



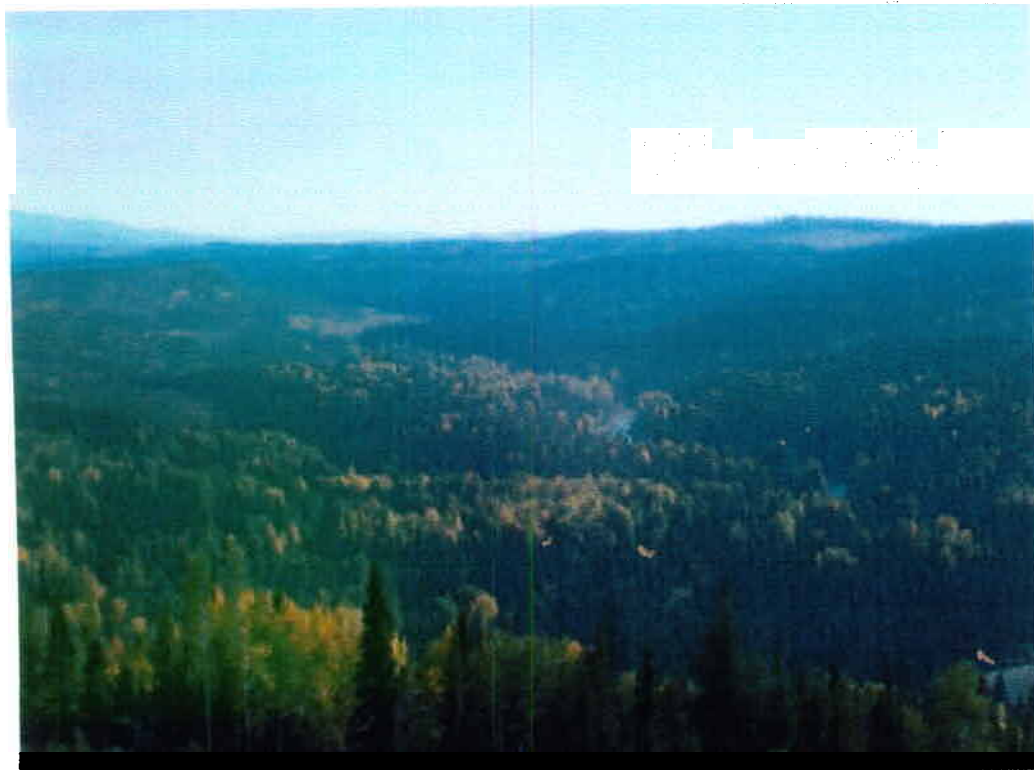
West Fraser Mills Ltd

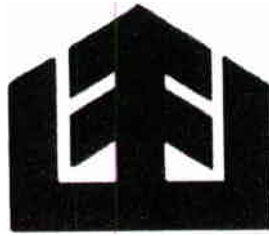
Quesnel Division

Tree Farm Licence 52

Bowron - Cottonwood Tree Farm Licence

Draft Management Plan 3





West Fraser Mills Ltd
Quesnel Division

Tree Farm Licence 52

Bowron - Cottonwood Tree Farm Licence

Draft Management Plan 3

Proposed

Prepared by

West Fraser Mills Ltd.

Alan Hunter, RPF
TFL Forester

Submitted:

March 6/01

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Description of TFL52	1
1.2 History	2
1.3 Licence Holder and Administration	3
2.0 RESOURCE INVENTORIES	4
2.1 Vegetation Resources Inventory	5
2.2 Terrestrial Ecosystem Mapping	6
2.3 Terrain Stability Mapping	6
2.4 Fish/Fish Habitat Inventory	6
2.5 Terrain Resource Inventory Mapping	7
2.6 Recreation Features	7
2.7 Managed Stand Site Index Adjustment	7
2.8 Watershed Assessments	8
3.0 MANAGEMENT OBJECTIVE	8
3.1 Management And Utilization	9
3.1.1 Timber Supply Analysis	9
3.1.1.1 Base Case	9
3.1.1.2 Alternative Landscape Level	11
3.1.1.3 Management Plan 3 Option	10
3.1.2 Forest Management	12
3.1.3 Harvesting Methods	14
3.1.4 Utilization Standards	15
3.1.5 Integration with Small Business Forest Enterprise Program	16
3.2 Protection and Conservation on Non-Timber Values	17
3.2.1 Visual Quality	17
3.2.2 Biological Diversity	17
3.2.3 Soils	19
3.2.4 Water	20
3.2.5 Recreation	21
3.2.6 Cultural Heritage Resources	23
3.2.7 Fish and Wildlife Habitat	23
3.2.8 Range Land	26
3.3 Integration of Harvesting with Non-Timber Uses	26
3.3.1 Trapper and Guide – Outfitters	26
3.3.2 Range Tenure Holders	27
3.3.3 Aboriginal People and Activities	27
3.3.4 Mining	28
3.4 Fire Management	28
3.4.1 Fire Prevention	28
3.4.2 Fire Suppression	29
3.4.3 Prescribed Fire	29

Table of Contents continued...

	Page
3.4.4 Fuel Management	31
3.5 Forest Health	31
3.5.1 Insect Pests	32
3.5.1.1 Bark Beetles	32
3.5.1.2 Defoliators	32
3.5.1.3 Leader Weevil	33
3.5.2 Diseases	34
3.5.2.1 Stem Rusts	34
3.5.2.2 Root Diseases	34
3.6 Silviculture	35
3.6.1 Basic Silviculture	35
3.6.1.1 Crop Planning	35
3.6.1.2 Stocking Standards	36
3.6.1.3 Site Preparation	38
3.6.1.4 Planting	38
3.6.1.5 Regeneration Delay	40
3.6.1.6 Seed Procurement	40
3.6.1.7 Stand Tending	41
3.6.1.8 Monitoring	42
3.6.2 FRBC – Funded Silviculture Obligations	43
3.6.2.1 Residual Balsam	43
3.6.2.2 Backlog NSR	44
3.6.3 Intensive Silviculture	45
3.6.3.1 Genetically Improved Seed	45
3.6.3.2 Planting Density	45
3.6.3.3 Juvenile Spacing	45
3.6.3.4 Conifer Release	46
3.6.3.5 Fertilizing	46
3.6.3.6 Pruning	46
3.6.3.7 Site Rehabilitation	46
3.6.3.8 Operation Trials and Research	46
3.7 Road Construction, Maintenance and Deactivation	47
3.7.1 Road Construction	47
3.7.2 Road Maintenance	48
3.7.3 Bridge Construction and Maintenance	48
3.7.4 Deactivation	48
3.8 Inventory and Growth and Yield	49
3.9 Research	50
4.0 CONSULTATION WITH OTHER RESOURCE USERS	51
4.1 First Nations	51
4.2 Guides and Trappers	51
4.3 Range Tenure Holders	52
4.4 Other Licensed Resources Users	52

Table of Contents continued...

	Page
5.0 IMPACT SUMMARY OF IMPLEMENTATION OF PROPOSED MP3	52
5.1 Harvest Levels	52
5.2 Economic Opportunities and Employment	52
5.3 The Protection and Conservation of Non – Timber Values	53
6.0 KEY SIMILARITIES AND DIFFERENCES BETWEEN THE CURRENT AND DRAFT/PROPOSED MP	53
7.0 PUBLIC REVIEW STRATEGY FOR MANAGEMENT PLAN 4	54
7.1 Advertising of the Management Plan	54
7.2 Public Review Strategy for Statement of Management Objectives	55
8.0 OTHER INFORMATION	55
8.1 Public and Agency Involvement	55
8.2 Summary of Comments from the Draft MP	55
8.3 Summary of Differences from the Draft MP to the Proposed MP	55
9.0 STRATEGIC AND OPERATIONAL PLANNING	55
9.1 Cariboo Chilcotin Land Use Plan	55
9.1.1 Cottonwood ERDZ Targets and Management on TFL52	55
9.1.2 Quesnel ERDZ Targets and Management on TFL52	58
9.1.3 QHSRDZ Targets and Management on TFL52	60
9.2 Cariboo Highlands Recreation Study	63
9.3 Bowron Lake Provincial Park Master Plan	63
10.0 SCHEDULE B PRORATE	63
11.0 REVISIONS TO MANAGEMENT PLAN 3	64
12.0 ANNUAL REPORT	64



TABLE OF TABLES

		Page
Table 1	Inventory Status	5
Table 2	Harvesting Equipment	15
Table 3	Utilization Specifications	16
Table 4	Species Harvested 1995 – 1999	17
Table 5	TFL Stocking Guidelines	37
Table 6	Site Preparation as a Percent of Previous Years Harvest Area	38
Table 7	Tree Species Planted 1995 –2000	39
Table 8	Silviculture Surveys	42
Table 9	Summary of NSR Areas	44

TABLE OF CHARTS

Chart 1	Biogeoclimatic Ecological Classification	6
Chart 2	Land Base Classification	13
Chart 3	Leading Species – Timber Harvesting Land Base	16

TABLE OF FIGURES

		Previous Page
Figure 1	TFL52 Location	2
Figure 2	TFL52 Biogeoclimatic Zones	6
Figure 3	Operability	7
Figure 4	Volume Recovery from a Log	13
Figure 5	TFL52 Visual Quality Objectives	18
Figure 6	TFL52 Landscape Units	19
Figure 7	TFL52 Recreation Opportunity Spectrum	22
Figure 8	TFL52 Caribou Zones	24
Figure 9	TFL52 Guide Territories	27
Figure 10	Cariboo Chilcotin Land Use Plan	55

APPENDICES

- I Statement of Management Objectives, Options and Procedures
- II Timber Supply Analysis Information Package *and analysis*
- III Twenty Year Plan
- IV Management Plan 2 Commitments – 2000 Summary of Progress
- V Management Options for Balsam Intermediate Utilization Stands on TFL 52
- VI Spruce Leader Weevil
- VII Management Objectives for the Non-Timber Values of Aspen Stands
- VIII Consolidation Reports of Selected Watersheds within the Quesnel Forest District
- IX “Identified Wildlife” Species
- X Public and Agency Review
- XI Forest Management Mailing List



1. Introduction

1.1 Description of Tree Farm Licence 52

Tree Farm Licence 52 is located east of Quesnel in the Cariboo Forest Region. Many lakes and rivers are found throughout the licence area. It contains the headwaters of the Cottonwood, Bowron and Willow Rivers, all of which flow directly into the Fraser River. The landscape of the eastern portion of TFL 52 is dominated by the Cariboo Mountains of the Quesnel Highlands Ecoregion (Columbia Highlands Ecoregion), while in the west gently rolling plateaus typical of the Quesnel Lowlands Ecoregion (Fraser River Plateau Ecoregion) near the Fraser River, are common.

The two major forested areas found on the TFL are the sub-boreal spruce (SBS) and the Engelmann spruce-sub-alpine fir (ESSF) biogeoclimatic zones. The sub-boreal spruce zone is generally found at elevations below 1200 meters and has a climate of cool, snowy winters and warm summers. The Engelmann spruce-sub-alpine fir zone is generally found above 1200 meters, and has a climate of long, cold winters and short, cool summers. Two minor biogeoclimatic zones are the Interior Cedar Hemlock (ICH), found in the eastern corner of the TFL, and the Alpine Tundra (AT), found on the highest parts of the Cariboo Mountains near Wells and Barkerville. The dominant tree species on the TFL are white spruce (51%), lodgepole pine (28%), sub-alpine fir (18%), and Douglas fir (1%). Species such as western red cedar, western hemlock and paper birch are found in localized areas, while trembling aspen and cottonwood are widespread throughout the TFL.

The gross area of TL 52 is 258,866 hectares; the net operable land base is 188,956 hectares. There are 10 landscape units covering the TFL, only two of which are entirely within the TFL boundary. The other eight overlap into the Quesnel Timber Supply Area or into Bowron Lake Provincial Park.

Primary access to TFL 52 is provided by Highway 26 between Quesnel and Bowron Lake Provincial Park. Almost all forest roads into TFL 52 originate from Highway 26. This provides excellent year-round access for both forest management and recreational activities.

The communities directly associated with TFL 52 are the City of Quesnel and the Village of Wells. Small numbers of people also live in unorganized areas at Cottonwood and Bowron Lake. Barkerville Historic Park is a significant tourist attraction during the summer months. Both Wells and Barkerville are located within the licence area. Two popular recreational areas, Bowron Lake Provincial Park and Troll Mountain Ski Resort, share a common boundary with TFL 52.



1.2 History

West Fraser originated in 1955 when three brothers, Henry H. Ketcham Jr., William P. Ketcham and Samuel K. Ketcham acquired a small lumber planing mill in Quesnel. From 1955 to 1979 the business expanded through the acquisition of a number of sawmills and related timber quotas throughout the interior of BC. The Company has continually grown since that time to become one of the largest integrated forest products companies in the Canada, producing lumber, wood chips, medium density fibreboard, plywood, pulp, linerboard, kraft paper and newsprint.

The Quesnel sawmill has an annual production capacity of 312.5 million board feet. A strategy of continual improvement has resulted in a steady increase in lumber recovery and production. In the last five years, a new planer has been built, kiln capacity has been increased, and sawing and optimizing technology has been upgraded.

The sawmill consumption is 1,050,000 m³ per year. West Fraser's portion of the annual harvest of 549,000 m³ from TFL 52 supplies approximately 50% percent of the sawmill's log requirements. The balance is obtained through a combination of other forest tenures and private log purchases.

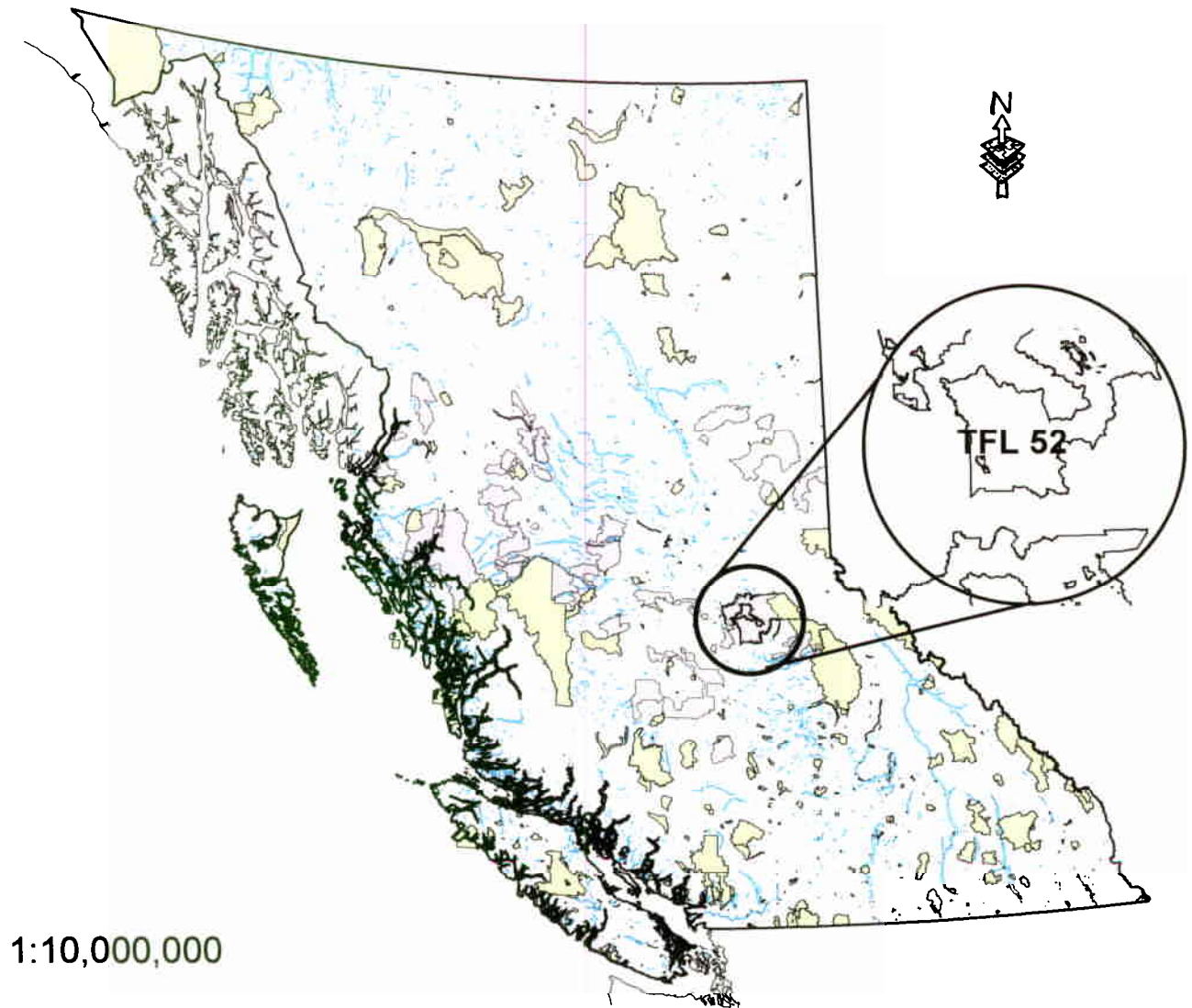
The number of persons employed directly or indirectly by West Fraser has grown steadily over the years. In Quesnel, by 1978, the Company directly or indirectly employed slightly less than 400 persons. By 1991, when the TFL was awarded, that number had grown to about 550. Today, there are 558 people employed directly in West Fraser manufacturing plants and another 205 full-time-equivalent positions in forest consulting, contract harvesting, trucking and silviculture operations.

Much of the area east of Quesnel has a long history of natural resource development. Mining boomed in the late 1800's and again in the 1930's. Today, mining is common throughout the TFL but on a smaller scale than earlier years. The level of activity fluctuates greatly with the market value of gold. Logging and accompanying milling operations, which provided for local consumption, began in the late 1800's. By the 1930's and 1950's, larger milling facilities were providing forest products for consumers outside the Cariboo. As a consequence of these past activities, the licence area has been extensively modified by human activity and has a well developed transportation network.



West Fraser and its predecessor companies have a history of forestry activities in the forests east of Quesnel dating back to the early 1950's. During the period from 1954-1957, quotas were established for operators in the Cottonwood, Big Valley, Bowron and Naver Public Sustained Yield Units (PSYU's). These quotas, originally held as Timber Sales, have been continually maintained in various forms of tenure to the present. In the early 1970's, West Fraser embarked on a major program of purchasing and consolidating forest tenures. This was combined with the

Figure 1

TFL 52 Location



1:10,000,000

-  West Fraser Licences
-  British Columbia Parks



construction of an efficient sawmill in Quesnel designed to optimize recovery from the wood profile in the PSYU's where West Fraser's cutting rights were located. West Fraser and its contractors have maintained continuous operations in the Cottonwood PSYU since 1950, Naver PSYU since 1952, Big Valley PSYU since 1953, and Bowron and Narcosli PSYU's and Prince George Special Sale Area since 1954.

In 1980, West Fraser applied for a Tree Farm Licence, as the Company believed it to be the most effective form of tenure for providing a secure land base. During the subsequent ten years, West Fraser and the Ministry of Forests, with considerable public involvement, negotiated the licence agreement. TFL 52 came into existence in January 1991. The security of the TFL provides the incentive to manage TFL 52 for the long term social and economic benefit of the community and the Company. The basic assumption West Fraser held in the early 1980's regarding TFL's remains the same today. The contents of this Management Plan reflects that philosophy while outlining the management objectives and strategies for TFL 52 from 2001-2006

1.3 Licence Holder and Administration

West Fraser Mills Ltd. is a wholly owned subsidiary of West Fraser Timber Co. Ltd., a publicly traded Canadian forest products company. The Company carries on its operations through subsidiary companies and joint ventures, collectively referred to as "West Fraser". The controlling interest of West Fraser shares is owned by the Ketcham family.

As of September 30, 2000, West Fraser employed approximately 8,364 people throughout the Company. Acquisition of facilities outside of BC has significantly increased West Fraser's operations. A list of current holdings is provided below.

Sawmills:

- West Fraser Mills Ltd. - Quesnel
- West Fraser Timber Ltd. - Williams lake
- Chetwynd Forest Industries - Chetwynd
- Fraser Lake Sawmills – Fraser Lake
- Pacific Inland resources - Smithers
- Skeena Sawmills - Terrace
- Northcoast Timber - Prince Rupert
- 50% interest in Houston Forest Products – Houston
- 32% interest in Babine Forest Products – Burns Lake
- 32% interest in Decker Lake Forest Products – Burns lake
- Blue Ridge Lumber Ltd. – Whitecourt, AB. (acquired 1995)
- 50% interest in Seehta Forest Products Ltd. – Brewster, AB (acquired 2000)
- **West Fraser (South) Inc. – Joyce, Louisiana (acquired 2000)**



- West Fraser (South) Inc. – Huttig, Arkansas (acquired 2000)

Pulp and Paper:

- Eurocan Pulp and Paper Co. Ltd. – Kitimat
- 50% interest in Quesnel River Pulp – Quesnel
- Slave Lake Pulp Corporation – Slave Lake, AB. (acquired 1997)
- 50% interest in Alberta Newsprint Company Ltd. – Whitecourt, AB.

