Weyerhaeuser
Timber Supply Analysis Information Package
For Management Plan #9 on TFL35
December 21, 2000 Revision

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Table of Contents

List of Tables

"This plan is the start of a never ending fact-finding job which, as time progresses, will gradually bring details into sharper focus for more efficient selection of logging areas, for revision of inventory estimates, for intensification of planning and for a stronger basis of predicting growth and yield. From this may evolve revisions of the sustained yield estimates, refinements in procedure, modifications of cutting methods, etc., for incorporation in future working plans"

Initial Management Working Plan for the BC Interior Sawmills Limited Management License Reserve Area (TFL 35), December 1955

INTRODUCTION

This information package has been prepared for Tree Farm License #35 (TFL 35) to document the assumptions and modeling procedures to be used in the timber supply analysis process. A key component of management plan approval is the confirmation and validation of these input data and procedures. This document contains the best data, knowledge and information available today. New data will be incorporated into the timber supply analysis, 20-year plan and management plan documents if the data is material and if it will not jeopardize Weyerhaeuser's ability to meet the legal deadlines that accompany the management plan preparation and approval process. Background material and information which guided the assumptions and procedures described in this information package are documented in the appropriate sections.

GROWTH AND YIELD

The growth and yield data contained within this package will continue to be reviewed by Weyerhaeuser staff during the Timber Supply Analysis portion of the management plan process up to the submission deadline. Where refinements and/or changes are made these will be communicated immediately.

BASE CASE

The base case will reflect the direction in the December 20th letter from Tony Buckley (District Manager, Kamloops Forest District), to Bob Helfrich (Manager, Forest Administration and Planning). The letter states "It is my interpretation that the KLRMP guidance as taken from the Biodiversity Guidebook recommendations is that three thirds OGMA development be the standard unless a timber supply impact is demonstrated. Three thirds development is the OGMA management practice in effect and therefore should be used in any base case timber supply analysis." In addition Weyerhaeuser's current performance will be reflected in the base case.

Table 1: Base case description

Option Name	Description
Base case	This option includes: • 3/3 old seral effective immediately • current and future WTP's • requirements from the Forest Practices Code (FPC) • new growth and yield data • current silvicultural practices • current practice regarding rehabilitation of all in-block roads and landings • appropriate forest cover, green-up, maximum allowable disturbance and cut block size limitations • Identified wildlife strategies are not included

The degree of certainty with data, assumptions and procedures outlined above, will be measured through a series of sensitivity analyses. These have been grouped into three categories:

- Harvest flow
- Biodiversity
- Forestry

Table 2: Sensitivity and harvest flow analyses descriptions

Category	Magnitude of change	Rationale
Harvest flow		
Non declining yield	N/A	A non-declining yield harvest flow policy will identify potential opportunities, that might be masked by a non-declining even flow policy
Maximum initial level harvest	N/A	Test stability of a maximum short-term harvest level constrained by a maximum +/-10% per decade change
Biodiversity		
Forest cover	+/- 5%	± 5% in forest cover requirements for Mule deer

Category	Magnitude of change	Rationale
constraints maximums/minimums		winter range and for old seral targets in the other management zones
1/3, 1/3, 1/3 old seral	On	To demonstrate the impact of the 1/3 (draft OGMA's), 1/3, 1/3 implementation guidelines[1] , with full WTP requirements
Mature plus old seral distribution	On/off	Demonstrate the impact of applying mature and old seral stage guidebook values immediately
Green up requirements	+ 1m, -1m	To determine the impact on the harvest forecast by increasing and decreasing the green-up height by 1 m.
Forestry		
Standing volume up/down	+/- 10%	To determine the impact on the harvest forecast of reducing and increasing standing mature volume by 10%.
Regeneration volume	+/- 10%	To determine the impact on the harvest forecast of increasing and decreasing the regenerated stand volumes by 10%.
Site index up/down	+/- 3m	To determine the impact on the harvest forecast of changing the regenerated site index values for all species.
Regeneration delay up/down	+ 2 yrs.	To determine the impact on harvest from changes in regeneration delay.

MANAGEMENT OPTION

A series of analyses will determine the maximum allowable impact to short and long term harvesting levels attributable to draft landscape unit biodiversity emphasis options stated in the Kamloops LRMP. A scenario will be developed that reflects the harvest level available outside of 3/3 old seral and WTP requirements while meeting all other constraints. This will show the harvest level against which the reductions for stand attributes, and wildlife trees identified in Appendix 6 of the LRMP "Interim Measures for Biodiversity Management" should be applied. A 4% maximum impact identified in the LRMP will be shown and compared with the base case above.

MODELS

Weyerhaeuser will use Batch VDYP, WinTIPSY 2.5 Alpha R, WOODSTOCK 2.0, and COMPLAN 3.0 during the preparation of the timber supply analysis and development of the 20-year plan. Both VDYP and TIPSY will be used to generate yield curves for the entire landbase. WOODSTOCK and COMPLAN are the forest estate models that will be used to determine potential harvest levels, and the 20yr plan.

[1] Biodiversity Guidebook, Chapter 2b. www.for.gov.bc.ca.tasb/legsregs/fpc/fpcguide/biodiv/chap2b.htm

Model Descriptions

WOODSTOCK can be used in one of four different model formulations; inventory projection, binary search inventory projection, Monte Carlo simulation and a generalized Model II linear program. During the preparation of MP9 it will be used in it's linear programming formulation.

COMPLAN is a spatially explicit inventory projection model that schedules harvests at the cutblock or stand level subject to adjacency (green-up) forest cover constraints. COMPLAN will be used to generate the 20-yr plan utilizing the output from WOODSTOCK. Discussions with the Timber Supply Forester on methodology will occur prior to preparation of the 20-yr plan.

CURRENT FOREST COVER INVENTORY

The inventory for TFL 35 MP9 is based on a 1978 mature inventory updated for harvesting and silviculture activities until Dec 31, 1999. The current GIS database was loaded into Arc/Info in 1993 and moved to TRIM (NAD 83) in 1994. The inventory attributes are stored in a relational database that can produce standard FIP-format files. The inventory is updated annually to reflect depletion and new silviculture data. Information is recorded on FS 810A Forms and processed with the Ministry of Forests' inventory program (FCAPS 3). Harvest boundaries are updated with GPS traversed locations.

The BC Ministry of Forests completed an inventory audit during 1994/95. The results of the audit determined the mature inventory to be statistically acceptable and to slightly under estimate the ground audit volume. The audit also determined a similar level of acceptance of the Site Index Assignment and the delineation of operable forest area.

DESCRIPTION OF LANDBASE

Timber harvesting land base determination

The determination of the timber harvesting landbase is accomplished through a stepwise procedure that identifies all stands excluded from harvest. These stands are removed sequentially to determine the net landbase available for timber harvest. In order to prevent duplication, area removed during one step is not included in a further step. Stands excluded from the timber harvesting landbase do not contribute to potential harvest levels, however their stand attributes are projected and tracked through time as they contribute to achieving other objectives. Table 3 below, summarize this process; there is no Schedule A land within TFL 35.

19710-30/TFL 35 MP9

- Note: This document was used at the AAC Determination.
RL: TFL 35

Timber harvesting land base determination

Category	Total Area or Percent		Area/Percent after each successive Netdown		
	productive forest (ha)	productive forest (%)	Area (ha)	Total TFL area (%)	Productive Forest (%)
Total area (incl. fresh water)			**36,563.6**	**100.00%**	
Non forest			1,114.3	3.05%	
Non-productive forest			20.6	0.06%	
Total productive forest			**35,428.7**	**96.90%**	**100.00%**
Park	10.6	0.03%	10.5	0.03%	0.03%
Terrain class 5	296.6	0.84%	293.2	0.80%	0.83%
Riparian reserves (stream)	511.7	1.44%	445.8	1.22%	1.26%
Riparian reserves (lake)	91.8	0.26%	72.2	0.20%	0.20%
Riparian reserves (wetland)	108.2	0.31%	103.5	0.28%	0.29%
Draft 1/3 OGMA's	2,117.70	5.98%	1,680.9	4.60%	4.74%
Current WTP's	218.1	0.62%	177.6	0.49%	0.50%
Current roads and trails	819.6	2.31%	765	2.09%	2.16%
Low site productivity (TEM NP)	601.7	1.70%	144.8	0.40%	0.41%
Low site productivity (Tem, 02, 09, 10)	455.9	1.29%	215.9	0.59%	0.61%
Non-commercial	1.9	0.01%	1.2	0.00%	0.00%
Deciduous reductions	437.9	1.24%	274.0	0.75%	0.77%
Total current reductions			**4,184.6**	**11.44%**	**11.81%**
Current Timber harvesting landbase			**31,244.1**	**85.45%**	**88.19%**
Future reductions					
Future roads and trails	74.8	0.21%	72.2	0.20%	0.20%
Long Term Timber Harvesting Landbase			**31,171.9**	**85.25%**	**87.98%**

See prior page (for current THLB of 31244.1 ha)

Table 3: Timber harvesting landbase determination for base case

Timber harvesting landbase		
Category	**Net area (ha)**	**Gross area (ha)**
Total area (incl. fresh water)	36,563.6	36,563.6
Non forest	1,114.3	1,114.3
Non-productive forest	20.6	20.6
Total productive forest	**35,428.7**	**35,428.7**
Park	10.5	10.6
Terrain class 5	293.2	296.6
Riparian reserves (stream)	445.8	511.7
Riparian reserves (lake)	72.2	91.8
Riparian reserves (wetland)	103.5	108.2
Draft 1/3 OGMA's	1,680.9	2,117.7
Current WTP's	177.6	218.1
Current roads and trails	765.0	819.6
Future roads and trails	72.2	74.8
Low site productivity (TEM NP)	144.8	601.7
Low site productivity (Tem, 02, 09, 10)	215.9	455.9
Non-commercial	1.2	1.9
Deciduous reductions	274.0	437.9
Total reductions to productive forest landbase	4,256.8	
Timber harvesting landbase	**31,171.9**	

Total area

The total area of TFL 35 including fresh water is 36,563.6 ha. For the purposes of this analysis the boundary locations as contained in Weyerhaeuser's GIS files and on the Kamloops Forest District inventory maps have been used to determine the total area. Area discrepancy with the TFL landbase in MP8 is explained by the memo contained in Appendix 1. Weyerhaeuser maintains that Problem Forest Types (PFT's) do not exist on the landbase. All stands not removed during the netdown process will be harvested. Marginally merchantable stands will be harvested as they are encountered during normal operations. The table in Appendix 2 shows the distribution of marginally merchantable stands in the 1999 FDP.

