	38	34
30	592	30	840			139	102	82	68	58	52	46	41	37
32	677	32	776			171	117	91	76	64	56	49	44	40
34	764	35	719			255	137	103	84	71	61	53	48	42
36	856	37	653				165	118	94	78	67	58	51	46
38	945	40	593				226	137	105	86	73	63	55	49
40	1045	43	545					164	120	96	81	69	60	53
42	1143	46	500					222	138	108	89	76	66	56
44	1208	48	447						166	122	99	83	72	63
46	1286	51	405						240	142	111	92	79	68
48	1358	54	365							173	127	103	86	74
50	1421	58	328								148	116	96	82

culm mai m^3/ha/yr	2.2	3.6	5.1	6.7	8.4	10.2	12.1	14.3	16.5	19.2	21.7
culm age years	144	125	101	98	89	84	81	74	67	57	53
merch age years	173	95	86	76	74	70	65	62	59	55	50

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	600	planted	85	0	0		
secondary	WH	33	1500	seedin	80	-2	5		

April 1994

Hemlock Yield Table

Regen Model Set 150-154 ***File h33n2***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	1	12	8	34	28	25	22	20	19	17	16	14	13	12
8	6	19	50	42	35	30	27	24	22	20	18	17	15	14
10	22	19	176	51	42	35	31	28	25	23	21	19	17	16
12	54	20	385	62	49	41	36	31	28	25	23	21	19	17
14	99	21	568	73	57	47	40	35	32	28	26	23	21	19
16	165	22	807	86	65	54	45	40	35	31	28	26	23	21
18	252	22	1058	102	75	60	51	44	39	35	31	28	25	23
20	359	23	1272	125	86	68	57	49	43	38	34	31	28	25
22	478	25	1376	159	101	77	63	54	47	42	37	33	30	27
24	591	26	1365	228	120	88	70	60	52	45	40	36	32	29
26	698	28	1284		145	101	79	66	56	49	44	39	35	32
28	790	30	1158		186	118	90	73	62	54	48	42	38	34
30	863	32	1010			139	102	82	68	58	52	46	41	37
32	925	35	875			171	117	91	76	64	56	49	44	40
34	1008	37	760			255	137	103	84	71	61	53	48	42
36	1075	40	661				165	118	94	78	67	58	51	46
38	1140	43	577				226	137	105	86	73	63	55	49
40	1202	46	507					164	120	96	81	69	60	53
42	1274	49	452					222	138	108	89	76	66	56
44	1338	52	405						166	122	99	83	72	63
46	1389	55	363						240	142	111	92	79	68
48	1469	58	333							173	127	103	86	74
50	1546	61	304								148	116	96	82
			culm mai m^3/ha/yr	3.0	5.0	6.9	8.9	10.9	12.8	14.9	16.8	19.1	21.2	24.0
			culm age years	152	118	101	84	73	62	56	52	53	48	42
			merch age years	300	101	86	74	66	59	53	47	43	39	35

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	3000	seedin	100	0	6		
secondary									

Hemlock Yield Table

Regen Model Set 160-162 ***File h33n4***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	6	16	59	42	35	30	27	24	22	20	18	17	15	14
10	33	19	269	51	42	35	31	28	25	23	21	19	17	16
12	80	20	573	62	49	41	36	31	28	25	23	21	19	17
14	145	21	843	73	57	47	40	35	32	28	26	23	21	19
16	226	21	1102	86	65	54	45	40	35	31	28	26	23	21
18	329	22	1369	102	75	60	51	44	39	35	31	28	25	23
20	445	23	1544	125	86	68	57	49	43	38	34	31	28	25
22	554	24	1599	159	101	77	63	54	47	42	37	33	30	27
24	657	25	1553	228	120	88	70	60	52	45	40	36	32	29
26	746	27	1463		145	101	79	66	56	49	44	39	35	32
28	804	28	1302		186	118	90	73	62	54	48	42	38	34
30	865	30	1144			139	102	82	68	58	52	46	41	37
32	918	32	998			171	117	91	76	64	56	49	44	40
34	986	34	872			255	137	103	84	71	61	53	48	42
36	1037	37	755				165	118	94	78	67	58	51	46
38	1084	39	656				226	137	105	86	73	63	55	49
40	1143	42	577					164	120	96	81	69	60	53
42	1213	45	508					222	138	108	89	76	66	56
44	1279	48	450						166	122	99	83	72	63
46	1314	51	396						240	142	111	92	79	68
48	1356	54	355							173	127	103	86	74
50	1406	57	317								148	116	96	82

culm mai m^3/ha/yr	3.6	5.6	7.5	9.4	11.5	13.2	15.3	17.1	19.3	21.2	23.9
culm age years	133	108	86	78	65	57	49	44	39	36	32
merch age years	300	116	78	69	61	54					

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	6000	seedin	100	0	6		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 160-162 ***File h33n5***

Site Ht.	Vol	Dia m	Num	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	3	2	34	28	25	22	20	19	17	16	14	13	12
8	8	17	69	42	35	30	27	24	22	20	18	17	15	14
10	32	19	258	51	42	35	31	28	25	23	21	19	17	16
12	83	20	617	62	49	41	36	31	28	25	23	21	19	17
14	144	21	818	73	57	47	40	35	32	28	26	23	21	19
16	221	22	995	86	65	54	45	40	35	31	28	26	23	21
18	313	24	1122	102	75	60	51	44	39	35	31	28	25	23
20	412	25	1154	125	86	68	57	49	43	38	34	31	28	25
22	525	27	1154	159	101	77	63	54	47	42	37	33	30	27
24	642	29	1111	228	120	88	70	60	52	45	40	36	32	29
26	757	32	1035		145	101	79	66	56	49	44	39	35	32
28	854	34	924		186	118	90	73	62	54	48	42	38	34
30	943	37	822			139	102	82	68	58	52	46	41	37
32	1024	39	736			171	117	91	76	64	56	49	44	40
34	1100	42	648			255	137	103	84	71	61	53	48	42
36	1167	45	569				165	118	94	78	67	58	51	46
38	1228	48	500				226	137	105	86	73	63	55	49
40	1304	51	454					164	120	96	81	69	60	53
42	1356	53	407					222	138	108	89	76	66	56
44	1404	56	365						166	122	99	83	72	63
46	1455	59	329						240	142	111	92	79	68
48	1516	62	300							173	127	103	86	74
50	1584	65	277								148	116	96	82

culm mai m^3/ha/yr	3.3	5.4	7.5	9.6	11.8	13.9	16.3	18.4	20.9	23.2	26.2
culm age years	140	117	101	82	73	63	58	55	49	45	40
merch age years					66	59	54	50	46	41	37

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	6000	seedin	100	0	6		spaced
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 170 ***File h33n6***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	2	6	20	42	35	30	27	24	22	20	18	17	15	14
10	26	16	237	51	42	35	31	28	25	23	21	19	17	16
12	87	19	679	62	49	41	36	31	28	25	23	21	19	17
14	171	20	1054	73	57	47	40	35	32	28	26	23	21	19
16	268	21	1360	86	65	54	45	40	35	31	28	26	23	21
18	372	22	1575	102	75	60	51	44	39	35	31	28	25	23
20	478	23	1677	125	86	68	57	49	43	38	34	31	28	25
22	564	24	1661	159	101	77	63	54	47	42	37	33	30	27
24	652	25	1583	228	120	88	70	60	52	45	40	36	32	29
26	731	26	1494		145	101	79	66	56	49	44	39	35	32
28	790	27	1336		186	118	90	73	62	54	48	42	38	34
30	833	29	1163			139	102	82	68	58	52	46	41	37
32	874	31	1019			171	117	91	76	64	56	49	44	40
34	933	33	894			255	137	103	84	71	61	53	48	42
36	995	35	795				165	118	94	78	67	58	51	46
38	1037	38	688				226	137	105	86	73	63	55	49
40	1103	40	603					164	120	96	81	69	60	53
42	1157	43	531					222	138	108	89	76	66	56
44	1229	46	475						166	122	99	83	72	63
46	1306	49	432						240	142	111	92	79	68
48	1355	52	385							173	127	103	86	74
50	1445	55	354								148	116	96	82

culm mai m^3/ha/yr	3.8	5.6	7.4	9.3	11.2	12.9	14.8	16.7	18.7	20.8	23.1
culm age years	125	94	86	72	65	57	50	44	40	37	34
merch age years	300	133	91	73	60	53	47	42	38	35	35

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	9000	seedin	100	0	6		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 170 ***File h33n7***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Diam	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	4	10	34	42	35	30	27	24	22	20	18	17	15	14
10	35	17	300	51	42	35	31	28	25	23	21	19	17	16
12	94	19	708	62	49	41	36	31	28	25	23	21	19	17
14	169	21	967	73	57	47	40	35	32	28	26	23	21	19
16	252	22	1133	86	65	54	45	40	35	31	28	26	23	21
18	347	24	1199	102	75	60	51	44	39	35	31	28	25	23
20	450	26	1197	125	86	68	57	49	43	38	34	31	28	25
22	558	28	1160	159	101	77	63	54	47	42	37	33	30	27
24	666	30	1085	228	120	88	70	60	52	45	40	36	32	29
26	773	32	991		145	101	79	66	56	49	44	39	35	32
28	871	35	885		186	118	90	73	62	54	48	42	38	34
30	959	38	783			139	102	82	68	58	52	46	41	37
32	1012	40	684			171	117	91	76	64	56	49	44	40
34	1078	43	596			255	137	103	84	71	61	53	48	42
36	1140	46	531				165	118	94	78	67	58	51	46
38	1192	48	474				226	137	105	86	73	63	55	49
40	1290	51	435					164	120	96	81	69	60	53
42	1373	54	398					222	138	108	89	76	66	56
44	1444	57	364						166	122	99	83	72	63
46	1506	60	331						240	142	111	92	79	68
48	1550	62	299							173	127	103	86	74
50	1571	65	269								148	116	96	82

culm mai m^3/ha/yr	3.6	5.6	7.7	9.8	11.9	14.1	16.4	18.6	20.9	23.4	26.0
culm age years	132	112	97	82	73	62	58	51	46	41	37
merch age years	115	91	81	72	66	59	54	48	44	40	36

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	WH	33	9000	seedin	100	0	6		spaced
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 810 ***File h33smn1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	0	13	2	42	35	30	27	24	22	20	18	17	15	14
10	2	18	15	51	42	35	31	28	25	23	21	19	17	16
12	5	20	41	62	49	41	36	31	28	25	23	21	19	17
14	10	21	64	73	57	47	40	35	32	28	26	23	21	19
16	19	22	100	86	65	54	45	40	35	31	28	26	23	21
18	33	22	153	102	75	60	51	44	39	35	31	28	25	23
20	51	23	201	125	86	68	57	49	43	38	34	31	28	25
22	73	25	223	159	101	77	63	54	47	42	37	33	30	27
24	98	27	229	228	120	88	70	60	52	45	40	36	32	29
26	126	30	226		145	101	79	66	56	49	44	39	35	32
28	157	32	218		186	118	90	73	62	54	48	42	38	34
30	191	35	208			139	102	82	68	58	52	46	41	37
32	227	38	197			171	117	91	76	64	56	49	44	40
34	269	41	186			255	137	103	84	71	61	53	48	42
36	311	44	176				165	118	94	78	67	58	51	46
38	355	47	166				226	137	105	86	73	63	55	49
40	402	50	157					164	120	96	81	69	60	53
42	449	53	149					222	138	108	89	76	66	56
44	502	56	142						166	122	99	83	72	63
46	557	59	136						240	142	111	92	79	68
48	616	62	130							173	127	103	86	74
50	676	65	124								148	116	96	82
			culm mai m^3/ha/yr	0.5	0.9	1.4	2.0	2.6	3.4	4.2	5.1	6.1	7.1	8.3
			culm age years	173	155	137	132	115	110	99	96	89	84	78
			merch age years	300	300	300	131	99	82	78	74	71	69	65

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	300	seedin	30	0	3		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 820 ***File h33a1***

Site Ht.	Vol	Dia	Num	Site Index (m @ 50 years bh)										
		m		12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	19	5	42	35	30	27	24	22	20	18	17	15	14
10	3	19	27	51	42	35	31	28	25	23	21	19	17	16
12	9	20	69	62	49	41	36	31	28	25	23	21	19	17
14	18	21	106	73	57	47	40	35	32	28	26	23	21	19
16	32	22	169	86	65	54	45	40	35	31	28	26	23	21
18	55	22	254	102	75	60	51	44	39	35	31	28	25	23
20	85	23	326	125	86	68	57	49	43	38	34	31	28	25
22	120	25	361	159	101	77	63	54	47	42	37	33	30	27
24	159	27	368	228	120	88	70	60	52	45	40	36	32	29
26	202	30	360		145	101	79	66	56	49	44	39	35	32
28	248	32	343		186	118	90	73	62	54	48	42	38	34
30	298	35	325			139	102	82	68	58	52	46	41	37
32	347	38	304			171	117	91	76	64	56	49	44	40
34	407	41	285			255	137	103	84	71	61	53	48	42
36	464	44	265				165	118	94	78	67	58	51	46
38	524	47	246				226	137	105	86	73	63	55	49
40	590	50	233					164	120	96	81	69	60	53
42	650	53	217					222	138	108	89	76	66	56
44	718	56	204						166	122	99	83	72	63
46	782	59	192						240	142	111	92	79	68
48	856	62	182							173	127	103	86	74
50	928	65	172								148	116	96	82

culm mai m^3/ha/yr	0.8	1.4	2.2	3.0	4.0	5.0	6.2	7.3	8.7	10.0	11.6
culm age years	170	149	133	128	109	101	96	82	81	73	56
merch age years	300	269	124	90	87	81	77	72	66	57	53