Manufactured Wood Products:

- Quesnel Laminators – Quesnel
- WestPine MDF – Quesnel (completed 1996)
- Ranger Board Ltd. – Whitecourt and Calgary, AB. (acquired 1995)
- Alberta Plywood Ltd. – Edmonton and Slave Lake, AB. (acquired 1999)

Retail (85% owned by West Fraser):

- 14 warehouse stores (Revy Home and Garden)
- 43 home improvement stores (Revelstoke Home Centres)

The Quesnel division of West Fraser Mills Ltd. operates as an individual business unit.



2. Resource Inventories

In the last five years, West Fraser completed a number of major biophysical inventories on TFL 52 that has resulted in one of the most complete assemblages of data for a land unit anywhere in the province. The data from these inventories contributes to a comprehensive assessment of resource values in the Timber Supply Analysis and Management Plan. Table 1 provides a list of the various inventories completed on the TFL.

Table 1 **Inventory Status**

Forest Resource Inventory	Standard	Date Approved	Proposed Activities
Vegetation Resource Inventory	MOF		Annual disturbance update
Terrestrial Ecosystem Mapping	RIC	January 2001	
Terrain Stability Mapping	RIC Level C and D	December 2000	
Fish/Fish Habitat	RIC	Ongoing	Submit new data as streams are assessed during operational planning
Terrain Resource Inventory Mapping (TRIM II)	RIC	1998	None required
Recreation Features Inventory	MOF	Approved 1994; upgraded to new standards in Nov. 1999	Review prior to submission of MP4
Managed Stand Site Indices	MOF	May 2000	Update through the term of MP3
Managed Stand Yield Tables	MOF	May 2000	Update through the term of MP3
Watershed Assessments	MOF	1998-2000	Update through the term of MP3

2.1 Vegetation Resource Inventory

As a condition of approval of Management Plan 2, West Fraser was required to complete a new timber inventory of the TFL. Between 1998 and 2000, West Fraser completed a vegetation resource inventory (VRI) of TFL 52, as this inventory method was expected to become the provincial standard. The VRI is a method of assessing the quantity and quality of timber and vegetation resources. At the time of this submission, the utility of the VRI for timber supply analysis is in question. In order to complete the timber supply analysis, West Fraser had to convert VRI data back into the forest inventory projection files.

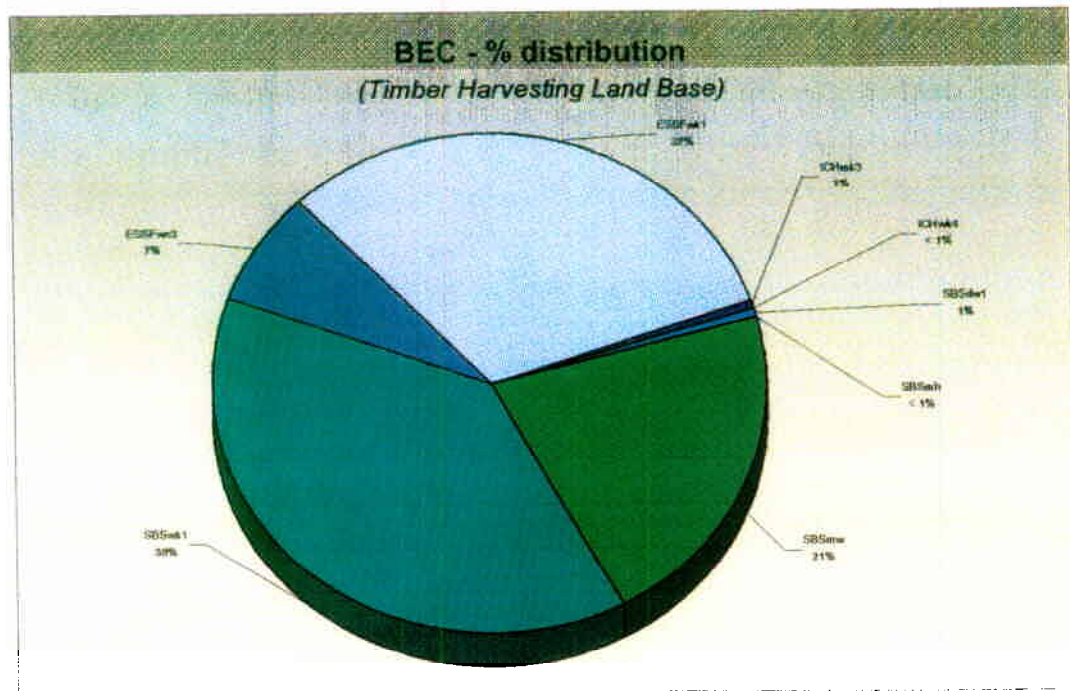


During the term of MP3, West Fraser will complete an annual disturbance update, and will submit the data in a digital format compatible with the requirements of MOF.

2.2 Terrestrial Ecosystem Mapping

Terrestrial ecosystem mapping (TEM) is the stratification of a landbase into polygons having similar climate, physiography, surficial material, bedrock geology, soils, and vegetation, which provides a biological and ecological framework for land management. The TEM project on TFL 52 was started in 1996 and completed in 2000, and has been integrated with TEM done beyond the boundaries of the TFL. TEM is being used for wildlife capability and suitability mapping, and will be used to help determine potential old growth management areas. TEM was used to adjust the BEC lines on the TFL. The distribution is shown in the following chart.

Chart 1 Biogeoclimatic Ecological Classification (BEC)

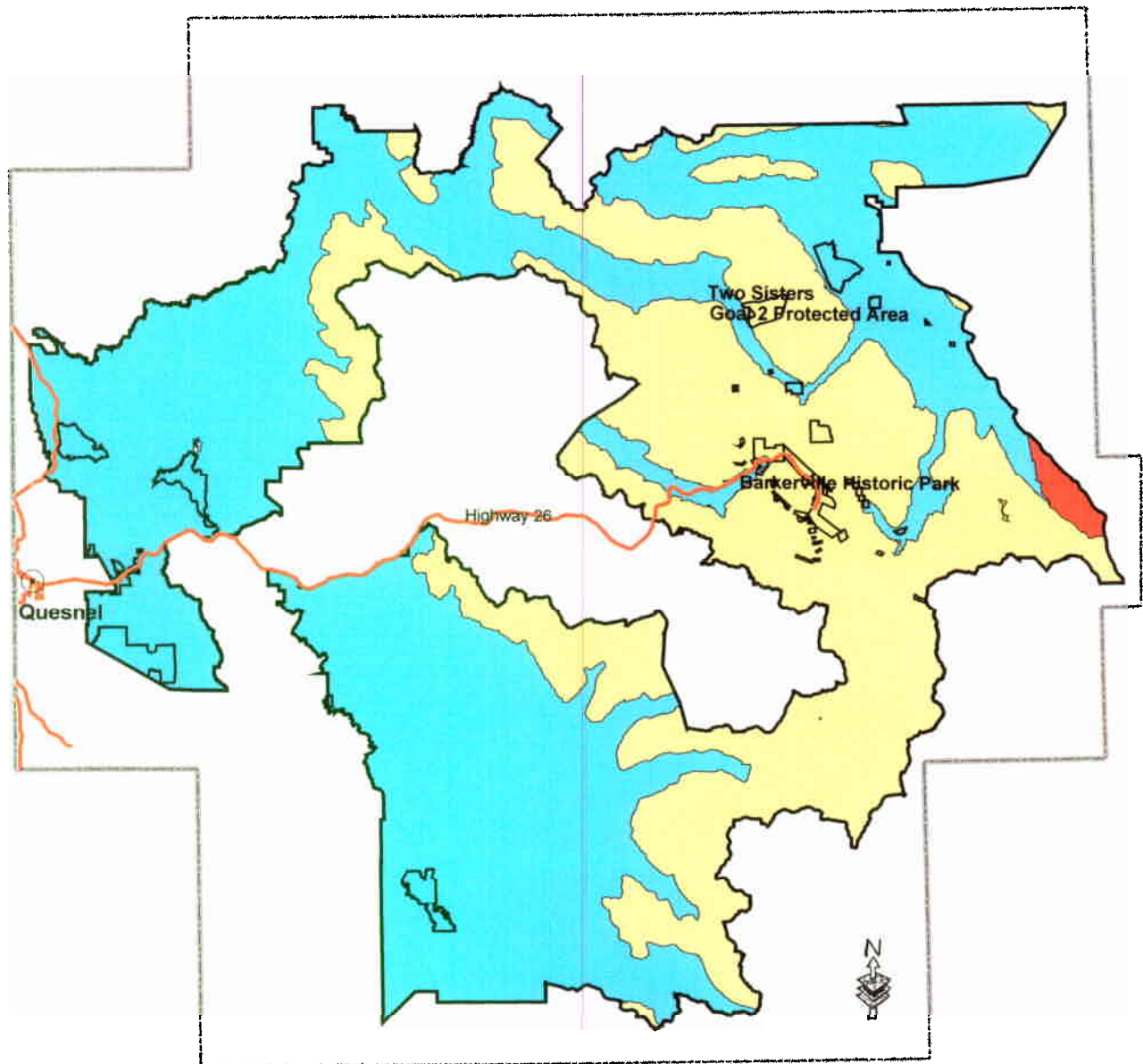


2.3 Terrain Stability Mapping

Terrain stability mapping (TSM) delineates areas of the land base according to the potential for erosion and mass wasting. Detailed TSM (RIC Level "C") was done in the mountainous portion of the TFL (Quesnel Highlands); reconnaissance level TSM (RIC Level "D") was done on the plateau portion. TSM was used to derive a first approximation of inoperable areas on the TFL. All Terrain Class IV (potentially unstable) and V (unstable) polygons were reviewed by West Fraser staff, and a

Figure 2

TFL 52 Biogeoclimatic Zones



Key to Features

-  AT
-  ESSF
-  ICH
-  SBS

1:500,000



West Fraser Mills Ltd



judgement made about whether individual polygons were operable or not. Past performance and local knowledge were the main criteria used. All polygons deemed as inoperable were deleted from the contributing land base. The TSM is used operationally when planning roads and harvest blocks to identify sites where detailed stability assessments are needed.

During the term of MP3, the areas identified as inoperable will be modified as new information becomes available

2.4 Fish/Fish Habitat Inventory

A reconnaissance level inventory of fish and fish habitat was undertaken in 1996 and will be completed in 2001. Final reports have not been completed. This inventory provided information to confirm fish presence (more sampling is required to confirm absence) and basic measurements to permit preliminary estimates of stream classification, which is used in operational planning. The stream classifications derived from this inventory were also used to buffer the streams with the appropriate riparian management widths so that area and volume netdowns could be calculated for the timber supply analysis.

Information about fish presence or absence gathered at an operational level will be used to update the fish inventory. Data will be provided to Ministry of Environment Lands and Parks so that consistency is maintained.

2.5 Terrain Resource Inventory Mapping

All maps used for resource planning are based on terrain resource information maps (TRIM). These maps show basic topology features such as rivers, lakes and roads. West Fraser undertook an update of the 1:20,000 base maps in a project designated as TRIM II.

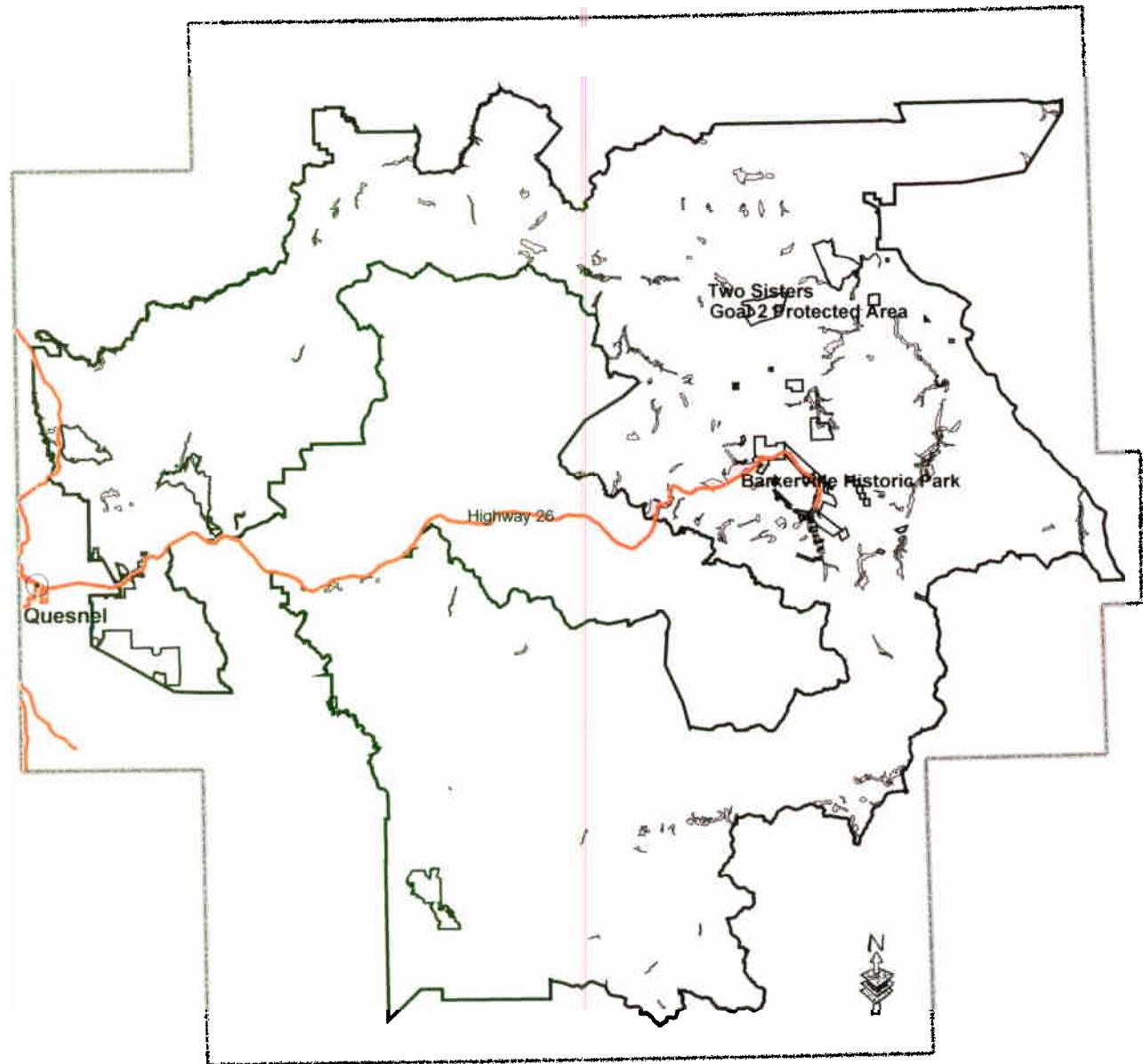
It is expected that there will be no need for TRIM II updates during the term of MP3.

2.6 Recreation Features Inventory/Recreation Opportunity Spectrum

The recreation feature inventory identifies physical, biological and/or cultural features that have the potential to support recreational experiences. The recreation opportunity spectrum identifies, records and classifies the current state of naturalness, remoteness and expected social experience. The initial inventory was completed in 1994. West Fraser utilized and built upon the *Quesnel Forest District Recreation Plan – Cottonwood East* (May 1998) to update the inventory and recreation opportunity spectrum in 1999 to current MOF standards.

Figure 3

TFL 52 Operability



1:500,000

Key to Features



Inoperable



West Fraser Mills Ltd



The Recreation Feature Inventory and recreation Opportunity Spectrum will be updated during the term of MP3 in readiness for MP4.

2.7 Managed Stand Site Index Adjustment

Site index, which is determined from inventory height and age data, is used as an estimate of site productivity. West Fraser believed there was a strong possibility that site indices for managed stands were underestimated because the original data was taken from natural stands. The Chief Forester acknowledged this uncertainty in the last timber supply analysis.

A project was completed that provides reliable estimates of potential site index for post-harvest regenerated stands for pine and spruce on the ecosystems of the TFL. There is now the ability to apply site index to site series across the TFL, rather than applying an average site index to all polygons. The results of this project, which was approved by the Ministry of Forests Research Branch in 2000, were used to develop Managed Stand Yield Tables for use in the timber supply analysis. The overall average potential site index for existing post-harvest regenerated stands (all species) is 19.7m. The overall average site index used for existing post-harvest regenerated stands in MP 2 was about 15.7m.

The two reports, *Site Index Adjustment Using BEC Classification on TFL 52* and *Yield Table Summary Report* are included as appendices in the *Timber Supply Analysis Information Package* found in Appendix II.

2.8 Watershed Assessments

A number of different projects were completed to assess the status of watersheds on the TFL. Interior Watershed Assessment Procedures (IWAP) assesses the potential for hydrological impacts from past road building and harvesting practices. The indices and interpretations from the IWAP's identified a number of sub-basins where the potential for adverse impacts was beyond an acceptable threshold. Road deactivation and stream restoration projects were undertaken to reduce some of the indices, and more detailed assessments were carried out. Detailed channel assessments were conducted in 1999-2000 of the eleven sub-basins identified as priorities east of Quesnel. This was done as a cooperative project with Ministry of Forests, Weldwood of Canada Ltd. and West Fraser. The results indicated that channel morphology had not been adversely affected. The sub-basins generally have low gradients, which minimizes sediment and bed load transport capability, and a capacity to buffer peak flows due to wetlands and lakes.



Integrated Watershed Restoration Plans were prepared as a joint effort with Weldwood of Canada Ltd. for the Bowron, Cottonwood and Willow Rivers, all of which flow within TFL 52. These plans helped set priorities for initial watershed restoration activities.

West Fraser will develop Watershed Restoration Plans for identified priority sub-basins, in conjunction with MOF and MELP. These plans identify restoration goals, works to be done, estimate costs and provide a timetable for completion. This is contingent upon continued FRBC or alternate funding.

3. Management Objectives

The primary goal in managing TFL 52 is to provide a continuous supply of timber for the Company's manufacturing operations, and to do so in a manner that is sensitive to the economic, environmental, social and cultural needs of the local communities. The goals, objectives and strategies in this Management Plan provide the direction for management activities on the TFL.

West Fraser Goals:

- Provide secure, long-term employment in the Quesnel area through sustainable forest management
- Ensure the long-term productivity of the land base, within the context of TFL 52 being a "working forest"
- Practice integrated resource management to accommodate recreation, fish and wildlife, range and other user groups
- Comply with all applicable environmental laws and regulations.

The objectives outlined in this section describe West Fraser's procedures to sustainably manage TFL 52 within the context of the Cariboo-Chilcotin Land Use Plan (CCLUP) and the Forest Practices Code (FPC). This information was originally presented in the Statement of Management Objectives, Options and Procedures (Appendix I), approved by the Regional Manager in his letter of April 10, 2000. The format and sequence of the objectives have been modified to conform to the suggested format provided in the Ministry of Forests' guide for preparation of management plans.

Many of the objectives reflect West Fraser's current practices. When sub-regional and landscape unit level plans are completed, West Fraser will incorporate the objectives of those plans into its' planning and operational processes.