Forest resource inventories

Table 4 below documents the status for all forest resource inventories.

Table 4: Forest Inventory status

Forest Resource Inventory	Standard Date Completed		Approval	Status/Comments
Forest inventory	1978 timber cruise and photo interpretation for mature inventory. Inventory is current to December 31 1999 for harvesting and silviculture activities.		Chief Forester, 1996 determination for 1978 inventory and 1992 update for harvest and silviculture activities	1995 audit by Inventory branch
Landscape VQO	February 1999		Kamloops Forest District	
Recreation	March 1997		Kamloops Forest District	
Range	Same as MP8		Kamloops Forest District	Each range unit has an AUM allocation - no change since MP 8
Stream and wetlands	January 2000		BC Ministry of Environment	On-going update process
Lakes	1991 Kamloops Lakes LRUP		Kamloops Forest District	2000 document revisions in progress
Terrain stability mapping	Level "C" April 1999		FRBC quality assurance certificate Approved by Kamloops Forest Region	Currently being reviewed and updated during operational planning
Terrestrial ecosystem mapping	December 1999		Partial approval received	Rock and wet ecosystems are currently being reworked and updated
Archeological overview assessment	As per the Kamloops LRMP 1995			New AOA model being developed
Management zone boundaries	General management deer winter range	Kamloops LRMP	Higher level plan order, January 23, 1996	

Forest Resource Inventory	Standard Date Completed		Approval	Status/Comments
	Special Wildlife management	1991 Fish and Wildlife plan[1]	Used in MP7 and MP8	

Non-forest

Table 5 below summarizes the non-forest land within TFL 35.

Table 5: Non-forest landbase description

Category	Area (ha.)
Rock	12.9
Non productive Brush	193.1
Lake	332.1
Swamp	531.4
Open Range	44.8
Total	1,114.3

Inoperable or inaccessible

All of the productive forest landbase within TFL 35 has been considered operable/accessible and can be economically accessed.

Low site productivity

The Terrestrial Ecosystem Mapping (TEM) project identified additional polygons with a "leading non-productive site series". These additional non-productive areas were not part of our forest inventory database. Because TEM polygon boundaries do not necessarily align with forest cover polygon boundaries, portions of these NP TEM polygons contain productive forest cover. Given the extent of this overlap, the relatively low site indices and reforestation issues these sites are removed from the operable landbase. This net down is TEM-based.

Table 6: Low productivity site series

Site series	Site series description	Site Index	Area (ha)
MSdm2 02	Juniper – Bluebunch Wheatgrass	11.2	82.4
ESSFdc2 02	Juniper – Pinegrass	11.7	29.2
ESSFdc2 09	Sedge – Sphagnum	10.4	193.6
ESSFxc 02	Pl – Juniper – Lupine	9.0	3.3
ESSFxc 09	Bluejoint – Sedge	9.0	35.4
ESSFxc 10	Willow - Sedge	8.7	112.1

[1] Operational harvesting and reforestation guidelines for the overall maintenance of fish and wildlife habitat on TFL35 & adjacent study area. Weyerhaeuser Canada Ltd. Internal report, December 1991

Site series	Site series description	Site Index	Area (ha)
Total			456.0

Environmentally sensitive areas (ESA's)

Weyerhaeuser will not be using ESA's during this analysis. Level "C" Terrain Stability Mapping was recently completed, along with some Level "A" assessments. All soil related ESA's are replaced by this new data. Terrain class four is 100% in the landbase and terrain class five is 100% out.

No landbase removals have been identified as a result of the recreation inventory. Following the process in the Kamloops TSA data package all ER2 is 100% in the landbase. The Lakes LRUP identified a ten-meter reserve zone and a 190-meter lakeshore management zone with a prescribed VQO. Recreation values are contained within the riparian reserve and management zones and the VQO's associated with the riparian features. No additional constraints are added.

Riparian reserves and management zones

All streams within TFL 35 have been classified. Reserve and management zone widths are from the FPC Operational Planning Regulations - Part 8 Riparian Management Areas. An exception is the use of a 10-meter reserve zone on S4 streams within the Kamloops District. The lakes are classified according to the Lakes LRUP. A ten-meter reserve and 190 lakeshore management zone was applied to Class C and D lakes. A reserve zone of 10 meters has been applied to all S4 creeks, in conjunction with a smaller management zone of 20 meters. Riparian reserve and management zone boundaries were determined by assigning reserve and management zone widths to each reach/class combination on the GIS. Riparian reserve and management zone areas were determined by multiplying the stream class length by the appropriate width.

Because streams, lakes and wetlands are physically inter-related an overlap exists with the zonation. A hierarchy for reserve and management zone determination was used: streams 1st, lakes 2nd and wetlands 3rd. The area in Table 7 recognizes the riparian hierarchy, but does not account for the overlaps of land categories higher in the net down process in Table 3. Basal area retention factors shown reflect current practice on TFL35. A discussion regarding current basal area retention factors in Appendix 3.

Table 7: Riparian management area statistics

Riparian Class	Stream Length (km)	Riparian Management Area					Total	
		Reserve zone		Management Zone				
		Width (m)	Gross Area (ha)	Width (m)	Gross area (ha)	Basal area retention	Width (m)	Area (ha)
S2	34.4	30	183.1	20	122.2	25	50	305.3
S3	68.9	20	275.3	20	274.7	10	40	550.0

Riparian Class	Stream Length (km)	Riparian Management Area					Total	
		Reserve zone		Management Zone				
		Width (m)	Gross Area (ha)	Width (m)	Gross area (ha)	Basal area retention	Width (m)	Area (ha)
S4	26.5	10	53.5	20	104.3	5	30	157.8
S5	18.8	0	0	30	112.1	5	30	112.1
S6	342.1	0	0	20	1,572.1	5	20	1,572.1
Total Streams	490.7		511.9		2,185.4			2,697.3
A class	0.8	200	0.3	0	108.3	0	200	108.6
B class	152.6	10	0.4	190	16.2	0	200	16.6
C class	140.4	10	21.5	190	508.0	0	200	529.5
D class	30.1	10	5.1	190	150.8	0	200	155.9
P class	8.2	10	1.2	190	39.2	0	200	40.4
W class	153.0	10	73.4	190	0	0	200	73.4
Total Lakes	485.1		101.9		822.5			924.4
W1	116.1	10	26.1	40	112.4	5	50	138.5
W2	0	10	0	20	0	5	30	0
W3	264.0	10	84.3	20	313.3	5	30	397.6
W5	26.6	10	10.6	40	46.7	5	50	57.3
Total wetlands	407.4		121.1		473.0			594.1

An area-weighted volume reduction was determined for basal area retention and applied to the yield curves across the TFL. The basal areas were converted to volume reductions using a BA to volume ratio of 2:1. An area-weighted volume retention factor was calculated for the management zone gross area (2.45%), and then modified to a TFL volume retention factor (0.25%). This retention factor will be applied to each yield curve in the wood supply model to account for basal area retention.

Wildlife habitat reductions

The 177.6 hectares for WTP's is a net number, the gross area is 218.1 hectares. These patches have been identified in recent Forest Development Plans.

An analysis was undertaken to determine the amount of future WTP's that would be required to meet objectives stated in the Biodiversity Guidebook. The current average WTP on the TFL was determined to be 0.3 hectares. The 0.3-hectare patch has an average radius of 30m. Combined with the 250 meter area-of-influence associated with each WTP a 560-meter grid was generated for TFL 35 with each point representing a potential WTP location. Existing WTP's, riparian features, Terrain class V, and other valid net downs were buffered by 250 meters. Any potential plots that fell within this buffer were removed. The net result was 519 potential WTP locations on the

TFL to provide full and uniform coverage.

The 519 potential locations translate to a total of 155.7 hectares (0.5% THLB – 155.7 / 31,171.9) required for future WTP's. An assumption was made that future WTP's will be located within the timber harvesting landbase without any location bias for site series, therefore the 0.5% area translates to 0.5% volume reduction.

Roads, trails and landings

Landings

In current Silviculture Prescriptions commitments are made to rehabilitate 100% of all landings on an ongoing basis. Site productivity on the majority of landings is successfully restored and the area successfully regenerated. The Information Package for Management Plan 8 identified an area weighted average for landings of 3.1%. Assumptions were made that 90% of the landing area was successfully restored to 60% of the original productivity. The same data and assumptions will be used in Management Plan 9.

An additional assumption was made that landings are located within the timber harvesting landbase without any location bias for site series, therefore the 3.1% area translates to 3.1% volume. This volume loss was modified to reflect the 90% restoration success (10% failure) and the 60% productivity recovery (40% recovery loss). Table 8 shows the calculation to determine a landing volume loss factor. This will be applied to potential harvest levels in a similar manner to the non-recoverable loss factor.

Table 8: Landing volume loss factor calculation

Volume factor	Loss	Net loss
3.1% (original estimate)	10% permanent (90% success)	0.31%
2.79% (3.1%-.31%)	40% loss (60% productivity restored)	1.12%
Combined total		1.43%

Future roads

Main access on the TFL is essentially complete. Within the portion of the TFL where permanent access is not constructed, planned and future roads were identified on the GIS, the right-of-ways buffered and the area removed from the timber harvesting landbase. Table 9 identifies the right-of-way width for each category of road. These widths are from the MP8 analysis, and were verified with ad hoc checks. Future roads are roads that will be built within the time frame of the current FDP. Once construction is complete the TFL is essentially roaded, and no additional deletions are necessary.

Current and future rehabilitated roads and trails

Existing and future productivity losses on rehabilitated block roads and trails is estimated to be 0.35%. This number is derived from the Kamloops TSR2 data package. A 5.7% estimate for roads and landings (MLSIS-based) was reduced for 0.54% to account for roads outside blocks, and reduced a further 1.68% for landings. Productivity losses on the remaining 3.48% were estimated to be 10%, for a net volume

reduction of 0.35%.

Within block disturbance

Within block disturbance is not included as a specific productivity loss. An analysis of the Site Index Adjustment (SIA) sample plots was conducted to determine the number of plots that fell on "within-block disturbance" (old roads, skid trails, road, berms, ruts). Of the 335 plots 33 (approximately 10%) contained disturbance. The proportion of these plots where site trees were measured was not different than the proportion from the total sample. If within-block disturbance had an impact on site productivity, then it was sampled during this process.