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	500	seedin	50	0	4		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 830 ***File h33d1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	0	0	34	28	25	22	20	19	17	16	14	13	12
8	1	17	6	42	35	30	27	24	22	20	18	17	15	14
10	4	19	32	51	42	35	31	28	25	23	21	19	17	16
12	11	20	88	62	49	41	36	31	28	25	23	21	19	17
14	22	21	137	73	57	47	40	35	32	28	26	23	21	19
16	39	22	210	86	65	54	45	40	35	31	28	26	23	21
18	67	22	313	102	75	60	51	44	39	35	31	28	25	23
20	105	23	411	125	86	68	57	49	43	38	34	31	28	25
22	149	25	457	159	101	77	63	54	47	42	37	33	30	27
24	199	27	465	228	120	88	70	60	52	45	40	36	32	29
26	254	30	458		145	101	79	66	56	49	44	39	35	32
28	317	32	439		186	118	90	73	62	54	48	42	38	34
30	383	35	415			139	102	82	68	58	52	46	41	37
32	449	38	390			171	117	91	76	64	56	49	44	40
34	523	41	361			255	137	103	84	71	61	53	48	42
36	598	44	337				165	118	94	78	67	58	51	46
38	676	47	313				226	137	105	86	73	63	55	49
40	754	50	292					164	120	96	81	69	60	53
42	825	53	269					222	138	108	89	76	66	56
44	905	56	250						166	122	99	83	72	63
46	981	59	233						240	142	111	92	79	68
48	1063	62	220							173	127	103	86	74
50	1140	65	205								148	116	96	82

culm mai m^3/ha/yr	0.9	1.8	2.8	3.8	5.1	6.4	7.9	9.4	11.0	12.5	14.7
culm age years	172	154	135	125	111	102	92	81	71	66	56
merch age years	300	146	103	94	90	84	78	71	64	59	53

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	600	seedin	70	0	4		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 840 ***File h33f1***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	0	13	5	34	28	25	22	20	19	17	16	14	13	12
8	3	19	23	42	35	30	27	24	22	20	18	17	15	14
10	10	19	80	51	42	35	31	28	25	23	21	19	17	16
12	24	20	171	62	49	41	36	31	28	25	23	21	19	17
14	45	21	257	73	57	47	40	35	32	28	26	23	21	19
16	76	22	377	86	65	54	45	40	35	31	28	26	23	21
18	124	23	539	102	75	60	51	44	39	35	31	28	25	23
20	182	24	648	125	86	68	57	49	43	38	34	31	28	25
22	250	25	718	159	101	77	63	54	47	42	37	33	30	27
24	324	27	733	228	120	88	70	60	52	45	40	36	32	29
26	403	29	713		145	101	79	66	56	49	44	39	35	32
28	478	32	659		186	118	90	73	62	54	48	42	38	34
30	552	34	600			139	102	82	68	58	52	46	41	37
32	623	37	541			171	117	91	76	64	56	49	44	40
34	697	40	487			255	137	103	84	71	61	53	48	42
36	776	43	442				165	118	94	78	67	58	51	46
38	855	46	400				226	137	105	86	73	63	55	49
40	936	49	364					164	120	96	81	69	60	53
42	1004	52	329					222	138	108	89	76	66	56
44	1063	55	297						166	122	99	83	72	63
46	1120	58	271						240	142	111	92	79	68
48	1200	61	251							173	127	103	86	74
50	1273	64	231								148	116	96	82

culm mai m^3/ha/yr	1.6	2.8	4.1	5.4	6.9	8.3	10.0	11.7	13.6	15.7	18.0
culm age years	164	138	116	102	88	87	78	72	67	57	53
merch age years	300	107	94	83	75	69	66	62	58	54	50

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	1200	seedin	80	0	6		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 850 ***File h33n1***

Site				Site Index (m @ 50 years bh)										
Ht.	Vol	Dia m	Num	12	15	18	21	24	27	30	33	36	39	42
m	m^3/ha	cm	#/ha	Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	1	12	7	34	28	25	22	20	19	17	16	14	13	12
8	4	19	37	42	35	30	27	24	22	20	18	17	15	14
10	14	19	110	51	42	35	31	28	25	23	21	19	17	16
12	35	20	254	62	49	41	36	31	28	25	23	21	19	17
14	64	21	369	73	57	47	40	35	32	28	26	23	21	19
16	107	22	529	86	65	54	45	40	35	31	28	26	23	21
18	170	22	730	102	75	60	51	44	39	35	31	28	25	23
20	247	23	889	125	86	68	57	49	43	38	34	31	28	25
22	332	25	966	159	101	77	63	54	47	42	37	33	30	27
24	420	26	977	228	120	88	70	60	52	45	40	36	32	29
26	507	28	934		145	101	79	66	56	49	44	39	35	32
28	591	31	853		186	118	90	73	62	54	48	42	38	34
30	667	33	763			139	102	82	68	58	52	46	41	37
32	741	36	678			171	117	91	76	64	56	49	44	40
34	822	39	604			255	137	103	84	71	61	53	48	42
36	897	42	536				165	118	94	78	67	58	51	46
38	969	44	479				226	137	105	86	73	63	55	49
40	1049	47	430					164	120	96	81	69	60	53
42	1122	51	387					222	138	108	89	76	66	56
44	1194	54	351						166	122	99	83	72	63
46	1266	56	321						240	142	111	92	79	68
48	1330	59	292							173	127	103	86	74
50	1409	62	269								148	116	96	82

culm mai m^3/ha/yr	2.1	3.6	5.1	6.6	8.2	9.8	11.7	13.5	15.7	17.7	20.1
culm age years	154	128	109	91	82	73	70	62	57	57	53
merch age years	300	103	90	79	70	62	59	56	53	50	48

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	2000	seedin	90	0	6		
secondary									

April 1994

Hemlock Yield Table

Regen Model Set 860 ***File h33n2***

Site Ht. m	Vol m^3/ha	Dia m cm	Num #/ha	Site Index (m @ 50 years bh)										
				12	15	18	21	24	27	30	33	36	39	42
				Total Age to Site Height (years)										
4	0	0	0	25	22	20	18	17	15	14	13	12	11	10
6	1	12	8	34	28	25	22	20	19	17	16	14	13	12
8	6	19	50	42	35	30	27	24	22	20	18	17	15	14
10	22	19	176	51	42	35	31	28	25	23	21	19	17	16
12	54	20	385	62	49	41	36	31	28	25	23	21	19	17
14	99	21	568	73	57	47	40	35	32	28	26	23	21	19
16	165	22	807	86	65	54	45	40	35	31	28	26	23	21
18	252	22	1058	102	75	60	51	44	39	35	31	28	25	23
20	359	23	1272	125	86	68	57	49	43	38	34	31	28	25
22	478	25	1376	159	101	77	63	54	47	42	37	33	30	27
24	591	26	1365	228	120	88	70	60	52	45	40	36	32	29
26	698	28	1284		145	101	79	66	56	49	44	39	35	32
28	790	30	1158		186	118	90	73	62	54	48	42	38	34
30	863	32	1010			139	102	82	68	58	52	46	41	37
32	925	35	875			171	117	91	76	64	56	49	44	40
34	1008	37	760			255	137	103	84	71	61	53	48	42
36	1075	40	661				165	118	94	78	67	58	51	46
38	1140	43	577				226	137	105	86	73	63	55	49
40	1202	46	507					164	120	96	81	69	60	53
42	1274	49	452					222	138	108	89	76	66	56
44	1338	52	405						166	122	99	83	72	63
46	1389	55	363						240	142	111	92	79	68
48	1469	58	333							173	127	103	86	74
50	1546	61	304								148	116	96	82
	culm mai m^3/ha/yr			3.0	5.0	6.9	8.9	10.9	12.8	14.9	16.8	19.1	21.2	24.0
	culm age years			152	118	101	84	73	62	56	52	53	48	42
	merch age years			300	101	86	74	66	59	53	47	43	39	35

Component	spp	si	estab density	seedling source	survivial /dist	delay /lag	age range	bgcz variant	site treatment
main	hem	33	3000	seedin	100	0	6		
secondary									

April 1994

APPENDIX 3. Prescriptions for Silvicultural Options

Douglas Fir Species Association

REGENERATION MODEL			BASIC SILVICULTURE			CURRENT SILVICULTURE			ENHANCED SILVICULTURE			WORKING LANDBASE ‘CURRENT”(ha)		
	Description		SITE INDEX CLASS[1]			SITE INDEX CLASS			SITE INDEX CLASS			SITE INDEX CLASS		
Number	sph Naturals		Poor	Medium	High	Poor	Medium	High	Poor	Medium	High	Poor	Medium	High
1020	300		PL 600	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 200	2 151	233	5
1030	600		PL 600	PL 600	PL 600	PL 600	PL 900	PL 900	PL 1 500	PL 1 500	PL 1 500	3 392	435	20
1040	1 500											5 065	345	2
1050	3 000							space		space	space	5 087	355	8
1010	101		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 200			
to 1014														
1012		Brush	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	412	790	2 748
1014		Salal	Treat 0%	Treat 0%	Treat 0%	Treat 0%	Treat 0%		Treat 100%	Treat 100%		621	948	-
1018	101		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 200	779	1 275	1 016
		Slash/Brush	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn			
		Brush	Treat 1	Treat 1	Terat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2			
1020	400		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	Pl 1 500	PL 1 500	PL 1 200			
to 1024														
1020												3 517	6 588	3 164
1022		Brush	Treat 0	Terat 1	Treat 2	Treat 0	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	1 534	2 899	5 833
1024		Salal	Treat 0%	Treat 0%	Teat 0%	Treat 32%	Treat 42%	Treat 0%	Treat 32%	Treat 42%	Treat 0%	2 669	4 637	4
1028	400		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 200	374	578	362
		Slash/Brush	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn			
		Brush	Treat 0	Treat 1	Treat 2	Treat 0	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2			
1030	800		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 500			
to 1034														
1030												4 544	8 429	6 319
1032		Brush	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	2 144	4 201	2 986
1034		Salal	Treat 0%	Treat 0%		Treat 0%	Treat 0%		Treat 0%	Treat 0%		785	1 538	
1040	1 500		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500 + space	PL 1 500 + space	2 215	3 706	1 428
1050	3 000		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 200 + space	PL 1 200 + space	PL 1 200 + space	348	727	233
									TOTAL			**35 637**	**37 684**	**24 128**

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1) Site Index Class: Poor 11 to 22, Medium 23 to 28, High greater than 28.

2) Brush Sites — Treat 0 - no treatment
Treat 1 - 1 treatment
Treat 2 - 2 treatments

3) Salal Sites — Treat % - % of area treated by site preparation and/or fertilization.

4) P. Burn refers to prescribed burning

5) Area total is slightly different from working landbase in Section 5.2 because of rounding.

6) Areas are for the current silvicultural option. There are small differences for the other two options because of differences in area of deciduous conversion to conifer.

Western Hemlock Species Association

REGENERATION MODEL			BASIC SILVICULTURE			CURRENT SILVICULTURE			ENHANCED SILVICULTURE			WORKING LANDBASE "CURRENT"(ha)		
	Description		SITE INDEX CLASS(1)			SITE INDEX CLASS			SITE INDEX CLASS			SITE INDEX CLASS		
Number	sph Naturals		Poor	Medium	High	Poor	Medium	High	Poor	Medium	High	Poor	Medium	High
112	300	Brush	PL 900	PL 900	PL 900	PL 1 200	PL 1 500	PL 1 500	PL 1 500	PL 1 500	PL 1 500	1 055	3 136	2 671
			Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2			
118	300		PL 900	PL 900	PL 900	PL 1 200	PL 1 500	PL 1 500	PL 1 500	PL 1 500	PL 1 500	174	623	72
		Slash/Brush	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn			
		Brush	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2			
120-124	500		PL 600	PL 600	PL 600	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 500			
120												6 786	11 212	3 826
122		Brush	Treat 0	Treat 1	Treat 2	Treat 0	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	5 256	8 182	4 141
124		Salal	Treat 38%	Treat 35%	Treat 36%	Treat 38%	Treat 35%	Treat 36%	Treat 100%	Treat 100%	Treat 100%	8 107	1 496	88
126	600		PL 900	PL 900	PL 900	PL 900	PL 1 200	PL 1 200	PL 1 500	PL 1 500	PL 1 200	2 221	421	27
		Slash/Brush	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn	P. Burn			
		Brush	Treat 0	Treat 1	Treat 2	Treat 0	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2			
130-134	1 200		PL 600	PL 600	PL 600	PL 600	PL 600	PL 600	PL 1 500	PL 1 500	PL 1 500			
130												15 302	15 587	5 412
132		Brush	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	Treat 1	Treat 1	Treat 2	4 217	7 659	3 240
134		Salal	Treat 0%	Treat 0%	Treat 0%	Treat 26%	Treat 36%	Treat 39%	Treat 26%	Treat 36%	Treat 39%	10 636	2 086	129
140 -144	1 500			PL 300	PL 300		PL 600	PL 600	PL 1 500	PL 1 500	PL 1 500			
140												15 812	15 266	2 599
144		Salal	Treat 45%	Treat 52%	Treat 0%	Treat 55%	Treat 52%	Treat 0%	Treat 55%	Treat 52%	Treat 0%	508	180	5
150-154	3 000													
150												46 556	54 958	10 697
154		Salal	Treat 0%	Treat 0%	Treat 0%	Treat 19%	Treat 18%	Treat 0%	Treat 19%	Treat 18%	Treat 0%	659	213	2
160	6 000						space	space		space	space	25 662	29 480	5 917
170	9 000						space	space	space	space	space	11 872	17 001	2 424
									TOTAL			**154 823**	**167500**	**41 250**

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1) Site Index Class: Poor 11 to 22, Medium 23 to 28, High greater than 28.

2) Brush Sites
Treat 0 - no treatment
Treat 1 - 1 treatment
Treat 2 - 2 treatments

3) Salal Sites Treat % - % of area treated by site preparation and/or fertilization.

