

**TREE FARM LICENCE 1
MANAGEMENT PLAN 9**

INFORMATION PACKAGE

VERSION 1.4

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**Prepared for
Skeena Cellulose Inc.**

by

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INTRODUCTION

This information package is prepared for Timber Supply Analysis, part of Tree Farm Licence 1 Management Plan 9 of Skeena Cellulose Inc. In this package the input assumptions and modelling procedures that will be used in the timber supply analysis are outlined. Sterling Wood Group Inc. has been engaged by Skeena Cellulose Inc. to undertake the timber supply analysis.

The purposes of the Timber Supply Analysis Information Package are:

- to provide a detailed account of factors related to timber supply that the Chief Forester must consider under the Forest Act when determining an allowable annual cut (AAC) and how these will be applied in the timber supply analysis;
- to provide a means for communication between licensee, Forest Service and BC Environment staff;
- to provide Forest Service staff with the opportunity to review data and information that will be used in the timber supply analysis before it is initiated; and
- to ensure that all relevant information is accounted for in the analysis to a standard acceptable to Forest Service staff.

PROCESS

The Statement of Management Objectives, Options and Procedures (SMOOP) for TFL 1 was accepted by the Ministry of Forests (MoF) on February 19, 1998.

OPTIONS AND SENSITIVITY ANALYSIS

OPTIONS

Draft timber management objectives were presented in the SMOOP as follows:

- to harvest an annual volume of 720,000 cubic metres of fibre (sawlogs, pulplogs and minor products) using harvesting techniques that maximize the economic utilization of fibre;
- harvest methods in order of most occurrence will include overhead cable systems, ground skidding and helicopter;

- fibre utilization will be maximized to meet market conditions;
- to pursue forest management and harvesting strategies that will ensure a sustainable long term fibre supply and maintain the forest productivity;
- to co-operate with the MoF in the administration of a Small Business Forest Enterprise Program (SBFEP) allowable cut of 29,950 cubic metres.

A forest landbase can produce many different harvest levels depending on the management assumptions chosen and the net operable landbase used. A timber supply analysis will be completed to determine potential harvest level options and to prepare a rationale for the AAC that will be proposed to the provincial Chief Forester for approval.

BASE TIMBER SUPPLY ANALYSES

Several resource management options will be modelled and analyzed. The analysis will provide a range of harvest flow levels depending on the combination of management assumptions and landbase options used in each. Sensitivity analysis and additional scenarios will be used to explore uncertainty in data and assumptions and some results from the five base options listed below.

The analysis options will include:

- 1) ***Gross Operable Landbase*** – this will determine the theoretical biological harvest level for the productive forest area unconstrained by non-timber resource factors. One harvest level will have no green-up or cover constraints applied. One harvest level will have a green-up and cover constraint applied.
- 2) ***Current Management*** – this will model the current management of TFL 1 with integrated resource management emphasis. It will include the conventional and non-conventional landbase, the cottonwood management zone, as well as Forest Practices Code requirements for adjacency, green-up and biodiversity.
- 3) ***Minus Nisga’a AIP Landbase*** – this will examine a harvest level from a reduced TFL landbase, resulting from deletion of the Nisga’a AIP area from Option 2.
- 4) ***Minus the Kitsumkalum Protected Areas*** - this will examine a harvest level from another reduced landbase.
- 5) ***Enhanced Forest Management*** – the net operable landbase from Option 2 will include a defined management zone having an enhanced timber emphasis. Within this zone incremental silviculture techniques such as commercial thinning and short rotations will be

practiced.

- 6) **Planned Management** – this option will model the proposed management strategies for the next five years as well as assumptions that will affect the management and the landbase for the next 30 years and are assumed to continue to the end of the analysis period.

SENSITIVITY ANALYSES

For the current management and planned management options a set of sensitivity analyses will be run. Table 1 lists the proposed set. During the analysis, more issues that require sensitivity analysis may become apparent.

Table 1: TFL 1 proposed sensitivity analyses for current and planned management options

Landbase	Sensitivity Analyses
Current management	Existing stand volume +20% Existing stand volume +10% Existing stand volume –10% Regenerated stand volume +10% Regenerated stand volume –10% Cover constraint percentages +10% Cover constraint percentages –10% Minimum harvest age +10 years Minimum harvest age –10 years Green-up heights +2 metres Green-up heights –2 metres Landbase increased by 10% Landbase decreased by 10% Old growth site index adjustment - all species no wildlife tree patches
Planned management	Existing stand volume +20% Existing stand volume +10% Existing stand volume –10% Regenerated stand volume +10% Regenerated stand volume –10% Cover constraint percentages +10% Cover constraint percentages –10% Minimum harvest age +10 years Minimum harvest age –10 years Green-up heights +2 metres Green-up heights –2 metres Landbase increased by 10% Landbase decreased by 10% Old growth site index adjustment - all species no wildlife tree patches

MODEL

The following forestry software is being used to prepare the TFL 1 information package and timber supply analysis:

- The forest estate model TREEFARM
- MoF Variable Density Yield Projection (VDYP) System
- MoF Variable Density Yield Projection (VDYP Batch) System
- MoF Table Interpolation Program for Stand Yields for Microsoft Windows (WinTIPSY).

FOREST ESTATE MODEL TREEFARM

TREEFARM is a forest estate model proprietary to Sterling Wood Group Inc. The model was first developed in 1979 and has undergone regular additions and upgrades. It has been used for a variety of industrial and government clients since 1984. Its use for tree farm licence allowable cut calculations was approved by the MoF in 1986. TREEFARM is now at version 6, upgrade 6 (version 6.6). The model is written in the programming language 'C' and is available for running under the Windows 95 and Windows NT operating systems. TREEFARM simulates the growth, harvesting and silvicultural treatment of a forest estate on an annual basis. The results are summarized at the end of each decade.

The initial inventory data represent the net landbase for a given allowable annual cut (AAC) calculation. The landbase is always stratified into land units. A land unit is the smallest piece of the landbase carried separately in TREEFARM. The number of land units is calculated by multiplying the number of forest types, site classes, age classes, silviculture treatment types and management zones. For example, a forest estate with 20 forest types, four site classes, 30 age classes, four management types, and four management zones will have a maximum of 38,400 land units. Each land unit is a grouping of polygons in the same forest type, site class, age class, management type, management zone.

In TREEFARM, analysis units are those groupings that receive a separate yield curve. Typically, analysis units are defined by forest type and site class.

The reporting system for TREEFARM summarizes this level of detail in a practical, understandable way.

A unique feature of TREEFARM is the subdivision of the forest estate according to silvicultural treatment.

TREEFARM does not require that inventory age classes be the same width as the time period used in harvest projections. For example, 20-year inventory age classes and five-year time periods are acceptable. TREEFARM can use up to 30 age classes.

Harvesting rules determine which areas in the present and future forest inventories are candidates for harvest. The harvesting rules influence the harvest schedule but do not specify it. The harvest schedule is specified by the harvesting algorithm in the forest estate model.

In TREEFARM the harvesting rules are:

- the total annual harvest required during each time period;
- the present-day harvest profile by forest type and age class;
- the minimum volume per hectare, stand average diameter (dbh), and minimum age a stand must reach before it can be cut;
- the ranking of forest types in order of preference for harvest;
- the ranking of silvicultural management types in order of preference for harvest;
- cover constraints and green-up periods for groupings of analysis units which are specified by the user.

A selected subset of harvesting rules may be chosen for any given run.

The current version of TREEFARM allows the user to model cover constraints and green-up periods in a variety of ways. Each land unit can be assigned to one or more set of cover constraints. Maximum age cover constraints are assigned independently from minimum age constraints. Both maximum and minimum age constraints can overlap. For example, minimum cover constraints for mature plus old seral stages combined can overlap with cover constraints for the old seral stage. Cover constraints which apply to an entire management zone can overlap with cover constraints applied to subsets of the zone.

Partial cutting of various kinds may be applied. Examples are; commercial thinning, shelterwood systems, or true all-aged selection cutting. The intensity of removals for a given system may be varied at each cutting cycle. Areas currently not under partial cutting systems may be converted to partial cutting. Using partial cutting systems requires the user to supply the appropriate yield tables.

To make projections for tomorrow it seems right to start where we are today. In its cutting procedure TREEFARM begins with today's harvesting profile. Over time the model departs from the starting profile in a systematic manner as the standing timber inventory changes. Technically any starting harvest profile may be provided to the model. If required a specific harvesting profile can be in force over the entire planning horizon.

TREEFARM includes a powerful three-stage harvesting algorithm. This produces many rotations for different forest type/resource zone combinations. TREEFARM can cut to a fixed profile, cut oldest first or cut to a combination of oldest first and species requirements. In most simulations a mix of all three types of harvest takes place.

For each time period the timber production objective is supplied to the model. When harvesting, TREEFARM will try to reach the objective but if this cannot be done in any time period it will get as close as it can without breaking any of the harvesting rules. Constant, declining, increasing and fluctuating series of timber production targets are all acceptable.

To qualify for harvest, a stand must reach a minimum volume, average dbh and age. Even then it cannot be cut if cover constraints are not satisfied.

TREEFARM can analyze many different silvicultural treatment regimes. Complete silvicultural programs involving planting, spacing, fertilization, thinning and rehabilitation of not sufficiently restocked (NSR) area can be constructed and included as part of the input file. Each part of the forest estate, treated and untreated, can be reported on separately. The future growing stock and future harvests from untreated areas, plantations, spaced, fertilized, spaced and fertilized areas are reported on specifically. Responses and harvest gains from incremental silviculture show up not only in the total harvest but in the harvest from the treated areas. TREEFARM can show harvest by silvicultural treatment type. The changing nature of the forest estate due to harvesting and silvicultural practices is very clearly shown.

Silvicultural programs can be targeted at analysis unit/site class combinations. For example, the proportion of Douglas-fir areas planted after logging can be different from the proportion of hemlock logged areas which are planted. The forest type regenerated after logging can be different from the forest type which was logged. NSR areas from past logging can be re-claimed during a model run.

Changes to the landbase are included in three ways. The first is by applying net down logic to the polygon inventory database file to produce a net landbase in a process completely independent of TREEFARM. Changing the net down logic will change the net landbase. The second is by applying factors like accessibility factors during a model run. The third way is to prepare detailed area summaries of the areas to be added or subtracted as additional data files. TREEFARM looks for area summaries to be added to or subtracted from the landbase at the beginning of the first six time periods. Given the same input data as the MoF model FSSIM, TREEFARM will produce similar results.

