Appendix 5 – Timber Supply Analysis Information Package

BRITISH COLUMBIA

File: 12850-20/48

April 25, 2006

Don Rosen
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Dear Don Rosen:

Re: Information Package for Tree Farm Licence (TFL) 48

Thank you for your revised Timber Supply Analysis Information Package (IP) in support of Sustainable Forest Management Plan 4 for TFL 48 (version 2.1 dated March, 2006) submitted March 17, 2006. I have extensively reviewed the document along with Ministry of Forests and Range (MoFR) Region staff, MoFR District staff, and Integrated Land Management Bureau specialists.

The current version of the document still contains inconsistencies that have been discussed with you and the consulting timber supply analyst responsible for preparing the IP. As the MoFR timber supply analyst responsible for reviewing this IP, I accept the document for use in the timber supply analysis for TFL 48 conditional to the notes on the attached pages.

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Don Rosen
Inventory Specialist, Chetwynd
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I wish to point out that this letter does not mean that the MoFR endorses every aspect of this analysis. During the AAC determination information session, MoFR staff will advise the deputy chief forester regarding the technical validity of the analysis and the implications of its assumptions and results. The deputy chief forester will consider this advice as he develops the rationale for his determination of the AAC for TFL 48.

Sincerely,

G. Nienaber

Gordon Nienaber, RPF
Timber Supply Analyst
Forest Analysis and Inventory Branch

cc: Winn Hays-Byl, Ops. Manager-Stewardship\CSM
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Don Rosen
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Notes and Conditions on Acceptance of Information Package for Sustainable Forest Management Plan 4 - Tree Farm Licence 48

The following are items that must be addressed before the Information Package may be used as the basis for timber supply analysis.

Visual Quality Management
- implement changes agreed to in email dated April 12, 2006
- inputs as proposed are correct but changes are necessary to make this clear

Old Growth Order
- remove NDU/BEC representation constraints presented in Table 51
- implement constraints as set in the legislated Provincial Old Growth Order - provide a sensitivity showing impact of removing Old Growth Order constraints

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TREE FARM LICENCE # 48

Timber Supply Analysis Information Package in Support of Sustainable Forest Management Plan 4

August 2006

Version 2.3

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CANADIAN FOREST PRODUCTS LTD.
CHETWYND OPERATION

TREE FARM LICENCE # 48

Timber Supply Analysis
Information Package
in Support of
Sustainable Forest Management Plan 4

August 2006

Version 2.3

Prepared by:

Robert Schuetz, RPF
INDUSTRIAL FORESTRY SERVICE LTD.

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1.0 INTRODUCTION

This Information Package was prepared to fulfill the timber supply analysis requirements in support of Management Plan (MP) 4. The format follows the Ministry of Forest's *Provincial Guide for the Submission of Timber Supply Analysis Information Packages for Tree Farm Licences* Version 3, February 1998; and the Supplemental Guide for Preparing Timber Supply Analysis Data Packages June 2003. This document contains the assumptions and modeling procedures that will be used in the timber supply analysis for Tree Farm Licence (TFL) #48

The purpose of the Timber Supply Analysis Information Package (IP) is:

- To provide a detailed account of the factors related to timber supply that the Chief Forester must consider under Section 8 of the Forest Act when determining an allowable annual cut (AAC), and how these are 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 the opportunity to review data and information that will be used in the timber supply analysis before it is initiated;
- To ensure that all relevant information is accounted for in the analysis, to a standard acceptable to Forest Service staff;
- To reduce the risk of having analyzes rejected because input assumptions and analysis methods were not agreed upon in advance.

Forest management in TFL # 48 involves both coniferous forest types and deciduous forest types. Management planning of both coniferous and deciduous stands will be completed by Canfor. In this analysis, both the coniferous and deciduous land bases will be analyzed and managed as one complex unit, albeit with different management assumptions and harvest forecasts. A separate harvest forecast will be determined for both the coniferous-leading stands within the TFL, and the deciduous-leading stands within the TFL.

2.0 PROCESS

The management plan process involves some key dates and deadlines in order to keep the process on track. Key dates are as follows:

- **October 15, 2005** - Draft Information Package submission to Bud Koch, RPF, MOF Branch
- **February 21, 2006** – MOF responds to the IP.
- **March 17, 2006** - A revised IP is delivered to the MOF.
- **Aril 25, 2006** – MOF provides a conditional approval letter
- **August, 2006**- A completed timber supply analysis report is delivered to the MOF.
- **_____, 2006** - The timber supply analysis is accepted by the MOF.
- **_____, 2006** - This is the deadline for submission of the proposed Management Plan. Two months after this date the proposed management plan is accepted or rejected.
- **_____, 2006** - The Chief Forester is scheduled to approve the Management Plan.

This package provides a great deal of explanation into the derivation of the input data to the timber supply model. The inventory information is accessed using an ARC-INFO GIS which was used to intersect the many coverages developed by Canfor over the terms of MP's 1, 2 and 3.

2.1 Growth and Yield

Natural stand growth and yield information, as determined through "Batch" version 6.6d of VDYP; and managed stand growth and yield information, as calculated through BatchTIPSY version 3.2b, have been submitted separately to facilitate the review process. The tables are included in Appendix A and B.

2.2 Missing Data/Uncompleted Tables

For this submission of the Information Package there are no missing tables.

3.0 TIMBER SUPPLY FORECASTS/OPTIONS/SENSITIVITY ANALYSES

The purpose of this section is to summarize the harvest forecasts that will be analyzed and provided in the timber supply analysis report for TFL # 48. The set of assumptions pertaining to each sensitivity analysis is covered in Section 11.

3.1 Base Case

The Base Case will identify the short-, medium- and long-term harvest levels based on the current level of integrated resource management, harvesting and silviculture performance. Assumptions include current directions from the Dawson Creek Forest District Manager and the TFL48 Public Advisory Committee (PAC), related to biodiversity requirements, acceptable view-shed management, wildlife management, watersheds, patch size and riparian reserve and management zone requirements.

Changes that have occurred during the course of Management Plan 3 will be incorporated into the Base Case scenario for Sustainable Forest Management Plan 4 (SFMP 4). These changes, in addition to Canfor's standard operating procedures, are detailed in the following Table 1. The harvest level associated with the Base Case analysis and most of the subsequent sensitivity scenarios will be assessed using a non-declining harvest level (the exception is the accelerated harvest scenarios). In each scenario a coniferous harvest level and a deciduous harvest level will be reported. In many cases the non-declining harvest forecast is dependent upon the most constrained period during the forecast period; this will mean that the initial harvest level can be increased to the true long-term harvest level (LTHL) some time during the planning horizon. The LTHL will be identified is the highest level that can be attained while maintaining a more or less constant growing stock. The points of greatest constraint in the harvest flow will also be shown.

Table 1: Base Case Timber Supply Analysis

Issue	Action / Comments
Utilization Standards	Natural stands and managed stands will be harvested at close utilization standards: minimum D.B.H. of 12.5 cm for pine and deciduous, 17.5 cm for spruce and balsam.
Silviculture	Species mix, densities and regeneration delay are based on current and past performance. Species mix and density model current planting practices of 1600 sph. Regeneration delay is based on performance over the last 10 years. Generally, regeneration delay has been reduced to two years or less.
Site Index	Calculated using VDYP. In two or more layered stands, the highest site index was selected.
Legislated FPC Requirement	Canfor will model the legislated requirements of the FPC following the *Provincial Guide for the Submission of Timber Supply Analysis Information Packages for Tree Farm Licences Version 3, Feb 1998 Appendix IV*. This includes RMAs and landscape unit biodiversity emphasis modeling as outlined by the MOF. Old growth biodiversity is modeled using Minimum Natural Disturbance Unit guidelines developed for the Prince George Forest Region.
Visually Sensitive Areas with established VQOs.	Canfor will model the impact of the known scenic area with established visual quality objectives (VQOs). This includes the consolidated inventory of Scenic areas completed by the MOFR in 2005 with established VQO's. Forest cover requirements for each VQO were determined using the *Procedures for Factoring Visual Resources into Timber Supply Analysis Mar* 1998.
Roads	A road management system was created for TFL # 48 during the term of MP 3. Average widths were determined via field sampling and applied to a GIS buffering routine. Existing roads, trails, seismic lines etc. have been identified in the VRI database. Future roads trails etc. will be removed by a percent reduction from all harvested stands.
Deciduous Stands	Deciduous stands will be included in both the gross and net land base. Merchantable deciduous stands across the entire TFL (not just the PA portion) will contribute to the THLB and the deciduous harvest calculation. Deciduous stands and the minor deciduous components of conifer stands are excluded from the THLB in ESSF areas, and where mixed and cable harvesting systems are required.
Wildlife Habitat	Habitat is accounted for through the land base net down for riparian reserves, inoperable areas and un-merchantable forest types. Caribou use predominately alpine and parkland habitats within the TFL and as such no additional forest cover objectives will be modeled. Ungulate winter range in the Dunlevy has been excluded from the THLB. Additional wildlife habitat values are tracked through time through the linkage between wildlife habitat ratings, BEC, site series and structure stage.
Old Growth and Early Seral	Old growth is managed through the application of forest cover constraints by Natural Disturbance Unit and sub-unit. Further, early seral and patch size distribution is handled through the development of a spatial harvest schedule for the first 8 periods (80 years) of the simulation horizon.
Streams and Lakes	Stream classifications have been completed for all 5 Blocks in the TFL. This information was used to buffer the classified streams in the TFL.
Heritage / Cultural	Known heritage and cultural sites have been identified on the TFL. These sites remain unchanged from MP#3. Areas around these sites have been buffered and removed from the THLB.
Recreation	Recreation and ROS information that was developed and utilized in MP# 3, will again be utilized in the Base Case analysis. Recreation class B1 is managed through the application of mature forest cover constraints.
Operability	A Terrain Mapping/Landslide Inventory project for the TFL was used in MP#3 to define operability constraints. This information remains unchanged for SFMP 4. A minimum economic volume/hectare will also apply to the three main operability types.

3.2 Sensitivity Analysis

Uncertainties around the data and assumptions used in the Base Case are investigated using sensitivity analysis. As well, the impact that changes to various management strategies can have on the harvest level are assessed through sensitivity analysis. Usually only one assumption is varied for each sensitivity analysis (harvest forecast). These forecasts are also used to provide input into the management direction for the TFL. Details on all scenarios are provided in Section 11.0.

Table 2: Sensitivity Analysis

Issue	Scenario # / Comments	
MP#3	2	Model old growth by Landscape Unit and BEC as per the Old Growth Order
Natural Range of Variability	3	Examine the impact of utilizing the mean level of the NRV
	4	Examine the impact of utilizing the highest level of the NRV
	5	Examine the impact of removing all biodiversity constraints
Mountain Pine Beetle	6	This scenario will examine the impact of pine mortality on the Tree Farm. Various levels of pine infestation will be tested
	7	This scenario will see an accelerated harvest level directed toward mature pine to mitigate the possible loss in volume due to the MPB
Woodlots	8	Examine the impact of including woodlots into the Base Case harvest flow
Visually Sensitive Areas	9	Examine the impact of adding recommended VQO's as a result of the new visual inventory (1999).
Future mine site	10	A spatial coverage was developed by Canfor through cooperation with the mines operating in the vicinity of TFL48. The cover identifies the future expansion of mining within the TFL. This future expansion was removed from the THLB in the land base net-down. This scenario examines the inclusion of these areas into the THLB.
SIBEC	11	A scenario was developed that adjusts the yield from post-95 managed stands to reflect yield estimates as a result of using the Site Index – Site Series by Region – SIBEC RDM Version May 2006

3.2.1 Sensitivity – MOF Standard Sensitivity Analysis

The following scenarios are standard Timber Supply Review sensitivity analyzes designed to assess the impact of uncertainties surrounding inventory, yield and management assumptions.

Table 3: Standard Sensitivity Analysis on the Base Case

Issue	Scenario # / Description		Comments
Harvest Flow	101	Model alternative harvest flows	Test the impact of an accelerated harvest flow and the current short-term harvest flow.
Land base	102	Model the impact of increasing the timber harvesting land base by 5%	Test impact regarding uncertainty with inventory information
	103	Model the impact of decreasing the timber harvesting land base by 5%	
Yield Estimates	104	Model the impact of increasing natural stand yields by 10%	Test implications of under or over estimating empirical stand yields
	105	Model the impact of decreasing natural stand yields by 10%	
	106	Model the impact of increasing managed stand yields by 10%	Test the implications of under or over estimating managed stand yields
	107	Model the impact of decreasing managed stand yields by 10%	
Minimum Harvest Age	108	Model the impact of reducing the minimum cutting age for natural stands by 10 years	Test implications of varying the minimum harvest age
	109	Model the impact of increasing minimum cutting age in natural stands by 10 years	
Visuals	110	Model the impact of decreasing the VQO categories by one class	Test the impact of VQO constraints in Visually Sensitive Areas
	111	Model the impact of increasing the VQO categories by one class	
Forest Cover Constraints	112	Model the impact of reducing the greenup constraint by 10 years	Test the impact of adjacency constraints
	113	Model the impact of increasing the greenup constraint by 10 years.	

Note that additional scenarios beyond those identified in Table 2 and Table 3 may also be examined depending on the analysis results.

3.3 Alternative Harvest Flows over Time

There are many possible harvest flows with different decline rates, different starting harvest levels, and potential tradeoffs between short- and long-term forecasts. One of the requirements of Section 8 of the *Forest Act* is that the Chief Forester considers the short- and long-term implications to British Columbia of alternative rates of timber harvesting from an area. Several alternative flow forecasts will be tested on the coniferous and deciduous land base to enable the Chief Forester to assess short-, medium-, and long-term tradeoffs in the Base Case analysis.

In timber supply analysis various harvest flows (short-, medium- or long-term) are sometimes possible without compromising long-term sustainable harvest flows. In this analysis the short-term harvest level will be increased to the maximum level possible. This will be followed with a decline of 10% per decade to the long-term sustainable harvest flow. Depending on the outcome of the Base Case harvest forecast, alternative rates of decline (or increase), or period prior to decline (or increase), will be explored.

Several issues must be considered in developing the Base Case harvest flow. For example, where harvest levels are declining, the rate of decline from the current harvest level should be controlled to avoid large and abrupt future harvest shortfalls and the long-term level should be stable. In MP's 2 and 3, TFL # 48 was capable of supporting a non-declining harvest flow. The AAC set for the term of Management Plan 3 was approximately that of the initial non-declining harvest flow identified as the Base Case in the timber supply analysis report. Further to Canfor's goal of managing the TFL in a sustainable manner, as well as the need to uphold sustainable forest management commitments, the Base Case harvest flow will for SFMP 4 will portray a mid and long-term non-declining harvest level. However, the short-term harvest level will be accelerated to deal with the development of a mountain pine beetle epidemic encroaching into TFL48 from the west.

4.0 MODEL

Canadian Forest Products Ltd. will use the Remsoft Spatial Planning System (Woodstock v2006.1.1, Spatial Woodstock and Stanley v5) for this timber supply analysis. The model was developed by a private company based out of Fredericton, New Brunswick. The model is used in conjunction with the linear programming optimization model MOSEK.

5.0 CURRENT FOREST COVER INVENTORY

The forest inventory conforms to Ministry of Forest's standards. The current forest cover inventory is based on a re-inventory performed by Canfor during the term of MP 2. The photography for this inventory was taken in 1993/94 for TFL Blocks 4 and 5, and in 1997 for TFL Blocks 1, 2 and 3. The inventory exists in the form of a Vegetation Resource Inventory (VRI). Phase I (the re-inventory) has been adjusted to incorporate extensive timber and ecology ground sampling (e.g. the Phase II part of a VRI). Finally, volume decay loss estimates and taper equations have been localized through a destructive sampling process referred to as "Net Volume Adjustment Factoring" (NVAF). The information gained in the process of completing Phase II and the NVAF revealed that volume estimates were generally underestimated and losses for decay were

typically overestimated for many of the stands in TFL 48. This has resulted in both a net increase in the amount of area that will contribute to the timber harvesting land base, and a net increase in the merchantable volume within each stand.

The inventory information of the TFL has been updated to February 2005, to account for stand aging, harvesting and other area/volume depletions. All constructed roads are now part of the VRI and have been removed from the forested land base. Trails, seismic lines and transmission lines have been removed from the forested land base. Canfor's spatial cut-block-tracking, silviculture and road management system was used as the source for the update and accomplished through ArcInfo™ Geographic Information System (GIS) buffering routines. The results of this buffering were visually inspected on the map products.

6.0 DESCRIPTION OF LAND BASE

The information provided in this section of the Information Package follows the order described in the Provincial Guide for the Submission of Timber Supply Analysis Information Packages for Tree Farm Licences version 4 March 2001.

6.1 Timber Harvesting Land Base Determination

The purpose of Table 4 is to summarize the area reductions made to the total area of the TFL, to arrive at the land base that is available for timber harvesting. The reductions and additions are listed in the order in which they are applied. Each reduction and addition is described in more detail in the appropriate sections that follow. Note that in the term of MP #3, the gross area in the TFL has decreased. This is a result of the removal of the Rice Property fields, addition of the Stewart Lake block (TFL48 Instrument 5) and removal of new or expansion areas for Woodlots. It should be noted that the Woodlots have not formally been removed from the TFL through a legal instrument to amend the TFL.

Table 4: Timber Harvesting Land Base Determination

Classification	Gross Area (ha)	Area (ha)	% Prod. Forest
MP 3 TFL Total Area (incl. Water)		643,511	
Changes to TFL Boundary			
Removed woodlots [1]		794	
Removed "Rice Property" farm fields		1231	
Inclusion of the Stewart Block		1,753	
SFMP 4 TFL Total Area (incl. Water)		**643,239**	
Less: TFL Boundary sliver polygons [1]		112	
Water	3,104	3,104	
Mine Sites (existing and proposed)	2,236	2,236	
Existing Roads	5,567	3,830	
Non-Vegetated Land	971	949	
Vegetated Non-Treed (no disturbance history)	67,171	66,943	
Plus: Sukunka Falls Park [2]	426	330	
Potentially Productive Area		**566,394**	**100.0%**
Less: Inoperable	34,038	34,038	6.0%
NDT 5	14,942	13,765	2.4%
Forested Islands	195	141	0.0%
Wildlife Habitat - Bull Trout	86	74	0.0%
Archaeological Sites	10	10	0.0%
Protected Areas (including parks)	14,853	12,849	2.3%
Recreation	1,270	418	0.1%
Buffers: Lakeshore reserves	28	25	0.0%
Stream/River riparian buffers	31,082	27,597	4.9%
Forested Wetlands	4,001	3,558	0.6%
Forested Wetland Buffers	1,882	1,760	0.3%
Low productivity sites	72,618	55,710	9.8%
Problem Forest types	62,497	48,077	8.5%
Sukunka Falls Park [2]	426	286	0.1%
Visual preservation	723	167	0.0%
Dunlevy Ungulate Winter Range	4,480	1,983	0.4%
Rare Site Series	4,080	2,572	0.5%
Total Reductions to Productive Forest		203,029	35.8%
Net Land Base		**363,365**	**64.2%**
Split into: Coniferous THLB		314,829	55.6%
Deciduous THLB		48,536	8.6%
Less: Losses to Future Roads (1.9%)		6,609	1.2%
Future Timber Harvesting Land Base		**356,756**	**63.0%**

Notes: 1 Woodlots have not formally been removed from the TFL, however they have been approved and issued by the MoF.
2 Sliver polygons less than 0.001 hectares in size were dissolved and merged with the largest adjacent polygon. As well, 23 ha were removed having no VRI information.
3 The Sukunka Falls Park is wholly encompassed by TFL48 but is not part of the TFL tenure. Comprising a total of 425 ha this park has been included in the Productive Forest Land Base for biodiversity purposes and then excluded from contributing to the THLB.

6.2 Total Area

The total management area of Tree Farm License # 48, but after reductions for private lands and woodlots that exist within the confines of the TFL is 643,239 hectares. The TFL boundary has changed from the area reported in MP 3, primarily due to the creation of new woodlots, and the addition of the Stewart block in exchange for the removal of the field portion of the Rice Property.

6.3 Non-Vegetated

Non-forest descriptors in the VRI can be broken into two land cover types: non-vegetated land and water.

6.3.1 Water

Water was identified on the VRI file for TFL #48 using BC land classification level 2 (i.e., BCLCS_LEVEL_2). The distribution of water resources relative to BCLCS_LEVEL_5 is shown in Table 5.

Table 5: Non-Vegetated Water

Description	Total Area (ha)
Lakes	1,231
Rivers	1,817
Reservoirs	56
Total	3,104

(BCLCS_LEVEL_5 where level 2 = “W”)

6.3.2 Non-Vegetated Land

Non-vegetated land includes areas in the alpine, uplands and wetlands. The area can be further classified as: snow/ice, rock/rubble and exposed land. The area for these items is described in the TFL vegetation resource inventory file. Details are provided in Table 6.

Table 6: Non-Vegetated Land

Cover Type	Landscape Position	Total Area (ha)
Rock	Upland	775
	Alpine	174
Total		949

Where BCLCS_level_4 = RO

6.4 Roads

Existing roads occur on the inventory files as polygons. During the term of MP#3 roads were classified and buffered based upon average measured widths. The roads occur on the inventory file as non-vegetated land. A total of 3,830 hectares are removed from the productive forest land base area for existing roads.

6.4.1 Classified roads

Roads which have a right-of-way identified on the inventory file by a break in the VRI polygons are identified on the file as “RP” in the non-veg table of the VRI database. Having a non-veg cover type of “RP” being greater than 15% identified the polygons selected for removal from the THLB. These same polygons may have been classified as shrub, herb or some other vegetation type depending on the vegetation contained within the polygon. Typically, paved highways, paved secondary roads, gravel secondary roads and main line roads should have had sufficient width to be typed out in the VRI. During the VRI update completed in February 2005 all roads were buffered by their average width based on road class and included in the VRI as a polygon with the BCLCS Level 4 = “RP”. During the term of MP3 Canfor developed a process of tracking all oil and gas activities on TFL 48. These activities have been included in the VRI update described for roads. Included in this classification are all oil and gas well sites, camps, sumps, road access and borrow pits. From Table 7 we see a total of 3,830 hectares have been classified in this manner.

Table 7: Existing Classified Roads

BCLCS LEVEL 1	BCLCS LEVEL 4	Total Area(ha)
Non-vegetated (N)	Road Surface (RP)	2,654
	Exposed Land (EL)	1,176
	Total	3,830

Note: Included in the net-down for existing classified roads is area lost to exiting well sites.

The “classification” of roads does not infer classification of road ownership but rather that the road has been identified, the right-of-way has been buffered and the road now exists as a polygon on the inventory file.

6.4.2 Existing Unclassified roads

There are no existing unclassified roads within the TFL. During the term of MP 2, Canfor completed a comprehensive road inventory. During MP3, the roads in this inventory were buffered for their average width. A road inventory management process keeps the TFL’s inventory updated for new road construction.

6.5 Mine Sites

Mining is a significant resource activity within the boundary of TFL 48. Mine sites have been identified in this analysis and excluded from the productive forest land base. This exclusion has occurred because it is difficult to predict the timing and extent of land denudation. As well, how much reclamation will occur and over what time period is unknown. Canfor could assume that when this reclamation occurs, many of these areas will contribute to the productive forest land base and provide an upwards pressure on the long term harvest level. However, for the purpose of this analysis no area has been added back to the forested land base due to current or future reclamation activities. Table 8 describes the TFL area exclude from the productive forest land base due to mining claims.

Table 8: Reduction for Mining

Mine Classification	Land Status (BCLCS_LEVEL_2)	Total Area (ha - including mine roads)
Existing	Treed	98
	Non-treed / land	1,625
Proposed	Treed	479
	Non-treed / land	34
	Total	2,236

Mine locations were intersected into the TFL database

6.6 Vegetated Non-Treed

Vegetated non-treed areas were often classified as NCBr in traditional forest cover inventories. These areas have been classified according to their position in the landscape, i.e., wetland, upland or alpine. If disturbance history exists in the upland or wetland areas, it is assumed that the area exists as backlog NSR resulting from a burn, or from logging. In these instances (i.e., when disturbance history exists for these polygons), the area was not netted out. If disturbance history does not exist, the area was netted out of the potentially productive land base. A breakdown of vegetated non-treed area is shown in Table 9. Further discussion on backlog NSR is provided in Section 8.7.2.

Table 9: Vegetated Non-Treed

Landscape Position [1]	Cover Type	Total Area (ha)
Wetland	Shrub tall	431.5
	Shrub low	543.2
	Herb	901.2
	Bryoid	7.3
Upland	Shrub tall	12,915.7
	Shrub low	12,892.1
	Herb	22,915.8
	Bryoid	2,569.9
Alpine	Shrub tall	76.0
	Shrub low	4,968.1
	Herb	7,295.8
	Bryoid	1,553.9
Total Vegetated Non-Treed		67,070.5
Add-back Upland [2]	Shrub low	127.6
Total Vegetated Non-Treed Reduction		66,942.9

1 BCLCS_LEVEL_1 = V, BCLCS_LEVEL_2 = N

2 Area in the uplands with disturbance history (BCLCS_LEVEL_5 = SP) was added back to the productive forest land base

6.7 Inoperable

Over the term of MP 2, Canfor completed a terrain inventory and landslide inventory, as well as slope stability and operability interpretations for TFL # 48. This has been completed using Terrain, BEC variant mapping, landslide inventory and slope to predict terrain stability and operability. Using a combination of slope and terrain stability, all areas of the TFL were classified as conventional harvest systems, mixed harvest systems, cable harvest systems, aerial harvest systems and inoperable. The area in the newly acquired Stewart block did not have this work completed. Conventional Dawson Creek TSA operability mapping was used to define conventional, cable and inoperable areas. The coniferous leading inoperable, which includes aerial areas identified in the Operability interpretations have been excluded from the THLB. As well, the deciduous stands existing on mixed and cable ground have been excluded from harvesting. Table 10 and Table 11 describe physical operability within the TFL by slope class and harvest system.