Plots were established in a cluster of 5 circular subplots (100m2 each): a random point (center subplot) with four satellite subplots in the cardinal directions (at 25 m from the random point). The first random point was offset for two reasons:

1. If the cluster was null (i.e., subplots were established and no suitable site trees were found), the cluster was offset using a systematic grid. The first random point was moved 25-m to the north (with satellites at 25-m in cardinal directions). Additional clusters were evaluated in a clockwise direction until a suitable cluster was found (8 potential offsets).
2. If random point fell on a mapped road, it was moved off the road. All mapped roads were netted out and therefore were not part of the target and sample populations.

If the random point fell on an unmapped road the cluster was established and satellite subplots were always established wherever they fell.

Weyerhaeuser is committed to addressing small/dispersed disturbance through prompt site preparation and planting. Recent field verification of an SIA plot indicated the plot was on old dispersed disturbance. Deductions for stocking-related impacts are accounted for in OAF1.

Table 9: Road deletions from TFL 35

Road	Length	R/W width (m)	Area (ha)
Main	26.8	25	67.0
Operational	472.5	15	708.7
Block	69	6	41.4
Trails	5.0	5	2.5
Future	83.9	Variable by type	74.8
Total	657.2		894.4

INVENTORY AGGREGATION

Management zones

The Kamloops Land and Resource Management Plan[1] was declared to be a Higher Level Plan pursuant to Section 1(1) of the Forest Practices Code of British

[1] Kamloops Land and Resource Management Plan, July 1995

Columbia Act effective January 31, 1996. TFL 35 lies within the "General Management Zone" identified in the LRMP, except for a small portion that falls within the Tranquille Creek Community Watershed. The LRMP went further and recognized "Critical Deer Winter Range" and "Critical Moose Winter Range" within the General Management Zone. This higher level plan provides guidance by providing management objectives and strategies for all resources within TFL 35.

The 1999 Landscape Inventory for the Kamloops District identified 56 visual landscape management polygons (including Lakes Visual Management Areas) scattered across the TFL. These individual polygons will be managed as one Visual Landscape Management Zone. Eleven Special Wildlife Management Areas were identified in 1991 in Weyerhaeuser's Fish and Wildlife Plan and will be modeled as one Special Wildlife Management Zone for Management Plan 9. Table 10 below summarizes the total and timber harvesting area within each zone.

Table 10: Management zone summary

Zone name	Area (ha)
General management	32,666.0
Critical deer winter range	691.1
Visual landscape management	2,362.6
Special wildlife management	843.8

Yield tables

237 yield tables were created for the current inventory, based on a unique combination of productivity group, species group, yield model, site index and stocking class. These yield curves were further aggregated to 72 yield curves for wood supply analysis within WOODSTOCK. Future regeneration strategies utilize 23 regenerated yield tables, one of which is identified as "proposed road".

Detailed land base information requirements

When the TFL inventory and analysis process is completed, the Timber Supply Forester will be provided with the detailed inventory file (digital ASCII format) created after the determination of the timber harvesting landbase. This file will include polygon specific information on both the area within the timber harvesting landbase and the area deducted from the total landbase to arrive at the timber harvesting landbase. For the base case, the Timber Supply Forester will be provided with all the resource assessment model input and output files (digital ASCII format), including detailed field descriptors.

GROWTH AND YIELD

Site index assignments

Three broad categories of stands have been identified. Yield curve construction will utilize a different model and a different series of site index curves for each broad category. Table 11 summarizes the yield model and site index methodologies for each

broad stand category. Additional analysis can be found in Appendix 4.

Table 11: Stand categories, yield model and site curve summary

Broad stand category	Silviculture era	Age	Yield model	Site index method
Existing and future regeneration	<1977	<40	TIPSY	TEM[1], SIA[2]
	1977-1989	<25	TIPSY	
	1990+	<13	TIPSY	
	Future	all	TIPSY	
	<1977	>40	VDYP	FCAPS3 process
	1977-1989	>25	VDYP	
	1990+	all	TIPSY	
All else	NA	all	VDYP	

For existing and future regeneration site index is based on the combination of recent Terrestrial Ecosystem Mapping fieldwork, SIA sampling and BEC site series-based aggregation procedures[3]. For all other stands, site index was calculated for using the FCAPS3 process.

Utilization specifications

The utilization specifications define the minimum dbh, the maximum stump height, the minimum top diameter and the minimum log length by species. These values are used to determine gross merchantable volume. The table below contains the specifications from our licence document. One exception during the analysis is that cedar utilization will be modeled at 17.5/10 for all ages. This was to simplify the batch VDYP process

Table 12: Utilization specifications for TFL 35

Species	Utilization			
	Minimum dbh (cm)	Maximum stump height (cm)	Minimum top diameter (cm)	Minimum log length (m)
Lodgepole pine	12.5	30.0	10.0	3.0
Cedar >141	17.5	30.0	15.0	3.0
All other species and ages	17.5	30.0	10.0	3.0

Decay, waste and breakage

The decay, waste and breakage numbers are from the Metric Diameter Class Decay, Waste and Breakage Factors for FIZ D included with the latest release of VDYP

[1] TEM project Larkspur Resources, ...

[2] Site index adjustments using BEC Classification on TFL 35, Final report, 2000. J.S. Thrower & associates Ltd.

[3] Productivity group development and application to the TFL35 landbase, Internal report, 2000. Weyerhaeuser

VDYP

The model will use the FIZ "D" factors in the waste and breakage data file associated with batch VDYP. The majority of TFL lies within FIZ "D" (76%), while the remainder lies within FIZ "G" (24%). A comparison showed no significant difference in volume, so waste and breakage factors from FIZ "D" were used for the entire TFL. This comparison is in Appendix 5.

TIPSY

All yield estimates from TIPSY will be reduced for decay, waste and breakage because the yield estimates are not net of decay. They were derived from the 1976 report "Metric Diameter Class Decay, Waste and Breakage Factors, All Inventory Zones". The relationships in the report are based on species, diameter and risk class from fire-origin mature and over-mature trees. These values will over-estimate the amount of decay, waste and breakage in managed stands because regenerated stands grow faster, will achieve the same diameters at earlier ages and have less exposure to those events that initiate cull and defect processes.

To determine decay waste and breakage factors for future regeneration strategies, diameters at age 100 (OAF 2 100% age) were reviewed and found to be in the range of 25cm +/- for the majority of the regeneration strategies for total volume and 30cm +/- for the 250 prime trees. Due to the management practices described above, we assumed that 60% of the trees would be in risk group 1 and 40% in risk group 2. Volume distributions at age 100 indicated that approximately 40 to 50% of the trees were in the 250 prime category and fell into the larger diameter class, which has greater loss factors. To develop species specific values for future regeneration, loss factors from risk group 1 were weighted 60% and those from risk group 2 were weighted 40% for both diameter classes. To reflect the volume distribution these factors were further weighted 50% for the 25cm diameter class and 50% for the 30cm class. The values are shown in Table 13.

Table 13: DWB Factors for TIPSY

Factor by species (%)		
Pl	Fdi	Sx
3.3	3.9	3.8

Initial yield curves were created with a 2% OAF2 for all species which will tend to underestimate the amount of cull and defect relative to the values in Table 13. Rather than re-run TIPSY adjustments in the wood supply model will be made. An additional 1.9% and 1.8% will be removed for Douglas fir and Spruce respectively. Because lodgepole pine will be harvested on average below age 100, an additional 1% (3% -2%) will be removed.

Operational adjustment factors for managed stands

Operational adjustment factors (OAF's) will be applied to reduce potential yields to operational yields.

OAF1

The NP portion of the TFL was re-inventoried the to a smaller level of detail than the current MoF standard of a two hectare minimum area. The table below shows the distribution of NP by category.

Table 14: NP area distribution

Type	# stands			
	>2 Ha	>1 Ha to <2 Ha	< 1 Ha	Total
Swamp	78	90	200	368
Lake	40	26	205	271
Open range	3	3	0	6
Rock	2	3	5	10
NP	16	7	21	44
Total	139	129	431	699

An additional 259.1 hectares was removed from the operable landbase using the TEM data. This area consisted of those TEM polygons that contained NP, or sites 02, 09 and 10 as the leading site series. Analysis of 10 years of Cutting Permit data shows that an additional 0.7% is mapped as NP. However recent work[1] examined the magnitude of NP within TFL35 and indicated average values of 3.3% NP, above that already identified in the forest inventory. The accumulated NP reductions to the THLB, and the CP analysis indicate a low OAF1, while the 1998 report indicated a higher number. To be conservative we will use an OAF1 for NP of 2%.

The Enhanced Forest Management Program follows a regime of detailed mapping, immediate site preparation, prompt planting with higher targets and minimums and prompt fill planting when required. The net result is a significant reduction in "un-stocked" holes. Our target establishment density (planted plus naturals) is 1,800 stems per hectare. The year 2000 survey results indicated that total trees on average are 2,000 stems per hectare (54%) higher than targets of 1800. The area-weighted inventory stems per hectare for Era 1 and 2 stands are 4,377 and 3,407 respectively, significantly higher than target values.

This rationale suggests an OAF1 for non-stocked productive holes for Era 3 stands of 2% and for Era 1 and 2 of 3%.

[1] A test of three remote sensing methods to estimate non-productive area proportion for operational adjustment factors, 1998. J.S. Thrower & Associates.

While formal studies have not been conducted, field-based experience suggests little evidence of endemic pest losses or climate-related events on regeneration growth. Unsalvaged losses are documented in an Appendix 9 in the data package. This number included losses to wind, fire and several species of bark beetles. Professional opinion puts this OAF1 number at 3%.

No formal studies have been conducted regarding random risk related growth losses, so the standard OAF1 of 3% will be used.

Total OAF1's for era 1 and 2 are 11%, and for era 3 10%.

OAF2

The OAF2 values are discussed above under decay, waste and breakage.

Volume deductions

All mature deciduous leading stands have been removed from the timber harvesting landbase. Deciduous volumes have not been removed from the VDYP yield curve estimates, the volume will be removed during the wood supply analysis according to the proportion specified in the species distribution of each curve.

Yield table development

VDYP

The generalized development of the yield tables for VDYP is described below. Specific procedures are documented in the ACCESS database and related modules used to prepare and analyze the data. A copy of these procedures can be made available. Yield curve summaries are in Appendix 6.