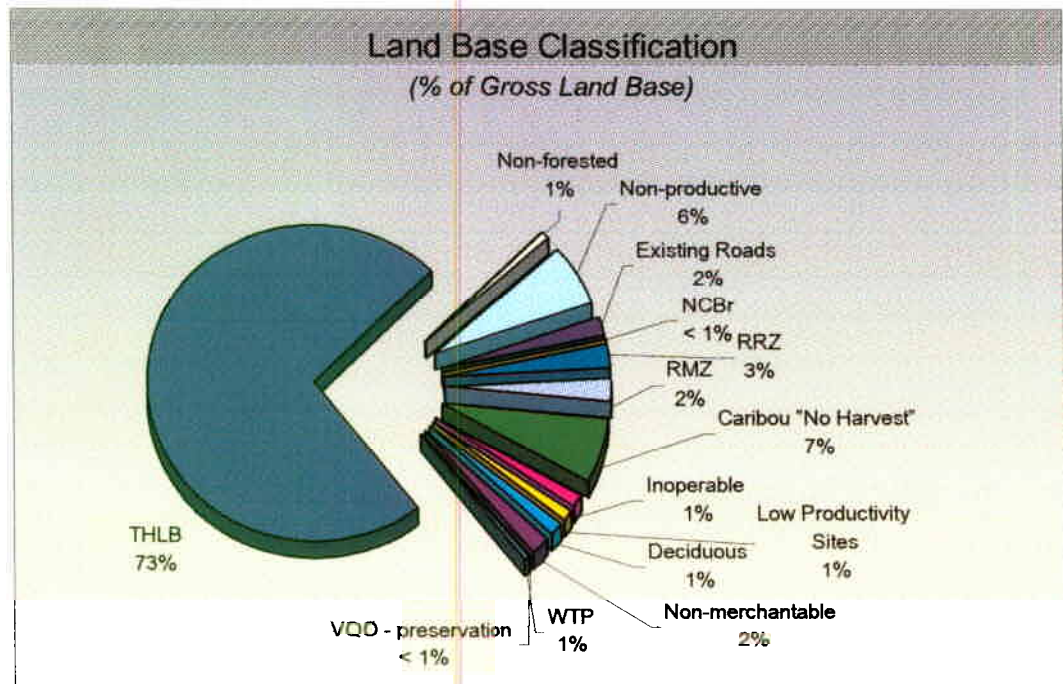


3.1 Management and Utilization of the Timber Resource

3.1.1 Timber Supply Analysis

The timber supply analysis (TSA) is carried out to provide the necessary information for the Chief Forester to determine the allowable annual cut for TFL 52 for the period of December 1, 2001 to November 30, 2006. The TSA assessed the short and long timber supply implications of three different management options. Harvest projections were made for a 250 year period using CASH6 (Critical Analysis of Schedules for Harvesting), which allows explicit simulation of integrated resource management by regulating forest cover constraints. Chart 2 shows the distribution of various forest classifications across the TFL

Chart 2 Land Base Classification



3.1.1.1 Base Case

This option reflects current management performance. The base case includes:

- New vegetation resource inventory
- New terrestrial ecosystem and terrain stability mapping
- Forest Practices Code as it is being interpreted as of May 1, 2000
- Key information from the CCLUP
- CCLUP draft landscape units and biodiversity emphasis
- New operability mapping based on terrain stability mapping



- Riparian management area reductions
- Caribou modified and no harvest zones
- New site indices and managed stand yield tables
- Close utilization standards
- Genetic gains from seed orchard tree improvement
- Basic silviculture on all sites

The Timber Supply Analysis Report undertaken in support of MP 3 forecasts a harvest level of 596,900 m³ per year for five decades, followed by increases in the sixth, eighth and eleventh decades. This is based on current management practices and incorporates all FPC provisions except Old Growth Management Areas. It also includes the draft biodiversity emphasis for the draft landscape units of the CCLUP. The timber supply analysis did not incorporate the “inventory adjustment factors” of the *Biodiversity Conservation Strategy for the CCLUP (July 1996)*, which results in a much more conservative estimation of the “old” and “mature” components of the forest.

Tests were done for significant impacts on timber supply due to increases and decreases in:

- Green up height
- Disturbance level (adjacency)
- Timber harvesting land base
- Natural stand yield tables
- Managed stand yield tables
- Regeneration delay
- Minimum harvest age
- Definition of “old” forest

Of these, only two had a disproportionate effect on the harvest level.

An increase or decrease in minimum harvest age of ten years results in a substantial change in harvest level, which indicates that it is important to monitor second growth stands because of the potential for increased or decreased available volume in the future.

Reducing the age of “old” forests from 250 years to 200 years also had a disproportionate impact. The reasons for doing this test were twofold:

- The CCLUP Biodiversity Conservation Strategy indicates that there is some uncertainty about the ages of stands over 140 years, which may have lead to an overestimation of the proportion of stands greater than 250 years that should be represented on the landscape.



- There is only 0.2% of the productive forest area on the TFL that is over 250 years of age and there is 10.5% of the productive forest area between 200 and 250 years.

Using 200 years as the definition of “old” forest results in a harvest level of 637,700 m³ per year for nine decades followed by an increase in the tenth and eleventh decades to 749,700 m³ per year. Given the magnitude of this impact, it is important that the ecologically significant attributes that are found in “old” forests are identified so that it can be determined whether those attributes are found in younger forests and whether silvicultural regimes can replicate those attributes in second growth stands.

3.1.1.2 Alternative Landscape Level Biodiversity Option

Landscape units and the corresponding biodiversity emphasis originated with the CCLUP but are presently in draft form only. The draft landscape units and biodiversity emphasis result in 48% low, 33% intermediate and 19% high on the TFL. However, the high and intermediate biodiversity emphasis falls mostly in the enhanced resource development zones. West Fraser believes the high and intermediate emphasis more appropriately belongs in the special resource development zone where the degree of harvesting constraint is already greater than in the enhanced zone.

West Fraser undertook an exercise to test the impact of assigning the high and intermediate emphasis to the QHSRDZ to the maximum extent possible, while trying to meet the 45% low, 45% intermediate and 10% high emphasis that is the target of the biodiversity guidebook. The result is that the alternative biodiversity scenario has 45% low, 44% intermediate and 11% high. Some intermediate emphasis still falls within the ERDZ. This scenario results in a harvest level of 632,200 m³ per year for six decades, which is a 5.9% increase over the base case. Increases in the harvest level follow in the seventh and eighth decades.

Applying a proportional, non-spatial analysis of 45% low, 45% intermediate and 10% high biodiversity to each draft landscape unit results in a slightly higher harvest forecast of 636,100 m³ per year for six decades, followed by increases in the eighth and ninth decades.

It is clear that there is a significant cost in foregone revenues and economic activity by formalizing the biodiversity emphasis as they are presently drafted.



3.1.1.3 Management Plan 3 Option

West Fraser proposes a harvest level of 596,900 m³ per year. This harvest level reflects current management strategies and the new land base inventories, and meets or exceeds FPC and CCLUP goals for biodiversity, riparian protection, caribou habitat, backcountry recreation and visual quality.

3.1.2 Forest Management

Objective

West Fraser will manage the forests of TFL 52 in a manner that provides a continuous supply of raw material for the sawmill and dependant facilities such as Quesnel River Pulp and Westpine MDF.

Discussion

Timber from TFL 52 supplies approximately 50% of the log supply for the sawmill. Byproducts from the sawmill provide raw material for other facilities. A portion of the sawdust and shavings are fed into a Konus burner to heat oil used to dry green lumber in the kilns. Wood chips from trim and waste in the sawmill are sent to Quesnel River Pulp. Off-grade chips and the remainder of the sawdust and shavings are trucked to Westpine MDF where medium density fibreboard is produced. The bark is used as hog fuel to provide heat for the MDF process. A minor amount of fibre and bark is occasionally stockpiled and burned when supply outstrips demand at Westpine MDF. Figure 4 demonstrates how fibre from a typical log is utilized.

Strategy

- Maintain two years worth of volume under approved cutting permits.
- Have roads constructed two years in advance of harvesting.
- Maintain two-year harvesting plans for individual logging contractors.

Objective

West Fraser will work to increase public awareness and knowledge of forest management activities through a signage program and participation of West Fraser staff in field tours, school classroom presentations, and open house meetings.

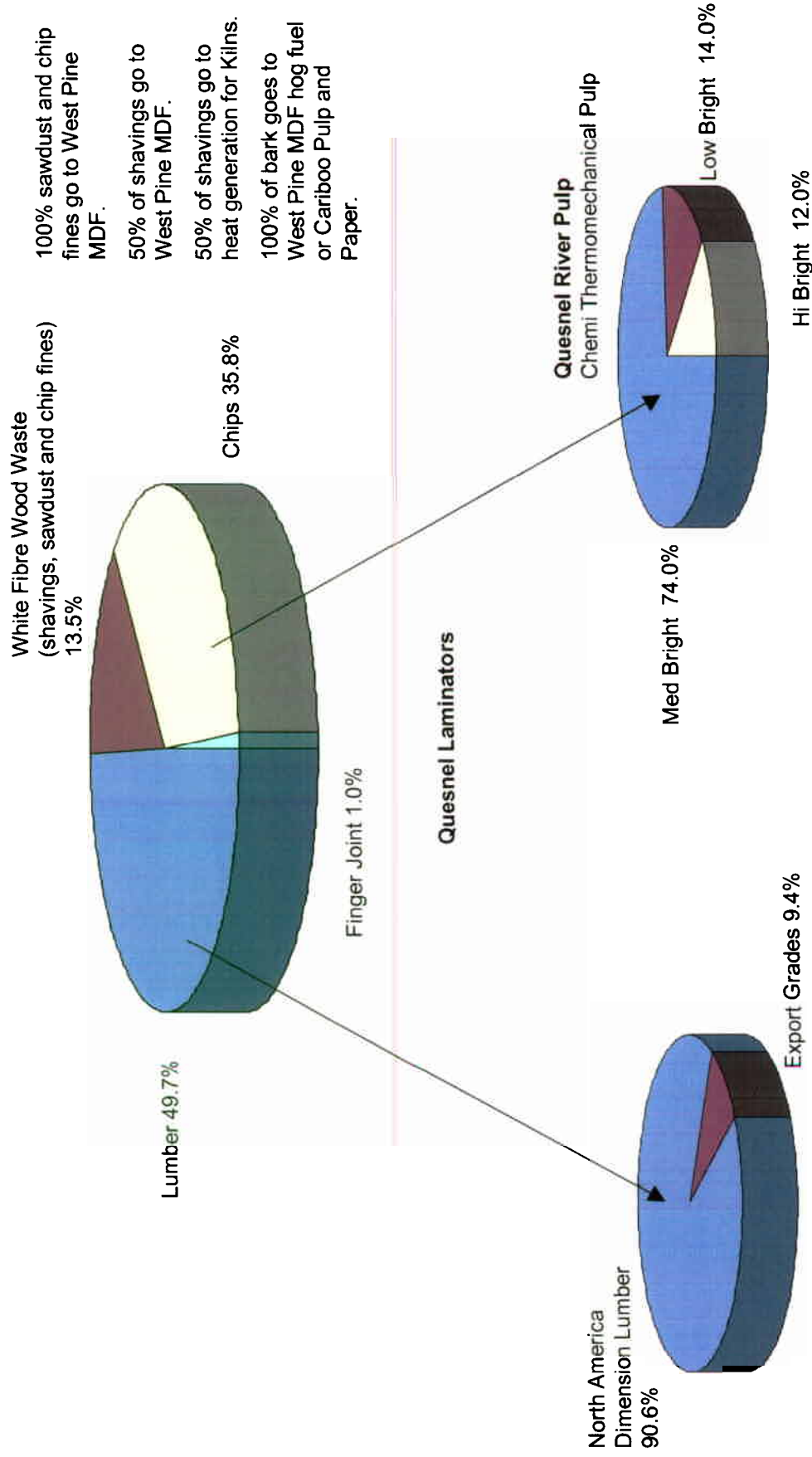
Discussion

The forest industry is central to the economy of Quesnel and the surrounding area, but it is still necessary to increase the level of understanding of forest management. West Fraser has erected approximately twenty-five information signs that describe the activities that have been conducted on specific cut blocks. In addition, eight interpretive signs have been erected at guided-tour stops within the TFL.

Figure 4

Volume Recovery from a Log

Quesnel Division





West Fraser uses the services of a retired Registered Professional Forester to conduct guided tours when requested by the public. Field trips for students in the high school forestry class have been provided when requested. West Fraser staff provide classroom presentations when requested, and assist annually with the Forestry Week activities at local schools.

West Fraser provides financial support and commits staff time to the Gavin Lake Forest Education Society. This is a regional facility that provides field and classroom education in forestry and ecology to elementary and high school students. In 2000, approximately 825 students used the Gavin Lake facility.

Strategies

- Continue supporting the Gavin Lake Forest Education Society.
- Participate on Forestry Week activities in cooperation with the school district.
- Continue making tours available through the Quesnel Tourist Information Centre and through direct requests.
- Continue funding “Forest Facts” on local radio.
- Install additional signs and maintain existing forest information signs.

Objective

West Fraser will provide, at reasonable cost, the quality, dimensions and volume of lumber to satisfy the needs of artisans and wood workers in the community of Wells/Barkerville.

Discussion

The community of Wells/Barkerville has a number of artisans who derive all or part of their living from traditional wood working, which is sold locally and regionally. Obtaining the required lumber can be problematic because the large mills are high-speed, high-volume, and production oriented, while small mills may produce inconsistently. West Fraser has provided the quality, dimensions and quantity of lumber requested and will endeavor to do so in the future.

Strategies

- Continue providing dimension lumber in the quantities and qualities needed by Wells artisans, upon request.

3.1.3 Harvesting Methods

Objective

West Fraser will harvest it's portion of the allowable annual cut using harvesting methods and equipment that are suited to the sites and conditions found within the TFL.



Discussion

West Fraser has maintained the same basic harvesting methods, through it's contractors, during the term of Management Plan 2. The present harvesting methods and equipment allow harvesting to be done efficiently under a wide range of site conditions, while minimizing the risk of excessive soil disturbance.

The majority of harvesting is done using feller bunchers and some type of ground-based skidding or forwarding in a roadside system. Specialized skidding and forwarding equipment is utilized on sites where some type of limiting factor has been identified. Two types of cable yarding systems are used to harvest on steeper terrain and on wet ground during the summer. The mix of harvesting systems used is as shown in the following table:

Table 2 Harvesting Equipment

Equipment type	Terrain/ Soil Moisture	Timber type
FMC933 clambunks	Broken/wetter sites	mid-large Sx-BI
Ecologger – 14m tower	Steep terrain; gulleys/ wet sites	Mid-large Sx-BI
D-4 high track; skidder	Broken	mid-size Pl-Sx-BI
6280 Cypress yarder	Steep	mid-large size Sx-BI
Conventional rubber-tires skidders	Uniform	Mid-small size Pl
Transgresco clambunk	Uniform/wetter sites	Mid-size Pl
D-5 high track, skidder,	Broken	Mid-size blowdown, insect salvage

This diversity of equipment and methods was incorporated to minimize soil disturbance and maintain production. Occasions may arise where other specialized methods, such as helicopters, may be required for specific harvesting projects. West Fraser does not anticipate having contractors make any fundamental changes to harvesting methods or equipment during the term of MP 3.

Strategies

- Prepare silviculture prescriptions, in accordance with the Operational Planning Regulation, that identify site limiting factors.
- Refer to the terrain stability maps to identify potentially unstable areas that may require detailed assessments.
- Prepare logging plans and assign contractors to harvest blocks that are suitable for their equipment in terms of terrain, soil conditions and timber size.
- Continue providing information and training to contractors.
- Continue regular monitoring of active operations.
- Continue keeping up to date on new harvesting techniques and equipment by attending trade shows, demonstrations and other harvesting operations.



3.1.4 Utilization Standards

Objective

West Fraser will adhere to the following utilization standards during the term of MP3:

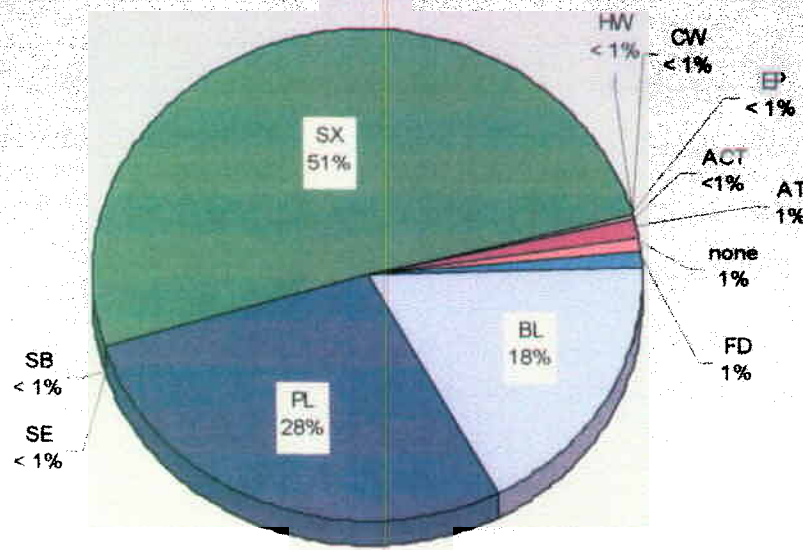
Table 3 Utilization Specifications

Parameter	Lodgepole Pine	All Other Coniferous Species	Aspen
Maximum Stump Height	30.0 cm	30.0 cm	30.0 cm
Diameter Stump Height	15.0 cm	20.0 cm	20.0 cm
Diameter Breast Height	12.5 cm	17.5 cm	17.5 cm
Minimum Top Diameter	10.0 cm	10.0 cm	10.0 cm
Minimum Log Length	3.0 m.	3.0 m	3.0 m

Any deviation from these standards will be with the mutual consent of West Fraser and the Ministry of Forests. The following chart shows the tree species profile found on the TFL. It is West Fraser's intent to generally match the volume cut to this profile.

Chart 3 Area by Leading Species – Gross Forested Land Base

Leading Species - Timber Harvesting Land Base (% of Timber Harvesting Land Base)





A GIS exercise was done to determine an approximation of the species cut in the period of 1995 –1999 for comparison with the species profile found on the TFL. West Fraser has not previously kept records of species cut. The following table shows that the percentage cut by species corresponds reasonably well with the TFL profile. The difference in the balsam cut versus profile is attributed to the fact that a proportion of the balsam shown in the present THLB was excluded in MP2 as caribou habitat.

Table 4 Species Harvested 1995 - 1999

Species	1996	1997	1998	1999	2000	Total	Percent
Spruce	380,699	175,967	184,693	218,931	134,406	1,094,696	56.4%
Pine	184,318	145,693	117,255	75,876	45,164	568,306	29.3%
Balsam	51,014	25,203	40,857	57,863	28,892	203,829	10.5%
Douglas-fir	23,936	24,474	10,760	6,841	9,437	75,448	3.9%

3.1.5 Integration with Small Business Forest Enterprise Program

Objective

West Fraser will continue to integrate the Small Business Forest Enterprise Program (SBFEP) into the development planning process for the TFL, and to identify suitable areas for the harvest of an average of 35,239 m³ annually.

Discussion

West Fraser is obligated to identify suitable areas and adequate volumes for harvest. The Company is also obligated to maintain a continuous inventory of the forest resource and to periodically complete a timber supply analysis over the TFL, including areas harvested, treated and planted under the SBFEP. It is the responsibility of the District Manager to administer the planning, harvesting and basic silviculture activities of the SBFEP. In order to maintain the inventory and to complete the timber supply analysis, the store of data covering the SBFEP has to be incorporated into the TFL data set.

As the forest sites covered by the SBFEP eventually become included into the TFL data set, the basic silviculture targets for the SBFEP should be the same as those approved in the Management Plan for the TFL. Once the free growing stage is reached, the SBFEP area reverts to managed forest land within the TFL. The MOF should provide West Fraser with silviculture data in digital format (INCOSADA standards) so that the TFL inventory can be maintained.

Strategies

- Continue using the Forest Development Plan as the tool to identify areas and volumes for consideration for inclusion in the SBFEP



- Acquire digital data (INCOSADA format) from MOF annually in order to maintain a continuous and complete inventory
- Encourage MOF to adopt the approved stocking standards of the TFL for the SBFEP blocks

3.2 Protection and Conservation of Non-Timber Values and Resources

3.2.1 Visual Quality

Objectives

West Fraser will adhere to the visual quality objectives (VQO) approved for TFL 52. West Fraser will periodically review the visual quality objectives.

Discussion

VQO's were established for the TFL in 1995. They have been and will continue to be incorporated into all operational planning for roads and harvesting so that visual impact is kept within acceptable limits.

Strategies

- Refer to VQO mapping during development of operational plans.
- Complete digital terrain modeling (visual quality analysis) for cut blocks and roads proposed within areas having retention or partial retention objectives, or where requested by the District Manager.
- Where appropriate and where specified in a silviculture prescription, leave deciduous species uncut where doing so will not jeopardize regeneration obligations.
- Review VQO's, and revise if necessary, to MOF standards during the term of MP3.