MODELLING FOREST PRACTICE CODE REQUIREMENTS

Code requirements to be modelled or accounted for in the landbase netdown are:

- Adjacency and green-up
- Riparian reserves
- Riparian management zones
- Stand level biodiversity
- Landscape level biodiversity.

Adjacency and green-up constraints are modelled using maximum age cover constraints. These are shown in Tables 39 a and b. Riparian reserves and management zones were identified using a GIS process. Single bank reserve and management zone widths used are shown in Table 11(a). Stand level biodiversity is modelled by a set of area reductions. For each landscape unit/biogeoclimatic subzone, the entry points for Table 20a in the biodiversity guide book were calculated. A percentage area reduction for wildlife tree patches was calculated from Table 20a for each landscape unit/subzone combination. These numbers are shown in Table 40. For each polygon in the timber harvesting landbase an area reduction was made for wildlife tree patches. If riparian zones were also present in the polygon, they were allowed to contribute to the required wildlife tree patch area.

CURRENT FOREST COVER INVENTORY

In the fall of 1989, Skeena Cellulose Inc. retained two consulting firms, Reid Collins and Associates and Timberline Forest Inventory Consultants to undertake a reinventory of TFL 1. The company wanted to have new inventory data for the preparation of Management Plan 8. To ensure the inventory was completed in time, the combined forces of two firms was necessary.

The TFL was split into five main blocks. Each consultant was assigned 50% of the area:

Block	Assignment	Area (ha)
Nass	Timberline	120,000
Copper	Timberline	150,000
Whitebottom	Timberline	25,000
Dane Estates	Timberline	4,000
Kalum-L. Nass	Reid Collins	320,000

The technical work commenced in October 1989 and was completed in June 1991.

PRE-STRATIFICATION, DATA COLLECTION & CLASSIFICATION STANDARDS & CRITERIA

All pre-stratification, data collection and classification standards and criteria were carried out in accordance with the 1988 version of Chapter III of the Ministry of Forests' Inventory Manual.

SAMPLING INTENSITIES

The classification methodology chosen relied heavily upon a high polygon visitation. The ground and air sampling program was designed to visit 68% of the polygons in the productive

forest and 36% of the polygons in the marginal forest area. Skeena Cellulose Inc. was responsible for sampling and labelling all disturbed and cut-over areas. Labels were derived from silviculture surveys and records completed for these areas.

SAMPLING INTENSITIES BY BLOCK

Block	Ground	Air	Total
Nass	103	1,200	1,303
Copper	128	1,894	2,022
Whitebottom	26	284	310
Dane Estates*	0	0	0
Kalum - L. Nass	200	3,000	3,200

*Data source for the Dane Estates was an inventory completed in 1986. All air and ground observations have been documented on maps and photos.

AERIAL PHOTOGRAPHY AND POLYGON TRANSFER METHODOLOGY

In the summer of 1988, new aerial photography was produced for TFL 1. Panchromatic black and white film was used. The scale of the photography was 1:20,000 at the lower elevations.

The 1988 aerial photography was used for stratification, interpretation and polygon transfer:

- film type - panchromatic, black & white

Government 1:20,000 digital maps (TRIM) were used as the map base. Stratified polygons and additional planimetric detail was photogrammetrically transferred from the 1998 aerial photographs to the base maps.

BASE MAPS

Prior to the commencement of the inventory, new base maps were produced. TRIM (Terrain Resource Information Management) maps base on NAD 83 (North American Datum 1983) were used. In total, 85 map sheets were required, 61 of which were obtained from the Ministry of Forests. SCI entered into a cost sharing project with the Ministry of Lands to make up the remaining 24 map sheets.

ATTRIBUTE LISTING

All forest cover attributes were recorded on MoF Forest Cover Attribute List forms FS

810 (1) and (2).

DIGITAL MAP PRODUCTION

All inventory information was captured digitally. Third order stereo plotters transferred the information stratified on the photographs to the base maps. Upon conclusion of the inventory classification, all the polygons and corresponding labels were digitized. SCI entered into a cost sharing agreement with the MoF. SCI agreed to supply the inventory data for TFL 1 in return for monetary assistance for the digitizing.

QUALITY CONTROL

To ensure consistency between the consultants and overall quality control, meetings and reviews of work completed were held throughout the term of the project. Quality control was carried out by representatives from the Ministry of Forest, Skeena Cellulose Inc., Reid Collins and Timberline.

SAMPLING INTENSITIES (GROUND AND AIR)

Based on an average polygon size of 25 hectares and removing the area of non-forest and cut over land, the sampling intensity within the operable forest is 68% (one sample per 37 ha). Within the inoperable area the sampling intensity is 36% (one sample per 69 ha).

DESCRIPTION OF LAND BASE

TIMBER HARVESTING LAND DETERMINATION

Table 2 is a summary of the area reductions for the entire TFL 1 to determinate the land base that is available for timber harvesting in the schedule A and Schedule B. Table 2 includes the areas for conventional and non-conventional timber harvesting land base. The non-conventional landbase has been examined by Skeena Cellulose. A subset of this non-conventional area totalling 14,872 hectares was included in the timber harvesting landbase. This area represents 11% of the initial timber harvesting landbase. The volume reductions have also been calculated and presented in the Table 2. The netdown sequence is the same as the sequence shown in the Table 2.

Table 2. Timber harvesting land base (option 4)

Description	Area Schedule A	Area Schedule B	Total Area	Volume Schedule A	Volume Schedule B	Total Volume
Total Land Base	966	609725	610691	138480	84560131	84698611
Non-Forest	109	320946	321055	964	4483549	4484513
Non-Productive Forest	12	17027	17039	0	504468	504468
Total Productive Forest	845	271752	272597	137516	79572114	79709630
Less:						
Inoperable/Inaccessible	133	84302	84435	4881	24377931	24382812
NC (Non Commercial)	13	732	745	0	0	0
Low Site	1	1507	1508	0	154866	154866
Deciduous	23	3542	3564	1231	323818	325049
Non-merchantable	162	6018	6181	31462	1204412	1235874
ESAs	17	15974	15991	2988	6098349	6101336
Alpine Tundra	0	366	366	0	154580	154580
Riparian Reserves	98	9619	9717	22893	3125888	3148782
Specific Geographically Defined Area	0	1434	1434	0	480996	480996
Unclassified Roads, trails and Landings	12	2721	2733	108	11277	11385
NSR	17	2172	2189	0	7076	7076
Wildlife Tree Patch	27	9066	9093	3636	2567592	2571228
Total Current Reduction	505	137452	137956	67199	38506783	38573982
Initial Timber Harvesting Land Base	341	134300	134641	70316	41065331	41135647
Additions:						
NSR	17	2172	2189			
Total Additions	17	2172	2189			
Current Timber Harvesting Land Base	358	136472	136830	70316	41065331	41135647
Future Reductions:						
Future roads, trails, landings	11	6173	6184			
Future Timber Harvesting Land Base	347	130299	130645	70316	41065331	41135647

TOTAL AREA

The total area of the TFL 1 is 610,691 ha that include the entire area excluding salt water. This area is different from the area shown in Management Plan #8. The reason is there is about a 1,000 hectare difference between the written description of the TFL boundary and the mapped TFL boundary. The mapped boundary includes 610,691 hectares.

NON-FOREST

Table 3 presents the list of non-forest types of the TFL 1 and the area for each type of the land.

Table 3: Non-Forest

Description	Total Area (ha)
No Typing Available	10400
Classified Roads, trails, and landings	5183
Alpine	272428
Alpine Forest	16195
Gravel Bar	456
Gravel Pit	127
Lakes	1489
Meadow	3
Rock	1780
River	5541
Swamp	6084
Urban	1371
Total	321055

NON-PRODUCTIVE FOREST

The non-productive forest has been classified in the TFL 1 inventory database and its total area is 17039 ha including NP, NPBR and NPBU.

INOPERABLE / INACCESSIBLE

Table 4 shows the area reduction for each type of the inoperable or inaccessible area. In the Table 4, total area in the productive area refers to the entire area covered by this classification including other, overlapping classifications. The area removed in the netdown step presents the same amount as in Table 2. The operable area presents the area left after the entire netdown process is done. The following descriptions for the determination of timber harvesting land will use this similar structure.

Table 4: Inoperable / Inaccessible

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
Non-harvestable	100	84435	84435	84435	0

NC (NON-COMMERCIAL)

The area of non-commercial cover is shown in Table 5.

Table 5: NC (Non-commercial) area

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed In the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
NC brush	100	1008	745	1008	0

LOW SITE

Low site areas are considered not suitable for harvest due to its low timber growing potential. The areas of low site removed from the landbase are shown in Table 6.

Table 6: Low site

Leading Species	FIZ	Site Index	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
Cottonwood	A	< 8	100	0	0	0	0
Balsam	A	< 6.5	100	22	0	22	0
Western Cedar	A	< 8.5	100	0	0	0	0
Hemlock	A	< 7	100	1661	206	1661	0
Lodgepole Pine	A	< 8.5	100	0	0	0	0
Spruce	A	< 3	100	0	0	0	0
Cottonwood	J	< 7	100	18	18	18	0
Balsam	J	< 6.5	100	1126	35	1126	0
Western Cedar	J	< 9	100	26	26	26	0
Hemlock	J	< 7.5	100	8536	1095	8536	0
Lodgepole Pine	J	< 9.5	100	119	119	119	0
Spruce	J	< 5	100	9	9	9	0
Total				11517	1508	11517	0

AREA REDUCTION FOR DECIDUOUS

Deciduous areas other than cottonwood were removed from the landbase.

Table 7: Area reduction for deciduous

Inventory Type Group	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
>=37 and <=42	100	3992	3564	3992	0

NON-MERCHANTABLE AREA

Non merchantable stands were defined as any area with age > 100 and height < 22.5 or Age > 60 and crown closure < = 25 % is removed in the netdown. Table 8 is a result from the netdown process.

Table 8: Area reduction for non-merchantable area

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area (ha) Removed after the Netdown	Operable Area (ha)
Age>100 and Height < 22.5 && Age > 60 and Crown Closure <=25 % && Age >100 and volume <250	100	30991	6181	30991	0

ENVIRONMENTALLY SENSITIVE AREAS

ESA mapping was used to identify environmentally sensitive areas on TFL 1. Table 9 shows the area reductions for ESAs.