Table 10: Physical Operability by Slope Class and Harvest System

Physical Operability Class		Slope / Area by Harvest System											
		0-10%		10-45%		45-70%		70-80%		80-100%		100%+	
Stability Index	Stable	124,226	Conv	249,776	Conv	218	Cable						
	Moderately Stable			703,02	Conv	3,862	Cable						
	Quasi-stable			508,83	Mix	34,087	Cable	131	Inop	8	Inop		
	Lower Threshold			21,220	Cable	43,300	Cable	8,902	Inop	3,685	Inop	15	Inop
	Upper Threshold			4,647	Inop.	8,033	Inop	2,968	Inop	2,791	Inop	1,539	Inop
	Defended			2,271	Inop	4,411	Inop	1,964	Inop	2,925	Inop	1,412	Inop
Totals		124,226		399,099		93,911		13,965		9,409		2,965	
		643,575											

Table 11: Physical Operability Classes by Net Area

Operability	Forest Area (ha)	Excluded Forest (ha) [1]	THLB (ha)
Conventional	415,123	114,165	300,958
Mixed	29,631	7,246	22,385
Cable	82,937	46,573	36,364
Aerial	5,928	**5,928**	0
Inoperable	28,111	**28,111**	0
Total	561,729	202,022	359,707

1. The bolded numbers in the excluded column refers to the total area (34,038ha) excluded in the net down table. Other numbers under excluded forest refer to area removed for reasons other than operability.

In this analysis, a net-down was not applied to areas having a conventional, mixed or cable operability classification. A net down of the THLB was applied to all coniferous-leading areas identified as aerial or inoperable. In addition, since it is not current practice to harvest deciduous-leading species from mixed, aerial or cable ground, or from the ESSF, the deciduous-leading stands occurring within these locations have also been excluded from the THLB.

6.8 Non-commercial

Non-commercial cover or NC is not identified on the VRI as a polygon attribute.

6.9 Low Productivity Sites Identified for Immature Stands

Table 12 documents the immature area that is not suitable for harvest due to its poor timber growing potential. A site index is the height of a stand measured at breast height age 50 (mbha50). The site indices indicated in Table 10 reflect the minimum site index required for a stand to reach 120 m3/ha at maturity on conventional ground. Similarly, a minimum stand volume of 150 m3/ha and 200 m3/ha is required for mixed and cable ground respectively. The site indices calculated in Table 12 were derived from VDYP. A 50% crown closure was assumed for coniferous timber types and a 60 % crown closure for deciduous. The stands were assumed to reach maturity at the regional priority cutting age (i.e., 101 for Pl, 141 for Sw, 121 for Bl and 81 for At and Cot).

The Ministry of Forests requested that Canfor monitor the harvesting performance in deciduous leading stands, which are currently classified as having a low timber growing potential. However, as a result of the deciduous manufacturing facility being closed for a significant period of time during MP#3 there was no harvesting of deciduous leading stands. With re-opening of this facility and the addition of other deciduous manufacturing capacity in the Peace an increase in the demand for deciduous is anticipated. Due to the lack of new information the site index limits have remained unchanged from MP#3.

Table 12: Low Site Index applied to Immature Stands

Timber Types	Site Index Upper Limit of Exclusion by Operability Type			Forest Area (ha)	Net Reduction Area (ha)
	Conventional	Mixed	Cable		
Balsam	9.6	10.9	13.0	37,645	25,447
Spruce	7.5	8.5	12.0	11,504	9,393
Pine	10.4	11.7	14.1	10,605	9,090
Aspen	16.1	0	0	11,029	10,137
Cottonwood	12.4	0	0	1,835	1,643
			Totals	72,618	55,710

6.10 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are no longer identified in Vegetation Resource Inventories. Area management concerns for steep slopes, soils, recreation, visual quality, and wildlife must now be addressed through other land base net downs. Some of these net downs include inventories which were accumulated by Canfor and are specific to resource management objectives other than timber management (e.g., recreation). Specific wildlife habitat areas are now being modeled, operability information is extensive and addresses steep slopes, soils, and physical operability concerns. Visual information is accounted for along with recreation net downs.

6.11 Riparian Reserves and Management Zones - Streams and Rivers

Since 1995, Canfor has conducted 1:20,000 RIC standard fish and fish habitat inventories throughout the TFL. Over the term of MP#3, this detailed modeling exercise has been completed for the entire TFL.

A Stream Classification Tool (SCT)(Hatfield and Ecometrics 2000 [1]) was designed to predict stream classes for all reaches in TFL 48. The best fit model used a 20% average reach gradient barrier to upstream fish migration, no fish bearing streams higher than 1300 m in elevation and no fish upstream of a confirmed barrier.

The SCT predicted stream class for more than 30,000 reaches. For the purposes of analysis we established the amount of merchantable volume left in the total Riparian Management Area (RMA). To do this we had to develop a total Riparian Management Area width applied to streams. Riparian Reserve Zone (RRZ) widths were applied as per the Operations Planning Regulations of the Forest Practices Code (e.g., S3 = 20m). Variable retention of merchantable timber left in the RMZs was based on SPs occurring within the TFL and harvested over the past 5 years.

Management Zone widths were applied using the same methodology as for RRZs. *The legislated RMZ width was factored for a percent retention by stream class, as derived from summarizing the prescribed retention in silviculture prescriptions from 2000 to 2003 (See the TFL48 SFMP Sec 3.7 for additional information). The area was then removed from the timber harvesting land base.* The results of the reductions for RRZ and RMZ are shown in Table 13.

Table 13: Riparian reserve and management zones around rivers/streams

Riparian Stream Class	Average Channel Width (m)	Stream Length (m)	FPC Act Reserve Zone Width (m)	FPC Act Mgmt Zone Width (m)	Net Width of Area Buffered (m) (1)	Total Buffered Area (ha)	Net Reduction Area
S1	>20 & < 100	145,016	50.0	20	56.1	31,082	27,597
S2	> 5 & ≤ 20	65,095	30.0	20	46.9		
S3	≥ 1.5 & ≤ 5	1,763,049	20.0	20	60.8		
S4	< 1.5	2,136,642	0.0	30	3.4		
S5	> 3	1,484,134	0.0	30	23.2		
S6	≤3	8,001,367	0.0	20	3.1		
Total		13,595,303					

(1) For TFL Blocks this is the weighted average reserve width of the stream to one side. Buffers were applied to both sides of every stream or river. Streams in the At BEC were not buffered as these areas were already removed from the THLB.

[1] Citation: Hatfield and Ecometrics. 2000. Stream Classification Tool, TFL 48. Prepared for Canadian Forest Products Ltd., Chetwynd. By Hatfield Consultants and Ecometrics Research, West Vancouver, BC. 13pp

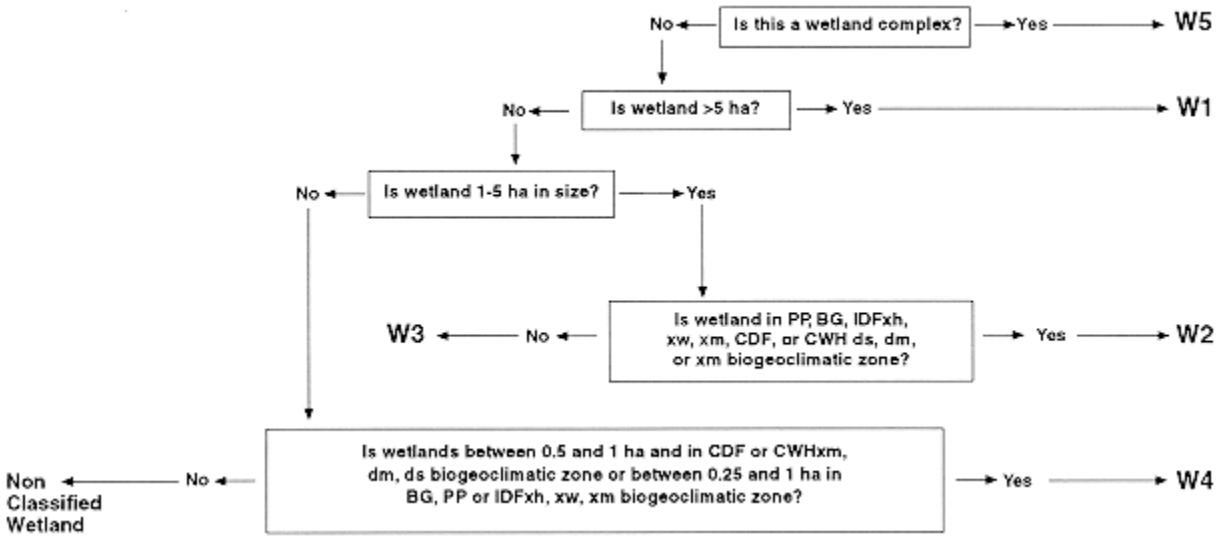
6.11.1 Forested Islands

Islands that exist primarily within the Sukunka River are often sufficiently large enough that riparian reserves did not capture all of the forest area within the island. Since it is unlikely that Canfor will harvest these areas in the foreseeable future, they were removed from the THLB via a visual inspection of maps of the TFL. The mapsheet polygon numbers were identified and used in the TFL net-down. A gross area of 195 hectares was identified as islands. Net within islands is 141 hectares that would otherwise have contributed to the THLB.

6.12 Riparian Reserves - Lakes and Wetlands

Lake riparian reserves were classified according to their size in the VRI. Thirty meter riparian reserves were placed around all lakes having a size between 5 and 1000 hectares.

Wetland classifications were determined using a GIS. Complex wetlands were calculated by buffering wetland polygons to determine which wetlands were within the proximity of others. The logic used to complete this buffer was derived using Figure 12 of the Riparian Management Plan Guidebook as shown below.



Wetlands have a management zone around them of varying widths and stem retention.

were defined as vegetated, treed, wetland polygons and vegetated, non-treed, wetland sites and a 10 meter reserve was placed around them. Complex wetlands are a relatively minor occurrence within the TFL as a result of the moderate to steep slopes. Due to the small area affected and the complexity of identifying and excluding these areas, wetland complex classifications have not been identified in this analysis. Sensitivity analysis may be used to examine the potential impact of addressing management concerns within these areas.

Table 14 describes the area removed from the timber harvesting land base for lakes and wetlands.

Table 14: Riparian reserve zones around lakes and wetlands

Riparian Class	Gross Area	Riparian Reserve Zone		Riparian Management Zone [3]			Total Buffer Width [3] (m)	Gross Area Reserved (ha)	Net Area Reduction (ha)
		Width (m)	% Retention	Width (m)	% Retention	Equivalent Distance Retention			
Lakes [1]		30	100	70	0	0	30	28	25
W1 [2]	2093	10	100	40	40	16	26	1,882	1,760
W3	825	0	0	30	40	12	12		
W5	2584	10	100	40	30	12	22		
Forest Wetlands						n/a		4,001	3,558

1 Lakes greater in size than 1000 ha or less than 5 ha did not have a buffer applied.
2 Wetlands were defined as vegetated treed wetland, vegetated non-treed wetland, or non-vegetated wetland in the VRI with an area not less than 5 hectares.
3 Riparian Management Zone retention estimates are based upon the principle and practice of winching merchantable stems out of riparian management zone areas, where the damage to remaining vegetation is minimized. The Percent retention is a rough approximation of the amount of merchantable volume retained in wetland riparian management zones

6.13 Wildlife Habitat Reductions

Land base reductions for wildlife habitat is intertwined with many of the biodiversity, adjacency and IRM assumptions used in the Base Case. Stand level area deductions for riparian areas and other forested land base exclusions will also contribute to wildlife habitat.

Specific reductions however, have been made for bull-trout, and ungulate winter range in the Dunlevy Special Management Area (Butler Ridge, Aylard and Williston Management Units). These area reductions are shown in Table 15.

Table 15: Specific Wildlife Habitat Area Reductions

Critical Habitat	Location	Gross Area (ha)	Forest Area (ha)	Net Area Reduction (ha)
Bull Trout	All	105	86	74
Ungulate Winter Range	Aylard	2461	1661	383
	Butler Ridge	301	199	87
	Williston	2982	2620	1513
	Graham	3704	3408	0 [1]
	Total UWR	9448	7888	1983
Total All Wildlife Reductions		9553	7974	2,057

Note: 768 hectares in the Graham UWR have been excluded from harvesting for other net down reasons.

A wildlife inventory has been carried out on TFL #48. Geographic areas denoting a range of habitat value have been identified based upon Terrain Ecosystem Mapping / Predictive Ecosystem Mapping (TEM/PEM) and the current structural stage of the forest. Since structural stage changes constantly over time, the habitat values in terms of quality and quantity applicable to any one species also changes. Canfor's objective is to manage the entire land base in a manner which maintains or enhances the current distribution of habitat values – though values in specific areas may fluctuate with disturbance activities The results of this analysis will help to derive appropriate forest cover requirements or stand level management practices - if and when applicable.

6.14 Cultural Heritage Resource Reductions

Known cultural heritage resources on TFL #48 have been provided by Archeology Branch, Ministry of Small Business, Tourism and Culture, and mapped by Canfor. As directed by the MOF, the 20 known spot locations have been intersected into the VRI and have been buffered with a 56 m radius to provide an approximate 1 hectare reserve. This 1 hectare buffer provides some measure of protection at a strategic level. More refined, site-specific buffers will be applied on the ground at the operational level of management. Table 16 provides a listing of the sites and the gross area and forested area affected. Consultations with Regional Archeological staff have indicated that a heritage trail is known to cross the TFL. However, the geographic location of this trail is not known, and therefore has not been incorporated into this analysis.

Table 16: Cultural/Heritage Sites

Landscape Unit	# of sites	Forest Area (ha)	Net Area Reduction (ha)
Boucher	3	2.5	2.5
Carbon	3	0.5	0.5
Highhat	3	3	2.8
Martin Creek	7	3.5	3.5
Wolverine	2	1.1	1.1
Total	20	10.6	10.4

6.15 Other Site Reductions

6.15.1 Protected Areas

Protected Areas resulting from the Dawson Creek LRMP have been removed from the T.H.L.B. Table 17 describes the area within the legislated protected areas within TFL #48.

Protected areas listed in the PAS section include; Bocock Peak, Butler Ridge, Klin-se-za (Twin Sisters), Peace River/Boudreau Lake, Pine/LeMoray, Gwillim Lake/Elephant Ridge, and Sukunka Falls Park in the Parks section. The forest area within all protected areas and the Sukunka Falls Park will contribute to the biodiversity seral stage targets within the zones that they occur.

Table 17: Protected Areas and Parks within TFL 48

Protected Area	Gross Area (ha)	Forest Area (ha)	Net Reduction (ha)
PAS	18,388	14,853	12,849
Parks	426	330	286
Total	18,814	15,183	13,135

6.15.2 Agriculture Land Reserves

Information pertaining to the Agricultural Land Reserve was obtained from the Provincial Land and Resource Data Warehouse. A small part of TFL #48 falls within areas identified under the Agriculture Land Reserve (ALR). Any indicated extractions from the TFL as a result of the ALR would have to be Minister approved upon referral under Sec 60.1B of the Forest Act.

Potential ALR's withdrawals have not been addressed in this analysis. The area within the ALR has been treated the same as the rest of the TFL. If a conversion occurs in the future, it is Canfor's understanding that the government would be responsible for providing compensation in some form. As well, should land conversions occur in the future, the impact on the long-term timber supply will be addressed at the time of the next analysis review. Table 18 describes the area within the ALR relative TFL 48.

Table 18: Agriculture Land Reserve Area

Total	Forested	Reductions for Other net down items	ALR Area in the THLB
31,842.00	27,737	7,223	20,514

6.15.3 High Elevation Forests

All forested and non forested areas within Natural Disturbance Type 5 (NDT 5) were removed from the timber harvesting land base. A total of 43,697 hectares are within NDT5. Contributing to the productive forest land base are 14,942 ha. After exclusions for operability, 13,765 ha were removed from the timber harvesting land base.

6.15.4 Seismic Lines, Pipelines, Trails and Transmission Lines

All seismic lines, pipelines, trails and transmission lines identified in the TFL data base had been buffered and identified as polygons in the VRI. These polygons were removed as part of the vegetated non-treed lands identified in Table 9.

6.16 Mature Stand Problem Forest Types

Mature problem forest types are stands that exceed the minimum cutting age, are physically operable, but are excluded from the timber harvesting land base due to the stands being too old, too short, have too small a diameter or have insufficient volume. Although many of these stands may be harvested in part, they are not specifically targeted for harvesting at the present time. Changes in timber value, timber availability, and sawmill requirements may change Canfor's perception of the value of these stands in the future. Table 19 documents the areas that are currently considered to be mature problem forest types. The land base deductions are described according to inventory file attributes.

The area removed from the THLB due to mature stand problem forest types significantly changed in SFMP4 versus MP3 due to the completion of the VRI Phase II ground sampling including Net Volume Adjustment Factor.

Height, age, and net merchantable volume were adjusted as a result of the Phase II and NVAF sampling completed on TFL 48. TSR volume is defined as the net merchantable volume at the 12.5cm+ utilization level in lodgepole pine leading stands and the 17.5cm+ level in all other stands. After adjustment, the average height increased by 5%, age decreased by 7% and TSR volume increase by 34%. The TSR volume increased by 18% in the high priority sample areas (those mature areas most likely to contribute to the timber harvesting land base) (JS Thrower & Associates 2005).

Table 19: Problem Forest Types

Leading Species	Characteristics							
	Age/Height/Stocking	Minimum Volume by Operability Class			Reduction Percent	Total Forested Area	Net Area reduction
		Conv.	Mix	Cable			
B, BH	age class ≥ 6 and height class ≤2, or age class ≥ 6 and stocking class = 2	120	150	200	100	12,658	7,531
BS	age class ≥ 6 and height class ≤2	120	150	200	100	12,587	9,914
S	age class 8 and height class ≤ 2	120	150	200	100	4,971	3,881
	All black spruce stands	All	all	all	100	7,362	5,411
Pl	age class ≥ 5 and height class = 1; all stocking class 4; all stands ≤17.5 metres	120	150	200	100	7,935	6,999
AtCon, CotCon AtDec, CotDec	Area within the ESSF, Area within cable or mixed operability	All	All	All	100	7,747	6,395
	age class ≥ 7 or age class ≥ 4 and height class = 1	120	All	All	100	9,039	7,773
Other Species (W, L, Ep)	all	All	all	all	100	198	173
Total						62,497	48,077

Table 20: Age, Height, Stocking Definitions

Age Class		Height Class		Stocking Class		
#	Age Range (years)	#	Height Range (m)	Class #		Definition
5	81 - 100	1	0 - 10.4	0		immature
6	101-120	2	10.5 - 19.4	1		mature & ≥ 76 stems/ha, 27.5+ cm dbh
7	121-140	3	19.5 - 28.4	2		mature & < 76 stems/ha, 27.5+ cm dbh
8	141 - 250	4	28.5 - 37.4	Sub-div. of 2	3	mature Pl ≥ 311 stems/ha, 17.5+cm dbh and 50% of stems 7.5+ cm dbh are ≥ 12.5+ cm dbh
9	251 +	5	37.5 - 46.4		4	mature Pl <311/ha, 15.5+cm dbh or ≥ 311/ha, 17.5+ cm dbh and <50% stems 7.5+ cm are ≥ 12.5+ cm dbh

6.16.1 Future roads and trails

During MP3, Canfor undertook a process that used the existing MP3 THLB and terrain information to develop a classified future road network for the entire TFL. Portions of the THLB that will be lost through the construction of future roads and trails were identified by buffering future roads and intersecting the resultant coverage against the THLB identified in MP3. Six classes of future road were developed. Table 21 identifies these classes and the amount of area that may be lost to future road construction. Because the future road network was built using the MP3 THLB cover, this information is not directly compatible with the larger THLB identified in SFMP 4. To incorporate this information into the current analysis, the future road coverage was intersected against the MP3 THLB to determine the loss in THLB area, by analysis unit for future roads. This loss was divided by the total THLB area to derive a percent reduction for future roads. The loss will be applied as percent area reduction applicable as a one time loss to all future managed stands.

Table 21: Future Roads

Class	Description	Width (m)	Area (ha)
1	Mainline	25	5,827
2	Operational	20	
3	Block	8	
10	Highway	50	
11	Secondary	30	
12	Gravel Sec	30	
MP3 THLB Area in existing unmanaged stands and existing older managed stands			314,151
Percent area lost in all existing stands			1.9%
Area in older existing managed stands and existing unmanaged stands			347,824
Maximum Loss to future stands in current analysis (348,296 x 1.9%)			6,609

6.17 Visual Landscape Inventories

During the term of MP 2 (1994), an inventory of visual portions of the TFL landscape was completed by Canfor. In 1999 this visual landscape inventory was added to and updated to the 1997 standard. In 2005 the Ministry of Forests consolidated all visual landscape inventories within the previous Dawson Creek Forest District (TFL48 and Dawson Creek TSA). During this process it was discovered that some areas that had been declared and made known were not part of the TFL 48 visual inventory used in MP3. The 2005 consolidated inventory that was provided by the MoFR, and identifies polygons having an existing VQO (EVQO) on the file, is used in the base case for TFL 48.

In the Base Case the net down logic excluded 723 hectares (of which 167 ha was net) of Visual Preservation VQO based upon the 1999 Preservation VQO classification. The subsequent inclusion of the 2005 visual inventory into the analysis increased the total established Preservation VQO to 1342 ha of Productive Forest. This inclusion only affected about 100 hectares of area that was considered part of the THLB. Rather than remove the 99.8 ha of THLB and rework the THLB throughout this document, the preservation VQO area that is included in the THLB will be constrained to ensure there is no harvesting in Preservation VQOs.

The areas added during the 1999 inventory are represented in the 2005 consolidated inventory as recommended VQO's (RVQO). Sensitivity analysis will be carried out that adds 'Recommended' VQOs to the 2005 consolidated visual landscape inventory. The sensitivity analysis is the cumulative amount of established and recommended VQO's from the 2005 consolidated inventory.

6.18 Recreation

The recreation inventory for TFL # 48 was completed in 1994. Based on input from the Dawson Creek Forest District the recreation inventory was updated in 2001. This updated inventory is used in this analysis. Management for recreation concerns within the TFL utilizes this inventory by making reductions to the net operable land base. The rationale for these reductions can be obtained from the Recreation/Landscape Analysis Report for TFL #48. Table 22 describes the reductions for recreation. To summarize, all areas having a recreation management class equal to 0 are excluded from the THLB. The area in recreation class B1 is traditionally modeled with an 80% inclusion factor. In this analysis we applied a 100% inclusion factor. Although this may seem optimistic, Table 22 reveals that the forested land base in areas identified as Recreation Class B1 have, through landbase reductions for operability, low sites, protected areas and problem forest types, already been reduced by 45 percent. Therefore, the application of forest cover constraints or area reductions will not be applied to the Recreation Class B1 areas.

Table 22: Recreation

Significance Feature	Management Class	Total Area (ha)	Forested Area (ha)	Inclusion Factor	Net Area Excluded for recreation (ha)	Total Forest Area Excluded (ha) [1]	THLB Area (ha)
B	0	1,316	1,222	0	370	1,222	0
B	1	39,550	36,486	1	0	16,449	20,037
C	0	70	44	0	44	44	0
C	1	147,490	114,764	1	0	53,172	61,592
C	2	13,892	10,409	1	0	4839	5,570
D	1	33,603	30,528	1	0	7417	23,111
D	2	405,994	366,076	1	0	116716	249360
Recreation Sites		4	4		4	4	0
Total		641,919	559,533		418	199,864	359,670

Note 1: Refers to the area removed by recreation classification for all net-down criteria, such as operability, riparian buffers, protected areas, problem forest types, etc.

6.19 Rare Site Series

In this analysis, site series and structural stage is used to identify wildlife habitat areas. As well, site series has been incorporated into the net down and rate, unusual site series have been identified. These areas have been excluded from the THLB.

Table 23: Reductions for Rare Site Series

Representation Cluster Name	BECLABEL	Site Series (Site_S1)	Productive Area (ha)	THLB Area Removed
BWBS subhydric wk1	BWBSwk 1	07	220	74
BWBS subhydric wk1	BWBSwk 1	08	84	13
BWBS subhygric wk1	BWBSwk 1	05	1,033	786
BWBS subhygric wk1	BWBSwk 1	06	306	177
BWBS submesic - mesic wk2-03	BWBSwk 2	03	1,313	728
BWBS xeric wk2-02	BWBSwk 2	02	744	545
ESSF subhygric - hygric mv	ESSFmv 2	06	378	249
ESSF subhygric - hygric mv	ESSFmv 4	05	1	0
		Totals	4,079	2,572

6.20 Area Additions

The forested portions of Sukunka Falls Park were added to the Productive Forest Land Base, since the park is enclosed within the boundaries of the TFL. Many other parks and protected areas are also included in the TFL and are identified on the inventory file as TENURE = TFL48. Sukunka Falls was the exception. The forested area in this park will contribute to visual and landscape biodiversity (as do the other parks and protected areas). The park will not contribute to the timber harvesting land base.