1. Summarize current inventory data for input into VDYP. Site indices, projected stocking class, projected crown closure, projected age, projected height, species percentages were aggregated into yield groups and area-weighted averages were calculated.
2. Assign productivity groups to all site series using the relationships in the report "Productivity Group Development for TFL35". Area-weighted site indices for each combination of species group and productivity group were determined. Site index estimates were from the inventory data file. The potential site indices from the TEM/SIA project were not used for existing timber.
3. Stocking class "0" was aggregated in with stocking class "1".
4. Develop yield curves for each combination of species group, stocking class and site index.
5. Area-weighted yield curves were developed for the timber supply analysis. The aggregation was based primarily on leading species.

TIPSY

The generalized development of the yield tables for TIPSY is described below. Specific procedures documented in "Productivity group development", the ACCESS database and related modules used to prepare and analyze the data. A copy of these procedures can be made available. Yield curve summaries are in Appendix 7.

1. Review previous Management Plans and annual reports and summarize the forest management activities and the predominant regeneration strategies used.
2. Summarize current inventory data for input into TIPSY. Inventory stems per hectare, projected age, projected height, species percentages were grouped into yield groups and area-weighted averages were calculated.
3. Develop productivity groups using SIA and TEM data and stand level analysis with TIPSY. Assign productivity groups to all site series. Assign site indices to each polygon using the combination of leading species in the forest cover label and area-weighted site indices for each productivity group.
4. Develop yield curves for each combination of species group, site index and silviculture era.
5. Area-weighted yield curves were developed for the timber supply analysis. The aggregation was based primarily on leading species

Silviculture eras

A review of all previous Management Plans[1] including the initial and interim plans of 1956 and 1958 identified three distinct silviculture eras differentiated by regeneration strategies. These regeneration strategies were summarized by dominant silviculture strategy, regeneration delay and species composition. Slivers were created during the overlay process, which may generate some anomalies between the age ranges for each silviculture era and actual ages. Slivers were dissolved when the area was less than 500m2 and the total number of slivers dissolved was 26,210. In other words approximately 346.8 hectares was incorporated into neighbouring polygons. As maximum sliver size increases so does the count. For example, slivers less than 1500m2 total 41,449 or 1,731.4 hectares. 500m2 was chosen as the maximum size, because we wanted to maintain the integrity of the TFL boundary, and because some features in the inventory are 0.1ha in size.

Era 1: Natural regeneration; prior to 1978

This era is described in the initial, interim and first four Management Plans. It is characterized by the focus on road development for wood harvest and protection. Reliance on natural regeneration for both clear cutting and diameter limit cutting silvicultural systems was dominant, with very little planting. Regeneration delay varied between 5 and 10 years and was summarized to be 10 years.

Era 2: Early planting; 1978 to 1989

This era is described in Management Plans 5 and 6 and can be characterized by the emergence of a planting program with less reliance on natural regeneration as well as prompt site preparation, recognition of NSR, and incorporation of early IRM objectives. Regeneration delay varied between 2 and 5 years and was summarized to be 5 years.

[1] TFL 35 Management plan history, Internal report 1999 Weyerhaeuser

Era 3: EFM, 1990+

This era is described in Management Plans 7 and 8 and can be characterized by the introduction of the EFM program and by the incorporation of IRM strategies and tactics into road construction and harvesting practices. Higher stocking standards were enacted along with immediate site preparation and significantly improved survival rates of planted stock. Regeneration delay in the management plans was stated as being between 1 and 2 years, however analysis of the silviculture history records in IFMS showed actual performance of less than one year on average. For the purposes of this analysis, one year is used.

Table 15: Management Plan summary of key statistics and methods

Plan	Period	Area (ha)	AAC (m^3//yr)	Gross landbase productivity (m^3/ha/yr)	Regen. delay	Dominant regeneration method
Initial	1956-1957	40,225	33,131	0.824	5 to 10	Natural
Interim	1958	40,225	33,131	0.824	5 to 10	Natural
MP1	1959 - 1962	40,225	50,970	1.267	5 to 10	Natural
MP2	1963 - 1968	39,891	50,970	1.277	5 to 10	Natural
MP2 revision	1963 - 1968		82,119	2.059	5 to 10	Natural
MP3	1969 - 1973	39,892	99,109	2.484	5	Natural
MP4	1974 - 1978	39,548	90,472	2.288	3 to 5	Natural
MP5	1979 - 1980	40,051	89,664	2.239	2	Plant
MP6	1981 - 1990	39,451	89,089	2.258	3.8	Plant
MP7	1990 - 1996	39,199	125,600	3.204	3 plant 6 nat.	EFM
MP8	1996 - 2001	36,466	125,600	3.444	2 plant 5 nat.	EFM

Additional analysis with the inventory data and with IFMS was undertaken and used with the "Calculate from existing stand option" with TIPSY 2.5 Alpha R to identify the species distribution, stems per hectare, height and age values that would be used as input to TIPSY.

Future regeneration

Regeneration strategies were developed for each combination of productivity group and management zone. Where different regeneration strategies were developed for different site series within a productivity group and management zone combination (Plcon: Pl70Sx30 on IDFdk2 07 and Pl90Fd10 on IDFdk 05) an area weighted species distribution was calculated. Yield table inputs for future regeneration are in Appendix 8

Genetic gain

Weyerhaeuser has three Lodgepole pine seed orchards at the Grandview Nursery. Orchard 308 has been producing seed since 1994. Small amounts were

planted in 1994 and 1995, with an operational program commencing in 1997. We have ramped-up production since, and the percent genetically improved stock is shown below.

Table 16: Percent genetically improved planting stock

Year	Percent genetically improved stock			
	Total	Lodgepole pine	Spruce	Douglas fir
1994	.07		.07	
1995	.06		.06	
1996	0			
1997	11	11		
1998	16	16		
1999	46	19	27	
2000	51	44	7	.4

The genetic worth of this orchard has been tested at 5% and the elevation range is between 750 and 1, 400 meters. To model deployment, all lodgepole pine in future yield curves in productivity group 1, had a genetic gain of 5% applied in TIPSY. The area and species distribution approximates the deployment in the elevation band. Future planting needs are predicted to remain constant within this elevation band and are met by current nursery forecasts.

PROTECTION

Un-salvaged losses

Based on the summary in Appendix 9, we estimate unsalvaged losses to be 0.7 % of TFL 35 annual harvest. This number is less than the unsalvaged losses projected by the Kamloops TSA because no losses were attributed to defoliators or abiotic events. Projected unsalvaged losses for the Kamloops TSA are 2.6% based on an AAC of 2,393,180 m3 (assuming the AAC remains at the level stated in the Kamloops TSA Timber Supply Analysis Report May 1995). This will be removed from each yield curve in the wood supply model.

INTEGRATED RESOURCE MANAGEMENT

Modeling techniques for specific management objectives

Modeling integrated resource management objectives will be accomplished through the use of forest cover objectives, adjacency restrictions and cutblock size limitations. Table 17 identifies the various modeling techniques that will be used to constrain, monitor and assess the impact on various management objectives.

Table 17: Modeling techniques for specific management objectives

Location	Objective	Modeling technique(s)
Critical deer winter range management zone	25% gross forested area in thermal cover[1]	25% gross forested landbase >20m
Wildlife Special Management Areas[2]	Seral stage distribution that contains mature to over mature trees	25% gross forested landbase > 80 years for Pl, and >100 years for other species
All management zones except the visual landscape management zone and mule deer winter range	Adjacency restrictions and three pass harvesting sequence	No more than 33% of the timber harvesting landbase area will be less than 3m in height
Mule deer winter range	Five hectare maximum cutblock size	No more than 20% of the gross forested landbase will be less than 3m in height
Visual landscape management	Maintain visual quality	Described in Table 19, below

Water

Harvest and regeneration activities will be monitored in the Skull and Jamieson watersheds during the analysis. Disturbance within the Whitewood creek watershed will be constrained to not exceed a 30% ECA. The portion of the Tranquille Community Watershed that falls with in TFL 35 is small and activities within this watershed will be included within the Jamieson watershed. To model impacts on hydrology, an area-weighted hydrological green-up height was determined. Approximately 60% of TFL35 lies within the snow pack zone requiring a 6-meter green-up. The remaining 40% of the TFL required a 3-meter green-up. The percent-weighted calculation is (.60 x 6m) + (.4 x 3m) = 4.8m. Several attempts were made to factor in specific hydrological recovery values by average height of the main canopy of the regeneration. These were unsuccessful.

Visual landscape Inventory

The visual landscape inventory was updated in 1999. Table 18 summarizes the visually effective greenup height as well as the maximum harvested percent below the visually effective green-up height. Values from each VQO for green-up height and maximum percent harvested were assigned to each VAC, using the values provided in the Kamloops LRMP Appendix 8. Given our higher levels of stocking we have slightly reduced the green-up heights and increased the maximum percent harvested for the partial retention and retention/preservation VQO's. An area-weighted green-up height and area-weighted maximum percent harvested were determined for each VQO.

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[1] Kamloops LRMP, Section 2.1.12.1, July 1995

[2] Operational harvesting and reforestation guidelines for the overall maintenance of fish and wildlife habitat on TFL35 & adjacent study area. Weyerhaeuser Canada Ltd. Internal report, December 1991

Preservation was combined with partial retention as it occupies approximately 0.8 hectares within the TFL.

Table 18: Green-up height and maximum height determination for each VQO

VQO	Area			Green-up		Maximum % harvested		Area-weighted	
	VAC			VAC		VAC		Greenup	Max. % harvested
	L	M	H	M	H	M	H		
M	0	401.3	492.1	3.5	3	25	30	3.2	28
PR	0	935.8	97.5	4	3	20	25	3.9	20
R/P	0	178	29.6	4	3	15	15	3.9	15
Total	0	1,515.1	619.2						

Recreation

A new recreation inventory was completed in March 1997. Most of the recreation within TFL 35 is dispersed except for several designated sites.

Wildlife management

Weyerhaeuser has been managing for wildlife habitat and diversity since the development and acceptance of our 1991 Fish and Wildlife Plan[1]. Regulatory and policy changes since 1991, have replaced the majority of strategies and tactics identified in the plan, and therefore only portions will be used.