Table 9: Area reduction for ESAs

ESA Category	ESA Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
Ea1	Snow Avalanche Area 1	100	118	31	118	0
Ep1	Regeneration Problem Area 1	100	32303	5655	32303	0
Er1	Recreation Area 1	100	47	47	47	0
Ew1	Wildlife Area 1	100	11	11	11	0
Es1	Soils Area 1	50	11465	3089	8800	2664
Esa1	Soil and Avalanche Area 1	50	0	0	0	0
Esp1	Soil and Regeneration Problem Area 1	50	11318	656	10730	587
Eh2	Water Area 2	50	262	74	194	67
Ep2	Regeneration Problem Area 2	50	5648	571	5145	502
Er2	Recreation Area 2	50	372	105	283	89
Ew2	Wildlife Area 2	50	253	114	170	83
Es2	Soil Area 2	30	30847	5447	19631	11216
Esh2	Soil and Water Area 2	30	27	8	9	18
Esp2	Soil and Regeneration Problem Area 2	30	2613	178	2292	321
Esr2	Soil and Recreation Area 2	30	107	5	97	11
Total			95389	15991	79830	15558

ESA

The percentage reductions for soils, recreation, regeneration problems and avalanches in Table 9 were based on the Kalum TSA data package, January 1998. The percentages for wildlife and water were based on professional judgement. It is important to note that the actual area removed in the netdown for environmentally sensitive areas is often greater than the nominal percentage reduction; and is never less. For example, in Table 9 the Esa1 label has a reduction of 50%, but 100% of these areas were actually removed in all stages of the netdown. The Es1 area has a 50% reduction factor but Table 9 shows that 77% of these areas were actually removed in all stages of the netdown.

AREA REDUCTION FOR ALPINE TUNDRA

Table 10 shows the removed alpine tundra area in the biogeoclimatic zone “AT”.

Table 10: Area reduction for alpine tundra

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
Alpine Tundra	100	2527	366	2527	0

RIPARIAN ZONES

The areas for management and reserve zones have been identified in the TFL 1 inventory database. Table 11 shows the area reduction for riparian zones.

Table 11: Area reduction for riparian zones

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area (ha) Removed after the Netdown	Operable Area (ha)
Reserve Zone	100	11846	8203	11846	0
Management Zone	10	27824	1515	14829	12995
Total		39670	9717	26675	12995

In the GIS database, Skeena Cellulose Inc. used the following single bank riparian reserve and management zone definitions. These are not quite the same as the riparian management guidebook.

Stream Class	Reserve (m)	Management Zone (m)
S1, S2	50	20
S3, S4	20	20
S5, S6	0	30

These definitions were used to generate two database resultants using a GIS; reserve and management. It is not possible for us to distinguish the reserve or management zone areas by stream class because the GIS exercise combined them into one management zone and one reserve for each polygon. All areas labelled reserve were removed from the timber harvesting landbase. Skeena Cellulose staff examined local maps and estimated that about 10% of all the areas labelled as management zones in the database should be removed from the landbase. In their opinion, this approximates the combined areas required by the separate management zones prescribed in the riparian management guidelines.

SPECIFIC GEOGRAPHICALLY DEFINED AREA

In the TFL 1, parts of the Upper Kitsumkalum drainage cover were proposed as protected areas defined in April 1996. The area reductions made for these are shown in table 12.

Table 12: Area reduction for specific geographically defined area

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed in the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
Upper Kitsumkalum	100	5862	1434	5862	0

NSR

NSR areas have been previously logged or burned but have not restocked fully. Table 13 shows the area for NSR in the netdown.

Table 13: NSR area

Description	% Reduction	Total Area (ha) in the Productive Area	Area (ha) Removed In the Netdown step	Total Area removed by all Netdown steps	Operable Area (ha)
NSR	100	3062	2189	3062	0

ROADS, TRAILS AND LANDINGS

The classified and unclassified roads, trails, and landings are described and calculated in the next two sections.

Classified Roads, Trails, and Landings

The area for classified roads, trails, and landing is spatially identified and calculated in the non-forest area of the TFL 1. The total removed area for classified roads, trails, and landings is 5183 ha as shown in the Table 3.

Unclassified Roads, Trails, and Landings

The 6% area reduction from forest stands 35 years or younger for unclassified roads, trails, and landings in the netdown is estimated and used by the Skeena Cellulose Inc. The total area reduction is 2733 ha as shown in the Table 2. A survey of silvicultural prescriptions for TFL 1 showed an average reduction of about 8%. These prescribed percentages represent

allowed maximum values and are greater than those actually achieved. Forestry staff on TFL 1 estimate the achieved reduction in productive land to be approximately 6%.

Future Roads, Trails, and Landings

The 6% of the current timber harvesting landbase older than 35 years removed for future roads, trails, and landings is shown in Table 2 as 6184 ha.

INVENTORY AGGREGATION

MANAGEMENT ZONES

Five management zones have been identified on TFL 1. These are wildlife, general, timber production, enhanced timber production, visual and riparian. Table 14 shows the areas in each zone.

Table 14: Management zones

Management Zone	Productive Forest	Net
Wildlife	64396	17917
General	86358	40854
Enhanced	74723	53214
Visual	34459	17851
Riparian	12660	4805
Total	272597	134641

DETERMINATION OF ANALYSIS UNITS

Thirty analysis units have been identified for TFL 1. They are defined in Table 15.

Table 15: Criteria for determining analysis units

Analysis Unit	FIZ	Leading Species	Inventory Type Group	Productivity Site Class	Age Range	Net Area (ha)
1	A	Hemlock & Cedar	9 - 17	2	All	119
2	A	Hemlock & Cedar	9 - 17	3	0 - 140	2,108
3	A	Hemlock & Cedar	9 - 17	4	0 - 140	1,120
4	A	Hemlock & Cedar	9 - 17	3	140+	2,883
5	A	Hemlock & Cedar	9 - 17	4	140+	10,278
6	A	Balsam	18 - 20	2	All	177
7	A	Balsam	18 - 20	3	All	543
8	A	Balsam	18 - 20	4	All	854
9	A	Spruce	21 - 26	2	All	398
10	A	Spruce	21 - 26	3,4	All	400
11	A	Cottonwood	35 - 36	1	All	119
12	A	Cottonwood	35 - 36	2	All	591
13	A	Cottonwood	35 - 36	3,4	All	381
14	J	Hemlock & Cedar	9 - 17	2	All	894
15	J	Hemlock & Cedar	9 - 17	3	0 - 140	15,258
16	J	Hemlock & Cedar	9 - 17	4	0 - 140	12,587
17	J	Hemlock & Cedar	9 - 17	3	140+	1,221
18	J	Hemlock & Cedar	9 - 17	3	140+	2,726
19	J	Hemlock & Cedar	9 - 17	4	140+	11,817
20	J	Hemlock & Cedar	9 - 17	4	140+	46,117
21	J	Balsam	18 - 20	2	All	1,202
22	J	Balsam	18 - 20	3	All	5,490
23	J	Balsam	18 - 20	4	All	6,572
24	J	Spruce	21 - 26	1,2	All	855
25	J	Spruce	21 - 26	3	All	1,352
26	J	Spruce	21 - 26	4	All	591
27	J	Lodgepole Pine	28 - 31	3	All	5,838
28	J	Lodgepole Pine	28 - 31	4	All	336
29	J	Cottonwood	35 - 36	1,2	All	808
30	J	Cottonwood	35 - 36	3,4	All	1,010
Total						134,641

DETAILED OPERABLE LANDBASE

Area By Management Zone, Analysis Unit And Age Class

Tables 16 – 20 show the area summaries for each management zone by analysis unit and age class. Table 21 shows the area summary for all management zones by analysis unit and age class.

Volume by Management Zone, Analysis Unit and Age Class

Table 22–26 show the volume summaries for each management zone by analysis unit and age class. Table 27 shows the volume summary for all management zones by analysis unit and age class.

Table 16: Management zone G – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Neidown Area
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	101	124	202	45	0	0	0	0	1	0	26	132	15	7	0	0	0	0	0	0	0	0	0	0	0	0	655
3	45	8	344	35	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	434
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	187	22	11	1388	1619
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	39	2	1	15	217	0	0	4973	5249
6	34	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81
7	23	0	21	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	112
8	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	414	472
9	2	8	36	59	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	150	260
10	0	8	37	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	56	169
11	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
12	97	0	30	30	5	1	31	0	0	2	0	5	0	0	0	1	0	15	0	0	0	0	0	0	0	2	218
13	52	1	23	33	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	3	0	0	0	141
14	6	31	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
15	163	272	223	54	61	3	0	1	99	168	64	15	3	40	0	0	0	0	0	0	0	0	0	0	0	0	1165
16	222	183	199	72	27	45	0	89	22	322	0	11	19	89	0	0	0	0	0	0	0	0	0	0	0	0	1300
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	271	273
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	8	0	0	0	28	0	13	0	0	472	534
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	5	31	0	0	0	3	41	22	2655	2770
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	65	140	16	32	12	373	0	212	68	149	19019	20091
21	93	112	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267
22	650	131	140	0	0	1	0	9	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	34	971
23	36	55	30	0	0	0	0	0	0	2	0	0	5	16	0	0	3	0	0	0	571	0	76	179	13	2516	3502
24	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73
25	0	6	14	0	0	0	0	1	0	10	0	0	0	0	0	21	0	0	2	0	114	0	0	0	0	17	186
26	0	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	22	37
27	3	1	0	0	0	0	0	3	0	92	0	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0	152
28	0	0	0	0	0	0	0	1	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
29	7	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
30	0	0	0	4	0	0	0	0	0	9	0	0	0	4	0	0	0	0	0	0	0	0	3	0	0	0	20
Total	1567	949	1442	405	93	55	31	103	123	619	90	198	43	155	18	99	206	42	139	15	1120	15	713	311	195	32107	40854