3.2.2 Biological Diversity

Objective

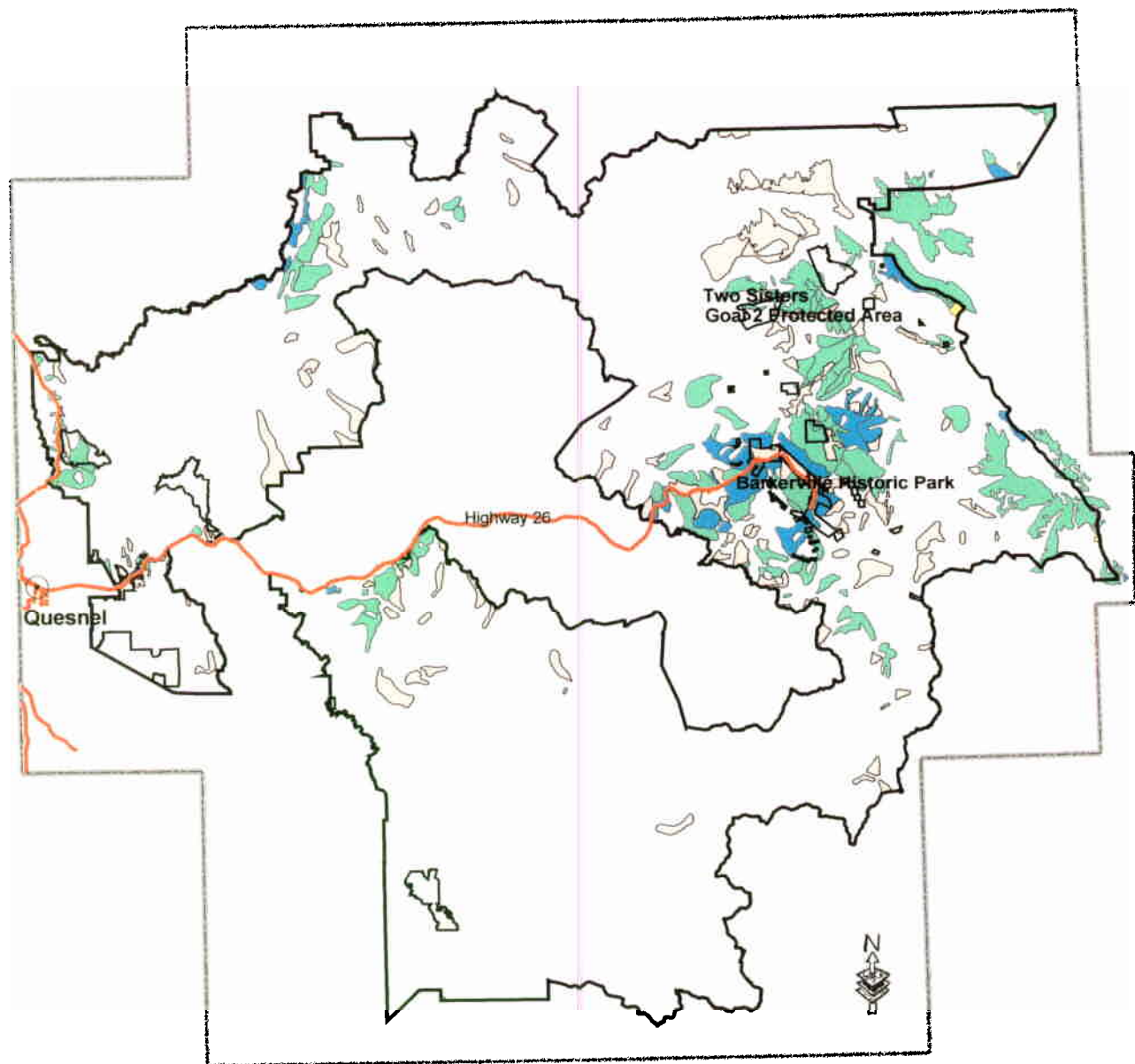
To meet District, Regional and FPC measures for protecting biological diversity.

Discussion

Biological diversity is currently being addressed in a variety of ways at both the stand and landscape level. Wildlife tree patches equal to 9% of the gross area of every cut block are left as long-term reserves until landscape unit plans can be developed and implemented. Some deciduous trees and snags within cut blocks are cut at a height of 3-5 m. to maintain perching habitat and potential sites for cavity nesters. Where mechanical piling is used as a site preparation method, scattered small piles will be left unburned as small mammal habitat.

Figure 5

TFL 52 Visual Quality Objectives



Key to Features



1:500,000



A basic assumption of biodiversity preservation in BC is that the habitat needs of most forest organisms can be maintained through having a variety of opening sizes, seral stages and forest stand attributes across the landscape. Draft landscape units have been designated as a part of the Cariboo-Chilcotin Land Use Plan (CCLUP), and draft biodiversity emphasis assigned. The biodiversity emphasis assigned to the landscape units resulted in 18.7% High, 33.2% Intermediate and 48.1% Low on the TFL as compared to the Biodiversity Guidebook target of 10% High, 45% Intermediate and 45% Low across a sub-region.

There are ten landscape units covering the TFL, of which only one is entirely within the TFL. A second landscape unit is 97% within the TFL, having minor exclusions for small parks and a CCLUP Goal 2 Protected Area. In addition, the TFL is covered by parts of the CCLUP Quesnel Highlands Special Resource Development Zone (SRDZ), Cottonwood Enhanced Resource Development Zone (ERDZ) and Quesnel ERDZ. The landscape units and resource development zones do not have any common boundaries. The Victoria Landscape Unit has a “high biodiversity” emphasis, but falls almost entirely within an ERDZ. The Umiti Landscape Unit has an “intermediate biodiversity” emphasis, but falls entirely within an ERDZ. Only the Antler Landscape Unit, with intermediate biodiversity emphasis, falls within the SRDZ. It is West Fraser’s position that the “high” and “intermediate” biodiversity emphasis are not appropriate for the enhanced resource development zones but should more logically be included in special resource development zones. The timber constraints that result from a “high biodiversity” emphasis are more easily accommodated and have a smaller economic impact within the special resource development zone.

The timber supply analysis explores the implications of the biodiversity emphasis assigned to the draft landscape units.

All aspects of the preparation of Management Plan 3, including the timber supply analysis, incorporate the draft landscape units and the assigned biodiversity emphasis.

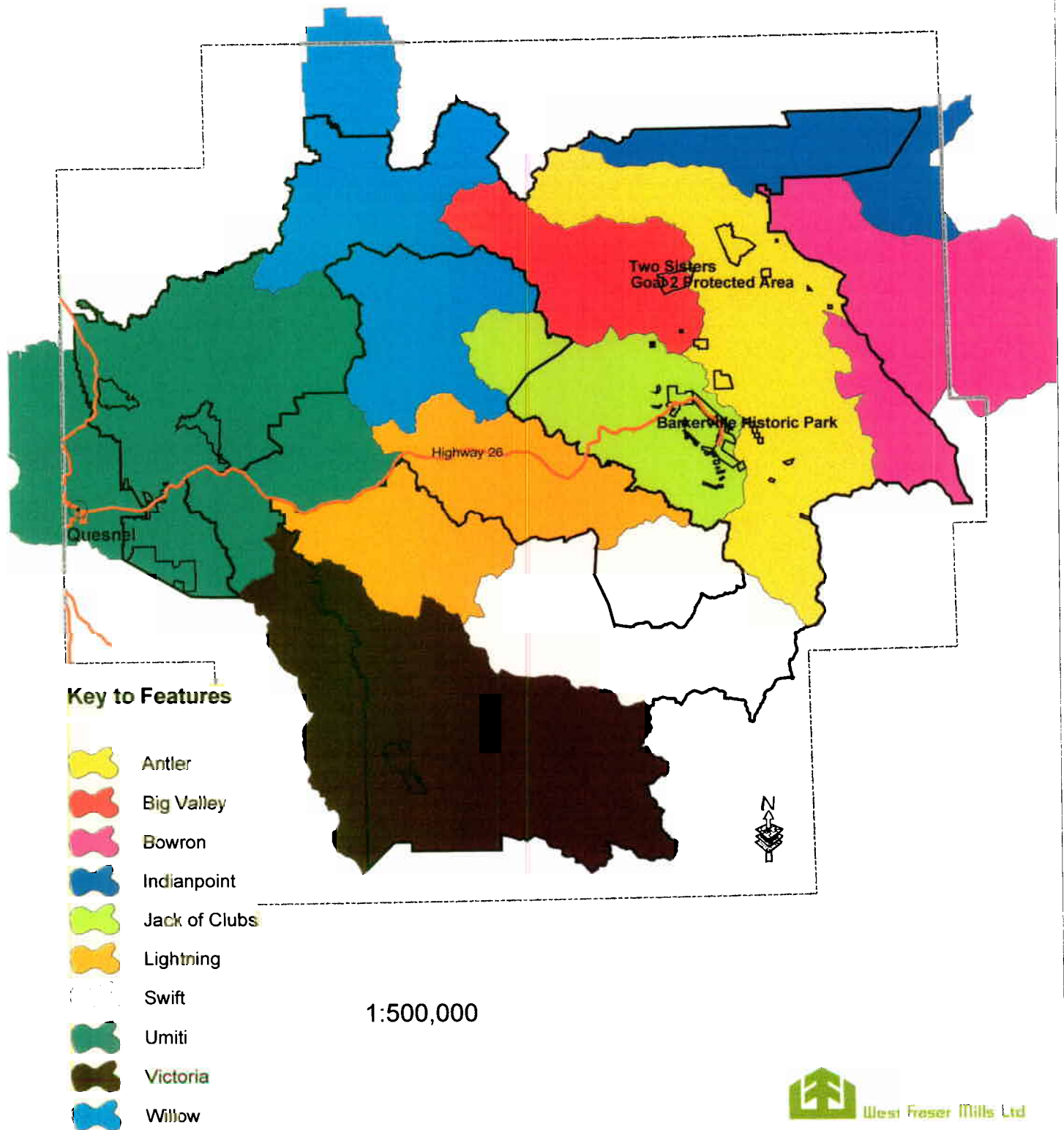
West Fraser has undertaken a project, based on the TEM, to provide interpretations for wildlife habitat capability and suitability for six species on the TFL. The species range from amphibians to song birds and raptors; from ungulates to carnivores. These interpretations will help the Company identify critical habitat and potential old growth management areas.

Strategies

- Create stub trees by cutting snags and deciduous trees at 3-5 m height, where appropriate.
- Create small mammal habitat by leaving small piles unburned where piling is used as a mechanical site preparation method.

Figure 6

TFL 52 Landscape Units





- Follow FPC guidelines and direction from MOF and MELP regarding recruiting and maintaining coarse woody debris.
- Where appropriate, and where specified in a silviculture prescription, leave deciduous species uncut where doing so will not jeopardize regeneration obligations.
- Prepare a seral stage distribution summary with the Development Plan using the procedure in the CCLUP Biodiversity Conservation Strategy.
- Continue identifying 9% of gross block area as reserves until landscape unit plans are in place.
- Continue using the Biodiversity Guidebook for operational planning.
- Complete the habitat capability/suitability mapping project and identify potential old growth management areas based on greatest environmental benefit with least timber impact.
- Participate in sub-regional planning processes.

3.2.3 Soils

Objective

West Fraser will protect soils and soil fertility by minimizing activities that cause soil degradation, and by rehabilitating sites that are damaged.

Discussion

Soil disturbance can range from beneficial to detrimental, depending on the site conditions and the severity and nature of the disturbance. Productivity of our forest sites depends on the maintenance of the soil resource. Each site can have limiting factors that, if not identified and accommodated, can lead to detrimental disturbance. Compaction, erosion or displacement are the undesirable results of inadequate planning and execution of road building, harvesting or site preparation.

Strategies

- Utilize terrestrial ecosystem mapping and terrain stability mapping in operational planning to help identify sensitive soils and site limiting factors.
- Conduct detailed terrain stability assessments when Terrain Class IV or V terrain is encountered when planning roads or harvesting.
- Use harvesting methods and equipment that are suited to each site so that compaction and rutting are avoided.
- Conduct operations in appropriate weather and soil moisture conditions. Some sensitive soils may be operated on only when dry, frozen or covered by a protective snow pack.
- Grass seed exposed soils where there is a risk of erosion.



3.2.4 Water

Objectives

West Fraser will plan and conduct its operations in a manner that protects water quality and quantity.

Discussion

TFL 52 contains the headwaters of the Bowron, Willow and Cottonwood/Swift Rivers. Rainbow trout, bull trout and Chinook salmon are present in many of the smaller streams throughout the TFL. Water quantity and quality are critical to a healthy fish population. In the last five years, West Fraser has conducted a number of assessments of watershed conditions and has undertaken some restoration measures to mitigate undesirable impacts of past road building and harvesting practices. The Interior Watershed Assessment Procedure arrived at indices for a number of sub-basins that were at or beyond the upper limit suggested in the guidebook. Detailed channel assessments were conducted in 1999-2000 of the eleven sub-basins identified as priorities east of Quesnel. This was done as a cooperative project with Ministry of Forests, Weldwood of Canada Ltd. and West Fraser. The results indicated that channel morphology had not been adversely affected and that development could proceed. Relatively gentle topography, low gradient streams, and numerous wetlands contributed to the positive results.

In the last two years, approximately 105 km. of roads and trails have been deactivated. This included removing culverts and restoring natural drainage patterns, which in some cases, has restored fish passage. The road deactivation program will continue, subject to availability of funding through FRBC or other sources. Deactivation will be consistent with access management plans developed under the CCLUP.

A fish/fish habitat inventory project, which is nearing completion, has been done on about 95% of the TFL. One of the results of this project was the classification of the streams according to the classifications described in the FPC Riparian Guidebook. Detailed surveys and assessments of streams are done during the planning phase for road and cutting permit development to ensure that the proper drainage structures and riparian management zones are in place.

Strategies

- Utilize terrestrial ecosystem mapping and terrain stability mapping in operational planning to help identify sensitive site conditions that could lead to erosion or mass wasting due to harvesting or road building.
- Conduct detailed terrain assessments when Terrain Class IV or V is identified on planned roads or cut blocks.
- Provide reserves and buffers to streams and watercourses during harvesting and silviculture treatments, according to FPC guidelines.



- Use engineered designs and plans for major stream crossings.
- Monitor all field operations to ensure that West Fraser meets or exceeds all applicable standards.
- Prescribe and implement deactivation of unnecessary roads.
- Grass seed disturbed sites on road rights-of-way and trails.

3.2.5 Recreation

Objectives

West Fraser will maintain backcountry recreation opportunities on the TFL according to the objectives of the CCLUP for the Quesnel Highlands SRDZ.

West Fraser will continue to maintain the established recreation sites on TFL 52, in cooperation with the Ministry of Forests.

Discussion

The Quesnel Highlands offers considerable opportunity for outdoor recreation in both summer and winter. The high recreational value is due in part to the geography of the area and the historic features left from the 1860's gold rush.

There are a number of good quality hiking trails that provide moderately difficult hiking access into alpine meadows on Mount Murray, Mount Proserpine and Bald Mountain. Backcountry skiers use alpine and sub-alpine bowls of Mount Greenberry and Mount Tinsdale. Cross country skiers use the Groundhog Lake and Cornish Mountain areas, where trails are set and groomed. Snowmobilers use the Groundhog Lake and Elk Mountain area, as well as unused logging roads throughout the TFL.

The summer use of all terrain vehicles (ATV's) is becoming a problem in some fragile alpine meadows, mostly outside the TFL, and there is some conflict between user groups in the Groundhog Lake area. West Fraser is a member of a steering committee for a *Special Management Tourism Project with District of Wells*, which aims to conduct a tourism and recreation overview of the Quesnel Highlands SRDZ, to develop and print a brochure with ATV organizations on low impact use of ATV's, and to develop a proposal for the management of trails and a cabin at Groundhog Lake for both motorized and non-motorized winter and summer recreational use. This is a cooperative project with MOF, MELP, Land Use Coordination Office, Village of Wells and West Fraser.

West Fraser worked with the Quesnel Snowmobile Club to develop and upgrade trails in the Deacon Creek area. This project arose because of safety concerns that developed when the 500 Road was upgraded for all season traffic. Snowmobilers, who had used the road prior to upgrading, were suddenly faced with logging traffic. West Fraser cut a 5-6m. wide trail for approximately five km., parallel to the 500 Road, so that snowmobiles could travel safely.



Approximately six km. of trails were brushed out. The network presently consists of forty-five km. of prepared and groomed trails, with considerable opportunity to expand.

West Fraser also cooperated with the Wells and Area Trails Society to GPS and map trails in the vicinity of Wells. A continuing project has been the development of trails on Cornish Mountain for cross country skiing and mountain biking. These trails incorporate roads and small cut blocks that were designed with development of the trails in mind. Some signing remains to be done.

The CCLUP target for backcountry recreation is to maintain 30% of the Quesnel Highlands SRDZ in backcountry condition. The “no harvest” and “modified harvest” areas identified in the caribou strategy account for 29.6% of the TFL portion of the SRDZ, VQO “retention” areas account for a further 3.8%, and non-forested areas account for a further 3.4%. The area in backcountry condition generally corresponds with the areas currently used for hiking and skiing, and form large contiguous units. Assigning the “high” and “intermediate” biodiversity emphasis in the Quesnel Highlands SRDZ would be expected to suit the interests of backcountry recreation.

Over a three year period, the Friends of Barkerville relocated the original 1861 Gold Rush Pack Trail from the Cariboo region into Barkerville. The 40 km. route was subsequently cleared of brush, GPS'd, and signed for hiking. Two primitive campsites were also installed. The majority of this trail is within the caribou “no harvest” or “modified harvest” zones. West Fraser provided financial, material and mapping assistance to complete the project.

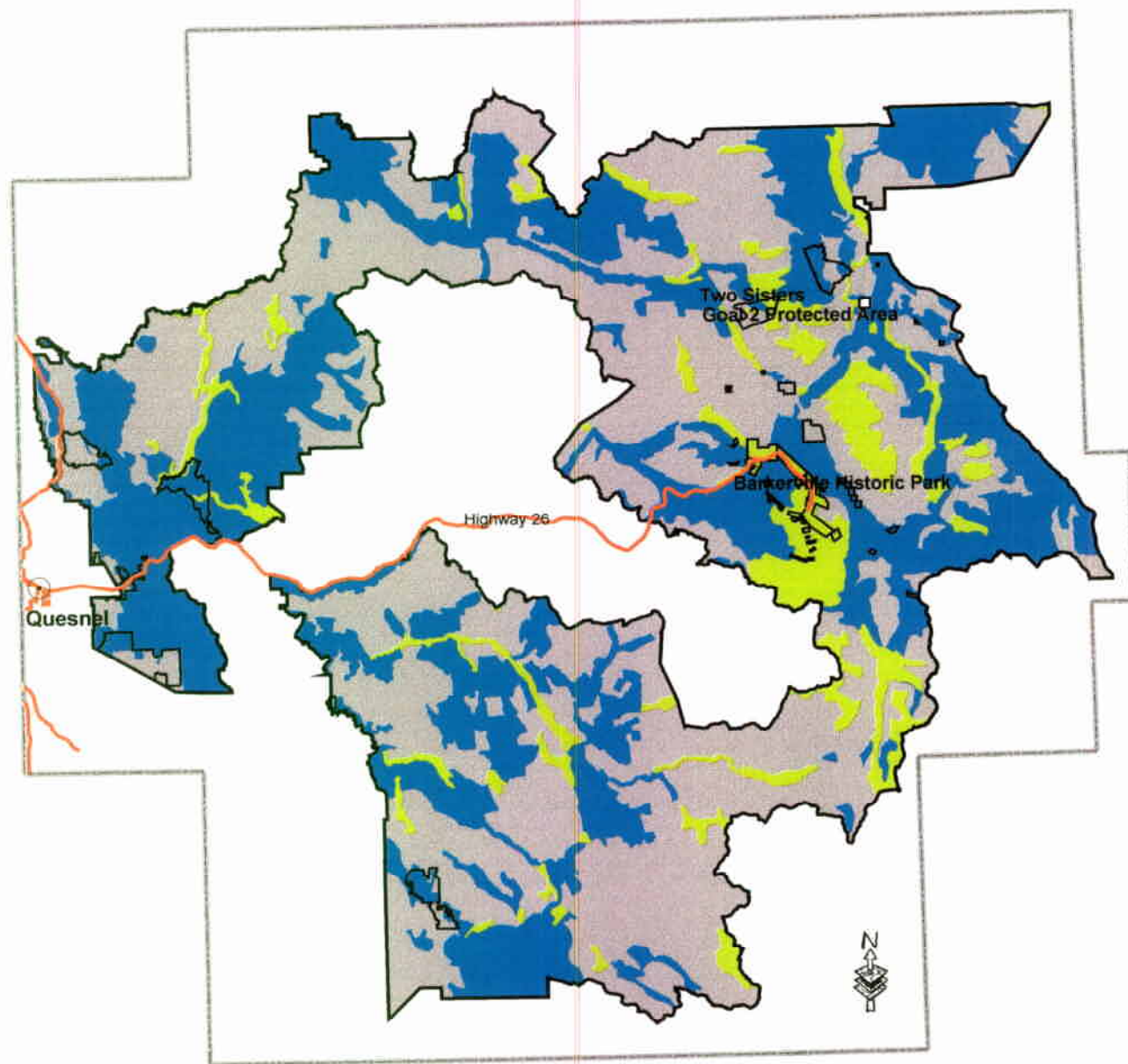
There are five Forest Service Recreation Sites on the TFL that West Fraser has maintained in the past and proposes to maintain in the future, in cooperation with Ministry of Forests. These sites receive considerable use for camping, fishing or hunting throughout the summer and fall.

Strategies

- Annually contract with Ministry of Forests to maintain the recreation sites on TFL 52.
- Meet CCLUP backcountry recreation targets by identifying the portions of the land base that meet the criteria for backcountry recreation. This includes a combination of recreation opportunity spectrum (ROS) experience classes of semi-primitive motorized, semi-primitive non-motorized, primitive and natural.
- Update the recreation features inventory and recreation opportunity spectrum for inclusion in MP4.
- Continue working with outdoor recreation groups who are developing and enhancing skiing, hiking and snowmobiling trails on the TFL.

