

# **MANAGEMENT PLAN 8**

## ***for Tree Farm Licence 37***

***held by Canadian Forest Products Ltd.***  
***(Plan Period – January 1, 1999 to December 31, 2003)***

*Submitted for approval to the*

**Provincial Chief Forester**  
**British Columbia Ministry of Forests**



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*by*



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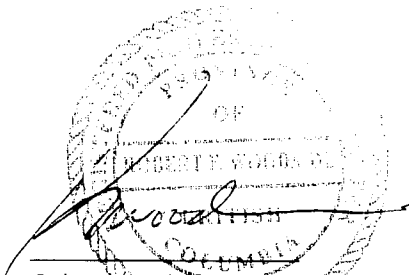
## Preface

Management Plan 8 for the Nimpkish Tree Farm Licence 37 was prepared according to section 2.25 of the TFL 37 licence agreement (March 1995) and considered the Licensee Manual for TFL Management Plan Preparation (British Columbia Ministry of Forests). This plan updates and builds upon seven preceding editions of working plans or management and working plans.

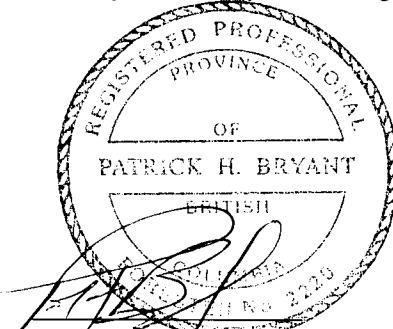
Although this public document is intended to be useful to a wide variety of lay and technical readers, emphasis is placed towards:

- Employees of Canadian Forest Products Ltd. who will use the plan to guide plans and activities.
- Government agency representatives involved in the approval process of this Management Plan 8.

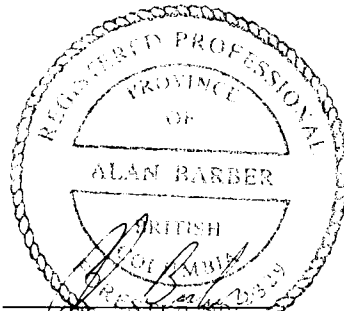
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*Specific individuals who are, or were, with Canadian Forest Products Ltd. and provided valuable contributions throughout the development of this plan are shown below:*

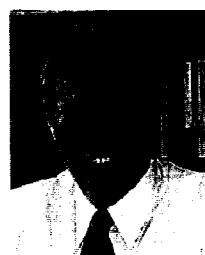


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# Table of Contents

<b>Preface</b>	<b>ii</b>
<b>Table of Contents</b>	<b>vi</b>
<b>List of Figures</b>	<b>x</b>
<b>List of Tables</b>	<b>x</b>
 <b>1. INTRODUCTION</b>	 <b>1</b>
<b>1.1 PURPOSE</b>	<b>3</b>
<b>1.2 Licence Area</b>	<b>4</b>
<b>1.3 Administration and Management of Tree Farm Licence 37</b>	<b>4</b>
<b>1.4 Progress on Current Management and Working Plan 7</b>	<b>4</b>
<b>1.5 Forest Practices Code and Management Plan 8</b>	<b>5</b>
 <b>2. LAND USE PLANS</b>	 <b>6</b>
<b>2.1 Vancouver Island Land Use Plan</b>	<b>6</b>
<b>2.2 Vancouver Island Resource Targets</b>	<b>7</b>
<b>2.3 Tsitika Watershed Integrated Resource Plan</b>	<b>8</b>
 <b>3. MANAGEMENT OBJECTIVES</b>	 <b>9</b>
<b>3.1 Canfor Management Objectives</b>	<b>9</b>
<b>3.2 Economic Objectives</b>	<b>9</b>
3.2.1 Customers	9
3.2.2 Timber	9
3.2.3 Forest Protection	9
3.2.4 Research and Development	10
<b>3.3 Social Objectives</b>	<b>10</b>
3.3.1 Community Involvement	10
3.3.2 Employment and Economic Opportunities	10
3.3.3 Recreation and Visual Landscape	10
3.3.4 Incremental Silviculture	10
<b>3.4 Environmental Objectives</b>	<b>10</b>
3.4.1 Wildlife and Vegetation Biodiversity	10
3.4.2 Fisheries	10
3.4.3 Water	11
 <b>4. MANAGEMENT GOALS, COMMITMENTS AND STRATEGIES</b>	 <b>12</b>
<b>4.1 Forest Practices Performance Review</b>	<b>12</b>
<b>4.2 Forest Resource Management</b>	<b>12</b>
4.2.1 Timber Harvesting	12
4.2.1.1 Rate of Harvest	13
4.2.1.2 Allowable Annual Cut Prorate	14
4.2.1.3 Harvest Methods and Practices	14
4.2.1.4 Harvest Priorities, Patterns and Ages	18
4.2.1.5 Silviculture Systems	19
4.2.1.6 Harvest Planning	19

4.2.1.7	Engineering	20
4.2.1.7.1.	Main and Secondary Roads	20
4.2.1.7.2.	Spur Roads	20
4.2.1.7.3.	Bridges and Related Work	20
4.2.1.7.4.	Railroad	20
4.2.1.7.5.	Access Management	21
4.2.1.8	Merchandising and Manufacturing	24
4.2.1.9	Special Forest Products	25
4.2.1.10	Contract Harvesting	26
4.2.1.11	Commercial Thinning	26
4.2.1.12	Timber Utilisation	27
4.2.1.13	Small Business Forest Enterprise Program	28
4.2.2	Silviculture	28
4.2.2.1	Silviculture Funding	28
4.2.2.2	Basic Silviculture	29
4.2.2.2.1.	Reforestation Methods	30
4.2.2.2.2.	Seed Procurement	31
4.2.2.2.3.	Site Preparation	31
4.2.2.2.4.	Nurseries and Planting Stock	33
4.2.2.2.5.	Regeneration Monitoring and Surveys	33
4.2.2.2.6.	Basic Spacing	34
4.2.2.2.7.	Brushing and Weeding	34
4.2.2.2.8.	Road Rehabilitation	36
4.2.2.2.9.	Silviculture Prescriptions	37
4.2.2.3	Incremental Silviculture	37
4.2.2.3.1.	Site Rehabilitation and Deciduous Conversion	38
4.2.2.3.2.	Tree Improvement	38
4.2.2.3.3.	Juvenile Spacing	39
4.2.2.3.4.	Pruning	40
4.2.2.3.5.	Fertilisation	41
4.2.2.4	Product Objectives	42
4.2.3	Forest Protection	42
4.2.3.1	Wildfire	42
4.2.3.1.1.	Wildfire Prevention, Detection and Suppression	43
4.2.3.1.2.	Fuel Management	43
4.2.3.1.3.	Use of Chemicals	43
4.2.3.2	Forest Health	44
4.2.3.2.1.	Pest Prevention, Detection and Control	44
4.2.3.2.2.	Use of Chemicals	46
<b>4.3</b>	<b>Integrated Resource Management</b>	<b>46</b>
4.3.1	Fisheries and Aquatic Resources	46
4.3.1.1	Fish Hatcheries	47
4.3.1.2	Stream Restoration	48
4.3.1.3	Fish and Fish Habitat Research	48
4.3.2	Wildlife Program	49
4.3.2.1	Wildlife Inventories	50
4.3.2.2	Wildlife Habitat Research	51
4.3.2.3	Wildlife Habitat Enhancement and Restoration	52
4.3.2.4	Wildlife Habitat Mapping	52
4.3.3	Biological Diversity	53
4.3.4	Recreation	54
4.3.4.1	Sites and Trails	54
4.3.4.2	Inventories	55
4.3.4.3	Cave and Karst	55
4.3.5	Visual Resources	57
4.3.5.1	Inventories	57
4.3.5.2	Planning and Implementing Options	57
4.3.6	Water	58
4.3.7	First Nations	58

4.3.8 Cultural Heritage	59
4.3.8.1 Archaeological Overview	59
4.3.8.2 Archaeological Sites	60
4.3.9 Trapping and Guide Outfitting	60
4.3.10 Mining	61
4.3.11 Fish Farming and Packing	61
4.3.12 Botanical Products	61
<b>4.4 Planning and Inventory</b>	<b>62</b>
4.4.1 Forest Resource Inventories	62
4.4.2 Forestry Information Systems	62
4.4.3 Timber Supply	62
4.4.3.1 Timber Inventory	63
4.4.3.2 Operability Review	63
4.4.3.2.1. Physical Operability	63
4.4.3.2.2. Economic Operability	64
4.4.3.2.3. Technical Operability	64
4.4.3.3 Sensitive Terrain	64
4.4.3.4 Growth and Yield	64
4.4.3.5 Unsalvaged Losses	65
4.4.4 Strategic Planning	66
4.4.5 Operational Planning	67
<b>4.5 Special Projects</b>	<b>68</b>
4.5.1 Proposal to Exchange Forest Licence for SBFEP	68
4.5.2 Application to Extend TFL 37	69
4.5.3 Sustainable Forest Management and Certification	69
4.5.4 First Nations Issues	69
4.5.5 Forest Renewal B.C.	70
<b>4.6 Research</b>	<b>70</b>
<b>5. EMPLOYMENT AND ECONOMIC OPPORTUNITIES</b>	<b>71</b>
<b>5.1 Communities</b>	<b>71</b>
<b>5.2 Fibre Flow</b>	<b>72</b>
<b>5.3 Employment Opportunities</b>	<b>73</b>
<b>5.4 Economic Opportunities</b>	<b>74</b>
<b>6. PUBLIC INVOLVEMENT</b>	<b>76</b>
6.1 Summary of comments received from the assessment of MWP 7	76
6.2 Summary of comments received from the draft SMOOP	76
6.3 Summary of comments received from the draft MP 8	76
6.4 Public review strategy for our next MP 9	77
<b>7. SUMMARY OF COMMITMENTS</b>	<b>78</b>
<b>8. SUMMARY OF CHANGES AND IMPACTS</b>	<b>79</b>
<b>8.1 Comparison Summary Between MP 8 and MWP 7</b>	<b>79</b>
8.1.1 Landbase	79
8.1.2 Growth and Yield	80
8.1.3 Planning	80
<b>8.2 Impact Summary of Implementing MP 8</b>	<b>80</b>



8.2.1 Harvest Levels	80
8.2.2 Economic Opportunities	81
8.2.3 Employees and Contractors	81
8.2.4 Non-timber Values	81
<b>9. PLAN DISTRIBUTION AND REVISIONS</b>	<b>82</b>
<b>10. ANNUAL REPORT OF OPERATIONS</b>	<b>83</b>
<b>11. REFERENCE LIST</b>	<b>84</b>
<b>12. GLOSSARY OF TERMS</b>	<b>87</b>

## **APPENDICES**

Appendix I	Map Samples
Appendix II	Licence Document
Appendix III	Public Review Strategy
Appendix IV	Statement of Management Objectives, Options and Procedures (SMOOP)
Appendix V	Timber Supply Analysis Information Package
Appendix VI	Timber Supply Analysis Report
Appendix VII	Chief Forester's Rationale for AAC Determination
Appendix VIII	Twenty Year Plan
Appendix IX	History
Appendix X	Company Operations and Manufacturing
Appendix XI	Company Policies and Principles
Appendix XII	Harvesting Performance
Appendix XIII	Contractors
Appendix XIV	Forest Resource Inventories
Appendix XV	Silviculture Standards and Procedures
Appendix XVI	Seed Inventory
Appendix XVII	Product Objectives Rationale
Appendix XVIII	Trapping and Guide Outfitting Licences
Appendix XIX	Mineral Claims
Appendix XX	Wildlife Program
Appendix XXI	Fish Inventory

## List of Figures

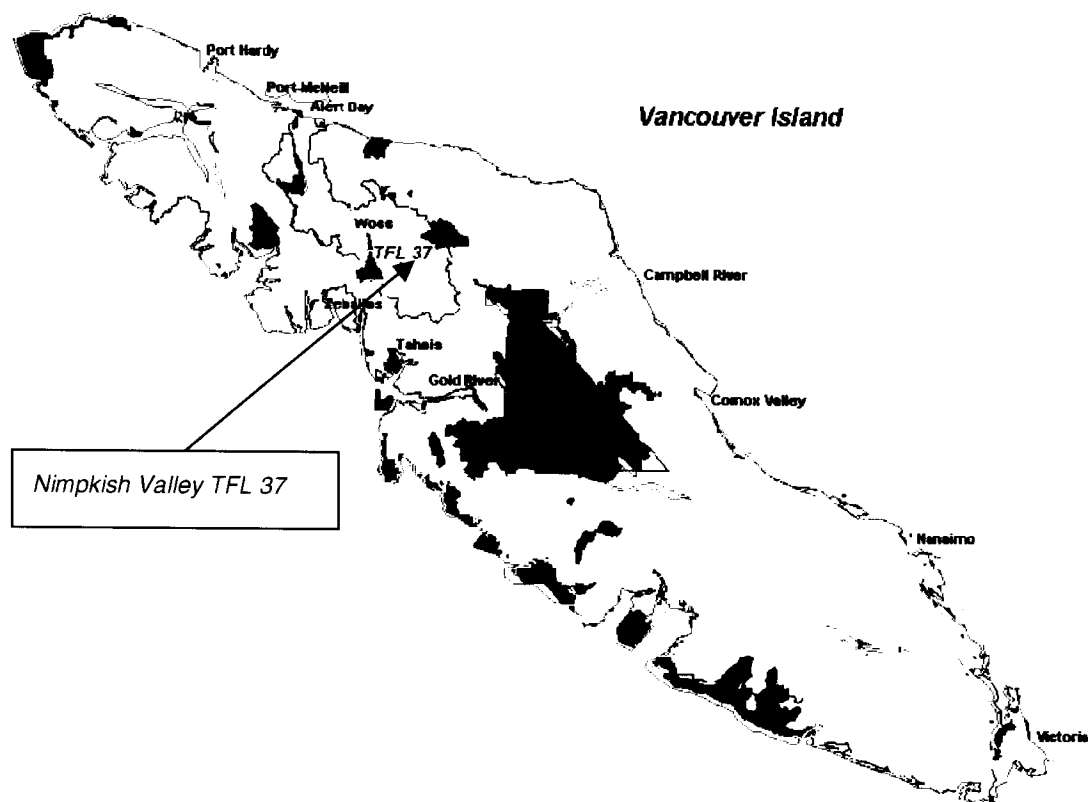
Figure 1	Nimpkish Valley TFL 37.....	1
Figure 2	Area (ha) by biogeoclimatic variant and leading species. ....	2
Figure 3	Protected areas and special management zones designated on TFL 37 .....	7
Figure 4	Draft priority use zones recommended on TFL 37.....	8
Figure 5	Natural disturbance types within TFL 37 .....	53
Figure 6	Archaeological Potential on TFL 37 .....	59
Figure 7	Fibre flow from TFL 37.....	72

## List of Tables

Table 1	Biogeoclimatic ecosystems within TFL 37 .....	1
Table 2	Major tree species within TFL 37 .....	2
Table 3	Land Tenure Breakdown for Tsitika Watershed.....	8
Table 4	Timber Supply Analysis Harvest Schedules.....	13
Table 5	AAC Prorate Calculation .....	14
Table 6	Approximate Distribution of Yarding Methods .....	18
Table 7	Existing Road and Railway Network.....	21
Table 8	Contractor Clause Performance.....	26
Table 9	Utilisation Specifications .....	27
Table 10	Brushing Treatments by Year <sup>1</sup> .....	35
Table 11	Key to stream riparian classification .....	47
Table 12	Recreation Sites and Trails .....	55
Table 13	Summary of Inoperable Areas .....	63
Table 14	Criteria used to Classify Economic Operability.....	64
Table 15	Annual Unsavaged Losses .....	66
Table 16	Strategic Level Plans .....	67
Table 17	Operational Level Plans.....	67
Table 18	Canfor's estimated fibre consumption and supply.....	72
Table 19	Estimated Employment Status.....	73
Table 20	Employment Income Estimates.....	74
Table 21	Provincial Government Revenue Estimates.....	74
Table 22	Approximate Public Review Periods for MP 9 (2004-2008).....	77
Table 23	Landbase comparison between MWP 7 and MP 8 <sup>1</sup> .....	79
Table 24	Growth and yield comparison between MWP 7 and MP 8 <sup>1</sup> .....	80
Table 25	Distribution of MP 8.....	82
Table 26	Distribution of annual report of operations .....	83

# 1. INTRODUCTION

The Nimpkish Valley Tree Farm Licence (TFL) 37 is located in the north central portion of Vancouver Island, south of Port McNeill along Nimpkish Lake, and south-east to the headwaters of the Nimpkish River toward Gold River (Figure 1).



**Figure 1** Nimpkish Valley TFL 37

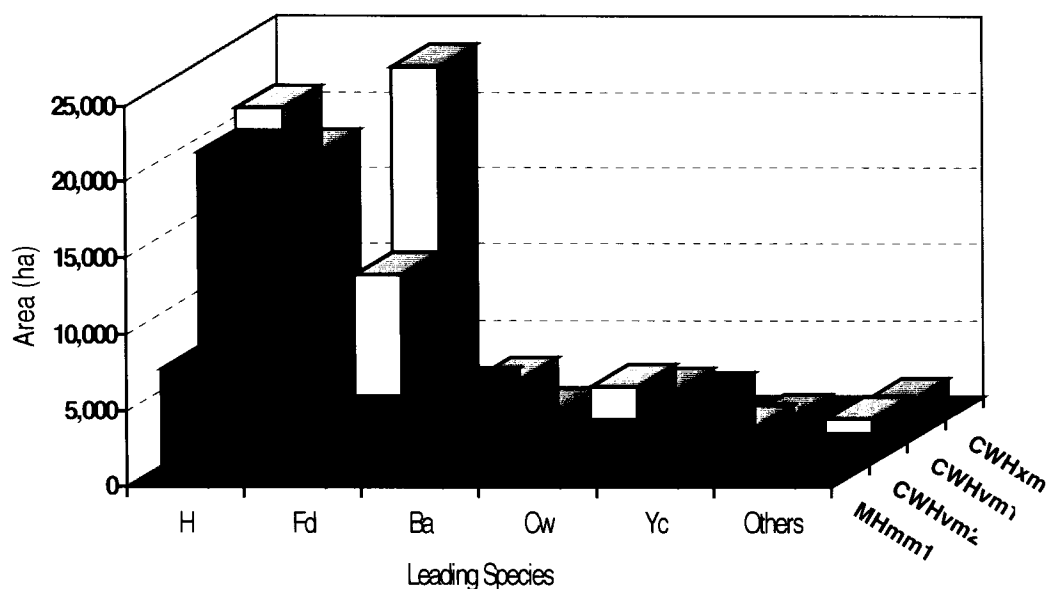
Biogeoclimatic ecosystems found within TFL 37 are shown in Table 1, Figure 2 and Appendix I. Table 2 lists the major tree species found within TFL 37.

**Table 1** Biogeoclimatic ecosystems within TFL 37

	<b>BEC Subzone</b>	<b>BEC Variant</b>	<b>Approximate Elevation Range (m)</b>	
Atc	Alpine Tundra and Glacier		1400	1600
MHmmp1	Mountain Hemlock	Parkland	1200	1400
MHmm1	Mountain Hemlock	Windward Moist Maritime	900	1400
CWHvm2	Coastal Western Hemlock	Montane Very Wet Maritime	600	1000
CWHvm1	Coastal Western Hemlock	Submontane Very Wet Maritime	0	600
CWHxm	Coastal Western Hemlock	Very Dry Maritime	0	400

**Table 2 Major tree species within TFL 37**

	<b>Common Name</b>	<b>Scientific Name</b>
Act	Black cottonwood	<i>Populus trichoparpa</i> Torr. & Grey
Ba	Amabilis fir/Balsam	<i>Abies amabilis</i> (Dougl.) Forbes
Bg	Grand fir	<i>Abies grandis</i> (Dougl.) Lindl.
Bp	Noble fir	<i>Abies procera</i>
Cw	Western redcedar	<i>Thuja plicata</i> Donn.
Dr	Red alder	<i>Alnus rubra</i> Bong.
Fdc	Douglas-fir	<i>Pseudotsuga menziesii</i> (Mirb.) Franco
Hm	Mountain hemlock	<i>Tsuga mertensiana</i> (Bong.) Carr.
Hw	Western hemlock	<i>Tsuga heterophylla</i> (Raf.) Sarg.
Pl	Lodgepole pine	<i>Pinus contorta</i> var. <i>contorta</i> Dougl.
Pw	Western white pine	<i>Pinus monticola</i> Dougl.
Ss	Sitka spruce	<i>Picea sitchensis</i> (Bong.) Carr.
Tw	Pacific yew	<i>Taxus brevifolia</i> Nutt.
Yc	Yellow cedar/Cypress	<i>Chamaecyparis nootkatensis</i> (D.Don) Spach.

**Figure 2 Area (ha) by biogeoclimatic variant and leading species.**

Under our TFL agreement, we are required to submit for approval a draft management plan (MP) to the Ministry of Forests' (MoF) Regional Manager for review and, after addressing comments from agencies and the public, a proposed MP to the provincial Chief Forester. The MP must contain commitments to co-ordinate and integrate the harvesting of timber with the protection and management of forest recreation and other resource values. This must be done concurrent with the activities and broad objectives of the MoF.

The provincial Chief Forester approved the current management and working plan (MWP) 7 for the period of January 1, 1994 to December 31, 1998. As part of the process, we have prepared this MP 8 with the following key components approved by the MoF:

- Review strategy for the key components (Appendix III).
- Review of MWP 7, pre-SMOOP assessment and statement of management objectives, options and procedures (SMOOP - (Appendix IV).
- Information package for the timber supply analysis (Appendix V), the timber supply analysis report (Appendix VI), and the twenty year plan (Appendix VIII).
- Draft MP 8.

Canadian Forest Products Limited is a subsidiary of the Canfor Corporation. Information about our company and its manufacturing plants is provided in Appendix X.

## 1.1 PURPOSE

The purpose of this MP 8 is to explain our objectives, goals and commitments, and strategies for the Nimpkish Valley TFL 37 for the period 1999 to 2003. Overall, the MP reflects upon past performance to measure success, involves the public to establish objectives, and provides commitments and strategies to ensure objectives are met. MP 8 is a tool, or suite of tools, that we can use to deliver broad resource objectives to meet explicit site-specific expectations on TFL 37 (Harrison, 1998).

Since this process is repeated every five years, we combine our management, research and monitoring to gain information about our activities. Learning from this experience then allows us to adapt and modify our programs accordingly.

MP 8 fulfils conditions 2.24 and 2.26 in the licence agreement, as well as an obligation outlined in section 28 of the Forest Act. In general, this plan provides strategic direction across the management unit and important linkages between higher level plans and operational plans.