4) P. Burn refers to prescribed burning

5) Area total is slightly different from working landbase in Section 5.2 because of rounding.

6) Areas are for the current silvicultural option. There are small differences for the other two options because of differences in area of deciduous conversion to conifer.

TFL 39, MP #7
Timber Supply Analysis

Results
Report

P.J. Kofoed, RPF

July 1994

TABLE OF CONTENTS

1.0 INTRODUCTION

The results for Option 2, current procedures, are discussed first in Section 2.0. Option 2 is used as a base option for examining various forest management issues. It is described in more detail than the other options, and provides additional information on the six working circles in TFL 39.

The remainder of this report is organized by issue. The standard format for each issue is to describe differences between options and to present harvest schedules by working circle for each option. Tables and figures are then used to compare option harvest schedules for TFL 39 and for working circles of interest. Depending on the issue, additional information is included to help explain the results

2.0 OPTION 2: CURRENT PROCEDURES

Option 2 is used as a base for comparing options for the issues examined in this analysis. It is characterized by:

- ❑ The net landbase excludes:
    - Physically inoperable areas.
    - Sensitive sites and areas for non timber values (ESAs).
    - Currently uneconomic areas.
- ❑ Application of the more stringent visual landscape cover class constraints.
- ❑ Current silviculture.
- ❑ Adjusted yield tables.
- ❑ Inventory site indexes.

Table 2.1 describes harvest schedules and Table 2.2 provides a summary of inventory and harvest statistics by working circle.

TABLE 2.1. **Option 2: Harvest Schedules by Working Circle (000 m^3/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	475	1349	420	97	1170	184	3695
2003 to 2007	500	1328	420	94	1120	172	3634
2008 to 2012	525	1306	420	91	1070	161	3573
2013 to 2017	550	1286	420	88	1020	149	3513
2018 to 2022	575	1265	420	85	970	138	3453
2023 to 2027	587	1244	420	82	960	127	3420
2028 to 2032	587	1223	420	79	960	116	3385
2033 to 2037	587	1203	420	76	960	104	3350
2038 to 2042	587	1181	420	76	960	103	3327
2043 to 2047	587	1161	410	76	960	103	3297
2048 to 2052	587	1150	410	76	960	103	3286
2053 to 2057	587	1138	410	76	960	103	3274
2058 to 2062	587	1127	410	76	960	103	3263
2063 to 2067	587	1116	410	76	960	103	3252
2068 to 2072	587	1103	410	76	960	103	3239
2073 to 2077	587	1103	400	76	960	103	3229
2078 to 2082	587	1103	400	76	990	103	3259
2083 to 2087	587	1103	400	76	1017	103	3286
2088 to 2092	587	1103	400	76	1017	103	3286
2093 to 2097	587	1103	400	76	1017	103	3286
2098 to 2102	570	1103	400	76	1017	103	3269
2103 to 2200	547	1103	390	76	1017	103	3236

TABLE 2.2. Option 2: Summary of Net Starting Inventory, Initial Harvest Level and LRSY by Working Circle (000 m³/year)

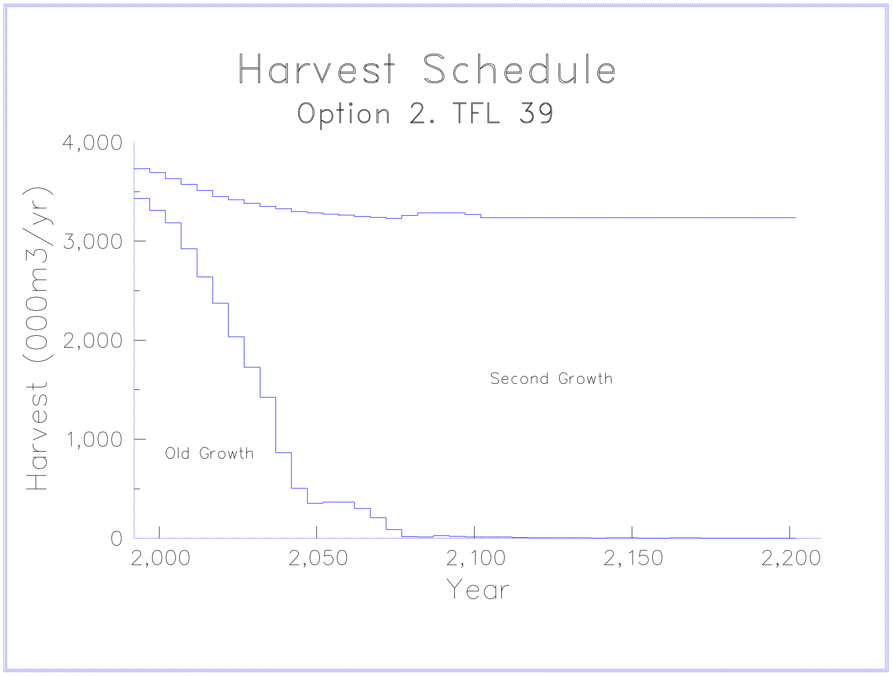
	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Net Landbase(1)							
Hectares	78 183	138 256	49 666	10 370	150 167	17 757	444 399
Percent	17.6	31.1	11.2	2.3	33.8	4.0	100.0
Net Mature Vol.(1)							
(000 m³)	8 532	49 943	10 254	4 176	52 795	10 411	136 111
Percent	6.3	36.7	7.5	3.1	38.8	7.6	100.0
Harvest ('93 to '97)							
(000 m³/year)	450	1 348	420	100	1 220	195	3 733
Percent	12.1	36.1	11.2	2.7	32.7	5.2	100.0
LRSY							
(000 m³/year)	547	1 103	390	76	1 017	103	3 236
Percent	16.9	34.1	12.1	2.3	31.4	3.2	100.0

(1) As of December 31, 1991.

The harvest schedules shown in Table 2.1 result from and illustrate the harvest flow rules used in this analysis. The harvest schedule shown for each working circle is only one of many possibilities. The procedure used has been to gradually change harvest from the initial harvest rate (period 1993 to 1997) until LRSY is reached by the period 2103 to 2107 at the latest. LRSY is the rate of harvest that is equivalent to forest growth (measured in stands of 14 meters height and greater) over the 100-year period from 2103 to 2202.

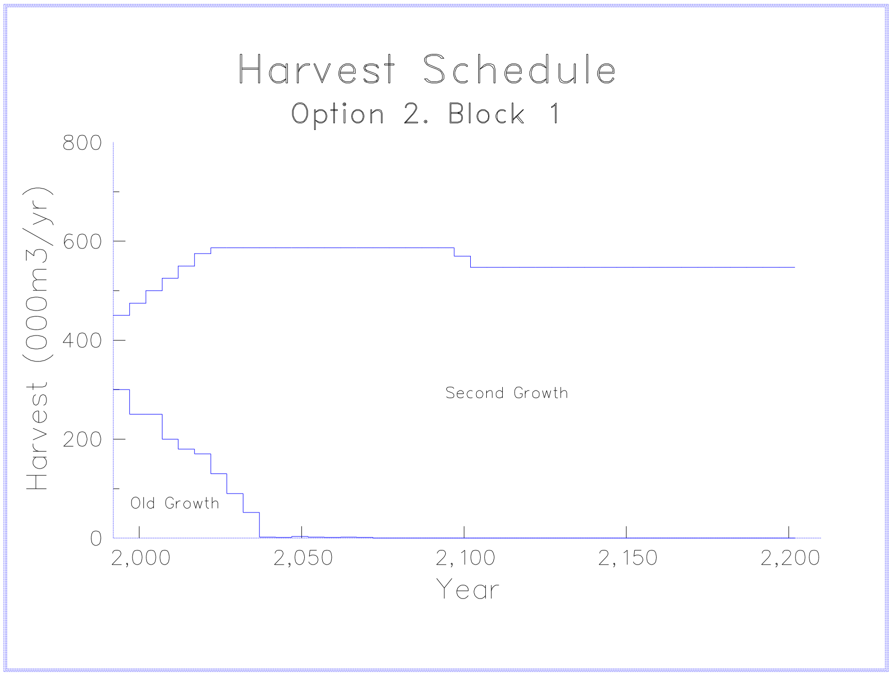
The TFL 39 harvest schedule starts at 3 733 000 m³ and declines gradually (at no time more than 3.5% in a 10-year period) reaching a level close to LRSY (3 236 000 m³/year) in 75 years. The total change in harvest rate is less than 14%. This TFL result includes a wide range of forest age class distributions and hence harvest schedules across the six working circles. The working circle initial harvest rates recognize these differences (refer to Table 2.1).

FIGURE 2.1



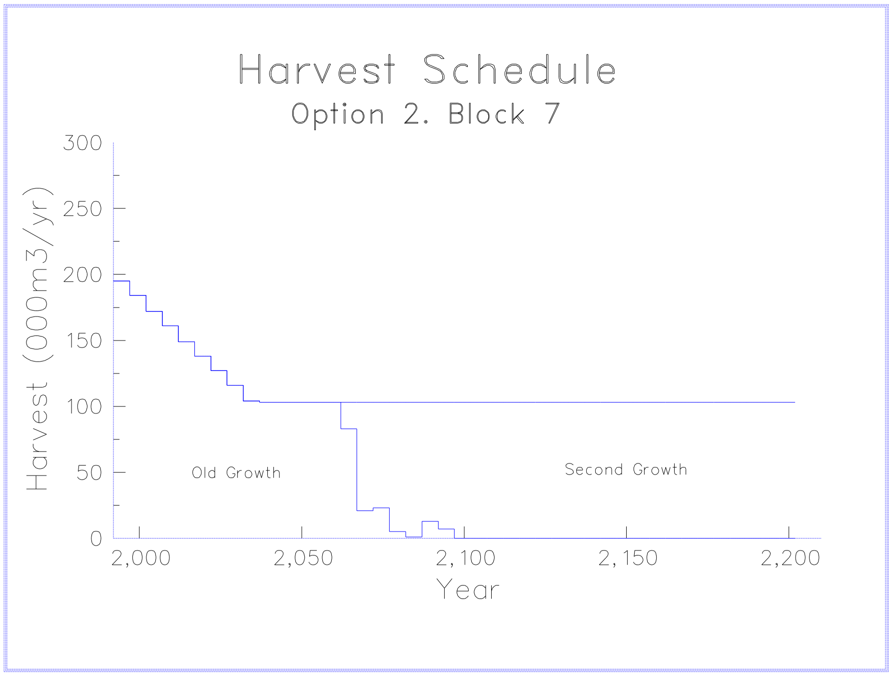
At one extreme is Block 1, which has experienced a long history of harvest activity. Table 2.2 shows that it has relatively little remaining available old-growth timber. This overstates the situation as Block 1 currently includes a substantial inventory of merchantable second-growth timber. Within 15 years, the harvest from second-growth stands is expected to exceed that from old-growth areas (refer to Figure 2.2). Block 1 harvest increases gradually from an initial 450 000 m³/year reaching a level of 587 000 m³/year (7% above LRSY) in 30 years before declining to the LRSY of 547 000 m³/year at 2103 (refer to Figure 2.2).

FIGURE 2.2



At the other extreme is Block 7, in which harvest operations commenced only in the last decade. Table 2.2 shows that Block 7 contains a high percentage of available old-growth timber (7.6% of the TFL) compared to its share of available area (4.0% of the TFL). The Block 7 harvest schedule starts at 195 000 m^3/year and declines smoothly, reaching a LRSY of 103 000 m^3/year in 50 years. Old growth provides most of the harvest for the next 75 years (refer to Figure 2.3).

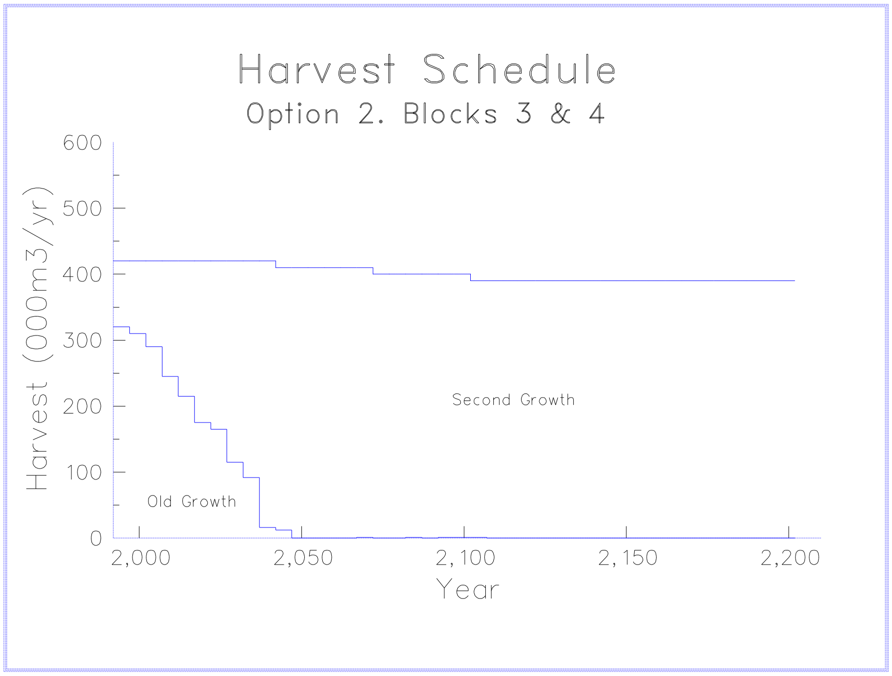
FIGURE 2.3



The other working circles are between the Block 1 and Block 7 situations.