Figure 7

TFL 52 Recreation Opportunity Spectrum



Key to Features

-  High Opportunity
-  Medium Opportunity
-  Low Opportunity

1:500,000



West Fraser Mills Ltd



- Continue participating on committees established to deal with recreation-related issues.

3.2.6 Cultural Heritage Resources

Objectives

West Fraser will plan and conduct its operations in a manner that does not interfere with cultural heritage resources.

Discussion

The area occupied by TFL 52 has an extensive history, starting with the 1860 gold rush. There are many remnants of the mining, such as ditches, old cabins, shafts, hand tools and equipment scattered over a wide area. Barkerville Historic Park maintains archived information on known sites.

West Fraser provided digital files of the TFL to University of Northern BC for the purpose of having the university, in conjunction with Barkerville Historic Park, incorporate known heritage sites onto the digital base.

The recreation features inventory takes into account the historical features that are generally known.

Strategies

- Refer to the approved recreation inventory for TFL 52 during operational planning, as the inventory provides an interpretation of areas with potential historical importance.
- Conduct impact assessments on proposed blocks within areas identified as being of provincial significance ("A" Feature Rating), or regional significance ("B" Feature Rating), or where directed by the District Manager.
- Support UNBC and Barkerville Historic Park in the completion of the heritage site mapping project.

3.2.7 Fish and Wildlife Habitat

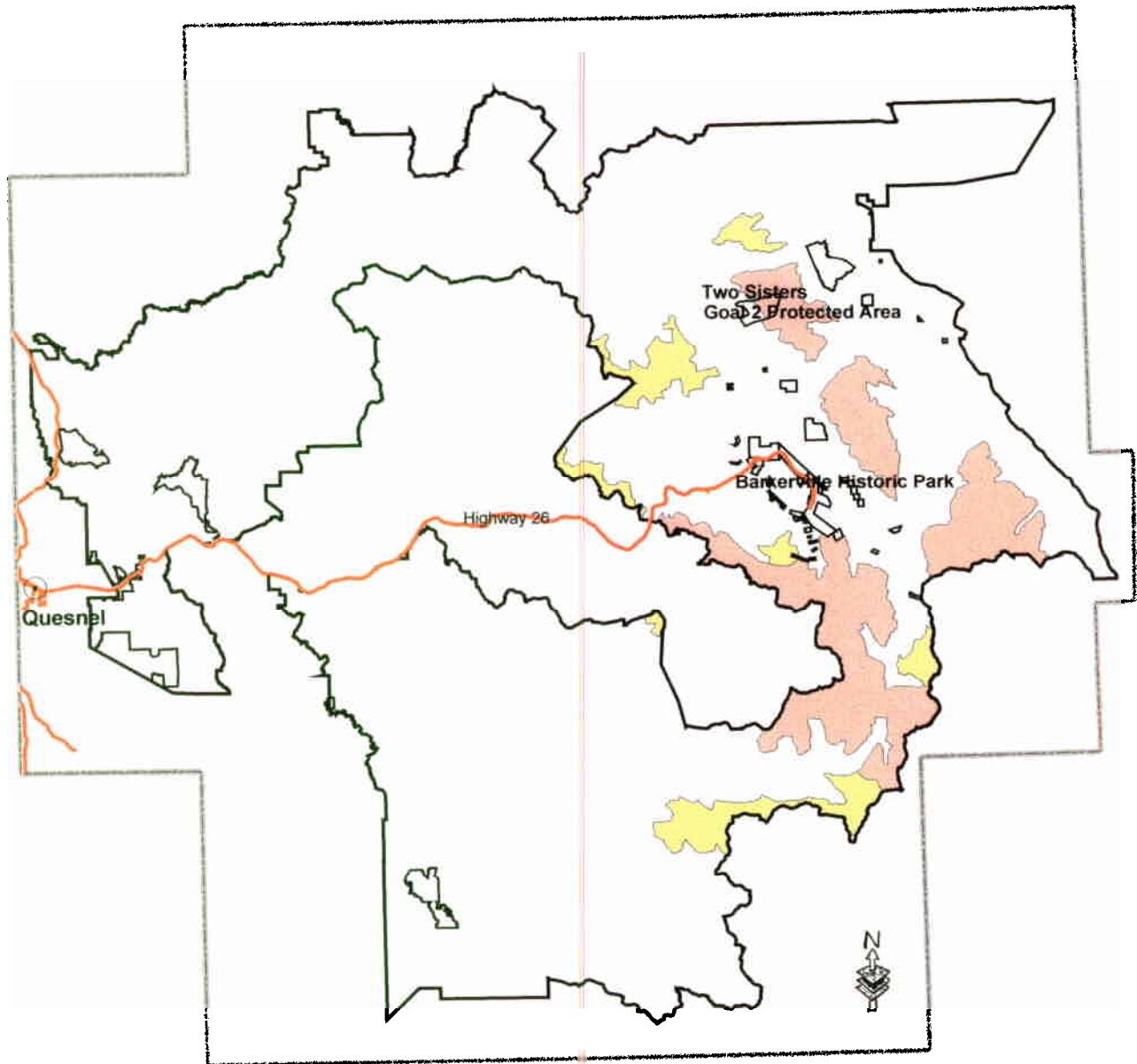
Objectives

West Fraser will maintain a diversity of habitats capable of supporting existing fish and wildlife species, through collaborative planning with resource agencies.

West Fraser will work with the Caribou Committee of MOF and MELP as they develop CCLUP guidelines for harvesting within caribou habitat, and will follow the guidelines as they are developed.

Figure 8

TFL 52 Caribou Zones



Key to Features

1:500,000



Modified Harvest

No Harvest



West Fraser Mills Ltd



Discussion

There is considerable variability in species and habitat diversity across the TFL, due, in part, to the broad change in topography from west to east. The Company has worked closely with MOF and MELP to identify and map caribou habitat on the TFL. Since the CCLUP was finalized, two new caribou high-use areas have been identified on Mt. Tom and at Lottie Lake. Both these areas were subsequently included in the “modified” and “no harvest” zones as part of the caribou strategy.

The “modified” and “no harvest” areas within the caribou range have been identified and mapped, but the actual harvesting practices have not been finalized. The proportion of “modified” and “no harvest” areas within the TFL follows the CCLUP targets of 12% and 21% respectively. West Fraser is working with the Caribou Committee and Weldwood of Canada on an experimental area on Mt. Tom to test caribou adaptation to small (<1.0 ha.) patch removal.

There are seven “identified wildlife” species present on the TFL, but no corresponding “wildlife habitat areas” as per Section 70 of the FPC *Operational Planning Regulation*.

Bull trout is present in many streams on the TFL and the Little Swift River has been identified by MELP as being of significant interest. About 60% of the Little Swift is outside the TFL. The management practices of the riparian management guidebook, and any other measures identified by MELP will be followed where harvesting is proposed.

The American bittern is a secretive blue-listed bird that inhabits lush vegetation along the borders of lakes, marshes and rivers. By the nature of the habitat it depends on, West Fraser believes that the riparian management provisions of the FPC will protect these birds.

Sandhill cranes have been observed in recent clearcuts in the vicinity of large hayfields and meadows along the Swift River. Use of clearcuts is believed to be unusual. The management practices of the riparian management guidebook, and any other measures identified by MELP will be followed where sandhill crane use is known.

Northern goshawks are distributed throughout BC, but are considered to be regionally important. The foraging area of a nesting pair of goshawks may be about 2400 ha. The foraging area may include a diversity of landforms and cover types, although areas with greater forest canopy closure, greater basal area and more trees per ha. may be preferred. No nesting sites have been identified on the TFL to date. Guidelines from the identified wildlife strategy and direction from MELP will be followed when goshawk nesting areas are found.



Fishers are blue-listed member of the weasel family that inhabit mixed forest stands and structural types. The TFL has nearly 20% of the forested land base constrained by such things as riparian management reserves, caribou habitat, inoperable ground, low productivity sites and wildlife tree patches. At present, 48% of the productive forest area is over 100 years old. It is believed that the habitat requirements for fishers can be met in the current management regime for the TFL.

The population of *grizzly bears* seems to be healthy on the TFL. In 1999 there were twenty-five confirmed sightings of grizzlies (several were obviously of the same bears), which included individuals and sow-cub groups of varying ages. It was estimated that twenty-three individual grizzlies were observed. In 2000 there were fourteen confirmed sightings, some of which appeared to be the same sow-cub groups observed the previous year. The reduction in the number of sightings is believed to be due to a geographical shift in workers to other forest areas. West Fraser will continue to record sightings of grizzlies with the intention of building anecdotal evidence of the population trends. West Fraser is also contributing \$50,000, through FRBC, to initiate grizzly bear studies in the Quesnel Highlands.

Mountain goats are found within other areas of the Quesnel Highlands, but none have been observed anywhere within TFL 52.

West Fraser will participate in any planning processes related to wildlife habitat areas, and will abide by recommendations that may come from the final plans. As there are no wildlife habitat areas identified, there is no provision for them in the timber supply analysis. Because the constraints to the forested land base are approaching 20%, it is expected that future wildlife habitat areas would have overlaps with presently constrained areas. Appendix IX provides more information on “identified wildlife” species present on the TFL.

West Fraser has undertaken projects to restore fish access and habitat, and to identify and map wildlife habitat for selected species.

Strategies

- Complete the wildlife capability/suitability mapping for the TFL.
- Assess the utilization of wildlife tree patches and riparian reserve zones by wildlife, provided that these projects are accepted as priorities by MELP in the FRBC resource management planning process.
- Prescribe and implement fish habitat restoration projects, provided that they are accepted as priorities by MELP in the FRBC resource management planning process.
- Participate in the implementation of the regional caribou strategy.
- Participate in the operational trials to develop suitable harvesting techniques in the caribou “modified harvesting” zone.



3.2.8 Range Land

Objectives

West Fraser will cooperate with MOF to make grazing opportunities available on the TFL.

Discussion

Range use has historically been a very minor activity on the TFL, and has been administered by the MOF. No range use issues or conflicts have been identified on the TFL. Range tenure holders on the TFL generally hold some other form of tenure as well, and receive notification of management activities through the development planning process.

Strategies

- Continue sending notifications of intended herbicide treatments to licensed range users.
- Grass seed disturbed sites along road rights-of-ways and trails.

3.3 Integration of Harvesting with Non-Timber Uses

3.3.1 Trappers and Guide-Outfitters

Objective

West Fraser will inform other licensed resource users of operational plans, and provide an opportunity for input, in accordance with legislation and regulatory policy.

Discussion

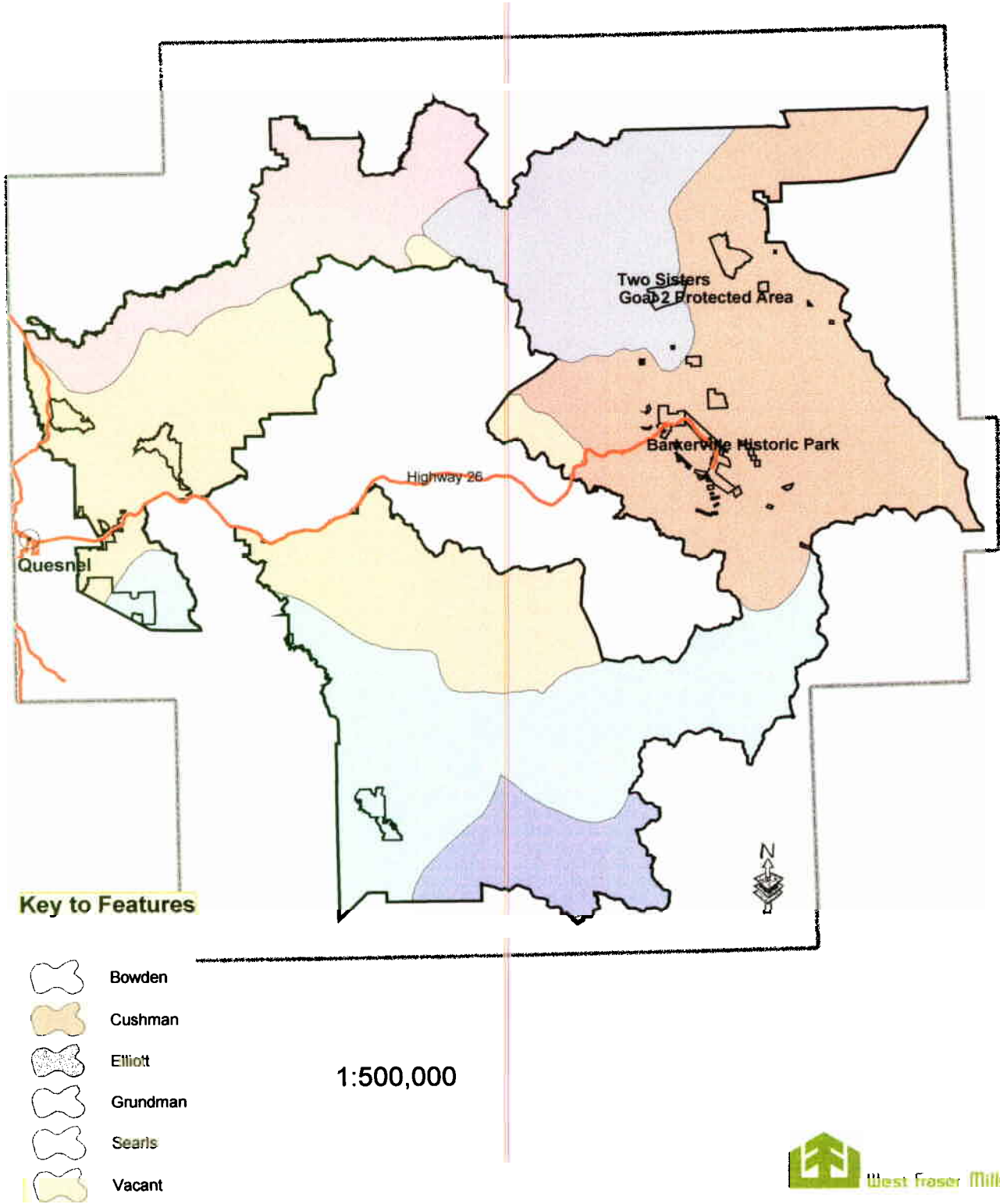
West Fraser maintains regular contact with owners of registered trap lines and guiding areas on the TFL. They are invited to provide comment into the Development Plan, which includes a section on access management, so that their concerns can be incorporated into operational planning. Guides and trappers are free to come into the West Fraser office at their convenience to review and discuss any concerns they may have regarding harvesting and access management.

Strategy

- Continue sending letters to trappers and guides inviting comment on the Development Plan.
- Continue an “open door” policy so that trappers and guides can drop in to discuss issues or concerns.
- Advertise in local print media regarding operational plans and opportunities for comment.

Figure 9

TFL 52 Guide Territories





3.3.2 Range Tenure Holders

Objective

West Fraser will cooperate with MOF and range users to minimize resource use conflicts.

Discussion

There are seven range tenure holders, with a combined use of approximately 1800 animal unit months either on or adjacent to the TFL. There have been no issues or conflicts identified in the last five years between range use and harvesting or access management. The use of herbicides for brush control on plantations has the potential for conflict with range users. West Fraser has in the past, and will continue to modify or provide alternate treatments to address any concerns that arise from discussions with range tenure holders.

Strategy

- Continue sending letters to range tenure holders inviting comment on proposed herbicide treatments, and modifying or changing treatments as needed.
- Promptly address any range use concerns that arise.

3.3.3 Aboriginal People and Activities

Objective

West Fraser will work with the Red Bluff (Lhtako First Nation) Band, Soda Creek Band, Williams Lake Band and Lheidli T'enneh (Shelley) Band to identify their activities on the TFL and to develop ways of integrating our operations with their needs.

Discussion

These bands have identified overlapping areas of interest over much of the TFL. The Lheidli T'enneh Band is in the late stages of treaty negotiations, and there is currently a treaty offer on the table. The Soda Creek Band, Williams Lake Band are in negotiations, but have not reached the point where an offer has been made. The Red Bluff Band is not in the treaty negotiating process.

Strategy

- Foster communication by meeting periodically during the operational and management planning process.
- Annually review proposed herbicide plans with First Nations bands so that West Fraser avoids infringing on traditional use activities.



- Assist the Crown in its fiduciary duty to consult with First Nations by referring plans and permits to First Nations bands that may have traditional interests in the TFL area.

3.3.4 Mining

Objective

West Fraser will maintain the existing good working relationship with the mining community.

Discussion

There are numerous small placer mining operations scattered throughout the TFL. The degree of activity is dependent on the price of gold. Mining and forestry operations have co-existed for many years without significant issues arising between the two. Road deactivation is the primary concern of the mining community, as West Fraser's operational roads provide access to the majority of mines. West Fraser also provides air photos, orthophotos and maps to individual miners for a nominal fee.

Strategy

- Continue providing maps and photos to individual miners.
- Continue purchasing timber when it becomes available on mining operations.
- Avoid deactivating roads where it is known that they will be used for exploration or mining.

3.4 Fire Management

The responsibility for the prevention and control of wildfires is detailed in provincial legislation and regulation and in MOF policy. The goal of West Fraser's fire management program is to minimize the damage to stands in the productive forest and to maximize the volume salvaged from those stands that become damaged by fire. In the last five years there have been six fires on the TFL, five of which were caused by lightning resulting in five ha. of damaged timber. The sixth fire was the result of an escaped prescribed burn, which covered 130 ha.

3.4.1 Fire Prevention

Objective

West Fraser will conduct its operations in a manner that meets the requirements of the *Forest Fire Prevention and Suppression Regulation*.

Discussion

Fire prevention is a responsibility of everyone, including contractors, who work for West Fraser. The Company actively monitors fire weather and burning



indices, and governs its operations according to provincial legislation and regulation.

Strategies

- Annually prepare and submit a Fire Management Plan by April 15th to the Cariboo Fire Centre.
- Continue subscription to the MOF fire weather network.
- Annually review with the Cariboo Fire Control Centre the area of representation of the weather stations on or adjacent to the TFL.
- Post daily the fire weather forecasts and burning indices for field staff, when the fire weather index from any weather station representative of conditions on the TFL is at a “moderate” or higher level.
- Conduct periodic inspections of contractors for compliance with the *Forest Fire Prevention and Suppression Regulation*.
- Regulate operations according to fire weather indices and the *Forest Fire Prevention and Suppression Regulation*.

3.4.2 Fire Suppression

Objective

West Fraser will cooperate with MOF to ensure rapid initial attack and control of fires by 10:00 a.m. on the day following discovery.

Discussion

Wildfires on the TFL tend to be small and originate from lightning. In the last five years, there has been one major fire (130 ha.) resulting from an escaped prescribed burn. West Fraser staff and contractors are trained and equipped to respond to fires as needed.

Strategies

- Maintain a central fire cache that meets, at a minimum, the requirements of the *Forest Fire Prevention and Suppression Regulation*.
- Conduct annual inspections and tests of fire pumps and tools.
- Maintain an updated list of fire suppression resources in the Fire Management Plan
- Provide annual fire suppression training to staff members and contractor employees.

3.4.3 Prescribed Fire

Objective

West Fraser will use prescribed fire as a silviculture treatment, where appropriate, and as a fuel management tool, in accordance with an approved burning plan and a burning reference number.



Discussion

Prescribed burning is a desirable management tool for silviculture on the TFL, although smaller cut block sizes and stringent smoke management requirements have made alternative treatments more economically viable. West Fraser has responded by burning under a regime of lower indices that has resulted in easier control and mop-up. Checks will be done in subsequent years to see if the lower impact burns are still producing the desired silvicultural benefits of reduced brush competition and increased growth and survival of seedlings.

Strategies

- Install weather stations in the vicinity of proposed prescribed burns to determine site specific burning indices.
- Maintain trained and experienced crews who are capable of conducting prescribed burns.

3.4.4 Fuel Management

Objective

West Fraser will reduce the fire hazard created by the accumulation of fuel during harvesting operations.

Discussion

The majority of harvesting operations utilize a roadside harvesting system, which results in an accumulation of logging debris along the road edge. In most cases there is not a great deal of fuel left elsewhere within the block.

Strategy

- Pile and burn roadside debris within one year after harvesting

3.5 Forest Health

Objective

West Fraser will maintain a forest health program that protects forest values and minimizes non-recoverable losses due to insects, disease and windthrow.

Discussion

Healthy forests are essential to the long-term sustainability of the TFL. West Fraser is committed to detecting forest pests, appraising the potential impact, and taking appropriate control actions. There are a number of known insects and diseases of both mature and immature forests that are of concern on the TFL, including weevils, defoliators, stem rusts, root rots and bark beetles.



The forest health program is divided into two components, insect pests and diseases.

3.5.1 Insect Pests

3.5.1.1 Bark Beetles

Discussion

There are three bark beetles present on the TFL, including mountain pine beetle (*Dendroctonus ponderosae*), spruce beetle (*D. rufipennis*), and western balsam bark beetle (*Dryocetes confusus*). Spruce beetle and western balsam bark beetle have been at endemic population levels for over five years. Mountain pine beetle populations have been increasing, but at a manageable rate on the TFL.