The Kamloops LRMP identifies specific areas as "Critical Deer Winter Range" and "Critical Moose Winter Range" within TFL 35. The LRMP requires that 25% of the forested area in the "Critical Deer Winter Range" be maintained in thermal cover. Thermal cover has been defined in the February 1999 Kamloops Timber Supply Area Data Package as mature timber greater than 20 meters. The origin of this number was from the Okanagan TSA Timber Harvesting Guidelines, which originally was defined as height class 3. Height class 3 was thought to represent that stage in stand development when crown architecture and crown closure would create sufficient thermal cover.

Specific forest cover objectives or cutblock size requirements were not developed for the "Critical Moose Winter Range". The objectives and strategies stated within the Kamloops LRMP will be managed operationally through the Forest Development Plan and Silvicultural Prescriptions.

Weyerhaeuser identified eleven Special Wildlife Management Areas in the 1991 Fish and Wildlife Plan and will continue managing these areas to maintain 25% mature and over-mature timber. This is defined as greater than 80 or 100 years of age for pine and other species respectively,

No Wildlife Habitat Areas, or related Procedures and Measures have been

[1] Operational harvesting and reforestation guidelines for the overall maintenance of fish and wildlife habitat on TFL35 & adjacent study area. Weyerhaeuser Canada Ltd. Internal report, December 1991

identified within TFL 35. Old seral requirements, green-up heights and strategies related to the low biodiversity emphasis are designed to address the remainder of the wildlife species requirements in terms of habitat.

Adjacent cutblock greenup

Stands will be eligible for harvest when the adjacent cutblock has attained a stand height of 3 meters in all zones except the Visual Landscape Management Zone. Time to green-up height is determined from height age output data generated from special TIPSY runs for each leading species for each productivity group. The data for each leading species for each productivity group is shown Table 19 below.

Table 19: Green-up ages by leading species for each productivity group

Productivity group	3m green-up		
	Pl	Sx	Fdi
1	10	19	13
2	11	21	15
3	13	24	16
4	20	32	19
5	NA	NA	15
6	23	43	28

Landscape level biodiversity emphasis

As part of the LRMP, draft landscape units and biodiversity emphasis options were identified. TFL35 lies completely within the Skull Landscape Unit, which is designated as having a low biodiversity emphasis option. Table 20 below identifies the old seral targets by NDT. These areas will be used as targets to demonstrate the impact of full implementation of old seral stage guidebook values in sensitivity analyses.

Reduction to reflect volume retention within cutblocks

Partial cutting regimes have been developed for those areas within riparian management zones. Volume retention is prescribed in Table 7 as basal area retention goals. These will be applied in the wood supply model at the time of harvest. Deletions for WTP's will be made in the appropriate sensitivity analysis or option. Non-merchantable material will be left on site for coarse woody debris.

TIMBER HARVESTING

Minimum merchantability standards, utilization specifications

Culmination of mai will be targeted, as stand volumes and other characteristics are acceptable. This will be modeled as an area-weighted culmination age for groups of regenerated yield curves. Minimum harvest age will be an output related to harvest levels goals, silviculture strategies and biodiversity requirements.

Initial harvest rate

Weyerhaeuser wishes to increase the current ±125,000m^3/yr harvest for TFL 35.

Harvest rules

Harvest location is largely influenced by forest health concerns. As stands age and the trees are unable to maintain their vigor, forest health issues tend to drive our harvest priorities. Currently our operational harvest priorities are:

- Stands/trees that are attacked by insects, that if left will spread to a larger area.
- Stands that are wind-thrown or damaged and susceptible to insect attack and subsequent spread.
- Stands past culmination age.
- Stands required to balance the harvest profile with the standing timber profile

Harvesting priorities are determined within WOODSTOCK in order to meet the maximum harvest objective. Generally this will be to harvest the oldest first to ensure vigorous stands replace the existing growing stock. However some of the biodiversity constraints will force the harvesting of younger stands in order to meet old seral objectives.

Harvest profile

All stands within the operable landbase will be harvested. 95 to 98% of the landbase is harvested with mechanized, ground-based systems and 2-5% of the landbase is being harvested with cable systems.

Silvicultural systems

The primary silviculture systems on TFL 35 are even aged systems. True selection/uneven aged management is very rarely a feasible option and has not been modeled.

OPTION ASSUMPTIONS

Table 20 below identifies the seral targets by NDT. Draft 1/3 OGMA's will be used to identify potential old seral stands. The impact on harvest flow of achieving the mature plus old seral targets immediately will be tested.

Table 20: Seral stage distribution targets for natural disturbance types

Natural disturbance type	BEC Variant	Old		Mature		Early	
		age	% area	age	% area	age	% area
NDT3	MSdm2	>140	>14	>100	NA	<40	NA
	ESSFdc2	>140	>14	>120	NA	<40	NA
	ESSFxc	>140	>14	>120	NA	<40	NA
	ICHmk2	>140	>14	>100	NA	<40	NA
NDT4	IDFdk2	>250	>13	>100	>17	<40	NA
	IDFxh	>250	>13	>100	>17	<40	NA

Weyerhaeuser will test a patch management strategy for TFL 35 during the 20-year plan preparation. Table 21 below contains the data for the patch size target distributions as well as the data for the sensitivity analysis around the testing of seral stage distribution targets.

Table 21: Patch size distribution targets for natural disturbance types

Natural disturbance type	Patch size	Percent
NDT3 with Fdi	<40	20-30
	40-80	25-40
	80-250	30-50
NDT3 without Fdi	<40	10-20
	40-250	10-20
	250-1000	60-80
NDT4	<40	30-40
	40-80	30-40
	80-250	20-30

Appendix 1: Memo describing area changes relative to MP8

Appendix 2: Marginally Merchantable Stand Harvest Schedule in 1999 FDP

CP	Area
68	5.17
70	0
72	12.68
73	74.96
75	2.85
77	2.22
79	28.62
83	2.36
84	62.8
85	0.11
86	7.01
87	0.75
88	3.28
89	6.27
90	0.28
91	0.03
92	25.11
93	2.26
95	9.24
	246.0

	Area (ha)	%
TFL 35 THLB (Base Case 1)	31,171.9	
Total Area MMS in TFL 35:	2,393.2	
Percent MMS based on THLB		7.67%
Proposed Development in MMS	246.0	
Percent development within MMS		10.28%

Appendix 3: Basal area retention analysis

A meeting was held with Phil Holman on November 1, 2000, to discuss concerns expressed over different Basal Area Retention within the management zone than that prescribed within the RMA Guidebook. Phil's arguments were based on his opinion that due to operational constraints a greater amount BA was being retained within the management zone than was being reported or is required to protect the integrity of the reserve zone.

The intent of the MZ is to provide a buffer along the reserve zone that will help to protect the integrity of the reserve zone. Based on a review of existing SP's on TFL 35, the primary strategy within the RMZ is to retain advanced regeneration, deciduous, brush and lesser vegetation. BA retention is considered on a site-specific basis and is identified within the SP where warranted. BA retention is prescribed with consideration of site specific features (slope, terrain, species, blowdown potential and riparian classification) and adjacent features (OGMA's, WTP's and WT's).

Based on the attached sample of TFL 35 Cutblocks, we feel the BA retention figures proposed in Table 7 of the TFL 35 Data Package best represent current practice on TFL 35.

The following clause is an example of an RMA prescription that is included in our reference silviculture prescription to describe management within the riparian management zone of a stream, wetland or lake:

Management zone _____ m (describe basal area or trees/ha to be retained) Stub or wildlife trees. Management zone 20 m; consisting of a 10 m vegetation protection area of which the first 5 m is also a no machine buffer. In the 10 m vegetation protection area disturbance to layer 3 and 4 conifers (approximately 300 stems per hectare), brush and lesser vegetation is to be limited to that necessary to carry out harvesting and silviculture operations as described in Section H and J. A 10 m vegetation protection buffer in the management zone is sufficient to ensure Riparian management objectives are met as the stream is just beginning to form and only has portions of a defined channel.
The management regime will describe the important species being protected and the expected post treatment percent cover once logging/regeneration/free-growing operations are complete.

The following table summarizes specific management zone recommendation by cutblock on TFL 35:

CP - Block	Riparian Class	Management Zone	Prescription
82 - 10	S4	20 m	Vegetation protection. Layers 3 and 4 to approximately 300 stems per hectare (including brush and lesser vegetation)
	S6	20 m	No basal area to be retained.
	S4	20 m	Vegetation protection. Layers 3 and 4 to approximately 300 stems per hectare (including brush and lesser vegetation). No basal area to be retained.
65 - 8	S3	20 m	Advanced regeneration, deciduous and brush to be retained. Mature trees or stubs at 20 sph (approx. 50 m apart) within the MZ.
65 - 9	S3	30 m	Advanced regeneration, deciduous and brush to be retained. Mature trees or stubs at 20 sph (approx. 50 m apart) within the MZ.
65 - 3	S3	20 m	Advanced regeneration, deciduous and brush to be retained. Mature trees or stubs at 20 sph (approx. 50 m apart) within the MZ.
67 - 7	S5	20 m	Advanced regeneration, deciduous, brush and wildlife trees to be retained.
77 - 4	S3	20 m	No special treatment due to width of the reserve zone.
	S4	30 m	No special treatment proposed.
	W3	20 m	Retain layer 3 and 4 (approx. 400 sph) of advanced regen, brush and lesser vegetation.
100 - 7	S6	20 m	No special treatment, WTP's.
74 - 4	S6	20 m	Retain layer 3 and 4 (approx. 50 - 400 sph) of advanced regen, brush and lesser vegetation.
8 - 56	S3 (R2)	20 m	Retain 100 – 200 sph of sub merchantable and non-commercial Se and Bl.
100 - 3	S6	20 m	No restriction in MZ.
74 - 2	S3	20 m	Retain layers 3 and 4 (500 – 1000 sph) of brush and lesser vegetation.