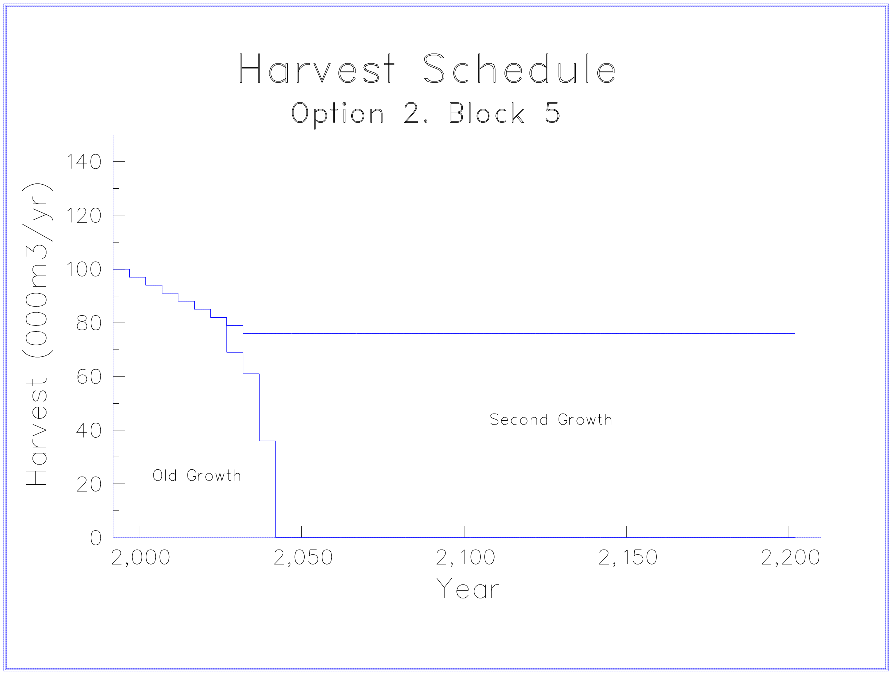
The Blocks 3 and 4 working circle is closer to the Block 1 situation. Table 2.2 shows that it is below average in available old-growth volume (7.5% of TFL) compared to available area (11.2% of TFL). The Blocks 3/4 harvest schedule starts at 420 000 m^3/ year and declines very gradually, reaching a LRSY of 390 000 m^3/year in 2103. The harvest rate changes by only 7%. Second-growth harvest is expected to exceed that from old growth within 20 to 25 years (refer to Figure 2.4).

FIGURE 2.4



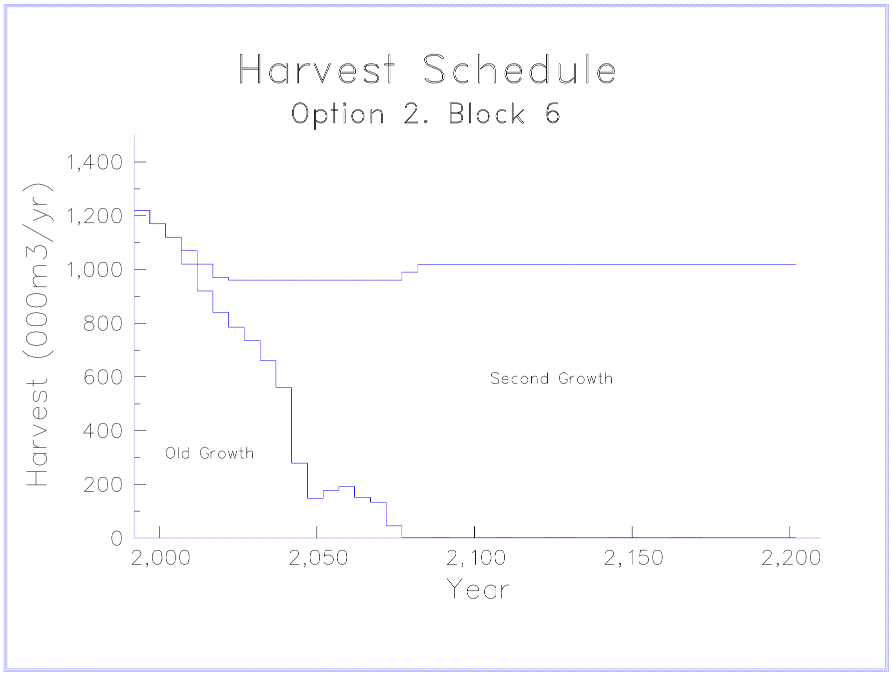
Block 5, the smallest working circle, has an above average share of available old-growth volume (3.1% of TFL) compared to available area (2.3% of TFL). The harvest schedule for Block 5 starts at 100 000 m^3/year and decline smoothly at no more than 8%/decade, reaching LRSY in 40 years. Old-growth harvest dominates for 45 years (refer to Figure 2.5).

FIGURE 2.5



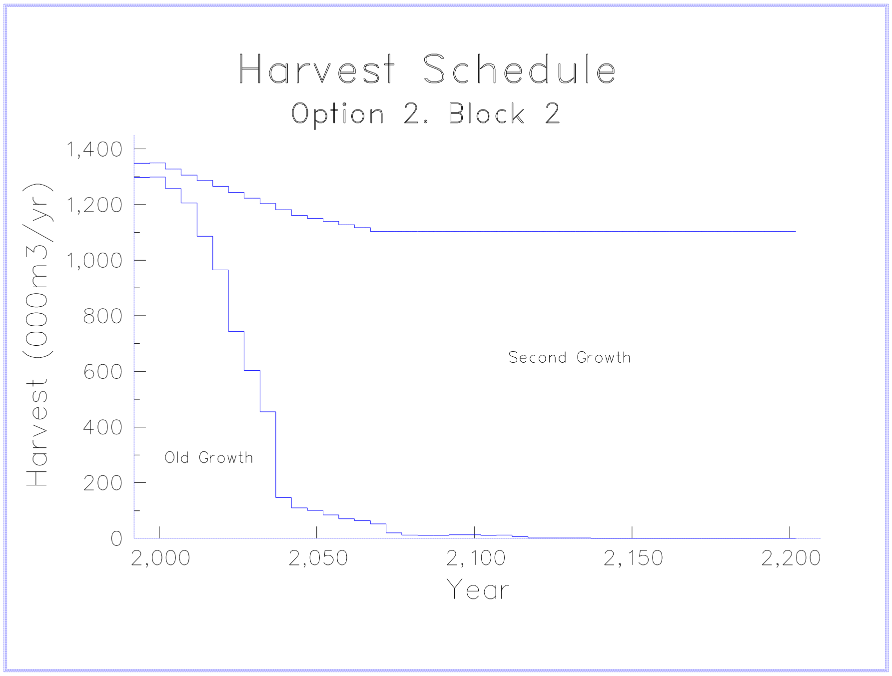
Block 6 contains approximately one third of TFL 39. It contains close to 39% of the available old growth and 34% of the available area. It also includes a substantial area of older second growth that is at or is approaching a merchantable condition. A significant proportion of this merchantable timber is on areas classified as partial retention for visual landscape values. The restrictions on rate-of-harvest in partial retention areas impacts the Block 6 harvest schedule (this is discussed in more detail in Section 4.0). The harvest starts at 1 220 000 m^3/year, declining at no more than 9% per decade to reach 960 000 m^3/year in 2023. It continues at this rate (6% below LRSY) for 60 years before increasing to LRSY at 1 017 000 m^3/year during the period 2083 to 2087.

FIGURE 2.6



Block 2 is of a similar size to Block 6. It contains 37% of the available old-growth timber and 31% of the available area in TFL 39. Visual landscape concerns (and hence constraints) are less than in Block 6. The Block 2 harvest schedule starts at 1 348 000 m³/years and declines gradually at no more than 3.5% per decade, reaching a LRSY of 1 103 000 m³/year in 75 years. Second-growth harvest is expected to exceed old-growth harvest in 35 to 40 years.

FIGURE 2.7



2.1 TSITIKA PLAN

The Tsitika Plan defines a harvest schedule for the Tsitika Watershed portion of Block 2. To the closest 1 000 m³/year it is as follows:

Period	**Harvest Levels (000 m³/year)**
1994 to 2038	204
2039 to 2058	147

An attempt to achieve the Tsitika Plan harvest schedule was not successful. Refer to Table 2.1.1. For the period 2038 to 2058, there is insufficient available volume to meet the target of 147 000 m³/year. The data set used in this analysis includes more netdowns and constraints, e.g., visual landscapes, than were in the Tsitika Plan. Note that

Table 2.1.1 shows a lower harvest level of 182 000 m^3/year for the period 1993 to 1997 to recognize MB's reduction in harvest during the moratorium on the lower Tsitika.

With these additional constraints, it is not possible to achieve the Tsitika Plan harvest schedule. In this analysis, harvest schedules have been run separately for the Tsitika Watershed portion of Block 2 and for the remainder of Block 2. The two harvest schedules are combined in a Block 2 total harvest schedule for presentation and discussion of results for the different options.

The approach taken with the Tsitika harvest schedules is to start the reduction in harvest earlier than the Tsitika Plan schedule and to more gradually decrease to LRSY. This is shown in Option 2 in Table 2.1.1. The harvest level of 204 000 m^3/year is continued to 2007 and then the harvest gradually declines, reaching a LRSY of 128 000 m^3/year in 2048.

TABLE 2.1.1. **Tsitika Watershed (Block 2), Harvest Schedules (000 m^3/year)**

Period	Tsitika Plan	Option 2
1993 to 1997	182	182
1998 to 2002	204	204
2003 to 2007	204	204
2008 to 2012	204	194
2013 to 2017	204	185
2018 to 2022	204	175
2023 to 2027	204	166
2028 to 2032	204	156
2033 to 2037	204	147
2038 to 2042	75	137
2043 to 2047	85	128
2048 to 2052	99	128
2053 to 2057	115	128
2058 to 2062	82	128
2063 to 2067	128	128
2068 to 2072	128	128
2073 to 2077	128	128
2078 to 2082	128	128
2083 to 2087	128	128
2088 to 2092	128	128
2093 to 2097	128	128
2098 to 2102	128	128
2103 to 2200	128	128

3.0 OPTION 1: REDUCTIONS FOR SENSITIVE SOILS

Option 1 portrays a view of timber as the dominant forest use. It permits analysis of the impacts of reserves and constraints for non-timber values. Area netdowns are made in Option 1 to safeguard sensitive soils. Unlike Option 2, netdowns are not made for other non-timber values (ESAs) and cover class constraints are not imposed, for visual landscape or other reasons. Old-growth timber classified as “currently uneconomic” is included (not included in Option 2) and harvested over a 100-year period.

Table 3.1 compares the net landbase and old-growth volume with that for Option 2.

Option 1 harvest schedules by working circle are shown in Table 3.2 and the TFL 39 harvest schedule is compared with that for Option 2 in Table 3.3.

TABLE 3.1. **Comparison of Options 1 and 2 Net Landbases and Old-Growth Volumes by Working Circle (000 m³/year)**

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Net Landbase (ha)							
Option 1	82 635	153 761	51 595	12 093	159 532	24 770	484 386
Option 2	78 183	138 256	49 666	10 370	150 167	17 757	444 399
(1 as a % of 2)	(106)	(111)	(104)	(117)	(106)	(139)	(109)
Net Mature Vol. (000 m^3)							
Option 1	9 632	57 949	10 941	4 955	56 103	13 027	152 607
Option 2	8 532	49 943	10 254	4 176	52 795	10 411	136 111
(1 as a % of 2)	(113)	(116)	(107)	(119)	(106)	(125)	(112)

TABLE 3.2. **Option 1: Sensitive Soil Reductions, Harvest Schedules by Working Circle (000 m³/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	490	1370	440	100	1240	190	3830
2003 to 2007	520	1370	460	100	1260	185	3895
2008 to 2012	560	1370	465	98	1275	180	3948
2013 to 2017	600	1370	465	98	1275	176	3984
2018 to 2022	640	1370	465	96	1275	171	4017
2023 to 2027	684	1370	465	96	1275	166	4056
2028 to 2032	684	1370	465	96	1275	161	4051
2033 to 2037	684	1370	465	94	1275	157	4045
2038 to 2042	684	1361	465	94	1275	152	4031
2043 to 2047	684	1358	465	92	1275	147	4021
2048 to 2052	684	1358	465	92	1275	142	4016
2053 to 2057	684	1358	465	92	1275	138	4012
2058 to 2062	684	1322	465	90	1275	133	3969
2063 to 2067	684	1322	465	90	1275	130	3966
2068 to 2072	684	1322	465	88	1275	130	3964
2073 to 2077	684	1297	465	88	1255	130	3919
2078 to 2082	684	1287	465	88	1235	130	3889
2083 to 2087	684	1267	445	87	1215	130	3828
2088 to 2092	656	1267	445	87	1195	130	3780
2093 to 2097	629	1247	425	87	1175	130	3693
2098 to 2102	603	1247	425	87	1155	130	3647
2103 to 2200	578	1219	415	87	1135	130	3564

TABLE 3.3. TFL 39, Option 1 Compared to Option 2, Harvest Schedules (000 m³/year)

Period	Option 2	Option 1
1993 to 1997	3733	3733
1998 to 2002	3695	3830
2003 to 2007	3634	3895
2008 to 2012	3573	3948
2013 to 2017	3513	3984
2018 to 2022	3453	4017
2023 to 2027	3420	4056
2028 to 2032	3385	4051
2033 to 2037	3350	4045
2038 to 2042	3327	4031
2043 to 2047	3297	4021
2048 to 2052	3286	4016
2053 to 2057	3274	4012
2058 to 2062	3263	3969
2063 to 2067	3252	3966
2068 to 2072	3239	3964
2073 to 2077	3229	3919
2078 to 2082	3259	3889
2083 to 2087	3286	3828
2088 to 2092	3286	3780
2093 to 2097	3286	3693
2098 to 2102	3269	3647
2103 to 2200	3236	3564

TABLE 3.4. Comparison of LRSYs (000 m³/year) for Options 1 and 2 by Working Circle

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Option 1 LRSY	578	1 219	415	87	1 135	130	3 564
Option 2 LRSY	547	1 103	390	76	1 017	103	3 236
(1 as a % of 2)	(106)	(111)	(106)	(114)	(112)	(126)	(110)

Compared to Option 2, the working circle and total TFL harvest schedules are substantially higher. For the TFL, the LRSY is 3 564 000 m³/year or 328 000 m³/year (10%) higher than for Option 2. The difference is greater (up to 750 000 m³/year) in the period prior to 2103. This is partly because of the harvest flow rules to reach LRSY by 2103. Alternative rules might increase or decrease this harvest difference during the first 100 years.