MP 8 is organised according to the following sections:

- Section 1 introduces MP 8 and TFL 37.
- Section 2 specifies the higher level plans that may influence operations on TFL 37 and ultimately MP 8.
- Section 3 outlines management objectives and articulates Canfor's vision as a company entrusted to manage TFL 37 in accordance with responsible and sustainable forest stewardship now and in the future.
- Section 4 describes the management goals, commitments and strategies targeted during the MP 8 period that are aimed at achieving the management objectives. This section describes specific management activities that will take place over the planning period of MP 8. Each subsection details the program goals, describes the current status, highlights our commitments and provides a brief strategy for the program over the next 5 years.
- Section 5 reviews **employment and economic opportunities** involving TFL 37.
- Section 6 explains how the **public was involved** in the preparation of MP 8, with particular attention to the review strategy accepted by the MoF Regional Manager.
- Section 7 summarises the salient **management commitments** that are linked towards achievement of our program goals and ultimately our management objectives.
- Section 8 summarises the **changes** between the MWP 7 and this MP 8 and discusses the associated **impacts**.
- Section 9 describes how the **distribution** and **revisions to the plan** will be handled.
- Section 10 briefly describes our **annual report of operations**.
- Section 11 provides **references** used in MP 8.
- Section 12 includes a **glossary of terms** used in MP 8.
- **Appendices** provide background and support the initiatives, standards and procedures discussed in the plan.

Since the first licence agreement was awarded in 1960, Canfor has prepared seven management and working plans. The current MWP 7 was approved for a five year period from January 1, 1993 to December 31, 1998.

## **1.2 Licence Area**

*TFL 37 covers approximately 188,745 hectares on Northern Vancouver Island, of which 54% are considered within the net operable landbase for the long term. Schedule A lands within TFL 37 amount to 25,642 hectares (14%), including 4,725 hectares (2.5%) of private land and 20,917 hectares (11%) of private timber in Timber Licences (TLs). Maps and area statements for TLs and private lands in Managed Forest (MF) 25 are provided in Appendix II.*

## **1.3 Administration and Management of Tree Farm Licence 37**

*The first TFL 37 was awarded to Canfor on December 28, 1960. The most recent replacement TFL 37 agreement came into effect on March 1, 1995 and expires in 2020 (Appendix II). This TFL is granted for a 25-year term and, subject to satisfactory levels of performance, will be replaced every five years with a new licence having a 25-year term. The TLs within TFL 37, are non-replaceable, and will be surrendered to the Crown after the timber to which the licence applies has been harvested and silviculture obligations have been fulfilled. These lands then become Schedule B lands under the TFL agreement (Section 4.2.1.2).*

## **1.4 Progress on Current Management and Working Plan 7**

*We manage the area with an adaptive management approach that incorporates the experience gained from the results of previous management methods and actions into updated objectives and strategies. The key to an adaptive management approach is making our strategy and assumptions explicit so they can be measured, monitored and adjusted for future management strategies.*

*Initiatives described in Appendix IX highlight our management of TFL 37 since 1960. Over the MWP 7 planning period, we were influenced by the following external initiatives:*

- The MoF completed the first timber supply review (TSR) and began the second TSR within a program to regularly update timber supply in each of the 37 TSAs and 34 TFLs throughout the province, including TFL 37 (Section 1.1).*
- The MoF replaced the previous TFL 37 dated January 1, 1981, in March 1, 1995 (Section 1.3 and Appendix II).*
- The provincial government proclaimed the Forest Practices Code of British Columbia Act (Code) into law (Section 1.5).*
- The provincial government announced the Vancouver Island Land Use Plan (VILUP). Within TFL 37, this included, among other things, the creation of five new parks and 4 special management zones (Section 2.1).*
- The MoF Resources Inventory Branch completed a timber inventory audit of TFL 37, according to the inventory audit program (Section 4.4.3.1).*
- The federal and provincial governments began treaty negotiations with First Nations groups claiming aboriginal title and rights over substantial portions of British Columbia, including TFL 37 (Section 4.5.4).*
- The British Columbia legislature passed of the B.C. Forest Renewal Act (Section 4.5.5).*

*Throughout the MWP 7 planning period, we also initiated, or became involved in, a number of activities that may influence our management of TFL 37:*

- Employment of a forest practices performance review program that supports internal audits of forest management activities and policies (Section 4.1).*
- Improvement of estimates of physical, harvesting and economic operability for TFL 37 (Section 4.4.3.2).*

- *Refinement of silviculture strategies towards ecosystem-based prescriptions (Section 4.2.2).*
- *Expansion of our wildlife program to include non-game species such as small mammals and forest birds (Section 4.3.2).*
- *Support to local First Nations initiatives with materials for ceremonial canoes, totem poles and reconstruction of their "Big House" (Section 4.3.7).*
- *Updated resource inventories to a digital base, including terrain, ecosystem, vegetation, wildlife and visual landscape (Section 4.4.1).*
- *Development of several forestry information systems modules to provide better access of information to operational and planning personnel (Section 4.4.2).*
- *Revision of site productivity estimates for managed stands within TFL 37 (Section 4.4.3.2).*
- *Participation in the process to develop the Canadian Standards Association's (CSA) Sustainable Forest Management System standard (Section 4.5.3).*
- *Participation in the Community Resource Board for Mount Waddington Regional District to address local economic, employment and resource issues (Section 5).*
- *Initiation of a proposal to incorporate the Woss community within the Regional District.*

*These developments directly affect our management strategies on the allocated landbase. MP 8 addresses how these economic, social and environmental changes will be handled.*

## **1.5 Forest Practices Code and Management Plan 8**

*In July 1995, the Code was proclaimed into law. The Code, with its accompanying regulations, standards and guidebooks, has introduced significant impacts on forest management in three broad areas: planning, practices and environmental protection, and enforcement. The Code has added complexity and cost to forest management. Canfor developed a Forest Practices Compliance Management Policy that has been implemented on TFL 37 to ensure compliance with the Code and other legislation and standards.*

*In June 1997, the Code was amended through Bill 47, the Forest Statutes Amendment Act. When fully implemented, planning requirements under the Code will be streamlined and economics may be considered by the District Manager in making decisions with the Code.*

*Regulation changes are being made in a number of areas of the Code concerning forest practices. It is unclear how significant these changes may be in reducing wood supply costs that arose from British Columbia government policy initiatives during the past several years.*

*In the four years since the Code it came into force, the MoF deemed that 591 out of 601 inspections on TFL 37 were in full compliance with the Code. Of the 10 inspections found in non-compliance during that time, only one finding has resulted in an associated penalty of \$5,000.*

*The management practices and standards on TFL 37 are conducted in accordance with the spirit and intent of the Code and its associated regulations. The Code, the Forest Act and all relevant legislation is therefore implicitly considered within the strategies and practices discussed throughout MP 8.*

## 2. Land Use Plans

### **2.1 Vancouver Island Land Use Plan**

*The VILUP decision of June 1994 announced among other things the creation of 23 large new protected areas. It also introduced the concept of zoning forest lands outside of parks into three land-use zone types -- Low Intensity Areas, High Intensity Areas and General Forestry Areas. These zones have since been renamed Special Management Zones (SMZ), General Management Zones (GMZ) and Enhanced Development Zones (EDZ) respectively.*

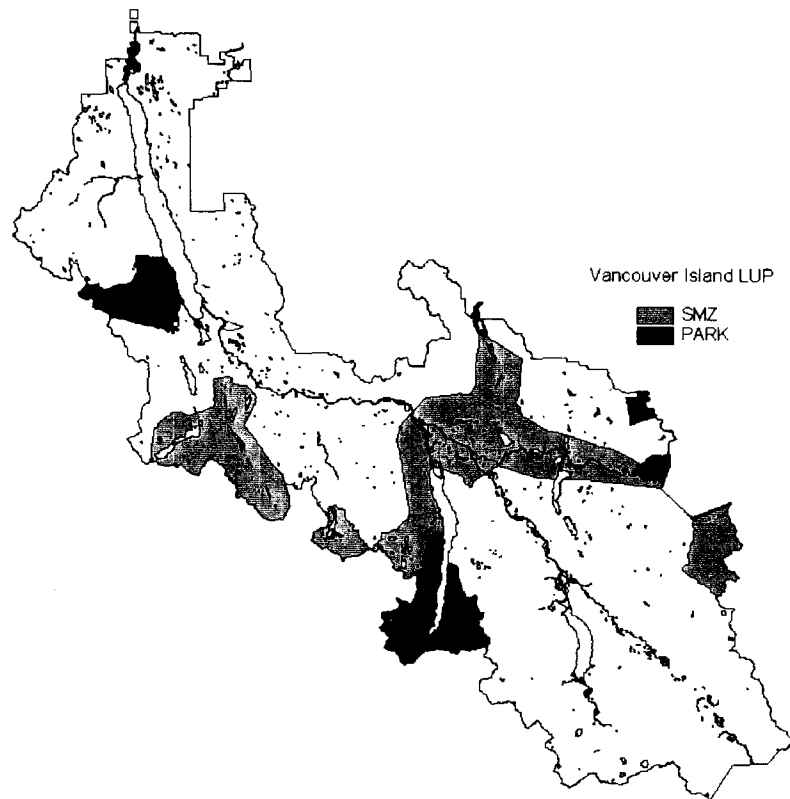


*Nimpkish Lake Park*

*Following the land-use decision, government endorsed final boundaries for the Protected Areas. It also approved boundaries and identified primary non-timber resource values for 22 SMZs, amounting to eight percent of Vancouver Island's land base.*

*The VILUP created five new park areas within TFL 37 that removed 11,422 hectares from the total landbase (Figure 3). Approximately 70% of the new parks are productive forest, which no longer contribute to the net operable landbase.*





**Figure 3**      **Protected areas and special management zones designated on TFL 37**

The VILUP also created four SMZs within TFL 37, involving a total of 29,925 hectares (Figure 3). Approximately 54% of these SMZ areas contribute to the net operable landbase.

## **2.2 Vancouver Island Resource Targets**

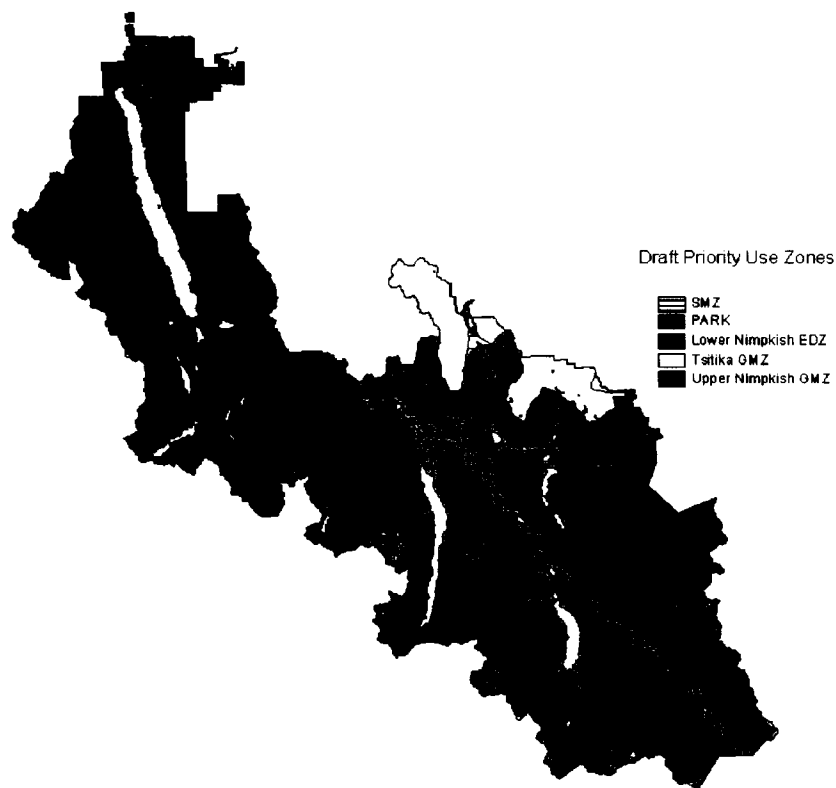
In May 1995, the government of British Columbia initiated a Vancouver Island Resource Targets (VIRT) project to help complete VILUP zoning by recommending GMZ and EDZ boundaries within Crown land in the Forest Land Reserve and private lands in TFLs. A technical team was formed for the VIRT project to develop and submit recommendations to the Land Use Co-ordination Office.

In November 1997, the VIRT technical team presented recommendations for:

- Locations of EDZs and GMZs,
- Management objectives and strategies for key forest resources in these zones, based on the requirements under the Code and the principles of priority use zoning and integrated resource management
- Refined management objectives and strategies for key resources in SMZs, based on recommendations previously submitted by the Low Intensity Area Review Committee

The team also recommended the objectives assigned to SMZs and EDZs be declared a higher level plan under the Code.

The VIRT project developed locations for two GMZs involving 83,833 hectares and one EDZ at 63,566 hectares (Figure 4). Respectfully, about 57% and 60% of these GMZ and EDZ areas contribute to the net operable landbase for forest management.



**Figure 4** Draft priority use zones recommended on TFL 37

The VIRT project also developed management objectives for conserving biological diversity in groups of the zones discussed above, or landscape units. This is presented further in section 4.3.3.

## 2.3 Tsitika Watershed Integrated Resource Plan

The Tsitika Watershed Integrated Resource Plan (TWIRP) was approved by the Environment Land Use Committee of the provincial government in October 1978. The Tsitika Follow-up Committee was formed to oversee the implementation of the plan. This committee was made up of representatives from the MoF, Ministry of Environment, Lands and Parks (MoELP), Ministry of Parks, Department of Fisheries and Oceans (DFO), Labour, Outdoor Recreation, Tourism, the public and industry. The land tenure breakdown for the Tsitika Watershed is given in Table 3.

**Table 3** Land Tenure Breakdown for Tsitika Watershed

Licensee	TFL	Area Breakdown	
MacMillan Bloedel Ltd.	TFL 39	28,512 ha	72%
Canadian Forest Products Ltd.	TFL 37	9,779 ha	25%
Western Forest Products	TFL 25	1,198 ha	3%
Total Area		39,489 ha	

With the recent implementation of the Code and the VILUP, the TWIRP plan became outdated. On April 11, 1996, the provincial Chief Forester agreed that the committee should stand down upon satisfactory completion of the Peel (Schmidt) Creek moratorium. Consequently, all planning initiatives employed in the Tsitika will be compatible with the Code and with the VILUP once its objectives are designated as a higher level plan.

## **3. Management Objectives**

### **3.1 Canfor Management Objectives**

*Canfor's management goals for TFL 37 promote a strong commitment to our employees, shareholders, community, and the environment.*

*We provide attractive investment returns to our shareholders. Our overall business strategy is to maximise profitability by reducing costs, improving efficiency, developing new market opportunities, including local sales, and merchandising products according to our customers' specific needs.*

*We maintain a stable employment base and contribute to the development of our local communities.*

*We protect existing forest values as we grow our future forests to sustain a maximum supply of quality timber to processing facilities in British Columbia.*

*As we develop our short- and long-term plans, we balance economic, social and environmental objectives. Our management objectives apply this approach to illustrate that we maintain stability by achieving a three-way balance of these broad objectives. We recognise that some of these management objectives can be linked with more than one broad objective.*

### **3.2 Economic Objectives**

#### **3.2.1 Customers**

*We demonstrate good forest stewardship and are able to gain access to evolving markets. Our programs involve customer information packages and tours. We also seek certification under the Canadian Standards Association/International Standards Association (CSA/ISO) Sustainable Forestry Program (ISO 14000 Certification – Sections 4.1 and 4.5.3).*

#### **3.2.2 Timber**

*Through careful planning and ecological-based harvesting practices, we balance non-timber values with the maximum short- and long-term economic return for the timber resource (Section 4.2.1).*

*Our harvests are regulated according to the Code, defined landscape and stand level objectives, cut control constraints, market demand, and various timber profiles designated by species composition, season, harvesting system and priority use zones (Section 4.2.1).*

*We continue to explore alternate harvesting systems and where appropriate, alternate silviculture systems in SMZs and commercial thinning in second growth stands (Sections 4.2.1.5 and 4.2.1.11).*

*We meet or exceed the basic silviculture requirements set in the existing forest practices legislation and guidelines. By applying an ecologically based silviculture strategy, we monitor and maximise the harvest levels the landbase is capable of sustaining (Section 4.2.2.1).*

#### **3.2.3 Forest Protection**

*We maintain an effective fire control organisation and forest health program to mitigate damage and losses caused by wildfires, windthrow, pests and disease (Section 4.2.3).*

### **3.2.4 Research and Development**

*We develop innovative systems, techniques and products that maximise the potential value derived from the timber resource. This work is carried out at our Sechelt seed orchard, our Vancouver research and development facility and Woss woodlands operation. We explore innovations designed to ensure that landscape and stand level management objectives will be met, while maximising the potential value derived from the timber resource (Sections 4.2.2.3.2 and 4.6).*

## **3.3 Social Objectives**

### **3.3.1 Community Involvement**

*We seek active partnerships that build community relationships and strengthen our business. We actively involve local communities, including First Nations, in decisions that may affect them. We support community initiatives through education and donations, such as school programs, the North Island Forestry Centre, sponsorships, and contributions of equipment and materials (Sections 4.3.7, 0 and 5).*

### **3.3.2 Employment and Economic Opportunities**

*We develop new employment opportunities, balancing operating costs with added product value. This improves stability of our local communities, including First Nations (Section 5).*

*We explore opportunities to support local primary and secondary manufacturing facilities (Section 4.2.1.8).*

### **3.3.3 Recreation and Visual Landscape**

*We integrate our visual landscape strategy and manage the full spectrum of recreation opportunities within our forest management activities (Sections 4.3.4 and 4.3.5).*

### **3.3.4 Incremental Silviculture**

*We juvenile space, prune and fertilise developing immature stands in concert with our end product strategy and government funding priorities. Additional employment from these activities assists in supporting local communities, including First Nations (Section 4.2.2.3).*

## **3.4 Environmental Objectives**

### **3.4.1 Wildlife and Vegetation Biodiversity**

*We continue to meet legislated stand- and landscape-level biodiversity requirements. We develop and apply an ecological-based biodiversity plan, based on our best information, local research and experience. This biodiversity plan is reviewed and accepted by government agencies and applied such that the overall impacts are acceptable to the local communities (Sections 4.3.2 and 4.3.3).*

### **3.4.2 Fisheries**

*We carry out our operational planning and harvesting practices in ways that protect or enhance important habitat characteristics and in-stream features. Fishery objectives are integrated into our forest management prescriptions in accordance with existing legislation and guidelines, in cooperation with other government agencies. We cooperate with and contribute to volunteer and First Nations' fishery enhancement programs (Section 4.3.7).*

### **3.4.3 Water**

- We recognise that maintenance of water quality is imperative to sustaining the aquatic ecosystem and for recreation and consumptive uses. We protect water quality by applying riparian management zones, coastal watershed assessment procedures, maintenance and deactivation of roads and monitoring water flow conditions during harvesting activities (Section 4.3.6).*

## 4. Management Goals, Commitments and Strategies

The following management strategies are organised and displayed accordingly:

### **0.0 Program Heading**

Overall Program Goals (s).

Program Status.

Program Commitments

Program Strategy

Each section, or program heading, begins with a brief definition of our goals for the program. This is followed by a short description of the current status of the program and may reference the past history of the program in Appendix IX. Our program commitments made within the term of MP 8 are highlighted in the text and summarised in section 7. These commitments reflect assumptions applied in the timber supply analysis information package (Appendix V) or in preparation for the next analysis for MP 9, to provide the provincial Chief Forester with appropriate information for developing an AAC rationale (Appendix VII). The final part of each section usually explains our strategy for implementing the program goals and commitments over the term of MP 8.

### **4.1 Forest Practices Performance Review**

We conduct reviews of our forest practices to improve effectiveness and consistency of forestry operations the quality

An important component of our corporate environmental management system is our forest practices performance review program. Under this program, we regularly conduct audits of forest management activities for compliance with government regulations, our forest practices compliance management policy, forest stewardship policy, forest industry standards and generally-accepted good forestry practices.

We address areas where audit results indicate further improvements are required. To assist us in tracking these issues and summarising findings, we will complete several forestry information system modules (Section 4.4.2). Finally, we will upgrade our forest practices performance review program to meet the ISO 14001 environmental management system standard by the end of 1999. To accomplish this, we will continue to train Canfor personnel in preparation for registration. The program is discussed in section 4.5.3.

### **4.2 Forest Resource Management**

#### **4.2.1 Timber Harvesting**

We develop timber harvesting strategies that maintain term sustainable harvest schedule or enhance the economic viability of harvesting timber according to the Allowable Annual Cut (AAC) determined by the provincial Chief Forester and a long

Appendix XII provides a record of past harvesting performance, with respect to the AAC, since TFL 37 was granted in 1961. The actual cut for any single year ranged from 78% of the AAC in 1970 to 132% of the AAC in 1976. The total average variation of actual cut to AAC between 1961 and 1997 is 101.5%. This illustrates the relatively steady flow of fibre from TFL 37 relative to the permissible annual variation of 50% to 150%.

The ever-changing social, economic and environmental conditions demand periodic checks that our management strategies are aligned with our management objectives. The more detailed commitments and strategies are presented below.

#### 4.2.1.1 Rate of Harvest

The timber supply analysis (Appendix VI) and the twenty year plan (Appendix VIII) includes a complex set of assumptions and a multitude of data. They are done to evaluate how management strategies in the short term affect the supply of wood available for harvesting over the next 250 years. The provincial Chief Forester determines an AAC for TFL 37 by considering this timber supply analysis and integrating important resource data, operating constraints and socio-economic factors, with the goal of a sustainable harvest of varying long-term yields.

Six options, plus a number of sensitivity analyses were completed to evaluate the availability of timber on TFL 37. A summary of the annual harvest schedules developed for the main options is shown in Table 4.

**Table 4 Timber Supply Analysis Harvest Schedules**

Simulation Year <sup>1</sup>	Annual Harvest by Timber Supply Analysis Scenario (m <sup>3</sup> /year)				
	MoF Base Case	Products- Based Silviculture	Enhanced Silviculture <sup>2</sup>	VILUP <sup>3</sup>	Twenty-Year Plan <sup>4</sup>
<b>1-5</b>	1,068,000	1,086,100	1,068,000	1,089,400	1,068,000
<b>6-10</b>	1,068,000	1,086,100	1,068,000	1,089,400	1,020,000
<b>11-15</b>	1,048,900	1,086,100	1,058,600	1,089,400	1,020,000
<b>16-20</b>	1,048,900	1,086,100	1,058,600	1,089,400	1,020,000
21-30	1,034,200	1,086,100	1,058,600	1,089,400	
31-40	1,034,200	1,086,100	1,058,600	1,089,400	
41-50	1,034,200	1,086,100	1,058,600	1,089,400	
51-60	1,034,200	1,086,100	1,058,600	1,089,400	
61-70	1,034,200	1,086,100	1,058,600	1,089,400	
71-80	1,034,200	1,086,100	1,058,600	1,089,400	
81-90	1,034,200	1,086,100	1,058,600	1,089,400	
91-100	1,034,200	1,086,100	1,058,600	1,089,400	
101-110	1,034,200	1,086,100	1,171,400	1,089,400	
111-120	1,091,700	1,086,100	1,255,500	1,153,400	
121-150	1,091,700	1,086,100	1,255,500	1,216,800	
151-250	1,172,100	1,182,500	1,255,500	1,216,800	
<b>Total</b>	<b>27,753,700</b>	<b>28,116,500</b>	<b>29,407,500</b>	<b>28,955,200</b>	

<sup>1</sup> Note that the first four periods are reported in 5-year increments and the remaining periods are in 10-year increments.