Appendix 4: Additional site index analysis

MP8 VDYP landbase		
SI	Area	Area weight
20.1	1326	26,653
15.2	1541	23,423
11.2	271	3,035
20.6	1678	34,567
15.5	2770	42,935
10.6	1060	11,236
20.3	861	17,478
16.2	1666	26,989
11.6	177	2,053
	11350	188,370
Area-weighted SI		16.6

MP9 Future Sx regen curves		
SI	Area	Area weight
22	79.5	1,749
22	150.4	3,309
19	170.9	3,247
15	805.7	12,086
	1206.5	20,390
Area-weighted SI		16.9

MP9 Complete Sx landbase		
SI	Area	Area weight
7.3	2.2	16
10.7	334.7	3,581
11.8	849.8	10,028
12.3	1.4	18
12.7	114.4	1,453
13.2	43.9	580
13.6	28.8	391
14.1	23.5	331
14.3	2,258.7	32,299
15	590.1	8,851
15.5	906.2	14,047
15.7	2,626.4	41,235
18.6	17.3	322
19.7	108.0	2,128
21.6	9.1	196
22	505.1	11,111
7.3	8.8	65
10.7	1.9	21
11.8	10.3	122
13.2	15.8	208
14.3	10.1	145
15	1.0	15
15.5	64.0	993
15.7	92.2	1,448
19.7	448.4	8,834
22	879.0	19,337
	9,951.2	157,773
Area-weighted SI		15.9

Appendix 5: FIZ D & G W2B comparison

Reference diameter	Species	Zone D					Zone G					Absolute percent difference between D and G			Potential percent impact on standing volume		
		Area	Percent of TFL	Risk group			Area	Percent of TFL	Risk group			Risk group			Risk group		
				1	2	3			1	2	3	1	2	3	1	2	3
				121+	121+	121+			121+	121+	121+	121+	121+	121+	121+	121+	121+
30/40	FD	6,121	17.5%	1.7	5.5	na	1,082	3.1%	1.5	5.2	na	0.2	0.3	na	0.01	0.01	na
20/40	S	8,376	24.0%	2.9	7.5	31.6	3,159	9.0%	2.9	7.5	31.6	0	0	0	0.00	0.00	0.00
40	PL	10,608	30.3%	10.3	12.9	63	2,590	7.4%	14.8	18.4	63	-4.5	-5.5	0	-0.33	-0.41	0.00
30/40	B	2,018	5.8%	21.9	31.8	52.8	1,014	2.9%	21.9	31.8	52.8	0	0	0	0.00	0.00	0.00
40	CW	0	na	na	na	na	4	0.01%	17.7	33.2	na	na	na	na	na	na	na
Zone total		27,123	77.6%				7,848	22.4%									
	Total	34,971	100.0%														

Appendix 6: VDYP yield table inputs

[illegible]	[illegible]	[illegible]													
1BV	1-B-V-14.5	1				93			6					52	428.03
	1-B-V-14.5	2				90			10					25	20.19
	1-Bcon-V-14.6	1	4			63		7	25	1		1		46	866.09
	1-Bcon-V-14.6	2				60			40					3	5.81
	1-Bcon-V-14.6	R				60			40					40	8.86
CV	1-C-V-19.3	1							10			90		50	1.69
	1-Ccon-V-15.2	1	10			20						70		80	0.12
DECID	1-Decid-V-18.2	1	26			1		12	3	58				42	169.62
	1-Decid-V-18.2	2	25			8		7	8	52				40	100.64
1FV	1-F-V-17.3	1	3					95	2					45	1,518.38
	1-F-V-17.3	2						100						4	3.31
	1-F-V-17.3	R						95	4	1				47	72.30
1FCV	1-Fcon-V-18.1	1	17			7		60	16	1				47	2,360.70
	1-Fcon-V-18.1	2	12			16		61	3	8				3	3.57
	1-Fcon-V-18.1	R				15		70	15					60	22.67
FDV	1-Fdec-V-18.6	1	7			2	10	59	4	18				34	83.24
	1-Fdec-V-18.6	2						60		40				10	0.97
1PV	1-P-V-17.5	1	95			2		2	1					52	796.93
	1-P-V-17.5	2	91					7	2					58	28.07
	1-P-V-17.5	3	96					2	2					60	461.24
	1-P-V-17.5	4	99			1								58	83.72
1PCV	1-Pcon-V-18.4	1	61			6		17	15	1				53	1,338.50
	1-Pcon-V-18.4	2	60					34	6					35	37.10
	1-Pcon-V-18.4	3	65			7		20	6	2				53	625.84
1PDV	1-Pdec-V-20.5	1	61			1	8	6	7	16				38	106.95
	1-Pdec-V-20.5	2	51			9			9	31				39	16.08
	1-Pdec-V-20.5	3	54					10	6	30				46	49.12

Aggregated Yield Curve	Yieldtable name	Stocking class	Fir %	Cw %	Hw %	Sx %	Pl %	Sb %	Ac %	Ep %	Aw %	Lw %	Crown closure	Area
1SV	1-S-V-15.5	1	2			3		1	94					36	833.10
	1-S-V-15.5	2				9			91					31	42.99
	1-S-V-15.5	R						2	98					37	10.37
1SCV	1-Scon-V-15.7	1	15			16		9	60	1				41	2,679.44
	1-Scon-V-15.7	2	8			18			74					13	16.75
	1-Scon-V-15.7	R				16		24	60					36	22.43
SDV	1-Sdec-V-18.6	1	12					1	55	32				43	17.30
2BV	2-B-V-12	1				92			8					52	94.36
	2-B-V-12	2				90			10					3	1.35
	2-Bcon-V-12.4	1	11			59		1	29	1				54	480.34
CV	2-Ccon-V-15.2	1	10			20						70		80	1.65
DECID	2-Decid-V-19	1	16				1	6	16	60				45	37.06
2FV	2-F-V-17.2	1	1					97	1	1				43	585.83
	2-F-V-17.2	2						100						6	32.93
	2-F-V-17.2	R						100						56	15.23
2FCV	2-Fcon-V-17.9	1	16			2		64	16	1				48	429.31
	2-Fcon-V-17.9	2	30					50		20				3	3.22
FDV	2-Fdec-V-18.1	1	1			3	9	67	2	18				32	26.22
2PV	2-P-V-17.7	1	92			1			7					51	803.87
	2-P-V-17.7	2	94			1			5					51	273.01
	2-P-V-17.7	3	93			2			5					54	315.50
	2-P-V-17.7	4	98			2								56	79.77
2PCV	2-Pcon-V-16.8	1	59			10		2	28	1				48	1,317.37
	2-Pcon-V-16.8	2	61			12		6	19	2				49	312.75
	2-Pcon-V-16.8	3	70			14		1	14					55	331.40
	2-Pcon-V-16.8	4	60			17			23					50	33.31
2PDV	2-Pdec-V-18	1	60			10				30				40	8.28
	2-Pdec-V-18	2	77						2	21				40	42.51
2SV	2-S-V-15	1	2			5			92	1				39	571.92

Aggregated yield curve	Yield curve name	Stocking class												Crown closure	Age
2SV	2-S-V-15	2	2			9			89					32	19.19
2SCV	2-Scon-V-14.3	1	18			23		1	58					45	2,246.74
	2-Scon-V-14.3	2	4			46			51					43	18.37
	2-Scon-V-14.3	R				30			70					60	3.69
SDV	2-Sdec-V-21.6	1	12						58	30				50	9.05
3BV	3-B-V-14.7	1	1			91			8					40	14.17
	3-B-V-14.7	2				90			10					3	0.31
	3-Bcon-V-11.4	1	6			61		1	33					45	357.07
DECID	3-Decid-V-19.6	1	32					2	1	65				44	25.76
	3-Decid-V-19.6	2	10					30		60				40	0.26
3FV	3-F-V-15	1	2	1			1	96		1				42	262.65
	3-F-V-15	2						100						40	0.25
	3-F-V-15	R						100						60	13.91
3FCV	3-Fcon-V-16.5	1	24			1		63	12	1				49	180.12
FDV	3-Fdec-V-17.2	1					12	72	4	12				27	9.50
3PV	3-P-V-13	1	92			4			4					47	42.43
	3-P-V-13	2	89						11					44	143.60
	3-P-V-13	3	94					4	2					58	36.03
	3-P-V-13	4	100											53	7.56
3PCV	3-Pcon-V-15.7	1	58			15		3	25					48	254.31
	3-Pcon-V-15.7	2	60			5		11	24					45	60.02
	3-Pcon-V-15.7	3	59			22		7	11	1				53	29.57
	3-Pcon-V-15.7	4	60			21			19					50	4.57
3PDV	3-Pdec-V-16.8	1	60			10				30				40	3.19
	3-Pdec-V-16.8	2	56						16	28				40	12.20
	3-Pdec-V-16.8	3	60					10		30				30	0.84
3SV	3-S-V-10.7	1	1			8			90					38	317.50
	3-S-V-10.7	2				10			90					32	17.20
3SCV	3-Scon-V-11.8	1	10			31			59					42	812.54

Aggregated yield curve	Yield curve name	Stocking class													
	3-Scon-V-11.8	2	7			34			59					23	47.42
	3-Scon-V-11.8	R				10		30	60					20	0.21
SDV	3-Sdec-V-12.3	1	6						57	9	28			43	1.44
4BV	4-B-V-16	1	10			90								40	0.47
	4-Bcon-V-12	1	11			60			29					40	15.08
DECID	4-Decid-V-20.3	1	17							83				56	0.29
4FV	4-F-V-11.8	1						100						34	6.53
	4-F-V-11.8	R						90		10				60	0.13
	4-Fcon-V-17.4	1	12			7		60	21					40	7.07
	4-Fdec-V-18.5	1						80		20				10	3.39
4PV	4-P-V-17.7	1	93			4			3					53	12.17
	4-P-V-17.7	2	89						11					47	6.86
	4-P-V-17.7	3	96						4					50	5.61
	4-P-V-17.7	4	100											50	0.41
	4-Pcon-V-16.6	1	56			8		1	35					45	36.32
	4-Pcon-V-16.6	2	59			24			16					49	1.62
	4-Pcon-V-16.6	3	70			6			24					53	8.11
	4-Pcon-V-16.6	4	64			34			2					48	2.00
	4-Pdec-V-12.8	1	60			10				30				40	0.54
4SV	4-S-V-13.6	1	3			2		3	92					37	19.28
	4-S-V-13.6	2				10			90					27	9.48
	4-Scon-V-12.7	1	14			28		1	58					40	114.07
	4-Scon-V-12.7	2	30			20			50					3	0.36
5FV	5-F-V-14.3	1	1					99						43	312.19
5FCV	5-Fcon-V-14.5	1	2			16		64	17					38	10.99
5FDV	5-Fdec-V-14.1	1					16	76		5		2		25	50.91
6BV	6-B-V-15.3	1				92			8					47	2.42
	6-Bcon-V-14.6	1	5			60		1	34					31	25.42
DECID	6-Decid-V-19.7	1	11				2		7	79				34	1.36