Strategies

- Conduct annual aerial pest detection surveys specifically to identify bark beetle infestations, but with the intent of also identifying other pests that may, from time to time, appear on TFL 52.
- Harvest pest infestations detected on merchantable stands on a priority basis.
- Harvest the oldest stands as a priority as they are most at risk to endemic and epidemic losses.
- Utilize falling and burning as a holding action until harvesting can be undertaken.
- Utilize pheromone lures and trap trees, where appropriate, to aggregate and hold beetle populations in an infested area.
- Solicit expert advice where new or unfamiliar pests are detected.

3.5.1.2 Defoliators

Discussion

Two year cycle budworm (*Choristoneura biennis*) has been identified as a recurring pest on the TFL. Areas of severe defoliation of mature spruce and balsam have occurred above the Willow River north of Wells and along the upper Swift River valley. Mortality does not appear to be high at present, except in the balsam understory. It is possible that a greater degree of mortality could occur if the population remains high or if severely defoliated trees do not have the capacity to recover.

West Fraser initiated surveys and installed sample plots in 1999 to try and gain some understanding of the extent of the outbreak and of population dynamics. The sample plots were re-examined in 2000 to check the level of feeding activity by mature larvae. As expected, there were areas of localized heavy feeding and defoliation. The wet cool summer weather may



have disrupted the pupation period and subsequent flight and egg deposition. More monitoring will be done in 2001.

At the present time there is no determination of the need for control measures to be taken.

Strategy

- Monitor larval development in summer 2001 and develop predictions for infestation levels for 2002 (which will be the next major defoliation year)
- Refer monitoring results to the Regional Entomologist and determine if control measures are necessary
- Incorporate severely defoliated areas into harvesting plans, where appropriate, to salvage mortality.

3.5.1.3 Leader Weevil

Discussion

White pine leader weevil (*Pissodes strobi*) is a pest of young spruce. The risk factors are stand age (positive correlation), stand density (negative correlation) and elevation (negative correlation). Spruce stands aged 16-25 years, with densities below 1200 stems per hectare, and situated below 900m. elevation are at greatest risk. Factors which modify this risk are increasing age, increasing levels of shade, greater stand densities, higher elevations, and increasing slope.

To put the risk of weevil on the TFL into context, less than 8% of the TFL is below 900m., and only a small proportion of planned harvesting will be below this elevation. Planting is done to a density of 1800 stems per hectare, which is above the optimum threshold for attacks, and there are few pure spruce plantations. It is estimated that 2150 ha. of spruce-leading plantations are in the high risk areas for weevil damage. Random sampling done as part of the site index adjustment project on the TFL did not identify a need to modify potential site index and managed stand yield tables because of weevil impacts.

Silviculture surveys for weevils done in 2000 in various BCG sub-zones identified weevils at low to moderately high levels in some stands. The silviculture surveys, however, do not allow any quantification for growth and yield purposes, and do not recognize situations where the spruce appears to be growing through the attack phase.

West Fraser submitted a separate report to the Regional Manager entitled "*Management Strategy for Spruce Leader Weevil on TFL 52*" which provides more information about potential for weevil damage in immature spruce stands. A copy is included in Appendix VI.



Strategy

- Plant a mix of ecologically appropriate species on susceptible sites.
- Plant to a target density of 1800 stems per hectare or higher, except where there are specific management reasons not to.
- Retain deciduous species as a component on plantations by avoiding brushing and weeding treatments that release over-topped spruce, especially in the SBSmw sub-zone.
- Avoid spacing treatments in susceptible spruce stands until trees are approximately 8m. tall
- Continue participation in efforts by the Vernon Seed Orchard to develop resistant spruce.

3.5.2 Diseases

3.5.2.1 Stem Rusts

Discussion

Western gall rust (*Endocronartium harknessii*) is the most commonly observed disease of lodgepole pine. Severe infection causes stem malformation, breakage and mortality. Because of the extent that lodgepole pine is planted on the TFL, it will be necessary to monitor the incidence of western gall rust and to develop management strategies as needed.

Stalactiform rust (*Peridermium stalactiforme*) is known to be present, and has caused some mortality in isolated spots. It is not believed that it is a significant pest at this time.

Strategy

- Ensure that silviculture surveyors are diligent about recording diseases.
- Plant mixed species at a density of 1800 stems per hectare to allow for some mortality.
- Reduce the incidence in managed stands by removing trees having stem infections during manual brushing operations

3.5.2.2 Root Diseases

Discussion

Root disease is unquantified on the TFL. West Fraser has identified this as a “knowledge gap” in the development of the Resource Management Planning process for determining funding priorities under the “Strengthening Sustainable Forest Management” program of Forest Renewal BC. West Fraser will undertake an overview assessment of *Tomentosus* root disease, providing that it is identified as an eligible activity



and a priority for FRBC funding. Because of the low potential for *Armillaria* root disease presence on the TFL, and because of higher priority pests, West Fraser will not pursue *Armillaria* studies during the term of MP 3.

3.6 Silviculture

The basis of long term sustained yield on the TFL is an effective silviculture program that results in a target density of ecologically appropriate species on each site series after harvesting. West Fraser is aggressive in its silviculture practices and will continue to meet or exceed legislative and regulatory requirements.

West Fraser's primary silviculture goal is to increase the long-term sustained yield by taking advantage of the natural productivity of the land base. This includes optimizing wood production and quality in a practical and cost effective manner while co-managing for other forest resources and forest users.

There are three broad areas of silviculture management and responsibility that are addressed in order to meet the silviculture goal. These are:

- Basic Silviculture (West Fraser funding obligation – Post October, 1987)
- FRBC funded Silviculture Obligations (Pre October 1, 1987)
- Intensive Silviculture

The objectives for all three components will be met by applying appropriate silvicultural practices.

3.6.1 Basic Silviculture

3.6.1.1 Crop Planning

Objective

West Fraser will utilize ecosystem-based crop plans to capture the productive capacity of harvested areas.

Discussion

The *Intensive Silviculture Management Strategy*, prepared by West Fraser in 1998 for the TFL, provides the first iteration of crop plans designed to maximize fibre volume and value, based on BEC sub-zones and site series. The plans also create opportunities for future commercial thinning, adding flexibility to the future timber supply. These plans will be reviewed, and modified if necessary, during the term of Management Plan #3 for their practical application. As landscape unit plans are developed over the TFL, specific objectives for biodiversity, wildlife habitat riparian management and others will be set. To meet those objectives, West Fraser will modify treatment regimes so that timber production is optimized under the constraint and so that other values are not compromised. For example, there



may be areas where the minimum stocking levels may be lowered to encourage browse species for wildlife.

Strategy

- Review the crop plans established in the Intensive Silviculture Management Strategy (WFM internal document, 1998), and modify if necessary.
- Develop treatment regimes that complement the crop plans.
- Participate in, or cooperate in the development of landscape unit objectives and plans.
- Modify crop plans and treatment regimes to suit the landscape unit objectives, when established.
- Review recent free growing sites to determine what changes, if any, can or should be made to the crop plans or treatment regimes.

3.6.1.2 Stocking Standards

Objective

West Fraser will meet or exceed free growing standards on all harvested areas to targeted stocking levels with ecologically appropriate species.

Discussion

Every cut block has an approved silviculture prescription that specifies the standards and time lines for a free growing stand. It is in West Fraser's long term interest to meet or exceed the approved targets because of the implications on future harvest levels. All harvested areas on the TFL are planted. West Fraser currently plants to a density of 1800 stems per hectare on most site series to account for some mortality so that target densities are achieved. The higher densities should also improve wood quality, as canopy closure and canopy lift will occur earlier.

Table 4 shows the stocking standards that are presently approved for the TFL. A "*Type II Silviculture Analysis*" is presently being done, which may result in amendments to these standards.

Strategy

- Where necessary because of site conditions or debris load, create improved micro-sites for seedlings by using appropriate site preparation techniques.
- Monitor all plantations, and apply stand tending techniques, as needed, to maintain the survival and growth of seedlings.
- Fill-plant sites where densities fall more than 25% below target.

Table 5 **TFL 52 Stocking Guidelines (December 1995)**

Subzone	Site Series	Initial Stocking Guidelines		Targets @ FG	Minimum Standards @ FG	Comments
		Pine	Spruce			
ESSFwk1	01	1200+	600	1600	700	Subalpine fir will form a minor component of this stand either through advanced regeneration and/or natural regeneration. Subalpine fir will be planted on operational basis.
	02	1100	500	1000	500	
	03	1200	600	1400	700	
	04, 05	600	1200+	1600	700	
	06, 07	800+	800	1000	500	
SBSmw	01	1200+	600	1600	700	Site series 01 - 04 Douglas-fir may be planted as a minor component. Site series 01, 06 - 08 subalpine fir from natural or advanced regeneration will be considered as a secondary species. Aspen may be considered as a component on series 01 - 08.
	02	1600		1000	500	
	03	1800		1600	700	
	04	1800+		1600	700	
	05	900	300	1200	700	
	06 - 08	600	1200+	1600	700	
	09	800+	800	1000	500	
	10	600+	600	800	200	
SBSwk1	01	1200+	600	1600	700	Site series 01 - 04 Douglas-fir may be planted as a minor component. Site series 01, 07, 08 subalpine fir from natural or advanced regeneration will be considered as a secondary species. Aspen may be considered as a component on series 01 - 08.
	02	1000		1000	500	
	03	1800		1600	700	
	04	1800+		1600	700	
	05	1800+		1600	700	
	06	600	600	1200	700	
	07, 08	600	1200+	1600	700	
	09	800+	800	1000	500	
	11	600+	600	800	200	

Note: Species selection indicates initial planting density guidelines. Silvicultural Prescriptions will determine the species requirements on a site specific basis.



3.6.1.3 Site Preparation

Objective

West Fraser will utilize site preparation techniques appropriate to each site to create improved microsites for planting, where required.

Discussion

Site preparation is done to create plantable spots, improve the rooting medium, and, in some cases, to reduce fire hazard. During the term of MP 2, all forms of mechanical site preparation were reduced in scale. This is attributable to more site-specific evaluation of need.

The area of prescribed burning has been lower since 1995 because there have generally been fewer burning windows because of wet weather or poor venting. In 1999 and 2000, burning was done with high duff moisture to reduce the risk of escapes and the costs of mop-up.

Table 6 shows the trends in site preparation.

Table 6 Site Preparation as a Percent of Previous Years Harvest Area

Activity	1995	1996	1997	1998	1999	2000
Broadcast burned	*101.1	22.0	15.7	12.4	13.8	14.8
Piled and burned	11.8	16.5	4.8	36.5	5.1	0.8
Disc trenched	13.7	7.0	4.5	12.0	0.9	0.8
Mounded	35.9	15.4	11.5	6.2	1.1	0.4
Excavator Screef	0.0	0.0	0.0	2.3	0.9	0.0
Herbicide site prepared	10.5	12.6	0.0	0.0	5.0	0.0

*Some area from 1993 logging burned in 1995

Strategy

- Refer to the silviculture prescription, treatment regime and TEM to check for any limiting factors.
- Check each harvested area to determine the most appropriate post treatment technique.
- Monitor plantation performance after mechanical site preparation and prescribed burning to quantify the benefits and costs.

3.6.1.4 Planting

Objective

West Fraser will plant all harvested areas on the TFL in a timely manner, using appropriate species and stock types.



Discussion

At this time, all harvested areas in TFL 52 are planted rather than left for natural regeneration. During the term of MP 2, increased emphasis was placed on raised microsite selection to improve the survival and growth of seedlings. On areas that are not site prepared, seedlings are planted so the root collar is at the soil surface, taking advantage of the nutrients in the humus layer and warmer surface soil temperatures. Higher planting densities suggested in MP 2 were implemented, with most areas now planted at 1800 stems per hectare. These higher planting densities offset pest losses and will contribute to higher quality wood due to earlier crown closure and lift. The exceptions are the driest and wettest sites where the number of trees that can be planted is limited by site factors.

Stock types in general use are PSB 415B and PSB 410 for spruce and PSB313B for pine. The PSB 410 is new to West Fraser and is used in stony and wet areas where rooting depth is restricted. All seedlings are grown under contract with commercial nurseries in BC, with approximately 45% of them grown in Quesnel.

The species planted are interior spruce (white/Engelmann cross) lodgepole pine and Douglas-fir. West Fraser participated in a joint collection of balsam (*Abies lasiocarpa*) in 1999, with the intent that balsam be incorporated in regeneration plans for high elevation (>1500m.) blocks. West Fraser is participating in the silviculture trials for the modified harvesting regime (adaptive management) in caribou habitat that is being conducted on Mt. Tom. This involves site preparation and planting trials on patch cuts (<1.0 ha.) above 1500m. The results of the trials will be incorporated into a high elevation regeneration strategy.

West Fraser believes that lodgepole pine has the capability to thrive on high elevation cut blocks, provided that appropriate sites are selected, and that the species should be maintained as an option for regeneration where site conditions are appropriate. There is evidence that stem deformation from snow creep and broken branches from settling snow can occur, which reinforces the need for careful selection of high elevation sites for planting pine.

Table 7 **Tree Species Planted**
1995-2000

	1995	1996	1997	1998	1999	2000
Spruce	48.3%	43.8%	50.3%	50.1%	41.7%	46.5
Lodgepole Pine	51.5%	54.5%	48.3%	48.7%	56.7%	53.0
Douglas fir	0.2%	1.7%	1.4%	1.2%	1.6%	0.5



Strategies:

- Investigate ways of improving seedling survival and performance.
- Analyze cost effectiveness of larger stock types.
- Review information on plantation survival and ingress and modify planting densities to best achieve targets suggested in Table 4.
- Analyze the regeneration success of lodgepole pine in the ESSF sub-zone during the term of MP 3.
- Modify the high elevation regeneration strategy, if necessary, according to the results of the trials in the caribou zone and of the surveys of lodgepole pine in the ESSF.

3.6.1.5 Regeneration Delay

Objective

West Fraser will maintain or reduce the current two year regeneration delay period.

Discussion

On blocks that do not require site preparation, or where site preparation can be done immediately subsequent to harvesting, regeneration delay is less than two years. Operational constraints on other blocks have not allowed the reduction below two years, on average that West Fraser desires. There are, however, opportunities to do so.

Strategy

- Conduct site preparation, where required, at the first opportunity following harvesting.
- Plant at the first opportunity following harvesting or site preparation.
- Continue operational trials and participation in the Northern Interior Vegetation Management Cooperative to help identify reforestation techniques that can reduce the regeneration delay period.

3.6.1.6 Seed Procurement

Objective

West Fraser will use the best available seed for reforestation.

Discussion

Seed to satisfy the reforestation requirements in TFL 52 comes from a combination of cone collection and seed orchard production. At this time, most of the spruce planted originates from genetically improved seed from the Vernon Seed Orchard. Lodgepole pine and Douglas fir improved seed are expected to be available from the seed orchard within seven years. Until then, West Fraser will utilize its inventory of wild seed. Collections of



lodgepole pine, Douglas fir, sub-alpine fir and high elevation Englemann spruce will be done when necessary. Wild seed will also be purchased if it is needed to supplement existing inventory.

Strategies

- Track seed requirements using the Forest Development Plan and Harvest Schedule
- Use genetically improved orchard seed when it is available.
- Maintain a seed inventory ledger to ensure sufficient seed is available to meet reforestation requirements.
- Follow the MOF seed transfer guidelines when allocating seed for individual cut blocks.

3.6.1.7 Stand Tending

Objective

West Fraser will conduct manual or chemical brush control on plantations according to an approved Pest Management Plan, in order to meet free growing obligations and to maximize growth and yield.

Discussion

West Fraser has an approved Pest Management Plan (PMP) for the TFL for the period of August 1, 2000 to July 31, 2001. The plan outlines a proactive approach to identify, prevent and monitor competing vegetation while carrying out silviculture treatments. The plan also provides a clear decision-making process that sets standards for treatments, and explains why, when and how vegetation management will be undertaken.

Treatment thresholds were developed around the concept of limiting factors on crop tree survival and growth caused by competing vegetation. The thresholds in the PMP will be revised as experience is gained in their application.

Related to the PMP, are improvements in seed quality, planting quality, and site preparation, which will result in more vigorous seedlings with a reduced dependence on brush control.

Strategy

- Monitor plantation performance as a result of implementing the PMP.
- Evaluate and modify the treatment thresholds in the PMP, if required.



3.6.1.8 Monitoring

Objective

West Fraser will monitor all reforested areas until a free growing status is reached and submit data to the MOF in the format and timeframe specified.

Discussion

Periodic monitoring of regenerated areas is required to identify areas where target stocking levels have not been achieved, to provide information on effectiveness of treatment regimes, and to provide information on pest incidence and damage. The data gathered in the various surveys and assessments increases confidence that regeneration targets are met. Where necessary, remedial prescriptions, works and strategies are developed and implemented. In addition to the basic monitoring, West Fraser has and will continue to install monitoring plots using the protocol of the Northern Vegetation Management Association.

Table 8 **Silviculture Surveys**

Survey	Site	Timing*	Intensity
Survival	all planted areas	walkthrough after 6 months	walkthrough
Regeneration	all planted areas	survey 2 to 5 years after planting	1 plot per 1 - 2 ha
Brushing	all planted sites	in conjunction with survival/regeneration survey or separate walkthrough assessment	1 plot per 1 - 2 ha or walkthrough
Free Growing	all planted sites	between earliest and latest assessment years	1 plot per 1 - 2 ha or 5 plots/strata
Pre-Stand Tending	selected regeneration sites	15 - 20 years after establishment	2 plots per ha

This schedule may be adjusted based upon the surveyor's recommendations.

Strategies

- Use the Integrated Forest Management System to forward plan and track all formal silviculture surveys and walkthrough assessments.
- Continue following MOF policy and procedures regarding surveying and monitoring plantation performance.
- Continue working with MOF to refine the electronic data transfer system and procedures.
- Continue installing monitoring plots using the protocol of the Northern Vegetation management Association.



3.6.2 FRBC-Funded Silviculture Obligations

There is a long history of harvesting on the area covered by the TFL. From the early 1960's to 1988, approximately 53,000 ha. were logged. The vast majority of this area has a new productive forest growing on it. The regeneration status on some areas logged in the late 1970's or early 1980's is still questionable. If silviculture work is required on these areas, the funding is expected to be provided by Forest Renewal BC since the previous Ministry Outstanding and Industry Outstanding obligations were transferred from the MOF.

During the past five years, West Fraser has surveyed approximately 20,000 ha. of backlog areas. This includes about 11,000 of residual balsam stands. The results of the surveys have been to identify areas of NSR that had previously been classified as satisfactorily stocked, and to identify areas of marginal stocking.

3.6.2.1 Residual Balsam

Objective

West Fraser will refine the area of residual balsam stands that require more detailed assessments, and implement an appropriate survey, prescription and treatment program.

Discussion

The stocking and quality of the residual balsam stands on the TFL have been of concern for many years. The surveys done over the past five years indicate that 47% of the area is well stocked, has good growth potential and needs no further treatment. 22% of the area has reached minimum stocking standards and probably requires no more treatment. 8% of the area has enough merchantable volume to be considered for harvesting. 3% of the area is composed of deciduous stands that may have a higher value for wildlife and biodiversity than for timber production. The remaining 20%, or about 2200 ha., appears to have poor stocking and may require more treatments.

The report "*Management Options for Balsam Intermediate Utilization Stands on TFL 52*", included as Appendix V, suggest that more intensive surveys of the poorly stocked sites would result in more area being classed as being satisfactorily stocked.

Strategy

- Survey the approximately 2200 ha. identified as being potentially under stocked.



3.6.2.2 Backlog NSR

Objective

West Fraser will strive to eliminate the backlog NSR area by the year 2005 by planting or by reclassifying to deciduous, non-productive or free growing status.

Discussion

Table 9 shows the status of backlog NSR on the TFL for the last twelve years. The change in the downward trend after 1997 is a result of surveying blocks classified as being stocked where there was doubt about the reliability of the original classification. Not included in the table is potential NSR that could be identified in the 2200 ha. of residual balsam discussed in the previous section. The area identified in Table 9 will be incorporated into regional resource management plans and funds allocated to carry out the necessary treatments.

Table 9 Summary of Not Sufficiently Restocked Area (FRBC-Funded)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
NSR Carried Forward	7822	5329	4929	3862	2865	2419	*2724	1764	1262	253	1140	1069
Planted (-)	391	217	691	486	392	684	1249	562	903	144	71	22
Surveyed NSR – SR (-)	2102	353	398	514	228	112		192	189			
Surveyed SR – NSR (+)	0	170	22	3	174	0	299	262	83	1031		258
NSR Balance	5329	4929	3862	2865	2419	1623	1764	1262	253	1140	1069	1305

Industry Outstanding and Ministry Outstanding amalgamated into one Table

Areas that are not free growing, and which have silviculture surveys older than five years, will be re-surveyed to determine or confirm their stocking status. Approximately 2,200 ha. of residual balsam stands will be surveyed, and any areas that are NSR or which require treatment to bring the stand to a free growing condition, will be incorporated into in the backlog silviculture program. Wherever possible, NSR areas identified for reforestation will be site prepared by excavator or herbicide application.