For example, the medium term difference would be decreased if reaching LRSY was targeted at a later time, although harvest would still probably show an increase over the initial harvest for a period. Similarly, the earlier difference between Options 1 and 2 could be increased by increasing the short-term harvest rate for Option 1 above that shown in Table 3.2 and reducing the period before LRSY is reached.

The greatest differences between Options 2 and 1 occur in Blocks 2, 5, 6, and 7.

- Reductions for deer and elk ranges contribute significantly to the lower harvest levels for Option 2 in Block 2.
- Similarly, reserves for grizzly bear and goats are a major contributor to the difference observed for Block 5.
- For Block 6, visual quality cover class constraints contribute significantly to the harvest differences, particularly during the first 100 years.
- Exclusion of "currently uneconomic" timber in Option 2 is the major difference between these options for Block 7, but reserves in Option 2 for grizzly bear, fisheries and recreation are also important.

4.0 OPTIONS 3 AND 4: VISUAL LANDSCAPE

Differences between Options 3, 4 and 2, Cover Class Constraints, are summarized in Table 4.1.

TABLE 4.1. **Description of Visual Landscape Cover Class Constraints**

	Option 2	Option 3	Option 4
VEG (m)	5	5	3
Regen. Delay for Ret. and Partial Reten. Areas	2	2	1
Percent Visual Alteration(1)			
• Retention	3	4	4
• Partial Retention	10	12.5	12.5
• Modification	20.5	22.75	22.75

1) In all options the percent visual alteration relates to an area half way between the net available area and the total green area (i.e., semi dispersed available and unavailable areas. Refer to section 8.3 in the Information package).

Table 4.2 describes the extent that the VQO classes occur by working circle.

TABLE 4.2. **Percentage of Area by VQO Classes for Options 2, 3 and 4 by Working Circle**

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
<u>Net Landbase</u>							
Retention	2.0	0.2	0.8	0	0.6	1.2	0.8
Partial Retention	35.7	8.1	11.0	13.0	30.6	15.6	21.3
Modification	20.9	19.5	17.1	28.8	0	9.4	12.7
<u>Net Old-Growth Area</u> (1991)							
Retention	2.1	0.4	0.8	0	0.9	1.2	0.8
Partial Retention	19.5	10.6	12.5	8.1	26.2	16.1	18.2
Modification	33.3	14.0	12.8	21.0	0	9.4	9.0

The impact of visual landscape cover class constraints on harvest (volume) schedules varies according to:

- The proportion of available area in retention and partial retention VQO classes. Impact increases as the proportion of area in these restrictive management zones increases.

- The number of years required to reach visually effective greenup (VEG). This depends on:

    - The height at which VEG is defined. VEG defined as 5 m will have more impact than if defined as 3 m in tree height.

    - Productivity of the site. Trees on better sites take less time to grow to a given height.

- Percent visual alteration. The impact increases as the percent visual alteration is decreased; e.g., less alteration is allowed in the retention VQO class than in the partial retention class.

- Green to Operable ratio (G\O). The impact increases as the proportion of a viewscape that is available for timber harvesting increases (i.e., as the G/O decreases).

- The proportion of old-growth volume within the more restrictive retention and partial retention classes. If these proportions are high, then short- and medium-term impacts can be severe.

- The timing of maximum mai and the shape of mai curves, particularly in partial retention areas. The impact is increased if the forest types reach culmination of mai at younger ages and if mai curves have a peaked shape rather than a flat shape. These effects are mainly long-term.

The impacts of three of these factors; years to VEG, percent visual alteration and green to operable ratio are conveniently combined into one number by calculating the implied "harvest cycle" for a VQO class within a forest unit. The harvest cycle is the minimum period of time that it would take to complete one harvest of the available land within a VQO class. This is a theoretical measure as in practice some areas will be harvested twice or more before other areas are harvested once. Comparing the harvest cycle to average minimum harvest ages provides an indication of the relative impact of cover class constraints. Table 4.3 shows G/O ratios, percent visual alterations, years to VEG and resulting harvest cycles by working circle and VQO class for Options 2, 3 and 4.

TABLE 4.3. More Detail on Visual Landscape Cover Class Constraints

			Basic % Visual Alteration(1)		Years to VEG		Harvest Cycle (years)		
Block	**VQO Class**	**G/O**	**Option 2**	**Options 3/4**	**Options 2/3**	**Option 4**	**Option 2**	**Option 3**	**Option 4**
1	Retention	2.7	3	4	16	12	324	243	176
1	Partial retention	1.7	10	12.5	16	12	132	106	76
1	Modification	2.3	20.5	22.75	16	12	53	48	37
2	Retention	6.4	3	4	16	12	162	121	88
2	Partial retention	1.6	10	12.5	16	11	140	112	75
2	Modification	1.3	20.5	22.75	15	11	76	65	50
3/4	Retention	1.1	3	4	13	10	468	351	257
3/4	Partial retention	1.1	10	12.5	16	12	168	135	97
3/4	Modification	1.1	20.5	22.75	15	11	78	71	54
5	Partial retention	2.2	10	12.5	16	11	112	89	59
5	Modification	2.0	20.5	22.75	16	12	59	53	41
6	Retention	1.3	3	4	17	12	553	362	248
6	Partial retention	1.5	10	12.5	17	12	151	121	83
7	Retention	3.0	3	4	19	14	346	259	185
7	Partial retention	2.5	10	12.5	18	14	114	91	68
7	Modification	2.6	20.5	22.75	18	13	54	48	36

(1) Basic % visual alteration is before the dispersion of available and unavailable areas is taken into account.

Options 3 and 4 harvest schedules by working circle are shown in Tables 4.4 and 4.5 and the TFL 39 harvest schedules are compared across Options 2, 3 and 4 in Table 4.6.

TABLE 4.4. Option 3: Practical Visual Landscape Constraints, Harvest Schedules by Working Circle (000 m^3/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	485	1351	420	97	1180	186	3719
2003 to 2007	510	1332	430	94	1145	176	3687
2008 to 2012	545	1314	430	92	1105	167	3653
2013 to 2017	570	1298	430	89	1070	157	3614
2018 to 2022	600	1280	430	86	1060	148	3604
2023 to 2027	624	1263	430	84	1060	138	3599
2028 to 2032	624	1246	430	81	1060	129	3570
2033 to 2037	624	1228	430	78	1060	119	3539
2038 to 2042	624	1211	430	76	1060	110	3511
2043 to 2047	624	1194	430	76	1060	103	3487
2048 to 2052	624	1177	430	76	1060	103	3470
2053 to 2057	624	1168	430	76	1060	103	3461
2058 to 2062	624	1159	420	76	1060	103	3442
2063 to 2067	624	1150	420	76	1060	103	3433
2068 to 2072	624	1141	420	76	1060	103	3424
2073 to 2077	624	1132	410	76	1060	103	3405
2078 to 2082	624	1123	410	76	1060	103	3396
2083 to 2087	624	1115	410	76	1060	103	3388
2088 to 2092	600	1115	400	76	1060	103	3354
2093 to 2097	600	1115	400	76	1060	103	3354
2098 to 2102	575	1115	400	76	1060	103	3329
2103 to 2200	551	1115	395	76	1060	103	3300

TABLE 4.5. Option 4: Less Stringent Visual Landscape Constraints, Harvest Schedules by Working Circle (000 m^3/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	487	1352	420	97	1220	186	3762
2003 to 2007	515	1334	440	94	1220	176	3779
2008 to 2012	550	1319	440	92	1220	167	3788
2013 to 2017	580	1306	440	89	1220	157	3792
2018 to 2022	615	1291	440	86	1220	148	3800
2023 to 2027	640	1277	440	84	1220	138	3799
2028 to 2032	650	1262	440	81	1220	129	3782
2033 to 2037	650	1249	440	78	1220	119	3756
2038 to 2042	650	1234	440	77	1190	110	3701
2043 to 2047	650	1220	440	77	1190	103	3680
2048 to 2052	650	1206	440	77	1190	103	3666
2053 to 2057	650	1193	440	77	1190	103	3653
2058 to 2062	650	1179	440	77	1160	103	3609
2063 to 2067	650	1170	440	77	1160	103	3600
2068 to 2072	650	1162	420	77	1160	104	3573
2073 to 2077	650	1155	420	77	1130	104	3536
2078 to 2082	650	1147	420	77	1130	104	3528
2083 to 2087	650	1139	420	77	1130	104	3520
2088 to 2092	625	1131	420	77	1100	104	3457
2093 to 2097	600	1124	420	77	1100	104	3425
2098 to 2102	575	1116	420	77	1100	104	3392
2103 to 2200	555	1116	400	77	1085	104	3337

TABLE 4.6. Visual Landscape Constraint Options, TFL 39, Harvest Schedules (000 m^3/year)

Period	Option 2	Option 3	Option 4
1993 to 1997	3733	3733	3733
1998 to 2002	3695	3719	3762
2003 to 2007	3634	3687	3779
2008 to 2012	3573	3653	3788
2013 to 2017	3513	3614	3792
2018 to 2022	3453	3604	3800
2023 to 2027	3420	3599	3799
2028 to 2032	3385	3570	3782
2033 to 2037	3350	3539	3756
2038 to 2042	3327	3511	3701
2043 to 2047	3297	3487	3680
2048 to 2052	3286	3470	3666
2053 to 2057	3274	3461	3653
2058 to 2062	3263	3442	3609
2063 to 2067	3252	3433	3600
2068 to 2072	3239	3424	3573
2073 to 2077	3229	3405	3536
2078 to 2082	3259	3396	3528
2083 to 2087	3286	3388	3520
2088 to 2092	3286	3354	3457
2093 to 2097	3286	3354	3425
2098 to 2102	3269	3329	3392
2103 to 2200	3236	3300	3337

Table 4.7 summarizes the harvest schedule differences between the three options, i.e., the impacts of the visual landscape cover class constraints.

TABLE 4.7. Summary of Differences Between Options 2, 3, and 4 Harvest Schedules for TFL 39 and Selected Working Circles

	Block 1	**Block 6**	**Block 7**	**TFL 39**
Average harvest for first 50 years (1993 to 2042)				
Option 2 (000 m^3/year)	542	1 041	145	3 508
Option 3 (000 m^3/year)	566	1 102	152	3 623
Option 4 (000 m^3/year)	579	1 217	152	3 769
As a percent of Option 2				
Option 3	104.3	105.8	105.2	103.3
Option 4	106.7	116.9	105.2	107.4
LRSY				
Option 2 (000 m^3/year)	547	1 017	103	3 236
Option 3 (000 m^3/year)	551	1 060	103	3 300
Option 4 (000 m^3/year)	555	1 085	104	3 337
As a percent of Option 2				
Option 3	100.7	104.2	100	102
Option 4	101.5	106.7	101	103.1

The TFL 39 harvest schedule for Option 3 shows a very gradual decrease reaching a LRSY of 3 300 000 m^3/year (12% less than the initial harvest level) in 2103. For the first 50 years, the average harvest rate is 115 000 m^3/year higher than for Option 2, for a period from 2018 to 2077 the difference is 180 000 m^3/year and the difference in LRSYs is 64 000 m^3/year. The medium-term impact of more stringent cover class constraints is significantly greater than the long-term impact because cover class constraints for visual landscape are a recent addition to the forest management framework and no period of transition has been recognized in this analysis. In the longer term, harvest patterns adjust to the new requirements.

For Option 4, the TFL 39 harvest schedule shows an increase in the differences noted between Options 2 and 3. The harvest level increases to slightly above the initial rate for 40 years before gradually declining to a LRSY of 3 337 000 m^3/year (3.1% or 101 000 m^3/year higher than for Option 2) at 2103. Again the medium-term (first 50 years) difference in average harvest compared to Option 2 is greater, at 261 000 m^3/year. For a period from 2018 to 2077 the increase in harvest for Option 4 varies between 300 000 m^3/year and 380 000 m^3/year.

Table 4.2 shows that Blocks 1 and 6 have the largest proportions of available forest classified in the restrictive partial retention VQO class. The percentages are 35.7% and 30.6% respectively for Blocks 1 and 6. Areas in the more restrictive retention class are considerably smaller, ranging up to 2% in Block 1. The results in Tables 4.4 to 4.7 show that harvest schedules in Blocks 1 and 6 are impacted most by the visual landscape cover class constraints. Further, the relative effects on Block 6 are substantially higher than for Block 1.

In Block 6, a substantial volume of old growth is classified as partial retention. This is less significant in Block 1. Table 4.3, which combines the effects of the G/O ratio, years to VEG and percent visual alteration into the single indicator of harvest cycle shows that compared to Block 1, Block 6 partial retention has a lower G/O ratio (less unavailable timber to break up the viewscapes), and a slightly longer period to reach VEG resulting in a longer harvest cycle (151 years for Block 6 compared to 132 years in Block 1– both for Option 2).

Finally, the different timber types in Block 6 compared to Block 1 contribute to the difference in long-term impacts. Much of the Block 1 partial retention forest occurs in medium-site Douglas-fir with relatively flat mai curves and with culmination of mai at 100 to 120 years of age. Delaying harvest of these areas to 130 years of age results in little loss of average growth.

For Block 6, western hemlock and spruce types dominate in partial retention areas. Yield tables for these types show sharper mai curves (compared to the main Block 1 timber types) with culmination in mai occurring prior to 100 years of age. Considerable forest growth can be lost by delaying harvest of these types to 150 years of age.