Table 17: Management zone E – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Neidown Area
1	0	1	17	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
2	147	57	89	243	14	0	0	0	0	9	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	563
3	69	153	136	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	42	0	0	240	322
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	3	0	0	1242	1290
6	37	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
7	85	70	86	20	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	264
8	27	2	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	138	208
9	0	0	12	1	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	38
10	0	2	47	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	100
11	0	0	15	10	37	4	0	0	0	8	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	80
12	11	0	21	31	138	0	0	0	0	10	0	7	0	0	0	0	0	0	0	0	0	0	15	0	0	0	232
13	18	0	6	72	20	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9	127
14	91	212	153	183	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	651
15	1710	1617	3852	1292	78	75	0	41	175	430	136	132	179	207	0	0	0	0	0	0	0	0	0	0	0	0	9926
16	1228	1207	2599	701	0	46	2	112	318	478	1	49	100	137	0	0	0	0	0	0	0	0	0	0	0	0	6976
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	13	0	0	391	408
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	145	87	4	0	16	71	20	102	20	29	618	1119
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	8	22	1	16	43	48	88	4210	4446
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	0	23	36	0	487	226	272	257	249	12388	14057
21	214	111	298	120	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772
22	833	451	850	644	167	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	57	3031
23	179	94	187	92	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	31	0	35	3	0	326	971
24	9	145	210	1	0	0	0	0	8	3	0	14	0	5	0	17	0	0	0	16	11	0	0	0	0	2	424
25	8	94	277	61	0	0	0	0	0	0	1	24	0	19	19	2	13	0	0	0	68	3	0	6	0	0	612
26	28	44	108	83	23	0	0	0	0	0	0	0	0	0	0	14	2	0	0	0	37	0	0	1	0	6	348
27	697	777	987	306	21	0	0	126	35	610	232	74	439	31	0	0	0	0	0	0	0	0	0	0	0	0	4336
28	5	45	113	53	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	4	0	0	249
29	166	45	188	10	3	2	25	0	0	9	0	15	0	3	3	0	0	0	0	0	0	0	3	5	0	3	480
30	65	44	247	46	0	0	0	1	0	84	0	5	22	3	0	0	0	0	0	24	78	0	1	0	0	52	670
Total	5627	5170	10525	4085	551	127	27	295	536	1641	372	355	744	435	31	303	127	30	44	162	796	268	529	346	366	19721	53214

9 Table 18: Management zone V – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Area
1	0	0	0	56	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
2	41	99	118	341	0	0	0	0	0	36	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	679
3	26	45	37	10	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	12	0	0	0	0	0	0	0	0	272
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	16	0	16	0	0	0	1147
6	0	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
7	20	0	0	28	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
9	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
10	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
11	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
12	1	10	4	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
13	0	1	2	15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
14	3	66	27	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107
15	456	486	922	57	0	0	0	95	44	167	351	224	53	73	0	0	0	0	0	0	0	0	0	0	0	0	2926
16	190	274	822	30	0	0	0	3	45	28	10	28	95	40	0	0	0	0	0	0	0	0	0	0	0	0	1565
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	176	193
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	22	0	0	1	10	16	10	14	0	0	291	427
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	4	0	47	55	0	0	62	4	22	2664	2883
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	81	4	2	9	44	16	0	286	64	16	3539	4077
21	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
22	594	130	68	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	805
23	2	0	0	10	0	0	0	0	0	0	0	0	0	0	0	14	0	5	24	98	5	0	56	23	0	787	1023
24	0	8	63	0	0	0	0	0	0	0	95	35	0	0	0	0	0	0	0	0	0	0	8	0	0	23	232
25	0	37	21	0	0	0	0	0	0	41	23	14	0	0	36	0	0	0	0	0	36	11	0	2	0	0	221
26	0	25	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	43	90
27	55	11	141	70	0	0	23	33	0	5	164	8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	518
28	0	0	16	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	20
29	25	8	43	3	0	0	0	0	0	0	4	0	0	0	0	0	15	0	0	0	0	0	0	0	0	24	123
30	2	8	65	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	18	0	0	0	0	6	105
Total	1418	1209	2364	666	89	11	23	132	90	278	648	313	155	161	140	127	23	18	125	207	107	21	459	107	36	8921	17851

10 Table 19: Management zone R – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Area
1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	5	5	9	14	2	0	0	0	0	0	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
3	1	11	17	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	4	0	132	207	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	8	0	28	0	0	193	231
6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
7	4	4	3	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	20
8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	24	27
9	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	61
10	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	37	43
11	0	0	0	12	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
12	14	0	10	14	9	0	16	0	0	3	0	11	0	0	0	0	0	0	0	0	0	2	3	0	0	0	82
13	7	5	13	14	0	1	0	0	4	6	0	1	0	0	0	0	0	0	0	0	0	8	0	0	0	0	68
14	5	7	12	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
15	41	26	156	101	16	1	0	7	11	25	7	16	0	7	0	0	0	0	0	0	0	0	0	0	0	0	413
16	36	43	148	29	0	8	0	2	6	23	10	17	2	8	0	0	0	0	0	0	0	0	0	0	0	0	331
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	119	125	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	3	0	0	33	0	0	0	7	292	340
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	2	4	258	273	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	1	0	0	17	0	19	52	1	1225	1332
21	6	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
22	25	16	19	19	11	0	0	0	0	10	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	62	165
23	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	53	0	0	11	0	152	218	
24	1	0	8	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	33	48
25	0	18	20	6	0	0	0	1	0	0	0	0	0	0	0	4	6	0	0	7	48	0	0	0	0	34	143
26	1	11	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	36
27	18	10	28	74	0	0	0	7	3	1	23	24	16	7	0	0	0	0	0	0	0	0	0	0	0	0	212
28	1	0	11	3	0	0	0	0	0	12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	29
29	2	1	46	12	17	2	24	0	1	13	0	0	0	4	1	0	2	0	0	0	1	0	14	2	0	3	145
30	2	2	24	12	0	0	3	0	0	1	0	0	11	6	0	0	0	0	0	0	25	0	7	0	0	1	96
Total	174	165	546	334	55	18	43	16	26	101	40	80	33	50	1	28	8	5	1	7	195	0	158	79	12	2628	4805

11 Table 20: Management zone W – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Area
1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2	54	86	18	3	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163
3	80	22	3	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	21	0	96	0	0	343	462
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	41	2	9	162	0	0	2133	2360
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	48	96
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	106	110
9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	20	0	21	31	80
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
13	9	0	0	14	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
14	4	9	1	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
15	207	152	203	47	37	0	0	4	60	86	0	10	1	22	0	0	0	0	0	0	0	0	0	0	0	0	828
16	168	106	482	64	4	5	0	35	36	1440	0	10	30	26	0	0	0	0	0	0	0	0	0	0	0	0	2415
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222	222
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	9	8	0	0	10	0	68	10	0	188	305
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1440	1445
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	19	25	50	0	0	116	179	218	13	72	5862	6560
21	40	54	6	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148
22	115	81	49	16	14	0	0	0	0	0	0	1	0	8	0	0	0	0	0	0	0	0	0	0	0	234	517
23	1	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	123	0	2	7	0	717	857
24	0	7	28	0	0	0	0	0	0	2	0	0	0	0	5	0	0	0	0	0	22	0	0	0	0	13	77
25	0	4	51	20	0	0	0	0	0	7	0	0	0	10	0	0	0	0	0	4	90	0	0	0	0	4	190
26	6	4	23	5	0	0	0	0	0	0	0	23	0	0	0	0	15	0	0	0	2	0	0	0	0	2	79
27	36	108	234	24	3	0	0	0	0	62	0	35	111	0	0	0	6	0	0	0	0	0	0	0	0	0	619
28	1	0	19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
29	4	0	10	25	0	0	0	0	2	0	0	2	0	2	0	0	0	0	0	0	1	0	0	0	0	0	46
30	4	4	15	0	0	0	0	0	0	1	0	42	0	8	0	0	0	0	0	0	45	0	0	0	0	0	119
Total	744	638	1152	284	82	5	0	39	99	1599	0	126	146	76	14	29	68	58	11	46	432	188	610	32	96	11341	17917

12 Table 21: All management zones – timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Area
1	3	1	17	97	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119
2	349	371	436	646	16	0	0	2	44	27	146	18	51	0	0	0	0	0	0	0	0	0	0	0	0	0	2108
3	221	239	537	118	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1120
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	12	12	40	21	0	397	26	11	2354	2883
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	15	0	85	88	27	24	426	0	0	9610	10278
6	75	0	47	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177
7	141	74	109	73	0	4	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	40	0	0	99	543
8	60	2	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	4	0	0	719	854
9	6	8	48	95	0	0	16	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	218	398
10	0	11	93	72	0	0	0	0	0	0	0	0	0	0	0	2	0	0	30	0	0	0	20	0	21	151	400
11	0	0	15	22	37	23	0	0	16	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	119
12	123	12	65	75	195	1	47	0	14	0	23	0	0	0	1	0	0	15	0	0	0	0	17	3	0	2	591
13	86	7	44	147	20	1	0	0	5	8	0	32	0	8	0	0	0	0	0	0	0	0	11	0	0	9	381
14	109	325	222	227	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	894
15	2578	2552	5355	1550	192	79	0	148	390	876	558	396	236	349	0	0	0	0	0	0	0	0	0	0	0	0	15258
16	1844	1812	4260	897	31	103	2	240	427	2291	21	115	246	299	0	0	0	0	0	0	0	0	0	0	0	0	12587
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	2	32	5	0	1178	1221
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	193	104	15	1	26	159	30	196	30	36	1860	2726
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	6	4	8	86	78	3	16	113	98	140	11226	11817
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	299	169	92	77	57	1009	406	1006	455	487	42033	46117
21	353	279	373	144	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1202
22	2217	809	1124	680	192	1	0	9	1	11	0	36	0	10	0	0	0	0	1	0	0	0	0	0	0	398	5490
23	219	149	216	102	0	0	0	0	0	2	0	0	10	18	0	15	27	5	24	98	784	0	170	224	13	4498	6572
24	11	161	309	1	0	0	0	0	8	5	95	50	0	10	5	17	0	0	0	0	33	0	8	0	0	143	855
25	8	160	363	87	0	0	2	0	0	59	23	39	0	29	54	26	19	0	2	27	355	15	0	8	0	55	1352
26	35	94	154	92	23	0	0	0	0	0	0	23	0	0	0	14	17	0	0	0	50	0	0	15	0	74	591
27	809	908	1389	474	25	0	23	168	38	771	420	141	574	39	0	0	60	0	0	0	0	0	0	0	0	0	5838
28	7	45	160	62	0	0	0	3	0	24	0	0	0	29	0	0	0	0	0	0	0	0	0	6	0	0	336
29	204	54	293	52	19	4	49	0	3	22	4	17	0	9	4	0	17	0	0	0	2	0	17	7	0	29	808
30	74	58	351	63	0	0	3	1	0	95	0	47	33	26	0	0	0	0	0	24	166	0	11	0	0	58	1010
Total	9531	8131	16030	5775	869	216	123	586	874	4238	1149	1071	1121	877	204	587	432	153	321	438	2650	492	2469	876	708	74719	134641