<sup>2</sup> Includes additional tree improvement only.

<sup>3</sup> Illustrates the harvest level costs associated with removing parks from the TFL 37 landbase through the VILUP.

<sup>4</sup> Spatial analysis of harvest over a twenty year planning horizon.

The results of the timber supply analysis support the current AAC – 1,068,000 m<sup>3</sup> per year, under current management and the existing timber harvesting landbase for TFL 37. This is mentioned for discussion purposes only and is not intended to suggest an AAC for the period of MP 8.

Sensitivity analyses from this non-spatial examination of harvest flow, indicate that the potential harvest flow is most sensitive to changes in managed stand volume and minimum harvest age.

As well, spatial analyses done for the twenty year plan indicate that silviculture green-up is a key issue in developing the short-term harvest rate on TFL 37. This issue was not clearly indicated in the non-spatial analysis because of the model's ability to harvest forest stands as small as 0.25 hectares, compared with the larger units selected for harvest in the spatial analysis. For instance, reducing silviculture green-up in the Nimpkish HIA to 2.25m allows the non-spatial MoF Base Case harvest schedule to be carried for the entire 20-year planning horizon. Similarly, reducing silviculture green-up ages by approximately one year in the Enhanced Green-up scenario allows the harvest schedule to match that of the MoF Base Case non-spatial analysis.

**Harvest timber according to the requirements of our licence document (Appendix II) and the allowable annual cut determined by the provincial Chief Forester (Appendix VII).**

Tracking daily timber production results from our operations allows us to monitor the annual harvest rate from TFL 37. We have some flexibility in our annual harvest level, which may vary according to market and operational conditions. The harvest must be within 50% of the allowable annual volume each year and also within 10% of the allowable volume every five years.

Our proposed harvest rate considers the current spatial harvest constraints applied on TFL 37 over the next 20 years. We believe opportunities exist that could relieve constraints on potential harvest levels. This may involve commercial thinning and partial harvesting within areas temporarily constrained under integrated resource management. The volume extracted from partial harvest systems should also help to alleviate the high costs associated with building and maintaining roads through these leave areas.

#### 4.2.1.2 Allowable Annual Cut Prorate

We apply an AAC prorate to derive annual rent charges as well as annual contractor compliance volumes (Section 4.2.1.10).

[The figures used for this Schedule B AAC prorate calculation were derived from the previous MWP. Work is on-going in this section and new figures will be provided during the term of MP 8]

The AAC prorate is based on the productivity assigned to the net operable landbase for Schedule A (Private) and Schedule B (Crown) timber. Table 5 shows the method used to determine the Schedule B AAC prorate that is consistent with the approach taken in previous MWPs for TFL 37.

**Table 5 AAC Prorate Calculation**

<b>Tenure</b>	<b>Long Term Net Operable Landbase</b>	<b>Long Term Harvest Level<sup>2</sup></b>	<b>% of Long Term Harvest Level</b>
Schedule A Land	20,620 ha	238,496 m3	20.4%
Schedule B Land			
SBFEP <sup>1</sup>	N/A	43,184 m3	
Licensee		887,420 m3	
Net Schedule B Land	80,460 ha	930,604 m3	79.6%
Total	101,080 ha	1,169,100 m3	

<sup>1</sup> Timber harvest volume allocated to the Small Business Forest Enterprise Program from TFL 37

<sup>2</sup> Long Term Harvest Level is derived from the Timber Supply Analysis (MoF Base Case).

The Schedule B AAC prorate is 0.796. Over time, as TLs within the TFL are reverted to Schedule B lands, only the Crown Grant lands will remain as Schedule A and this prorate should increase to approximately 95%.

#### 4.2.1.3 Harvest Methods and Practices

We employ a range of financially feasible timber harvest methods and practices that produce logs and minor products and mitigate any negative impacts to other forest resources.

Harvest methods are briefly described below, in order of least- to highest-cost.





*Hand falling a western redcedar tree*

*Direct loading of logs comprises a significant component of our harvest. This includes loading from right-of-way, day-light and/or super-snorkel areas. The distances to either side of an access road from these areas are approximately 15 metres, 25 metres and up to 50 metres, respectively.*

*Direct loading is not considered a formal yarding method according to our discussion below. Still, this harvest phase represents approximately 30% of our total volume at costs ranging from \$6/m<sup>3</sup> to \$9/m<sup>3</sup>.*

*“Supersnorkel” log loader*

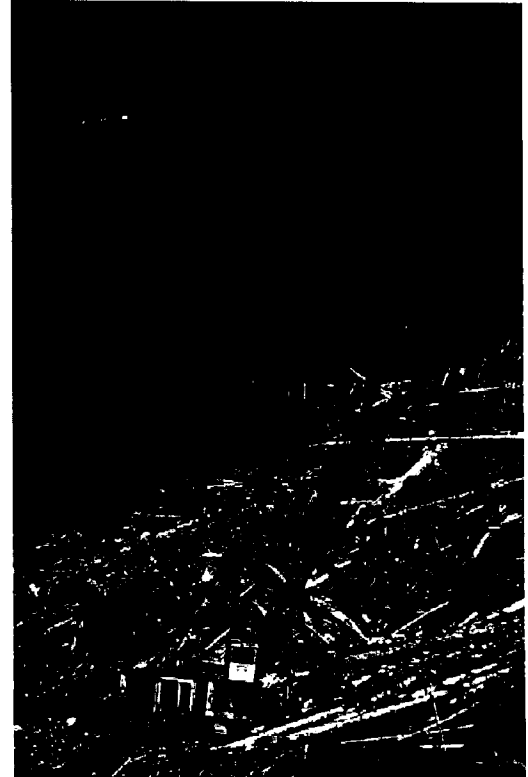


*Our primary ground-based method on gentle slopes with suitable soils and conditions is log-forwarding/hoe-chucking. The machines used are hydraulic excavators equipped with loading grapples or hydraulic loaders with high-floatation undercarriages specially designed to swing logs to roadside. The tracks do not move while the logs are being handled, to minimise soil disturbance. Hoe forwarding is economically viable up to 150 metres from the access road, though 100 metres is preferred.*



*Log forwarder or "hoe-chucker"*

*On steeper ground, the most common harvest method is grapple yarding. This method uses a large crane with a four-drum winch configured in a running skyline to either a stump-block or a mobile backspar. A grapple, and occasionally a carriage, is suspended from a block running along the haulback line. The two mainlines are connected to the grapple, working both with and against themselves. The mainline controls opening and closing of the grapple, while the haulback line returns the carriage to roadside. In all cable methods, strawlines are light cables used to pull the other lines into position. The preferred distance for grapple yarding is 150 metres though it can be viable to yard up to 300 metres.*



*Grapple yarder*



Highlead yarder

Highlead steel spars replaced wooden tree spars about 40 years ago. Consisting of a 28 metre steel pipe spar guyed vertically by 6 cables anchored to stumps, these yarders employ a three-drum winch that controls mainline and haulback lines. The mainline is attached to a set of swivels and eyes -- called butt-rigging -- which is connected to choker cables that are wrapped around logs. The mainline pulls logs into the landing area and the haulback pulls the butt-rigging back out. Highlead yarders can be on tracks or tires and are mobile when the spar is lowered. Highlead machines can efficiently yard logs in steep terrain, up to about 300 metres from the landing.

Skyline yarder

Skyline yarders are used to yard logs from areas with difficult road access, such as steep slopes or broken terrain. They are also used to fully suspend logs above streamside reserves, gullies or special management zones. Similar to highlead yarders in configuration, they have a skyline drum in addition to the mainline, haulback and strawline. Radio controlled carriages capable of independently lifting logs run along the skyline controlled by the other lines. Our skyline machines have yarded logs up to 1000 metres in distance.

Helicopter logging is planned where highlead or skyline yarders are not feasible and road access is economically or environmentally prohibitive. Helicopters require large water dumps or landings to enable safe handling of high production. The use of water dumps is not as available within TFL 37 as other areas on the B.C. coast and we must cut logs to specific dimensions for loading, hauling and sorting. These and other factors make helicopter logging our least cost-effective method. Helicopter logging within our "unconventional" land classification of TFL 37 has only been employed on a very limited basis, as we can successfully harvest most of our operable timber using conventional methods. However, it is certainly a proven harvest method on the B.C. Coast.

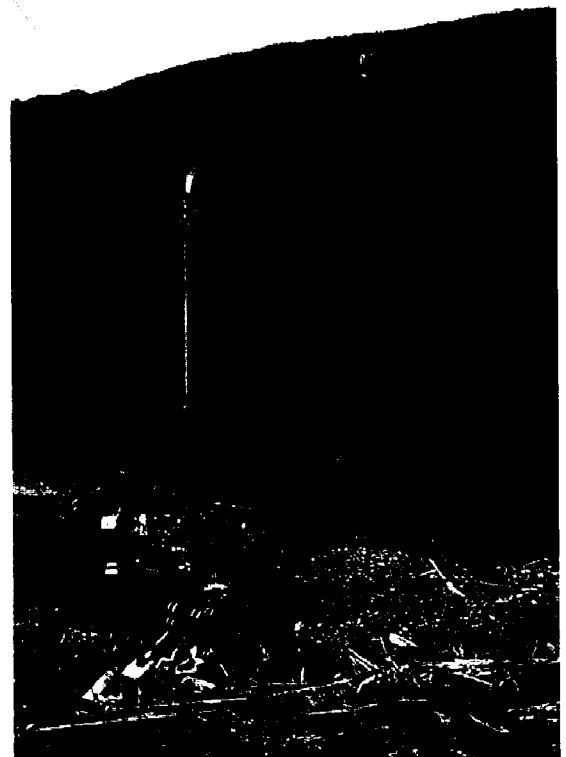


Table 6 illustrates the approximate distribution of yarding methods over the term of MWP 7.

**Table 6 Approximate Distribution of Yarding Methods**

<b>Harvest Method</b>	<b>Approximate Distribution by Yarded Volume</b>	<b>Approximate Tree to Truck Cost (\$/m3)</b>
Hoe-forwarding	12%	\$10-15/m3
Grapple yarding	69%	\$15-25/m3
High-lead steel spars	10%	\$20-30/m3
Skyline yarders	8%	\$25-35/m3
Commercial thinning	1%	\$25-35/m3
Helicopter	0%	\$60-75/m3

---

**Incorporate areas classified for unconventional harvest methods within our operational plans.**

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We will continue to select the most appropriate combination of harvest methods to suit conditions of each site and establish setting boundaries accordingly. Within special management zones and areas that are sensitive for riparian, wildlife, visually sensitive resources, we intend to investigate opportunities for alternative harvesting systems. We are planning to harvest areas using helicopter methods within unconventional areas and we also plan to conduct trials for harvesting second growth using mechanised harvesters.

#### **4.2.1.4 Harvest Priorities, Patterns and Ages**

*We apply harvest priorities, patterns and ages to address forest health, visual landscape and product objectives and to develop a balanced age class structure of managed stands in the long-term.*

We organise our harvesting priorities in the following order:

- Salvage damaged or diseased timber.
- Harvest old growth stands first.
- Gradually increase the proportion of second growth harvested over the next 30 years.
- Disperse harvest areas to deal with spatial constraints.
- Harvest areas in a single sequence and apply a clear cut with reserves silviculture system, but where appropriate, harvest special forest products beforehand to maximise stand value (Section 4.2.1.9).
- Adhere to visual quality objectives.
- Harvest according to a 50% winter/intermediate – 50% summer seasonal distribution to provide year-round seasonal logging.
- Harvest according to the current species profile of mature, operable stands.

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**Target a seasonal cut policy of 50% winter/intermediate and 50% summer.**

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Under normal circumstances windfall, damaged or diseased timber and mature stands will be given highest priority. Second growth stands over 60 years of age are now included within the planning framework to mitigate spatial and temporal constraints imposed by the Code that prevent continuity of the mature timber harvest.

#### 4.2.1.5 **Silviculture Systems**

*We prescribe silviculture systems that are ecologically appropriate for the harvest areas and consistent with the objectives established in higher level plans.*

*A silviculture system is defined as a planned program of activities involved in producing tree crops from seedling to final harvest. "Silviculture systems are generally named according to the method of final harvest, which largely determines the type of silviculture activities that will have to be undertaken over the subsequent rotation" (Kimmins 1992). The predominant silviculture system applied to date has been clearcutting coupled with immediate reforestation. We refer to this system as "clearcutting with reserves." This results in even-aged stands interspersed with patches of older-age classes functioning as wildlife habitat.*

*Over the past five years, opening sizes on TFL 37 have been an average of 25 hectares, ranging from less than one hectare to 40 hectares. A limited amount of partial-harvest techniques such as seed-tree harvesting have been employed on SMZs in accordance with the VILUP. In 1997, alternative silviculture systems amounted to 19 hectares out of a total harvest area of 1150 hectares.*

*Our overall strategy for silviculture systems is based on a combination of historical success in regeneration performance on clearcuts and our confidence in the biogeoclimatic ecosystem classification system.*

*To maximise forest productivity over the next rotation(s) and given the shade intolerance of desired tree species, clearcutting will be the silviculture system of choice. An exception to this will likely occur on high elevation areas in the CWHvm2 and MHmm1 variants where natural disturbance patterns result in an uneven-aged stand structure. Heavy snow packs, brush competition and cold air pooling typical in these areas can result in difficult reforestation. Evidence from recent trials suggests that partial cuts may be beneficial for regeneration of desired shade tolerant species on these ecosystems.*

*Special Management Zones (SMZs) and riparian management zones place higher emphasis on full or partial retention of mature timber. In situations that allow partial harvest, we intend to explore alternative systems to maximise recovery of economic timber while meeting overall management objectives.*

*Cutblock size, spatial orientation and placement of wildlife reserves can be varied to meet a diversity of resource objectives. Landscape level biodiversity requirements will likely have the most significant impact on cutblock size. Depending on overriding objectives, cutblock size may range from patches of several hectares to 100 hectares, based on VIRT recommendations (Section 2.2). Our strategy is to design cutblocks to meet the silviculture requirements of desired tree species while providing for other resources and the requirements of higher level plans.*

#### 4.2.1.6 **Harvest Planning**

*Our harvest plans demonstrate an orderly and comprehensive development of areas. They meet business and regulatory requirements, integrate other resources, are environmentally sensitive and address endemic and/or catastrophic events.*

*The most current strategic (Section 4.4.4) and business plans are carefully considered in developing operational harvest plans. Specifically, we review our total chance plan and twenty year plan to provide long-term direction, as well as current market conditions and our annual business plans to investigate short-term opportunities.*

*Harvest planning must also consider the various operational plans that are periodically updated (Section 4.4.5). Forest development plans (FDP) indicate locations of areas and roads proposed for development and are required under the Code. Logging plans provide site specific instructions for harvesting and will soon be incorporated into silviculture prescriptions (SP).*

*SPs demonstrate our environmental considerations for harvesting and our silviculture plan to develop the new stand to free-growing stage. SPs are also required under the Code. Normally, once a proposed cutblock is approved on the FDP we can submit a road permit application for approval to begin road construction. Once an SP for the cutblock is approved, a cutting permit package is submitted for approval to commence harvest operations.*

*We create timber-developed inventory (TDI) reports to monitor our harvest planning and road building status. Our standing timber inventory (STI) is closely linked to our periodic business plans.*

*Key components produced from this MP 8 link higher level objectives to operational harvest plans. MP8, the timber supply analysis, the twenty year plan and various inventories are strategic planning exercises that are considered during the various stages of harvest planning (Section 4.4.4).*

*Besides spatial constraints that are required to address other resource uses, detailed consideration of the physical, technical and economic operability limits is required to select candidate areas for harvesting. Operability limits for TFL 37 are briefly described in section 4.4.3.2.*

#### **4.2.1.7 Engineering**

*We plan and design roads and bridges in advance of construction to manage environmental and safety risks.*

##### **4.2.1.7.1. Main and Secondary Roads**

*Main roads are those that are maintained continuously to access all major watersheds, reloads, camps and our dryland sort. Secondary roads access all other drainages and more than one opening. Since the re-introduction of smaller cutblocks and the requirement to separate them with leave blocks, more secondary main roads have had to be constructed. This trend will continue until the green-up of blocks adjacent to leave blocks allows a levelling off of secondary road construction. Most drainages in TFL 37 have secondary road access and are maintained for future development, secondary harvesting of minor products, silviculture work and fire suppression activities. Development in drainages with no roads over the next five years will be occurring in the Schoen and Kaipit Lake areas.*

##### **4.2.1.7.2. Spur Roads**

*Spur roads are short-term roads that are maintained until reforestation activities are complete after which time they are permanently deactivated or rehabilitated.*

##### **4.2.1.7.3. Bridges and Related Work**

*Bridge work accounts for a large proportion of the cost of our capital program. Timber structures on main roads have been replaced with steel and concrete superstructures. On short-lived secondary and spur roads we routinely use temporary wood or portable steel and concrete bridges.*

##### **4.2.1.7.4. Railroad**

*Canfor continues to rely on the railroad as the primary transportation system for about 80% of the harvest volume. The system consists of 90 km of mainline linking the dryland sort at Beaver Cove to the re-loads at Camp A, Woss, Maquilla, and Vernon. The rail bed has been maintained and brought up to standard in drainage structures and bridges. Rolling stock has been updated and locomotive rebuilding program is currently underway. The re-loads -- where the logs are transferred from trucks to railcars -- have all been*



*Reload transferring logs from the truck to the train car.*

*rebuilt with steel pipe A-frames and modern, reconditioned winches. The use of the rail system is critical to the ability of the dryland sort to handle the volume logged on the TFL.*



*Locomotives hauling a load of logs to Beaver Cove*

#### 4.2.1.7.5. Access Management

*We ensure that our management of access structures protects other resources and complies with operational and safety requirements.*

*We manage access roads and their associated structures within TFL 37 by planning, building, maintaining, deactivating and rehabilitating specific forest roads. Management of highways and forest service roads are not within our mandate. Excluding highways, the total length of our road and railway network for all categories is 2187 kilometres, while 376 kilometres of roads have been rehabilitated. Table 7 shows this in more detail. For further reference, a map of the current road classification is provided in Appendix I.*

**Table 7 Existing Road and Railway Network**

<b>Road Classification</b>	<b>Average Width (m)</b>	<b>Total Length (km)</b>	<b>Total Area (ha)</b>
<b>Primary</b>			
Actively maintained (AM)	13	193	251
<b>Secondary</b>			
Actively maintained (AM)	11	585	643
Semi-permanent deactivated (SD)	10	65	65
Temporary deactivated (TD)	10	9	9
<b>Spur</b>			
Actively maintained (AM)	10	434	434
Semi-permanent deactivated (SD)	9	652	587
Temporary deactivated (TD)	9	52	47
Permanent deactivated (PD)	8	65	52
Not maintained (NM)	8	35	28
<b>Railway (RW)</b>	11	97	107
<b>Total</b>		2,187	2,223
<b>Rehabilitated (R)</b>	15	376	564

*In addition, we maintain 105 major truck bridge structures, 19 major rail structures and approximately 7000-8000 culverts ranging from 600mm corrugated galvanised pipes to gravel decked log structures.*

#### **4.2.1.7.5.1. Planning and Inspecting Roads**

*Road work can have a number of impacts on other resources. These impacts are considered in all phases of road work, from initial route selection to deactivation. We mitigate impacts on slope stability, soil productivity, water and visual quality by ensuring that full consideration is given to avoiding riparian, hazardous terrain and other sensitive areas when planning road corridors. Identifying and avoiding problem sites is a key criteria in the design process.*

*We routinely inspect our road network and incorporate maintenance activities into access plans. The frequencies of our road inspections relate to the level of risk and hazards present along a road and the consequences of a problem occurring. We will plan our road construction, maintenance, deactivation and rehabilitation activities in the FDP and consider access for fire suppression within remote areas of TFL 37.*

#### **4.2.1.7.5.2. Road Construction**

*We construct permanent and temporary structures to provide access for timber harvesting or other forest management activities. Permanent access structures include roads, landings, pits or quarries that are either required for continuous or periodic duration or comprise material that is not suitable for rehabilitation. Temporary access structures include those haul roads, landings and excavated or bladed trails that will be restored to a productive state upon completion of harvesting.*

*Road construction involves grubbing and clearing, excavating material, controlled rock-blasting, surfacing roads, managing ditches and constructing drainage structures. Road systems are planned and constructed to minimise the number of stream crossings on a watershed basis. In addition, we take measures during road construction to protect sensitive slopes, prevent soil erosion, avoid changes in drainage patterns and restore soil productivity where possible. Stream crossings are selected to mitigate the risk of impact on riparian and in-stream resources.*



*Excavator used to build and maintain roads*

#### **4.2.1.7.5.3. Road Maintenance**

*Monitoring and maintenance of our road network is critical to ensure structures are operating as designed and installed. Where problems are occurring or are likely to occur, we take remedial*



measures. In some situations, additional structures may be required that were not anticipated during design and construction.

#### **4.2.1.7.5.4. Road Deactivation**

For roads that will no longer be maintained, we plan and apply road deactivation measures to stabilise roadbeds and restore natural drainage patterns. Roads are deactivated to temporary, semi-permanent or permanent levels where access is not required for a specified period and where roads will not be subject to routine maintenance to ensure the stability of the road prism.

#### **4.2.1.7.5.5. Road Rehabilitation**

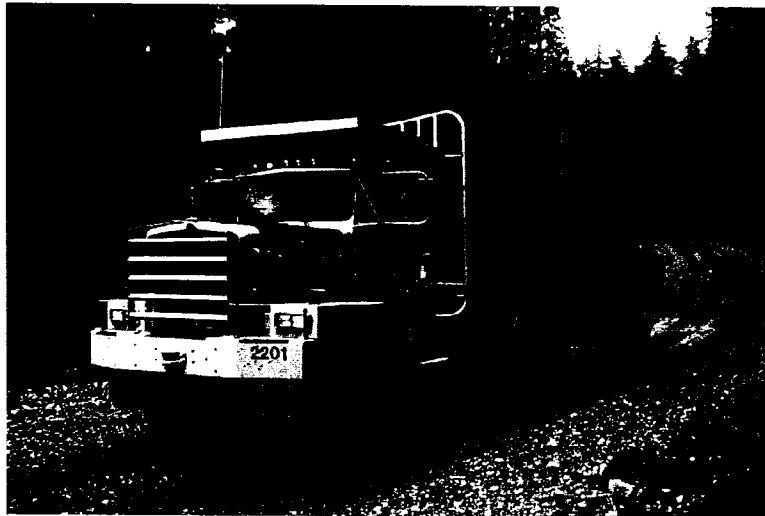
Canfor is a leader in aggressively rehabilitating temporary access structures to maximise the productive forest available within TFL 37 (Section 4.2.2.8). Road rehabilitation requires the restoration of soil productivity and reforestation of the affected area. Where roads are not to be rehabilitated immediately after harvesting, we take measures to ensure the stability of the road prism and to prevent soil erosion.

We prefer to minimise the area occupied by roads and landings, given the expense and difficulties associated with rehabilitating these structures to a productive state. Otherwise, we construct roads in a way that will facilitate and increase the likelihood of restoration to an acceptable level of soil productivity.

#### **4.2.1.7.5.6. Access for Public and Industrial Users**

Canfor regularly provides opportunities for the use of the road network by the public and periodic use by other forest industrial users including the SBFEP.