Net-down programming which might typically remove not-satisfactorily-restocked areas (NSR), did not remove these stands in the net-down process. Due to a rapid treatment and regeneration program, all NSR stands have an existing site index and species profile.

The gross productive area of NSR in the TFL is 3,245.2 hectares. Approximately 382.7 hectares are considered “lost” due to land base net downs (e.g. riparian reserves). The remaining 2,862.5 hectares comprises 2,148 hectares of current NSR and 714.5 hectares of backlog NSR.

The majority of the NSR existing within the TFL has been surveyed by Canfor to determine the leading species planted and regenerating and to determine an estimated site index based upon the biogeoclimatic ecosystem classification. Based upon this information, the NSR is added back to the appropriate managed stand analysis units.

In theory, backlog NSR continues to exist on TFL48. However, in reality these areas are now stocked sites that have regenerated to mixedwood stands. The concept of rehabilitating these areas to intensively managed plantations is neither practical nor economical. The "backlog NSR" area has been allocated to 2 analysis units – low-stocking conifer and low stocking-deciduous. The total area in these sites is 924 hectares, of which 714.5 hectares contributes to the THLB. These stands are assumed to grow on old "managed" stand curves that had their stocking adjusted to reflect the current stand density in these polygons. Table 47 in Section 8.7.2 describes the NSR area that gets added to managed stand analysis units.

7.0 INVENTORY AGGREGATION

The Remsoft Spatial Planning System utilizes GIS type "Themes" to classify the land base. The themes themselves are used to represent analysis units, and spatially identify areas within the TFL with specific management objectives - analogous to the AUs, zones and groups used in FSSIM.

7.1 Management Zones and Multi-Level Objectives (Groups)

The analysis of spatially specific management objectives and constraints across and within TFL # 48 is accomplished by through the creation of a comprehensive spatial data base that includes the modeling themes shown in Table 24. Each of these themes were selected for a specific reason – details of which are described in the sections following. Zones were created based upon attributes identified in Table 24. Each of the themes 1-15 identified below are described in the Tables that follow – with respect to classifications are area.

Table 24: Modeling Themes

Theme	Label	Description and Application
*THEME {1}	Analysis unit	Based upon Inventory Type group and leading species, site quality and current age – used for associating to yield tables
*THEME {2}	Genetics	Identification of area utilizing Class A Seed for spruce – used for association managed stand yield tables
*THEME {3}	THLB	Classification of the TFL into timber harvesting land base (THLB), non contributing forests (NCLB), Woodlots, private land and non forest.
*THEME {4}	Management	Used to identify the management status of the TFL (ie existing, older (pre 1995) managed, and intensive management (post 1995)) and track transitions from unmanaged to managed forest.
*THEME {5}	Natural Disturbance Unit	Identification of NDUs based upon spatial areas and subdivide into mountain and valley areas by BEC
*THEME {6}	BEC	Biogeoclimatic ecosystem classification
*THEME {7}	Landscape Unit	Landscape units – used for sensitivity analysis
*THEME {8}	VQO	Visual quality area – used for EVQO and RVQO constraints
*THEME {9}	Pulpwood Area	Pulpwood 10 and 13 areas – used for reporting only
*THEME {10}	Recreation Class	Recreation class– used for reporting only
*THEME {11}	Watershed	Used to apply Equivalent Clear-cut area constraints
*THEME {12}	Wildlife Habitat	Used to identify the areas having ungulate winter range habitat values
*THEME {13}	Dunlevy Zone	Used to identify the spatial management areas within the Dunlevy
*THEME {14}	Map stand	Used to identify each mapsheet forest cover polygon within the TFL
*THEME {15}	Remsoft ID	Concatenation of all themes. Used to assign site series and thereby track wildlife habitat ratings (quality and quantity)
Area	Area (ha)	Used to identify the area of each polygon
Age	Age in periods	Used to identify the stand age in 10 year periods; to rate structural stage for the application of wildlife habitat ratings; and to identify carbon amounts as they change by age and analysis unit

7.1.1 Theme 1 – Analysis Unit

Table 25 identifies the criteria used to identify analysis units (species, site quality and current age) the associated area. Correlation between analysis units and yield tables also includes an association with Themes 2, 3 and 4 – genetics, THLB and management class

Table 25: Analysis Units

AU #	AU Code	Description	Forest Area (ha)	THLB Area (ha)	Type Group	Site Index Criteria	Current Age
1	Bl_all	Balsam - all	43,201	5,191	18	all	all
2	Bx_y	Balsam mixed young	34,346	12,966	20	all	<=140
3	Bx_o	Balsam mixed old	18,828	9,097	20	all	>140
4	Bl_s	Balsam Shelterwood	17,561	13,991	20	all	all
5	Sw_yg	Spruce young good	11,913	7,514	21	>10	<=140
6	Sw_ym	Spruce young medium	8,738	5,201	21	<=10	<=140
7	Sw_og	Spruce old good	9,804	5,349	21	>10	>140
8	Sw_om	Spruce old medium	3,551	2,756	21	<=10	>140
9	Sc_yg	Spruce conifer young good	45,961	37,311	22,24,25	>11	<=140
10	Sc_ym	Spruce conifer young medium	20,675	10,517	22,24,25	<=11	<=140
11	Sc_og	Spruce conifer old good	15,284	11,829	22,24,25	>11	>140
12	Sc_om	Spruce conifer old medium	33,447	23,019	22,24,25	<=11	>140
13	Sd_g	Spruce-deciduous good	16,828	13,795	26	>14	all
14	Sd_m	Spruce-deciduous medium	7,853	5,523	26	<=14	all
15	Ss_g	Spruce Shelterwood good	9,403	7,851	21-25	>14	all
16	Ss_m	Spruce Shelterwood medium	15,188	12,534	21-25	<=14	all
17	Pc_yg	Pine Conifer young good	23,826	21,061	30	>15	<=140
18	Pc_ym	Pine Conifer young medium	48,469	34,965	30	<=15	<=140
19	Pc_og	Pine Conifer old good	5,963	5,117	30	>14	>140
20	Pc_om	Pine Conifer old medium	11,897	9,517	30	<=14	>140
21	Pd_g	Pine Deciduous good	14,149	11,574	31,34	>12	All
22	Pd_m	Pine Deciduous medium	4,484	2,043	31,34	<=12	all
23	Pl_g	Pine good	18,389	16,768	28,29	>15	all
24	Pl_m	Pine medium	38,470	29,083	28,29	<=15	all
25	Ac_g	Aspen conifer good	12,817	7,247	41	>15	all
26	Ac_m	Aspen conifer medium	10,000	3,671	41	<=15	all
27	Ad_g	Aspen deciduous good	34,211	22,044	42	>14	all
28	Ad_m	Aspen deciduous medium	6,723	2,471	42	<=14	all
29	Ct_con	Cottonwood-conifer	8,744	4,236	35	all	all
30	Ct_dec	Cottonwood deciduous	14,747	8,409	37-40	all	all
31	LwStk_c	Low stocking – conifer	292	257		all	all
32	LwStk_d	Low stocking – deciduous	632	458		all	all
		Totals	566,394	363,365			

Note: Analysis units were allocated based upon the species percent by volume for managed stand and the inventory type group (ITG) for existing unmanaged stands. AU's 4, 15, 16 were identified spatially as two or more layered stands in the ESSF, SBS, and all stands within the ESSF wc3.

7.1.2 Theme 2 – Genetics

A portion of TFL 48 now has now been delineated for having Class A spruce seed available. Future managed stands within this area will utilize Class A seed for the spruce component of these stands. The yield tables representing the stands in these areas will be adjusted to reflect the volume gain associated with Class A seed. Table 26 describes the amount of area available for Class A seed. Information pertaining to the location of areas for which class A seed is available was obtained from the Ministry of Forests, Tree Improvement Branch (2003).

Table 26: Genetic Gain Area

TFL 48 Classification	Area (ha) where Class A Seed is Available	Area (ha) where Seed is not available	Total Area (ha)
THLB	64,048	299,317	363,365
NCLB	66,505	136,524	203,029
Total Productive Forest	130,553	435,841	566,394

7.1.3 Theme 3 – Timber Harvesting Land Base

Information regarding the timber harvesting land base is provided in Table 4.

7.1.4 Theme 4 – Management Classification

Stands within the TFL are divided into three management classifications. These are:

1. Existing unmanaged stands
2. Existing managed stands (harvested pre 1995)
3. “Future” managed stands (harvested in 1995 and beyond)

After harvesting, the area in existing unmanaged stands and existing managed stand convert to “future” managed stands. Upon conversion, only 98.1 percent of the area is assumed to reforest. The remaining 1.9 percent is assumed to remain as roadway and will no longer contribute to the THLB. Table 27 describes the amount of area currently attributed to each of these management classifications.

Table 27: Management Classifications

THEME 4	THLB Area (ha)	Percent of THLB
Existing unmanaged Area	326,449	90%
Existing managed area	21,371	6%
Future managed area	15,545	4%
Total Area (ha)	363,365	100%

7.1.5 Theme 5 – Natural Disturbance Units

Natural Disturbance units applied in this analysis have been developed for the Prince George Forest Region. Table 28 describes the area by NDU. The area in the Boreal Plains and Boreal Foothills – Valley is shown sub-divided into conifer leading stands and deciduous leading stands. This is done for analysis purposes and the application of old-growth targets.

Table 28: Natural Disturbance Units

THEME 5	Total Area (ha)	NCLB Area (ha)	THLB Area (ha)
Boreal Foothills - Mountain	177,423	73,389	104,034
Boreal Foothills - Valley - Conifer	125,200	30,237	94,963
Boreal Foothills - Valley - Decid.	39,669	19,961	19,708
Omineca - Mountain	13,220	3,708	9,512
Omineca - Valley	6,210	1,815	4,395
Wet Mountain	92,738	42,400	50,338
Boreal Plains - Upland - Conifer	68,120	15,345	52,775
Boreal Plains - Upland - Decid.	43,814	16,174	27,640
Total Area (ha)	566,394	203,029	363,365

7.1.6 Theme 6 – Biogeoclimatic Ecosystem Classification

TFL 48 Biogeoclimatic Ecosystem Classifications (BEC) has not been updated since MP#3. Table 29 describes the area within each BEC across the TFL.

Table 29: Biogeoclimatic Ecosystem Classifications

THEME 6	Total Area (ha)	NCLB Area (ha)	THLB Area (ha)
AT	1,005	1,005	0
BWBSmw1	124,546	40,191	84,355
BWBSwk1	34,648	8,082	26,566
BWBSwk2	12,521	4,452	8,069
ESSFmv2	148,996	53,391	95,605
ESSFmv4	11,758	5,746	6,012
ESSFmvp2	6,393	6,393	0
ESSFmvp4	1,426	1,426	0
ESSFwc3	57,017	32,072	24,945
ESSFwcp3	6,120	6,120	0
ESSFwk2	52,572	15,096	37,476
SBSwk2	109,388	29,051	80,337
Edge slivers no BEC [1]	4	4	0
Total	566,394	203,029	363,365

1 Edge slivers occurred because the BEC cover used was consistent with the BEC inventory from MP3 that was clipped to the TFL boundary. Though BEC coverage occurs over the entire TFL, this problem was discovered too late in the process to redo.

7.1.7 Theme 7 – Landscape Unit

Landscape Units were utilized in MP#3 in conjunction with biogeoclimatic zones to ensure that harvesting did not become overly concentrated in any one place in the TFL. Landscape Units were also used for the application of old seral biodiversity constraints and the maintenance of old growth. This analysis will see Landscape units used in sensitivity scenarios. Table 30 describes the area within the Landscape Units in TFL 48.

Table 30: Landscape Units

LU_NAME	Theme7	Total Area (ha)	NCLB Area (ha)	THLB Area (ha)
BURNT-LEMORAY	bl	106,693	46,106	60,587
BOUCHER	bo	35,464	9,645	25,819
CARBON	ca	80,177	36,157	44,020
DUNLEVEY	du	45,441	20,789	24,652
EAST PINE	ep	18,953	4,524	14,429
GETHING	ge	56,093	15,062	41,031
HIGHHAT	hh	87,168	21,641	65,527
MARTIN CREEK	mc	57,694	17,300	40,394
PINE RIVER	pr	1,624	391	1,233
WOLVERINE	wl	77,087	31,414	45,673
		566,394	203,029	363,365

7.1.8 Theme 8 – Visually Sensitive Areas

Visually sensitive areas within TFL 48 are used to ensure that harvesting within the TFL is planned with sufficient due diligence to minimize the visual impact of harvesting on the scenic landscape. Visually sensitive areas having established visual quality objectives (VQOs) are utilized in the Base Case for this analysis. The established VQO's are based on the 2005 consolidated inventory completed in 2005. Additional scenarios will investigate the effect of recommended VQOs.

Table 31 describes the area within the TFL having Established VQOs. In the forest estate model, VQOs will have forest cover constraints applied to the VQO / landscape unit zonation. See Table 52 for more information

Table 31: Visually Sensitive Areas

THEME 8	Total Area (ha)	NCLB Area (ha)	THLB Area (ha)
Established Modification	13,075	4,280	8,795
Established Maximum Modification	17,090	5,275	11,815
Established Partial Retention	49,995	17,692	32,302
Established Preservation	1,342	1,242	100
Established Retention	12,931	6,416	6,515
Recommended Modification	1,686	525	1,161
Recommended Maximum Modification	1	1	0
Recommended Partial Retention	15,281	7,523	7,758
Recommended Preservation	0	0	0
Recommended Retention	91	77	14
Not Visually Sensitive	454,902	159,997	294,905
Totals	566,394	203,028	363,365

7.1.9 Theme 9 – Pulpwood Area

In MP#3 deciduous leading stands outside of Pulpwood Agreement #13, (with the exception of the remaining deciduous-leading stands in TFL Block 3B1 and 3B2 (Rice Property)) were excluded from the T.H.L.B. for SFMP 4, these stands were included as part of the THLB, so long as they are not in the ESSF. Table 32 describes the total area of PA#10 and PA#13 relative to the TFL. This information is tracked for reporting purposes only.

Table 32: Pulpwood Agreement Area

PA	Total	Forested	Forested Deciduous	Deciduous THLB
Area (ha)	483,758	481,109	81,801	45,408

7.1.10 Theme 10 – Recreation

Information regarding recreation classifications is provided in Section 6.18 and in Table 22.

7.1.11 Theme 11 – Watersheds

Similar in some ways to landscape units, watersheds are used in the current Base case to ensure that harvesting does not become overly concentrated in any one area. Table 33 describes the area in each watershed and the ECA constraint applicable to the watershed. The ECA target refers to the amount of area that can be in a non-green-up state (reflected by a 3m green-up height). (See Section 10.2.4 and Table 54).

Table 33: Watersheds

Watershed Name	THEME11	ECA %	Total Forest (ha)	NCLB (ha)	THLB (ha)	Max <3 m

Watershed Name	THEME11	ECA %	Total Forest (ha)	NCLB (ha)	THLB (ha)	Max <3 m
Eleven Mile	11_Mile35	35	17,833	9,635	8,198	6,242
Seven Mile	7_Miles35	35	6,705	2,553	4,152	2,347
Basin "862"	86Basn_35	35	2,006	263	1,743	702
Adams Creek	Adams_C35	35	5,356	1,811	3,545	1,875
Aylard Creek	Aylard_30	30	5,078	2,277	2,802	1,524
Beany Creek	Beany_C30	30	3,361	1,177	2,184	1,008
Brazion Creek	Brazion30	30	27,568	9,281	18,287	8,270
Burnt Creek	Burnt_C30	30	49,033	19,363	29,670	14,710
Cameron Creek	Cameron40	40	2,430	647	1,783	972
Dunlevy Creek	Dunlevy25	25	15,607	6,354	9,253	3,902
Gaylard	Gaylard25	25	14,800	4,018	10,782	3,700
Gething	Gething25	25	17,044	5,161	11,884	4,261
Gwillim	Gwillim35	35	3,446	1,034	2,412	1,206
Hasler Creek	HaslerC30	30	18,202	4,896	13,306	5,461
Highat Creek	Highhat35	35	14,737	3,677	11,060	5,158
Johnson	Johnson30	30	11,195	2,287	8,908	3,358
Lower Carbon	L_Carbo40	40	10,770	3,208	7,562	4,308
Lower Murray	L_Muray30	30	15,846	4,416	11,430	4,754
Lower Peace Reach	L_Peace40	40	13,066	3,329	9,737	5,226
Lower Pine Residual	L_PineR35	35	15,311	3,168	12,143	5,359
Lower Sukunka	L_Sukun35	35	47,476	13,742	33,734	16,617
Lower Wolverine	L_Wolvr30	30	19,943	7,843	12,100	5,983
Lebleu Creek	LebleuC40	40	1,771	564	1,207	708
LeMoray Creek	LeMoray30	30	9,287	5,197	4,090	2,786
Middle Wolverine	M_Wolvr35	35	14,175	7,103	7,072	4,961
Medicine Woman Creek	Medicin35	35	1,698	359	1,339	594
North Peace Residual	North_Peac	40	8,669	6,925	1,744	3,468
Ruddy Creek	Ruddy_C25	25	5,354	1,979	3,375	1,339
Trapper Creek	Trapper30	30	6,401	2,602	3,800	1,920
Upper Carbon	U_Carbo30	30	38,590	19,286	19,304	11,577
Upper Murray	U_Muray30	30	13,901	5,519	8,382	4,170
Upper Pine Residual	U_PineR30	30	36,200	14,083	22,116	10,860
Upper Sukunka	U_Sukun35	35	21,926	7,316	14,610	7,674
Upper Wolverine	U_Wolvr30	30	13,220	6,532	6,688	3,966
No watershed identified	XXXXXXX		58,388	15,425	42,963	0
			566,393	203,028	363,365	160,965

7.1.12 Theme 12 – Wildlife Habitat Areas & WTPs

Several spatially defined wildlife areas have been delineated for TFL48. Areas pertain to Grizzly habitat, and ungulate habitat. Portions of these areas overlap.

Table 34: Wildlife Habitat

THEME12	Total Productive Forest (ha)	NCLB Area (ha)	THLB Area (ha)
Grizzly	209,504	94,333	115,171
Ungulate	2,637	990	1,647

The wildlife themes identified here were added to allow for the ability to perform sensitivity analysis if required. In some instances, such as the UWR in the Dunlevy, the areas were used to identify stands for removal from the THLB.

Wildlife Tree Patches (WTPs) in this analysis are not spatially identified. To account for WTPs, the amount of area or volume harvested from each forest stand must be reduced by the amount required to be retained as a WTP. For this analysis, a percent volume reduction was used as a proxy to identify area retained as WTPs.

The proportion of the timber harvesting land base that is in WTPs was derived from an intersection of existing WTPs against the total forested land base identified in MP#3. During the MP#3 analysis the proportions of all WTPs within and outside the THLB was identified. The results revealed that 55% percent of all spatially established WTPs were inside the THLB and 45% were outside the THLB

Within the TFL, 8.0 percent of the forested area within cut blocks must legislatively be retained in WTPs after the blocks are harvested.

By extension, this equates to 4.4 percent of the THLB (8.0% * 0.55).

To simulate management of WTPs, this analysis will reduce the volume in each harvested stand by 4.4 percent.

Note that in MP#3, WTPs were modeled not as volume reduction, but by doubling the area in WTPs and modelling these areas on an extended rotation.

7.1.13 Theme 13 - Dunlevy Special Management Area

Forest management considerations for the Dunlevy Special Management Areas are described in the Dunlevy Creek Management Plan. The plan was prepared by the Ministry of Sustainable Resource Management (MSRM), and completed January 24, 2002. Information pertaining to the THLB and other forestry statistics were supplied for the Plan by Canfor, using the TFL 48 Management Plan #3 Data Base. The current analysis has seen an increase in the potential THLB as a result of improvements in inventory information. These increases were utilized to adjust the recommended harvest target for the Dunlevy. Table 35 describes the area within the Dunlevy. These areas have changed in some ways significantly from the 2002 report. The changes are due to the refinement of some of the line work associated with the plan. The Dunlevy theme is used to manage the extent and timing of harvest operations within the Compartments. This is discussed further in Section 10.3.4.1.

Table 35: Dunlevy Creek Management Areas

Compartment #		Total Productive Forest (ha)	NCLB Area (ha)	THLB Area (ha)
1	Adams Creek	6,513	2,903	3,610
2	Aylard Creek	5,438	2,619	2,819
3	Lower Dunlevy	8,657	3,781	4,876
4	Upper Dunlevy	3,184	1,270	1,914
5	Dresser Creek	5,902	2,503	3,399
6	Butler Ridge	5,357	5,357	0
	Totals	35,051	18,433	16,618

7.1.14 Theme 14,15 – Map Stand, Remsoft ID – Additional Wildlife

Map Stand and Remsoft ID are tracked in an analysis completed for Canfor's Public Advisory Group in support of CSA Certification, in order to provide the flexibility to add additional management themes as required. This section pertains to the analysis completed by Canfor in support of this certification – not the timber supply analysis in support of MP#4..

Map stand provides the link to the forest attributes for each forest cover polygon within TFL 48. There are approximately 85,000 mapsheet polygons within the TFL.

The act of intersecting additional inventory coverages such as BEC, NDU, Wildlife, Landscape units, operability, site series, etc results in the division of these forest polygon into numerous divisions and small sliver polygons. To simply the database somewhat, many of the sliver polygon (ie <0.001ha) were dissolved to the adjacent largest polygon. The result is a database of just under 205,000 polygons.

One of the primary applications for tracking the location and timing of harvested stands across TFL 48 is for the identification of wildlife habitat. During the term of MP#3, wildlife habitat ratings were completed for several species of public concern within the TFL. Some of these species were assessed in the Type II analysis for TFL 48 that was completed in 2002. In this analysis, seven species are examined. These are:

Table 36: Wildlife Habitats Evaluated

Species code	English definition
ALAL_FDG	Moose – feeding - growing season
CEEL_FDG	Elk – feeding - growing season
RATA_FDWE	Caribou – feeding – winter early
RATA_FDWL	Caribou – feeding – winter late
MAAM_AW	Marten – all winter habitat
MAPE_AW	Fisher – all winter habitat
URAR_FDP	Grizzly bear – feeding - spring
GUGU_FD_W	Wolverine – feeding winter

Note that in the MP#3 analysis, grizzly bear habitat was managed in the Base Case through the maintenance of early seral targets within NDT's 1 and 2 in a spatially defined area. In this analysis, a forest cover constraint was not applied to manage for Grizzly habitat. Partly because the early seral targets are working counter to the watershed targets,

Wildlife habitat is identified through the application of wildlife habitat ratings. Habitat ratings are based upon a field study of the types of BEC, variant, site series, site series modifier, seral community and structural stage that are coincident with a specific habitat value for a specific species. Each combination of the BEC, site series etc is given a rating of from 1 to 7 denoting the value of that site for the species of interest. All of these ecosystem criteria remain static through time, with the exception of structural stage. Harvesting and simply stand ageing changes the structural stage of a site, which in turn changes its habitat value. Table 37 provides 3 examples of site classifications and their corresponding habitat rating. There are over 5400 different ecosystem classification combinations within the TFL, each of which has a distinct wildlife habitat rating for each species.

Table 37: Wildlife Habitat Ratings

Site descriptor	Examples of ecosystem classifications		
SITE_S1	02$	FM	32
SITEMC_S1			AL
SITE_M1A	w	s	
SERAL_1	ak		
BGCLABEL	BWBSmw1	ESSFmv2	ESSFwc3
SS_Mod	1a	2	6
WILDLIFE_TAG	BWBSmw102$w1a	ESSFmv2FMs2	ESSFwc3326
Species of Interest	**Habitat Ratings Corresponding to the Classifications above**		
ALAL_FDG	6	5	4
CEEL_FDG	4	4	4
RATA_FDWE	6	4	5
RATA_FDWL	6	2	5
MAAM_AW	6	6	5
MAPE_AW	6	6	6
URAR_FDP	6	2	4
GUGU_FD_W	2	2	1

Habitat ratings are a numeric measure (from 1 to 7) based upon the ecosystem classification. Habitat quality is simply the measure of the total area within each rating. Harvesting activities and stands aging over time will affect the location and quantity of the different quality levels. Harvesting and stand ageing will be assumed to affect only the structural stage of the BEC label.

We assume that after clearcut harvesting the structural stage of the stand will convert to a "3" = Shrub/herb.

Table 38: Structural Stage Projection Assumptions

Structural Stage	Description	Age/BEC Criteria[1]
3	Shrub / Herb	Any new cut blocks and stands < 20 years old
4	Pole / Sapling	Stand age 21-40 years
5	Young Forest	Stand age 41-80 years
6	Mature Forest	BWBS – 81-140 years Other BEC – 81-250 years
7	Old Forest	BWBS – 141+ years Other BEC 251+ years

1 We also assume that the structural stage of stands in the alpine and the parklands (i.e. ESSFmvp2) will remain static over time.

8.0 GROWTH AND YIELD

Yield curves have been forwarded to Research Branch staff for their review and acceptance. Appendix I includes a tabular account of the yield tables used in this analysis.

8.1 Site Index Assignments

Site indices for existing natural stands were assigned using the MOF's Variable Density Yield Prediction Model, batch version 6.6d.