Table 22: Management zone G – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Volume
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	25	4350	6006	0	0	0	8	397	0	9963	55627	7318	3651	0	0	0	0	0	0	0	0	0	0	0	0	87346
3	0	43	7711	173	0	0	0	0	0	0	0	479	87	0	0	0	0	0	0	0	0	0	0	0	0	0	8494
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7420	0	0	0	116372	16682	6533	945655	1092662
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	767	0	16573	1094	481	6828	99691	0	0	2405956	2531390
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
7	0	0	1	1170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33598	34768
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8085	0	0	0	0	191152	199237
9	0	22	738	11677	0	0	0	1	0	0	0	0	0	0	0	0	0	3000	0	0	0	0	0	0	0	120933	136372
10	0	0	782	1215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14433	0	0	0	0	0	0	35843	52273
11	0	0	0	0	0	1814	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1814
12	0	0	317	875	637	84	4212	0	0	433	0	1501	0	0	0	271	0	4319	0	0	0	0	18	26	0	382	13075
13	0	0	82	119	0	0	0	0	0	0	0	7247	0	0	0	0	0	0	0	0	0	0	939	0	0	0	8387
14	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
15	0	3	64	129	4126	540	0	195	23041	40268	18047	3872	877	14076	0	0	0	0	0	0	0	0	0	0	0	0	105239
16	0	26	5	20	0	526	0	4137	3635	44264	0	3184	5747	23931	0	0	0	0	0	0	0	0	0	0	0	0	85474
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	684	0	0	0	0	0	0	176978	177661
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4819	3175	0	235	0	11227	0	7020	0	0	261950	288427
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3078	0	0	1895	12747	170	0	13	879	15881	7254	1320657	1362573
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1216	19792	50331	6067	10002	5180	130761	0	84626	23801	58594	8186734	8577103
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	2	9	0	0	272	0	1626	0	243	0	1392	0	0	0	0	0	168	0	0	0	0	0	0	0	23063	26776
23	0	0	0	0	0	0	0	0	0	315	0	0	1565	5668	0	0	722	0	0	0	177916	0	32413	61337	5386	1027220	1312542
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32027	32027
25	0	82	29	0	0	0	0	129	0	1880	0	0	0	0	23	7925	0	0	740	0	44158	0	0	0	0	7704	62670
26	0	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1394	0	0	0	0	8134	9618
27	0	0	0	0	0	0	0	394	0	20048	0	0	0	0	0	0	18702	0	0	0	0	0	0	0	0	0	39144
28	0	0	0	0	0	0	0	70	0	1054	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1124
29	0	0	35	150	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	206
30	0	0	0	5	0	0	0	0	0	2025	0	0	0	829	0	0	0	0	0	0	0	0	731	0	0	0	3589
Total	0	294	14131	21543	4764	3239	4212	6561	27073	110529	28011	73303	15594	48154	4317	32807	73697	15280	63002	6444	374021	6841	342689	117727	77767	14778002	16250001

Table 23: Management zone E – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Neldown Volume
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	104	43	278	0	0	0	1	347	0	0	755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1529
3	0	7	43	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	0	633	0	14892	0	59790	0	0	240629	315835
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4320	0	572	15282	699	3158	71916	0	0	1023112	1119059
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	25263	0	0	37619	62888
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1836	0	0	64323	66160
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5555	0	0	0	17429	0	19835	26093	68912
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	32
13	0	0	0	62	0	0	0	0	0	0	0	549	0	0	0	0	0	0	0	0	0	0	0	0	0	0	611
14	0	0	3	4023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4027
15	0	3	181	651	5478	0	0	989	16436	21803	0	2820	409	7562	0	0	0	0	0	0	0	0	0	0	0	0	56335
16	0	5	116	77	0	266	0	3958	3876	189056	0	2817	6923	7530	0	0	0	0	0	0	0	0	0	0	0	0	214625
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	148787	149052
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	895	3652	3460	3083	0	5211	0	36602	5081	0	102783	160768	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	465	1253	767353	769071
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1921	6858	8284	17820	0	39430	64643	86498	4420	23034	2551136	2804042	
21	0	0	0	4629	7057	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11686
22	0	0	17	1183	1802	0	0	0	0	0	0	145	0	3197	0	0	0	0	0	0	0	0	0	0	0	156109	162463
23	0	0	0	0	0	0	0	0	0	0	0	0	1349	345	0	0	0	0	0	44208	0	905	2100	0	271878	320786	
24	0	3	30	0	0	0	0	0	0	465	0	0	0	35	2124	0	0	0	0	10128	0	0	0	0	0	6630	19416
25	0	5	0	0	0	0	0	0	0	1365	0	0	0	4025	0	0	0	0	0	1439	36410	0	0	0	0	1963	45207
26	0	0	130	0	0	0	0	0	0	0	0	4874	0	0	0	0	3881	0	0	521	0	0	0	0	0	730	10137
27	0	2	0	1	179	0	0	0	0	11769	0	11498	33776	0	0	0	2255	0	0	0	0	0	0	0	0	0	59480
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	1	632	0	0	0	0	488	0	0	693	0	463	0	0	0	0	0	0	341	0	0	0	0	0	2617
30	0	0	0	2	0	0	0	0	0	196	0	8654	0	1716	0	0	0	0	0	0	9573	0	0	0	0	0	20141
Total	0	128	564	11609	14516	266	0	4949	21148	224655	0	32811	42458	24873	4940	10510	22290	20903	6760	16721	161212	67801	300272	12332	44123	5399144	6444985

Table 24: Management zone V – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Volume
1	0	0	0	12069	366	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12435
2	0	35	467	37726	0	0	0	0	10986	0	8	673	0	20350	0	0	0	0	0	0	0	0	0	0	0	0	69573
3	0	28	281	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1027
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4079	0	4966	0	0	0	0	0	0	139	146755	155939
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16997	0	5783	0	7712	0	0	512340	542832
6	0	0	0	0	14134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14134
7	0	0	0	1714	0	799	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2512
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17464	17464
9	0	0	0	5769	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5769
10	0	0	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	325	455
11	0	0	0	0	0	2439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2439
12	0	0	1	0	6648	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6649
13	0	0	1	55	0	0	0	1	205	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	261
14	0	0	67	1329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1396
15	0	27	340	1789	0	0	0	22239	12955	43480	100412	64180	15772	25014	0	0	0	0	0	0	0	0	0	0	0	0	286208
16	0	5	310	0	0	0	0	66	8046	3853	2098	7349	26062	11845	0	0	0	0	0	0	0	0	0	0	0	0	59634
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8778	175	0	99357	108309	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23352	9027	0	0	404	4492	7904	4608	7453	0	0	157762	215001
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5445	0	1317	12	19417	22394	0	25262	1611	10792	1316925	1403175	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5570	26804	1506	867	2777	16396	6053	0	98421	18961	7671	1542159	1727184
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	244	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9333	9577
23	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5073	0	1668	8920	32335	1504	0	21114	9252	0	288299	368165
24	0	0	229	0	0	0	0	0	0	0	32654	11980	0	0	0	0	0	0	0	0	0	0	4408	0	0	10718	59989
25	0	23	217	0	0	0	0	0	0	14901	5984	4311	0	0	11330	99	0	0	0	0	12876	5257	0	701	0	114	55812
26	0	511	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4680	0	16665	21873
27	0	0	4	17	0	0	2885	5044	0	1600	43058	2104	2079	0	0	0	0	0	0	0	0	0	0	0	0	0	56790
28	0	0	0	0	0	0	0	168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	441	0	0	608
29	0	0	41	237	0	0	0	0	0	0	1084	101	0	0	0	0	4834	0	0	0	0	0	0	0	0	7042	13339
30	0	29	131	0	0	0	0	0	0	0	0	0	0	1194	0	0	0	0	0	0	4899	0	0	0	0	1771	8024
Total	0	658	2238	60751	21149	3237	2885	27515	21247	75026	185290	90704	43914	58403	45606	45081	7657	7512	48514	75618	39019	9865	173149	35819	18603	4127027	5226576

Table 25: Management zone R – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Volume
1	0	0	0	236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236
2	0	6	59	1760	267	0	0	0	0	0	0	4008	1654	0	0	0	0	0	0	0	0	0	0	0	0	0	7754
3	0	16	148	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46541	2987	0	0	86110	135638
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	882	0	0	0	0	2499	0	11286	0	0	91405	106071
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	2	488	0	579	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3311	4380
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13040	13040
9	0	0	2	322	0	0	0	0	0	0	0	0	0	0	0	0	0	281	0	0	0	0	0	0	0	51093	51698
10	0	0	56	1	0	0	0	0	0	0	0	0	0	0	0	636	0	0	0	0	0	0	0	0	0	23920	24614
11	0	0	0	2479	0	1392	0	0	0	1807	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5678
12	0	0	50	1643	1374	0	2127	0	650	0	3321	0	0	0	0	0	0	0	0	0	88	0	641	1025	0	0	10919
13	0	0	135	48	0	134	0	0	447	948	0	340	0	2096	0	0	0	0	0	0	0	0	2699	0	0	0	6848
14	0	0	0	1714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1715
15	0	6	125	4185	1522	191	0	1547	3222	6186	1719	5382	0	2746	0	0	0	0	0	0	0	0	0	0	0	0	26831
16	0	16	142	15	0	0	0	165	691	3000	2082	4223	722	2042	0	0	0	0	0	0	0	0	0	0	0	0	13098
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	459	2295	0	73312	76108
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1822	0	1407	0	0	16033	0	0	0	4008	163623	186892
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	510	0	2645	1205	1717	131934	138106
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5088	58	327	0	14	6093	123	8412	14456	614	569667	604852
21	0	0	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
22	0	1	0	1216	1776	51	0	0	0	2582	0	0	0	669	0	0	0	0	505	0	0	0	0	0	0	40767	47587
23	0	0	0	0	0	0	0	0	0	0	0	0	0	468	0	0	0	0	0	0	17195	0	0	2671	0	53380	73714
24	0	0	183	0	0	0	0	0	0	0	53	0	0	2104	0	0	0	0	0	0	0	0	0	0	0	15013	17353
25	0	0	87	16	0	0	0	131	0	0	0	0	0	0	0	1296	1490	0	3	2834	19733	0	0	0	0	16045	41634
26	0	27	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2834	0	0	0	0	43	2921
27	0	0	0	57	0	0	0	1039	697	122	6819	5757	5174	2094	0	0	0	0	0	0	0	0	0	0	0	0	21759
28	0	0	0	0	0	0	0	0	0	997	0	0	0	220	0	0	0	0	0	0	0	0	0	0	0	0	1216
29	0	0	36	475	2525	325	5150	0	213	3189	0	113	0	997	431	0	609	0	0	0	197	0	4329	467	0	722	19779
30	0	0	3	5	0	0	374	0	0	297	0	0	2755	1478	0	0	0	0	0	0	5376	0	1775	0	0	116	12180
Total	0	71	1048	14734	7465	2671	7651	2882	5270	19777	10673	23145	10305	14933	431	9766	2157	2014	508	2943	70558	123	78798	25105	6338	133502	1652659