We recognise the public's desire and right to access throughout TFL 37, except within active harvest areas. However, under some conditions, areas may be restricted to protect property and equipment or to protect our employees and the public from safety hazards. As these are industrial roads, special caution is required and road users assume the risk of accident or injury.



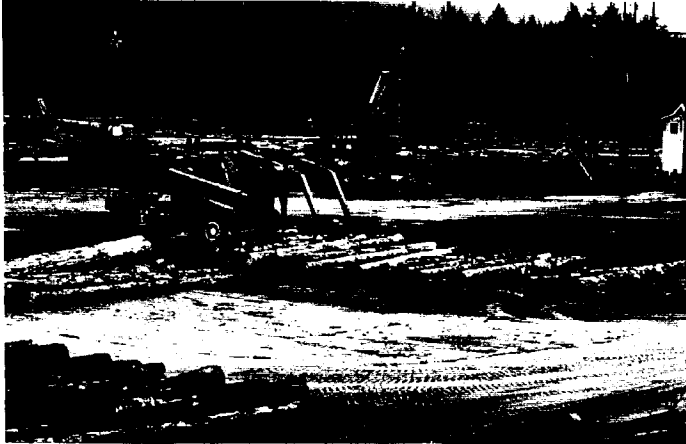
*Loaded logging truck*

On rare occasions when the fire hazard rating is extreme we may restrict access only to main roads that are easily patrolled. We expect all road-users will cooperate in reporting and suppressing fires. B.C. Forest Service fire protection regulations apply to everyone.

*Subject to a road use agreement and fee, other industrial users may temporarily require our roads. The intent of this fee is to recover road maintenance costs and the agreement should serve to protect both parties.*

#### **4.2.1.8 Merchandising and Manufacturing**

*Logs are delivered to our Beaver Cove dryland sort where they are scaled and merchandised by species and grades into 40 to 60 sorts. Each sort is tailored to meet customer's special needs. Most logs are then bundled, placed in the water and boomed for the 320 kilometre tow to manufacturing facilities in the Vancouver area.*



*Stacker preparing logs for sorting and scaling.*

*Bundle of logs sliding into the water.*



*Boom boats arranging bundles into booms.*

Our coastal fibre base has been a mainstay for the world class pulp and newsprint operation, Howe Sound Pulp and Paper (HSPP), owned jointly by Canfor and Oji Paper of Japan. This facility alone consumes more than twice the annual harvest rate from TFL 37 (Section 5). Supplying fibre directly and indirectly through log trading will continue as a key element to creating value.

HSPP also produces dimension lumber at its Westcoast Cellulibre Division. While the primary function of this division is to produce wood chips for Canfor's pulp and newsprint mills, dimension lumber is recovered from low-value pulp logs whenever the lumber recovery will increase the economic return from the fibre. Logs from our coastal logging operations are traded with other coastal operators and leveraged to increase the supply of suitable fibre for HSPP.

To encourage local community stability we actively seek local log sale opportunities from TFL 37 and ventures with local producers. This helps support local manufacturing from Courtenay to Port Hardy. Products produced from these facilities range from fence material to high value veneer flitches, used for guitars, door and window stock, panelling and many others.

Specific employment and economic opportunities associated with merchandising and manufacturing are discussed further in section 5.

#### **4.2.1.9 Special Forest Products**

*We plan for special forest products to utilise all commercial products and to create employment and small business opportunities, while ensuring high standards of management and environmental control.*

The main harvest is generally done in a single sequence, but to maximise utilisation and value, cedar poles and fir cabin logs and pilings may sometimes be removed before the main harvest. Special forest products such as cypress cants, cedar shake blocks and small cedar logs are typically removed following the main harvest.

We support local processing of special forest products by ensuring this program is administered towards long-term stability. Three small sawmills are located within TFL 37 to produce various cedar products and railway ties. We also support salvage operations that recover shakes, shingles, and cants from first-pass harvest areas. Earlier this decade, this including salvaging logs that sunk to the bottom of Nimpkish Lake long ago, when the lake was used for transporting logs (Appendix IX).

Canfor operates a hardboard plant at its Panel and Fibre Division in New Westminster, British Columbia, which uses purchased waste fibre as raw material. Most of the hardboard is finished to produce embossed and simulated wood-grain panelling products.

In order to expand and diversify the range of products manufactured from its raw material base, Canfor manufactures a range of wood fibre products. Baled, refined dry fibre is produced from wood residues and chips. The hardboard mill refines, dries and compresses the fibre into highly compacted bales for easy handling and shipping. The fibre is used as raw material for hardboard production, cement board products, agricultural products and in the manufacture of moulded products for the automotive industry.

Refined dry fibre, to which a non-toxic, environmentally safe green dye and tackifier is added, is used to produce three products for hydro-seeding businesses. These products, when mixed with grass seed, fertiliser and water, can be sprayed on the ground as a fast and economical way of re-vegetating disturbed areas.

Composite mat products are a blend of refined wood fibre and various other fibres and are manufactured at our mat plant. Wood fibre composite mats can be pressed into three-dimensional shapes to make a range of products including interior car panels, furniture components and building materials.

#### 4.2.1.10 Contract Harvesting

*We integrate contract harvesting within operational development strategies to provide long-term opportunities for full and phase contractors.*

The Timber Harvesting Contract and Subcontract Regulation (B.C. Reg. 22/96) and part 15.00 of TFL 37 obligates us to ensure that each year at least 50% of the annual timber harvested from Schedule B land involves independent logging contractors. For the B.C. coast, the annual timber volume can be harvested under any combination of full contracts, each of which provides for a term of at least 5 years, and phase contracts, each of which provides for a term of at least 2 years. A list of full and phase contractors currently employed is provided in Appendix XIII.

The total timber volume attributable to contracts is the sum of the timber volume attributable to full and phase contractors (Appendix XIII). Over the past decade, compliance with the contractor clause was exceeded by an average of nearly 20% (Table 8). This reflects the increased road building done by contractors in recent years to meet Code requirements.

**Table 8 Contractor Clause Performance**

<b>Year</b>	<b>Harvested Volume from Schedule B Lands</b>	<b>Total Volume Contracted</b>	<b>Percent Compliance of Total Volume Contracted</b>
1987	940,254 m <sup>3</sup>	523,283 m <sup>3</sup>	111%
1988	798,128 m <sup>3</sup>	438,936 m <sup>3</sup>	110%
1989	828,869 m <sup>3</sup>	471,866 m <sup>3</sup>	114%
1990	703,191 m <sup>3</sup>	381,606 m <sup>3</sup>	109%
1991	725,802 m <sup>3</sup>	373,213 m <sup>3</sup>	103%
1992	775,638 m <sup>3</sup>	416,135 m <sup>3</sup>	107%
1993	757,694 m <sup>3</sup>	442,348 m <sup>3</sup>	117%
1994	897,172 m <sup>3</sup>	588,552 m <sup>3</sup>	131%
1995	816,131 m <sup>3</sup>	496,341 m <sup>3</sup>	122%
1996	679,347 m <sup>3</sup>	504,084 m <sup>3</sup>	148%
1997	763,068 m <sup>3</sup>	534,921 m <sup>3</sup>	140%
<b>Average</b>	<b>868,529 m<sup>3</sup></b>	<b>517,129 m<sup>3</sup></b>	<b>119%</b>

Our full and phase contractors are involved in all aspects of planning and development. Timber production is carefully tracked to ensure that contractor compliance measures are achieved.

#### 4.2.1.11 Commercial Thinning

*We integrate our commercial thinning program into our harvest planning framework and provide thinning harvest opportunities in areas where spatial constraints are limiting.*

Over the past decade, Canfor has tested the operational feasibility of a series of commercial thinning harvest systems (Appendix IX). The volume harvested from commercial thinning over the past five years was approximately 9,816 m<sup>3</sup> per year on approximately 59 hectares per year.

Thinning from below is the accepted approach for recovering merchantable material that is otherwise lost to stand mortality. In MWP 7, we estimated that up to 25% of the standing volume can be harvested without significantly affecting the available volume at final harvest. At this time, our estimate remains unacceptable to MoF until we can provide more documentation of yield and other related information.

While single-entry commercial thinning regimes do not generally increase volume yields on a specific site, they can provide opportunities to harvest timber in areas where harvesting is limited to meet a variety of other resource objectives. In fact, as it improves the quality of the final stand within the context of our end-product objectives, thinning harvests may be incremental to the AAC.



*Mini-Alp Skyline used in commercial thinning*

***Continue to pursue cost-effective commercial thinning opportunities at an annual harvest of approximately 10,000 m<sup>3</sup> per year.***

*Stand and forest level modelling techniques and a review of the operable landbase will assist in establishing optimum commercial thinning targets. An acceptable approach will be developed with the MoF Research Branch.*

*Exploring different thinning equipment and methods will help develop cost-effective alternatives for a range of stand types and conditions.*

#### **4.2.1.12 Timber Utilisation**

*We comply with government standards and penalties regarding timber utilisation as we balance customer needs with objectives for maintaining biological diversity.*

*Utilisation standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. These standards are expressed in each cutting permit document issued by the MoF. Typically, these apply to all coniferous species that are log Grade X or better, with the criteria described in Table 9.*

**Table 9 Utilisation Specifications**

<b>Utilisation Specification</b>	<b>Natural Stands</b>	<b>Managed Stands</b>
Maximum stump height <sup>1</sup>	30 cm	30 cm
Minimum log length <sup>2</sup>	3.0 m	3.0 m
Minimum top diameter	15 cm	10 cm
Minimum diameter at breast height	17.5 cm	12.5 cm

<sup>1</sup> Maximum stump height is measured on the side of the stump adjacent to the highest ground level.

<sup>2</sup> Minimum top diameter is measured as the inside bark diameter at the narrowest end of the log.

*The volume of existing deciduous species is a very minor component of the existing stand timber inventory used to determine the AAC. Deciduous species of all grades, all grade Y coniferous logs material and logs with smaller top diameters or shorter lengths may be harvested whenever market conditions provide an appropriate financial opportunity. Stumps, tops and decayed material are excluded from the existing stand timber inventory used to determine the AAC.*

*Residue and waste surveys are completed following harvest to provide data and information for the monetary billing of avoidable waste as liquidated damages for contract non-compliance, and for determining residue and waste volumes for cut control. These volumes vary according to timber types, economic, safety, physical and environmental limitations.*

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***Harvest timber to specifications that incorporate, but are not limited to, the utilisation standards expressed in each cutting permit and the timber inventory.***

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*We will continue to monitor timber utilisation through residue and waste surveys that indicate the opportunity costs and benefits associated with the material that is left behind following harvest. We will also work with the MoF and various industry associations to balance contradicting policies.*

#### **4.2.1.13 Small Business Forest Enterprise Program**

*We work with the District Manager and encourage the SBFEP to harvest in an orderly manner by integrating its planning with Canfor's operations.*

*The small business forest enterprise program (SBFEP) apportionment within the Port McNeill Forest District for TFL 37 is 43,184 m<sup>3</sup>. Volume sold under this program is current up to 1999. If an agreement is reached to exchange tenure (Section 4.5.1), this program will terminate at that time.*

*Our FDPs specify SBFEP areas that reflect the harvest profile for TFL 37 on Crown land and we will align our resources with secondary manufacturers to compete for these licences.*

### **4.2.2 Silviculture**

#### **4.2.2.1 Silviculture Funding**

*Funding for silviculture activities is based on the history of legislation defining agency responsibilities. For a given cutblock, funding responsibility for silviculture depends on what activities are proposed and when the block was logged.*

##### **Basic Silviculture**

- *Blocks logged prior to October 1, 1987: All costs for activities associated with achieving a free-growing stand are the responsibility of the Crown.*
- *Blocks logged after October 1, 1987: All costs for activities associated with achieving a free-growing stand are the responsibility of the licensee.*

##### **Incremental Silviculture**

*Costs for intensive silviculture activities on stands that have met free-growing obligations are the responsibility of the Crown. Funding mechanisms for these programs have changed several times throughout the past decade. Currently, funding for incremental silviculture is delivered through Forest Renewal B.C. (Section 4.5.5).*

#### 4.2.2.2 Basic Silviculture

We carry out basic silviculture activities to:

- i) Establish and tend new stands that suit the ecological characteristics and productivity estimates of each site,
- ii) Optimise the timing of management activities that positively influence the stand's development, and
- iii) Produce a diverse and sustainable flow of species and products.

In keeping with the vision of Canfor's first Chief Forester on TFL 37, Tom Wright, we reforest every area logged promptly and successfully with an ecologically appropriate selection of tree species.

"The major silviculture problem to be considered in the design of a cutting plan is that of achieving prompt and adequate restocking of the cut-over lands by such desirable forest tree species as Douglas-fir, western hemlock and western redcedar. The establishment of mixed stands of these three species is encouraged to provide greater yields and more resistance to insects, disease and windthrow" - Wright, 1960 (TFL 37 Working Plan No. 1).

Appendix IX outlines basic silviculture activities completed to date.

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#### **Meet the requirements of the basic silviculture strategy while basing investment levels on site quality.**

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Appendix XIV sets out an ecosystem-based silviculture strategy including species and stocking standards, which will guide our program from harvest through to free-growing. Strategies have been set up for ecosystem "types" (site series) in each biogeoclimatic zone and variant found on TFL 37. An ecosystem-based strategy allows us to predict, with reasonable accuracy, the reliability and potential productivity of various tree species on each site. Species mixes prescribed for a given site will be based both on ecological suitability and desired end product. SPs will be prepared in accordance with this strategy.

Our basic silviculture strategy (Appendix XV) outlines the following standards :

- **Preferred species:** tree species that are ecologically suited to the site and management activities are primarily aimed at their establishment and growth. The characteristics of these species are consistent with the desired timber and non-timber objectives for the site.
- **Stocking and stocking method:** sets out target numbers of trees per hectare to ensure full site occupancy. Minimum standards are set in accordance with legislation. Stocking method outlines recommended treatments to achieve target stocking.
- **Minimum intertree distance:** sets out intertree spacing which in combination with average spacing will result in target stocking with a good distribution. During planting operations, plantable spot decisions will be based on microsite quality rather than measured distances to ensure maximum seedling survival and production. On difficult sites, minimum intertree spacing may be reduced to take advantage of limited plantable spots.
- **Regeneration delay:** sets the allowable delay or "fallow period" for a given area measured from commencement of primary harvesting operations. The regeneration delay specified in the tables sets the administrative period which allows for completion of harvest, restocking, surveys and reporting – our target is to restock areas within 1 year of harvest completion, i.e. cutblocks are fallow for no more than one year.

- *Free-growing age: defines the period measured from commencement of primary harvesting where a stand must meet free-growing requirements and is usually defined as a range, (earliest to latest).*
- *Free-growing height: defines for each species on a site, the minimum height that must be attained for a given tree to be considered free-growing. Free-growing heights apply only for SPs approved after April 1, 1994.*

*The following sections outline treatment-specific strategies to meet our program goals.*

#### **4.2.2.2.1. Reforestation Methods**

*We apply reforestation methods that promote prompt and complete reforestation of all cutblocks with ecologically and economically appropriate trees.*

*All areas harvested are reforested through a combination of planting and natural regeneration. Appendix IX outlines reforestation performance on TFL 37 to date. Planting is completed by contract crews and currently accounts for our largest forestry cost. Reforestation plans are prepared each year that set out locations and specifications for each cutblock to be treated.*



*Planting a mixture of amabilis fir and western redcedar*

*Sites in the CWHxm and CWHvm1 have greater potential to produce desired products over a shorter period and will generally receive greater resources.*

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***Investigate the potential of restocking high elevation sites in CWHvm2 and MHmm1 using a combination of natural regeneration and fill planting.***

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*This will involve collecting advanced regeneration data in pre and post harvest assessments in combination with careful monitoring of regeneration performance. This may also include designing cutblocks to foster natural regeneration. A combination of natural regeneration with fill planting will ensure that genetic diversity is not compromised.*

*We plan to adjust timing of planting to August – September for high elevation areas. This allows seedlings to garner the benefits of favourable soil temperatures for root development that occur during this period. We will also explore the growth and yield impact(s) of various reforestation methods on high elevation sites.*



#### 4.2.2.2. Seed Procurement

*We secure an appropriate supply of ecologically suitable and genetically improved seed/hedge to satisfy projected seedling requirements.*

*Cone rake used to collect cones*

*Seed supplies for reforestation are maintained through:*

- *Collections from the forest for non-genetically improved, (B class), seed for amabilis fir and yellow cedar.*
- *Production from Canfor's seed orchard for genetically improved, (A class), Douglas-fir and western hemlock.*
- *Purchase of A and B class seed of various species from other forest companies and the MoF.*

*To take advantage of increasing orchard production of high quality first and second generation "A" class seed becoming available, our strategy will be to maintain smaller inventories of the best seed for Douglas-fir, western hemlock, western redcedar and white pine.*

*Class B seed for amabilis fir, yellow cedar and other minor species will be collected or purchased to meet five year reforestation requirements.*

*Each year, we will complete an analysis of seed requirements for reforestation. This analysis will be based on site types and elevations projected in forest development plans. This will allow us to adjust seed purchase and/or collection strategies accordingly. Whenever a seed collection is considered a plan is prepared which outlines locations and drop zones.*



#### 4.2.2.3. Site Preparation

*We undertake site preparation measures to prepare harvested sites for planting or to reduce fire hazard.*

*Site preparation treatments are completed to facilitate planting. Past treatments have included broadcast and spot burning, mechanical site preparation and roadside piling and burning. In general, sufficient plantable spots exist following harvest and site preparation treatments are required only in unusual situations. Use of container grown planting stock has increased flexibility in microsite selection.*

*Where necessary we prepare sites utilising the most ecologically sound and cost effective method to meet stocking requirements set out in the silviculture strategy and applicable SP. Where these treatments are anticipated, a site preparation plan is prepared which sets locations and treatment specifications.*

*The use of prescribed fire has decreased significantly due to:*

- *Reduced slash loading through improved timber utilisation.*
- *Concerns for air quality.*

- Risk of damage to surrounding timber and adjacent reserves, such as wildlife tree patches, and riparian management zones.
- The recognition of the role of forest floor organic material in the long-term maintenance of site productivity on many sites.
- The desire to preserve natural regeneration on some sites.

Despite the recent decline, when properly applied on appropriate sites, prescribed burning is an excellent method for achieving many site preparation objectives. Fire can be used on steep terrain, does not compact the soil, and improves access for planting. Fire impacts can also improve seedling survival and growth by reducing competing vegetation, by increasing nutrient availability and by warming the soil.

On suitable sites, we anticipate that broadcast burning will remain as a viable option in meeting silviculture objectives.

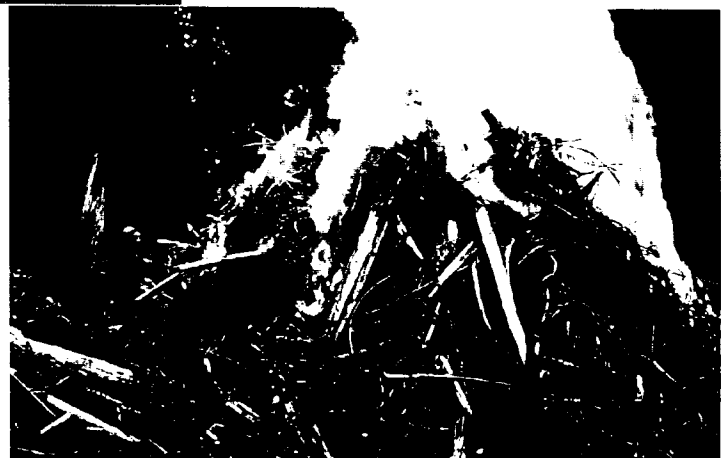
Appendix IX outlines our site preparation performance to date.

#### **4.2.2.2.3.1. Roadside Piling and Burning**

Grapple and highlead yarding systems can result in significant accumulations of woody material along roadsides. As a general rule, all roadside debris accumulations that will interfere with stocking are piled and burned to allow full site occupancy of desirable crop trees. Pile burning is done according to specific burn plans submitted to the MoF for approval. Piles may be left unburned in specific situations where research indicates value for wildlife habitat. Burn Plans are prepared which outline locations, requirements and protection considerations.



*Piling roadside slash*



*Pile burning site preparation*

#### 4.2.2.2.3.2. Mechanical Site Preparation

Mechanical site preparation has occurred on areas where other site conditions preclude the use of prescribed fire. Treatments have typically consisted of creation of well-spaced plantable spots using a small excavator. Risk of soil compaction is carefully considered prior to mechanical site preparation:

- Assess slash loading and machine trafficability during post harvest inspections and residue surveys.
- Schedule mechanical site preparation accordingly to meet regeneration stocking standards.

#### 4.2.2.2.4. Nurseries and Planting Stock

*We engage nurseries to produce healthy planting stock to exacting specifications that will maximise the survival and growth of our plantations.*

Planting stock is produced on contract by independent nurseries on Vancouver Island and the Lower Mainland. Stock produced is based on annual sowing requests submitted to the MoF. The majority of seedlings are grown in styroblock containers with larger transplanted seedlings used for high brush hazard sites. Recent research on TFL 37 indicates that nursery treatments such as pre-lift fertilisation and application of animal repellents may provide improved seedling performance at lower costs relative to on-site treatments. We will continue to work with nursery staff and Forestry Canada to develop treatment alternatives and incorporate these into our operational silviculture program.



*Inspecting seedlings at a local nursery*

#### 4.2.2.2.5. Regeneration Monitoring and Surveys

*We survey all newly regenerated stands to ensure that appropriate species and stocking is achieved by the free-growing stage of development.*

All areas are surveyed in accordance with applicable stocking standards using MoF survey methods. Generally speaking, on TFL 37 this involves:

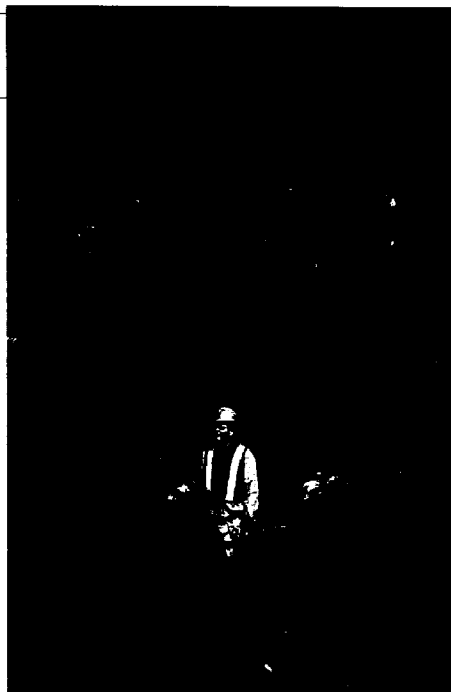
- A regeneration survey within 3 years of harvest completion.
- A free-growing survey within 11 years of harvest completion.

- Numerous other specialised surveys and walkthroughs such as planting survival assessments and brush assessments as required to ensure that site productivity is maximised.
- The recent forest re-inventory identified 480 ha of potentially not satisfactorily restocked (NSR) lands on TFL 37 that were not previously recognised. These areas are potentially NSR as this label was attached to polygons for which the classification was uncertain.