[illegible]	[illegible]	[illegible]	[illegible]												
6FV	6-F-V-17.7	1	1					97	2					39	3.74
	6-Fcon-V-17.4	1	17			4		54	23	1				50	1.61
6PV	6-P-V-16.2	1	98			1			1					51	8.12
	6-P-V-16.2	2	88						12					44	3.90
	6-P-V-16.2	3	100											25	0.60
	6-Pcon-V-13.8	1	64			8			29					46	18.73
	6-Pcon-V-13.8	2	60			2			38					42	2.67
	6-Pcon-V-13.8	3	52			24			20	4				48	4.06
	6-Pcon-V-13.8	4	80			10			10					40	0.08
6SV	6-S-V-14.1	1	1			4		2	93					39	23.44
	6-S-V-14.1	2				10			90					30	0.06
	6-Scon-V-13.2	1	14			27		1	58	1				36	59.03
	6-Scon-V-13.2	2	10			30			60					15	0.69

Appendix 7: TIPSY yield table inputs

Aggregated yield curve	YIELDTABLE	Pl%	B%	Py%	Dr%	Ep%	Fd%	S%	At%	Ac%	Cw%	Lw%	Stems	Age	Height	Area (ha)
1BR	1-B-E1-20.3		92					8					3219	30	7.0	151.56
	1-B-E2-20.3	1	83					16					5857	13	1.0	8.10
	1-B-E3-20.3	10	90										8400	9	1.0	0.17
	1-Bcon-E1-20.3	6	64				6	23					4076	30	6.0	498.04
	1-Bcon-E2-20.3	7	59				4	28		2			3393	15	1.0	38.67
	1-Bcon-E3-20.3	40	58					2					3874	7	1.0	58.90
CR	1-Ccon-E1-19.3		30					30			40		7280	24	7.0	2.68
1DR	1-Decid-E1-18.2	22	25			6	0	10	19	18			4702	26	10.0	15.80
	1-Decid-E2-18.2	15	27			21	2	8	27		1		5411	19	7.0	13.01
	1-Decid-E3-18.2	27	3			6		6	59				6736	9	3.0	31.90
1FR	1-F-E1-21	1	3				91	4			1		5437	29	8.0	106.31
	1-F-E2-21		2				90	8					2636	16	4.0	36.32
	1-F-E3-21	10					90						1800	4	0.5	1.33
1FCR	1-Fcon-E1-21	14	11				55	18	2				3753	25	7.0	386.34
	1-Fcon-E2-21	18	26				51	5					5963	16	3.0	50.22
	1-Fcon-E3-21	28	3			2	42	21	4				3992	4	0.6	99.76
1FDR	1-Fdec-E1-21		10			30	40	10	10				7500	38	12.0	4.40
LR	1-L-E3-21	10	20				10					60	3040	5	1.0	2.04
1PR	1-P-E1-21.5	95	2				1	2					2937	16	5.0	232.65
	1-P-E2-21.5	93	3				1	3					2248	12	3.0	654.89
	1-P-E3-21.5	96	2				0	2					2263	5.6	1.1	557.21
1PCR	1-Pcon-E1-21.5	60	11				9	17	1				3583	23	8.0	659.12
	1-Pcon-E2-21.5	69	15				7	8	2				3746	14	4.0	801.41
	1-Pcon-E3-21.5	68	10				6	13	3				2554	6.1	1.2	705.60
1PDR	1-Pdec-E1-21.5	42					15	15	28				2658	25	8.0	53.42
	1-Pdec-E2-21.5	68	6			1	2	3	18	1			2916	12	3.0	134.69
	1-Pdec-E3-21.5	70	4			1	3	2	18	1			3204	9	2.0	182.62
1SR	1-S-E1-22	5	3					92					4609	24	3.0	378.76

Aggregated yield curve	YIELDTABLE	Pl%	B%	Py%	Dr%	Ep%	Fd%	S%	At%	Ac%	Cw%	Lw%	Stems	Age	Height	Area (ha)
	1-S-E2-22	1	1					98					1655	6	1.0	42.20
	1-S-E3-22		3					96					1536	5	0.5	66.09
1SCR	1-Scon-E1-22	11	19				5	62	2	1			4586	23	4.0	816.78
	1-Scon-E2-22	5	19				8	64		3			1421	12	1.0	35.04
	1-Scon-E3-22	16	15				4	61	2	1	1		3099	7	1.2	64.59
1SDR	1-Sdec-E1-22		9				1	63	21	6			6091	18	3.0	27.68
	1-Sdec-E2-22	9	10			38		42	1				3643	18	1.0	13.19
2BR	2-B-E1-18.1	2	90					7					4079	29	6.0	60.44
	2-B-E2-18.1		83					17					6080	12	1.0	2.76
	2-B-E3-18.1	10	90										8295	9	1.0	18.08
	2-Bcon-E1-18.1	18	60					22					6340	24	5.0	243.19
	2-Bcon-E2-18.1	26	61					11	1				8087	17	3.0	125.57
	2-Bcon-E3-18.1	29	57					13	1				3569	8	1.0	172.17
2DR	2-Decid-E1-18.9	40	15						45				4667	12	5.0	8.40
	2-Decid-E2-18.9	20	8			22	7	9	31		3		6788	14	6.0	27.85
2FR	2-F-E1-17.4						100						4214	22	6.0	8.32
2FCR	2-Fcon-E1-17.4		16				73	11					3958	22	7.0	4.84
	2-Fcon-E2-17.4	27	16			5	50	1					4970	17	4.0	12.96
	2-Fcon-E3-17.4	23					42	12					1296	2	0.3	19.40
LR	2-L-E3-17.4	10	20				10					60	3040	5	1.0	0.39
2PR	2-P-E1-18.6	92	6					2	1				1703	15	4.0	85.06
	2-P-E2-18.6	95	2					3					2346	14	4.0	355.82
	2-P-E3-18.6	94	2					4					1748	3.4	1.1	310.16
2PCR	2-Pcon-E1-18.6	61	13					19					4986	19	5.0	264.37
	2-Pcon-E2-18.6	68	19					9	4				4217	14	4.0	277.78
	2-Pcon-E3-18.6	66	16					17	1				2547	5.2	1.0	509.91
2PDR	2-Pdec-E2-18.6	66	9			1	1	9	13				2456	15	5.0	13.41
	2-Pdec-E3-18.6	62	10					9	19				3260	6	1.0	36.07
2SR	2-S-E1-19.7	2	9					89					4705	20	2.0	42.88

Aggregated yield curve	YIELDTABLE	Pl%	B%	Py%	Dr%	Ep%	Fd%	S%	At%	Ac%	Cw%	Lw%	Stems	Age	Height	Area (ha)
	2-S-E2-19.7							100					1600	2	0.2	0.25
	2-S-E3-19.7		3					97					2379	4	0.4	42.84
2SCR	2-Scon-E1-19.7	16	22					62					4629	22	3.0	312.51
	2-Scon-E2-19.7	6	25					69					2513	13	1.0	13.71
	2-Scon-E3-19.7	24	11					65					1958	4.8	0.6	197.92
3BR	3-B-E1-15		92					8					2668	23	4.0	6.93
	3-B-E3-15	10	90										7897	9	1.0	5.51
	3-Bcon-E1-15	8	72					20					4539	30	8.0	1.97
	3-Bcon-E2-15	24	62					14					3916	16	2.0	7.97
	3-Bcon-E3-15	19	68					13					4213	9	1.0	54.84
CR	3-Ccon-E1-0		30					30			40		7280	24	7.0	0.24
DR	3-Decid-E2-19.6	20	10			60	10						6400	15	6.0	0.58
2FCR	3-Fcon-E1-16		20				60	20					4400	27	9.0	0.28
	3-Fcon-E2-16	40				13	47						2171	16	4.0	1.55
	3-Fcon-E3-16	23					42					35	1600	0.3	2.0	1.14
3PR	3-P-E1-15.6	99						1					2227	20	7.0	0.47
	3-P-E2-15.6	97	3										2130	11	2.0	2.49
	3-P-E3-15.6	99											1900	3	1.0	43.26
3PCR	3-Pcon-E1-15.6	69	16				0	14	1				3576	14	3.0	20.68
	3-Pcon-E2-15.6	64	9				8	15	4				4062	15	4.0	2.31
	3-Pcon-E3-15.6	70	10				0	20	0				1845	5.9	1.5	57.20
2PDR	3-Pdec-E2-15.6	68	10					6	16				2467	12	3.0	1.62
	3-Pdec-E3-15.6	80							20				3407	9	1.0	0.38
3SR	3-S-E1-15.5	14	1					85					9375	22	2.0	3.63
	3-S-E3-15.5							100					1848	3	0.3	20.33
3SCR	3-Scon-E1-15.5	11	27					63					6167	23	3.0	36.01
	3-Scon-E2-15.5	3	20					77					3022	13	1.0	19.19
	3-Scon-E3-15.5	12	16					72					2369	6.7	0.6	8.40
SDR	3-Sdec-E1-15.5		10					80	10				1886	10	1.0	0.16

Aggregated yield curve	YIELDTABLE	Pl%	B%	Py%	Dr%	Ep%	Fd%	S%	At%	Ac%	Cw%	Lw%	Stems	Age	Height	Area (ha)
4BR	4-B-E3-10.7	10	90										8400	9	1.0	0.88
	4-Bcon-E1-10.7	26	58					16					8056	36	6.0	4.47
	4-Bcon-E2-10.7	23	77										2995	13	1.0	1.27
4SR	4-Fcon-E1-12.8		20				60	20					3200	27	7.0	0.13
4PR	4-P-E2-10	99	0					1					2415	13	3.0	6.46
	4-Pcon-E1-10	59	14					26	1				7143	24	8.0	6.26
	4-Pcon-E2-10	42	40					18					1899	17	4.0	0.30
	4-Pcon-E3-10	70	20					10					2026	8	1.0	0.06
4SR	4-S-E1-10.7							100					800	11	1.0	0.18
	4-Scon-E1-10.7	12	25					64					2256	19	2.0	1.63
	4-Scon-E3-10.7	10	20					70					2055	10	1.0	0.09
6BR	6-B-E1-7.8		90					10					5580	31	4.0	3.34
	6-Bcon-E1-7.8	10	69					22					3607	32	10.0	3.09
	6-Bcon-E2-7.8	20	70					10					3942	17	2.1	1.45
6SR	6-Fcon-E1-8		17			3	57	23					2637	28	9.0	0.88
6PR	6-P-E1-8.8	100											1580	12	3.0	0.60
	6-P-E2-8.8	95	1					3					2256	12	3.0	5.83
	6-P-E3-8.8	88						12					1759	2.2	0.7	2.59
	6-Pcon-E1-8.8	60	9				2	27	2				5685	31	11.0	1.65
	6-Pcon-E2-8.8	57	23				6	8	6				4576	14	4.0	4.69
	6-Pcon-E3-8.8	72	20					8					1919	7	1.0	2.44
6SR	6-S-E1-7.3	1	9					90					13236	24	3.0	1.91
	6-S-E2-7.3	9	1					90					2057	10	1.0	0.78
	6-Scon-E1-7.3	14	16					69					2022	25	3.0	2.92
	6-Scon-E2-7.3	10	20					70					1853	9	1.0	5.71
	6-Scon-E3-7.3												0	0	0.0	0.43