Site indices for existing managed stands were assigned using the site index assigned to the VRI file from Canfor's Silviculture Management System. The site index was based upon the biogeoclimatic ecosystem classification (BEC) in which each managed stand belonged, which was in turn based on the silviculture survey. Each silviculture strata is assigned a site index based on either SIBEC or growth intercept during the silviculture survey. Current NSR stands are assigned a site index based on SIBEC. The spatial and attribute information was then updated into the VRI.

8.2 Utilization Levels

During the term of SFMP 4 harvesting will be conducted to the utilization standards indicated in Table 39.

Table 39: Utilization Levels

Species	Utilization			
	Minimum Dbh (cm)		Maximum Stump Height (cm)	Minimum Top dib (cm)
	Natural Stands	Plantations		
Spruce	17.5	17.5	30.0	10.0
Balsam	17.5	17.5	30.0	10.0
Lodge pole Pine	12.5	12.5	30.0	10.0
Deciduous	12.5	12.5	30.0	10.0

8.3 Decay Waste and Breakage for Unmanaged Stands

To obtain net volumes per hectare, Ministry of Forests' decay, waste and breakage factors provided in the Variable Density Yield Prediction Model (VDYP) for Forest Inventory Zone (FIZ) L and Special Cruise 474 were used.

8.4 Operational Adjustment Factors for Unmanaged and Managed Stands

Operational adjustment factors for managed stands were applied to all managed stand yield tables. Factors of 15% OAF 1 and 5% OAF 2 were used. An additional 5% OAF was applied to the managed portion of shelterwood stands to reflect their slower growth under a canopy.

8.5 Volume Adjustments

An adjustment to the volume in unmanaged stands was applied to several coniferous analysis units that exist in the ESSF. To reflect Canfor's practice of retaining deciduous stems within the ESSF, the deciduous component of leading coniferous-mixed-wood stands within the ESSF was removed from the VDYP generated volume curve for each of these AU's.

Table 40 shows the amount of volume removed for existing unmanaged Analysis units for the deciduous component of coniferous leading stands in the ESSF.

Table 40 Volume adjustments for Stands in the ESSF

Unmanaged AU [1]	Description	Percent Reduction	THLB Area Affected (ha)
13 - Sd_g	Spruce deciduous stands in good sites	20	603
14 - Sd_m	Spruce deciduous stands in medium site	25	521
21 - Pd_g	Pine deciduous stands in good sites	20	868
22 - Pd_m	Pine deciduous stands in medium sites	18	449

1: Four yield tables were added to the analysis to reflect this volume adjustment for stands in the ESSF.

8.6 Yield Table Development

8.6.1 Aggregated Yield Tables

Yield tables are initially created such that a natural stand yield table exists for every forest polygon within the TFL. These polygons are then assigned to an analysis unit and the yield tables area-weighted to produce one table for each analysis unit. Zone specific' yield curves exist a) in the form of future managed stand yield tables where genetic seed is currently available for spruce; and b) in for natural stands in the ESSF where the deciduous component of these stands is not harvested.

8.6.2 Yield Tables for Existing Unmanaged Stands

Yield tables for natural stands were generated using the Variable Density Yield Prediction (VDYP) 'batch' model, version 6.6d.

Separate curves were produced for some of the natural mature stands versus natural immature stands. This was done in cases where significant amounts of area existed for natural stands both in an immature and over-mature (>140 years) state. A review of the area distribution by age class and inventory type group revealed that this was particularly evident in spruce-leading stands.

A temporary yield curve was created for each forest polygon in the TFL. The yield curves were then grouped by analysis unit and area-weighted to provide one curve for each analysis unit. All of the net area in each analysis unit was used in the generation of the curves. With the exception of the deciduous volume reduction to coniferous mixed-wood stands in the ESSF, and the effect of class A seed on future managed stand in the "genetic zone", the same set of curves were applied across the TFL #48.

Copies of the curves were forwarded to Mr. Robb Drummond at the MOF Resources Inventory Branch for approval.

8.6.3 Existing Timber Volume Check

To verify that significant error did not occur in the aggregation of polygons into analysis units, the total net volume of the current inventory (i.e., T.H.L.B.) using VDYP polygon specific volumes was compared to the total net volume of the current inventory (i.e., T.H.L.B.) using the aggregated analysis unit volumes from the VRI file.

Table 41: Total TFL Empirical Volume

	Method Used		
	Polygon Specific (m3)	**Analysis Unit (m3)**	**% difference**
Total Empirical Volume (m3)	80,707,931	81,279,857	0.71%

The calculations are performed as follows:

1) Total polygon specific inventory volume: Σ(all unmanaged polygons in the T.H.L.B. (projected VDYP volume/ha 'multiplied by' net polygon area))

2) Total analysis unit volumes: Σall analysis units (Σall age classes (analysis unit area in age class N 'multiplied by' VDYP estimated volume @ age class N))

8.6.4 Yield Tables for Managed Stands

Managed stand yield tables were created using the Table Interpolation Program for Stand Yields (Version 3.2) for balsam, spruce, and lodgepole pine. Mixed-wood stands will have their managed stand yield tables blended as a portion of both VDYP and TIPSY. The species distribution derived for the natural mixed-wood stand curves was used to determine the percentage of deciduous to be blended with the coniferous.

All stands harvested on or after 1995 were assumed to be intensively managed and growing along TIPSY generated managed stand yield tables (MSYT).

Stands harvested prior to 1995 will also grow along TIPSY MSYT, but will utilize a combination of natural and planted regeneration histories, longer regeneration delays, and reduced stocking. Table 27 showed the amount of area which has a harvest year that is pre 1995 and will be assumed to be growing on the MSYT. The combination of increased regeneration delay, reduced stocking levels, increased proportion of naturals and Canfor's historic activities of a) monitoring stocking levels, b) fill planting, c) brushing and d) thinning activities, make TIPSY a more appropriate model than VDYP to use to estimate the growth and yield of these stands.

The Prince George and Peace River Class A seed planning units (SPU) occur within TFL 48. Class A trees are available within the Prince George (PG) SPU. Stands harvested after 1995 and into the future will incorporate the improved Class A Sx seed that is available for the PG SPU portions of the TFL. Canfor intends to use improved seed where available, for all spruce planted in the future (See Table 42).

Table 42: Yield Table Transitions

Current Status	Seed Planning Unit	Transition
Unmanaged	Sx PG SPU	Future managed with Genetic Gain for Sw
	Sx PR SPU	Future managed
Existing Managed (harvested pre 1995)	Sx PG SPU	Future managed with Genetic Gain for Sw
	Sx PR SPU	Future managed
Future Managed (harvested on or after 1995)	Sx PG SPU	Future managed with Genetic Gain for Sw
	Sx PR SPU	Future managed

8.6.4.1 Silviculture Systems

The mature and over-mature even-aged stands in TFL #48 are predominantly spruce, spruce-balsam and spruce-lodge pole pine. Clear- cutting will generally be the prescribed harvesting system for these timber types.

The mature and over-mature uneven-aged, two-layered stands in the ESSF and SBS in TFL #48 are predominately balsam with a spruce-balsam under-story, or spruce with a spruce-balsam under-story. These stands will be harvested using an irregular shelterwood harvesting system. Historic regeneration problems which occurred in these sites as a result of clear cut harvesting has indicated that this is a more appropriate silviculture system. Typically the stands have a top layer of 200 year-old plus stems with a bottom layer of stems aged 50-70 years. Canfor currently harvests these stands in the winter by removing the top layer. Approximately 40-45% of the area is accessed through a trail system. The existing regeneration is left to become mature. The trails are regenerated within 2 years with spruce seedlings at a density of 1600 stems per hectare (sph). Once the regenerated stand becomes mature, the stand will once again be treated to an irregular shelterwood system. The system was modeled using the following assumptions.

- Unmanaged shelterwood stands are harvested by removing 90% of their mature volume.
- After harvesting the area reverts to a managed shelterwood stand. This stand has a structural stage equivalent to a 65 year old stand.
- The managed shelterwood stand yield table is comprised of 45 percent MSYT as defined by TIPSY and 55% advanced regeneration as defined by VDYP.
- The stand will be eligible for re-harvesting when the MSYT portion of the stand reached maturity. This will occur when the stand reaches an age equivalent of 65 + the culmination age of the MSYT portion of the stand.

- Harvesting will remove 90 percent of the managed shelterwood stand.

See Appendix II for a detailed graphical description of the logic used for each of the shelterwood yield tables.

8.6.4.2 Silviculture Management Regimes

The TIPSY model does not contain data for the managed growth of deciduous stands. Since portions of conifer-deciduous and deciduous-coniferous stands are assumed to regenerate naturally, the portion which remains deciduous will regenerate to the original VDYP curve. The coniferous portion will grow on a TIPSY curve which is blended to the VDYP curve.

8.6.4.3 Aggregated Yield Tables

Within TFL # 48, the forest cover polygons comprising the T.H.L.B. were aggregated into analysis units based on leading species, secondary species, site index and current age.

8.6.4.4 Regeneration Delay

Regeneration delay by analysis unit is shown in Table 44 and Table 45. The regeneration delay was applied as an input directly into the TIPSY model during the creation of the post-1995 managed stand yield tables.

8.6.4.5 Regeneration Assumptions

Table 23, Table 44 and Table 45 describe the regeneration assumptions used to create managed stand yield tables. As indicated in Table 42, three sets of managed stand yield tables are used to represent the TFL. The first set applies to stands harvested prior to 1995. The second set applies to all stands harvested on or after 1995. The third applies to all future stands harvesting in the portion of the TFL where Class A seed is currently available.

8.6.4.6 Species Conversion

Operating under the principle that there will be no significant net gain or loss of deciduous in the TFL, mixed-wood stands will regenerate to their original proportions of coniferous and deciduous. The managed deciduous component will be assumed to grow on VDYP curves. The coniferous component will be assumed to grow on the TIPSY curve.

Table 43: Regeneration Assumptions (Stands Harvested prior to 1995)

AU #	AU description	Existing managed area	Weighted SI	Species % [6]	Regen method [4]	Regen Density [3]	yield table source [5]
1	BL_all	487	14.7	Sw 100	P 60 N 40	1300	TIPSY
2	Bx_y	1,222	14.6	Sw 100	P 60 N 40	1300	TIPSY
4	Bl_s	8	15.0	Sw 100	P45 N 55	1300	TIPSY
6	Sw_ym	1300	9.0	Sw 100	P 60 N 40	1300	TIPSY
9	Sc_yg	7,823	16.8	Sw 80 Pl 20	P 20 N 80	1300	TIPSY
10	Sc_ym	6	9.0	Sw 80 Pl 20	P 50 N 50	1300	TIPSY
13	Sd_g	3,493	18.3	Sw 53 At 47	P 53 N 47	1300	TIPSY/ VDYP
14	Sd_m	237	12.0	Sw 64 At 36	P 64 N 36	1300	TIPSY/ VDYP
15	Ss_g	35	13.5	Sw 100	P45 N 55	1300	TIPSY / VDYP
16	Ss_m	311	12.0	Sw 100	P45 N 55	1300	TIPSY / VDYP
17	Pc_yg	4,075	19.3	Pl 80 Sw 20	P 20 N 80	1300	TIPSY
18	Pc_ym	665	14.5	Pl 80 Sw 20	P 50 N 50	1300	TIPSY
23	Pl_g	494	18.8	Pl 100	P 20 N 80	1300	TIPSY
24	Pl_m	76	14.4	Pl 100	P 50 N 50	1300	TIPSY
25	Ac_g	21	21.0	At 70 Sw 17 Pl 13	N 70 P 30	1300	VDYP/TIPSY
26	Ac_m	57	15.0	At 69 Sw 13 Pl 18	N 89 P 31	1300	VDYP/TIPSY
27	Ad_g	339	18.3	At 100	N 100	3000	VDYP
29	Ct_con	6	17.0	At 70 Sw 25 Pl 5	N 70 P 30	1300	VDYP/TIPSY
31	LwStk_c	257	17.7	Sw60 Pl10 Ac30	N100	550	TIPSY/VDYP
32	LwStk_d	458	19.2	At45 Ct30 Sw20 Pl 5	N 100	700	VDYP/TIPSY
		21,370					

1 Proportions of deciduous in coniferous leading stands were obtained based upon the current percent species distribution.

2 Operational Adjustment Factors of 15% and 5% were applied to all managed stand yield tables when TIPSY was used.

3 Regeneration Density refers to TIPSY inputs only. In instances where the yield table source is VDYP, the regeneration density is assumed to follow the change in density and volume predicted by natural stand yield tables

4 'Regen method' refers to the proportion of analysis unit area that is planting (P) versus natural (N). The 'P' always refers to a TIPSY input. The 'N' may refer to a TIPSY input or a VDYP input depending on the 'yield table source'. With the exception of AU27 all resultant yield tables are blended. Where the yield table source is just TIPSY, the resultant table is a blend of planting and naturals using the 'regen method' proportions. Where yield table source is TIPSY and VDYP, the resultant yield table is a blend of TIPSY input, and the original unmanaged aspen tables (Aus 27 and 28) depending on site quality)

5 Species % cells that indicate an At component describe the proportion of the resultant AU the comes from unmanaged AU 27 or 28.

Table 44: Regeneration Assumptions (Stands Harvested on/after 1995 Outside Genetic Area)

AU#	AU_decip	Area_ha	Site index	SIBEC	Species %	TIPSY Regen Density	Regen method	Regen Delay	Yield Table Source
1	BL_all	1,940	11.7	12.6	Bl 100	1600	P 100	2	TIPSY
2	Bx_y	9,641	12.6	12.6	Bl 100	1600	P 100	2	TIPSY
3	Bx_o	4,035	9.7	12.6	Bl 100	1600	P 100	2	TIPSY
4	Bl_s	919	11.6	13.9	Bl 100	1600	P45 N55	0	TIPSY/VDYP
5	Sw_yg	9,394	16.5	16.6	Sw100	1600	P 100	2	TIPSY
6	Sw_ym	2,367	14.4	17.1	Sw100	1600	P 100	2	TIPSY
7	Sw_og	5,423	14.0	17.7	Sw100	1600	P 100	2	TIPSY
8	Sw_om	2,224	9.2	17.2	Sw100	1600	P 100	2	TIPSY
9	Sc_yg	34,547	15.3	16.7	Sw80 Pl20	1600	P 100	2	TIPSY
10	Sc_ym	9,050	11.2	15.6	Sw80 Pl20	1600	P 100	2	TIPSY
11	Sc_og	10,673	13.7	17.3	Sw80 Pl20	1600	P 100	2	TIPSY
12	Sc_om	16,200	9.2	15.8	Sw80 Pl20	1600	P 100	2	TIPSY
13	Sd_g	13,729	17.4	17.4	Sw65 At35	1600	P 65 N 35	2	TIPSY/VDYP
14	Sd_m	5,443	13.0	17.1	Sw65 At35	1600	P 65 N 35	2	TIPSY/VDYP
15	Ss_g	2,041	12.1	15.5	Sw 100	1600	P45 N 55	0	TIPSY/VDYP
16	Ss_m	2,192	8.2	15.2	Sw 100	1600	P45 N 55	0	TIPSY/VDYP
17	Pc_yg	20,360	17.7	17.9	Pl80 Sw20	1600	P 100	2	TIPSY
18	Pc_ym	31,298	13.3	16.6	Pl80 Sw20	1600	P 100	2	TIPSY
19	Pc_og	4,432	16.4	18.2	Pl80 Sw20	1600	P 100	2	TIPSY
20	Pc_om	7,871	12.1	16.6	Pl80 Sw20	1600	P 100	2	TIPSY
21	Pd_g	11,502	15.9	17.4	Pl65 At35	1600	P 65 N 35	2	TIPSY/VDYP
22	Pd_m	1,986	11.6	17.2	Pl65 At35	1600	P 65 N 35	2	TIPSY/VDYP
23	Pl_g	13,350	17.4	17.1	Pl100	1600	P 100	2	TIPSY
24	Pl_m	30,001	13.1	16.4	Pl100	1600	P 100	2	TIPSY
25	Ac_g	7,235	17.8	17.5	At70Sw17Pl13	1600	N 70 P 30	2	VDYP/TIPSY
26	Ac_m	3,622	14.4	17.4	At70Sw17Pl13	1600	N 70 P 30	2	VDYP/TIPSY
27	Ad_g	22,040	18.4	18.4	At100	n/a	N 100	2	VDYP
28	Ad_m	2,453	12.9	12.9	At100	n/a	N 100	2	VDYP
29	Ct_con	4,230	16.0	18.1	Ct73Sw17P10	1600	N 73 P27	2	VDYP/TIPSY
30	Ct_dec	8,404	15.6	15.6	Ct100	n/a	N 100	2	VDYP
31	LwSTK_c	257	17.7	17.7	Pl 55 Sw 45	1600	P 100	2	TIPSY
32	LwStk_d	458	19.2	19.2	At 55 Sw 45	1600	N 55 P 45	2	VDYP/TIPSY
		299,317	14.6	16.7					

Notes:

1. Operational Adjustment Factors (OAFs) of 15% and 5% were applied to TIPSY managed stand yield tables .
2. See footnotes under Table 43 for additional information
3. The logic used to create the shelterwood yield tables is provided in Appendix II
4. The SIBEC column indicates the area-weighted site index determined using the MOF's *Site Index Estimates by Site Series*, May 2006. This information was used in sensitivity analysis.

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Table 45: Regeneration Assumptions (Stands Harvested on/after 1995 Inside Genetic Area)

AU#	AU_decip	Area_ha	Site index	SIBEC	Species	Density	Regen Planted	Regen Delay	Genetic Gain in Sw	Yield Table Source
1	BL_all	3,251	10.2	12.6	Bl 100	1600	P 100	2	19	TIPSY
2	Bx_y	3,310	12.4	11.9	Bl 100	1600	P 100	2	19	TIPSY
3	Bx_o	5,078	9.7	12.6	Bl 100	1600	P 100	2	19	TIPSY
4	Bl_s	13,031	9.9	13.8	Bl 100	1600	P45 N55	0	19	TIPSY/VDYP
5	Sw_yg	377	14.4	14.6	Sw100	1600	P 100	2	19	TIPSY
6	Sw_ym	109	12.7	14.2	Sw100	1600	P 100	2	19	TIPSY
7	Sw_og	342	11.9	14.3	Sw100	1600	P 100	2	19	TIPSY
8	Sw_om	584	9.0	13.1	Sw100	1600	P 100	2	19	TIPSY
9	Sc_yg	2,672	14.5	14.0	Sw80 Pl20	1600	P 100	2	19	TIPSY
10	Sc_ym	1,394	10.0	14.0	Sw80 Pl20	1600	P 100	2	19	TIPSY
11	Sc_og	1,248	13.0	13.4	Sw80 Pl20	1600	P 100	2	19	TIPSY
12	Sc_om	6,893	8.8	13.6	Sw80 Pl20	1600	P 100	2	19	TIPSY
13	Sd_g	66	17.9	14.9	Sw65 At35	1600	P65 N35	2	19	TIPSY/VDYP
14	Sd_m	81	10.5	14.5	Sw65 At35	1600	P65 N35	2	19	TIPSY/VDYP
15	Ss_g	5,825	11.6	14.0	Sw 100	1600	P45 N55	0	19	TIPSY/VDYP
16	Ss_m	10,367	8.1	14.2	Sw 100	1600	P45 N55	0	19	TIPSY/VDYP
17	Pc_yg	702	16.8	14.9	Pl80 Sw20	1600	P 100	2	19	TIPSY
18	Pc_ym	3,667	12.9	14.6	Pl80 Sw20	1600	P 100	2	19	TIPSY
19	Pc_og	685	16.2	14.7	Pl80 Sw20	1600	P 100	2	19	TIPSY
20	Pc_om	1,646	11.8	14.4	Pl80 Sw20	1600	P 100	2	19	TIPSY
21	Pd_g	72	14.6	12.8	Pl65 At35	1600	P65 N35	2	n/a	TIPSY
22	Pd_m	57	11.3	17.3	Pl65 At35	1600	P65 N35	2	n/a	TIPSY
23	Pl_g	369	16.5	15.3	Pl100	1600	P 100	2	n/a	TIPSY
24	Pl_m	2,130	12.7	15.1	Pl100	1600	P 100	2	n/a	TIPSY
25	Ac_g	12	16.0	17.5	At70Sw17Pl13	1600	N70 P30	2	19	VDYP/TIPSY
26	Ac_m	49	10.8	17.4	At70Sw17Pl13	1600	N70 P30	2	19	VDYP/TIPSY
27	Ad_g	4	16.1	16.1	At100	n/a	N 100	2	n/a	VDYP
28	Ad_m	18	10.4	10.4	At100	n/a	N 100	2	n/a	VDYP
29	Ct_con	6	13.5	17.5	Ct73Sw17P10	1600	N73 P27	2	19	VDYP/TIPSY
30	Ct_dec	4	7.3	7.3	Ct100	n/a	N 100	2	n/a	VDYP
		64,049	10.6	13.8						

Notes:

5. Operational Adjustment Factors (OAFs) of 15% and 5% were applied to TIPSY managed stand yield tables See footnotes under Table 43 for additional information
6. The logic used to create the shelterwood yield tables is provided in Appendix II
7. The SIBEC column indicates the area-weighted site index determined using the MOF's *Site Index Estimates by Site Series*, May 2006. This information was used in sensitivity analysis.

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8.7 Silviculture History

8.7.1 Existing Managed Immature

All stands harvested prior to 1995 will be modeled to grow on managed stand yield tables. The purpose of Table 46 is to document, for each analysis unit, the area of existing managed second growth stands within the TFL.

Table 46: Immature Management History

AU #	AU Description	Existing pre 1995 Managed Stands (area ha)			Existing post 1995 Managed Stands (Area ha)		Total Area
		<10yrs	10yrs to 20yrs	>20yrs	<10yrs	>=10yrs	
1	BL_all	0	258	229	63	40	591
2	Bx_y	179	459	584	463	532	2,218
4	Bl_s	0	0	8	0	725	732
5	Sw_yg	160	618	507	670	206	2,161
6	Sw_ym	6	9	0	1,385	477	1,877
9	Sc_yg	759	5,227	1,838	850	401	9,074
10	Sc_ym	0	6	0	1,161	652	1,819
13	Sd_g	536	1,929	1,028	182	127	3,803
14	Sd_m	10	176	51	686	230	1,153
15	Ss_g	0	0	35	0	909	944
16	Ss_m	0	0	311	0	122	433
17	PC_yg	683	2,474	918	160	159	4,393
18	Pc_ym	61	459	146	657	417	1,739
21	Pd_g	0	0	0	0	0	0
22	Pd_m	0	0	0	0	0	0
23	Pl_g	9	369	116	58	27	579
24	Pl_m	3	18	55	302	144	522
25	Ac_g	0	17	4	0	0	21
26	Ac_m	0	57	0	427	259	743
27	Ad_g	13	259	67	0	0	339
28	Ad_m	0	0	0	204	86	290
29	Ct_con	0	5	1	399	213	618
30	Ct_dec	0	0	0	2	2	4
		2,419	12,339	5,899	7,668	5,729	34,054

Notes: The older areas in “Existing Future Managed Stands” are a combination of wildlife tree patches delineated in cut blocks and the residual area in shelterwood stands. Due to the multilayers in shelterwood stands and the age of the advanced regen, all managed shelterwood stands are assumed to have a minimum age of 65 years

8.7.2 Current NSR and Low Stocking Sites

Low stocking sites were previously considered backlog NSR that had been logged prior to 1987. All other NSR is current NSR. A breakdown of the amount of NSR by analysis unit and management class is provided in Table 47.

Current NSR is created from harvesting operations. It is treated under silviculture prescriptions. The regeneration delay of 2 years or less keeps the amount of current NSR relatively small.

Areas with a logging history before 1987 and do not currently meet the backlog free growing standard due to low stocking are included in the "LwStk" analysis units. Due to the amount of stocking present and the dispersed nature of the areas no additional treatments are proposed. Only a small amount of area remains within theTFL48 of this nature. The areas are described in Appendix III, Table 67. They will grow under a managed stand yield table that has had its initial stocking adjusted to reflect the actual stocking that is present in these stands; see AU's 31 and 32.

Table 47: Current NSR and Low stocking sites

AU# [1]	Description	Current NSR Area (ha)	Low Stocking (only Aus 31 and 32)
5	Sw_yg	512	
6	Sw_ym	5	
9	Sc_yg	435	
10	Sc_ym	32	
13	Sd_g	5	
14	Sd_m	81	
15	Ss_g	17	
16	Ss_m	142	
17	Pc_yg	500	
18	Pc_ym	96	
23	Pl_g	41	
24	Pl_m	210	
27	Ad_g	64	
29	Ct_con	8	
31	LwStk_c	0	257
32	LwStk_d	0	458
	totals	2,148.0	714.5

9.0 PROTECTION

9.1 Non-Recoverable Losses (NRLs)

Non-recoverable losses are timber volumes that are being destroyed on an annual basis by natural causes. Estimated annual losses are deducted from the gross harvested volume in the model to determine the net volume of timber that could be harvested over time.