Table 26: Management zone W – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Volume	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	104	43	278	0	0	0	1	347	0	0	755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1529	
3	0	7	43	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	0	633	0	14692	0	59790	0	0	240629	315835	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4320	0	572	15282	699	3158	71916	0	0	1023112	1119059	
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	25263	0	0	37619	62888	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1836	0	0	64323	66160	
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5555	0	0	0	17429	0	19835	26093	68912	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	32	
13	0	0	0	62	0	0	0	0	0	0	0	549	0	0	0	0	0	0	0	0	0	0	0	0	0	0	611	
14	0	0	3	4023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4027	
15	0	3	181	651	5478	0	0	989	16436	21803	0	2820	409	7562	0	0	0	0	0	0	0	0	0	0	0	0	56335	
16	0	5	116	77	0	266	0	3958	3876	189056	0	2817	6923	7530	0	0	0	0	0	0	0	0	0	0	0	0	214625	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	148787	149052	
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	895	3652	3460	3083	0	0	5211	0	36602	5081	0	102783	160768	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	465	1253	767353	769071	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1921	6858	8284	17820	0	0	39430	64643	86498	4420	23034	2551136	2804042	
21	0	0	0	4629	7057	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11686	
22	0	0	17	1183	1802	0	0	0	0	0	0	145	0	3197	0	0	0	0	0	0	0	0	0	0	0	0	156109	162453
23	0	0	0	0	0	0	0	0	0	0	0	0	1349	345	0	0	0	0	0	0	44208	0	905	2100	0	271878	320786	
24	0	3	30	0	0	0	0	0	0	465	0	0	0	35	2124	0	0	0	0	0	10128	0	0	0	0	0	6630	19416
25	0	5	0	0	0	0	0	0	0	1365	0	0	0	4025	0	0	0	0	0	1439	36410	0	0	0	0	0	1963	45207
26	0	0	130	0	0	0	0	0	0	0	0	4874	0	0	0	0	3881	0	0	0	521	0	0	0	0	730	10137	
27	0	2	0	1	179	0	0	0	0	11769	0	11498	33776	0	0	0	2255	0	0	0	0	0	0	0	0	0	59480	
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
29	0	0	1	632	0	0	0	0	488	0	0	693	0	463	0	0	0	0	0	0	341	0	0	0	0	0	0	2617
30	0	0	0	2	0	0	0	0	0	196	0	8654	0	1716	0	0	0	0	0	0	9573	0	0	0	0	0	20141	
Total	0	128	564	11609	14516	266	0	4949	21148	224655	0	32811	42458	24873	4940	10510	22290	20903	6760	16721	161212	67801	300272	12332	44123	5399144	6444985	

Table 27: All management zones – volume on the timber harvesting landbase

Analysis Unit	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	201-210	211-220	221-230	231-240	241-250	>250	Netdown Volume
1	0	0	52	20352	366	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20771
2	0	176	7176	68006	2401	0	0	9	744	13827	10467	61715	8972	24001	0	0	0	0	0	0	0	0	0	0	0	0	197494
3	0	148	9042	540	0	0	0	0	0	0	0	1152	87	0	0	0	0	0	0	0	0	0	0	0	0	0	10969
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4131	91	4966	8053	24663	14692	0	252000	19669	6672	1565097	1900032
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	960	5087	0	34142	38221	9524	9985	191844	0	0	4559433	4889195
6	0	0	3	0	16563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16566
7	0	0	2549	5652	0	1378	0	0	0	0	0	1294	0	0	0	0	0	0	0	0	0	0	25263	0	0	75153	111289
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13595	0	1836	0	0	341609	357040
9	0	22	1024	17857	0	0	0	5417	0	0	0	0	0	0	0	0	0	3281	0	0	0	0	0	0	0	179256	206857
10	0	0	3229	2436	0	0	0	0	0	0	0	0	0	0	0	636	144	0	19888	0	0	0	17429	0	19835	100874	164571
11	0	0	69	4373	7321	6752	0	0	0	3681	0	0	1077	0	0	0	0	0	0	0	0	0	0	0	0	592	23865
12	0	0	473	5933	29925	84	6339	0	0	3274	0	6798	0	0	0	271	0	4319	0	0	88	0	5458	1051	0	382	64396
13	0	0	266	898	1185	134	0	0	698	1153	0	8136	0	2233	0	0	0	0	0	0	0	0	3638	0	0	2755	21095
14	0	0	171	33297	3702	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37169
15	0	245	4380	51665	23166	14919	0	33795	103298	219806	159838	113281	72910	124152	0	0	0	0	0	0	0	0	0	0	0	0	921455
16	0	124	1687	440	0	2511	183	21356	53952	316308	4344	29887	65535	81275	0	0	0	0	0	0	0	0	0	0	0	0	577613
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	673	0	0	684	248	0	1020	14714	2735	0	753197	773271
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27656	73307	39778	5904	639	11680	74836	12134	106292	15531	18726	1027524	1414007
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8522	1690	1317	2793	35270	32837	822	5556	44115	39114	51536	5624579	5848151
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8707	91243	60222	33639	26095	21591	370500	148171	385049	147377	170672	18214695	19677963
21	0	0	203	27431	15234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42867
22	0	3	790	59626	28027	323	0	1626	244	2825	0	10273	0	3886	0	0	0	0	673	0	0	0	0	0	0	265394	373690
23	0	0	498	1	0	0	0	0	0	315	0	0	2914	6481	0	5101	9045	1668	8920	32335	253394	0	70483	76848	5386	1809977	2283367
24	0	14	1469	57	0	0	0	0	2248	1393	32708	17304	0	3999	2124	6273	0	0	0	0	14480	0	4408	0	0	65198	151676
25	0	131	1444	916	0	0	0	260	0	18153	6149	12410	0	9779	17959	9875	5700	0	743	10084	142273	6872	0	3568	0	25825	272142
26	0	632	497	143	0	0	0	0	0	0	0	4874	0	0	0	3446	4453	0	0	0	17055	0	0	5073	0	27735	63908
27	0	10	61	751	1425	0	2885	25167	8495	166191	112683	38593	157179	12270	0	0	20957	0	0	0	0	0	0	0	0	0	546666
28	0	0	0	0	0	0	0	237	0	2051	0	0	0	7099	0	0	0	0	0	0	0	0	0	1696	0	0	11084
29	0	61	535	2144	3055	667	10504	0	701	5609	1084	4847	0	2419	1272	0	5471	0	0	0	538	0	5251	2003	0	8567	54728
30	0	97	442	253	0	0	374	119	0	17236	0	9709	7891	5843	0	0	0	0	0	6316	37336	0	2735	0	0	13396	101749
Total	0	1664	36061	302771	132368	26768	20285	87988	170381	771822	327272	320284	316567	283437	66241	197607	152265	56569	136206	177975	949134	183739	1130514	314666	272827	34701237	41135647

15 GROWTH AND YIELD

SITE INDEX ASSIGNMENTS

The Site Index Curves for interior and coastal species have been used for timber supply analysis in the TFL 1. The following table shows the references.

Table 28: Site Index Curves Reference

Species	FIZ	Site Index Curves Reference
Lodgepole pine	J	Goudie (1984)
Ponderosa pine	J	Hann and Scrivani (1987)
White spruce	J	Goudie (1984)
Balsam	A, J	Kurucz (1982)
Western hemlock	A, J	Wiley (1978)
Western red cedar	A, J	Kurucz (1982)
Cottonwood	J	Alberta For. Ser. (1985)

A – Coastal : J – Interior

Source: Site Index Curves and Tables for British Columbia – Interior and Coastal Species. October 1991.

The site index for stand age over 30 years old and below 30 years old have been assigned for each polygon in the TFL 1 inventory database, respectively. Four types of productive site classes have been assigned, which are:

- Productive site class 1: BH50 SI > 35
- Productive site class 2: $25 < \text{BH50 SI} \leq 35$
- Productive site class 3: $15 < \text{BH50 SI} \leq 25$
- Productive site class 4: $3 < \text{BH50 SI} \leq 15$

Site Index for Stand Age Equal or Over 30 Years Old

VDYP Batch version 6.4 has been used to generate BHA 50 site index for each polygon of 30 years or older.

Site Index for Stand Age Below 30 Years Old

The site index for stand age less than 30 years old is randomly assigned by using the approximated area distribution of the VDYP site index in stands between 30 and 140 years old for each species. The results of this process are shown in Table 29.