It will be necessary to develop a decision matrix for backlog areas so that treatment priorities can be assigned. The criteria will include potential site index, value as wildlife habitat, practicality of treatment (based on treatment unit size, location and access) and financial return. Potential intensive silviculture treatments such as incremental planting and conifer release will be part of the evaluation.



Strategy

- Develop a decision matrix to help identify treatment opportunities and to help establish priorities.
- Continue surveying areas where stocking status is questionable.
- Incorporate backlog NSR areas into the regional resource plans to secure funding.
- Establish and implement treatment regimes for NSR units.

3.6.3 Intensive Silviculture

Intensive silviculture includes stand treatments that will increase the long run sustainable yield above that projected using a regime of basic silviculture, improve the quality of the wood produced and decrease harvest age. Intensive silviculture includes such practices as fertilizing, pruning, rehabilitating degraded or unproductive sites, releasing conifers overtopped by deciduous species, juvenile spacing, using genetically superior seed, and increasing planting densities.

The *Type II Forest Level Silviculture Analysis*, which is currently being prepared, will provide strategic direction for allocating limited funds to intensive silviculture activities. The prioritization of intensive silviculture activities depends on a financial analysis of gain in yield versus discounted cost.

3.6.3.1 Genetically Improved Seed

West Fraser, as current practice, uses genetically improved seed from the Vernon Seed Orchard. Approximately 95% of the planted spruce originates from improved seed. It is expected that improved seed for lodgepole pine will be commonly available in about 2007. Improved spruce is expected to provide an 8% increase in yield, while improved pine is expected to have a 5% increase.

3.6.3.2 Planting Density

The target planting density on most site series on the TFL is currently aimed at 1800 seedlings per ha., which is about 50% higher than the targets specified in the *FPC Establishment to Free Growing Guidebook* (April 1995). West Fraser is also examining the yield and cost implications of increasing the planting density to 2000 seedlings per ha. on some sites to improve tree form and wood quality.

3.6.3.3 Juvenile Spacing

Data from free growing surveys for the past five years indicates that stand densities average about 2250 stems per ha. This indicates that juvenile



spacing will be a minor component of intensive silviculture on managed stands. TFL 52 has a small component of high density fire origin lodgepole pine stands that may benefit from spacing.

3.6.3.4 Conifer Release

The VRI completed in 2000 identified a substantial area of regenerated deciduous cover on previously harvested or burned areas. In some areas, West Fraser believes there is a healthy, vigorous understory of coniferous species. As these areas are identified through surveys and reconnaissance, a conifer release program will be developed.

3.6.3.5 Fertilizing

The *Quesnel TSA Sustainable Harvest Report* (September 1999) indicates that there are both potential short- and long-term timber supply gains from fertilizing. During the term of MP2, 266 ha. were fertilized, and foliar analysis has been done on a number of other units in preparation for fertilizing. The Type II Silviculture Analysis will provide direction on the development of a fertilization program.

3.6.3.6 Pruning

Of concern on the TFL is the apparently large size and number of branches on some regenerated lodgepole pine stands. The cause may be related to genetics or to low stand densities. In some cases, pruning may be an effective treatment to achieve high quality sawlogs. Approximately 60 ha. of lodgepole pine have been pruned in TFL 52. These areas will be revisited to determine if further lifts are needed.

3.6.3.7 Site Rehabilitation

Rehabilitating roads and landings to a productive state is still in the developmental stage in BC. Various trials have been undertaken but there is not a proven cost-effective method for general use. West Fraser has undertaken several trials in the last five years to try and re-establish conifers on non-productive sites. These trials will be re-measured to help determine survival, growth rate and overall effectiveness of the treatments.

3.6.3.8 Operational Trials and Research

West Fraser has established a network of operational trials on the TFL over the past ten years. Re-measuring the trials provides essential local knowledge of the results and effectiveness of management regimes and silviculture treatments, and permits improvement through adaptive



management. Retrospective assessments of past practices and the results of those practices provide another avenue to improvement. Such practices as prescribed burning, mechanical site preparation and herbiciding may be good candidates for retrospective assessment. New trials will be established as needed.

A commercial thinning trial within Age Class III lodgepole pine was done in cooperation with the MOF Research Branch. In the trial, spacing was reduced to 1500, 1200 and 900 stems per ha. in replicated blocks. Data from this trial will assist in developing crop plans that include commercial thinning as an option.

3.7 Road Construction, Maintenance and Deactivation

West Fraser has completed a road inventory on the TFL as an extension of the TRIM II project. A detailed examination of air photos combined with road width measurements and GPS survey of roads built subsequent to the aerial photography (1996) has resulted in a comprehensive inventory. There are 347 km of Primary (20m. r/w), 641 km of Secondary (15m. r/w), 2,108 km of Spur (10m r/w) and 1,072 km of In-block (6m. r/w) Roads on the TFL. A road management system, with a spatial component, is being implemented to track road construction and deactivation.

3.7.1 Road Construction

Objective

West Fraser will build all new roads to provide safe and efficient access for forest management and public use, and in a manner that complies with the Forest Practices Code.

Discussion

The majority of the main and secondary road systems were established on the TFL prior to 1990. Only minor extensions to existing road systems are expected. All proposed road development is identified on the Forest Development Plan

Strategy

- Follow all forest road construction standards specified in forest legislation, regulation and MOF policy.
- Avoid potentially unstable areas whenever possible, and refer any proposed road development that crosses Terrain Class IV or V (from terrain stability mapping) to a qualified professional to ensure that development can be done without compromising slope stability.
- Grass seed all exposed soil resulting from road construction.



3.7.2 Road maintenance

Objective

West Fraser will maintain all roads used in forestry operations when active, and will conduct routine maintenance elsewhere as and when necessary.

Discussion

Grading, graveling, ditch cleaning, and brush control are all essential maintenance activities. West Fraser has a regular inspection and maintenance program to ensure that all roads are kept to a standard that allows safe use.

Strategy

- Inspect all roads annually and carry out required maintenance.
- Inspect all roads, in particular drainage structures, after major storm events.

3.7.3 Bridge Construction and Maintenance

Objective

West Fraser will design, build and maintain all bridges and major stream crossings according to the Forest Practices Code and MOF engineering standards.

Discussion

In the last five years, West Fraser has replaced six existing stream crossings with bridges and installed fourteen new bridges, all fabricated with steel and pre-cast concrete. Only two bridges were temporary log structures. The advent of the Forest Practices Code has significantly changed the planning, engineering and installation of stream crossings so that the impact on streams, especially those having fish, is minimal. All bridges are designed to a seventy-five ton load limit.

Strategy

- Design and install bridges according to the requirements of the FPC.
- Inspect all permanent bridges at least once every three years, and maintain as necessary.

3.7.4 Deactivation

Objective

West Fraser will deactivate roads when they are no longer required for forest management activities.

Discussion

The Forest Development Plan will identify all primary roads to be deactivated, the level of deactivation, and the timing of deactivation. The needs of range users, guides and outfitters, miners and recreationists are considered before



proposing roads for deactivation. The purpose for deactivating roads is to stabilize natural drainage patterns, to reduce erosion and instability, and to restore productivity.

Deactivation will either be “temporary”, “semi-permanent” or “permanent”. Temporary deactivation includes (but is not limited to) installing water bars, cross ditches, crowning or out-sloping road surfaces and cleaning ditches. Access may be maintained for two or four wheel drive vehicles. Semi-permanent deactivation includes removal of drainage structures, installing additional cross ditches, if needed, and stabilizing cut and fill slopes, if needed. Access may be maintained for four wheel drive or all-terrain vehicles. Permanent deactivation includes removal of drainage structures, including bridges, out-sloping or in-sloping road surfaces, and pulling back side cast material where appropriate. Access is limited to all-terrain vehicles or walking. All deactivated roads are seeded with a grass seed mix to West Fraser’s specifications.

In the last five years, West Fraser has permanently or semi-permanently deactivated approximately 115 km. of roads.

Strategy

- Identify the primary roads to be deactivated, the time of deactivation and the level of deactivation in the Forest Development Plan.
- Conduct deactivation according to approved plans that consider the needs of other users.
- Maintain a record of deactivated roads.

3.8 Inventory and Growth & Yield

Objectives

West Fraser will maintain and update inventories to MOF standards as new data is obtained or collected.

West Fraser will develop and implement a growth and yield program on the TFL.

Discussion

West Fraser completed a vegetation inventory, a site index adjustment project, a road inventory and operability mapping for the TFL in preparation for the timber supply analysis for MP 3. These require regular updates, refinements and monitoring to ensure that the best information is available for operational and strategic planning.

West Fraser did a gap analysis in 1996 to help set priorities for projects that would remove some of the uncertainties identified in the timber supply analysis for Management Plan 2. The majority of those projects were completed. It is now



necessary to revisit the current status of our growth and yield program and build upon the work done in the last five years.

Strategy

- Complete a disturbance update annually to incorporate new harvesting and silviculture data into the vegetation inventory.
- Map and record road building and deactivation in a spatial road management system.
- Revise operability mapping as new field information becomes available.
- Consult with growth and yield experts to update the gap analysis done in 1996.
- Incorporate the MOF growth and yield protocol to establish a monitoring procedure for validating managed stand yield predictions.
- Cooperate with MOF to re-measure existing permanent sample plots and establish new ones.
- Complete VRI Phase II sampling, if necessary, to improve the reliability of yield predictions.
- Acquire the most recent fish, wildlife and habitat data from MOF and MELP for operational planning purposes

3.9 Research

Objective

West Fraser will continue to support and participate in forest research initiatives.

Discussion

The opportunity for research in forest management is virtually unlimited. West Fraser perceives that there are knowledge gaps or needs for development in the following areas:

- Decision-making tools for prescribing brush control treatments.
- Silviculture treatment regimes on various BEC subzone and site series, which includes such activities as fertilization, pruning, stand density and inter-tree spacing.
- Extent and impact of *Tomentosus* root rot.
- Green up in relation to hydrological recovery.
- Growth and yield models.

West Fraser is an active participant in the regional resource management planning sessions that are used to allocate FRBC funding to projects that are regionally significant. This is an effective process for allocating limited finances. West Fraser also belongs to and provides funding for Forest Research Institute of Canada and the Northern Interior Vegetation Management Association, which provide operational and research information in silviculture and harvesting practices.

Strategy



- Continue funding and participation in the Forest Research Institute of Canada.
- Continue participating in regional resource planning.
- Continue to support regional research initiatives.
- Continue participation and funding for the Northern Interior Vegetation Management Association.

4. Consultation with Other Resource Users

West Fraser recognizes the legitimate right of other people using or having an interest in the TFL to be informed of forest management activities. A common database of all resource users and interested people is maintained so that the appropriate people or groups can be contacted regarding the various planned or proposed activities that may be of interest. A copy of the mailing list is provided in Appendix X

Consultation is done according to the requirements of the FPC and Forest Act. This includes the FDP and MP process as well as other plans such as the Pest Management Plan. Advertisements are placed in the local newspaper to invite comment on proposed activities from interested parties. In addition, West Fraser maintains an “open door” policy so that interested people can drop in at the office if they have any questions or concerns.

4.1 First Nations

It is the fiduciary duty of MOF and MELP to consult with First Nations. West Fraser assists in this responsibility by providing the opportunity for review and comment on operational plans. The First Nations bands that have expressed an interest in the area occupied by the TFL, as identified on maps of the BC Treaty Commission, are sent letters of invitation to review and discuss the Forest Development Plan.

Extensive consultation was done during the preparation of the Pest Management Plan for the TFL. West Fraser staff visited each First Nations band office, and in most cases, had positive responses and in-put. As a result, operational herbicide plans will be sent annually to the appropriate bands.

4.2 Guides and Trappers

Licensed guides and trappers are sent letters that invite review and comment of operational plans. They are encouraged to visit the office to discuss any questions or concerns they may have.



4.3 Range Tenure Holders

All range tenure holders on the TFL are sent letters inviting review and comment on operational plans. West Fraser ensures that herbicide plans are referred to range users, and that plans are implemented that take into account any concerns that are expressed. This has worked well in the past and will be followed in the future.

4.4 Other Licenced Resource Users

There are a large number of placer mining tenures throughout the TFL, and ownership changes frequently. Most mining is done at a very small scale and has little impact on forest management. Many of the placer operators use West Fraser as a source for maps, orthophotos and air photos, which are provided at a nominal cost. West Fraser will continue to cooperate with the mining community but will not embark on a consultation process as there is no identified need to do so.

5. Impact Summary of Implementation of Proposed MP3

5.1 Harvest levels (current and projected)

The current Allowable annual cut for the TFL is 549,000m³ per year, which includes 35,239m³ apportioned to the Small Business Forest Enterprise Program. The base case in the timber supply analysis indicates that a long term sustained yield of 596,900 m³ can be maintained for the next six decades, followed by a modest increase. The base case would provide 53% of the annual consumption of the Quesnel sawmill.

5.2 Economic Opportunities and Employment

The number of people employed either directly or indirectly by West Fraser in Quesnel has increased from about 550 in 1991 to approximately 763 in 2000. Using the employment factor of 90 direct person years of employment per 100,000m³ of AAC (from the Quesnel Timber Supply Area Socio-Economic Analysis, 1994) then 40 full-time equivalent jobs would be created in the base case scenario. As the number of employees at the sawmill, planer, MDF plant and pulp mill is stable, the increase in employment generated by an increase in AAC would be in the forest consulting, logging, trucking and silviculture community.

The direct revenue to the government, using an average stumpage value of \$30/m³, would be approximately \$1,350,000 per year.



5.3 The Protection and Conservation of Non-Timber Values

MP 2 had to contend with a considerable amount of uncertainty. At the time MP 2 was prepared and was being considered by the MOF, there was a transition period into full implementation of the FPC and the CCLUP. The effect of many of the FPC and CCLUP provisions was not fully understood. Most of this uncertainty has been eliminated over the last few years as the constraining factors have been accounted for and, in many cases, mapped. These two initiatives resulted in a great increase in protective measures for the soil resource, water quality, fish habitat, caribou habitat and biological diversity. In general, there has been an increase in the net downs on the operable land base between MP2 and MP3 of about 11, 900 ha. to account for riparian areas, wildlife tree patches, inoperable ground and a larger area of caribou habitat. The improvements in inventory and growth and yield data have more than compensated for the reduced operable land base.

6. Key Similarities and Differences between the Current and Draft/Proposed MP

There are a number of areas where there is a significant difference between MP 2 and MP 3. The area of greatest difference is in the completeness of the inventories on the TFL. Terrestrial ecosystem mapping, terrain stability mapping, fish/fish habitat inventory, vegetation inventory and site index adjustment have all been initiated and completed during the term of MP 2 for use in MP3. This increases the degree of certainty about various factors on the land base, especially for the productive forest net downs for non-timber values.

The current management plan (MP 2) was prepared during the transition phase of the introduction of the Forest Practices Code and the Cariboo-Chilcotin Land Use Plan. There was still considerable uncertainty about how the FPC would be implemented and how it would affect the forest industry in general. The CCLUP had been signed in July 1994 and officially announced by the government in October, 1994. How the targets of the CCLUP would be implemented were not immediately known, and have in fact, taken the last five years to evolve. MP 3 and the timber supply analysis incorporates all the constraints of the CCLUP and the FPC.

In MP 2, all areas identified as high elevation caribou habitat (in general, areas above 1500m.) were deferred from harvesting pending development and approval of a caribou management strategy. All "no harvest" and "modified harvest" zones have since been identified, and a portion of the timber within the caribou zone has been included in the timber supply analysis for MP 3, according to the targets of the CCLUP.



In MP 2, biodiversity was addressed through a series of buffers along major rivers and streams, which were intended as forest ecosystem networks. These networks were never endorsed by MOF or MELP and have been dropped in favour of the strategy outlined in the FPC Biodiversity Guidebook and in the CCLUP Biodiversity Conservation Strategy (July 1996). All analysis done on the TFL for MP 3 are based on the CCLUP draft landscape units; the analysis for MP 2 was based on traditional West Fraser operating areas.

The FPC is explicit about riparian management practices. This has resulted in comprehensive classification of all streams on the TFL and the removal of the appropriate riparian reserve zones from the timber harvesting land base for the timber supply analysis. In MP 2 there were 461 ha. removed from the timber harvesting land base for riparian reserves; as a result of the FPC this increased to 12,072 ha.

MP 2 identified priorities and made commitments that had to be addressed prior to the preparation of MP 3. A list of all of these was made upon approval of MP 2, and was used as a practical guide and report card for activities over the next five years. A copy of the "Management Plan Commitments" and the status of each one is included in Appendix IV. This summary has been included in the TFL 52 Annual Report for the past four years.

7. Public Review Strategy for Management Plan 4

West Fraser will follow the procedures and timelines set out in Schedule D of Tree Farm Licence 52, dated January 1, 2001.

7.1 Advertising of the Management Plan

Advertisements will be placed in the Quesnel Cariboo Observer for two consecutive weeks inviting comments on the current MP 3 and asking for identification of subjects to be addressed in MP4. MP 3 will be available for review and comment during normal business hours for a period of one month after advertising. An open house session will be held in Wells on two consecutive days for four hours per day.

Letters will be sent to all licenced tenure holders, First Nations bands, and other people or groups with an expressed interest in the TFL inviting comment on MP 3 and asking for identification of subjects for inclusion in MP 4.



7.2 Public Review Strategy for Statement of Management Objectives, Options and Procedures (SMOOP) for MP 4.

Advertisements will be placed in the Quesnel Cariboo Observer for two consecutive weeks advising of the draft SMOOP and inviting review and comment. Letters will be sent to all licenced tenure holders, First Nations bands, and other people or groups with an expressed interest in the TFL inviting comment on the SMOOP. The SMOOP will be available during normal business hours for a two week period for public review. Any written or oral comments received will be replied to, with copies of the comments and responses provided to MOF.

8. Other Information

8.1 Public and Agency Involvement

This section will be completed following the receipt of comments from referral to the Regional Manager and resource agencies and to the public.

8.2 Summary of Comments from the Draft MP

This section will be completed following the receipt of comments from referral to the Regional Manager and resource agencies and to the public.

8.3 Summary of Differences From the Draft MP to the Proposed MP as a Result of Agency Comments

This section will be completed following the receipt of comments from referral to the Regional Manager and resource agencies and to the public.

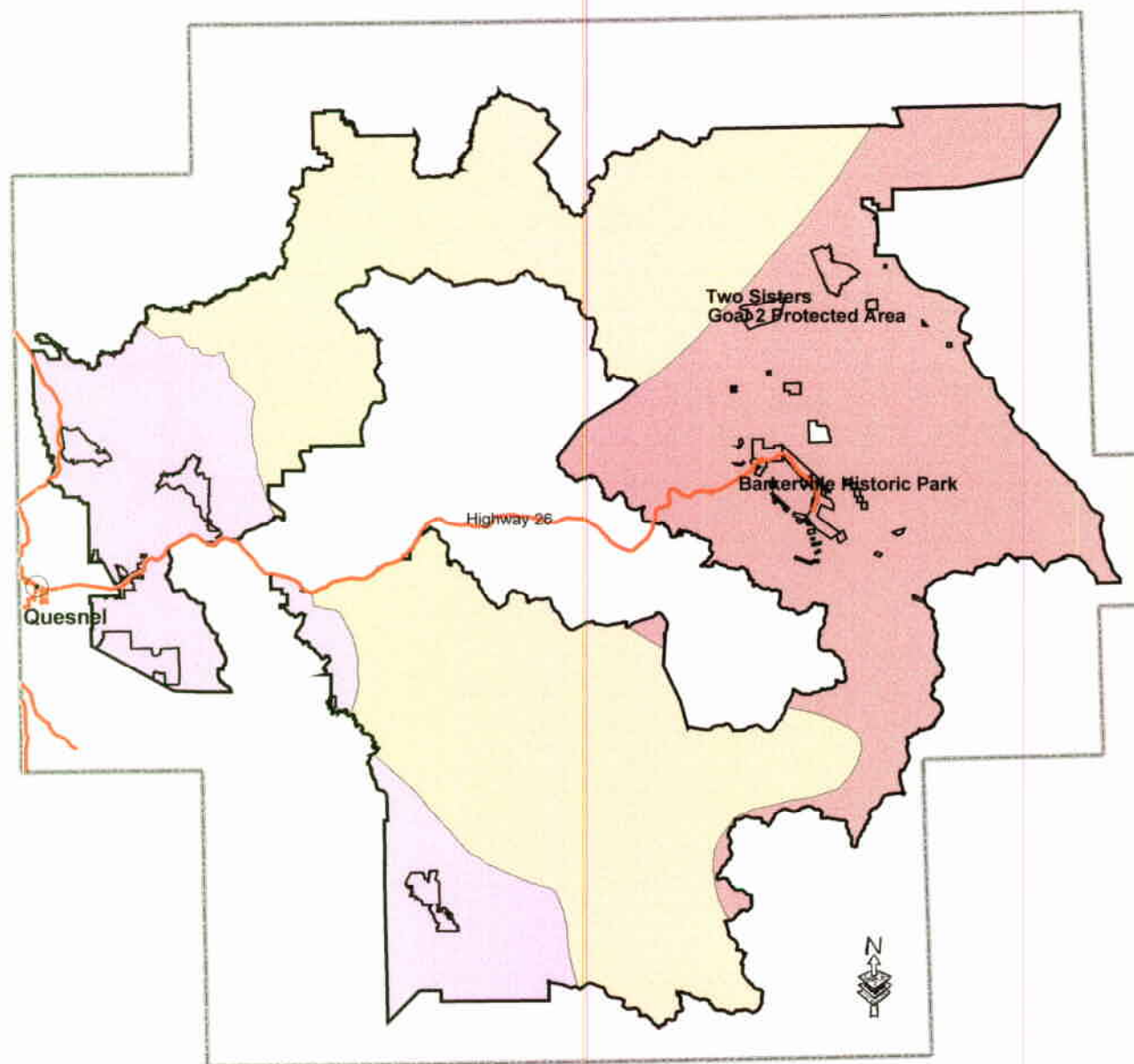
9. Strategic and Operational Planning

9.1 Cariboo Chilcotin Land Use Plan

The CCLUP was designated by the provincial government as a higher level plan under the Forest Practices Code Act of BC Act in October, 1994. A "Ninety-Day Implementation Process – Final Report" was produced in February, 1995 that presented resource targets consistent with the land use plan for each resource development zone. TFL 52 contains part of the Cottonwood Enhanced Resource Development Zone (CERDZ), part of the Quesnel Enhanced Resource Development Zone (QERDZ) and part of the Quesnel Highlands Special Resource Development Zone (QHSRDZ).