Approximately two thirds of the TFL 39 impact from visual landscape constraints (differences between Options 2, 3 and 4) occurs in Block 6. Relaxing the constraints in Option 3 results in a Block 6 harvest schedule which gradually declines, reaching LRSY in 2018 and then stays at this level. Harvest does not have to go below LRSY for a period as it did in Option 2. Average harvest increases above those of Option 2 are 81 000 m^3/year for the first 50 years, 43 000 m^3/year for LRSY and up to 100 000 m^3/year for a period from 2018 to 2077.

In Option 4, the Block 6 harvest schedule changes very gradually reaching a LRSY of 1 085 000 m^3/year (11% below the initial harvest level) in 2103. The initial harvest level of 1 220 000 m^3/year is maintained for 45 years. Average harvest increases above those of Option 2 are 166 000 m^3/year for the first 50 years, 68 000 m^3/year for LRSY and 100 000 m^3/year plus for a period from 2013 to 2072

Most of the remaining short term impact of visual landscape constraints occurs in Block 1. Harvest schedules for Options 3 and 4 follow the same pattern as for Option 2; they increase to above LRSY for a period before decreasing to LRSY at 2103. For the first 50 years Options 3 and 4 average harvests are respectively 24 000 m^3/year and 37 000 m^3/year higher than Option 2. The LRSY differences are relatively small at 4 000 m^3/year and 8 000 m^3/year.

5.0 OPTION 5: BIODIVERSITY

Option 5 differs from Option 2 in that the net old-growth area and volume has been reduced by a further 4%. This option was requested by the Chief Forester as an additional allowance for biodiversity concerns. Table 5.1 shows the resulting reductions in area and volume by working circle.

TABLE 5.1. **Option 5: Reductions in Old-Growth Area and Volume by Working Circle**

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Area (ha)	574	2 805	594	252	3 734	685	8 644
Volume (000 m^3)	341	1 998	410	167	2 112	416	5 444

Option 5 harvest schedules by working circle are shown in Table 5.2 and the TFL 39 harvest schedule is compared with that for Option 2 in Table 5.3.

***TABLE 5.2.* Option 5: Biodiversity, Harvest Schedules by Working Circle (000 m^3/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	472	1346	420	95	1160	183	3676
2003 to 2007	497	1322	420	91	1100	170	3600
2008 to 2012	522	1299	420	87	1050	158	3536
2013 to 2017	547	1275	420	82	1000	145	3469
2018 to 2022	572	1252	420	78	950	133	3405
2023 to 2027	584	1228	420	75	943	120	3370
2028 to 2032	584	1204	410	75	943	108	3324
2033 to 2037	584	1181	410	75	943	99	3292
2038 to 2042	584	1158	410	75	943	99	3269
2043 to 2047	584	1134	410	75	943	99	3245
2048 to 2052	584	1112	410	75	943	99	3223
2053 to 2057	584	1092	410	75	943	99	3203
2058 to 2062	584	1085	400	75	943	99	3186
2063 to 2067	584	1085	400	75	943	99	3186
2068 to 2072	584	1085	400	75	943	99	3186
2073 to 2077	584	1085	400	75	943	99	3186
2078 to 2082	584	1085	400	75	943	99	3186
2083 to 2087	584	1085	400	75	943	99	3186
2088 to 2092	584	1085	390	75	943	99	3176
2093 to 2097	584	1085	390	75	943	99	3176
2098 to 2102	564	1085	390	75	970	99	3183
2103 to 2200	544	1085	386	75	996	99	3185

TABLE 5.3. **Biodiversity, TFL 39, Harvest Schedules (000 m^3/year)**

Period	Option 2	Option 5
1993 to 1997	3733	3733
1998 to 2002	3695	3676
2003 to 2007	3634	3600
2008 to 2012	3573	3536
2013 to 2017	3513	3469
2018 to 2022	3453	3405
2023 to 2027	3420	3370
2028 to 2032	3385	3324
2033 to 2037	3350	3292
2038 to 2042	3327	3269
2043 to 2047	3297	3245
2048 to 2052	3286	3223
2053 to 2057	3274	3203
2058 to 2062	3263	3186
2063 to 2067	3252	3186
2068 to 2072	3239	3186
2073 to 2077	3229	3186
2078 to 2082	3259	3186
2083 to 2087	3286	3186
2088 to 2092	3286	3176
2093 to 2097	3286	3176
2098 to 2102	3269	3183
2103 to 2200	3236	3185

For the TFL, the 4% reduction in old growth results in a 1.6% reduction in LRSY from 3 236 000 m^3 to 3 185 000 m^3. The long-term impact is less than 2% because old growth is slightly less than half of the available area and the average site index in old-growth areas is less than that for second-growth areas. The initial harvest rate is not affected. The transition to LRSY is slightly steeper than for Option 2, with the rate-of-change in harvest never exceeding 4% per decade (3.5% for Option 2) and a harvest level close to LRSY been reached 10 years earlier in 2058 compared to 2068 for Option 2.

The impact by working circle varies according to the proportion of area that is currently in old growth. For Blocks 1, 3 and 4 with relatively little old growth the impact is small. For Blocks 2 and 5, impacts are similar to that for the TFL, as LRSYs are reduced by close to 2%, the rate of change in harvest towards LRSY is slightly steeper and LRSY is reached 10 years earlier. Block 6 results show impacts (differences from Option 2) a little greater than average as the period of harvest below LRSY is extended by 15 years at a harvest level 1.8% lower (943 000 m^3/year compared to 960 000 m^3/year) and LRSY is reduced by 2.1%. Block 7 (with the greatest proportion of old growth) results show a steeper decline to LRSY and a LRSY that is 4% lower than for Option 2.

6.0 OPTIONS 6, 7 AND 8: ECONOMIC OPERABILITY AND HARVEST METHOD

MB has classified the forest by broad classes of logging: conventional and nonconventional (aerial) harvest systems. Further, a largely inventory database exercise, has provided a broad classification of old growth according to "current economic operability". Classes for this include "currently uneconomic", "currently marginal" and "currently economic".

Option 2 excludes the "currently uneconomic" timber. Options 6, 7 and 8 vary from Option 2 as follows:

❑ Option 6 includes the currently uneconomic timber. Harvest of these low volume stands is spread out over a hundred plus years to simulate the long term opportunity for utilizing this timber according to market cycles and real price trends for quality old-growth timber. This is consistent with MB's view of economic operability.

❑ Option 7 excludes the currently marginal timber.

❑ Option 8 excludes both the currently marginal timber and those areas that are classed as currently economic but require nonconventional harvest systems.

The impact of these variations about Option 2 by working circle depend on the proportion of the current inventory that is old growth (large in Block 7 to small in Block 1) and the proportions of old-growth timber classified as currently uneconomic, currently marginal and nonconventional. Tables 6.1 and 6.2 show by working circle, net forest areas and old-growth volumes by the different categories.

TABLE 6.1. Working Landbase(1) by Working Circle, Logging Method and Economic Class (ha)

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Conventional Economic	68 107	124 307	44 385	7 097	137 453	12 593	393 942
Nonconventional Economic	8 732	9 342	3 732	2 454	5 355	2 296	31 911
Marginal (Conventional and Nonconventional)	1 344	4 607	1 549	819	7 359	2 868	18 546
Uneconomic (Conventional and Nonconventional)	1 520	4 228	504	634	4 276	5 466	16 628
TOTAL	79 703	142 484	50 170	11 004	154 443	23 223	461 027

TABLE 6.2. Working Landbase Mature Volumes by Working Circle, Logging Method and Economic Class (000 m^3)

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Conventional Economic	5 064	41 136	6 784	2 117	47 192	7 765	110 058
%	56.3	80.2	65.1	48.4	87.4	64.0	78.0
Nonconventional Economic	2 873	6 968	2 863	1 701	3 038	1 549	18 992
%	31.9	13.6	27.5	38.8	5.6	12.8	13.5
Marginal (Conventional and Nonconventional)	595	1 839	607	358	2 565	1 097	7 061
%	6.6	3.6	5.8	8.2	4.8	9.0	5.0
Uneconomic (Conventional and Nonconventional)	470	1 319	165	203	1 193	1 727	5 077
%	5.2	2.6	1.6	4.6	2.2	14.2	3.5
TOTAL	9 002	51 262	10 419	4 379	53 988	12 138	141 188
%	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Inventory dated: December 31, 1991

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(1) Includes both mature and immature areas.

Table 6.3 shows the long term impact of the different options. LRSYs are listed by working circle and option. Percentages are also included with Option 2 LRSYs recorded as 100% to show variation caused by the other options.

***TABLE 6.3.* LRSYs (000 m^3/year) for Options 2, 6, 7, and 8 by Working Circle**

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Option 6 LRSY	552	1 121	391	79	1 028	118	3 289
% relative to Opt. 2	(101)	(102)	(100)	(104)	(101)	(115)	(102)
Option 2 LRSY	547	1 103	390	76	1 017	103	3 236
% relative to Opt. 2	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Option 7 LRSY	541	1 078	383	72	995	91	3 160
% relative to Opt. 2	(99)	(98)	(98)	(95)	(98)	(88)	(98)
Option 8 LRSY	488	1 008	359	55	968	77	2 955
% relative to Opt. 2	(89)	(91)	(92)	(72)	(95)	(75)	(91)

Harvest schedules by working circle are shown in Tables 6.4, 6.5 and 6.6 for Options 6, 7 and 8.

TFL 39 harvest schedules are compared with Option 2 in Table 6.7.

***TABLE 6.4.* Option 6: Working Landbase, Harvest Schedules by Working Circle (000 m^3/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	480	1350	420	97	1173	184	3704
2003 to 2007	505	1329	420	94	1126	174	3648
2008 to 2012	530	1310	420	91	1079	163	3593
2013 to 2017	555	1290	420	88	1032	153	3538
2018 to 2022	580	1271	420	85	985	142	3483
2023 to 2027	591	1251	420	82	969	132	3445
2028 to 2032	591	1232	420	79	969	121	3412
2033 to 2037	591	1212	420	78	969	116	3386
2038 to 2042	591	1193	420	78	969	116	3367
2043 to 2047	591	1171	420	78	969	116	3345
2048 to 2052	591	1161	420	78	969	117	3336
2053 to 2057	591	1150	415	78	969	117	3320
2058 to 2062	591	1140	415	78	969	117	3310
2063 to 2067	591	1131	410	78	969	117	3296
2068 to 2072	591	1121	410	79	969	117	3287
2073 to 2077	591	1121	405	79	969	117	3282
2078 to 2082	591	1121	405	79	1000	117	3313
2083 to 2087	591	1121	400	79	1028	117	3336
2088 to 2092	591	1121	400	79	1028	117	3336
2093 to 2097	591	1121	400	79	1028	117	3336
2098 to 2102	575	1121	400	79	1028	117	3320
2103 to 2200	552	1121	391	79	1028	118	3289

***TABLE 6.5.* Option 7: Currently Economic Landbase, Harvest Schedules by Working Circle (000 m^3/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	470	1346	420	94	1160	178	3668
2003 to 2007	495	1321	420	89	1105	161	3591
2008 to 2012	520	1297	420	83	1050	159	3529
2013 to 2017	545	1273	420	78	1000	147	3463
2018 to 2022	570	1250	420	72	950	135	3397
2023 to 2027	581	1225	420	72	945	123	3366
2028 to 2032	581	1202	410	72	945	111	3321
2033 to 2037	581	1178	410	72	945	99	3285
2038 to 2042	581	1155	410	72	945	91	3254
2043 to 2047	581	1135	410	72	945	91	3234
2048 to 2052	581	1122	410	72	945	91	3221
2053 to 2057	581	1108	400	72	945	91	3197
2058 to 2062	581	1095	400	72	945	91	3184
2063 to 2067	581	1081	400	72	945	91	3170
2068 to 2072	581	1078	400	72	945	91	3167
2073 to 2077	581	1078	400	72	945	91	3167
2078 to 2082	581	1078	390	72	975	91	3187
2083 to 2087	581	1078	390	72	995	91	3207
2088 to 2092	581	1078	390	72	995	91	3207
2093 to 2097	581	1078	390	72	995	91	3207
2098 to 2102	564	1078	390	72	995	91	3190
2103 to 2200	541	1078	383	72	995	91	3160

TABLE 6.6. Option 8: Currently Conventional Economic Landbase, Harvest Schedules by Working Circle (000 m³/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	55	1220	160	3653
1998 to 2002	465	1310	413	55	1160	150	3553
2003 to 2007	480	1272	406	55	1105	141	3459
2008 to 2012	495	1235	399	55	1050	132	3366
2013 to 2017	510	1198	392	55	1000	122	3277
2018 to 2022	515	1161	385	55	950	113	3179
2023 to 2027	515	1124	378	55	922	104	3098
2028 to 2032	515	1087	371	40	922	95	3030
2033 to 2037	515	1050	364	40	922	86	2977
2038 to 2042	515	1020	359	40	922	77	2933
2043 to 2047	515	1014	359	40	922	77	2927
2048 to 2052	515	1008	359	55	922	77	2936
2053 to 2057	515	1008	359	55	922	77	2936
2058 to 2062	515	1008	359	55	922	77	2936
2063 to 2067	515	1008	359	55	922	77	2936
2068 to 2072	515	1008	359	55	922	77	2936
2073 to 2077	515	1008	359	55	922	77	2936
2078 to 2082	515	1008	359	55	945	77	2959
2083 to 2087	515	1008	359	55	968	77	2982
2088 to 2092	515	1008	359	55	968	77	2982
2093 to 2097	515	1008	359	55	968	77	2982
2098 to 2102	500	1008	359	55	968	77	2967
2103 to 2200	488	1008	359	55	968	77	2955

TABLE 6.7. Economic Operability and Harvest Method Options, TFL 39, Harvest Schedules (000 m³/year)

Period	Option 6 (Working Landbase)	Option 2 (Currently Economic & Marginal)	Option 7 Currently Economic	Option 8 Currently Conventional Economic
1993 to 1997	3733	3733	3733	3653
1998 to 2002	3704	3695	3668	3553
2003 to 2007	3648	3634	3591	3459
2008 to 2012	3593	3573	3529	3366
2013 to 2017	3538	3513	3463	3277
2018 to 2022	3483	3453	3397	3179
2023 to 2027	3445	3420	3366	3098
2028 to 2032	3412	3385	3321	3030
2033 to 2037	3386	3350	3285	2977
2038 to 2042	3367	3327	3254	2933
2043 to 2047	3345	3297	3234	2927
2048 to 2052	3336	3286	3221	2936
2053 to 2057	3320	3274	3197	2936
2058 to 2062	3310	3263	3184	2936
2063 to 2067	3296	3252	3170	2936
2068 to 2072	3287	3239	3167	2936
2073 to 2077	3282	3229	3167	2936
2078 to 2082	3313	3259	3187	2959
2083 to 2087	3336	3286	3207	2982
2088 to 2092	3336	3286	3207	2982
2093 to 2097	3330	3286	3207	2982
2098 to 2102	3320	3269	3190	2967
2103 to 2200	3289	3236	3160	2955

In Option 6, the currently uneconomic old-growth harvest is spread out over 100 years. For TFL 39, the harvest level gradually increases above that for Option 2 until LRSY is reached at 3 289 000 m³/year, 1.6% higher than that for Option 2.