Table 29: Site index stands younger than 30 years for the operable landbase

Inventory Type Groups (< 30 years old)	Site Index	Area (ha) of polygons < 30	Area Distribution (%) of stand age ≥ 30 < 140	Area Distribution (%) of stand < 30 allocated	Area Weighted Average Site Index of stand age < 30
1 – 8					
9 – 11					
	>25 & ≤30	14.78	7.09	6.13	29.00
	>20 & ≤25	10.72	5.09	4.44	20.50
	>15 & ≤20	215.63	87.82	89.43	18.05
12 – 17					
	>30 & ≤35	105.96	0.43	0.42	31.40
	>25 & ≤30	588.13	2.37	2.33	27.23
	>20 & ≤25	4095.82	16.49	16.20	22.24
	>15 & ≤20	9167.46	36.73	36.26	18.04
	>10 & ≤15	10252.54	39.67	40.55	13.69
	>5 & ≤10	1072.23	4.32	4.24	9.58
18 – 20					
	>30 & ≤35	186.56	2.43	2.30	30.40
	>25 & ≤30	1141.13	14.87	14.04	27.22
	>20 & ≤25	5144.96	61.10	63.29	22.31
	>15 & ≤20	775.42	10.11	9.54	18.11
	>10 & ≤15	880.59	11.48	10.83	14.08
21 – 26					
	>35 & ≤40	22.47	1.28	1.23	35.40
	>25 & ≤30	673.64	34.88	36.88	27.15
	>20 & ≤25	448.17	25.25	24.53	22.52
	>15 & ≤20	291.14	16.48	15.94	17.85
	>10 & ≤15	290.15	16.40	15.88	13.65
	>5 & ≤10	101.14	5.72	5.54	9.23
27 – 32					
	>20 & ≤25	643.28	16.61	15.26	22.52
	>15 & ≤20	3357.43	77.87	79.66	18.01
	>10 & ≤15	213.76	5.52	5.07	13.61
33 – 34					
35 – 36					
	>40	18.74	1.16	1.15	40.42
	>35 & ≤40	114.25	7.04	7.02	36.11
	>30 & ≤35	388.05	23.89	23.86	31.42
	>25 & ≤30	345.20	21.27	21.22	27.15
	>20 & ≤25	306.66	18.91	18.85	22.68
	>15 & ≤20	448.30	27.37	27.56	17.86
	>10 & ≤15	4.87	0.31	0.30	12.50
	>5 & ≤10	0.64	0.05	0.04	9.00

Site Index for Each Analysis Unit

Table 30 shows the area-weighted averages for site index in each analysis unit.

Table 30: Site index for each analysis unit

Analysis Unit	Unadjusted SI	Adjusted SI using paired plots	Adjusted SI using interim equations
1	27.7		
2	20.0		
3	13.4		
4	17.0	27.6	
5	12.3	24.0	
6	28.7		
7	19.9		21.4
8	12.0		21.7
9	28.0		
10	18.1		
11	37.6		
12	29.6		
13	19.6		
14	28.2		
15	19.0		
16	12.9		
17	16.3	27.1	
18	16.1		20.5
19	12.0	23.6	
20	12.0		18.2
21	27.8		
22	21.5		21.6
23	11.5		15.0
24	28.5		
25	20.1		20.8
26	12.3		14.6
27	18.6		
28	13.2		13.3
29	30.4		
30	19.0		19.9

In Table 30, the column entitled “Adjusted SI using paired plots” contains adjusted site index volumes for hemlock leading stands 140 years or older in the CWH biogeoclimatic zone. These values were calculated from the adjustment equation presented by the MoF in “Site Index Adjustment for Old-Growth Coastal Western Hemlock Stands in the Kalum Forest District.”, by G. Nigh and B. Love, March 3, 1998. The adjustment equation is:

$$\Delta SI = 13.9 - 0.192 SI_o$$

where ΔSI = site index adjustment (m)
 SI_o = site index of existing old growth stand
calculated from height and age.

In the timber supply analysis base run (option 4) for TFL 1 and in other runs, these adjusted site index values for old growth analysis units 4, 5, 17 and 19 will be used for regenerated stand yields, after the existing old growth has been logged.

In Table 30, the column entitled “Adjusted SI using interim equations” contains site index adjustments derived from interim adjustment equations presented by the MoF in “Interim Old Growth Site Index Adjustment Equations and Application Guidelines.”

Analysis units 4, 5, 17 and 19 contain old growth stands in the CWH biogeoclimatic zone. Analysis units 6, 7, 18, 20, 22, 23, 25, 26 and 28 contain stands of all ages. For these latter analysis units only, the site index adjustment has been calculated for existing stands 140 years or older.

At the time of data package preparation we have not decided whether adjusted site index values for analysis units 6, 7, 18, 20, 22, 23, 25, 26 and 28 will be included in the timber supply analysis.

UTILIZATION LEVEL

Table 31 presents the Utilization levels that are used to develop the merchantable yield table.

Table 31: Utilization levels

Species	Minimum DBH (cm)	Maximum Stump Height (cm)	Minimum Top dib (cm)
CottonWood	22.5	30	10
All commercial species	17.5	30	10

DECAY, WASTE AND BREAKAGE FOR UNMANAGED STANDS

The VDYP generated yield tables in Appendix I are net decay, waste and breakage. Special cruise #301 was used to deduct waste and breakage when VDYP was run, except for cottonwood where special cruise 169 was used.

OPERATIONAL ADJUSTMENT FACTORS

Operational adjustment factors (OAF) were used in WinTIPSY to reduce potential yields to operational yields. These factors are shown in Table 34.

YIELD TABLE DEVELOPMENT

Yield tables were prepared for each analysis unit. VDYP software calculated the existing stand yield tables and WinTIPSY software calculated the regenerated stand yield tables. All yield tables are presented in Appendix I.

A regeneration delay was added to the WinTIPSY yield tables for regenerated stands. The regeneration delay is the number of years from disturbance (e.g. harvesting or fire) until a stand is planted or until the first successful seed year. VDYP tables describe existing stands and no regeneration delay is required.

YIELD PREDICTION

We have used the MoF audit plots for TFL 1 to derive a localization factor for VDYP volumes obtained from the inventory polygon attributes. The MoF provided the compiled ground volumes for each polygon sampled in the audit. We added the VDYP volume estimated from the inventory database attributes for each of these polygons. Then we calculated the ratio of ground compiled volume to inventory database volume. For stands 60 years or older this ratio was 0.81. That is, the compiled ground volumes averaged 81% of the inventory database existing mature volumes. For existing stands, this localization factor was applied to existing volume estimates made from the inventory database. These adjustments are included in the volumes shown in Tables 22 to 27.

For the yield analysis, existing volumes will be obtained from VDYP generated yield curves, except for stands 140 years or older. In these ages the localized inventory database volume will be used. This will ensure that correct volumes for existing old growth timber are used in the yield analysis.

For regenerated curves, standard TIPSY yield tables will be used to predict future yields.

Base Yield Tables

Crown Closure Assignments

Crown closure is the percentage of ground area covered by the vertical projection of tree crowns. Crown closure values are only used to produce VDYP yield tables (VDYP Interactive Application User Guide, version 6.3, May 1995.), not WinTIPSY yield tables.

The crown closure values used in the VDYP tables are area-weighted averages over all age classes.

Table 32: Crown closure for each analysis unit

Analysis Unit	Crown Closure (%)
1	53
2	58
3	54
4	68
5	68
6	51
7	46
8	60
9	52
10	62
11	83
12	55
13	65
14	50
15	55
16	59
17	68
18	69
19	70
20	69
21	49
22	44
23	61
24	46
25	53
26	57
27	50
28	71
29	53
30	54

Species Composition

Species composition for each analysis unit is area-weighted. The three species with the largest percent composition are prorated to sum to 100%. Table 33 shows the result.

Table 33: Species composition

Analysis Unit	Species 1	Species 1 Percent	Species 2	Species 2 Percent	Species 3	Species 3 Percent
1	Hw	65	B	23	S	12
2	Hw	64	B	27	S	9
3	Hw	68	B	21	S	11
4	Hw	61	B	27	S	12
5	Hw	70	B	26	S	4
6	B	63	Hw	34	S	3
7	B	59	Hw	30	S	11
8	B	65	Hw	31	S	4
9	S	67	Hw	19	Ac	14
10	S	68	Hw	22	B	10
11	Ac	84	S	11	Hw	5
12	Ac	89	S	7	Hw	4
13	Ac	84	S	13	Hw	3
14	Hw	72	B	18	Cw	10
15	Hw	71	B	22	S	7
16	Hw	74	B	19	S	7
17	Hw	63	B	33	S	4
18	Hw	74	B	20	Cw	6
19	Hw	66	B	31	Cw	3
20	Hw	78	B	20	S	2
21	B	64	Hw	35	S	1
22	B	63	Hw	35	S	2
23	B	68	Hw	29	S	3
24	S	62	Hw	21	Ac	17
25	S	69	Hw	22	Ac	9
26	S	73	Hw	20	Ac	7
27	PI	74	Hw	21	S	5
28	PI	82	Hw	17	At	1
29	Ac	77	S	15	Hw	8
30	Ac	74	S	16	Hw	10

Aggregated Yield Tables

No yield tables/analysis units are aggregated for this timber supply analysis. Instead, an aggregated or area weighted site index is calculated and assigned to each analysis unit.

EXISTING STAND VOLUMES

Timber volumes for existing stands were derived by applying VDYP batch to the forest cover attributes of every polygon. A localization factor for stands 60 years and older was derived

from the MoF audit plots for TFL 1. The resulting volumes are shown in tables 22 to 27.

YIELD TABLES FOR MANAGED STAND

Silviculture Management Regimes

Table 34 presents the silviculture management regimes that are used to develop the base yield tables by running WinTIPSY.

Table 34: Silviculture management regimes

Leading Species	Inventory Type Group	Productive Site Class	SI FIZ A	AU	SI FIZ J	AU	Type	%	Initial	% OAF1	% OAF2	F
Hemlock & Cedar	9 – 17	2	27.7	1	28.2	14	Planted Natural	50 50	1400 4000	15	5	
Hemlock & Cedar	9 – 17	3	20.0 17.0	2 4	19.0 20.2	15, 17, 18,,	Planted Natural	25 75	1400 4000	15	5	
Hemlock & Cedar	9 – 17	4	13.4 12.3	3 5	12.9 17.9	16, 19, 20	Planted Natural	0 100	1400 4000	15	5	
Balsam	18 – 20	2	28.7	6	27.8	21	Planted Natural	50 50	1400 4000	15	5	
Balsam	18 – 20	3	19.9	7	21.5	22	Planted Natural	25 75	1400 4000	15	5	
Balsam	18 – 20	4	12.0	8	11.5	23	Planted Natural	0 100	1400 4000	15	5	
Spruce	21 – 26	1			28.5	24	Planted	100	1400	15	5	
Spruce	21 – 26	2	28.0	9	28.5	24	Planted	100	1400	15	5	
Spruce	21 – 26	3	18.1	10	20.1	25	Planted	100	1400	15	5	
Spruce	21 – 26	4	18.1	10	12.3	26	Planted	100	1400	15	5	
Lodgepole Pine	28 – 31	3			18.6	27	Planted Natural	50 50	1400 4000	15	5	
Lodgepole Pine	28 – 31	4			13.2	28	Planted Natural	50 50	1400 4000	15	5	

Regeneration Matrix

Table 34a shows the stand type an existing old growth area will regenerate to after logging. The rows show the existing analysis unit. The columns show what stand types each existing analysis unit will regenerate to.