**Assess identified NSR lands on the ground and regenerate/reclassify accordingly.**

Regeneration and free-growing surveys are completed by deadlines outlined in stocking standards using MoF methods. Surveys are scheduled and tracked in our silviculture database and results are reported to the MoF through the Major Licence Silviculture Information System (MLSIS). Where required, planting plot data may be used to indicate and report stocking level. Survey plans are prepared each year that outline locations and survey specifications.

*Forester conducting a free-growing survey*



#### **4.2.2.2.6. Basic Spacing**

*We exercise basic spacing measures to prevent the potential repression in growth of regenerated stands associated with excessively dense stocking.*

The provincial Chief Forester has directed that basic spacing be conducted on all sites for all species where the number of stems exceeds specific stocking levels per hectare as outlined in the TFL standards (Appendix XV). We will closely monitor regenerated stands for over-stocking and treat appropriately.

Basic spacing will not be employed on salal phase sites. Research has shown that rapid development and maintenance of a dense overstory of trees is required to shade out competing salal. Our strategies will be guided by these research results on similar sites.

#### **4.2.2.2.7. Brushing and Weeding**

*We brush where required to ensure that all newly regenerated stands reach a free-growing stage of development as promptly as possible.*

Brushing treatments are completed as required to ensure that free-growing status is achieved in accordance with stocking standards. Treatments used are in accordance with Ministry of Environment and MoF legislation. This may involve the use of manual, mechanical or chemical methods. No aerial herbicide treatments are applied on TFL 37.

Pre-harvest ecosystem classification has proved invaluable in the identification of and planning for areas having a high risk of brush encroachment. High-risk areas are promptly planted with higher densities of large genetically improved planting stock with the aim of reducing the need to apply herbicides or costly mechanical treatments. This regime has resulted in a reduction of our brushing program (Table 10).

**Table 10      Brushing Treatments by Year <sup>1</sup>**

<b>Year</b>	<b>Total Treated (ha)</b>	<b>Mechanical (ha)</b>	<b>Chemical (ha)</b>
1990	317	55	262
1991	101	13	88
1992	231	55	176
1993	76	38	38
1994	116	13	106
1995	0	0	0
1996	20	0	20
1997	19	19	0

<sup>1</sup> Expanded from Table 1 in Appendix IX.

We are also experiencing success with mechanical treatments of salmonberry and red alder. Timing of these treatments is critical to ensure efficacy.

We will prepare and maintain vegetation management plans to allow sufficient lead-time for First Nations, public and interest group consultation in Pesticide Use Permit applications and treatment scheduling.

- Utilise ecosystem mapping and GIS to construct a vegetation management plan. This will involve identification of high-risk areas on our proposed Forest Development Plan.
- Use the plan to schedule customised reforestation regimes with the overall aim of reducing the need for brushing treatments.

#### **4.2.2.2.7.1.      Use of Chemicals - Herbicides**

Glyphosate (brand name Vision) and Triclopyr (brand name Release) are currently the only chemicals registered for use for forestry applications in British Columbia.

As stated above, one of the central goals of our silviculture strategy is to reduce the need for brushing. Chemical brushing is recommended only after all alternatives have been carefully considered. All herbicide application is completed by government licensed contractors under the supervision of Canfor staff.

All chemical treatments on TFL 37 are ground based. Precautions taken before and during treatment focus on ensuring that herbicides do not enter water. All watercourses are clearly marked prior to treatment. This includes a minimum 10 metre pesticide free zone and a 5-metre buffer zone on any moving water. Under the Code, areas adjacent to high value fish streams require riparian reserve zones of up to 50 metres. Thus there would be no chemical application within 50 metres of these waters.

No treatment zones, contractor application equipment and application rates are monitored by both Canfor staff and Ministry of Environment officials during and after treatment. Application rates used are in the range of 1.8 kg per hectare for Glyphosate.

#### 4.2.2.2.8. Road Rehabilitation

*We rehabilitate temporary roads to maximise the landbase available for timber production.*

*During the 1980s, we recognised the opportunity to rehabilitate and restock unused spur roads. Following preliminary work that showed favourable results the decision was made in 1987 to rehabilitate all redundant roads. To date, we have put 376 kilometres (564ha equivalent) of roads back into production. The majority of this reclamation has occurred on sites of medium to high site productivity on lower to mid elevations. This ongoing program has resulted in significant reduction in site loss.*

*Site occupancy due to all roads and railway on the net operable land area currently roaded totals 3.98%. With primary mainlines and the railway discounted, the area associated with secondary and spur roads meets the MWP 7 target of 3.5%.*

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***Continue road rehabilitation program to meet target of 3.5% area netdown for future roads.***

---

*During pre harvest reconnaissance we assess the sensitivity of soils to disturbance, and determine whether site conditions will be suitable for rehabilitation work once timber harvesting and reforestation operations are complete. Roads planned for subsequent rehab are identified and constructed accordingly. Generally speaking, they are kept as narrow as reasonably possible and organic material is set aside to be mixed back into the road material following completion of harvesting operations. Maintenance of organic material is key to preserving site productivity.*

*In 1996, in accordance with MWP 7 commitments, a study was implemented to determine long term productivity of rehabilitated roads across a range of site types, elevations and tree species. Performance of seedlings on roads is compared against controls in "undisturbed" portions of adjacent plantations. This study is funded by Forest Renewal B.C.*

*Results to date are inconclusive, however most road plots are showing seedling survival and growth rates at least equal to those of the controls. Conclusive results are expected following re-measurement in 1999.*

---

***Maintain and re-measure all road rehabilitation trial installations according to the research plan schedule.***

---

*The findings from this road rehabilitation trial will be used to make any necessary adjustments to overall rehabilitation strategy.*

- *Re-measurement and analysis of trial installations will be completed in the fall of 1999, 2001 and 2006.*
- *Over the term of this plan we intend to investigate the viability of rehabilitation investments on high elevation sites.*

#### 4.2.2.2.9. Silviculture Prescriptions

*Silviculture prescriptions are a site specific application of the strategies designed to achieve a free-growing stage of development according to accepted standards.*

*Our prescriptions are consistent with management strategies and landscape level objective.*

*SPs are prepared and approved for all blocks prior to harvest. We will ensure, for the area under an SP, that the prescription:*

- Is consistent with the silviculture system selected for the area.*
- Demonstrates that the free-growing stand specified in the prescription will be established to meet the target requirements specified in the prescription within the free-growing assessment period specified in the prescription.*
- Demonstrates that growth of ecologically suitable species will occur at the site.*
- Demonstrates that protection of fish, wildlife, recreation, scenic, soil, water, cultural heritage and other resource use values will be facilitated.*
- Describes any action required to achieve known landscape level objectives for stand structure and species composition.*



*Forester collecting data  
for a silviculture prescription*

#### 4.2.2.3 Incremental Silviculture

*We support an incremental silviculture program to create employment opportunities for local communities while improving the quality of second growth stands.*

*There is a long history of incremental silviculture treatments on TFL 37 (Appendix IX). Treatments have included juvenile spacing, pruning, fertilisation, and stand conversion. Since 1976 we have maintained consistently high levels of treatment and adapted treatments to incorporate non-timber values such as wildlife habitat enhancement. This has contributed to significant employment for the local silviculture contracting community and First Nations. Incremental treatments on a site specific basis are guided by stand management prescriptions (SMP). The following sections outline specific treatment strategies for our incremental silviculture program.*

#### 4.2.2.3.1. Site Rehabilitation and Deciduous Conversion

*We rehabilitate sites and convert deciduous stands to provide harvest opportunities and to maximise the landbase available for timber production.*

No site rehabilitation projects were completed over the past five years. This was due in large part to the fact that the majority of deciduous stands occur in areas near major streams. With improved inventory data and a better understanding of and experience with Code requirements for riparian zones, an opportunity exists to assess and treat deciduous stands. The recent forest re-inventory identified scattered, deciduous-leading stands within the net operable landbase, totalling 557 hectares.

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#### **Assess deciduous stand types and develop strategies to rehabilitate, convert or enhance these stands.**

---

Accordingly, we will:

- Ground check candidate stands identified in the re-inventory.
- Prepare SMPs for areas eligible for treatment. Immature stands of deciduous species will not be converted to conifer if a merchantable stand can be produced under the existing conditions within a reasonable time frame.
- Harvest schedules for merchantable deciduous stands will be determined by log market conditions.

Once assessed, treated and/or harvested, these areas will be managed according to the silviculture strategy and appropriate site series (see Appendix XV). Future managed stands include 192 hectares of patchy areas on floodplains that may be managed for conifers, mixed hardwood/conifers or hardwoods only.

#### 4.2.2.3.2. Tree Improvement

*We support a tree improvement program to produce or obtain the highest volume gain and/or pest resistant reforestation material available.*

The supply of genetically improved seed for western hemlock, high elevation Douglas fir and western white pine is currently being met from three producing orchards at Canfor's Sechelt Seed Orchard site. Low elevation Douglas-fir, western redcedar, and sitka spruce improved seed is purchased from other private producers.

Our ten-year tree improvement plan aims at the following:

- Doubling the current volume gain or pest resistance of material out-planted on TFL 37 for each species that has a MoF breeding program.
- Managing all current orchards to maximise breeding values until new and developing orchards replace them.
- Increase production to provide all western hemlock, Douglas-fir, western white pine, western redcedar and yellow cedar needs.
- Minimise risk to wood quality objectives and/or genetic diversity across the landscape.

Preliminary sensitivity analysis indicates that tree improvement has a significant impact on harvest flow. Forest level modelling indicates that long run harvest levels could be increased if genetic gain estimates prove successful. Over the term of this plan we will continue to explore the forest level benefits of increased productivity expected from our proposed tree improvement program.





*Pollinating cones at Canfor's Sechelt Seed orchard*

*In addition to supporting the MoF tree breeders by providing test seed and sites, we are currently proponents of the following research trials to help us achieve the above goals:*

- *Conduct a progeny test our high elevation Douglas fir orchard.*
- *Determine the field rust resistance value of our western white pine orchard.*
- *Determine differences between growth characteristics of western hemlock rooted cuttings versus seedlings from the same high gain families.*
- *Compare weevil resistance and growth patterns of resistant sitka spruce seedlots, cuttings and somatic seedlings in the field.*
- *Develop large amounts of yellow cedar cuttings through tissue culture.*

*Appendix XVI outlines current seed inventory.*

#### **4.2.2.3.3. Juvenile Spacing**

*We juvenile space selected stands to provide employment opportunities, improve future thinning and harvest opportunities, manage risks to forest health and maintain biological diversity*

*Spacing is the cutting of undesirable trees within a young stand to reduce competition among the residual trees for water, nutrients and sunlight. The cut trees are usually not removed from the site. Spacing is done to:*

- *Control density to meet tree growth objectives.*
- *Meet biodiversity and wildlife habitat resource objectives.*
- *Maintain or enhance forest health.*
- *Manage species composition and stand structure.*
- *Increase stand value.*

*Typically the effects of reducing stand density are:*

- *An increase in growth of residual trees.*
- *An increase in juvenile wood production and an increase in average knot size.*

- *A reduction in the length of financial and technical rotations and an increase in rotations based on the culmination of mean annual increment.*
- *Avoidance of height-growth repression that can occur in high density stands growing on poor sites.*

*On an annual basis, we have juvenile spaced an average of 450 hectares of young stands over the past 10 years. Juvenile spacing standards are outlined in Appendix XIV.*



*Silviculture worker spacing trees*

*Over the term of this plan we intend to investigate opportunities and revise standards with the aim of maintaining or creating multi-tiered stands following spacing treatments. We will continue to investigate methods of improving stand quality and wildlife habitat enhancement through spacing treatments.*

#### **4.2.2.3.4. Pruning**

*We prune selected stands to provide employment opportunities, improve future stand values, manage risks to forest health and maintain biological diversity.*

*Pruning is the removal of branches from the stem of a tree to promote the production of knot-free or clear wood.*

*Pruning improves stand and forest values by:*

- *Reducing the size of the knotty core and increasing clear wood production.*
- *Improving wood quality of some species by speeding the change from lower value juvenile wood to higher value mature wood.*
- *Increasing the log and lumber value by increasing the proportion of clear wood produced.*
- *Reducing stem taper.*
- *Reducing the impact of white pine blister rust.*



*Silviculture worker pruning a Douglas-fir*

*To date, we have pruned approximately 1400 hectares under various sources of government funding (Appendix IX). Areas treated are typically Douglas-fir leading stands on good sites.*

*Appendix XIV outlines standards for pruning treatments.*

*We will treat stands consistent with product strategy and only those sites that are targeted for large, 45cm+ sawlog production. Pruning treatments may also be employed to create forage for wildlife.*

#### **4.2.2.3.5. Fertilisation**

*We fertilise selected stands to accelerate growth at strategic stages of development.*

*Fertilisation is a silviculture treatment that can be effectively used to increase the merchantable yield and value of established forests. By adding nutrients that are limited on a site, fertilisers can improve the growth of individual stands. However, with knowledge of the timber supply profile and the timing and magnitude of wood supply needs, fertilisation can also be strategically used to accelerate the development of specific age classes and timber types. This is done to facilitate an even supply of wood at the forest level.*

*The response of a forest stand to fertilisation is best considered as a reduction in rotation length. Fertilisation accelerates the rate of stand development. A fertilised crop will therefore generally not differ significantly from a non-fertilised crop grown over a longer rotation.*



*Helicopter applying fertiliser*

To date, 7600 hectares have been fertilised on TFL 37 under various government funding mechanisms (Appendix IX). Treatments have consisted of aerial applications of nitrogen, (Urea fertiliser 46-0-0). Areas treated are typically Douglas-fir leading stands on medium sites. Recent foliar analysis indicates that deficiencies exist for nitrogen and other key nutrients especially on sites that were burned by wildfire earlier this century.

Appendix XIV outlines fertilisation standards.

Over the term of this plan we will:

- Utilise TEM data, new timber inventory, fire history data and fertilisation standards to construct a 5-year fertilisation plan.
- Conduct foliar analysis to ensure correct match of fertiliser mix to stands.
- Explore the forest level impact of various fertilisation regimes and adjust treatment priorities if necessary.

#### 4.2.2.4 Product Objectives

We establish product objectives to provide a diversity of species, quality and sizes that optimise the growing potential of each stand.

Our product objectives will provide manufacturing and marketing opportunities in the long-term.

Product objectives have been developed for all site types on TFL 37. Appendix XVII outlines log sizes and target stand volumes by site series. Specific objectives were developed using a combination of the following:

- Input from a survey of key manufacturing, sales and production staff in the company. This gave insight into species priorities and log specifications anticipated to provide maximum product flexibility in future.
- Site series specific stand and stock tables and log grade profiles produced by stand-level growth and yield models (Section 4.4.3.4).

Product strategy assumptions were integrated into the silviculture standards and procedures (Appendix XV). This strategy refines species, grade and piece size profile to plan harvesting and log processing opportunities in the long-term. Minimum harvest ages were determined based on product piece size and minimum volume objectives. Species selection by site series was determined by considering both ecological suitability and outlooks for product needs.

### 4.2.3 Forest Protection

We integrate forest protection measures into operational and strategic plans to mitigate loss and damage to timber resources and property from fire, insects, diseases and other damaging agents.

#### 4.2.3.1 Wildfire

A fire management plan is an internal document that contains specific goals, objectives, and standards for the use, application and control of fire to meet land and resource management objectives. Each year we submit a pre-organisation plan to the MoF, which outlines active logging areas and corresponding map co-ordinates.

*Our wildfire control strategy is guided by the following:*

- *Apply fire control measures within three minutes of discovery.*
- *Extinguish all fires in the shortest possible time and return to normal operations or conditions as soon as possible.*
- *Control all wildfires by 10:00 a.m. of the day following discovery.*
- *Minimise the potential negative effects of fire suppression activities on water quality and fish habitat without compromising effective wildfire control.*

#### **4.2.3.1.1. Wildfire Prevention, Detection and Suppression**

*As a statement of fire policy and action, a fire control plan, including the fire preparedness plan, includes standards and tactics for:*

- *Fire weather index monitoring and interpretation.*
- *Pre-suppression organisation.*
- *Fire detection and reporting.*
- *Initial attack plan and procedures.*
- *Continued attack.*
- *Safe work procedures.*

*Fire access routes are considered in developing road access plans (Section 4.2.1.7.5.1).*

#### **4.2.3.1.2. Fuel Management**

*Forest ecosystems on TFL 37 suggest the interval between fire disturbances is generally 250 to 350 years. Fuel management considers the hazard from forest fuels at the planning stage, before disturbances take place. The forest development plan identifies areas that will be disturbed or altered by harvesting. It also shows that adjacent areas disturbed from harvesting, post harvest activities, silviculture treatments and natural events such as wind and insects are considered.*

*Providing a reasonable opportunity of preventing wildfire spread between contiguous disturbed areas involves consideration of a fuel management plan as cut blocks are proposed for harvest. The fuel management plan identifies natural fuel breaks such as rock and waterbodies, and fire-resistant forest types to classify areas according to low, moderate and intense risk levels of spreading wildfire. In addition, current green-up and hydrological requirements provide some protection of spread by limiting the size of areas harvested.*

#### **4.2.3.1.3. Use of Chemicals**

*If circumstances permit, the use of fire fighting chemicals is avoided. However, our fire suppression procedures may utilise a gelling agent, a fire suppressant foam concentrate and a fire retardant to provide effective wildfire control. When the use of chemicals is necessary the following procedures are then considered:*

- *Avoid aerial application of fire fighting chemicals within 30 m and ground application within 15 metres of any streamside, riparian or lakeshore management area.*
- *Locate all large-scale mixing operations in community watersheds at approved sites.*

- *Locate large-scale mixing operations a minimum of 60 m from the nearest natural water source, and use containment berms or structures capable of retaining 100 percent of mixed fire fighting chemicals.*
- *Make a spill prevention and response plan for all large-scale mixing operations. Personnel operating the mixing unit should be knowledgeable in procedures for preventing and responding to spills.*
- *Make every reasonable effort to recover spilled chemicals and remove them from the site or use them on the fire line.*
- *Collect residual quantities of mixed chemicals from the mix and dip tanks, wash chemicals from pumps, hoses, tanks and berms, and dispose of them safely.*

#### **4.2.3.2 Forest Health**

*We manage forest health issues in a manner that maintains, recovers or enhances the short- and long-term productivity of the forest resources.*

*There have been no serious disease outbreaks on TFL 37. However, insect epidemics have caused considerable damage. Appendix IX outlines the history of disease and pest incidence on the landbase. A forest health plan is prepared and submitted with forest development plans.*

##### **4.2.3.2.1. Pest Prevention, Detection and Control**

###### **4.2.3.2.1.1. Insects**

*A number of pest species exist on TFL 37 and populations are monitored and/or managed to reduce the risk of spread and impact on the timber resource.*

*Known pest species of concern to Canfor personnel include the following:*

- *Western blackheaded budworm (Acleris gloverana) – This pest has appeared in epidemics several times over the past 30 years. Small outbreaks of this pest were noted in 1997. Populations will continue to be monitored.*
- *Hemlock sawfly (Neodiprion tsugae) – During 1996 and 1997, populations of this pest reached epidemic levels in an adjacent TFL to the south. Populations now appear to be in remission. Evidence of outbreaks will continue to be monitored during aerial reconnaissance.*
- *Balsam fir bark beetle (Pseudohylesinus sericeus) - A small outbreak of this pest caused mortality to standing balsam timber on approximately 15 hectares on an adjacent tenure. All affected timber was salvaged in a timely fashion. Outbreaks of this pest in coastal areas are considered rare and it usually infests dead or dying timber. The outbreak will be monitored but it is not expected to spread beyond current levels.*
- *Ambrosia Beetle (Trypodendron lineatum and Gnathotrichus sulcatus) - Since 1981, we have operated a pheromone trap system for capturing ambrosia beetles. This system provides protection for decked logs at the Beaver Cove dryland sort. A total of 204 traps are maintained to control this pest.*
- *Sitka spruce weevil (Pissodes strobi) – This pest has essentially eliminated sitka spruce as a reliable option in the reforestation program on TFL 37. This is an extremely valuable and productive tree species and we intend to get it back into our portfolio. We are co-operating with the MoF, B.C. Research and the Canadian Forestry Service in the development of weevil resistant planting stock. Several test plantations across TFL 37 will be closely monitored.*

Canadian Forestry Service staff routinely monitor our operation and we cooperate fully in this program. Monitoring operations may include specific insect detection flights by Canfor, MoF and CFS personnel. At least once per year a comprehensive aerial survey is conducted to collect information on windthrow and to check for evidence of insect attacks. Reports of attacks from Canfor staff and the public are immediately followed up. Records of findings are recorded in Forest Health files. Stand level incidence is recorded in specific opening files and our silviculture record keeping database, Phoenix.

Our pest control strategy is largely proactive and is designed to minimise risk. Generally speaking, history has shown that insect outbreaks usually target one tree species and populations are ultimately controlled by biological factors. To control potential damage and minimise losses, Canfor manages for a mix of ecologically suitable species both at the stand and landscape level. In the event of a potentially catastrophic insect outbreak, our intent would be to cooperate with government agencies and neighbouring licensees in designing and implementing a co-ordinated control program. Aerial application of pesticides may be required to control a catastrophic outbreak.

#### **4.2.3.2.1.2. Diseases**

The following diseases are of concern to forest managers in the Nimpkish Valley.

- White pine blister rust (*Cronartium ribicola*) - Very few western white pine reach merchantable size because of mortality caused by this disease. Western white pine has a rapid growth rate, is adaptable to a variety of different growing sites and is relatively resistant to root diseases. Therefore, it is important that white pine blister rust is overcome. As a means of control, the lower branches are pruned from healthy white pine trees. Pruning specifications are included in the Silviculture Strategy. Also, through our tree improvement program, we are aggressively working toward production of rust resistant families. Our white pine breeding and testing program is carried out in cooperation with the MoF.
- Root rots (*Fomes annosus*, *Armillaria mellea* and *Phellinus weirii*) - Isolated patches of root rots occur in immature and mature forest stands. Because the problems associated with these root rots are aggravated by commercial thinning and juvenile spacing, root rot infections are identified and careful consideration is given before implementing intensive forest management treatments for these areas. Root rots appear to favour certain ecosystem types on TFL 37. Specifically, CWHxm site series 03 and 01 and CWHvm1 site series 03 have been found to have higher incidence of root rots. During pre harvest reconnaissance, areas are checked for evidence of root rots. Where evidence is found, full root rot grid surveys are completed and disease centres are marked in the field and accurately mapped. Affected areas receive a specific prescription to control the spread of disease. Control measures may include push falling, stump pulling, planting of resistant tree species or a combination of these treatments.
- Dwarf mistletoe (*Arceuthobium tsugense*) - This parasitic plant occurs in immature hemlock stands originating from harvested areas that are not burned. Such patches are centred around severely infected residual trees. Studies show that volume losses in trees with moderate and severe infections average 24% and 42% respectively. Therefore, to prevent transmission of the parasite to young stands, freshly harvested sites with known infections are burned or residual hemlock trees on unburned sites are cut after logging.

At the stand level, disease control prescriptions are included in SPs that are kept in opening files. Specific activities or actions required are forward planned and tracked in Phoenix. Records of surveys, plans and treatments are kept in opening files. Applicable activities are reported through MLSIS.