In the Data Package for MP 3, a calculated NRL number based on the forest cover inventory was summarized by non-logging disturbances. This estimate will be used in the analysis for SFMP 4 as well. The estimates are split for coniferous and deciduous species:

Table 48: Non recoverable losses

Cause	Net Loss (m3/year)
Fire	44,605
Insects / Disease	4,367
Windthrow (and other natural causes)	7,174
Total	56,146

Reduction for Non-Recoverable Coniferous Losses: 49,700 m^3/year

***Reduction for Non-Recoverable Deciduous Losses: 6,400* m^3/year**

The TFL 48 MP#3 Management Plan approval letter written by the Deputy Chief Forester indicated that NRL's may be overestimated and asked Canfor to work with the MOF to confirm or vary this estimate. See Table 26 in Section 3.16 of the SFMP for the results for the work done to-date. Over the past 5 years it is estimated that there has been significantly less NRL's than what is currently being modeled (e.g. 4,395m^3/year). However, in consideration of the MPB outbreak currently on TFL48, Canfor has chosen not to adjust downward the NRL estimate at this time.

Sensitivity analysis is conducted around the impact of mountain pine beetles on the TFL. In these scenarios, non-recoverable losses are calculated explicitly for the first decade using an annual IFS Mountain Pine Beetle Epidemic and Control model. Additional volume NRLs will be applied at a rate of 5000m^3/year for the first decade for conifer and 49,700m^3/year thereafter. For deciduous they remain the same at 6,400m^3/year.

Stand mortality was also addressed through a ceiling cap on the maximum age that a stand could achieve. Once it achieved this age, if not harvested, it was assumed that it would cycle back as an immature stand. The maximum age applied to each leading species was estimated by adding 10 years to the age of the oldest stands within the TFL. The ages applied were:

- Spruce Leading 460 years
- Pine-leading 350 years
- Balsam-leading 460 years
- Aspen-leading 200 years
- Cottonwood-leading 310 years

10.0 INTEGRATED RESOURCE MANAGEMENT

10.1 Forest Resource Inventories

Table 49: Forest Resources Inventory Status

Inventory	Standard	Completed	Approved	Approved By	Status
Forest Cover/VRI	VRI Phase 1	2000	2000	Regional Inventory Forester	Updated to for depletion to Dec 31, 2004
	VRI Phase II/NVAF	2004	2005	Provincial Biometrician	Approved – (Age Height and volumes adjusted and projected to 2005)
Visual Landscape	RIC	2005	2005	Regional Manager (2005 consolidated inventory)	Pending: EVQO used in basecase RVQC used in sensitivity
Recreation	RIC	1999	1995/2001	Regional Manager	Approved
Stream	RIC	1997-2000			Pending
Operability	n/a	2000	Dec 2000	Regional Geomorphologist	Approved
Road/trail network	n/a	2000	n/a	n/a	n/a
BEC	MOF	2000	Nov 2000	Regional Ecologist	Approved
Grizzly Habitat	MOELP	2000		District Manager	Approved
Ungulate Winter Range	MOE	2000	2005	MOE	Provided by MOE
Silviculture	MLSIS	2000	yearly	District Manager	Approved
Protected Areas	MOELP	2000	June 29, 2000	Cabinet per Parks FTP Site	Approved
TFL Boundary	N/A	2004	July 27, 2004	Resource Tenures Branch. New boundary included with TFL 48 Instrument 5 document	Approved
PA 10 & 13	N/A	2000	2000	District Manager	Approved
LRMP RMZ's	LUCO	1999	March 1999	Cabinet	Approved
Archeological Sites	N/A	Unknown	June 1999	Ministry of Small Business Tourism and Culture	Approved
Genetic Gain	MoFR	2003	2003	MoFR – Tree Improvement Branch	Approved
Site Series	RIC	2001	Pending	Regional Ecologist	Pending completion of accuracy assessment
Landscape Units	N/A	2001	2004	Minister of Sustainable Resource Management	Approved
Natural Disturbance Units	N/A	2003	2003	Regional Ecologist	Approved
Watersheds	N/A	2005	N/A	N/A	N/A
Agricultural Land Reserve	N/A	2004	2004	Agricultural Land Commission (MSRM)	Approved

10.2 Forest Cover Requirements and Modeling Constraints

This analysis for TFL 48 will utilize the Remsoft Spatial modeling system. The simulation part of this system, known as “Woodstock” will be used to determine a sustainable harvest level by formulating the TFL as a linear program by declining an objective function and constraints as outputs. “Linear programs” are models that are comprised of a set of mathematical relationships that are functions of activities that comprise the alternatives. These relationships describe the criterion of optimality (the objective function) and the set of feasible alternatives (constraints due to limitations of the system being modeled). The problem with pure linear programming on a system as complex as TFL 48 is that one can only optimize a single objective function at a time; all other goals must be handled as constraints. Within TFL 48, goals for maximizing harvests are equally important as goals of maintaining habitat and old-growth. As a compromise, “Goal Programming” is used. In goal programming, every management goal is specified as an absolute constraint on an output. The details of this are beyond the scope of this information package.

For the purposes of modeling forest management across TFL 48, harvesting is conducted with consideration given to the following management restrictions.

1. Minimum harvest age and minimum economic volume
2. A sustainable future THLB growing stock
3. Minimum old-growth constraints applied by natural disturbance unit
4. Limits on the amount of harvesting in visually sensitive areas
5. Limits on the minimum amount of thermal cover in ungulate winter range
6. Limits on the minimum amount of old growth within NDU/BEC Variant
7. Restrictions on access, timing and harvest levels within the Dunlevy Special Management Area
8. Limits on the amount of area below hydrological green up by watershed (ECA)

These management considerations are modeled aspatially within the Woodstock model. Spatial management considerations are modeled explicitly within the Stanley model by utilizing the preliminary harvest schedule identified through Woodstock, and then calibrating this by rationalizing adjacency constraints, cutblock size, opening size, and greenup delays.

Each of these management considerations are discussed in the sections following.

10.2.1 Natural Disturbance Units – Natural Range of Variation

Work completed within the Prince George Forest Region by the Regional Ecologist has seen the recent establishment of natural disturbance units or NDUs. NDUs were developed through a scientific process to replace the Provincial identification of Natural Disturbance Types, as defined by the Forest Practices Code Act Biodiversity Guidebook. The rational to support NDUs is documented by the Ministry of Forests Northern Interior Forest Region office. Further information is also provided in the Section 3.3 of SFMP4, where a detailed discussion occurs around Late Seral Forest Indicators and the targets.

The application of NDU constraints on TFL 48 for the Base Case scenario is based upon the minimum natural range of variation for stands greater than 140 years of age (100 years for deciduous in the Boreal Plains and Boreal Foothills - Valley). Table 50 describes the area within each NDU zone and subzone as well as the minimum NRV target applied to each of these areas as a percent and in equivalent area.

Table 50: Natural Disturbance Units – Natural Range of Variation

NDU	THLB Area (ha)	Total Forest Area (ha)	NRV % Target	Target Area (ha) >140 yrs (>100 yrs for decid)	Decades until Constraint is met through the NCLB
Boreal Foothills – Mountain	104,034	177,423	33	58,550	6
Boreal Foothills – Valley - Conifer	94,963	125,200	23	28,796	10
Boreal Foothills – Valley – Decid.	19,708	39,669	10	3,967	always
Omineca – Mountain	9,512	13,220	58	7,668	never
Omineca – Valley	4,395	6,210	23	1,428	4
Wet Mountain	50,338	92,738	84	77,900	never
Boreal Plains - Upland – Conifer	52,775	68,120	17	11,580	6
Boreal Plains - Upland – Decid.	27,640	43,814	10	4,381	always
Total Area (ha)	363,365	566,394		194,270	

Due to the large size of NDUs and the desire that there is some representation of old growth by BEC, the constraints identified in Table 50 have been expanded to include NDU/BEC combinations. Table 51 identifies the proportion of forest area designated as old growth (above 140 years for conifer and 100 years for deciduous) that will be applied to each NDU/BEC across the TFL.

Note that portions of Parks that are within the TFL have been excluded from the timber harvesting land base, but are retained in the model as these areas contribute to biodiversity and seral stage targets. These areas were identified in Table 17.

Table 51 NDU/BEC old growth constraints

Natural Disturbance Unit	BEC	Late Seral Target	Forest Area (ha)
Boreal Plains - Deciduous	BWBSmw1	10%	39028
	BWBSwk1	10%	4217
	ESSFmv2	10%	510
	SBSwk2	N/A	41
Boreal Plains Deciduous - Total		10%	
Boreal Foothills – Valley - Deciduous	BWBSmw1	10%	23129
	BWBSwk1	10%	1606
	BWBSwk2	10%	5082
	SBSwk2	10%	9866
Boreal Foothills – Valley - Deciduous - Total		10%	
Boreal Plains - Conifer	BWBSmw1	5%	31425
	BWBSwk1	5%	23531
	ESSFmv2	5%	12959
	SBSwk2	N/A	202
Boreal Plains – Conifer - Total		17%	
Boreal Foothills – Valley - Conifer	BWBSmw1	7%	30912
	BWBSwk1	7%	5294
	BWBSwk2	7%	7438
	SBSwk2	7%	81537
Boreal Foothills – Valley – Conifer - Total		23%	
Boreal Foothills – Mountain	ESSFmv2	10%	106082
	ESSFmv4	10%	11756
	ESSFwc3	10%	24543
	ESSFwk2	10%	26406
Boreal Foothills – Mountain - Total		33%	
Omineca Valley	BWBSmw1	N/A	31
	SBSwk2	7%	6179
Omineca Valley - Total		23%	
Omineca Mountain	ESSFmv2	17%	13188
Omineca Mountain - Total		58%	
Wet Mountain	ESSFmv2	25%	16256
	ESSFwc3	25%	32389
	ESSFwk2	25%	26163
	SBSwk2	25%	11558
Wet Mountain- Total		84%	

10.2.2 Visually Sensitive Areas

The base case utilizes the established VQO's as represented in the 2005 consolidated Visual Landscape Inventory. This is the not same inventory used for Management Plan 3.

Canfor's management of visually sensitive areas has evolved such that all new harvesting proposed in visually sensitive areas has to be planned using the principles of visual landscape design. In addition, Canfor has taken further actions that effectively address visual landscape management. These include:

- Block layout consistent with visual landscape design and biodiversity requirements which soften block appearance;
- The initial minimum target density on the TFL is 1600 sph. This density exceeds that of the Regional well-stocked stand target of 1200 sph;
- Road and trail deactivation/rehabilitation, grass seeding/reforestation and an acute awareness of dispersed site disturbance have reduced site disturbance well below levels considered normal when VAC denudation percentages were calculated;
- Site preparation methods where used, now emphasize minimal disturbance of the duff in order to maintain a more natural look to the blocks. Broadcast burning is not used and raw planting is the preferred treatment. This minimizes exposed rock and soil;
- Mixed species plantations which avoid monocultures, and improves visual characteristics;
- Increased cable harvesting reduces the presence of skid trails on the steeper visual slopes.

Over the past 5 years, Canfor has demonstrated performance in the following harvesting methods: Ground-based conventional, cable and aerial systems. Silviculture systems used are selection, shelterwood, irregular shelterwood, patch cut, clearcut and clearcut with reserves. Shelterwood harvesting has been used extensively during the term of MP 2 and MP 3 to ensure regeneration concerns are addressed in higher elevation ESSF balsam and spruce multi-layered stands. Selection logging techniques have also been used in visually sensitive areas to minimize the impact on visual resources. These actions demonstrate Canfor's commitment to managing the visual resource.

Table 52 describes the area by VQO and the percent constraint applied to each of the designations. Constraints will be applied at the landscape unit level to the total forested area within each VQO.

Table 52: Forest Cover Constraints in Visual Areas

VQO	LU_NAME	Productive Forest (ha)	THLB	Max % < greenup	Max area < greenup	Years to greenup
Established Modification	Boucher	222	154	21.9	49	24
	Burnt-Lemory	1062	429	21.9	233	24
	Carbon	10	0	21.9	2	24
	Dunlevey	1310	586	21.9	287	24
	Gething	3937	2686	21.9	862	24
	Highhat	1959	1587	21.9	429	24
	Martin Creek	1282	1050	21.9	281	24
	Wolverine	3294	2302	21.9	721	24
Established Maximum Modification	Burnt-Lemory	3590	2157	25	898	23
	Highhat	10430	7342	25	2608	23
	Martin Creek	3070	2316	25	768	23
Established Partial Retention	Boucher	6226	3616	9.9	616	24
	Burnt-Lemory	2373	1255	9.9	235	24
	Carbon	2002	1592	9.9	198	24
	Dunlevey	2992	344	9.9	296	24
	Gething	5480	3997	9.9	543	24
	Highhat	8379	5970	9.9	830	24
	Martin Creek	11103	7715	9.9	1099	24
	Wolverine	11440	7814	9.9	1133	24
Established Retention	Burnt-Lemory	1193	271	1.6	19	28
	Carbon	1960	1384	1.6	31	28
	Dunlevey	2328	317	1.6	37	28
	East Pine	1064	467	1.6	17	28
	Gething	1782	1147	1.6	29	28
	Highhat	546	413	1.6	9	28
	Martin Creek	259	44	1.6	4	28
	Wolverine	3753	2470	1.6	60	28
Recommended Modification	Carbon	127	6	21.9	28	24
	Dunlevy	242	63	21.9	53	24
	Gething	621	162	21.9	136	24
	Highhat	424	35	21.9	93	24
	Martin Creek	73	10	21.9	16	24
	Wolverine	181	2	21.9	40	24
Recommended Partial Retention	Burnt-Lemory	463	95	9.9	46	24
	Carbon	6667	1067	9.9	660	24
	Dunlevy	6248	467	9.9	619	24
	Gething	1525	135	9.9	151	24
	Highhat	2	0	9.9	0	24
	Martin Creek	21	0	9.9	2	24
	Wolverine	352	44	9.9	35	24
Recommended Retention	Carbon	79	2	1.6	1	28
	Martin Creek	5	0	1.6	0	28
	Wolverine	5	0	1.6	0	28

Note: Only established VQOs were applied in the Base Case scenario. Recommended VQOs were included in sensitivity analysis. When modelling, maximum modification VQO areas were grouped with the IRM zones identified in Table 53: Forest Cover Constraints in Non-Visual Areas

10.2.3 Forest Cover Constraints in Non-visually Sensitive Areas

Harvest methods are generally feller buncher/grapple skidder on the majority of the timber types scheduled for harvesting during the term of MP 3. Hand felling/line skidding occurs on a site specific basis as required. Cable logging was initiated in the TFL during the term of MP 1. MP 2 saw the cable logging program expand significantly and the advent of helicopter logging in two areas: (CP 645 in 1997, and CP 631 in 2002).

As sensitive sites (e.g., stream protection or steep slopes) are identified, logging methods are selected to best suit the site. Logging methods will continue to be prescribed on a site specific basis and carried out so as to minimize soil disturbance, soil compaction and other environmental concerns.

Canfor will continue to use and develop innovative harvesting systems to address site specific concerns. Although much of the TFL has highly productive sites, minimum volume requirements are a factor in determining logging systems. The minimum economic volume within stands must exceed a certain volume in order to offset the higher costs associated with mixed or cable logging. Volume however, is not the only factor used in the selection of a harvesting system, rather the harvesting system is chosen that best meets the site specific objectives. Examples of where site specific harvest methods may be used:

- Helicopter logging of wind-throw in viewsheds to meet VQOs, and to minimize site disturbance and damage to existing plantations.
- Helicopter logging of previously inoperable areas in the TFL.
- Irregular shelterwood systems in uneven aged stands, to reduce plantation mortality and increase fiber production.
- Selective or partial cut cable yarding systems in highly visible or sensitive areas.
- Cable yarding throughout the TFL to minimize soil disturbance on steep or wet ground.

Cut block adjacency is reflected aspatially through a maximum of 33% of the area less than 3 metres in height, for the non-visually sensitive areas of the TFL. As well, cut block adjacency is also reflected in the 20-year spatial harvest plan which is created in support of the Base Case harvest level that will be presented in the timber supply analysis report. Table 53 shows the forest cover constraints applied to the non-visual portions of each landscape unit.

Table 53: Forest Cover Constraints in Non-Visual Areas [1]

LU_NAME	Productive Forest (ha)	THLB	Max % less than greenup	Max area less than greenup	Years to greenup
Conifer Leading Stands					
Boucher	15,621	12,540	33	4,138	18
Burnt-LeMoray	98,033	57,456	33	18,960	18
Carbon	75,585	40,846	33	13,479	18
Dunlevy	26,976	16,214	33	5,351	18
East Pine	6,658	5,807	33	1,916	18
Gething	41,350	31,888	33	10,523	18
Highhat	67,348	52,784	33	17,419	18
Martin Creek	35,656	26,667	33	8,800	18
Pine River	1,132	926	33	306	18
Wolverine	54,485	31,333	33	10,340	18
Deciduous Leading Stands					
Boucher	13,230	9,509	33	3,138	10
Burnt-LeMoray	2,971	1,156	33	381	10
Carbon	559	185	33	61	10
Dunlevy	11,834	7,190	33	2,373	10
East Pine	11,233	8,155	33	2,691	10
Gething	3,441	1,243	33	410	10
Highhat	8,936	4,772	33	1,575	10
Martin Creek	9,393	4,918	33	1,623	10
Pine River	492	308	33	102	10
Wolverine	4,115	1,753	33	578	10
Total All	489,048	315,650		104,165	

Note: The areas identified in this table include area from Table 52 as existing maximum modification, and all recommended VQOs were included as not visually sensitive in the base case analysis.

10.2.4 Forest Cover Constraints in Watersheds

Equivalent Clear-cut Area (ECA) constraints are applied to the watersheds identified in Table 33 according to the guidelines shown in Table 54.

Table 54: ECA Application

Average Height (m)	Mid-point Height (m)	Years to Achieve Height (years)	Hydrologic Recovery (IWAP) (%)	ECA Constraint (Max. % of Area less than Trigger Height)			
				25%	30%	35%	40%
0 - < 3 m	0	0	0%	na	n/a	n/a	n/a
3 - < 5m	3	17	25%	25% < 17 yrs	30% < 17 yrs	35% < 17 yrs	40% < 17 yrs
5 - < 7 m	5	25	50%	31% < 25 yrs	37.5% < 25 yrs	43.8% < 25 yrs	48.8% < 25 yrs
7 - < 9 m	7	32	75%	38% < 32 yrs	45% < 32 yrs	52.5% < 32 yrs	57.5% < 32 yrs
9 m +	9	39	90%	44% < 39 yrs	52.5% < 39 yrs	61% < 39 yrs	66% < 39 yrs

10.2.5 Forest Cover Objectives in Ungulate Winter Range

Ungulate winter range habitat areas are constantly being revised within the TFL. Some of the constraints applicable to winter range have been addressed in land base net-downs. *Additionally, for the Sukunka Graveyard ungulate winter range (see "Ungulate" in Table 34) a maximum of 20 percent of the productive forest may be less than 3 metres in height and a minimum of 50 percent of the productive forest must be greater than 100 years.*

The rationale for these forest cover constraints were first tested as a sensitivity analysis in MP3. Subsequently, the results have been used as a rationale by the MoE in the "Material Supporting the Notice to Establish" these UWR areas under Section 7(2) of the Forest Planning and Practices Regulation.

10.3 Rationale for Other Land Base Modelling Considerations

10.3.1 Recreation

The following recreation sites have been removed from the timber harvesting land base:

- Boulder Lake
- Carbon Lake
- Gething Creek
- Wright Lake

10.3.2 Forest Ecosystem Networks

There are no forest ecosystem networks established for TFL # 48.

10.3.3 Wildlife Tree Patches

Refer to Section 7.1.12 for details and rationale.

10.3.4 Higher Level Plans

TFL # 48 falls entirely within the Dawson Creek Land and Resource Management Plan (LRMP). The Dawson Creek LRMP was officially approved with direction to implement on March 30, 1999.

New protected areas that were proposed in the LRMP have received official designation under an Order-In-Council (OIC). These areas have been excluded from the T.H.L.B.

Resource management zones, which were defined as part of the LRMP process will not have specific forest cover constraints applied to them. Canfor believes that all of the activities and concerns associated with the resource management zones can and will be addressed at the operational level of management, rather than at the strategic level. Landscape Unit, biogeoclimatic zone, variant biodiversity objectives provide sufficient levels of spatial resolution to ensure that multi-resource management objectives are being addressed.

The LRMP recognizes the Twin Sisters RMZ as an area of profound spiritual significance and traditional use value to the First Nations people of northeastern BC. Due to the low levels of THLB within the RMZ's and the management of visual areas from the Twin Sisters Protected Area, Canfor feels that no additional forest cover constraints will be necessary to meet the objectives stated in the LRMP section 4.13.

Table 55 : Twin Sisters RMZ Forested and THLB Areas

RMZ	Gross Area	Forested Area	THLB	THLB % of Gross Area
Twin Sisters Mountain Sub-RMZ	6340	5628	2264	36%
Twin Sisters Headwaters Sub-RMZ	17861	15019	7494	42%

10.3.4.1 Dunlevy Creek Management Plan

During the term of MP#3, a special management plan for the Dunlevy block of the TFL was developed (January 24, 2002) and prepared by the Ministry of Sustainable Resource Management and subsequently received Government endorsement. The Plan divides the Dunlevy into several compartments and identifies specific operational guidelines around which harvesting and mineral extraction may occur. The information used to determine that amount of harvesting in each compartment was based upon the MP#3 THLB. Since the THLB has changed for in this analysis, the area targets are adjusted accordingly and in keeping with the relative amount of harvest area to THLB area. The timing of harvest has not changed; however, additional periods were included to cover the entire planning horizon. Spatially, the model blocked stands in these planning periods using a 60-hectare target block size and a 500-metre buffer between blocks. Table 56 describes the planning periods and the area targeted for harvesting in the Dunlevy.

Table 56: Area Proposed for Harvest by Decade within the Dunlevy Plan Area

Period	THLB Areas and Decade Targeted	Compartment				
		Adams	Aylard	Lower Dunlevy	Upper Dunlevy	Dresser Creek
	2001 THLB	3,621	2,261	6,379	1,891	2,704
	2006 THLB	3,610	2,819	4,876	1,914	3,400
1	2005			245	480	
2	2015	1,246				
3	2025			245		
4	2035				480	
5	2045		561	245		
6	2055			489		1,697
7	2065	722				
8	2075			489		
9	2085					
10	2095	897				
11	2105			726		
12	2115		848			
13	2125			726		1,697
14	2135		848			
15	2145				566	
16	2155	1,246		245		
17	2165					
18	2175			245	480	
19	2185		561			
20	2195	722		245		
21	2205					
22	2215			489		
23	2225		848			

Period	THLB Areas and Decade Targeted	Compartment				
		Adams	Aylard	Lower Dunlevy	Upper Dunlevy	Dresser Creek
	2001 THLB	3,621	2,261	6,379	1,891	2,704
	2006 THLB	3,610	2,819	4,876	1,914	3,400
24	2235			489		
25	2245	897				1,697

10.3.5 Minimum Harvest Age Derivation

Minimum harvestable ages are simply minimum criteria. While harvesting may occur in stands at the minimum harvest age in order to meet forest level objectives (e.g., maintaining overall harvest levels for a short period of time or avoiding large inter-decadal changes in harvest levels), most stands will not be harvested until well past the minimum timber production ages due to other resource values.

On TFL #48 the minimum harvest age is set at the culmination age for each analysis unit, so long as the analysis unit has achieved a minimum economic volume of 140m3/ha by this age. This is consistent with the management strategies designed to maximize fiber production, while giving consideration for economic realities. Full site occupancy, maximizing M.A.I. and culmination age harvesting will help to achieve Canfor's forest management, economic opportunity and employment objectives. On a more stand specific basis, cutting priority is highest on blow-down, insect attacked or fire damaged stands. To date, Forest Development Plans have placed priorities on harvesting stands affected by blow-down or pest damage, and stands with a high risk of blow-down or declining rates of growth. Table 57 shows the minimum cutting age (i.e., culmination age) by analysis unit.

Table 57: Minimum Merchantability Standards

AU #	AU Description	Culmination Age			
		Unmanaged Stands	Existing Managed Stands	Future Managed Stands	Future Managed Stands with Genetic Gains
1	Bl_all	160	120	140	150
2	Bx_y	130	120	130	120
3	Bx_o	150	n/a	170	150
4	Bl_s	150	145	210	210
5	Sw_yg	100	110	100	100
6	Sw_ym	130	190	120	120
7	Sw_og	120	n/a	120	130
8	Sw_om	170	n/a	170	170
9	Sc_yg	120	110	110	100
10	Sc_ym	140	190	140	150
11	Sc_og	130	n/a	120	120
12	Sc_om	190	n/a	170	170
13	Sd_g	100	90	90	80
14	Sd_m	130	140	130	150
15	Ss_g	160	175	195	195
16	Ss_m	210	195	255	195
17	Pc_yg	80	80	80	70
18	Pc_ym	110	110	90	100
19	Pc_og	90	n/a	80	80
20	Pc_om	120	n/a	100	110
21	Pd_g	80	n/a	80	90
22	Pd_m	110	n/a	100	110
23	Pl_g	90	80	80	80
24	Pl_m	120	90	90	90
25	Ac_g	80	80	90	90
26	Ac_m	90	100	100	130
27	Ad_g	70	n/a	70	70
28	Ad_m	80	n/a	80	80
29	Ct_con	90	90	80	110
30	Ct_dec	110	n/a	110	110
31	LwStk-c	n/a	100	80	n/a
32	wStk-d	n/a	110	70	n/a

In addition to Culmination Age, each stand was assessed to ensure they met the minimum economic volume target of 140m3/ha. At the ages shown, all analysis units achieve 140m3/ha.