Existing Managed Immature

Existing managed immature was defined to be all those areas 20 years or younger. Table 35 summarizes these areas.

Table 35: Managed Immature Areas

Analysis Unit	Areas	
	1 - 10	11 - 20
1	3	1
2	349	371
3	221	239
6	75	0
7	141	74
8	60	2
9	6	8
10	0	11
12	123	12
13	86	7
14	109	325
15	2578	2552
16	1844	1812
21	353	279
22	2217	809
23	219	149
24	11	161
25	8	160
26	35	94
27	809	908
28	7	45
29	204	54
30	74	58
Total	9531	8131

BACKLOG AND CURRENT NON-STOCKED AREA (NSR)

Backlog NSR is any area that was denuded prior to 1987 and is not fully stocked. All other NSR is current NSR. Table 36 presents the areas 2189 hectares of the current NSR as shown in the Table 2. These areas are distributed to each analysis unit according to recent harvest patterns by forest type.

Table 36: NSR distribution

Analysis Unit	NSR
1	2
2	36
3	19
4	49
5	174
6	4
7	11
8	17
9	1
10	1
11	1
12	6
13	4
14	15
15	259
16	213
17	21
18	46
19	200
20	782
21	24
22	110
23	132
24	2
25	3
26	1
27	35
28	2
29	8
30	10
Total	2189

I. PROTECTION

UNSALVAGED LOSSES

Unsalvaged losses reflect trees destroyed or damaged by natural causes and are additional to those accounted for in the VDYP decay, waste and breakage and the WinTIPSY operational adjustment factors. Table 37 shows the estimates deducted from the TREEFARM harvest flow results to determine the net volume that will be harvested over time. These are the same unsalvaged losses that were used in management plan 8. There have been no fires in TFL 1 and nearly all losses from blowdown are salvaged. There have been no major losses from insect attacks.

Table 37: Unsalvaged losses

Cause of loss	Total losses (m³/year)	Net losses (m³/year)
Total	4500	4500

I. INTEGRATED RESOURCE MANAGEMENT

FOREST COVER REQUIREMENT

Forest cover requirements in this timber supply analysis will be directed at meeting green-up and biodiversity requirements.

The forest cover constraints to be used in the timber supply analysis are shown in Tables 38a, and 38b.

Table 38a: Forest Cover requirements for the general, enhanced and visual management zones

Management Zone	Green-up Height (m)	Green-up Maximum Allowable Disturbance (% area)	Application	Modified %
General	3	35	Productive Forest	17
Enhanced	3	35	Productive Forest	25
Visual				
VQO = R	5	5	Productive Forest	3
VQO = PR	5	15	Productive Forest	9
Wildlife	5	25	Productive Forest	7
Riparian	5	25	Productive Forest	10

In the timber supply analysis, landscape biodiversity constraints will be applied explicitly by landscape unit, natural disturbance type, biodiversity emphasis and biogeoclimatic sub zone. Table 38 b summarizes the biodiversity constraints that will be used.

**Table 38b: Forest Cover requirements
for Landscape level biodiversity**

Biogeoclimatic Zone	Minimum Retention Area (%)				Minimum Age	Application
	NDT	L	I	H		
CWH	1	13	13	19	250	Productive Forest
	2	9	9	13	250	Productive Forest
MH	1	19	19	28	250	Productive Forest
ESSF	1	19	19	28	250	Productive Forest
	2	9	9	13	250	Productive Forest
ICH	1	13	13	19	250	Productive Forest
	2	9	9	13	250	Productive Forest

Emphasis Zones

Biodiversity emphasis ratings are included in TFL 1 data base. Table 38(c) shows the area distribution of high, low and intermediate emphasis zones. The MoF recommends assumption of a 45%, 45%, 10% split between low, intermediate and high zones. The distribution in Table 38(c) is 30%, 63%, 7%. The timber supply analysis will consider both distributions.

Table 38c: Distribution of Biodiversity Emphasis

Biogeoclimatic Zone	NDT	BEA	Hectares	% Area
CWH	1	H	588	0.83
	1	I	100	0.14
	1	L	18	0.02
	2	H	8,476	0.05
	2	I	107,617	0.64
	2	L	52,051	0.31
ESSF	1	I	62	0.95
	1	L	3	0.05
	2	I	9	0.04
	2	L	217	0.96
ICH	2	H	8,276	0.23
	2	I	27,279	0.76
	2	L	167	0.00
MH	1	H	146	0.00
	1	I	34,566	0.54
	1	L	29,286	0.46

WILDLIFE TREE PATCHES

Table 20(a) in the biodiversity guidebook is the correct one to apply because landscape units have been designated. Table 39 is calculated by interpolating the data from the Table 20(a) in the biodiversity guidebook that is based on the two entry points: % of the area available for harvesting that has already been harvested without wildlife tree retention, and % available for harvest. This has been done for each landscape planning unit (LPU) and the results are shown in Table 39. The percentages in Table 39 have already been reduced to include the contribution of riparian reserves and management zones. They may be further reduced by contributions to wildlife tree patches from inoperable, low site, environmentally sensitive and other areas which have been removed from the timber harvesting landbase.

Table 39: Wildlife tree patches

LPU Name	LPU Code	Zone	Subzone	Percent
Beaver/Mayo	1	CWH	ws	4.28
	1	MH	mm	1.40
Clore	2	CWH	ws	3.95
	2	MH	mm	2.35
Headley/Hoodoo	3	CWH	ws	6.39
	3	ICH	mc	8.57
	3	MH	mm	2.69
Ishkheenickh	4	CWH	ws	6.64
	4	MH	mm	3.98
Kiteen	5	CWH	ws	7.54
	5	MH	mm	1.53
Kitnayakwa	6	CWH	ws	6.68
	6	MH	mm	3.94
Lava Lake	7	CWH	ws	3.68
	7	ICH	mc	9.29
	7	MH	mm	3.73
Lower Nass	8	CWH	ws	6.56
	8	MH	mm	2.07
Cedar/Meadow	9	CWH	ws	8.60
	9	MH	mm	1.53
Nogold	10	CWH	ws	9.27
South Kalum	11	CWH	ws	12.13
West Copper	12	CWH	ws	7.16
	12	MH	mm	2.83
Whitebottom/Dane	13	CWH	vm	8.76
	13	CWH	ws	4.13

TIMBER HARVESTING

Minimum Merchantability Standards

In the timber supply analysis a stand must satisfy both the minimum volume and age requirements before it can be harvested. Table 40 shows minimum harvest rules that will be used for each analysis unit.

Table 40: Minimum harvest volume and age

Analysis Unit	Existing		Natural		Planted	
	Min Age	Min Vol	Min Age	Min Vol	Min Age	Min Vol
1	39	250	48	250	40	250
2	56	250	67	250	58	250
3	96	250	108	250	97	250
4	66	250	48	250	40	250
5	104	250	56	250	47	250
6	34	250	46	250	38	250
7	56	250	69	250	59	250
8	104	250	136	250	123	250
9	38	250	46	250	38	250
10	56	250	69	250	60	250
11	50	200	50	200	50	200
12	95	200	95	200	95	200
13	132	200	132	200	132	200
14	64	250	47	250	39	250
15	69	250	73	250	63	250
16	114	250	122	250	110	250
17	83	250	50	250	41	250
18	84	250	89	250	78	250
19	124	250	57	250	48	250
20	124	250	135	250	122	250
21	77	250	48	250	40	250
22	78	250	63	250	54	250
23	159	250	146	250	132	250
24	62	250	52	250	41	250
25	72	250	75	250	63	250
26	119	250	128	250	114	250
27	87	250	78	250	69	250
28	137	250	140	250	128	250
29	69	200	69	200	69	200
30	103	200	103	200	103	200

Operability

The operability mapping was not changed since it was approved for Management Plan #8.

Currently, about 77% of the harvest is logged by conventional methods and 23% by non conventional. In the operability mapping, non conventional areas were coded 'L'. We included a subset of these areas using the forest cover definitions given below in table 41.

Table 41: Forest Cover Definitions for Non-Conventional Logging

Leading Species	Age Class	Height Class	Stocking Class	Site Index
Hemlock	9	4	1	11 - 30
Balsam	9	4	1	11 - 30
Hemlock	8	3	1	11 - 30
Balsam	8	3	1	11 - 30
Hemlock	7	3	1	11 - 30
Balsam	7	3	1	11 - 30
Hemlock	7	4	1	11 - 30
Balsam	7	4	1	11 - 30

Initial Harvest Rate

The expected initial harvest rate will be 720000 cubic metres per year.

Harvest Rules

Section 4.1 describes the harvest rules used by TREEFARM in more detail.

Harvest Profile

The current harvest species profile from TFL 1 is hemlock 60%, balsam 30%, spruce 5% and cedar 5%.

Harvest Flow Objectives

The initial harvest level will be defined by attempting to maintain the current AAC for TFL 1 for as long as possible, declining by at most 10% in each of the following decades, and avoiding harvest shortfalls below the long term level. The long term level is defined as the harvest that will maintain total timber growing stock at an even level so that harvesting can continue at a constant level in perpetuity.

If the current AAC can be achieved initially then the first decade harvest will be raised as high as possible followed by declining harvests to the long term level as described above.

If the current AAC cannot be achieved initially then the initial harvest level will be as high as possible with reasonable declines in following decades, and avoiding harvest shortfalls below the long term level. If the harvest forecast must fall below the long term harvest level, the decline below the long term level will be kept as small as possible, while also attempting to increase the harvest back to the long term level as soon as possible.

REFERENCES

- B.C. Ministry of Forests, January 1998. Kalum South Timber Supply Area Data Package.
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