The relative impact is greatest in Block 7 as it has the highest proportion of old growth and the greatest proportion of old-growth volume (14.2%) that is classified as currently uneconomic. For Block 7, adding the currently uneconomic, increases LRSY by almost 15% (Table 6.3). The transition to LRSY is more gradual, although the harvest rate drops slightly below LRSY (always higher than the Option 2 harvest schedule) for a period because the gradual harvest of the currently uneconomic areas delays the addition to available timber from the future managed forest.

The impacts of currently uneconomic timber on harvest levels are smaller on a percentage basis for the other working circles. In terms of total harvest volumes, they are similar for Blocks 2 and 6 because of the size of these two blocks.

The area and particularly volume of current marginal timber is greater than that classified as currently uneconomic (refer to Tables 6.1 and 6.2). The transition to LRSY is a little steeper in Option 7 and the LRSY is lower by 3.3%.

Again, the greatest relative impact occurs in Block 7.

The old-growth volume classified as nonconventional and currently economic is considerably greater than that for the currently uneconomic and marginal combined and the area is of a similar magnitude, but of higher average productivity. Consequently, the harvest schedule differences between Options 7 and 8 are larger than those between Options 7 and 2 or between Options 7 and 6.

Lower initial harvest levels occur for Option 8 in Blocks 5 and 7 (Table 6.6) compared to the other options. For both of these working circles, the modeled adjacency constraint becomes limiting in the early periods of the harvest schedules. The TFL harvest schedule reduces at a maximum of 6% per decade towards LRSY indicating opportunities for reallocating harvest to the other working circles to retain the same initial harvest rate as Option 2 and not exceed a 10% per decade rate of change in TFL 39 harvest. The TFL LRSY is 281 000 m^3/year or 8.7% lower than that for Option 2 and harvest levels close to LRSY are reached near 2038, 30 years earlier than occurs in Option 2.

The area classified for nonconventional harvesting systems in Block 1 is increased by second-growth areas that regenerated after fires early this century. The result is that Block 1 has the second largest area classified as currently economic nonconventional. The Option 8 LRSY is reduced by 11% compared to Option 2.

In magnitude, the greatest impact of excluding currently marginal and currently economic nonconventional is in Block 2. It has the largest area of nonconventional timber. The Option 8 LRSY is 91% of that for Option 2 and is reached in 2048 compared to 2068 for Option 2.

7.0 OPTIONS 9 AND 10: SILVICULTURE

Current silviculture, a portrayal of recent practices, is applied in most options including Option 2. Option 9, "basic" silviculture and Option 10, "enhanced" silviculture show variations about Option 2.

Assumptions for the three levels of silviculture are described in detail in Appendix 3 of the Information Package.

In summary;

- ❑ Option 9 (basic silviculture) portrays silviculture standards that relate to MoF stocking targets. Spacing, conversion of deciduous stands to conifer and other incremental silvicultural stands are excluded.
- ❑ Option 2 (current silviculture) includes higher planting densities (than Option 9) on some areas. Half of the available deciduous areas in Blocks 1 and 2 are converted to conifer over a 70-year period. Denser stands, particularly on medium and high sites are spaced.
- ❑ Option 10 (enhanced silviculture) includes higher planting densities than Option 2 on some areas. Deciduous conversion to conifer is extended to Blocks 3, 4, and

6 as well as Blocks 1 and 2 and it is accelerated to occur over a 25- to 40-year period depending on the block. Option 10 also includes increased levels of treatment for brush and salal sites (mainly low to medium sites) and spacing.

Harvest schedules by working circle are shown for Options 9 and 10 in Tables 7.1 and 7.2. TFL 39 harvest schedules for Option 2, 9 and 10 are compared in Table 7.3.

TABLE 7.1. Option 9: Basic Silviculture, Harvest Schedules by Working Circle (000 m^3/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	465	1346	420	96	1170	184	3681
2003 to 2007	490	1322	420	92	1120	172	3616
2008 to 2012	515	1298	420	89	1070	161	3553
2013 to 2017	540	1275	410	85	1020	149	3479
2018 to 2022	567	1252	410	81	970	138	3418
2023 to 2027	567	1229	410	77	944	127	3354
2028 to 2032	567	1206	410	73	944	116	3316
2033 to 2037	567	1183	410	70	944	104	3278
2038 to 2042	567	1160	400	70	944	102	3243
2043 to 2047	567	1137	400	70	944	102	3220
2048 to 2052	567	1118	400	70	944	102	3201
2053 to 2057	567	1104	400	70	944	102	3187
2058 to 2062	567	1104	400	70	944	102	3187
2063 to 2067	567	1077	390	70	944	102	3150
2068 to 2072	567	1064	390	70	944	99	3134
2073 to 2077	567	1050	390	70	944	99	3120
2078 to 2082	567	1046	380	70	977	99	3139
2083 to 2087	567	1046	380	70	977	99	3139
2088 to 2092	567	1046	380	70	977	99	3139
2093 to 2097	541	1046	380	70	977	99	3113
2098 to 2102	516	1046	380	70	977	99	3088
2103 to 2200	492	1046	371	70	977	99	3055

TABLE 7.2. **Option 10: Enhanced Silviculture, Harvest Schedules by Working Circle (000 m^3/year)**

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	480	1354	430	97	1170	184	3715
2003 to 2007	507	1337	430	94	1120	172	3660
2008 to 2012	534	1321	430	91	1070	161	3607
2013 to 2017	561	1304	430	88	1020	149	3552
2018 to 2022	588	1288	445	85	988	138	3532
2023 to 2027	614	1271	445	82	988	127	3527
2028 to 2032	614	1255	445	80	988	116	3498
2033 to 2037	614	1238	445	80	988	104	3469
2038 to 2042	614	1222	450	83	988	104	3461
2043 to 2047	614	1206	450	83	988	104	3445
2048 to 2052	614	1199	450	83	988	104	3438
2053 to 2057	614	1191	450	83	988	104	3430
2058 to 2062	614	1184	440	83	988	104	3413
2063 to 2067	614	1176	440	83	988	104	3405
2068 to 2072	614	1169	440	83	988	104	3398
2073 to 2077	614	1161	440	83	988	116	3402
2078 to 2082	614	1154	430	83	1039	116	3436
2083 to 2087	614	1152	430	83	1090	116	3485
2088 to 2092	614	1152	430	83	1090	116	3485
2093 to 2097	614	1152	430	83	1090	116	3485
2098 to 2102	595	1152	430	83	1090	116	3466
2103 to 2200	577	1152	423	83	1090	116	3441

TABLE 7.3. **Silviculture Options, TFL 39, Harvest Schedules (000 m^3/year)**

Period	Option 9 Basic Silviculture	Option 2 Current Silviculture	Option 10 Enhanced Silviculture
1993 to 1997	3733	3733	3733
1998 to 2002	3681	3695	3715
2003 to 2007	3616	3634	3660
2008 to 2012	3553	3573	3607
2013 to 2017	3479	3513	3552
2018 to 2022	3418	3453	3532
2023 to 2027	3354	3420	3527
2028 to 2032	3316	3385	3498
2033 to 2037	3278	3350	3469
2038 to 2042	3243	3327	3461
2043 to 2047	3220	3297	3445
2048 to 2052	3201	3286	3438
2053 to 2057	3187	3274	3430
2058 to 2062	3174	3263	3413
2063 to 2067	3150	3252	3405
2068 to 2072	3134	3239	3398
2073 to 2077	3120	3229	3402
2078 to 2082	3122	3259	3436
2083 to 2087	3139	3286	3485
2088 to 2092	3139	3286	3485
2093 to 2097	3113	3286	3485
2098 to 2102	3088	3269	3466
2103 to 2200	3055	3236	3441

Differences between the TFL harvest schedules increase gradually over time until LRSYs are attained. Long-term impacts are more significant than short-term effects.

The Option 9 (basic silviculture) harvest schedule has a LRSY of 3 055 000 m^3/year, 181 000 m^3/year or 5.6% less than that for Option 2.

Above average differences occur in Blocks 1 (in particular) and 2 because of the inclusion of deciduous conversion to conifer in Option 2, but not in Option 9.

The Option 10 (enhanced silviculture) harvest schedule increasingly differs from Option 2 over time until at LRSY it is 205 000 m^3/year or 6.3% greater than that for Option 2. The inclusion of deciduous conversion to conifer in Blocks 3, 4 and 6 help explain the above average impacts in these blocks. Higher planting densities on poor sites contribute to gains in Blocks 5, 6 and 7.

8.0 OPTION 11: YIELD ASSUMPTIONS

After the MoF reviewed MB yield assumptions, adjustments were required to ensure that these assumptions more closely reflected those of the MoF. These adjustments are included in all options except Option 11 which is included to show the impact of these changes:

- ❑ All Douglas-fir dominant yield table volumes are reduced by 10%. Douglas-fir dominant is defined as those yield tables that have a component of up to 400 sph of species other than Douglas-fir. Douglas-fir refers here to the Douglas-fir species association which also includes pines and yellow cypress. This includes regeneration model numbers 10 to 50 and 1010 to 1028 and yield table numbers 710 to 760 applied to cruised stands in the current inventory.
- ❑ All western hemlock association yields are increased by 5%. This includes regeneration model numbers between 100 and 200 and yield table numbers 810 to 860, applied to cruised stands.
- ❑ Operational adjustment factors (OAFs) are increased by reducing volumes for all regeneration model yield tables (numbers 10 to 200 and 1010 to 1050) by 5%.

Option 11 harvest schedules by working circle are shown in Table 8.1 and the TFL 39 harvest schedule is compared with that for Option 2 in Table 8.2.

TABLE 8.1. Option 11: Unadjusted, Y-XENO Yields, Harvest Schedules by Working Circle (000 m³/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	480	1350	420	97	1170	184	3701
2003 to 2007	505	1330	420	94	1120	172	3641
2008 to 2012	535	1310	420	91	1070	161	3587
2013 to 2017	560	1291	420	88	1020	149	3528
2018 to 2022	590	1271	420	85	970	138	3474
2023 to 2027	610	1252	420	82	956	127	3447
2028 to 2032	610	1232	420	79	956	116	3413
2033 to 2037	610	1213	410	76	956	104	3369
2038 to 2042	610	1194	410	76	956	103	3349
2043 to 2047	610	1174	410	76	956	103	3329
2048 to 2052	610	1164	410	77	956	103	3320
2053 to 2057	610	1154	410	77	956	103	3310
2058 to 2062	610	1144	410	77	956	103	3300
2063 to 2067	610	1134	410	77	956	104	3291
2068 to 2072	610	1127	400	77	956	104	3274
2073 to 2077	610	1127	400	77	956	104	3274
2078 to 2082	610	1127	400	77	990	104	3308
2083 to 2087	610	1127	400	77	1021	104	3339
2088 to 2092	610	1127	400	77	1021	104	3339
2093 to 2097	610	1127	400	77	1021	104	3339
2098 to 2102	595	1127	400	77	1021	104	3324
2103 to 2200	580	1127	393	77	1021	104	3302

TABLE 8.2. Yield Assumptions Options, TFL 39, Harvest Schedules (000 m³/year)

Period	Option 2 (Adjusted)	Option 11 (Y-XENO)
1993 to 1997	3733	3733
1998 to 2002	3695	3701
2003 to 2007	3634	3641
2008 to 2012	3573	3587
2013 to 2017	3513	3528
2018 to 2022	3453	3474
2023 to 2027	3420	3447
2028 to 2032	3385	3413
2033 to 2037	3350	3369
2038 to 2042	3327	3349
2043 to 2047	3297	3329
2048 to 2052	3286	3320
2053 to 2057	3274	3310
2058 to 2062	3263	3300
2063 to 2067	3252	3291
2068 to 2072	3239	3274
2073 to 2077	3229	3274
2078 to 2082	3259	3308
2083 to 2087	3286	3339
2088 to 2092	3286	3339
2093 to 2097	3286	3339
2098 to 2102	3269	3324
2103 to 2200	3236	3302

The main difference between the two sets of yield assumptions occurs in the Douglas-fir dominant forest types as described above. For these types, yields are decreased by close to 15% in Option 2 compared to Option 11 (10% for the yield table adjustment and a further 5% for the additional OAF adjustment). Areas in these types by working circle are shown in Table 8.3.

Most of the TFL 39 forest occurs in the western hemlock association. For these areas, there is very little difference between Options 2 and 11 as the 5% increase in OAFs is balanced by the 5% increase in yields.