10.3.6 Operability

The majority of harvesting on the TFL takes place with conventional, ground-based equipment. This reflects the generally favorable operating conditions in the area. Non-conventional methods such as overhead cable systems and helicopter logging are used as required, to harvest steeper ground to meet terrain stability requirements or to expand summer harvesting opportunities on areas with sensitive soils. Currently, approximately 40% of harvesting activities within the TFL utilize cable systems. The increased use of this system has occurred as a result of the backlog of cable ground accessible from existing roads. This component of cable logging will decrease to a lower level over time. Horse logging or small tractor logging is being utilized on a small scale to provide social opportunities, to demonstrate the ability to carry out partial cuts and to meet visual quality objectives through shelterwood or selective cutting.

Utilizing any and all of these systems where applicable has resulted in there being very few physically inoperable areas within the TFL

Economic operability has been estimated using a combination of the age/height/stocking attributes of a forest stand, and an indication of site quality. Although these areas are excluded at this time from the timber harvesting land base, this does not preclude Canfor's harvesting within them some time in the future. Estimates of future market conditions are typically difficult to predict. Economic operability is also addressed through minimum volume criteria applied to stands existing where mixed and cable harvesting systems are required.

10.3.7 Initial Harvest Rate

The principle harvest flow pattern being considered will mimic the harvest flow indicated in MP 3. This was a non-declining harvest level.

10.3.8 Harvest Rules

In general terms, harvesting priorities take into account forest profile considerations, forest health conditions, hydrologic considerations, wildlife and environmental issues. However, the principal emphasis will be placed on maximizing growth potential from the productive forest land base.

In a linear programming type of modeling solution, the resultant harvest level is that which addresses all management constraints and selects stands in a manner that maximizes the overall harvest. In support of this objective, the following harvest rules will be applied to the linear programming matrix:

1. Maximize the coniferous harvest
2. Maximize the deciduous harvest
3. Ensure that the long term merchantable growing stock does not decline after 170 years.

10.3.9 Harvest Profile

The harvest profile will be divided between the deciduous land base and the coniferous land base. In MP#3, the deciduous harvest came solely from the pulpwood portion of the TFL. In SFMP 4, this harvest is expanded to include the merchantable deciduous across the entire TFL.

10.3.10 Silviculture Systems

Clear cutting is the system of choice on the TFL. Irregular shelterwood harvesting is also occurring on approximately 9.4% of the timber harvesting land base land base. This is represented by analysis units 4, 15, 16 in the Base Case.

10.3.11 Harvest Flow Objectives

Guidance in developing harvest flow objectives is taken from the current economic and social objectives of the Crown expressed by the Minister of Forests in a letter to the Chief Forester in 1994. He emphasized the importance of the continued availability of good forest jobs and to the long-term stability of communities that rely on forests. He continues on to state that any decreases in allowable cut at this time should be no larger than necessary to avoid compromising long-run sustained yield.

In the Base Case for this analysis, a non-declining harvest flow will be modeled. This may mean that the initial flat-line harvest level is increased to the long term harvest level at some time in the forecast period. The long-term harvest level is defined by the highest long-term level that can be attained while maintaining a (more or less) constant total growing stock.

Harvest flow objectives must also consider the threat of the mountain pine beetle that is prevalent east of the Rockies and has in the past year, advanced into TFL48 through several southerly mountain passes. An accelerated harvest flow that targets pine at risk of attack from the MPB will be modeled in sensitivity analysis. The harvest flow objective for these MPB scenarios will be to minimize the non-recoverable losses attributed to MPB tree mortality

11.0 Option Assumptions

The options and sensitivity analysis, which will be assessed in the Timber Supply Analysis Report, are summarized in Table 58. A brief description of how each scenario will be modeled follows, along with the changes to pertinent tables. Some of the changes to the scenarios are self evident. In those cases, additional information is not provided.

Table 58: Summary List of Scenarios

#	Name	Description
2	LU/BEC	Model old growth by Landscape Unit and BEC as per the Old Growth Order
3	Mean NRV	Examine the impact of utilizing the mean level of the NRV
4	Max NRV	Examine the impact of utilizing the highest level of the NRV
5	No NRV	Examine the impact of removing all biodiversity constraints
6	MPB – no uplift	Examine the impact of pine mortality while maintaining the Base Case harvest level
7	MPB – Uplift 30%	This scenario will see an accelerated harvest level directed toward mature pine to mitigate the possible loss in volume due to the MPB
8	Include Woodlots	Examine the impact of including woodlots into the Base Case harvest flow
9	Recommended VQOs	Examine the impact of a new visual inventory.
10	Mining	Examine the inclusion of proposed mine sites into the TFL
101	30 year accelerated	Maximize the harvest for the next 30 years than drop to a NDY
102	Increase TFL 5%	Increase the THLB landbase by 5%
103	Decrease TFL 5%	Decrease the TFL by 5%
104	Incr. natural stands by 10%	Increase all empirical yield tables by 10%
105	Decr. naturals by 10%	Decrease all empirical yield tables by 10%
106	Incr. managed stands by 10%	Increase all managed yield tables by 10%
107	Decr. managed by 10%	Decrease all managed yield tables by 10%
108	Decr. min cut age 10yrs	Decrease the minimum cutting by 10 years
109	Incr. min cut age 10 years	Increase the minimum cutting ages by 10 years
110	Incr VQOs one class	Adjust the constraints on each VQO up one class. (e.g., retention VQO area as assigned a preservation VQO constraint)
111	Decr VQOs one class	Adjust the constraints on each VQO down one class. (e.g., retention VQO area as assigned a partial retention VQO constraint)
112	Inrc greenup constraint	Increase all greenup constraints in the Stanley model by 1 period
113	Decr greenup constraint	Decrease all greenup constraints in the Stanley model by 1 period

11.1 Scenario 2 Model Landscape Unit BEO

In this scenario the NDU guidelines will be replaced with LU/BEC constraints as shown below.

Table 59: Group Constraints applied based on the Established Old Growth Order

BEO	LU / BEC	Species	Prod Forest	NCLB	THLB	Constraint
Low	Boucher - BWBSmw1	Conif	11,472	3,034	8,438	11%>140
Low	Boucher - BWBSmw1	Decid	15,962	5,310	10,652	13%>100
Low	Boucher - BWBSwk1	Conif	5,279	371	4,907	11%>140
Low	Boucher - BWBSwk1	Decid	1,798	771	1,028	13%>100
Low	Boucher - SBSwk2	All	951	159	792	9%>250
Intermediate	Burnt-Lemoray - ESSFwc3	All	41,630	25,022	16,608	19%>250
Intermediate	Burnt-Lemoray - ESSFwk2	All	38,937	10,965	27,976	19%>250
Intermediate	Burnt-Lemoray - SBSwk2	All	22,986	7,029	15,957	9%>250
Intermediate	Carbon - ESSFmv2	All	46,132	20,883	25,249	9%>250
Intermediate	Carbon - ESSFwc3	All	9,716	4,607	5,109	19%>250
Intermediate	Carbon - ESSFwk2	All	4,368	1,310	3,059	19%>250
Intermediate	Carbon - SBSwk2	All	15,192	4,590	10,601	9%>250
High	Dunlevey - BWBSmw1	Conif	10,295	3,762	6,533	16%>140
High	Dunlevey - BWBSmw1	Decid	9,341	5,307	4,034	19%>100
High	Dunlevey - BWBSwk2	Conif	7,438	2,806	4,632	16%>140
High	Dunlevey - BWBSwk2	Decid	5,082	1,646	3,436	19%>100
High	Dunlevey - ESSFmv4	All	11,756	5,746	6,011	13%>250
Low	East Pine - BWBSmw1	Conif	6,892	954	5,938	11%>140
Low	East Pine - BWBSmw1	Decid	12,039	3,569	8,470	13%>100
Low	Gething - BWBSmw1	Conif	8,864	1,880	6,984	11%>140
Low	Gething - BWBSmw1	Decid	2,810	1,610	1,201	13%>100
Low	Gething - ESSFmv2	All	24,147	6,970	17,178	9%>250
Low	Gething - SBSwk2	All	20,162	4,495	15,667	9%>250
Low	highhat - BWBSmw1	Conif	7,470	1,659	5,811	11%>140
Low	highhat - BWBSmw1	Decid	8,747	3,554	5,192	13%>100
Low	highhat - ESSFmv2	All	31,099	7,292	23,808	9%>250
Low	highhat - ESSFwk2	All	2,536	610	1,926	19%>250
Low	highhat - SBSwk2	All	37,297	8,514	28,783	9%>250
Low	Martin Creek - BWBSmw1	Conif	12,408	2,414	9,994	11%>140
Low	Martin Creek - BWBSmw1	Decid	10,956	4,840	6,116	13%>100
Low	Martin Creek - BWBSwk1	Conif	18,409	3,705	14,704	11%>140
Low	Martin Creek - BWBSwk1	Decid	2,448	1,196	1,252	13%>100
Intermediate	Wolverine - BWBSmw1	Conif	3,792	854	2,938	11%>140
Intermediate	Wolverine - BWBSmw1	Decid	1,769	991	778	13%>100
Intermediate	Wolverine - BWBSwk1	Conif	5,128	953	4,175	11%>140
Intermediate	Wolverine - BWBSwk1	Decid	1,576	1,079	498	13%>100
Intermediate	Wolverine - ESSFmv2	All	34,141	13,105	21,036	9%>250
Intermediate	Wolverine - ESSFwc3	All	5,576	2,378	3,198	19%>250
Intermediate	Wolverine - ESSFwk2	All	6,727	2,212	4,516	19%>250
Intermediate	Wolverine - SBSwk2	All	12,794	4,260	8,533	9%>250

Note: Landscape unit / BEC groups without THLB area are not shown in this table.

11.2 Scenario 3 Model Mean NRV

Table 60 describes the old growth constraints applied to the natural disturbance units in TFL 48 if mean natural range of variability targets were used.

Table 60: Scenario 3 - Mean NRV

NDU	THLB Area (ha)	Total Forest Area (ha)	NRV % Target	Target Area (ha) >140 yrs (>100 yrs for decid)	Decades until Constraint is met through the NCLB
Boreal Foothills - Mountain	104,034	177,423	41	72,743	12
Boreal Foothills - Valley - Conifer	94,963	125,200	32	40064	never
Boreal Foothills - Valley - Decid.	19,708	39,669	15	5950	3
Omineca - Mountain	9,512	13,220	63.5	8395	never
Omineca - Valley	4,395	6,210	31.5	1956	never
Wet Mountain	50,338	92,738	84	77900	Never
Boreal Plains - Upland - Conifer	52,775	68,120	25	17,030	never
Boreal Plains - Upland - Decid.	27,640	43,814	15	6,572	4
Total Area (ha)	363,365	566,394		230,610	

11.3 Scenario 4 Model Maximum NRV

Table 61 describes the old growth constraints applied to the natural disturbance units in TFL 48 if maximum natural range of variability targets were used.

Table 61: Scenario 4 - Maximum NRV

NDU	THLB Area (ha)	Total Forest Area (ha)	NRV % Target	Target Area (ha) >140 yrs (>100 yrs for decid)	Decades until Constraint is met through the NCLB
Boreal Foothills – Mountain	104,034	177,423	49	86,937	never
Boreal Foothills – Valley - Conifer	94,963	125,200	40	50,080	Never
Boreal Foothills – Valley – Decid.	19,708	39,669	20	7,934	5
Omineca – Mountain	9,512	13,220	69	9,122	never
Omineca – Valley	4,395	6,210	40	2,484	Never
Wet Mountain	50,338	92,738	88	81,609	Never
Boreal Plains - Upland – Conifer	52,775	68,120	33	22,480	Never
Boreal Plains - Upland – Decid.	27,640	43,814	20	8,763	6
Total Area (ha)	363,365	566,394		269,409	

11.4 Scenarios 6 and 7 Modelling the Mountain Pine Beetle Epidemic

To model the mountain pine beetle epidemic, two models were used. The first model is a Beetle epidemic and control model that was run on an annual basis for 10 years. The principle inputs to this model were analysis unit areas, volumes, diameters classes, along with assumptions on the level of infestation, shelf-life, the amount of harvest volume directed towards pine beetle control and volume salvage and single tree control. The principle output was the forecast amount of non-recoverable pine volume losses determined by the epidemic model. These NRLs were then factored into the Woodstock model by directing MPB 'harvesting' of pine volume only in leading pine stands and in leading spruce stands with a significant pine component. The leading pine stands attacked by the beetle were assumed to regenerate back to themselves as unmanaged stands. The leading spruce stands continued to grow on the same yield curve, less the pine component.

Stands at risk to attack by the Mountain Pine Beetle were identified by assuming that all leading pine analysis units greater than 60 years of age and all leading spruce analysis units having 40% or more pine component would be attacked and killed over the next 10 years. This assumption results in the following statistics.

- Gross mature (>60 years age) pine volume in the TFL is 25,235,600 cubic metres
- Total number stands with pine volume is 33,700
- 119417 ha THLB or 153,476 ha of productive forest are greater than 60 years age with more than a 40% pine component. Under this assumption 18,343,800 cubic metres of pine in the THLB is at risk. This is equivalent to approximately 35 years harvest under the current coniferous AAC.
- All analysis units have their pine component separated from the remainder of the stand volume.

Scenarios were tested that modeled a non-declining harvest flow and an accelerated harvest flow. Scenarios were also tested using different levels of pine infestation.

11.5 Scenario 8 – Woodlots

During the initial phase of the net down process, woodlots were removed from the productive forest land base and the THLB. Table 62 identifies the woodlots within the TFL. Woodlots are divided into two separate categories; 1) those that were removed in MP3 but the AAC apportionment table included with the Management Plan approval letter dated September 20, 2001 did not reflect the removal and 2) those new woodlots removed during the term of MP3 and in the SFMP4 analysis. In this scenario, these 1,042 and 797 hectares are added back to the productive forest land base and the THLB as 2 separate scenarios to quantify the impact of each removal.

Table 62: Woodlot Licenses

TENURE	Accounted for in MP3	Removed in MP4
W0266	247	
W0297		314
W0668	176	262
W1189		218
W1501	619	
	1,042	797

11.6 Scenario 9 – Recommended Visual Quality Objectives

Scenario 9 tests the impact of the visual quality classes identified recently by the Regional landscape forester. Table 52: Forest Cover Constraints in Visual Areas identifies the recommended area within each VQO. The recommended VQO's for new scenic areas within each landscape unit were removed from the IRM zone (except for recommended maximum modification) and forest cover constraints consistent with the VQO designation were applied.

11.7 Scenario 10 – Mine Sites

Scenario 10 tests the impact of including the proposed mine sites identified in Table 8: Reduction for Mining. This scenario add the entire forested area in proposed mine sites (i.e., 479 hectares) to the THLB. Although this is an overestimate of the amount of area, the impact of this amount of area inclusion is expected to be relatively small.

11.8 Scenario 11 – SIBEC

Scenario 11 builds off of the base case assumptions making two changes. All post95 managed stand yield tables (except the shelterwood tables) where adjusted using site index estimates by site series (e.g., SIBEC). The current May 2006 estimates were acquired from the MOF's website. Table 44 and Table 45 indicate the area weighted site index by analysis unit resulting from the SIBEC tables. As a result of the change in yield table, the minimum harvest age associated with the changes were also addressed. The measure of impact was reviewed through a non-declining yield harvest flow.

11.9 Scenarios 101 to 113 – Standard MOF Sensitivity Analysis

Scenarios 101 to 113 are standard sensitivity scenarios that are traditionally requested by the MOF. The value of these scenarios is to evaluate the relative weight of various input and management assumptions on the harvest flow for a land base. The procedures used to conduct these scenarios are consistent with MOF Analysis Branch Timber Supply Review sensitivity analysis.

Appendix I

Yield Tables

Table 63: Unmanaged Stand Yield Tables

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
Bl_all	0	0	0	0	4	17	39	66	93	116	136	155	173	192	211	229	247	263	279	295	310	325	339	353	366	376
Bx_y	0	0	0	1	7	25	56	91	124	152	178	201	223	245	267	287	305	323	339	355	370	384	398	412	425	435
Bx_o	0	0	0	0	1	8	23	47	75	99	121	141	160	179	197	215	231	247	263	277	291	305	318	330	342	352
Bl_s	0	0	0	0	2	10	26	50	76	98	119	137	155	173	191	208	224	239	254	268	282	296	308	320	332	342
Sw_yg	0	0	0	0	7	33	80	131	179	221	257	289	316	341	363	382	398	412	424	435	445	453	461	468	474	480
Sw_ym	0	0	0	0	1	1	2	8	27	58	88	116	142	166	189	210	228	246	261	275	289	301	312	322	332	341
Sw_og	0	0	0	0	2	14	43	86	131	171	206	238	267	292	315	336	354	370	384	396	408	418	428	437	445	452
Sw_om	0	0	0	0	0	1	2	8	28	58	90	121	149	177	202	226	248	268	287	304	320	335	349	362	374	385
Sc_yg	0	0	0	0	3	19	56	105	154	198	238	274	307	337	363	385	404	420	433	445	456	466	476	484	492	499
Sc_ym	0	0	0	0	0	1	4	18	46	81	115	148	178	206	233	256	277	296	313	329	343	357	369	381	392	402
Sc_og	0	0	0	0	1	9	36	79	126	169	208	243	276	305	331	354	373	389	404	416	427	438	448	457	465	473
Sc_om	0	0	0	0	0	1	3	13	35	65	97	128	158	186	213	238	260	281	300	317	333	349	363	377	389	400
Sd_g	0	0	0	0	5	28	76	132	182	225	261	293	320	343	363	379	392	402	410	418	424	430	436	440	444	448
Sd_m	0	0	0	0	0	1	12	41	80	119	154	185	213	238	260	279	294	306	317	327	335	343	351	357	363	369
Ss_g	0	0	0	0	1	6	18	41	74	109	140	168	194	218	241	261	280	297	313	327	341	353	365	376	386	395
Ss_m	0	0	0	0	0	1	4	10	22	41	63	87	110	133	155	175	195	213	231	247	263	277	291	304	316	327
Pc_yg	0	0	1	17	61	115	164	206	243	276	306	333	357	379	396	409	418	424	427	428	431	434	438	441	444	447
Pc_ym	0	0	0	2	16	49	88	125	158	187	214	239	262	283	299	312	322	329	333	336	339	343	347	351	355	358
Pc_og	0	0	1	12	50	101	147	187	223	255	284	310	334	356	372	385	394	401	404	406	409	413	417	420	424	427
Pc_om	0	0	0	1	10	35	69	102	133	162	188	212	234	254	270	283	293	301	306	309	313	317	322	326	330	333
Pd_g	0	0	0	6	29	66	107	145	178	207	233	257	278	297	311	322	329	333	334	334	336	338	340	342	344	346
Pd_m	0	0	0	0	2	16	43	74	104	131	156	178	199	217	232	243	250	255	258	260	261	264	267	269	271	273
Pl_g	0	0	1	17	62	117	167	213	254	291	325	357	387	413	432	446	456	462	464	464	465	468	471	474	477	480
Pl_m	0	0	0	1	14	46	84	121	155	187	216	244	270	294	312	326	336	342	345	346	348	352	355	358	362	365
Ac_g	0	0	0	7	33	75	117	155	187	215	239	258	273	285	295	302	307	310	312	313	314	316	317	319	320	321
Ac_m	0	0	0	0	6	24	49	75	98	118	136	151	164	174	182	188	192	194	196	198	199	201	202	204	205	206
Ad_g	0	0	0	9	38	79	120	156	187	213	234	250	262	270	277	283	285	285	286	286	286	286	287	287	287	287
Ad_m	0	0	0	0	3	19	47	76	102	125	144	160	172	181	188	193	196	196	197	197	198	198	199	199	200	200
Ct_con	0	0	1	7	31	71	113	150	182	210	235	256	275	292	306	317	323	326	328	330	332	334	336	337	339	340
Ct_dec	0	0	0	3	17	46	82	117	148	176	201	223	242	258	271	280	284	285	286	286	287	288	288	289	289	289

Table 64: Species Distribution (%) in Existing Unmanaged Stands

AU	S	B	PL	L	AC	AT	E
1	9	91	0	0	0	0	0
2	29	63	8	0	0	0	0
3	31	66	3	0	0	0	0
4	24	75	1	0	0	0	0
5	91	1	3	0	4	1	0
6	91	2	4	0	2	1	0
7	92	3	3	0	2	0	0
8	90	7	2	0	1	0	0
9	61	10	23	0	3	3	0
10	62	18	18	0	1	1	0
11	64	14	19	0	2	1	0
12	65	27	8	0	0	0	0
13	62	1	5	0	17	13	2
14	61	2	7	0	16	12	2
15	72	24	4	0	0	0	0
16	70	29	1	0	0	0	0
17	25	4	65	0	2	4	0
18	25	8	64	0	1	2	0
19	27	5	64	0	2	2	0
20	25	10	63	0	1	1	0
21	11	0	61	0	6	21	1
22	9	1	62	1	5	21	1
23	6	0	92	0	0	2	0
24	5	1	93	0	0	1	0
25	17	0	13	0	6	61	3
26	13	1	18	0	4	63	1
27	3	0	2	0	12	82	1
28	4	0	3	0	11	80	2
29	25	0	7	0	60	7	1
30	6	0	2	0	64	17	11

Table 65: Existing Managed Stand Yield Tables

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
Bl_all	0	0	0	0	1	17	57	113	170	224	277	324	360	390	413	433	449	463	475	484	491	499	501	501	501	501
Bx_y	0	0	0	0	1	16	55	110	167	221	273	320	358	387	410	430	446	460	472	482	489	497	500	500	501	500
Bl_s	0	0	0	0	1	15	52	106	166	221	276	323	360	390	414	434	450	465	477	487	495	501	503	504	504	505
Sw_yg	0	0	0	0	6	42	112	192	266	332	381	420	451	477	496	512	521	527	530	533	533	534	535	534	532	530
Sw_ym	0	0	0	0	0	0	1	4	17	38	68	102	136	168	199	228	258	286	310	332	350	365	378	390	399	408
Sc_yg	0	0	0	0	8	32	79	137	195	248	294	331	361	384	404	421	435	445	454	459	462	464	466	466	466	465
Sc_ym	0	0	0	0	0	0	1	6	18	37	63	93	123	152	179	205	230	254	276	294	310	323	335	345	354	362
Sd_g	0	0	0	4	31	90	153	208	263	304	334	356	374	387	398	407	409	409	409	408	408	407	407	406	404	401
Sd_m	0	0	0	0	1	8	31	68	109	150	184	216	247	274	296	313	326	336	345	352	358	363	368	372	375	378
Ss_g	0	0	0	0	0	6	27	66	117	169	217	264	307	342	370	394	412	429	443	455	466	474	480	487	492	493
Ss_m	0	0	0	0	0	1	10	35	73	119	164	206	246	285	319	346	369	389	405	419	431	441	451	459	465	470
Pc_yg	0	0	0	20	71	131	188	242	286	322	352	376	396	413	426	436	444	450	456	460	464	466	463	461	458	455
Pc_ym	0	0	0	2	21	53	91	128	162	192	218	242	264	282	295	307	316	324	332	338	342	346	350	353	356	357
Pl_g	0	0	0	22	77	137	189	235	273	301	326	348	366	379	391	402	411	416	421	425	430	432	436	439	441	436
Pl_m	0	0	0	2	25	60	98	132	162	187	209	228	245	259	270	279	286	293	299	304	307	310	313	315	317	319
Ac_g	0	0	0	14	65	138	219	290	350	396	432	460	481	496	504	507	509	510	511	510	509	509	508	508	508	508
Ac_m	0	0	0	0	7	31	70	117	165	209	249	285	314	337	356	373	386	399	409	417	424	430	432	433	434	435
Ct_con	0	0	0	2	19	59	114	171	226	274	315	346	373	394	412	427	439	449	456	461	465	467	467	467	467	467
LwStk_c	0	0	1	10	32	68	113	155	196	230	260	286	309	327	342	355	365	372	378	383	387	390	393	395	396	397
LwStk_d	0	0	1	6	21	50	87	124	157	185	209	229	246	259	270	278	282	284	286	288	289	290	291	291	291	291

Table 66: Post 1995 Stands Yield tables (inside the Genetic Areas)