#### 4.2.3.2.1.3. Other Damaging Agents

- Roosevelt elk (*Cervus elaphus* spp. *roosevelti*) – *These animals can cause significant damage to young plantations. Damage is caused through browsing of planted seedlings or physical damage to stems from rubbing antlers. Areas are assessed for elk populations and seedlings are protected with various devices. We are currently experimenting with 3 types of browse protection: stucco wire cages, Sinocast tree cones and Plantskydd (a chemical repellent). Approximately 20,000 browse protection devices were installed on known elk sites in 1997.*
- Columbian black-tailed deer (*Odocoileus hemionus* spp. *columbianus*) – *These animals also cause damage to young plantations by browsing seedlings. Deer particularly favours Western redcedar. Damage prevention is similar to that for elk. Seedlings may also be "hidden" in heavy slash as deer will avoid difficult terrain.*
- Windthrow – *Windthrow is an ongoing problem on the landbase. At least once per year an aerial survey for windthrow is completed and salvage operations are aggressively implemented. We are currently experimenting with control methods such as helicopter pruning and feathered edges on cutblocks (Section 4.4.3.5).*

#### 4.2.3.2.2. Use of Chemicals

*No chemicals were used during the term of MWP 7. Under normal (endemic) circumstances, the use of chemicals to control pests is not anticipated over the term of this plan.*

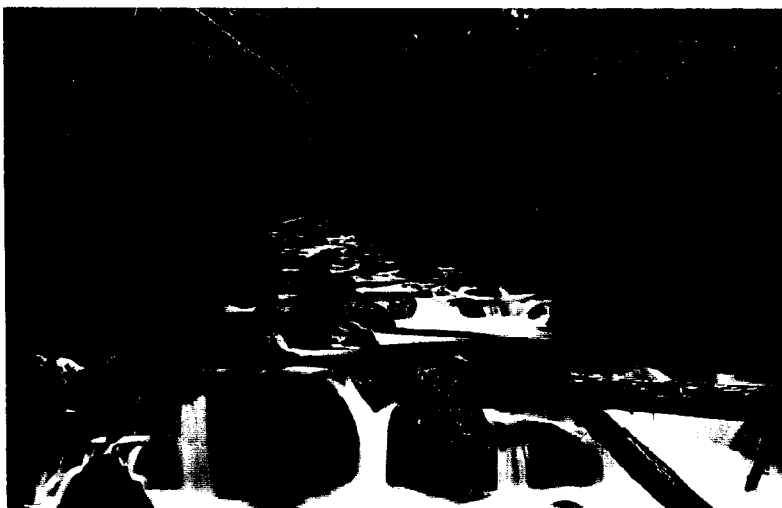
*Should a catastrophic outbreak occur, any chemical use for control of pests will be subject to plans and permits approved by regulating agencies.*

## 4.3 Integrated Resource Management

### 4.3.1 Fisheries and Aquatic Resources

*We protect and restore, where necessary, the quality and quantity of fish habitat.*

*Riparian habitats occur along streams and around lakes and wetlands. In order to protect riparian and aquatic habitats, riparian management reserves that exclude timber harvesting, and riparian management zones that restrict timber harvesting are established according to detailed stream assessments.*



*Fish stream – Claude Elliot creek*



Coastal fisheries/forestry stream classification on TFL 37 was based initially on the 1981 stream classification by our fish biologist and local knowledge. This information was updated to Fish Forestry Guideline standards and was further updated to Code standards in June 1997. These standards designate streams into six riparian classes - S1 to S6. Each stream reach receives a stream riparian classification based on presence of fish, occurrence in a community watershed and average channel width. Table 11 describes the criteria for stream riparian classification.

**Table 11 Key to stream riparian classification**

No ← Is the stream a fish stream or in a community watershed? → yes			
Average Channel Width	Riparian Class	Stream Width	Riparian Class
> 3 metres	S5	> 20 metres	S1
≤ 3 metres	S6	> 5 to 20 metres	S2
		1.5 to 5 metres	S3
		< 1.5 metres	S4

The updated stream riparian classification utilised local knowledge of fish presence from the former stream coverage. As this digital coverage did not provide sufficient stream width information to Code standards, all fish streams were identified as S1 or S2. Accordingly, we applied the more restrictive management criteria appropriate to S2 streams to streams that may actually be S3 or S4. In a few cases however, either field confirmation or estimates of stream width from orthophotos provided sufficient detail to classify the S3 and S4 streams.

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**Reclassify all fish streams, lakes and wetlands to our new operational base.**

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We will initiate a fish inventory project in 1998. The primary objective is to classify the updated streams. In order to achieve the primary objective, the first step to be completed is a GIS analysis of all the streams on TFL 37. By using the GIS, we can determine the stream reach breaks based on gradient and stream width. Streams which have a gradient of less than 30% will be classified as having fish potential and streams greater than 30% will be classed as no fish potential (Appendix XXI).

Data on fish and fish habitat have been collected for over 20 years in the Nimpkish Valley by various groups, such as Canfor, 'Namgis First Nation, MoELP and DFO. Where field data are lacking, a sampling strategy will be developed based on the Resource Inventory Committee's (RIC) 1:20,000 Reconnaissance Fish and Fish Habitat Inventory specifications.

In addition, fish inventories will be carried out in proposed cut blocks if a stream has potential to support fish populations but no fish were observed during the layout stage.

#### **4.3.1.1 Fish Hatcheries**

Four fish hatcheries are located on TFL 37. The Stolt Sea Farm fish hatchery is a commercial hatchery located near Beaver Cove (Section 4.3.11). Non-commercial hatcheries include the Woss Community Hatchery, G'wani Hatchery and Port McNeill Chinook Club. Fish farms and packers are discussed later in section 4.3.11. Canfor will help maintain local fish hatcheries through local support.



*Checking eggs at Woss Community Hatchery*

#### **4.3.1.2 Stream Restoration**

*In 1997, under the Forest Renewal B.C. watershed restoration program, we conducted fish stream restoration activities on the Lukwa and Meadow creeks and the Davie and Kilpala rivers. Restoration activities include removal of log jams, stream bank protection, creating pools, diverting streams back into old channels and building fish ladders. Many potential future projects have been identified. Canfor will prepare and submit high priority project proposals to MoELP for in-stream restoration activities.*

*Spyder excavator  
used in stream restoration*



#### **4.3.1.3 Fish and Fish Habitat Research**

*In the past, the fish program has focused on fish inventory for FDP purposes rather than habitat enhancement research. In 1997, Canfor began exploring partnerships to conduct research on sockeye habitat enhancement.*

*Canfor will partner with 'Namgis First Nation, York University, DFO, MoELP, and the Nimpkish Resource Management Board to develop a research project on the effects of lake fertilisation of the food web.*

### 4.3.2 Wildlife Program

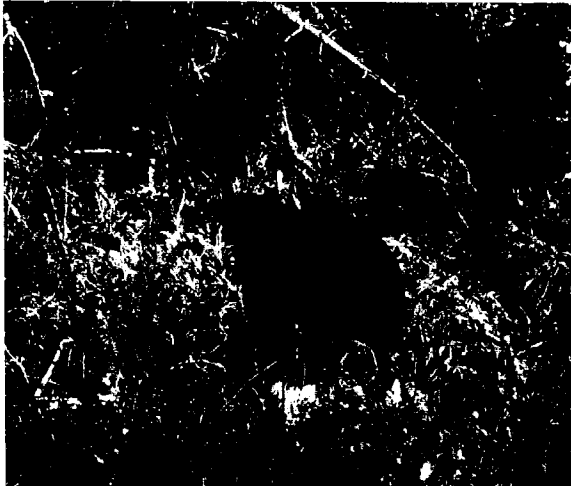
*We will address habitat concerns for identified wildlife species on TFL 37.*

*TFL 37 contains a great diversity of wildlife and habitats. The Code defines wildlife to include vertebrates (mammals, birds, reptiles and amphibians), fish, crustaceans and molluscs, and threatened or vulnerable plant or animal species. It also includes the eggs and juvenile stages of these vertebrates and invertebrates.*

*Thirty-three native mammal species reside on TFL 37. Some of these include Columbian black-tailed deer, Roosevelt elk, black bear, wolf, cougar, beaver, and marten. The Keen's Long-eared Myotis is the only mammal present on TFL 37 that may be classified as an "identified wildlife" species (Volume 1, page 96 of the November 1997 Draft Identified Wildlife Management Strategy).*

*There are nearly 130 native bird species on TFL 37. Bird species on TFL 37 currently classified as identified wildlife include marbled murrelet, Queen Charlotte goshawk, a sub-species of the northern goshawk, turkey vulture, and American bittern.*

*Canfor was the first forest company in B.C. to hire a biologist on staff. From 1973 to 1992 the focus of the wildlife program was Columbian black-tailed deer inventory and research. The focus shifted in 1992 to non-game species such as small mammals and forest birds. Canfor's present wildlife program consists of eighteen inventory, research and enhancement projects (Appendix XIX). Data collected from these projects are used both at a cutblock level and a landscape level. At a cutblock level, the information has been used and will continue to be used for both cutblock and wildlife tree patch design. At a landscape level, the data has been used to develop a landscape level approach to habitat management. In addition, the data will be used to develop an ecosystem restoration plan for the Tsitika-Woss Special Management Zone.*



*Black bear*

*Cougar*



*Columbian Black-tailed Deer**Roosevelt Elk*

#### **4.3.2.1 Wildlife Inventories**

Since 1992, Canfor has initiated the following inventories: Bald eagle (blue-listed until 1996) nests, owls (2 species are blue-listed), marbled murrelet (red-listed), coarse woody debris, vegetation (not VRI), Queen Charlotte Island goshawk (red-listed), wildlife trees, birds in various stand-level biodiversity treatments. Canfor will partner with provincial and federal government agencies to develop inventories and habitat maps for Queen Charlotte goshawk and marbled murrelet.

*Marbled Murrelet*



*Hairy Woodpecker*

#### **4.3.2.2 Wildlife Habitat Research**

Since 1992, Canfor has initiated the following habitat research projects: small mammals, bats (one species is registered as both a red-listed endangered species and the other is blue-listed), black bears (partnered with MoELP), and woodpeckers. Our research on red and blue listed species has been supplemented by MoELP and Canadian Wildlife Service projects on TFL 37 including: Queen Charlotte goshawk, white-tailed ptarmigan and marten/ermine. We will partner with the provincial government and universities to develop further habitat research on Queen Charlotte goshawk.



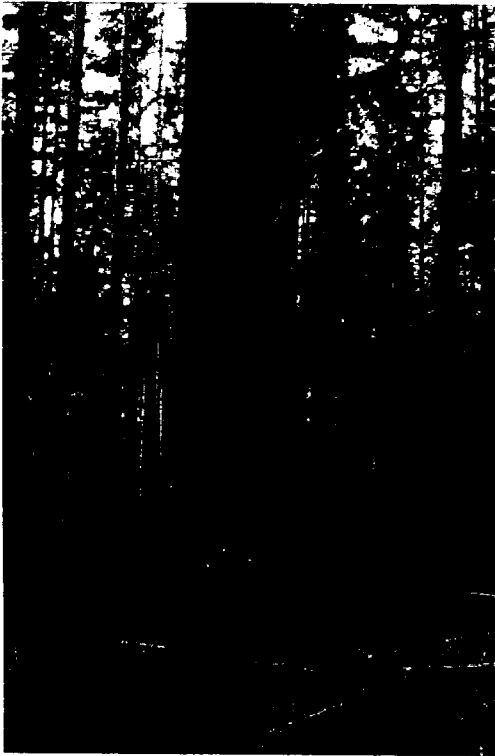
*Queen Charlotte Goshawk nest*



*Black bear den in western redcedar tree*

#### 4.3.2.3 Wildlife Habitat Enhancement and Restoration

Since 1992, we have initiated the following wildlife habitat enhancement / restoration projects in second growth forests: artificial snag planting, owl nesting habitat, swallow nesting habitat, kestrel nesting habitat, bat roosting habitat and deer winter range. In the future, we will explore additional wildlife habitat restoration techniques, particularly for application in the Tsitika-Woss SMZ, as per VILUP. We will continue to install artificial snags on de-built roads within newly logged areas within SMZs. We will also explore partnerships with universities and government on research projects focusing on habitat restoration of identified wildlife species.



*Wildlife tree (snag) in existing managed forest*



*Creating future wildlife trees*

#### 4.3.2.4 Wildlife Habitat Mapping

In 1983, the provincial cabinet approved an ungulate winter range plan for TFL 37. This plan deferred 6,369 ha of ungulate winter range for up to 20 years and the government agreed to fund research into deer winter range creation in second growth forests. Some of these winter ranges are poor quality in terms of suitable ungulate winter habitat but represent good logging opportunities. There appear to be areas of good winter range that have poor logging opportunity outside current winter ranges. Therefore, we will explore trades for existing low quality, non-critical designated winter range for higher quality, non-designated winter ranges. There will be no net loss of either productive forest area or critical winter range as a result of the revisions to the 1983 Ungulate Winter Range Plan.

The Code now addresses the establishment and grand-parenting of ungulate winter ranges. On October 13, 1998, the MoF and MoELP recommended 77 ungulate winter ranges for grand-parenting within the Nimpkish Valley, totalling 6582 hectares. Excluding ungulate winter range areas within new parks, 6188 hectares fall within the TFL working area. According to the Code, ungulate winter ranges must be confirmed before October 15, 2003 by the provincial the Chief Forester and Deputy Minister of MoELP.

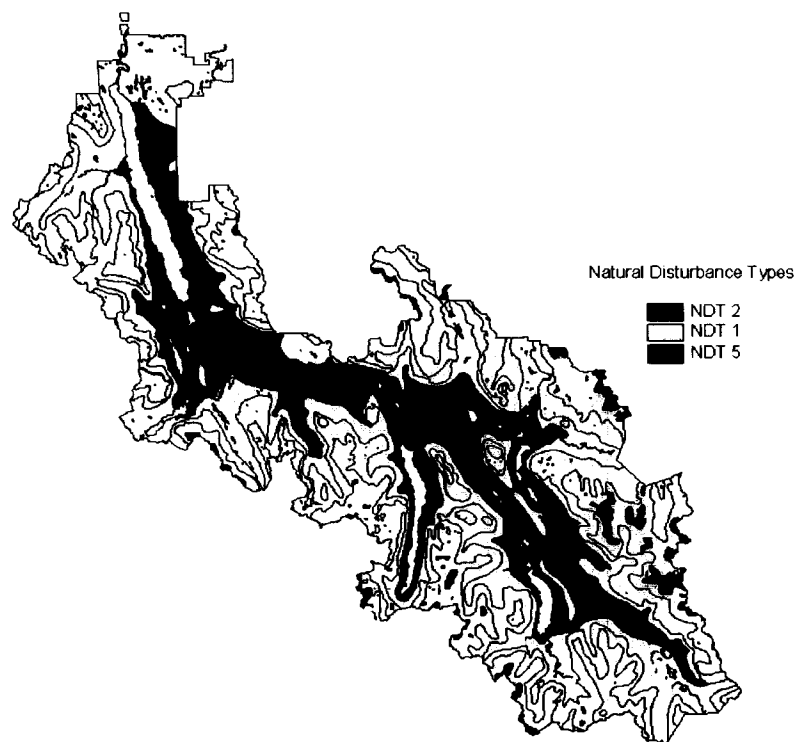
Where possible, we identify and protect trees with known black bear dens and raptor nests. This is largely achieved by familiarising our engineering and forestry crews on characteristics of black bear dens and raptor nests so that they can identify these resource features during road and cutblock layout and cruising.

### 4.3.3 Biological Diversity

*We apply an ecological approach to maintain biological diversity and suitable habitat conditions for all native species.*

Biological diversity, or biodiversity, is the full range of living organisms in all their forms and levels of organisation. It includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. The Code acknowledges the importance of conserving biodiversity, and a supporting guidebook has been released that addresses stand- and landscape-level biodiversity management in a variety of ecological units found within the province. A major consideration in managing for biodiversity at the stand level is the retention of wildlife tree patches. At the landscape level, the major biodiversity concerns involve leaving sufficient and appropriately located old-growth forests for species dependent on, or strongly associated with old-growth forests.

Figure 5 illustrates that most of TFL 37 falls within the natural disturbance type (NDT) 1 classification, in which stand-initiating events such as fire and windthrow are considered rare. The balance of the land base is identified as NDT 2 where stand-initiating events are considered infrequent.



**Figure 5** Natural disturbance types within TFL 37

Managing for biological diversity is currently focusing on stand-level management. Until recently, Canfor has been retaining 7% of the total area under prescription within each silviculture prescription for stand-level biodiversity. In 1998, Canfor conducted a landscape level analysis to determine the level of wildlife tree patch retention required by Table 20(b) of the biodiversity guidebook. On April 6, 1998 we received approval from MoF to apply Table 20(b) to all new cutblocks being engineered.

*In terms of landscape level biodiversity, the VIRT process has not been finalised. When it is, VIRT will establish the landscape unit boundaries, biodiversity emphasis options and the landscape level biodiversity objectives.*

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***Conduct a landscape level biodiversity analysis once the VIRT process is complete.***

---

*The landscape level biodiversity analysis will be based on the biodiversity guidebook and subsequent clarification letters from Provincial, Regional and District MoF and MoELP staff. It will explore current old forest remaining by biogeoclimatic zone, subzone and variant, ecosystem representation, connectivity, and interior forest habitat. The dynamic nature of interior habitat is currently unknown and we will explore partnerships with universities to conduct research into this topic.*

*Until (i) the VIRT process is complete, (ii) the landscape level biodiversity objectives are identified, (iii) the landscape level analysis is complete, and (iv) we can establish whether the draft FEN options are required to meet the landscape level objectives, we will continue to hold draft FEN options in special management zones where connectivity is a primary value.*

#### **4.3.4 Recreation**

*We manage the full spectrum of outdoor recreation opportunities within our forest management activities.*

*Our recreation program provides opportunities for public recreational use at the current level and explores opportunities to increase or enhance this use in the future.*

##### **4.3.4.1 Sites and Trails**

*We have a proactive recreation program, which maintains and monitors the use of sites and trails listed in Table 12. These sites represent a total of 62 hectares, which are temporarily removed from the harvest landbase in our timber supply analysis. With the exception of two of the interpretative trails and one campsite, these sites are located within areas that were once harvested.*



*Windsurfing on Nimpkish Lake*



**Table 12 Recreation Sites and Trails**

<b>Recreation Site</b>	<b>Features</b>
<b>Campsites</b>	
Nimpkish Lake	20 pads; pebble beach; windsurfing
Kinman Creek	40 pads; pebble beach; windsurfing
Anutz Lake	20 pads; sandy beach; boating; hiking
Atluck Lake	10 pads; pebble beach; boating; hiking
Woss Lake	30 pads; sandy beach; fishing; boating; walking
Lower Klaklakama (North)	6 pads; rocky beach; fishing
Lower Klaklakama (South)	10 pads; rocky beach; fishing
Vernon Lake	40 pads; sandy beach; fishing; boating
<b>Interpretative Trails</b>	
Hoomak	1100m trail with interpretative signs
Siding 4	400m trail with interpretative signs
Lower Klaklakama (South)	250m trail with interpretative signs

Recreation opportunities involving productive forest lands may be modified by protection, harvesting or silviculture treatments. For example, we may harvest trees from recreational areas to recover tree mortality or for public safety. Canfor will continue to maintain the existing eight campsites and three forest interpretative trails.

Areas protected as parks and ecological reserves are designated within and adjacent to TFL 37:

- 11,422 hectares within TFL 37.
- 8,170 hectares adjacent to TFL 37, as Schoen Park.

These areas are managed by B.C. Parks Branch of the MoELP to provide considerable recreation opportunities as well.

#### **4.3.4.2 Inventories**

In 1992, we conducted a major update to the recreation inventory. Minor updates are completed annually. In 1993, we initiated a recreation analysis project to compare the supply of recreation opportunities with current use and projected demands on TFL 37. The report was submitted to MoF in 1995 and approved for this MP.

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#### **Update the recreation inventory and analysis to revised MoF standards.**

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Once the revised standards are available from MoF, we will design and implement a new revised recreation inventory and analysis.

#### **4.3.4.3 Cave and Karst**

*We protect and maintain the quality and/or contents of management type "B" karst features from the potentially adverse effects of surface activities.*

Caves are a unique non-renewable resource with geological, scenic, educational, cultural, biological, hydrological, paleontological and recreational values. We consider the protection and management of caves and karst features to be an essential part of integrated resource management on TFL 37. These features are dispersed throughout areas dominated with limestone bedrock (Appendix I). In addition, specific cave and karst sites are investigated as they are encountered.