Figure 10

TFL 52 Cariboo Chilcoltin Land Use Plan



Key to Features

-  Cottonwood
-  Quesnel
-  Quesnel Highlands

1:500,000



West Fraser Mills Ltd



The following sections refer specifically to the goals and targets for each resource development zone as stated in the CCLUP “90-Day Implementation Process – Final Report” (February, 1995).

9.1.1 Cottonwood ERDZ Targets and Management on TFL 52

- Grazing – addressed in Section 3.2.8
- Wildcraft – The “Ninety-Day Implementation Process – Final Report” objective is to maintain roaded access to 90% of the polygon. This is not an issue on the TFL as those pursuing wildcraft have access to all active roads using two-wheel or four wheel drive vehicles, and deactivated roads using ATV’s.
- Mining - addressed in Section 3.3.4
- Recreation – The objective is “to maintain 5% of the polygon in backcountry condition.....and along regionally significant trails.” This is accomplished through areas designated as riparian reserves along the Swift River and Ahbau Lake, and as caribou “modified” and “no-harvest” areas in the vicinity of Caribou Mountain. West Fraser has cooperated with the Quesnel Snowmobile club to develop a 40 km. network of trails which utilize old logging roads between the Quesnel and Swift Rivers.
- Fish and Wildlife – There are nine objectives associated with fish and wildlife:
 - * *“To manage the Cottonwood River watershed for salmon stocks through riparian area protection and controls on the rate of harvest.”*
This objective is met through the assignment of riparian reserves for the appropriate level of stream classification, according to the FPC Riparian Management Area Guidebook. There has not been a defined rate of harvest for this objective, but West Fraser meets the seral stage targets specified for the draft landscape units that occupy the TFL 52 portion of the Cottonwood River watershed.
 - * *“To manage for the biodiversity targets....”*
The seral stage summary submitted with the FDP shows that West Fraser is well within the seral stage targets for old and mature forests. The procedure outlined in the CCLUP Biodiversity Conservation Strategy is used. The timber supply analysis demonstrates that the short- and long-term timber supply can be met while incorporating the biodiversity targets. Biodiversity is addressed in Section 3.2.2
 - * *“To maintain riparian habitats....”*
All streams on or near any cut block are classified and assigned the appropriate riparian management area, according to the FPC Riparian Management Area Guidebook. West Fraser has fully complied with the classification of streams as required by the FPC.



- * *“To maintain caribou habitat as per the Quesnel Highlands caribou strategy.”*
Identified caribou habitat in the CERDZ is a minor component of the land base. The areas identified as “modified” and “no-harvest” within the caribou range in the vicinity of Caribou Mountain satisfies this target. This is addressed in Section 3.2.7.
- * *“To manage for grizzly bear, moose, fur-bearer, species at risk, and other sensitive habitats within the areas identified as riparian buffers, recreation areas, caribou habitat, mule deer winter range and lakeshore management zones... under the biodiversity conservation strategy.”*
West Fraser has demonstrated that it meets the requirements for the mature and old forest of the CCLUP Biodiversity Conservation Strategy, the FPC Riparian Management Area Guidebook, and the regional caribou strategy. Meeting these requirements is considered a proxy for meeting this CCLUP target until more specific guidelines or strategies are in place.
- * *“To establish Landscape Units....”*
Draft landscape units and interim biodiversity emphasis have been identified as a part of the CCLUP Biodiversity Conservation Strategy. West Fraser has incorporated the draft landscape units and interim biodiversity emphasis in its operational and strategic planning process, including the timber supply analysis for MP 3. There is more discussion on landscape units in Section 3.2.2
- * *“To initiate water allocation planning to address stream flow requirements in late summer and placer mining.”*
This target is beyond the management mandate for TFL 52. Adherence to the FPC and the CCLUP Biodiversity Conservation Strategy will maintain water quality and quantity. There is further discussion about water in Section 3.2.4.
- * *“To maintain mule deer winter range values....”*
There are no identified mule deer winter ranges within the TFL portion of the CERDZ.
- * *“To manage the Caribou and Cottonwood River watersheds for hydrologic stability through watershed assessment, restoration work and monitoring programs.”*
West Fraser conducted an Interior Watershed Assessment Procedure (IWAP) and sediment source survey in 1997-98 on the Cottonwood River. The IWAP indices flagged several sub-basins for a more detailed assessment. Those were John Boyd, Umiti, and Sovereign, Reddish and Bendixon Creeks, all of which have an extensive road network and a long



history of forest harvesting. In 1998, eight km. of road were deactivated in Reddish Creek; in 1999 a total of 39.9 km. were deactivated in Umiti and John Boyd Creek. The MOF deactivated a further 22 km. in John Boyd Creek outside the TFL. In 2000, another eight km. of road was deactivated in Umiti Creek.

In 1999-2000 a channel assessment was completed for all of the identified sub-basins. In all cases there was little or no sign of channel disturbance attributable to harvesting. The final report stated that increases to peak flow due to harvesting are not likely to happen, therefore delivery of sediment to streams will not happen provided that the FPC is followed and erosion control measures on new roads are undertaken.

- * *“The following targets apply to the entire productive forest land base in this polygon: 79% conventional harvest; 10% modified harvest; 11% no harvest.”*

West Fraser meets the TFL portion of the CERDZ targets through the areas identified in the caribou strategy and in riparian management areas.

9.1.2 Quesnel ERDZ Targets and Management on TFL 52

- Grazing – addressed in Section 3.2.8
- Wildcraft – The *“Ninety-Day Implementation Process – Final Report”* objective is to maintain roaded access to 80% of the polygon. This is not an issue on the TFL as those pursuing wildcraft have access to all active roads using two-wheel or four wheel drive vehicles, and deactivated roads using ATV's.
- Mining - addressed in Section 3.3.4
- Recreation – The objective is “to maintain 5% of the polygon in backcountry condition, portions of the Quesnel and Fraser Rivers and areas on Dragon Mountain.” The TFL portion of the QERDZ does not infringe on these areas. There are, however, areas in backcountry condition along the Swift River and in the area between the Cottonwood River and Ahbau Creek.
- Tourism – There are no tourism operations on the TFL within the QERDZ. The approved Visual Quality Objectives for the TFL identify areas of partial retention along the Highway 97 corridor north of Quesnel in the vicinity of Hush Lake. There are two Class A “wilderness lakes” in the Sunberg operating area which were designated by the District manager.
- Fish and Wildlife – There are eight objectives associated with fish and wildlife:
 - * *“To manage the Quesnel River watershed for salmon stocks through riparian area protection and controls on the rate of harvest....”*
The western portion of the TFL infringes to a very minor degree into the Quesnel River watershed. Forest management activities are not expected to have any impact on this objective.



- * *“To manage for the biodiversity targets....”*
The seral stage summary submitted with the FDP shows that West Fraser is well within the seral stage targets for old and mature forests. The procedure outlined in the CCLUP Biodiversity Conservation Strategy is used. The timber supply analysis demonstrates that the short- and long-term timber supply can be met while incorporating the biodiversity targets. Biodiversity is addressed in Section 3.2.2
- * *“To maintain riparian habitats....”*
All streams on or near any cut block are classified and assigned the appropriate riparian management area, according to the FPC Riparian Management Area Guidebook.
- * *“To manage for grizzly bear, moose, fur-bearer, species at risk, and other sensitive habitats within the areas identified as riparian buffers, recreation areas, mule deer winter range and lakeshore management zones... under the biodiversity conservation strategy, including key deciduous stands.”*
West Fraser has demonstrated that it meets the requirements for the mature and old forest of the CCLUP Biodiversity Conservation Strategy, and of the FPC Riparian Management Area Guidebook. There is a small area identified as mule deer winter habitat that will be managed according to regional guidelines at the time that harvesting is approved. No recent harvesting has been done. There are a few relatively large pure and mixed aspen stands within the TFL. A report entitled “Management Objectives for the Non-Timber Values of Aspen Stands” is included as Appendix VII.
- * *“To manage approximately three lakes as quality lakes for wilderness fisheries.”*
Two small lakes in the Sunberg area have been designated as “Class A” lakes, and 200m management zones are incorporated in operational plans.
- * *“To initiate water allocation planning to address high population and competing water uses in this area.”*
This target is beyond the management mandate for TFL 52. In addition, there are no population centres or competing water uses on the TFL portion of the QERDZ.
- * *“To maintain mule deer winter range values....”*
There are approximately 200-300 ha. of identified mule deer winter range within the TFL portion of the QERDZ. West Fraser has not operated in this winter range recently. Any harvesting proposed will follow management plans, where they exist, and interim guidelines in the
meantime.



- * *“To maintain habitat and biodiversity values through modified management in deciduous stands over approximately 15% of the forest in this polygon.”*

West Fraser has harvested an average of approximately 9000m³ of aspen in each of the last five years, coincidentally with the harvest of coniferous stands. There are a few relatively large pure and mixed aspen stands within the TFL. A report entitled “Management Objectives for the Non-Timber Values of Aspen Stands” is included as Appendix VII.

- * *“The following targets apply to the entire productive forest land base in this polygon: 60% conventional harvest; 34% modified harvest; 6% no harvest.”*

West Fraser proposes to use conventional harvest methods in the QERDZ portion of the TFL except for the areas identified as mule winter range and where VQO's specify retention or partial retention. Riparian management areas along the Swift and Cottonwood Rivers, and other smaller streams, contribute to the “no harvest” target.

9.1.3 QHSRDZ Targets and Management on TFL 52

- Grazing – addressed in Section 3.2.8
- Wildcraft – The “*Ninety-Day Implementation Process – Final Report*” objective is to maintain roaded access to 40% of the polygon. The unroaded areas roughly correspond to the area in backcountry condition, which is approximately 37% of the TFL portion of the QHSRDZ. This indicates that approximately 63% of the area is roaded to some degree.
- Mining - addressed in Section 3.3.4
- Recreation – The objective is “to maintain 30% of the polygon in backcountry condition. In order to be compatible with the timber targets, this includes areas above 5000 feet, ...and areas adjacent to the Stanley-Cariboo Wagon Road.” West Fraser estimates that 37% of the TFL portion of the QHSRDZ is in backcountry condition, which does not include the significant inoperable and riparian area along Antler Creek. In addition, Bowron Lake Provincial Park is situated on the eastern boundary of the TFL. Many of the old roads and trails on the TFL are used for backcountry recreation in such pursuits as snowmobiling, hiking and skiing.
- Tourism –The objective for tourism is “to promote tourism development in this polygon and focus tourism use and development on the backcountry areas identified in the recreation targets” and “to maintain the visual quality in the viewshed surrounding existing tourism operations, including the historic town of Barkerville.” West Fraser has cooperated with the community of Wells to develop cross-country ski trails on Cornish Mountain, which is situated adjacent to the village. The trails utilize narrow roads and small cut blocks that were designed and built with ski trails planned as the end use.



West Fraser cooperated with the Friends of Barkerville to relocate, brush and map the original gold rush pack trail into Barkerville. The Company has provided financial assistance to the Wells and Area Trails Society to design, construct and erect trail head signs for the Jubilee, Yellowhawk and Groundhog Lake trails. Visual analysis is done on cut blocks that fall within the Barkerville corridor to help ensure that visual quality is maintained. West Fraser is participating on a steering committee for a project that is, in part, examining tourism potential in the QHSRDZ.

- Fish and Wildlife – There are nine objectives associated with fish and wildlife:
 - * *“To manage the Cariboo, Bowron and Cottonwood River watershed for salmon stocks through riparian area protection and controls on the rate of harvest....”*

This objective is met through the assignment of riparian reserves for the appropriate level of stream classification, according to the FPC Riparian Management Area Guidebook. West Fraser is meeting the seral stage targets specified for the draft landscape units that occupy the TFL 52 portion of these watersheds which fall into the QHSRDZ.
 - * *“To manage for the biodiversity targets....”*

The seral stage summary submitted with the FDP shows that West Fraser is well within the seral stage targets for old and mature forests. The procedure outlined in the CCLUP Biodiversity Conservation Strategy is used. The timber supply analysis demonstrates that the short- and long-term timber supply can be met while incorporating the biodiversity targets. Biodiversity is addressed in Section 3.2.2
 - * *“To maintain riparian habitats....”*

All streams on or near any cut block are classified and assigned the appropriate riparian management area, according to the FPC Riparian Management Area Guidebook.
 - * *“To maintain caribou habitat as per the Quesnel Highlands caribou strategy.”*

Caribou habitat is an important component of the land base of the QHSRDZ. West Fraser, MOF and MELP have reached agreement on the “modified” and “no-harvest” zones within the TFL. Section 3.2.7 addresses caribou habitat in more detail.
 - * *“To manage for grizzly bear, moose, fur-bearer, species at risk, and other sensitive habitats within the areas identified as riparian buffers, recreation areas, caribou habitat and lakeshore management zones... under the biodiversity conservation strategy.”*



West Fraser has demonstrated that it meets the requirements for the mature and old forest of the CCLUP Biodiversity Conservation Strategy, the FPC Riparian Management Area Guidebook, and the regional caribou strategy. Meeting these requirements is considered a proxy for meeting this CCLUP target until more specific guidelines or strategies are in place.

- * *“To establish Landscape Units which include both the Special Resource Development Zone and the adjacent Protected Area; manage in conjunction with Protected Area to maintain representational values.”*
Draft landscape units and interim biodiversity emphasis have been identified as a part of the CCLUP Biodiversity Conservation Strategy. West Fraser has incorporated the draft landscape units and interim biodiversity emphasis in its operational and strategic planning process, including the timber supply analysis for MP 3. The values in the adjacent Protected Areas were incorporated into the process. There is more discussion on landscape units in Section 3.2.2
- * *“To apply an access management strategy aimed at restricting the development of permanent access over approximately 30% of the polygon, in addition to the area to be managed for backcountry experience.”*
The SRDZ portion of the TFL is extensively roaded due to past harvesting and mining activities. When the adjacent park is considered in this polygon, there is an extensive unroaded area. Three km. of road in McKenna Creek and five km. in Russian Creek were recently deactivated to an ATV level of access. An access management strategy for the heavily roaded Babcock Creek area was completed in 2000 as part of a project done by Weldwood of Canada Ltd. Deactivation will be done according to priorities determined in the resource management planning process with FRBC, MOF and MELP
- * *“To manage the Cariboo River watershed for hydrological stability....”*
No part of the TFL lies within the Cariboo River watershed.
- * *“The following targets apply to the entire productive forest land base in this polygon: 34% conventional harvest; 32% modified harvest; 34% no harvest.”*
West Fraser proposes to use conventional harvest methods in the QHSRDZ portion of the TFL except for the areas identified as caribou “modified harvest” and where VQO’s specify retention or partial retention. Riparian management areas along the Swift and Bowron Rivers, and other smaller streams, as well as the caribou “no harvest” areas contribute to the “no harvest” target. With existing constraints, the “no harvest” area is 49% of the productive forest land base of the QHSRDZ, and the “modified harvest” area is 15%.



9.2 Cariboo Highlands Recreation Study

The Land Use Coordination Office and the Village of Wells, through the Wells Gateway project, are sponsoring a three-part project to prepare a management strategy for the Groundhog Lake trails and facilities, to conduct a tourism overview of the Quesnel Highlands Special Resource Development Zone, and to prepare a brochure encouraging low-impact ATV use in sensitive areas.

Approximately 40% of the TFL falls within the QHSRDZ. Groundhog Lake is a motorized and non-motorized summer and winter use area within the TFL. The lake and trails are entirely within the caribou “no harvest” zone. West Fraser is a member of the steering committee for this project and is providing material assistance in the form of relevant data collected through various assessments on the TFL.

This project will help to provide future direction for recreational use in the QHSRDZ and will provide some insight into possible tourism potential.

9.3 Bowron Lake Provincial Park Master Plan

BC Parks is in the process of updating the master plan for Bowron Lake Provincial Park. The issues of concern for BC Parks as they relate to the TFL are potential access to the park from harvesting areas above Spectacle Lakes, noise from harvesting equipment, and visual quality.

West Fraser will minimize the risk of unauthorized access developed into the park by deactivating all roads on blocks adjacent to the park according to approved deactivation plans. In the past West Fraser has cooperated with BC Parks to protect the wilderness experience on the lakes by avoiding harvesting adjacent to the park during the peak summer months. In addition, new harvesting equipment is significantly quieter than it was even ten years ago. The TFL has approved VQO's which were developed, in part, from view points on Bowron and Spectacle Lakes.

It is not expected that operations on the TFL will be affected by the Bowron Lake Provincial Park Master Plan, nor will operations on the TFL affect the park.

10. Schedule B Prorate

There is no Schedule A land incorporated into TFL 52.



11. Revisions to Management Plan 3

This Management Plan is for the period December 1, 2001 to November 30, 2006. Should conditions arise during this period that require changes in strategy or direction as outlined in this plan, amendments will be submitted to the MOF Chief Forester for approval.

12. Annual Report

An annual report which summarizes activities on the TFL for the past year will be prepared and submitted by April 1 each year to:

- Director, Timber Harvesting Branch, Victoria
- Regional Manager, Cariboo Forest Region, Williams lake
- District Manager, Quesnel Forest District, Quesnel
- Regional Director, Ministry of Environment, Lands and Parks, Williams Lake
- Forest Ecosystem Specialist, Ministry of Environment, Lands and Parks, Quesnel
- Mayor, Village of Wells
- Mayor, City of Quesnel



List of Acronyms

AAC	Allowable Annual Cut
ATV	All Terrain Vehicle
BEC	Biogeoclimatic Ecosystem Classification
CCLUP	Cariboo-Chilcotin Land Use Plan
CERDZ	Cottonwood Enhanced Resource Development Zone
ERDZ	Enhanced Resource Development Zone
ESSF	Engelmann Spruce – Sub-alpine Fir biogeoclimatic subzone
FDP	Forest Development Plan
FPC	Forest Practices Code
G&Y	Growth and Yield
INCOSADA	Integrated Corporate Spatial and Attribute Database (MOF spatial database)
LU	Landscape Unit
MDF	Medium Density Fibreboard
MOF	Ministry of Forests
MP	Management Plan
MELP	Ministry of Environment, Lands, and Parks
NSR	Not Sufficiently Restocked
PMP	Pest Management Plan
PSP	Permanent Sample Plot
QERDZ	Quesnel Enhanced Resource Development Zone
QHSRDZ	Quesnel Highlands Special Resource Development Zone
RIC	Resource Inventory Committee
ROS	Recreation Opportunity Spectrum
SBFEP	Small Business Forest Enterprise Program
SBS	Sub-Boreal Spruce biogeoclimatic subzone
SRDZ	Special Resource Development Zone
TEM	Terrestrial Ecosystem mapping
TFL	Tree Farm Licence
TRIM	Terrestrial Resource Information Management
TSM	Terrain Stability Mapping
TSA	Timber Supply Analysis
VQO	Visual Quality Objectives
VRI	Vegetation Resource Inventory