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
Bl_all	0	0	0	0	0	1	15	49	93	142	186	226	263	304	337	364	385	401	414	424	433	441	446	451	455	458
Bx_y	0	0	0	0	1	14	55	113	173	224	272	323	361	390	411	427	441	451	459	467	472	476	479	482	484	481
Bx_o	0	0	0	0	0	1	8	32	71	114	160	198	235	270	307	337	362	381	396	409	418	427	434	439	444	448
Bl_s	0	0	0	0	0	0	0	27	42	54	65	76	86	99	121	147	176	203	228	251	275	298	317	335	348	360
Sw_yg	0	0	0	0	6	50	119	189	250	312	363	399	425	444	459	471	481	487	493	497	495	493	491	489	487	485
Sw_ym	0	0	0	0	1	18	67	128	187	238	290	338	375	400	421	435	449	458	466	473	477	480	484	487	484	481
Sw_og	0	0	0	0	0	9	42	91	147	193	237	282	321	352	373	391	404	415	424	431	437	441	444	447	449	452
Sw_om	0	0	0	0	0	0	2	16	45	80	119	157	190	221	252	284	311	333	351	364	376	385	393	400	406	409
Sc_yg	0	0	0	0	8	50	113	175	228	281	324	355	377	394	407	417	426	432	437	441	440	439	439	438	437	434
Sc_ym	0	0	0	0	0	1	11	39	77	119	160	195	228	261	293	317	339	354	367	377	385	393	398	403	407	411
Sc_og	0	0	0	0	2	23	75	134	188	236	284	325	357	379	397	411	422	430	438	443	447	451	455	454	452	450
Sc_om	0	0	0	0	0	0	2	14	40	73	109	146	177	206	233	262	288	309	327	340	352	362	369	376	382	387
Sd_g	0	0	0	4	46	121	193	262	318	354	380	400	414	425	430	431	431	431	430	430	430	428	426	424	422	421
Sd_m	0	0	0	0	1	7	27	61	100	141	177	208	238	267	290	310	323	333	341	348	354	358	361	365	368	370
Ss_g	0	0	0	0	0	0	0	16	32	50	68	84	102	130	164	199	232	261	290	317	339	357	372	384	395	405
Ss_m	0	0	0	0	0	0	0	0	12	22	35	48	60	76	102	134	169	200	229	258	285	307	326	341	354	365
Pc_yg	0	0	2	41	106	169	222	265	304	334	353	369	382	393	402	410	416	419	422	424	426	428	430	431	433	434
Pc_ym	0	0	0	6	29	66	107	145	178	205	230	252	269	284	296	306	315	323	329	332	335	337	339	341	343	345
Pc_og	0	0	2	32	87	144	193	232	268	297	318	333	345	355	364	371	377	382	386	387	388	389	390	390	391	392
Pc_om	0	0	0	2	14	40	72	103	133	159	180	200	218	233	245	256	264	271	277	282	287	291	295	298	301	301
Pd_g	0	0	0	6	37	80	123	160	191	216	237	255	269	280	289	295	300	304	307	309	311	313	314	316	317	318
Pd_m	0	0	0	0	4	22	49	78	105	129	149	167	180	192	201	209	216	221	225	229	232	234	237	239	241	244
Pl_g	0	0	0	19	73	134	186	228	262	292	315	330	344	355	365	374	382	388	392	395	398	400	403	405	406	408
Pl_m	0	0	0	1	15	45	82	117	147	173	195	213	228	241	253	263	272	279	286	292	295	297	299	301	302	303
Ac_g	0	0	0	5	31	80	131	176	216	250	276	296	312	325	335	343	349	352	354	355	356	357	358	359	360	361
Ac_m	0	0	0	0	4	18	41	70	98	125	148	168	186	201	213	223	230	235	240	243	246	249	252	254	256	257
Ad_g	0	0	0	9	38	79	120	156	187	213	234	250	262	270	277	283	285	285	286	286	286	286	287	287	287	287
Ad_m	0	0	0	0	3	19	47	76	102	125	144	160	172	181	188	193	196	196	197	197	198	198	199	199	200	200
Ct_con	0	0	0	5	23	61	106	148	185	217	247	271	292	309	324	335	341	346	349	352	355	357	358	359	360	361
Ct_dec	0	0	0	3	17	46	82	117	148	176	201	223	242	258	271	280	284	285	286	286	287	288	288	289	289	289

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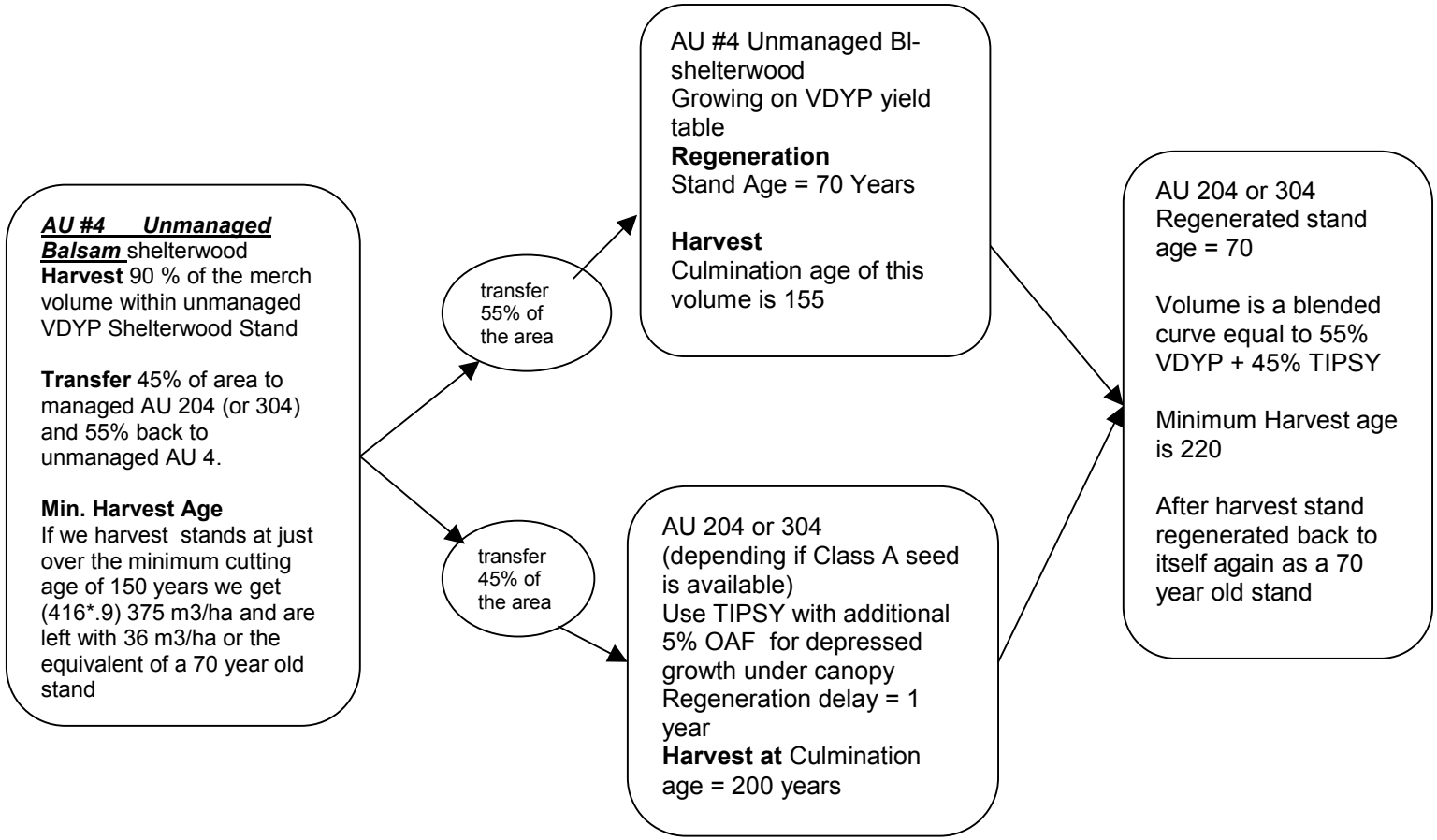
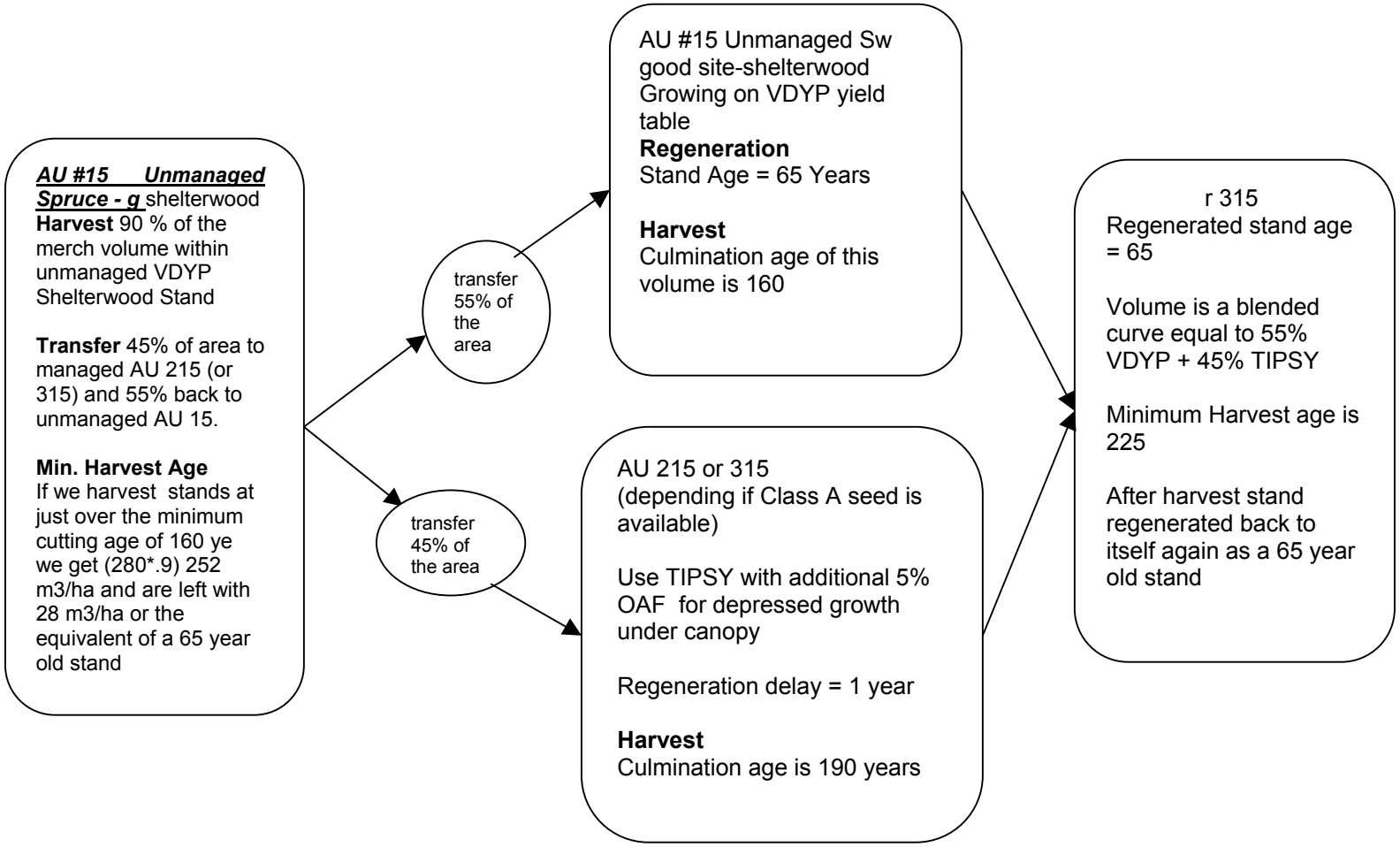
Appendix II

Modeling Shelterwood Stands

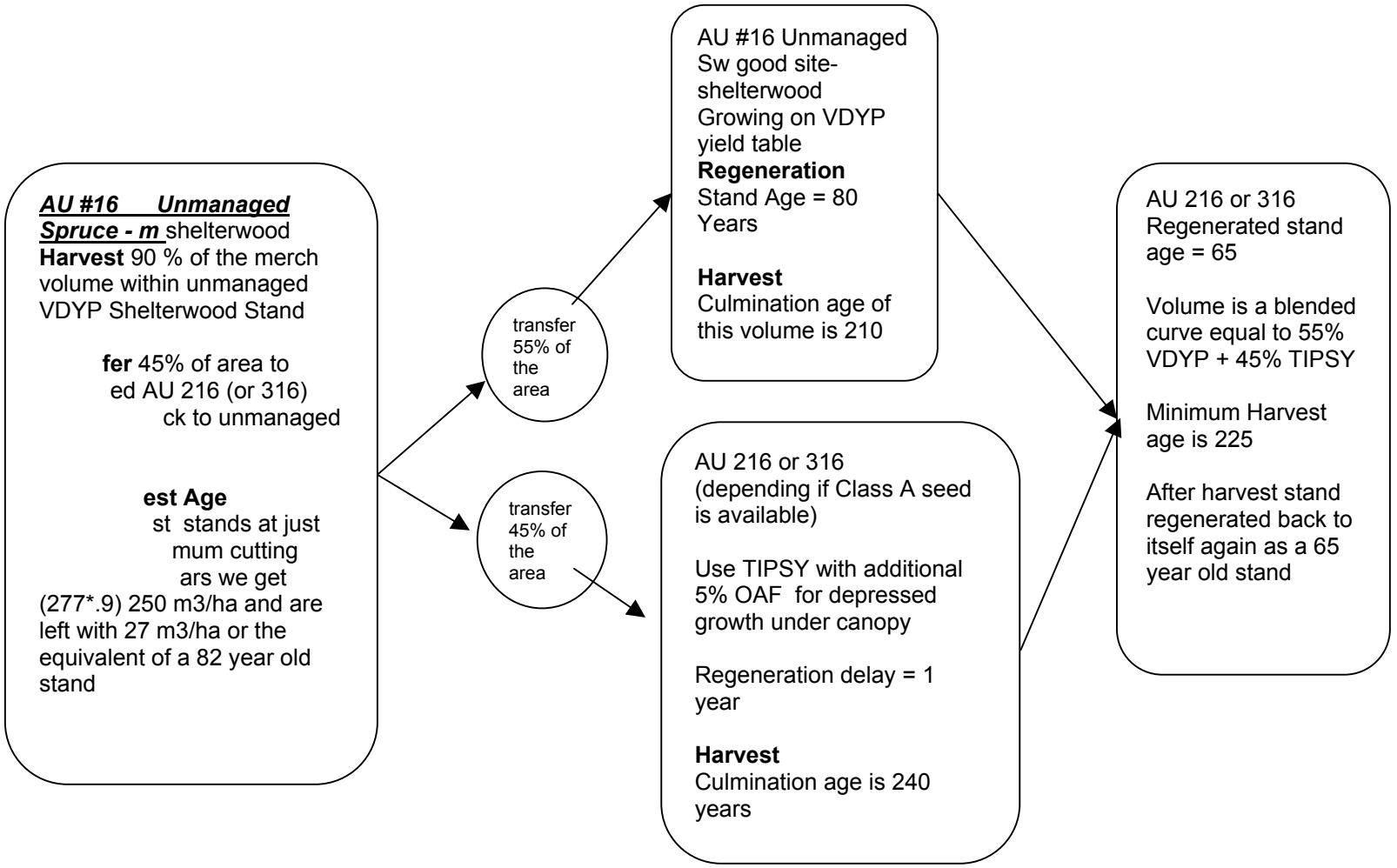
Flow Chart of Modeling Assumptions used to Model Balsam Shelterwood Harvesting



Flow Chart of Modeling Assumptions used to Model Good Site Spruce Shelterwood Harvesting



Flow Chart of Modeling Assumptions used to Model Medium Site Spruce Shelterwood Harvesting



Appendix III

Low Stocking Stand information

Table 67: Stocking Status of Stands with Low Stocking

						Area by Species (Inv Layer)						
MAPSTAND	ha	BlockID	Stratum	Tree Type	Current Status Label	Ac	At	Bl	Ep	Pli		Total
093O020_1576	2.1	051-001	C	CONIFEROUS	I:SX90/BL10-0/0-0.0/0.0-24-3-300(1999),S:SX75/BL25-19-0.02-24-133(1999)0(FG)	-	-	0.2	-	-	1.9	2.1
093O020_1579	2.8	051-001	C	CONIFEROUS	I:SX90/BL10-0/0-0.0/0.0-24-3-300(1999),S:SX75/BL25-19-0.02-24-133(1999)0(FG)	-	-	0.3	-	-	2.5	2.8
093P015_1498	2.0	071-002	D	CONIFEROUS	I:SX50/PLI40/BL10-0/0-0.0/0.0-12-5-333(1999),S:SX83/PLI17-8-0.6-15-200(1999)0(FG)	-	-	0.2	-	0.8	1.0	2.0
093P015_1500	6.3	071-002	D	CONIFEROUS	I:SX50/PLI40/BL10-0/0-0.0/0.0-12-5-333(1999),S:SX83/PLI17-8-0.6-15-200(1999)0(FG)	-	-	0.6	-	2.5	3.1	6.3
093P092_967	20.4	002-01A	B	CONIFEROUS	I:SW70/AC10/AT10/EP10-0/0-0.0/0.0-15-0-466(1994),S:SW100-5-0.9-15-222(1994)22(FG)	2.0	2.0	-	2.0	-	14.3	20.4
093P092_973	1.1	002-01A	B	CONIFEROUS	I:SW70/AC10/AT10/EP10-0/0-0.0/0.0-15-0-466(1994),S:SW100-5-0.9-15-222(1994)22(FG)	0.1	0.1	-	0.1	-	0.8	1.1
093O099_1669	6.0	210-003	C	CONIFEROUS	I:BL50/SW29/AT14/AC7-0/0-0.0/0.0-15-20-467(2000)(7),S:SW66/BL17/PLI17-12-1.7-15-200(2000)(7)167(FG)	0.4	0.8	3.0	-	-	1.7	6.0
093O089_1508	7.7	240-005	B	CONIFEROUS	I:SW26/AT25/AC18/PLI18/BL13-0/0-0.0/0.0-21-6-500(2001)(7),S:SW60/PLI33/BL7-10-1.5-21-188(2001)(7)63(FG)	1.4	1.9	1.0	-	1.4	2.0	7.7
093O089_1518	1.4	240-005	B	CONIFEROUS	I:SW26/AT25/AC18/PLI18/BL13-0/0-0.0/0.0-21-6-500(2001)(7),S:SW60/PLI33/BL7-10-1.5-21-188(2001)(7)63(FG)	0.3	0.4	0.2	-	0.3	0.4	1.4
093O089_1529	0.4	240-005	B	CONIFEROUS	I:SW26/AT25/AC18/PLI18/BL13-0/0-0.0/0.0-21-6-500(2001)(7),S:SW60/PLI33/BL7-10-1.5-21-188(2001)(7)63(FG)	0.1	0.1	0.1	-	0.1	0.1	0.4
093O089_1631	3.7	992-003	A	CONIFEROUS	I:PLI94/AC6-0/0-0.0/0.0-21-7-514(2001)(7),S:PLI100-13-2.3-21-257(2001)(7)143(FG)	0.2	-	-	-	3.5	-	3.7
093O089_1635	0.9	992-003	A	CONIFEROUS	I:PLI94/AC6-0/0-0.0/0.0-21-7-514(2001)(7),S:PLI100-13-2.3-21-257(2001)(7)143(FG)	0.1	-	-	-	0.8	-	0.9
093O089_1646	2.9	992-003	A	CONIFEROUS	I:PLI94/AC6-0/0-0.0/0.0-21-7-514(2001)(7),S:PLI100-13-2.3-21-257(2001)(7)143(FG)	0.2	-	-	-	2.7	-	2.9
093O089_1613	7.2	209-001	B	CONIFEROUS	I:SW50/AC25/BL25-0/0-0.0/0.0-21-5-600(2001)(7),S:SW100-20-2.2-21-250(2001)(7)50(FG)	1.8	-	1.8	-	-	3.6	7.2
093O039_1727	1.5	039-002	C	CONIFEROUS	I:SW90/BL10-0/0-0.0/0.0-12-10-680(1994),S:SW91/BL9-6-0.3-12-440(1994)0(FG)	-	-	0.2	-	-	1.4	1.5
093O089_1593	5.2	209-002	B	CONIFEROUS	I:PLI54/SW25/AC21-0/0-0.0/0.0-21-15-686(2001)(7),S:PLI75/SW25-11-2.2-21-457(2001)(7)286(FG)	1.1	-	-	-	2.8	1.3	5.2
093O089_1594	0.1	209-002	B	CONIFEROUS	I:PLI54/SW25/AC21-0/0-0.0/0.0-21-15-686(2001)(7),S:PLI75/SW25-11-2.2-21-457(2001)(7)286(FG)	0.0	-	-	-	0.1	0.0	0.1
093O089_1596	1.2	209-002	B	CONIFEROUS	I:PLI54/SW25/AC21-0/0-0.0/0.0-21-15-686(2001)(7),S:PLI75/SW25-11-2.2-21-457(2001)(7)286(FG)	0.2	-	-	-	0.6	0.3	1.2
093O058_527	0.8	060-001	B	CONIFEROUS	I:SX90/AT10-0/0-0.0/0.0-21-3.5-760(1999),S:SX91/PLI9-9-0.8-21-400(1999)0(FG)	-	0.1	-	-	-	0.7	0.8
093O058_531	0.4	060-001	B	CONIFEROUS	I:SX90/AT10-0/0-0.0/0.0-21-3.5-760(1999),S:SX91/PLI9-9-0.8-21-400(1999)0(FG)	-	0.0	-	-	-	0.4	0.4
094B008_1839	32.7	216-005	B	CONIFEROUS	I:SW48/AC33/BL13/PLI4/AT2-0/0-0.0/0.0-21-5-800(2000)(7),S:SW82/BL9/PLI9-14-2.3-21-276(2000)(7)88(FG)	10.8	0.7	4.2	-	1.3	15.7	32.7
094B008_1894	4.3	216-002	C	CONIFEROUS	I:SW54/BL38/PLI8-0/0-0.0/0.0-18-3-800(2000)(7),S:SW64/BL18/PLI18-10-1.2-18-367(2000)(7)167(FG)	-	-	1.6	-	0.3	2.3	4.3
093P051_2343	1.8	032-001	D	CONIFEROUS	I:SW60/AC40-0/0-0.0/0.0-15-5-800(1998),S:SW100-11-1.4-15-486(1998)0(FG)	0.7	-	-	-	-	1.1	1.8
093P051_2360	0.7	032-001	D	CONIFEROUS	I:SW60/AC40-0/0-0.0/0.0-15-5-800(1998),S:SW100-11-1.4-15-486(1998)0(FG)	0.3	-	-	-	-	0.4	0.7
093P051_2368	0.5	032-001	D	CONIFEROUS	I:SW60/AC40-0/0-0.0/0.0-15-5-800(1998),S:SW100-11-1.4-15-486(1998)0(FG)	0.2	-	-	-	-	0.3	0.5
093P051_2373	1.2	032-001	D	CONIFEROUS	I:SW60/AC40-0/0-0.0/0.0-15-5-800(1998),S:SW100-11-1.4-15-486(1998)0(FG)	0.5	-	-	-	-	0.7	1.2
093P051_2391	0.7	032-001	D	CONIFEROUS	I:SW60/AC40-0/0-0.0/0.0-15-5-800(1998),S:SW100-11-1.4-15-486(1998)0(FG)	0.3	-	-	-	-	0.4	0.7
093O089_1576	4.4	240-007	C	CONIFEROUS	I:BL55/SW36/PLI9-0/0-0.0/0.0-18-1-880(2001)(7),S:SW49/BL38/PLI13-11-1.6-18-320(2001)(7)280(FG)	-	-	2.4	-	0.4	1.6	4.4
094B039_68	5.4	259-009	A	CONIFEROUS	I:SW71/EP20/AC9-0/0-0.0/0.0-18-8-985(2001)(7),S:SW100-15-3.5-18-369(2001)(7)169(FG)	0.5	-	-	1.1	-	3.8	5.4
094B039_70	7.7	259-009	A	CONIFEROUS	I:SW71/EP20/AC9-0/0-0.0/0.0-18-8-985(2001)(7),S:SW100-15-3.5-18-369(2001)(7)169(FG)	0.7	-	-	1.5	-	5.5	7.7
093O050_2349	2.9	024-002	B	CONIFEROUS	I:SW50/BL27/AC23-0/0-0.0/0.0-15-6-1120(2000)(7),S:SW66/BL34-15-1.6-15-300(2000)(7)180(FG)	0.7	-	0.8	-	-	1.5	2.9
093O050_2365	0.4	024-002	B	CONIFEROUS	I:SW50/BL27/AC23-0/0-0.0/0.0-15-6-1120(2000)(7),S:SW66/BL34-15-1.6-15-300(2000)(7)180(FG)	0.1	-	0.1	-	-	0.2	0.4
093O050_2372	2.0	024-002	B	CONIFEROUS	I:SW50/BL27/AC23-0/0-0.0/0.0-15-6-1120(2000)(7),S:SW66/BL34-15-1.6-15-300(2000)(7)180(FG)	0.5	-	0.5	-	-	1.0	2.0
093O058_523	1.6	060-001	A	CONIFEROUS	I:SX50/AT30/EP20-0/0-0.0/0.0-21-12.3-1160(1999),S:SX100-8-0.9-21-400(1999)0(FG)	-	0.5	-	0.3	-	0.8	1.6
093O058_525	0.5	060-001	A	CONIFEROUS	I:SX50/AT30/EP20-0/0-0.0/0.0-21-12.3-1160(1999),S:SX100-8-0.9-21-400(1999)0(FG)	-	0.1	-	0.1	-	0.2	0.5