*Huston Lake caves*

*Recently, we worked with a cave and karst specialist to develop standard operating procedures (SOP) that guide our forestry activities near MoF management type "B" karst features.*

*We will conduct a karst inventory as field personnel locate significant karst features within proposed cut blocks and road locations. The inventory process includes:*

- Establishing the general bounds for the primary karst catchment associated with the subject block.*
- Conducting a ground search of appropriate intensity.*
- Identifying found cave entrances and significant surface karst features in the field.*
- Evaluating and classifying caves and other notable karst features found.*
- Documenting the significant features that are found through measurement, narrative descriptions, illustrations and photography.*
- Mapping cave entrances and surface karst features.*

*Once the inventory and evaluation is completed, measures are recommended to mitigate impacts to these cave and karst features. The range of possible protective measures during road building and harvesting phases includes:*

- Relocating roads and cutblock boundaries.*
- Establishing reserves.*
- Employing alternative harvest systems.*
- Enhancing the supervision and monitoring of specific activities.*
- Restricting road building or harvesting practices.*
- Imposing weather or timing restrictions for specific activities.*
- Committing to manage for and/or rehabilitate impacted point features and sinking stream features.*

### 4.3.5 Visual Resources

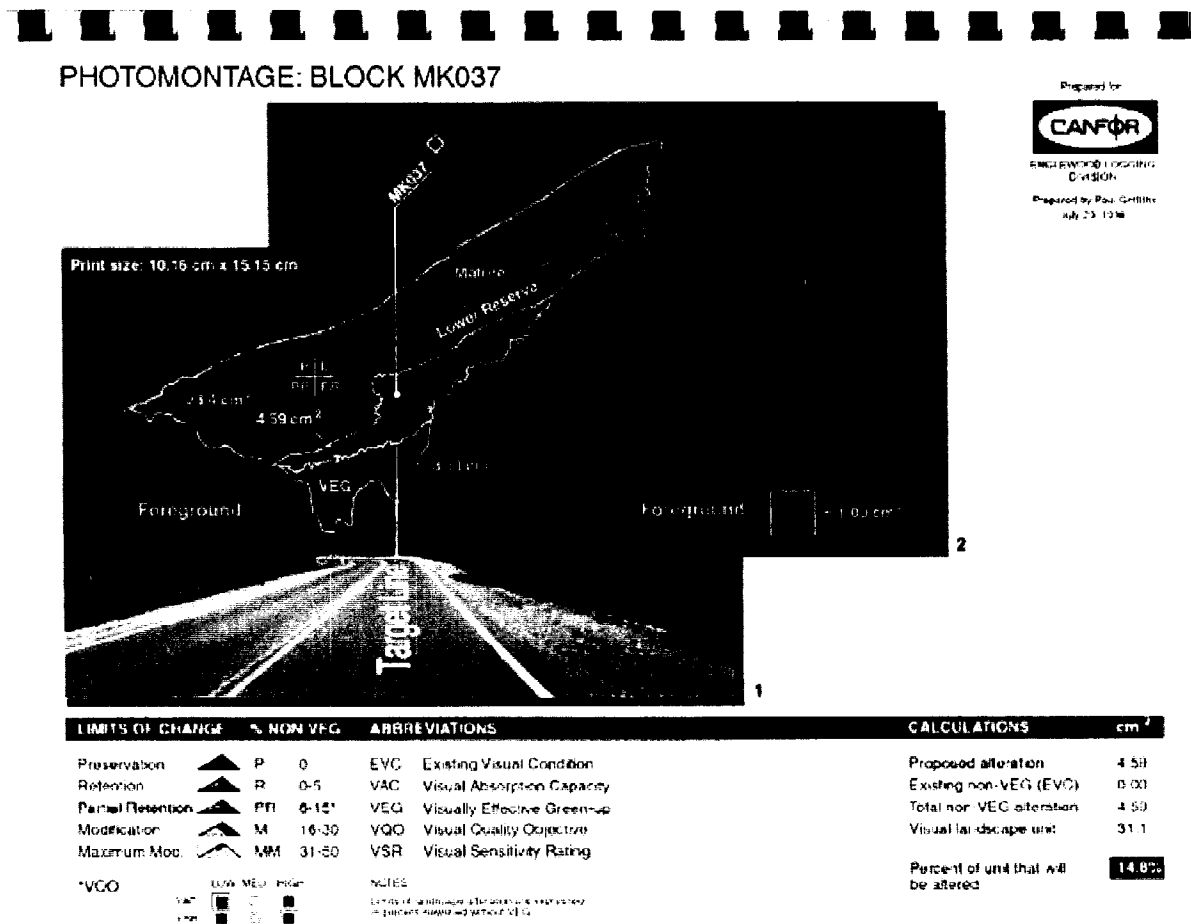
*We integrate our visual resource program into planning and operational activities to maintain scenic values from Johnstone Strait, along the Highway 19 Corridor and within the Atluck/Pinder SMZ.*

#### 4.3.5.1 Inventories

The first step in maintaining scenic values is to ensure our visual landscape inventory is up to date for planning purposes. Accordingly, we conduct regular reviews of our visual landscape inventory. Our visual landscape inventory was updated in 1997 to the latest MoF standards and incorporated into the timber supply analysis (Appendix VI).

#### 4.3.5.2 Planning and Implementing Options

Visual landscape objectives are considered within various planning phases but we consider specific measures for maintaining scenic values within SPs (Section 4.2.2.2.9). This may be demonstrated through digital terrain modelling or photo-mosaic exercises.



*Photomontage used to predict the visual appearance of proposed harvest areas*

Visually effective green-up (VEG) is achieved when signs of previous logging are generally no longer visible as regenerated stands grow taller. For the stands within TFL 37, VEG is achieved when stands reach a height of 6.5 metres, on average. Operational plans consider this target within areas classified as visually sensitive class (VSC) 1 and 2 where maximum disturbance limits are respectively applied at 1% to 5% and 10% to 15%.

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**Continue to actively harvest within scenic areas while maintaining the associated visual resource values.**

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Mitigating impacts to scenic values within highly sensitive areas may involve one or more of the following strategies during planning:

- Reduce the time to achieve VEG with larger and perhaps genetically improved stock and/or fertilising trees at the time of planting (Section 4.2.2.1).
- Soften the visual impact using forest landscape design techniques of cutblocks and retention areas proposed in visually sensitive areas.
- Encourage the use of alternative silviculture systems that leave a remaining component of trees.
- Utilise angle of incidence or visual screens to better place cut blocks.
- Work with the district MoF office to establish known scenic areas and develop a strategy to mitigate impacts of visual resource management on timber supply.

#### 4.3.6 Water

**We minimise the effects our activities have on water quality and quantity within lakes and streams.**

There are no community watersheds within TFL 37. Water quality and quantity are maintained by such measures as:

- Securing silt fences during construction projects when there is a runoff potential.
- Timing projects appropriately to minimise the affect on turbidity.
- Prioritising the deactivation of all high risk areas, through the watershed restoration programs.
- Completing coastal watershed assessments on all critical habitats where extensive harvesting has occurred and following recommended direction given.

We are also helping to maintain a water quantity measuring station at Gold Creek with MoELP.

#### 4.3.7 First Nations

**We seek active partnerships with the 'Namgis, Mowachaht/Muchalaht and Tlowitsis/Mumtagila First Nations that build community relationships and strengthen our business.**

The Nimpkish Valley TFL 37 is located almost entirely within the 'Namgis First Nation territory. Additionally, small areas of TFL 37 are within the Mowachaht/Muchalaht and the Tlowitsis/Mumtagila First Nations territories (Appendix I). Two indian reserves representing 23.6 hectares are located within the boundaries of TFL 37 but are excluded from its total area.

Annually, we review, consult with and seek input to our FDPs with these three First Nations. During these meetings, we often confirm future contacts and discuss employment and education opportunities, Forest Renewal B.C. projects, planned and ongoing projects, community developments, fisheries information and requirements for cultural use.

We regularly support 'Namgis, Mowachaht/Muchalaht and Tlowitsis/Mumtagila First Nations initiatives through education, donations, sponsorships and contributions of equipment and materials. For example, Canfor supplies cedar logs and other forest products to local bands for various traditional uses including reconstruction of the Big House in Alert Bay, totem poles and ceremonial war canoes. We also support the collection of cedar bark and medicinal plants.

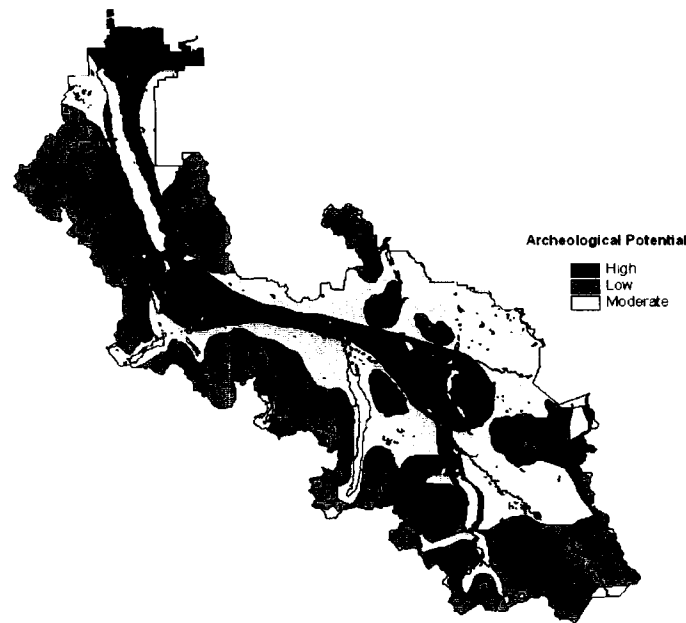
#### 4.3.8 Cultural Heritage

*We actively investigate and plan for the protection of cultural heritage values.*

Cultural heritage resources include archaeological values that pre-date European influence and more recent historic values. Cultural heritage resources include archaeological sites, traditional use sites and culturally modified trees (CMTs). Archaeological or traditional use sites are located throughout TFL 37, primarily within riparian reserve zones and parks. Traditional use studies are ongoing within areas identified as archaeologically sensitive zones to assist in operational planning.

##### 4.3.8.1 Archaeological Overview

An archaeological overview assessment (AOA) was conducted for Vancouver Island by the Archaeology Branch, Ministry of Small Business, Tourism and Culture and was provided to Canfor through the Port McNeill MoF district office. Although this study is not intended for direct use at an operational level it identified, among other things, the archaeological potential of areas within TFL 37 as shown in Figure 6.



**Figure 6** Archaeological Potential on TFL 37

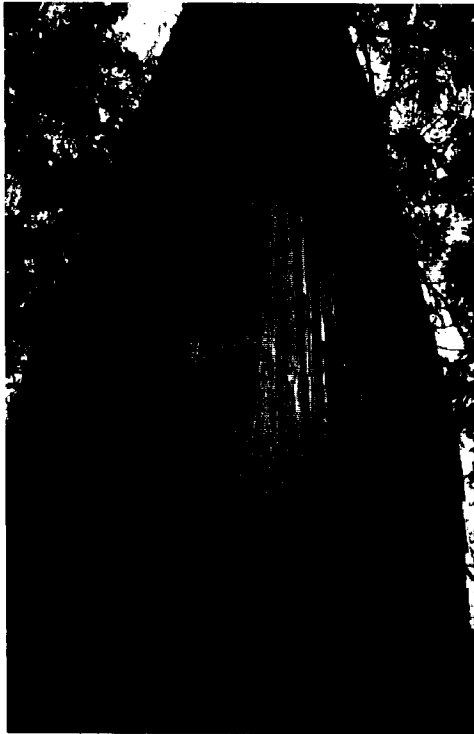
Based on this classification, we can discern where archaeological impact assessments (AIA) may be required for all archaeological site types, including CMTs.

We also review FDPs with the 'Namgis First Nation to assist in locating potential features and engage their representatives to inspect proposed cut blocks within potentially sensitive areas. We refer to archaeological

*inventories when preparing operational plans to identify potentially sensitive areas and to locate potential archaeological features.*

#### **4.3.8.2 Archaeological Sites**

*We obtained an inventory of archaeological sites from the Archaeology Branch, Ministry of Small Business, Tourism and Culture. This covers forest utilisation sites, habitation sites, burial sites, intertidal sites, rock art sites, trail sites and ritual sites. The general locations and detailed information is strictly used for planning purposes and is kept in confidence to prevent damage to these sites. The Kwakiutl Territorial Fishery Commission (KTFC), representing a*



*number of First Nations including 'Namgis, completed a traditional use study. However, their findings have not yet been made available.*

*It is likely that further undiscovered archaeological sites will be encountered. In most instances, though, the known archaeological sites are located within areas that are already excluded from the timber harvest landbase. To date, there has been only one operational plan altered to protect a significant feature, an unfinished canoe blank in the Kilpala area.*

*In the event that a previously undiscovered archaeological site is reported, forestry activities in the vicinity will cease. The site is immediately reported to the district recreation officer along with the location and a description of the site. The recreation officer will contact the Archaeological Branch to confirm and classify the site and ensure that the 'Namgis First Nation is consulted regarding the cultural significance of the site.*

*Plank tree*

#### **4.3.9 Trapping and Guide Outfitting**

*We respect and protect the rights of licensed trappers and guide outfitters in our forest development plans.*

*We encourage trappers and guide outfitters to review our FDPs by including a special notice to trappers in the FDP advertisement for public review. A list of registered trapping and guide outfitter licences is provided in Appendix XVIII.*

*We continue to identify issues relating to trapping and guide outfitting by effectively planning and managing for biological diversity, by maintaining records of registered trapline holders and by actively encouraging trappers and guide outfitters to review forest development plans. Notices of development in their areas are distributed to encourage trappers and outfitters to review our plans and solicit their input. This provides us with an opportunity to resolve issues in the planning stage.*

#### 4.3.10 Mining

*We respect and protect the rights of mining licensees in our forest development plans.*

Over the years, mining activity within the licence has been sporadic. Several mining claims exist within TFL 37 but have not necessitated changes to our development activities (Appendix XIX).

The Ministry of Employment and Investment, Energy and Minerals Division occasionally refers notices of work to our office for reference.

#### 4.3.11 Fish Farming and Packing

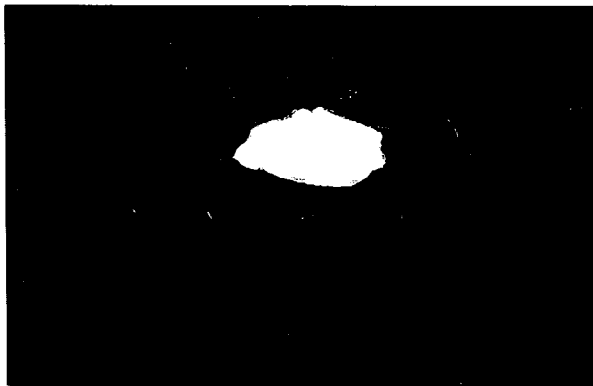
*We facilitate and integrate the needs of fish farms and packers in our forest development plans and special projects.*

Englewood Packers, operate a major commercial fish packing operation on our private lands within TFL 37. In addition, Stolt Sea Farm operates a major fish hatchery nearby that supplies its fish farms with fish stocks (Section 4.3.1). These operations employ approximately 125 people.

We work with local fish farms and packers to explore ventures that are mutually beneficial. Recently, Canfor began a program to produce commercial and residential compost by mixing by-products from these fish operations with woody debris from our Beaver Cover dryland sort.

#### 4.3.12 Botanical Products

*We facilitate and integrate the use of and harvest of botanical products in our forest development plans.*



*Chanterelle mushroom*

Active harvests for salal, cedar boughs and mushrooms occur within TFL 37 at various times. Generally, these harvests are unregulated with no control over limits or standards.

We also enter agreements with producers of honey (bees) and taxol (from yew bark) to coordinate our road maintenance and harvesting activities with their activities.

We accommodate the harvest of botanical products within TFL 37 by promoting harvesting practices and safe access to these resources (Section 4.2.1.7.5.6). In addition, we enter formal agreements with honey manufacturers and review vegetation management plans with them. As taxol is currently being produced synthetically, the demand for yew bark has ceased.

## **4.4 Planning and Inventory**

### **4.4.1 Forest Resource Inventories**

*We target forest resource inventories towards satisfying new requirements of the Code.*

Canfor has progressively accumulated a variety of resource inventories since it was awarded TFL 37. Appendix XIV contains a detailed listing and status of the resource inventories currently employed. Typically, these are updated annually or as needed to meet strategic or operational planning needs. Over the term of MWP 7, the focus of the resource inventory program was on geo-referencing the digital coverages to a common base.

Strategies that involve specific resource inventories are discussed in their respective sections and are summarised in Appendix XIV.

### **4.4.2 Forestry Information Systems**

*We develop and maintain forestry information systems to assist resource planners in meeting regulatory obligations and developing strategic plans.*

Over the term of MWP 7, forestry information systems development focused on providing better access of spatial and attribute information to operational and planning personnel. Several forestry information system modules were developed and implemented, including geographical information system (GIS) and database standards. The system is designed to promote better collection, analysis and sharing of data to assist with forest resource planning and to track our performance under our forest practices compliance program. When this three-year development plan is completed it will provide foresters and engineers with a powerful planning and management tool, and help us meet our forest stewardship commitments.

As they are completed, we will utilise the improved forestry information applications to assist in accessing, summarising, updating and managing resource inventory data in a timely, efficient and cost-effective manner.

### **4.4.3 Timber Supply**

*We periodically review the timber supply to:*

- i) maintain reliable estimates of timber inventory timber for existing stands,*
- ii) re-examine the extent of the timber harvesting landbase,*
- iii) improve our understanding of stand dynamics for TFL 37, and then*
- iv) incorporate assumptions into management strategies and timber supply analyses.*

In preparation for the timber supply analysis (Appendix V and Appendix VI), Canfor recently completed a timber inventory, operability review and a growth and yield review.



#### 4.4.3.1 Timber Inventory

In March 1996, the MoF completed an inventory audit of the 1985 timber inventory for TFL 37 that concluded:

- The mature timber inventory, including the operable forested area, is statistically acceptable.
- The non-forest classification did not meet provincial standards.
- The site index assignment may not be accurate in young stands.

Recently, a new forest classification and re-inventory was prepared to MoF standards to address geo-spatial inconsistencies and the classification issues found in the audit. This new inventory may be further augmented to meet components of the new Vegetation Resources Inventory (VRI) standards. In preparing the timber supply analysis for this plan, we updated the timber inventory to January 1, 1997. The site index assignment issue was dealt with in our growth and yield program (Section 4.4.3.2).

The timber inventory is a snapshot of timber volumes estimates associated with existing stands. Improving the reliability of these timber volume estimates may involve the following strategy:

- Undertake a formal quality assurance review of the forest inventory and incorporate a detailed comparative analysis to the results from the MoF inventory audit of TFL 37.
- Monitor and adjust the use and reliability of Canfor's generalised volume estimates (average volume lines) used for estimating timber volumes for existing natural stands.
- Develop options to incorporate our timber inventory into the new VRI standards.

#### 4.4.3.2 Operability Review

The timber supply analysis information package (Appendix V) provides a detailed description of the TFL 37 landbase. Only 54% of the total area is considered operable for timber harvesting after non-productive forest land, reductions for integrated use, and environmentally sensitive areas are considered. Physical, technical and economic operability limits for TFL 37 are briefly described in Table 13 and sections 4.4.3.2.1, 4.4.3.2.2 and 4.4.3.2.3 below.

**Table 13 Summary of Inoperable Areas**

Operability Classification	Total Area (ha)	Total Productive Forest (ha)	Net Operable Landbase	
			Net Area (ha)	Net Volume (1000s m3)
Physically Inoperable	17,422	13,132	0	0
Uneconomic	27,799	3,169	0	0
Marginally Economic	20,107	20,096	8,493	4,798
Technically Unconventional	13,318	12,459	6,998	5,510

<sup>1</sup> Total area includes all non-park area for a given land classification within TFL 37.

##### 4.4.3.2.1. Physical Operability

The physical operability classification for TFL 37 was developed from a map-based GIS exercise that considered previous performance and local knowledge. Physically operable areas are classified as regions where falling and yarding logs can be done safely. Physically inoperable areas are associated with gullies, canyons, rock bluffs or other unstable areas that are unsafe to work in.

#### 4.4.3.2.2. Economic Operability

The dynamic and cyclical nature of forest product markets was considered in our classification of economic operability. This classification was assigned as a GIS and database exercise according to the forest stand's economic potential at the middle of the most current market cycle.

Productive forest stands were first classified as uneconomic based on the ecological classification or site productivity and yield projection parameters. Next, criteria in Table 14 were applied to further assign approximate economic operability. Then, local knowledge and past harvesting performance was carefully considered to refine this classification for TFL 37.

**Table 14 Criteria used to Classify Economic Operability**

<b>Classification</b>	<b>Value<sup>1</sup> (\$1000s/ha)</b>	<b>Volume (m<sup>3</sup>/ha)</b>	<b>Leading Species</b>	<b>Crown Closure (%)</b>	<b>Height (m)</b>
Uneconomic	<40	<400	Ac, Dr, Pl	<40	<30
Marginally Economic	40 to 70	400 to 600		>40	>30
Economic	>70	>600			

<sup>1</sup> Stand value varies with markets – these values are based on average prices between 1990 and 1997.

#### 4.4.3.2.3. Technical Operability

Technical operability is classified as those areas suitable for two broad classifications of harvest systems -- conventional and unconventional. Conventional harvesting consists of all ground based and cable systems, while unconventional harvesting consists of aerial systems including helicopter, balloon and multi-span skyline. We have demonstrated application of conventional systems including skyline yarding prior to and throughout the MWP 7 period. As discussed in section 4.2.1.3, we are proposing helicopter harvesting methods on our operational plans from areas classified as unconventional.

#### 4.4.3.3 Sensitive Terrain

Preliminary terrain stability mapping was applied in the timber supply analysis (Appendix VI). This inventory provided netdowns for environmentally sensitive areas for soils, from terrain classes IV and V as well as for regeneration problems, by identifying colluvial areas. Netdown assumptions are based on recent operational planning and regeneration performance (Appendix V).

The terrain mapping project is being completed to level "C" standards for terrain stability mapping (1996) and is funded by Forest Renewal B.C.

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#### **Complete final terrain and terrain stability mapping of TFL 37.**

#### **Improve our forest level assumptions regarding the regeneration potential on colluvial areas.**

---

The ongoing terrain stability mapping project will soon provide final attributes for all observable terrain features within TFL 37 that also identify unstable or potentially unstable areas.

We will examine the survival and stocking levels of post-harvested stands relative to colluvial areas identified in the final terrain mapping. This exercise will provide better estimates of any impact colluvial areas may have on managed stands and explore opportunities to minimise the impact.

#### 4.4.3.4 Growth and Yield

Growth and Yield observes how trees have grown in the past to predict how they might grow in the future. It also considers how trees fit into the forest ecosystem and how they respond to different environments. Estimates

regarding a stand's growth over time and the yield at some point in its development are used to analyse timber supply forecast over time. Yield tables were developed for post-harvest regenerated stands in the timber supply analysis, which applied the TIPS<sup>1</sup> / TASS<sup>2</sup> growth and yield model for managed stands and VDYP<sup>3</sup> for natural stands (Appendix V).

We intend to develop a detailed growth and yield strategy for TFL 37 that incorporates past initiatives and future programs. This strategy will identify and explore opportunities in the assumptions used for growth and yield estimates of post-harvest regenerated stands. The following growth and yield opportunities may be explored:

- Decay, waste and breakage reductions for natural and managed stands may be too high.
- Operational adjustment factors (OAF<sub>1</sub> and OAF<sub>2</sub>) may be over-estimated.
- Site index estimates for high elevation species may be too low.
- Gains attributed to genetic improvement from first- and second-generation seed orchards may be under-estimated.

The productivity of a site largely determines how quickly trees will grow and therefore affects expectations of timber volumes in regenerated stands. Estimates of site productivity (site indices) are commonly expressed in terms of expected tree height 50 years after reaching 1.3 metres.

We are working on a project that focuses on relationships between site index and preliminary ecological attributes and classification (Site Index - Biogeoclimatic Ecological Classification - SIBEC). The objective is to estimate the average site index for Douglas-fir, western hemlock, amabilis fir, western redcedar, and mountain hemlock in post-harvest regenerated stands in the productive forest landbase of TFL 37.

Preliminary site series units from an ongoing ecosystem mapping project were used to estimate site indices, which were applied to the managed stand yield tables used in the timber supply analysis (Appendix V). The ecosystem mapping project is being completed to standards for Terrestrial Ecosystem Mapping in B.C. (1995) and is funded by Forest Renewal B.C.

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**Complete the ecosystem classification of TFL 37.**

**Improve the productivity and yield estimates by re-analysing SIBEC data with the final ecosystem mapping.**

---

The results from this project that provided statistically-based site index samples remain part of our on-going SIBEC project. Further work proposed is included into our growth and yield strategy.

#### **4.4.3.5 Unsalvaged Losses**

Wildfire, windthrow, insects, disease and other natural factors can cause catastrophic losses of whole stands of trees. Over the long-term the probability of losses to natural causes can be predicted. Where losses occur in merchantable stands some of the dead or dying timber may be salvageable. Areas that involve salvage harvesting are monitored by a unique naming designation for the cut block.

Past forest health events and measures are discussed further in Appendix IX. The estimated annual unsalvaged net losses applied in the timber supply analysis amount to 3165 m<sup>3</sup>, as shown in Table 15.