Appendix 8: Future regeneration yield table names and inputs

Prod. Grp.	BEC	Site Series	Management Zone			
			General	Mule Deer	Special Management	Landscape
1	MSdm2	01	1_Pl_Plant_21	1_f5p5_21	1_P8S2_21	1_Pl_Plant_21
1	MSdm2	04	1_Pl_Plant_21	1_f5p5_21	1_P9F1_21	1_Pl_Plant_21
1	MSdm2	05	1_Pl_Plant_21	1_f7p3_21	1_s5f5_22	1_Pl_Plant_21
1	ICHmk2	01	1_Pl_Plant_21	1_f5p5_21	N/A	1_Pl_Plant_21
1	ICHmk2	04	1_Pl_Plant_21	1_f5p5_21	N/A	1_Pl_Plant_21
1	MSdm2	06	1_s8p2_22	1_f7p3_21	1_s5f5_22	1_s8p2_22
1	IDFdk2	07	1_P8S2_21	1_P8S2_21	N/A	1_P8S2_21
1	IDFdk2	05	1_P9F1_21	1_f7p3_21	N/A	1_P9F1_21
1	ICHmk2	05	1_f7p3_21	1_f7p3_21	N/A	1_f7p3_21
2	ESSFdc2	01	2_p_18	N/A	N/A	2_p_18
2	ESSFdc2	05	2_P8S2_18	N/A	N/A	2_P8S2_18
2	IDFdk2	01	2_p_18	2_F7P3_17	N/A	2_p_18
2	ESSFdc2	06	2_P8S2_18	N/A	N/A	2_P8S2_18
2	MSdm2	03	2_p_18	2_f_17	2_P5F5_18	2_p_18
2	IDFdk2	04	2_P9F1_18	2_F7P3_17	N/A	2_P9F1_18
2	ESSFxc	06	2_P8S2_18	N/A	N/A	2_P8S2_18
2	ESSFdc2	07	2_s_19	N/A	N/A	2_s_19
2	ICHmk2	03	2_p_18	2_f_17	N/A	2_p_18
2	ICHmk2	02	2_p_18	2_f_17	N/A	2_p_18
2	IDFdk2	06	2_P8S2_18	2_F7P3_17	N/A	2_P8S2_18
2	ESSFdc2	08	2_s_19	N/A	N/A	2_s_19
3	ESSFxc	01	3_P7S3_15	N/A	N/A	3_P7S3_15
3	ESSFxc	05	3_P7S3_15	N/A	N/A	3_P7S3_15
3	IDFdk2	03	3_p_15	3_f_16	N/A	3_p_15
3	ESSFdc2	04	3_p_15	N/A	N/A	3_p_15
3	MSdm2	07	3_s_15	3_S5P5_15	3_s_15	3_s_15
3	ESSFxc	07	3_s_15	N/A	N/A	3_s_15
3	ESSFxc	08	3_s_15	N/A	N/A	3_s_15

Prod. Grp.	BEC	Site Series	Management Zone			
			General	Mule Deer	Special Management	Landscape
3	IDFdk2	02	3_p_15	3_f_16	N/A	3_p_15
3	ESSFdc2	02	N/A	N/A	N/A	N/A
3	ESSFdc2	03	3_p_15	N/A	N/A	3_p_15
4	ESSFxc	10	N/A	N/A	N/A	N/A
4	MSdm2	02	N/A	N/A	N/A	N/A
4	ESSFxc	09	N/A	N/A	N/A	N/A
4	ESSFdc2	09	N/A	N/A	N/A	N/A
4	ESSFxc	02	4_p7s3_10	N/A	N/A	4_p7s3_10
5	IDFxh2	04	5_f_16	5_f_16	N/A	5_f_16
5	IDFxh2	05	5_f_16	5_f_16	N/A	5_f_16
5	IDFxh2	01	5_f_16	5_f_16	N/A	5_f_16
5	IDFxh2	06	5_f_16	5_f_16	N/A	5_f_16
5	IDFxh2	07	5_F7S3_16	5_F7S3_16	N/A	5_F7S3_16
5	IDFxh2	02	5_f_16	5_f_16	N/A	5_f_16

YIELDTABLE	Pl%	Fd%	S%	Stems	Regen. delay	Genetic gain	Area
1_f5p5_21	50	50		1800	1	5%	17.2
1_f7p3_21	30	70		1800	1	5%	4.02
1_p8s2_21	80		20	1800	1	5%	553.2
1_p9f1_21	90	10		1800	1	5%	134.5
1_Pl_Plant_21	100			1800	1	5%	19,336.9
1_s5f5_22		50	50	1800	1		79.5
1_s8p2_22	20		80	1800	1	5%	150.4
2-f7p3_17	30	70		1800	1		230.1
2_f_17		100		1800	1		19.6
2_f7p3_17	30	70		1800	1		205.1
2_p_18	100			1800	1		7,932.2
2_p5f5_18	50	50		1800	1		0.7

YIELDTABLE	Pl%	Fd%	S%	Stems	Regen. delay	Genetic gain	Area
2_p8s2_18	80		20	1800	1		2,976.5
2_p9f1_18	90	10		1800	1		233.8
2_s_19			100	1800	1		170.9
3_f_16		100		1800	1		154.1
3_p_15	100			1800	1		808.9
3_p7s3_15	70		30	1800	1		1,453.6
3_s_15			100	1800	1		805.7
4_p7s3_10	70		10	1800	1		3.3
5_f_16		100		1800	1		358.7
5_f7s3_16		70	30	1800	1		22.9
Proposed Rd							74.8

Appendix 9: Unsalvaged losses

The following is a summary of assumptions used to derive the estimate for unsalvaged losses for TFL 35:

The following factors contribute to reduced unsalvaged losses:

- TFL 35 has an extensive road system allowing for easy access and recovery of salvage timber.
- Weyerhaeuser has developed and implemented a detail pest and windthrow management strategy (copy available).
- Annual monitoring is completed to identify pest infestations and wind thrown timber with follow up salvage operations.
- Aggressive fire protection program in cooperation with the BC MoF Regional Fire Center.

Unsalvaged losses are based on a review of last five years activities to estimate losses associated with Bark Beetles, Fire and Wind Throw. The approach employed is similar to that used in the Kamloops TSA Timber Supply Analysis Data Package.

Bark Beetles

Total Bark Beetle unsalvaged losses is estimated at 439 m3/year based on the following:

Mountain Pine Beetle

In recent years Mountain Pine Beetle (MPB) infestations have increased considerably within the Kamloops TSA including TFL 35. Weyerhaeuser has maintained an aggressive program to monitor infestation level and implement salvage program in an effort to reduce losses. Salvage activities have been focused in the Stuart Lake; Rushton South/Venn Creek; Wentworth and Skull Creek Pest Units.

Strategies and tactics for management of Mountain Pine Beetle are outlined in the 2000 Operational Plan for TFL 35 Pest Units (copy available).

During 1996 to 1998 Single Tree Disposal was employed to manage infestation in isolated areas on TFL 35. No single tree disposal was completed during 1999.

Year	Total Volume (m3)
1999	0
1998	298.1
1997	94.3
1996	50.0
1995	0

The estimated annual loss to unsalvaged MPB infestation is 189 m3/yr. This estimate accounts for losses due to single tree disposal and unsalvaged isolated trees (100 m3 unsalvaged plus 88.5m3 (F&B) loss to MPB).

Douglas Fir Beetle

Douglas Fir Bark Beetle infestations occur along the eastern boundary of TFL 35 primarily in the vicinity of Venn Creek. The 1999 trap tree program was very successful indicating a vigorous population. Due to steep slope in Venn and Jamieson Creek there are populations that are not being actioned. Estimated losses due to Douglas Fir Beetle is 50.0 m3/yr.

Balsam Bark Beetle

Low to moderate endemic levels of WBBB exists throughout TFL 35. No management strategy exists for this pest due to the low infestation levels and location. Annual loss due to WBBB is estimated at 200 m3/yr.

Spruce Bark Beetle

Low endemic levels throughout the range of spruce on TFL 35. No losses estimated.

Wind Damage

A similar approach was used to estimate the losses due to wind damage. The total number of cutblocks greater than 5 ha was determined over a five year period. Unsalvaged wind damage along cutblock edge was estimated at 25m3/cutblock. Average annual losses due to wind damage is estimated at 490 m3/yr

Year	Cutblocks Greater than 5.0 ha.	Estimated Annual Loss
1999	23	575
1998	13	325
1997	33	825
1996	17	425
1995	12	300

Fire Damage

A review of the fire history on TFL 35 over the past six years was completed to determine losses due to fire damage. Average annual loss due to fire is estimated at 46.7 m3.

Year	Location	Estimated Size	Estimated Loss	Comments
1999	No fires reported			
1998	Stuart Lake McCauley Creek	Spot 3.5 ha	10 m3 250 m3	Most of fire was located outside TFL. 1.6 ha salvaged within TFL
1997	No fires reported			
1996	No fires reported			
1995	No fires reported			
1994	Bob Lake Road Bob Lake	Spot Spot	10 m3 10 m3	

Defoliator Damage and Abiotic Losses

No losses are estimated due to defoliator damage and abiotic factors.

TFL 35 Unsalvaged Losses

Activity	Estimated Annual Loss (m3/yr)	Comments
Bark Beetle	439.0	
Wind	490.0	
Fire	46.7	
Total	975.7 m3/yr	0.7 % reduction in harvest flow due to unsalvaged losses.

Based on the above it is estimated that 0.7 % of TFL 35 annual harvest consists of unsalvaged losses.