						Area by Species (Inv Layer)						
MAPSTAND	ha	BlockID	Stratum	Tree Type	Current Status Label	Ac	At	Bl	Ep	Pli	Sx	Total
093O058_528	2.8	060-001	A	CONIFEROUS	I:SX50/AT30/EP20-0/0-0.0/0.0-21-12.3-1160(1999),S:SX100-8-0.9-21-400(1999)0(FG)	-	0.8	-	0.6	-	1.4	2.8
093O089_1491	8.1	205-003	D	CONIFEROUS	I:SW54/AC20/AT16/PLI6/BL4-0/0-0.0/0.0-21-23-1350(2001)(7),S:SW84/PLI12/BL4-17-2.1-21-350(2001)(7)150(FG)	1.6	1.3	0.3	-	0.5	4.4	8.1
093O099_1906	0.6	205-003	D	CONIFEROUS	I:SW54/AC20/AT16/PLI6/BL4-0/0-0.0/0.0-21-23-1350(2001)(7),S:SW84/PLI12/BL4-17-2.1-21-350(2001)(7)150(FG)	0.1	0.1	0.0	-	0.0	0.3	0.6
093O099_1908	0.5	205-003	D	CONIFEROUS	I:SW54/AC20/AT16/PLI6/BL4-0/0-0.0/0.0-21-23-1350(2001)(7),S:SW84/PLI12/BL4-17-2.1-21-350(2001)(7)150(FG)	0.1	0.1	0.0	-	0.0	0.3	0.5
093P015_1487	5.5	071-001	A	CONIFEROUS	I:SX40/AC30/AT20/BL10-0/0-0.0/0.0-15-14-1357(1999),S:SX91/PLI9-11-1.5-15-314(1999)0(FG)	1.7	1.1	0.6	-	-	2.2	5.5
093P015_1505	10.0	071-001	A	CONIFEROUS	I:SX40/AC30/AT20/BL10-0/0-0.0/0.0-15-14-1357(1999),S:SX91/PLI9-11-1.5-15-314(1999)0(FG)	3.0	2.0	1.0	-	-	4.0	10.0
093O089_1561	3.2	240-008	C	CONIFEROUS	I:SW52/AT20/PLI18/AC8/BL2-0/0-0.0/0.0-18-7-1442(2001)(7),S:SW63/PLI37-9-1.8-18-474(2001)(7)168(FG)	0.3	0.6	0.1	-	0.6	1.7	3.2
093O089_1579	6.6	240-008	C	CONIFEROUS	I:SW52/AT20/PLI18/AC8/BL2-0/0-0.0/0.0-18-7-1442(2001)(7),S:SW63/PLI37-9-1.8-18-474(2001)(7)168(FG)	0.5	1.3	0.1	-	1.2	3.4	6.6
094B039_62	3.3	259-011	B	CONIFEROUS	I:SW61/EP19/AC10/PLI10-0/0-0.0/0.0-18-10-1600(2001)(7),S:SW100-10-1.8-18-600(2001)(7)333(FG)	0.3	-	-	0.6	0.3	2.0	3.3
094B039_64	1.4	259-011	B	CONIFEROUS	I:SW61/EP19/AC10/PLI10-0/0-0.0/0.0-18-10-1600(2001)(7),S:SW100-10-1.8-18-600(2001)(7)333(FG)	0.1	-	-	0.3	0.1	0.8	1.4
094B040_114	0.4	259-011	B	CONIFEROUS	I:SW61/EP19/AC10/PLI10-0/0-0.0/0.0-18-10-1600(2001)(7),S:SW100-10-1.8-18-600(2001)(7)333(FG)	0.0	-	-	0.1	0.0	0.2	0.4
093P033_1067	1.7	A24961-001	C	CONIFEROUS	I:SX60/AC21/PLI19-11/15-1.8/6.0-18-3-1675(2003)(7),S:SX71/PLI29-12-2.5-18-600(2003)(7)225(FG)	0.4	-	-	-	0.3	1.0	1.7
093P033_1080	2.2	A24961-001	C	CONIFEROUS	I:SX60/AC21/PLI19-11/15-1.8/6.0-18-3-1675(2003)(7),S:SX71/PLI29-12-2.5-18-600(2003)(7)225(FG)	0.5	-	-	-	0.4	1.3	2.2
093O089_1536	0.6	205-002	C	CONIFEROUS	I:SW48/AC42/AT7/BL3-0/0-0.0/0.0-15-9-1681(2001)(7),S:SW91/BL7/PLI2-17-2.4-15-289(2001)(7)74(FG)	0.3	0.0	0.0	-	-	0.3	0.6
093O089_1541	16.2	205-002	C	CONIFEROUS	I:SW48/AC42/AT7/BL3-0/0-0.0/0.0-15-9-1681(2001)(7),S:SW91/BL7/PLI2-17-2.4-15-289(2001)(7)74(FG)	6.8	1.1	0.5	-	-	7.8	16.2
093O089_1553	3.3	205-002	C	CONIFEROUS	I:SW48/AC42/AT7/BL3-0/0-0.0/0.0-15-9-1681(2001)(7),S:SW91/BL7/PLI2-17-2.4-15-289(2001)(7)74(FG)	1.4	0.2	0.1	-	-	1.6	3.3
093O098_1689	7.3	220-005	A	CONIFEROUS	I:PLI40/SX30/BL20/AC10-0/0-0.0/0.0-12-10-1733(1995),S:PLI57/SX43-8-1.4-12-667(1995)433(FG)	0.7	-	1.5	-	2.9	2.2	7.3
093O039_1738	2.6	039-004	C	CONIFEROUS	I:SX77/BL23-0/0-0.0/0.0-12-2-2120(1999),S:SX79/BL21-4-0.2-10-560(1999)0(FG)	-	-	0.6	-	-	2.0	2.6
093P092_1005	0.8	992-014	A	CONIFEROUS	I:SW54/EP29/AC17-0/0-0.0/0.0-18-3-2141(2001)(7),S:SW100-15-2.3-18-282(2001)(7)71(FG)	0.1	-	-	0.2	-	0.4	0.8
093P092_1007	14.3	992-014	A	CONIFEROUS	I:SW54/EP29/AC17-0/0-0.0/0.0-18-3-2141(2001)(7),S:SW100-15-2.3-18-282(2001)(7)71(FG)	2.4	-	-	4.2	-	7.7	14.3
093O050_2265	3.2	022-002	B	CONIFEROUS	I:BL50/SX50-0/0-0.0/0.0-12-12-2267(1999),S:SX86/BL14-13-1.8-12-400(1999)0(FG)	-	-	1.6	-	-	1.6	3.2
093O050_2269	1.8	022-002	B	CONIFEROUS	I:BL50/SX50-0/0-0.0/0.0-12-12-2267(1999),S:SX86/BL14-13-1.8-12-400(1999)0(FG)	-	-	0.9	-	-	0.9	1.8
093P042_2101	15.7	A22658-001	A	CONIFEROUS	I:SX43/EP30/AC27-0/0-0.0/0.0-18-0-2363(1996),S:SX100-9-0.5-18-475(1996)88(FG)	4.2	-	-	4.7	-	6.7	15.7
093O098_1697	0.8	220-006	A	CONIFEROUS	I:SX80/AC10/PLI10-0/0-0.0/0.0-19-10-2366(1995),S:SX79/PLI16/BL5-5-1.0-19-600(1995)0(FG)	0.1	-	-	-	0.1	0.6	0.8
093O099_1690	2.9	222-005	G	CONIFEROUS	I:SW70/PLI30-0/0-0.0/0.0-21-1-2988(1992),S:SW83/PLI17-2-0.25-21-200(1992)0(FG)	-	-	-	-	0.9	2.0	2.9
Total Conifer Area	257					47.7	15.5	24.5	15.8	25.0	128.1	257
					Average Conifer Sp Comp Sx50 Ac19 Pl10 Bl10 At 06Ep 06 1183sph (334wssph)	19%	6%	10%	6%	10%	50%	100%
093P084_1325	2.6	008-002	C	DECIDUOUS	I:EP47/AC33/SW20-0/0-0.0/0.0-18-10-150(2001)(7),S:SW100-12-2.4-18-20(2001)(7)0(FG)	0.9	-	-	1.2	-	0.5	2.6
093P084_1328	5.3	008-002	C	DECIDUOUS	I:EP47/AC33/SW20-0/0-0.0/0.0-18-10-150(2001)(7),S:SW100-12-2.4-18-20(2001)(7)0(FG)	1.7	-	-	2.5	-	1.1	5.3
093P084_1338	12.5	008-002	C	DECIDUOUS	I:EP47/AC33/SW20-0/0-0.0/0.0-18-10-150(2001)(7),S:SW100-12-2.4-18-20(2001)(7)0(FG)	4.1	-	-	5.9	-	2.5	12.5
093P084_1299	3.0	008-001	B	DECIDUOUS	I:EP64/AT18/SW18-0/0-0.0/0.0-18-15-440(2001)(7),S:SW100-21-7.0-18-80(2001)(7)40(FG)	-	0.5	-	1.9	-	0.5	3.0
093O099_1522	0.1	213-002	C	DECIDUOUS	I:AC90/SW10-0/0-0.0/0.0-21-1.5-560(1998),S:SW100-12-1.7-21-80(1998)0(FG)	0.1	-	-	-	-	0.0	0.1
093P015_1521	2.7	071-003	C	DECIDUOUS	I:AC50/AT30/SX20-0/0-0.0/0.0-12-3-629(1999),S:SX100-10-0.9-12-143(1999)0(FG)	1.3	0.8	-	-	-	0.5	2.7
093O089_1725	0.6	240-013	A	DECIDUOUS	I:AC38/SW31/BL14/PLI14/AT3-0/0-0.0/0.0-15-2-900(2001)(7),S:PLI42/SW33/BL25-11-2.9-15-300(2001)(7)225(FG)	0.2	0.0	0.1	-	0.1	0.2	0.6
093O089_1729	1.1	240-013	A	DECIDUOUS	I:AC38/SW31/BL14/PLI14/AT3-0/0-0.0/0.0-15-2-900(2001)(7),S:PLI42/SW33/BL25-11-2.9-15-300(2001)(7)225(FG)	0.4	0.0	0.2	-	0.2	0.3	1.1
093O089_1730	3.8	240-013	A	DECIDUOUS	I:AC38/SW31/BL14/PLI14/AT3-0/0-0.0/0.0-15-2-900(2001)(7),S:PLI42/SW33/BL25-11-2.9-15-300(2001)(7)225(FG)	1.4	0.1	0.5	-	0.5	1.2	3.8
093O089_1731	1.4	240-013	A	DECIDUOUS	I:AC38/SW31/BL14/PLI14/AT3-0/0-0.0/0.0-15-2-900(2001)(7),S:PLI42/SW33/BL25-11-2.9-15-300(2001)(7)225(FG)	0.5	0.0	0.2	-	0.2	0.4	1.4
093O089_1672	9.4	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	4.7	-	0.7	-	-	4.1	9.4
093O089_1704	3.2	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	1.6	-	0.2	-	-	1.4	3.2

						Area by Species (Inv Layer)						
MAPSTAND	ha	BlockID	Stratum	Tree Type	Current Status Label	Ac	At	Bl	Ep	Pli	Sx	Total
093O090_1124	3.1	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	1.6	-	0.2	-	-	1.3	3.1
093O090_1125	0.6	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	0.3	-	0.0	-	-	0.2	0.6
093O090_1127	6.8	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	3.4	-	0.5	-	-	2.9	6.8
093O090_1137	0.9	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	0.4	-	0.1	-	-	0.4	0.9
093O090_1145	2.3	207-001	A	DECIDUOUS	I:AC50/SW43/BL7-0/0-0.0/0.0-18-10-982(2000)(7),S:SW100-13-3.3-18-382(2000)(7)145(FG)	1.1	-	0.2	-	-	1.0	2.3
093P043_1882	2.3	021-001	C	DECIDUOUS	I:AC50/SX40/BL10-0/0-0.0/0.0-12-1-1080(1999),S:SX83/PLI17-6-0.5-12-240(1999)0(FG)	1.1	-	0.2	-	-	0.9	2.3
093P015_1493	0.4	071-002	C	DECIDUOUS	I:AT60/SX30/PLI10-0/0-0.0/0.0-12-15-1100(1999),S:PLI60/SX40-11-2.9-12-167(1999)0(FG)	-	0.2	-	-	0.0	0.1	0.4
094B039_66	1.7	259-012	A	DECIDUOUS	I:EP36/SW32/AC26/AT6-0/0-0.0/0.0-18-6-1240(2001)(7),S:SW100-16-3.0-18-240(2001)(7)200(FG)	0.4	0.1	-	0.6	-	0.5	1.7
093P004_2016	0.7	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	0.4	-	-	-	-	0.3	0.7
093P004_2021	4.0	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	2.2	-	-	-	-	1.8	4.0
093P004_2027	1.1	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	0.6	-	-	-	-	0.5	1.1
093P004_2029	10.4	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	5.7	-	-	-	-	4.7	10.4
093P004_2039	0.7	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	0.4	-	-	-	-	0.3	0.7
093P004_2052	1.8	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	1.0	-	-	-	-	0.8	1.8
093P004_2059	0.6	T5998	B	DECIDUOUS	I:AC55/SW45-0/0-0.0/0.0-21-4-1265(2001)(7),S:SW100-16-2.1-21-341(2001)(7)141(FG)	0.3	-	-	-	-	0.3	0.6
093O099_1870	38.8	202-003	B	DECIDUOUS	I:AC43/AT38/SW15/PLI4-0/0-0.0/0.0-27-24-1767(2001)(7),S:SW89/PLI11-16-2.4-27-267(2001)(7)71(FG)	16.7	14.7	-	-	1.6	5.8	38.8
093P004_2030	6.1	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.9	2.7	0.3	-	-	2.1	6.1
093P004_2031	2.9	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.4	1.3	0.1	-	-	1.0	2.9
093P004_2040	1.4	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.2	0.6	0.1	-	-	0.5	1.4
093P004_2044	10.2	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	1.5	4.6	0.5	-	-	3.6	10.2
093P004_2047	5.9	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.9	2.6	0.3	-	-	2.0	5.9
093P004_2053	1.4	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.2	0.6	0.1	-	-	0.5	1.4
093P004_2060	1.0	T5998	C	DECIDUOUS	I:AT40/SW35/AC15/BL5-0/0-0.0/0.0-18-5-1814(2001)(7),S:SW92/BL8-10-1.4-18-418(2001)(7)205(FG)	0.1	0.4	0.0	-	-	0.3	1.0
093O099_1836	1.8	205-004	C	DECIDUOUS	I:AC56/SW19/BL13/AT11/PLI1-0/0-0.0/0.0-21-5-1891(2001)(7),S:SW57/BL39/PLI4-12-1.1-21-418(2001)(7)109(FG)	1.0	0.2	0.2	-	0.0	0.3	1.8
093O099_1838	3.3	205-004	C	DECIDUOUS	I:AC56/SW19/BL13/AT11/PLI1-0/0-0.0/0.0-21-5-1891(2001)(7),S:SW57/BL39/PLI4-12-1.1-21-418(2001)(7)109(FG)	1.8	0.4	0.4	-	0.0	0.6	3.3
093O099_1871	3.0	205-004	C	DECIDUOUS	I:AC56/SW19/BL13/AT11/PLI1-0/0-0.0/0.0-21-5-1891(2001)(7),S:SW57/BL39/PLI4-12-1.1-21-418(2001)(7)109(FG)	1.7	0.3	0.4	-	0.0	0.6	3.0
093O099_1603	0.8	219-002	C	DECIDUOUS	I:AT34/AC30/SW20/PLI10/BL3/EP3-0/0-0.0/0.0-15-21-1977(2000)(7),S:SW62/PLI34/BL4-12-1.5-15-394(2000)(7)149(FG)	0.3	0.3	0.0	0.0	0.1	0.2	0.8
093P043_1875	2.3	021-001	B	DECIDUOUS	I:AC50/SX40/AT10-0/0-0.0/0.0-15-9-2000(1999),S:SX95/BL5-10-1.5-15-367(1999)0(FG)	1.1	0.2	-	-	-	0.9	2.3
093P043_1878	4.0	021-001	B	DECIDUOUS	I:AC50/SX40/AT10-0/0-0.0/0.0-15-9-2000(1999),S:SX95/BL5-10-1.5-15-367(1999)0(FG)	2.0	0.4	-	-	-	1.6	4.0
093O089_1511	48.1	202-002	C	DECIDUOUS	I:AT48/SW23/AC21/PLI6/BL2-0/0-0.0/0.0-18-10-2069(2001)(7),S:SW78/PLI19/BL3-13-2.0-18-315(2001)(7)74(FG)	10.1	23.1	1.0	-	2.9	11.1	48.1
093O089_1513	1.3	202-002	C	DECIDUOUS	I:AT48/SW23/AC21/PLI6/BL2-0/0-0.0/0.0-18-10-2069(2001)(7),S:SW78/PLI19/BL3-13-2.0-18-315(2001)(7)74(FG)	0.3	0.6	0.0	-	0.1	0.3	1.3
093O089_1519	21.7	202-002	C	DECIDUOUS	I:AT48/SW23/AC21/PLI6/BL2-0/0-0.0/0.0-18-10-2069(2001)(7),S:SW78/PLI19/BL3-13-2.0-18-315(2001)(7)74(FG)	4.6	10.4	0.4	-	1.3	5.0	21.7
093O099_1645	11.1	210-002	B	DECIDUOUS	I:AT36/AC27/EP19/SW12/PLI5/BL1-0/0-0.0/0.0-18-20-2331(2000)(7),S:SW68/PLI25/BL7-18-1.8-18-215(2000)(7)15(FG)	3.0	4.0	0.1	2.1	0.6	1.3	11.1
093O099_1655	19.1	210-002	B	DECIDUOUS	I:AT36/AC27/EP19/SW12/PLI5/BL1-0/0-0.0/0.0-18-20-2331(2000)(7),S:SW68/PLI25/BL7-18-1.8-18-215(2000)(7)15(FG)	5.2	6.9	0.2	3.6	1.0	2.3	19.1
093P075_419	0.7	T3B003	20D	DECIDUOUS	I:AC55/AT33/SX12-0/0-0.0/0.0-15-5-2366(2003)(7),S:SX100-2-0.3-15-286(2003)(7)0(FG)	0.4	0.2	-	-	-	0.1	0.7
093P075_424	1.3	T3B003	20D	DECIDUOUS	I:AC55/AT33/SX12-0/0-0.0/0.0-15-5-2366(2003)(7),S:SX100-2-0.3-15-286(2003)(7)0(FG)	0.7	0.4	-	-	-	0.2	1.3
093O060_2405	7.1	062-001	C	DECIDUOUS	I:AT50/PLI20/SW20/AC10-0/0-0.0/0.0-24-25-2440(1997),S:SW78/PLI22-5-1.2-24-460(1997)0(FG)	0.7	3.5	-	-	1.4	1.4	7.1
093O060_2410	0.6	062-001	C	DECIDUOUS	I:AT50/PLI20/SW20/AC10-0/0-0.0/0.0-24-25-2440(1997),S:SW78/PLI22-5-1.2-24-460(1997)0(FG)	0.1	0.3	-	-	0.1	0.1	0.6
093O089_1599	0.2	214-001	D	DECIDUOUS	I:AC36/AT33/PLI15/SW10/EP5-0/0-0.0/0.0-18-7-2483(2001)(7),S:PLI69/SW31-15-5.7-18-358(2001)(7)208(FG)	0.1	0.1	-	0.0	0.0	0.0	0.2

						Area by Species (Inv Layer)						
MAPSTAND	ha	BlockID	Stratum	Tree Type	Current Status Label	Ac	At	Bl	Ep	Pli	Sx	Total
093O089_1610	0.6	214-001	D	DECIDUOUS	I:AC36/AT33/PLI15/SW10/EP5-0/0-0.0/0.0-18-7-2483(2001)(7),S:PLI69/SW31-15-5.7-18-358(2001)(7)208(FG)	0.2	0.2	-	0.0	0.1	0.1	0.6
093O089_1614	0.2	214-001	D	DECIDUOUS	I:AC36/AT33/PLI15/SW10/EP5-0/0-0.0/0.0-18-7-2483(2001)(7),S:PLI69/SW31-15-5.7-18-358(2001)(7)208(FG)	0.1	0.1	-	0.0	0.0	0.0	0.2
093O089_1487	15.5	250-004	D	DECIDUOUS	I:AT56/AC19/PLI16/SW8/BL1-0/0-0.0/0.0-21-19-3097(2001)(7),S:PLI57/SW43-20-6.7-21-386(2001)(7)117(FG)	2.9	8.7	0.2	-	2.5	1.2	15.5
093O089_1501	0.2	250-004	D	DECIDUOUS	I:AT56/AC19/PLI16/SW8/BL1-0/0-0.0/0.0-21-19-3097(2001)(7),S:PLI57/SW43-20-6.7-21-386(2001)(7)117(FG)	0.0	0.1	0.0	-	0.0	0.0	0.2
093O099_1799	4.6	250-004	D	DECIDUOUS	I:AT56/AC19/PLI16/SW8/BL1-0/0-0.0/0.0-21-19-3097(2001)(7),S:PLI57/SW43-20-6.7-21-386(2001)(7)117(FG)	0.9	2.6	0.0	-	0.7	0.4	4.6
093O099_1896	5.4	250-004	D	DECIDUOUS	I:AT56/AC19/PLI16/SW8/BL1-0/0-0.0/0.0-21-19-3097(2001)(7),S:PLI57/SW43-20-6.7-21-386(2001)(7)117(FG)	1.0	3.0	0.1	-	0.9	0.4	5.4
093O099_1595	5.7	208-004	B	DECIDUOUS	I:AC36/EP31/AT22/SW10/BL1-0/0-0.0/0.0-18-30-3297(2000)(7),S:SW97/BL3-21-3.4-18-189(2000)(7)23(FG)	2.1	1.3	0.1	1.8	-	0.6	5.7
093O099_1613	32.1	208-004	B	DECIDUOUS	I:AC36/EP31/AT22/SW10/BL1-0/0-0.0/0.0-18-30-3297(2000)(7),S:SW97/BL3-21-3.4-18-189(2000)(7)23(FG)	11.6	7.1	0.3	10.0	-	3.2	32.1
093P092_931	39.7	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	7.2	10.3	-	14.3	-	7.9	39.7
093P092_944	9.2	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	1.7	2.4	-	3.3	-	1.8	9.2
093P092_951	0.2	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	0.0	0.0	-	0.1	-	0.0	0.2
093P092_953	3.9	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	0.7	1.0	-	1.4	-	0.8	3.9
093P092_955	7.7	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	1.4	2.0	-	2.8	-	1.5	7.7
093P092_958	5.8	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	1.0	1.5	-	2.1	-	1.2	5.8
093P092_962	10.7	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	1.9	2.8	-	3.9	-	2.1	10.7
093P092_966	0.9	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	0.2	0.2	-	0.3	-	0.2	0.9
093P092_971	1.8	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	0.3	0.5	-	0.6	-	0.4	1.8
093P092_987	4.0	045-001	B	DECIDUOUS	I:EP36/AT26/SW20/AC18-0/0-0.0/0.0-18-19-3310(2001)(7),S:SW99/PLI1-24-1.6-18-340(2001)(7)57(FG)	0.7	1.1	-	1.5	-	0.8	4.0
093P004_1994	0.7	T5997	A	DECIDUOUS	I:AC40/AT40/SX20-0/0-0.0/0.0-18-20-5433(2001)(7),S:SX94/PLI6-14-1.8-18-233(2001)(7)50(FG)	0.3	0.3	-	-	-	0.1	0.7
093P004_1995	0.4	T5997	A	DECIDUOUS	I:AC40/AT40/SX20-0/0-0.0/0.0-18-20-5433(2001)(7),S:SX94/PLI6-14-1.8-18-233(2001)(7)50(FG)	0.1	0.1	-	-	-	0.1	0.4
093P004_1996	0.3	T5997	A	DECIDUOUS	I:AC40/AT40/SX20-0/0-0.0/0.0-18-20-5433(2001)(7),S:SX94/PLI6-14-1.8-18-233(2001)(7)50(FG)	0.1	0.1	-	-	-	0.1	0.3
093O089_1485	3.1	250-004	B	DECIDUOUS	I:AT69/AC26/PLI3/BL1/SW1-0/0-0.0/0.0-21-52-5894(2001)(7),S:PLI62/SW38-22-6.5-21-153(2001)(7)35(FG)	0.8	2.2	0.0	-	0.1	0.0	3.1
093O099_1804	11.1	250-004	B	DECIDUOUS	I:AT69/AC26/PLI3/BL1/SW1-0/0-0.0/0.0-21-52-5894(2001)(7),S:PLI62/SW38-22-6.5-21-153(2001)(7)35(FG)	2.9	7.7	0.1	-	0.3	0.1	11.1
093O099_1861	0.6	250-004	B	DECIDUOUS	I:AT69/AC26/PLI3/BL1/SW1-0/0-0.0/0.0-21-52-5894(2001)(7),S:PLI62/SW38-22-6.5-21-153(2001)(7)35(FG)	0.2	0.4	0.0	-	0.0	0.0	0.6
093O099_1891	6.1	250-004	B	DECIDUOUS	I:AT69/AC26/PLI3/BL1/SW1-0/0-0.0/0.0-21-52-5894(2001)(7),S:PLI62/SW38-22-6.5-21-153(2001)(7)35(FG)	1.6	4.2	0.1	-	0.2	0.1	6.1
093O099_1786	2.3	205-004	E	DECIDUOUS	I:AT82/PLI9/SW7/AC1/BL1-0/0-0.0/0.0-21-65-6215(2001)(7),S:SW58/PLI42-11-0.9-21-292(2001)(7)46(FG)	0.0	1.9	0.0	-	0.2	0.2	2.3
093O099_1801	7.9	205-004	E	DECIDUOUS	I:AT82/PLI9/SW7/AC1/BL1-0/0-0.0/0.0-21-65-6215(2001)(7),S:SW58/PLI42-11-0.9-21-292(2001)(7)46(FG)	0.1	6.4	0.1	-	0.7	0.5	7.9
Total Decid Area	458					130.1	149.2	8.2	59.9	15.9	94.6	458
Total Area	715				Deciduous Sp Comp At33 Ac28 Sx21 Ep13 Pl03 Bl03 2486sph(294wssph)	28%	33%	2%	13%	3%	21%	100%