Older cruised hemlock association volumes are 5% higher in Option 2 compared to Option 11. Additional OAFs have not been applied to these areas as unproductive areas and brush impacts, etc., are reflected in the cruise procedure.

***TABLE 8.3.* Option 11: Area of Douglas-fir Dominant Forest Types by Working Circle**

	Block 1	**Block 2**	**Blocks 3&4**	**Block 5**	**Block 6**	**Block 7**	**Total**
Area (ha)	27 474	14 490	2 417	833	8 253	687	54 154
% of Working Circle Net Available Area	35.1	10.5	4.9	8.0	5.5	3.9	12.2

For TFL 39, the LRSY increases by 2% to 3 302 000 m^3/year in Option 11 compared to 3 236 000 m^3 in Option 2. The difference in harvest levels between the two options increases gradually from zero (same initial harvest levels) until LRSY is reached.

Within working circles the impact of the different yield assumptions depends largely on the proportion of area that is in the Douglas-fir dominant forest types (for which yields are 15% lower in Option 2 than Option 11).

The greatest impact is in Block 1 where 35% of the area is in these Douglas-fir types. The Option 11 LRSY is 33 000 m^3/year or 6% higher than that for Option 2. As with the TFL result, the impact is greatest in the long term (LRSY).

Most of the remaining impact occurs in Block 2, with 10% of its area in Douglas-fir dominant forest types. Again the difference between Option 11 and Option 2 harvest schedules increases gradually over time until a 2.2% difference occurs in LRSYs (Option 11 is 24 000 m^3 higher than Option 2).

For the other working circles, differences between Option 11 and Option 2 harvest schedules are small. Most of the Douglas-fir dominant yield types in the northern working circle of Blocks 6 and 7 occurs in low-site yellow cypress stands with relatively little impact on forest yields.

9.0 OPTION 12: SITE INDEX

MB has developed a biophysical decision tree to improve site index estimates in old growth and, young stands for strategic analysis. This procedure for assigning site index has been used in Option 12. All other options in the analysis use site indexes as assigned (by various site index curves) in the inventory.

The biophysical decision tree procedure results in site indexes that are significantly higher on average than those in the inventory. Refer to Table 9.1 which includes area weighted site indexes by working circle for Options 2 and 12.

***TABLE 9.1.* Option 12 compared to Option 2: Site Indexes and LRSYs by Working Circle**

	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
Average Site Index							
Option 12	28.7	26.9	27.2	27.9	25.3	22.0	26.5
Option 2	25.3	24.6	24.3	23.5	22.4	19.3	23.7
Difference (12-2)	3.4	2.3	2.9	4.4	2.9	2.7	2.8
LRSYs (000 m^3/year)							
Option 12	690	1 277	465	100	1 202	122	3 856
Option 2	547	1 103	390	76	1 017	103	3 236
% Difference (12 higher than 2)	26	16	19	32	18	18	19

Option 12 harvest schedules by working circle are shown in Table 9.2 and the TFL 39 harvest schedule is compared with that for Option 2 in Table 9.3.

TABLE 9.2. Option 12: Revised Site Indexes, Harvest Schedules by Working Circle (000 m^3/year)

Period	Block 1	Block 2	Blocks 3&4	Block 5	Block 6	Block 7	Total
1993 to 1997	450	1348	420	100	1220	195	3733
1998 to 2002	480	1370	440	98	1190	184	3762
2003 to 2007	510	1370	460	95	1160	172	3767
2008 to 2012	540	1361	480	95	1130	161	3767
2013 to 2017	580	1353	486	95	1100	149	3763
2018 to 2022	620	1328	486	95	1080	138	3747
2023 to 2027	660	1320	486	95	1080	127	3768
2028 to 2032	700	1311	486	95	1080	116	3788
2033 to 2037	740	1303	486	95	1080	110	3814
2038 to 2042	764	1278	486	95	1080	110	3813
2043 to 2047	764	1277	486	95	1080	110	3812
2048 to 2052	764	1277	486	100	1080	110	3817
2053 to 2057	764	1277	486	100	1080	110	3817
2058 to 2062	764	1277	486	100	1080	110	3817
2063 to 2067	764	1277	486	100	1080	110	3817
2068 to 2072	764	1277	486	100	1080	110	3817
2073 to 2077	764	1277	486	100	1080	110	3817
2078 to 2082	764	1277	486	100	1080	110	3817
2083 to 2087	764	1277	486	100	1100	110	3837
2088 to 2092	725	1277	486	100	1150	110	3848
2093 to 2097	690	1277	486	100	1202	122	3877
2098 to 2102	690	1277	486	100	1202	122	3877
2103 to 2200	690	1277	465	100	1202	122	3856

TABLE 9.3. Site Index Options, TFL 39, Harvest Schedules (000 m^3/year)

Period	Option 2 (Inventory)	Option 12 (Revised)
1993 to 1997	3733	3733
1998 to 2002	3695	3762
2003 to 2007	3634	3767
2008 to 2012	3573	3767
2013 to 2017	3513	3763
2018 to 2022	3453	3747
2023 to 2027	3420	3768
2028 to 2032	3385	3788
2033 to 2037	3350	3814
2038 to 2042	3327	3813
2043 to 2047	3297	3812
2048 to 2052	3286	3817
2053 to 2057	3274	3817
2058 to 2062	3263	3817
2063 to 2067	3252	3817
2068 to 2072	3239	3817
2073 to 2077	3229	3817
2078 to 2082	3259	3817
2083 to 2087	3286	3837
2088 to 2092	3286	3848
2093 to 2097	3286	3877
2098 to 2102	3269	3877
2103 to 2200	3236	3856

The increased site indexes in Option 12 compared to Option 2 have two main impacts. The first is to increase volume estimates at a given age. The second is to reduce minimum harvest ages.

The TFL 39 harvest schedule increases gradually to a LRSY of 3 856 000 m3/year that is 3.3% higher than the initial harvest level and 19.2% higher than the LRSY for Option 2.

Within working circles the greatest increase in LRSY occurs in Block 1 (26.1%) and in Block 5 (31.6%). For the other working circles the increase ranges between 16% and 19%.

Option 12 harvest schedules for Blocks 5 and 7 drop slightly below LRSY (but higher than harvest levels for Option 2) for a period prior to the new forest (after harvest of old growth) becoming available for harvest.

10.0 OPTIONS 13 TO 17: SPECIFIC LANDBASE OPTIONS

10.1 Block 6: Options 13 and 14

Table 10.1.1 compares Block 6 harvest schedules for Option 2 with Option 13 (Yakoun Lake Basin removed from the landbase) and with Option 14 (Yakoun River Corridor removed from the landbase).

TABLE 10.1.1. **Block 6: Landbase Options, Harvest Schedules (000 m^3/year)**

Period	Option 2	Option 13 (Less Yakoun Lake Basin)	Option 14 (Less Yakoun River Strip)
1993 to 1997	1220	1220	1220
1998 to 2002	1170	1160	1165
2003 to 2007	1120	1105	1110
2008 to 2012	1070	1055	1060
2013 to 2017	1020	1005	1010
2018 to 2022	970	955	960
2023 to 2027	960	945	950
2028 to 2032	960	945	950
2033 to 2037	960	945	950
2038 to 2042	960	945	950
2043 to 2047	960	945	950
2048 to 2052	960	945	950
2053 to 2057	960	945	950
2058 to 2062	960	945	950
2063 to 2067	960	945	950
2068 to 2072	960	945	950
2073 to 2077	960	945	950
2078 to 2082	990	970	970
2083 to 2087	1017	993	1008
2088 to 2092	1017	993	1008
2093 to 2097	1017	993	1008
2098 to 2102	1017	993	1008
2103 to 2200	1017	993	1008

Table 10.1.2 describes the landbase for each option and compares LRSYs.

***TABLE 10.1.2.* Net Landbase and Results: Summary for Block 6, Landbase Options**

	Block 6 (Option 2)	Yakoun Lake Basin	Yakoun River Corridor
Net Landbase (ha) % of Block 6	150 167 100	3 270 2.2	605 0.4
Old-growth volume (000 m³) % of Block 6	52 795 100	1 855 3.5	204 0.4
Net landbase in retention VQOs (ha) % of Block 6	964 100	667 69.2	1 --
LRSY contribution (000 m³/ha) % of Block 6	1 017 100	24 2.4	9 0.9

A significant portion of the Yakoun Lake Basin net landbase is in the retention VQO class (20% or 667 ha out of 3 270 ha). This reduces the harvest contribution of this area, particularly in the medium term. The difference between Options 2 and 13 is generally 15 000 m³/year through to 2077 increasing to a difference of 24 000 m³/year between LRSYs.

The smaller Yakoun River Corridor area has a greater impact on harvest levels relative to its size compared to the Yakoun Lake Basin. The corridor contains land of above average site index and it is less constrained on average by visual quality cover class constraints. The net area of the corridor is 605 ha or 18.5% of the 3 270 ha in the lake basin. Yet the harvest impact of the corridor (difference between Options 2 and 14) is 10 000 m³/year for much of the medium term compared to 15 000 m³/year for the Lake Basin (difference between Option 2 and 13) and the impact on LRSY is 9 000 m³/year or 38% of the 24 000 m³/year for the lake basin.

10.2 Block 7: Option 15

Table 10.2.1 compares the initial landbase and old-growth volumes for Block 7 (Option 2) and for Block 7 less the Koeye Watershed (Option 15).

***TABLE 10.2.1.* Net Landbase and Results Summary for Block 7 Landbase Options**

	Block 7 Option 2	**Block 7 less Koeye Watershed (Option 15)**	**Option 15 as a % of Option 2**
Net landbase (ha)	17 757	11 748	66
Old-growth volume (000 m³)	10 411	6 876	66
LRSY (000 m³/year)	103	67	65

Table 10.2.2 compares the harvest schedules for Block 7 including the Koeye Watershed (Option 2) with Block 7 excluding the Koeye Watershed (Option 15). The initial harvest level is reduced to 145 000 m³/year for Option 15 to meet the adjacency constraint in the early years of the run and to show a regular decline in harvest level to LRSY.

The Koeye Watershed contributes approximately one third of the net landbase and starting old-growth volume in Block 7, Option 2. Correspondingly, the LRSY for Option 15 at 67 000 m^3/year is 65% of that for the total block and in Option 2. The Koeye Watershed working landbase contains proportionally a smaller amount of currently uneconomic and currently marginal timber than does the remainder of Block 7.

TABLE 10.2.2. **Block 7: Landbase Options, Harvest Schedules (000 m^3/year)**

Period	Option 2	Option 15 (Less Koeye Watershed)
1993 to 1997	195	145
1998 to 2002	184	133
2003 to 2007	172	122
2008 to 2012	161	112
2013 to 2017	149	103
2018 to 2022	138	95
2023 to 2027	127	87
2028 to 2032	116	79
2033 to 2037	104	71
2038 to 2042	103	67
2043 to 2047	103	67
2048 to 2052	103	67
2053 to 2057	103	67
2058 to 2062	103	67
2063 to 2067	103	67
2068 to 2072	103	67
2073 to 2077	103	67
2078 to 2082	103	67
2083 to 2087	103	67
2088 to 2092	103	67
2093 to 2097	103	67
2098 to 2102	103	67
2103 to 2200	103	67

10.3 Block 2: Options 16 and 17

Table 10.3.1 compares Block 2 harvest schedules for the three options.

TABLE 10.3.1. **Block 2: Landbase Options, Harvest Schedules (000 m³/year)**

Period	Option 2	Option 16 (Less Lower Tsitika)	Option 17 (Less Lower Tsitika and Wings)
1993 to 1997	1348	1348	1348
1998 to 2002	1349	1347	1345
2003 to 2007	1328	1324	1322
2008 to 2012	1306	1299	1297
2013 to 2017	1286	1277	1273
2018 to 2022	1265	1254	1250
2023 to 2027	1244	1232	1228
2028 to 2032	1223	1211	1205
2033 to 2037	1203	1189	1183
2038 to 2042	1181	1167	1161
2043 to 2047	1161	1146	1138
2048 to 2052	1150	1131	1123
2053 to 2057	1138	1117	1109
2058 to 2062	1127	1104	1094
2063 to 2067	1116	1090	1080
2068 to 2072	1103	1090	1080
2073 to 2077	1103	1090	1080
2078 to 2082	1103	1090	1080
2083 to 2087	1103	1090	1080
2088 to 2092	1103	1090	1080
2093 to 2097	1103	1090	1080
2098 to 2102	1103	1090	1080
2103 to 2200	1103	1090	1080

Table 10.3.2 compares Option 2 net landbases, old-growth volume and LRSYs for Block 2, the Lower Tsitika and the Wings.

TABLE 10.3.2. **Net Landbase and Results Summary for Block 2, Landbase Options**

	Block 2 (Option 2)	Lower Tsitika	Wings
Net landbase (ha)	138 256	1 766	1 811
% of Block 2	100	1.3	1.3
Old-growth volume (000 m³)	49 943	1 274	1 328
% of Block 2	100	2.6	2.7
Net landbase in partial retention VQOs (ha)	11 184	962	1 810
% of Block 2	100	8.6	16.2
LRSY contribution (000 m$^{3/year}$)	1 103	13	10
% of Block 2	100	1.2	0.9

In Option 2, the Lower Tsitika and adjacent wings are amongst the most constrained areas in Block 2 for harvest scheduling. The partial retention visual landscape class occurs on 55% of the net area removed in the Lower Tsitika (962 ha of 1 766 ha) and on 100% of that removed in the wings (1 810 ha). Consequently, the difference in harvest schedules is smaller than might otherwise be expected. This is particularly so in the medium term as in Option 2, the harvest of predominately old-growth timber in these partial retention areas is spread out over approximately 150 years. In the longer term, harvest levels (LSRYs) are decreased by 13 000 m^3/year through removing the Lower Tsitika (Option 16) and an additional 10 000 m^3/year if the wings are also unavailable (Option 17) compared to Option 2.