---

1 Table Interpolation Program for Stand Yields

2 Tree And Stand Simulator

3 Variable Density Yield Projection

**Table 15 Annual Unsalsvaged Losses**

Category	Hazard	Losses to Hazards (m <sup>3</sup> /year)		
		Gross	Salvage	Net Loss
Fire	Man-caused	11,200	9,100	2,100
	Natural	40	0	40
Wind	Windfall	25,000	23,975	1,025
Total		36,240	33,075	3,165

Fire occurrences within the Nimpkish Valley TFL 37 have been relatively steady, although there have significant declines in large areas affected since Canfor introduced protection measures in 1948.

Since 1981, losses due to wind have been minor. However, windfall invariably occurs in standing timber along the boundaries of the harvested settings requiring an ongoing and expensive salvage program. To reduce windfall in exposed areas, progressive clearcutting harvest patterns were used until 1990. Proposed new logging guidelines may require patch-cut harvesting which will increase the perimeter of the mature timber resulting in more windfall.

Losses due to insects and disease are considered in the OAF<sub>2</sub> assigned to managed stand yield tables.

---

**Monitor and incorporate estimates from natural, unsalvaged losses (after salvage) into harvest forecasts.**

---

Timber losses are reported in the TFL annual report of operations (Section 10). This information, along with MoF and Forestry Canada information is used to monitor and develop unsalvaged loss assumptions for the timber supply analysis (Appendix V).

#### 4.4.4 Strategic Planning

*We develop strategic plans to explore harvest flows impacts that incorporate results from previous initiatives and link landscape level plans to operational plans.*

The VILUP and VIRT objectives for SMZs and RMZs (Section 2.1) are recommended as higher level plans for this area. The public review period ended in February 1998. The provincial cabinet is expected to approve the higher level plan by the end of 1998. Figure 4 illustrates the boundaries of these areas within TFL 37.

Constraints on our forest practices, imposed by the Code and the VILUP, address other resource values. It is important to understand the associated impacts of these constraints and to monitor their success in addressing the desired objectives. Consequently, we search for advancements in the available tools and information that address these issues.

A timber supply analysis (Appendix VI) and a twenty year plan (Appendix VIII) are prepared as key components of each TFL management plan. The results of these plans are incorporated into new strategies that address our management objectives. Table 16 summarises our strategic level plans.

**Table 16 Strategic Level Plans**

<b>Strategic Plan</b>	<b>Reference</b>	<b>Objective</b>	<b>Updates</b>
<b>Plans required under TFL agreement</b>			
Management plan	Section 1.1	Explains objectives, goals, commitments and strategies for TFL 37 over the next five year period.	Every 5 years
Timber supply analysis	Appendix VI	Examines short-term and long-term impacts to harvest flows resulting from current management objectives and strategies and explores opportunities associated with changes to the landbase, growth and yield and forest cover constraints.	Every 5 years
Twenty year plan	Appendix VIII	Illustrates conceptual harvest areas, harvest patterns and road construction scheduled over the next twenty year period.	Every 5 years
<b>Other strategic plans</b>			
Forest health plan	Section 4.2.3.2	Accounts for significant forest health issues and outlines strategies and tactics for health management	As needed
Total chance plan	Appendix VIII	Indicates conceptual harvest areas, harvest patterns and road construction scheduled for the operable area to provide long-term direction for developing operational plans.	As needed

#### 4.4.5 Operational Planning

*We develop operational plans that consider strategic and business plans and assess environmental impacts to specific forest management treatments.*

The Code includes an operational planning regulation that dictates the requirements and standards for preparing operational plans. Some operational plans are required under the Code. We also prepare other operational plans that are either incorporated into regulatory plans or may be considered tactical/business plans. Table 17 summarises our operational plans.

**Table 17 Operational Level Plans**

<b>Operational Plan</b>	<b>Reference</b>	<b>Objective</b>	<b>Updates</b>
<b>Plans required under Code</b>			
Forest development plan	Section 4.2.1.6	Indicates proposed and approved harvest cutblocks and road construction scheduled over the next five year period	Annual
Road permit	Section 4.2.1.6	Applies for approval to construct specific sections of road	As needed
Cutting permit	Section 4.2.1.6	Applies for appraisal and approval to harvest a group of cutblocks	As needed
Silviculture prescription	Section 4.2.2.2.9	Prescribes environmental considerations for harvesting and the silviculture plan to develop the new stand to free-growing stage	As needed
Fire Preparedness Plan	Section 4.2.3.1.1	Provides details for fire suppression	Annual
Fuel Management Plan	Section 4.2.3.1.2	Provides fuel management guidelines for silviculture treatments, harvesting and hazard abatement to mitigate risk with large continuous areas with hazardous fuels	As needed
Burn plan	Section 4.2.2.2.3.1	Provides details for controlled burning activities	As needed
Vegetation management plan	Section 4.2.2.2.7	Specifies the treatment scheduling of herbicides to manage brush competition	As needed
Stand management prescription	Section 4.2.2.3	Outlines site specific incremental silviculture treatments for one or more areas.	As needed
Annual Report of Operations	Section 10	Reports management activities over the previous year and describes future initiatives	Annual

**Table 17 Operational Level Plans (continued)**

<b>Operational Plan</b>	<b>Reference</b>	<b>Objective</b>	<b>Updates</b>
<b>Plans incorporated into regulatory plans</b>			
Logging plan	Section 4.2.1.6	Describes the harvesting actions to be carried out on a specified site according to an approved SP and FDP.	With SPs
Access plan	Section 4.2.1.7.5.1	Describe road construction or modification, maintenance or deactivation activities.	With FDPs
Fire control plan	Section 4.2.3.1.1	Specifies goals, objectives, and standards for the use, application, and control of fire	Annual
<b>Other operational plans</b>			
Timber developed inventory	Section 4.2.1.6	Monitors our harvest planning and road building status	As needed
Reforestation plan	Section 4.2.2.2.1	Specifies the locations, species, stocktypes and seedlots to be planted.	As needed
Seed collection plan	Section 4.2.2.2.2	Specifies collection locations, species and helicopter drop sites.	As needed
Site preparation plan	Section 4.2.2.2.3	Outlines locations and site preparation requirements.	As needed
Sowing requests	Section 4.2.2.2.4	Outlines the species, stocktypes, seedlots and supplying nurseries to meet future reforestation needs.	As needed
Silviculture survey plan	Section 4.2.2.2.5	Specifies area locations, plot locations, survey stocking standards and total number of plots required.	As needed

## 4.5 Special Projects

*We undertake special projects to explore new initiatives, issues and potential changes to our management objectives, goals and strategies.*

### 4.5.1 Proposal to Exchange Forest Licence for SBFEP

*We will continue to seek a fair exchange of the SBFEP tenure within TFL 37 for quota from FL A19233.*

*Since 1995, Canfor and other licensees have negotiated with the MoF to reduce the annual harvest of the Kyuquot supply block within the Strathcona TSA. The disproportionate harvest of the Kyuquot supply block compared to the Sayward and Loughborough supply blocks raised the proposal to reallocate harvest volume and operating areas by licensees. Our options are to submit a proposal ourselves or together with the other licensees.*

*We feel that redistributing charts from the contiguous areas of the Artlish and Upper Tahsish watersheds to the scattered areas of the Sayward forest and Loughborough Inlet is inherently more suited to the SBFEP program. At the same time, we feel this is an opportunity to promote stable employment in local communities on northern Vancouver Island. This proposal considers exchanging SBFEP volume within TFL 37 for a quota reduction to our forest licence (FL A19233) while shifting the SBFEP program to the Sayward and Loughborough supply blocks.*

*This would restore the equivalent SBFEP volume back to the TFL licensee and maintain our equipment and workforce within existing operating areas. The Campbell River Forest District would administer the increase of SBFEP volume in smaller dispersed operating areas on the East Coast of the TSA.*

*Along with the other licensees, we are currently negotiating equitable long-term harvest levels involved in the exchange and the MoF is currently soliciting input from stakeholders.*

#### **4.5.2 Application to Extend TFL 37**

*We will continue to explore the potential long-term harvest levels associated with combining TFL 37 with Canfor's chart area in FL A19233.*

*In 1988, we submitted an application to the MoF to extend TFL 37 by replacing FL A19233 within the Strathcona TSA with an equivalent addition to TFL 37. This would include our timber licences in the Artlish and Tahsish River drainages as well as Crown lands within the TSA.*

*We first submitted this logical geographical extension of TFL 37 in 1979. Today, we still believe this proposal can provide more steady employment opportunity and improve community stability on northern Vancouver Island. Our high standards for forest management, timber utilisation and operability, in combination with the appended landbase, would assist in achieving landscape level objectives recommended by VIRT. We believe the increase in area under TFL 37 would have a synergistic effect by relieving spatial constraints, ultimately resulting in a higher AAC.*

*We intend to analyse and present the results associated with this extension. These unsolicited findings will be submitted to the MoF and offered to public for review.*

#### **4.5.3 Sustainable Forest Management and Certification**

*Canfor is committed to achieving sustainable forest management in TFL 37. We became interested in the independent verification of sustainable forest management in 1993 following a proposal by one of our customers to evaluate the forest practices of its suppliers. Canfor was an early supporter of the development of a credible, independently verified certification system to demonstrate to our customers that we were managing the forests entrusted to our care in a sound manner. We participated on the Canadian Standards Association (CSA) Sustainable Forest Management Technical Committee to develop the CSA Sustainable Forest Management System Standard (CAN/CSA - Z809-96) which was approved in October 1996. In late 1996, Canfor announced that it began implementing the CSA standard at its woodlands operations. That work is continuing.*

*Canfor also participated in the Canadian proceedings of the International Organisation for Standardisation (ISO) Working Group 2 process that developed a forestry reference document (known as a Type III Technical Report) to assist organisations with implementing an ISO 14001 Environmental Management System for forest management. In April 1998, we announced that we are seeking ISO 14001 registration of an environmental management system for all woodlands operations by the end of 1999. An ISO-registered environmental management system will form part of the sustainable forest management system for registration under the CSA standard.*

*We have followed with interest the development of the certification system of the Forest Stewardship Council (FSC) and their Principles and Criteria for Natural Forest Management. The FSC is of great interest to a number of European retailers of wood and paper products, especially in the United Kingdom. Europe is an important market for Canfor. We will closely monitor the progress of the FSC certification scheme, especially the development of regional FSC standards for B.C..*

#### **4.5.4 First Nations Issues**

*Many First Nations have claimed aboriginal title and rights over substantial portions of British Columbia, including the 'Namgis First Nation's claim over most of TFL 37. Provincial government policy requires that management and operating plans take into account and not infringe upon aboriginal rights.*

*In December 1997, the Supreme Court of Canada issued the Delgamuukw decision in which it affirmed that First Nations groups have a spectrum of aboriginal rights in lands used or occupied by their ancestors. Those rights may vary from rights of limited use up to aboriginal title. The decision has added to uncertainty regarding property rights in Canada (including forest tenure and other resource rights), particularly in much of British Columbia and other*

*areas where treaties were not concluded with First Nations groups. The federal and provincial governments are currently pursuing negotiations with numerous First Nations groups towards comprehensive land claim settlements and treaties. Canfor's involvement in these negotiations is not permitted.*

*When settled, we will incorporate treaty negotiation results into the planning process.*

#### **4.5.5 Forest Renewal B.C.**

*We will incorporate funding opportunities into our forest management activities that are consistent with the Forest Renewal B.C. mandate to renew the forest sector in B.C..*

*In 1994, the B.C. Forest Renewal Act was passed in the British Columbia legislature. The Act establishes a Crown corporation known as Forest Renewal B.C. to plan and implement the Forest Renewal Plan. This plan involves a program of expenditures to renew the forest economy of British Columbia, enhance the productive capacity and environmental value of forest lands, create jobs, provide training for forest workers and strengthen communities. Revenue to fund the Forest Renewal Plan is being provided from an increase in the Crown's royalty and stumpage charges, which was initiated on May 1, 1994.*

*The forest management work proposed under these applications covers work beyond the requirements of our tenure agreements. These projects will enhance the long-term productivity of the forest areas we manage and increase the forest inventory information available for future forest management and planning.*

*Canfor recently signed a Multi-Year Agreement (MYA) with Forest Renewal B.C.. over a five-year term to carry out and complete projects and activities approved by Forest Renewal B.C.. These activities are subject to inspection, monitoring and audit processes to ensure the work has been performed according to our plan. We are required to submit quarterly and annual reports and statements containing financial and statistical information about the work.*

## **4.6 Research**

*We participate in various research endeavours to seek better methods and new opportunities in forest management, planning and wood products.*

*Since 1980, Canfor has conducted its own research and development programs in addition to providing continuing support of industry sponsored research organisations such as Forintek Canada Corporation, the Forest Research Institute of Canada and the Pulp and Paper Research Institute of Canada. Our research and development centre concentrates on three broad areas: product development, new fibre resource utilisation and researching ways to add value to Canfor's existing product lines.*

*In addition, we conduct various operational and development research projects on TFL 37. Appendix IX includes summaries of these projects within their respective program areas.*



## 5. Employment and Economic Opportunities

*We promote land uses to support enterprises that enhance employment and economic opportunities.*

*The programs and strategies described in MP 8 assume the annual rate of harvest discussed in section 4.2.1.1, although the provincial Chief Forester may choose to adjust the short term AAC differently (Appendix VII). This section discusses the communities, fibre-flow, employment and economic opportunities associated with MP 8 and the forest management activities on TFL 37.*

### 5.1 Communities

*Figure 1 in section 1 illustrates where TFL 37 is situated among nearby communities. The communities of Campbell River and the Comox Valley are relatively diversified although the major resource sectors of forestry, commercial fishing and mining remain significant. Expanding sectors include tourism and outdoor recreation, the retail and service sector and the public sector. Much of this expansion is fuelled by high rates of population growth. In contrast, Port McNeill, Woss, Gold River, and Sayward are essentially single industry, forestry-dependent communities. Tourism and outdoor recreation also play an important role in the area while Alert Bay, Zeballos, Kyuquot and Port Hardy communities include commercial fishing.*

*Most employees involved with the administration, harvesting and local manufacturing of fibre from TFL 37 reside in Alert Bay, Sointula, Port McNeill, Woss or Campbell River. Employees that manufacture products with fibre harvested from TFL 37 work and reside in the lower mainland area.*

*Together with provincial, regional and community representatives, Canfor is actively pursuing an initiative to develop the community of Woss into a village or hamlet under Regional District administration.*



*Community of Woss*

## 5.2 Fibre Flow

Fibre from Canfor's tenure in B.C. provides a total contribution of less than 7% to the provincial and the regional AAC (Table 18). TFL 37 alone contributes 1.5% of the provincial and just over 5% regional timber harvest. It is also clear that Canfor must enter purchase agreements for 220% to 230% of its fibre supply in order to meet consumption requirements.

**Table 18 Canfor's estimated fibre consumption and supply**

	m3/yr	AAC Contribution from TFL 37 <sup>4</sup>
British Columbia (BC) AAC <sup>1</sup>	70,855,250	2%
Vancouver Region (VR) AAC <sup>1</sup>	20,300,160	5%
Canfor's AAC in BC <sup>2</sup>	4,810,400	22%
Canfor's Consumption in BC	10,555,000	10%
Canfor's AAC in VR	1,332,799	80%
Canfor's Consumption in VR <sup>3</sup>	3,090,000	35%

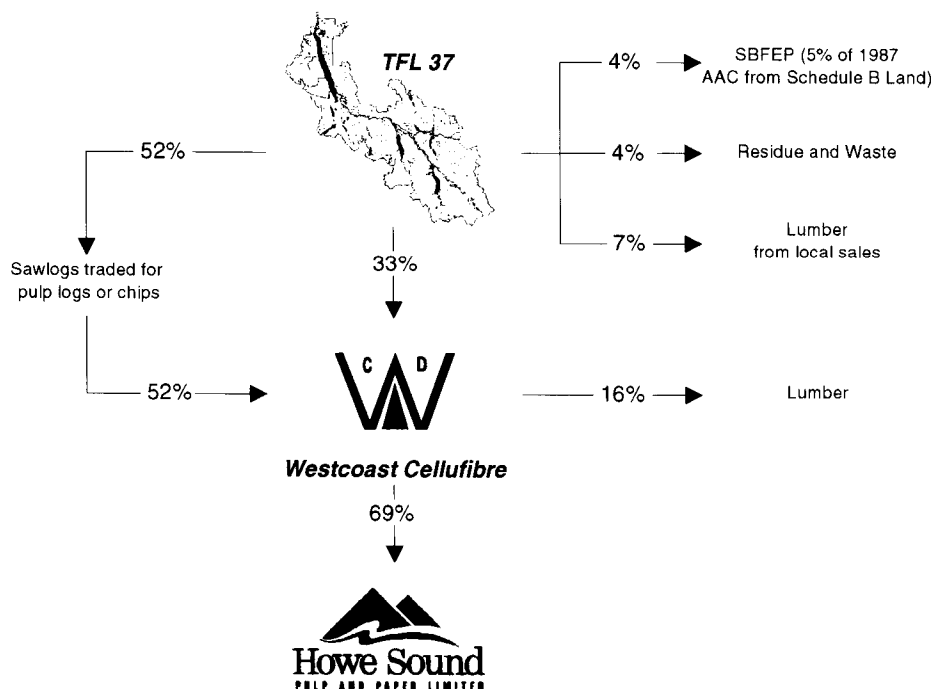
<sup>1</sup> Source: Five-Year Forest and Range Resource Program 1997-2002.

<sup>2</sup> Canfor's 1996 figures.

<sup>3</sup> Includes consumption from Panel and Fibre, Westcoast Cellulofibre and HSPP

<sup>4</sup> Based on current AAC for TFL 37.

Most of the timber volume harvested from TFL 37 leaves north Vancouver Island for processing in the B.C. Lower Mainland area. This supports substantial employment opportunities in that area. Two major processing facilities located in the Vancouver area are heavily dependent on volumes from TFL 37 – HSPP and Westcoast Cellulofibre (Appendix X). The flow of fibre from TFL 37 to the various processing facilities is illustrated in Figure 7.



**Figure 7 Fibre flow from TFL 37**

HSPP has an annual fibre input requirement of approximately 2.2 million m<sup>3</sup>. This is approximately twice the current AAC from TFL 37. All logs manufactured from TFL 37 are directly or indirectly allocated to supply HSPP with chips.

Pulp logs are sent directly for chipping while higher quality logs are traded and leveraged for additional pulp logs and/or chips. Canfor's ability to distribute logs to their highest potential use is largely determined by the market conditions and trade agreements in place at the time.

Westcoast Cellul fibre has an annual fibre input requirement of approximately 1.0 million m<sup>3</sup>. Its primary function is to provide chips to HSPP from the direct and indirect distribution of low quality logs from Canfor and other suppliers. The mill supplements its line by producing dimension lumber from the low quality logs it secures.

Approximately 75,000 m<sup>3</sup> from TFL 37 are sold annually to local mills in Port Hardy, Port McNeill, Woss, Campbell River, Courtenay and Nanaimo. This mostly involves either low grade or high grade western redcedar, cypress and Douglas-fir.

Currently no fibre from TFL 37 is processed by the other major processing facilities located on north Vancouver Island:

- Bowater's pulp mill in Gold River.
- Fletcher Challenge's pulp mill in Campbell River.
- TimberWest's sawmill in Campbell River.
- Western Forest Product's sawmill in Tahsis.

### 5.3 Employment Opportunities

Table 19 shows the estimated contribution that the flow of fibre from TFL 37 provides on the current employment status on the B.C. coast. Currently, a total of 1,207 direct jobs, including 22 First Nations people, and 1,116 indirect and induced jobs are supported by the annual harvest from TFL 37. Typically, a decrease in harvest level is assumed to cause a direct negative impact on the number of jobs. Measures for mitigating employment impacts were suggested in the VILUP:

- Periodic shut-downs.
- Alternative employment opportunities.
- New log supplies which might sustain existing opportunities.

The VILUP also suggested that employment intensity is declining due to technological change and industry rationalisation. Long-term impacts will be significantly lower than short-term gross impacts.

**Table 19 Estimated Employment Status**

Activity	Number of Direct Jobs			Number of First Nations <sup>1</sup>	Number of Indirect and Induced Jobs <sup>2</sup>
	Permanent	Temporary	Contract		
Administration <sup>3</sup>	21	1			16
Planning and Development	41	3	9	3	38
Timber Harvesting <sup>4</sup>	327		87	2	298
Special Forest Products	10			2	7
Silviculture	3		56		42
Watershed Restoration Program	8			3	6
Lumber Manufacturing <sup>5</sup>	271	51		9	300
Pulp Manufacturing <sup>6</sup>	288	26	5	3	409

<sup>1</sup> Number of First Nations people employed from direct jobs.

<sup>2</sup> Coastal multipliers of 1.72, 1.93 and 2.28 were respectively applied to harvesting, lumber and pulp manufacturing activities (Source MoF and Price Waterhouse, Recent coastal Timber Supply Review - Fraser TSA Analysis Report, June 1998.).

<sup>3</sup> Includes Canfor's Englewood Logging Division, corporate office and log supply personnel.

<sup>4</sup> Includes road building, timber harvesting, log transportation and merchandising.

<sup>5</sup> Includes local mills and mills lower mainland.

<sup>6</sup> Includes chip production and processing from Westcoast Cellul fibre and HSPP.

These employment figures only account for jobs that are directly tied to TFL 37. Jobs associated with the public sector and the SBFEP were not considered in this exercise.

Since the initial harvest rate in section 4.2.1.1 is assumed to be unchanged, no significant impacts are expected regarding the number of persons employed on TFL 37. On the other hand, opportunities to mitigate a reduced AAC – should it be necessary, may involve the following initiatives:

- Explore opportunities to develop local value-added manufacturing facilities.
- Seek a fair exchange of the SBFEP tenure within TFL 37 for quota from FL A19233 (Section 4.5.1).
- Explore the potential long-term harvest levels associated with combining TFL 37 with Canfor's chart area in FL A19233 (Section 4.5.2).
- Undertake watershed restoration and silviculture projects through MYAs with Forest Renewal B.C. (Section 4.5.5) to protect environmental values and to alleviate harvest flow constraints through silviculture activities.

## 5.4 Economic Opportunities

Areas most vulnerable to a harvest reduction exist where forestry dominates as a source of income. Families leaving the area to seek other opportunities and a loss of local industrial operations could also affect local communities through a reduction in municipal tax revenues and potential loss of locally, provincially and federally funded services.

The estimates given in Table 20 include employment and before-tax income of workers supported by the harvesting and processing of Canfor's timber harvest allocation within TFL 37. The figures are based on the current AAC, the employment estimates in Table 19 and MoF multiplier assumptions.

The provincial government receives various taxes and other revenues from the forest industry in exchange for the rights to harvest and use its timber. Estimates of average provincial government revenues are given in Table 21

**Table 20 Employment Income Estimates**

<b>Job Type</b>	<b>Income Factor<sup>1</sup> (\$/person-year)</b>	<b>Employment (person-years)</b>	<b>Total (\$ millions/year)</b>
Direct	46,950	1,207	56.7
Indirect/Induced	32,500	1,116	36.3

<sup>1</sup> Source MoF and Price Waterhouse, Timber Supply Review - Fraser TSA Analysis Report, June 1998.

**Table 21 Provincial Government Revenue Estimates**

<b>Revenue Type</b>	<b>Revenue Factor<sup>1</sup> (\$/m3)</b>	<b>Current AAC<sup>2</sup> (m3/year)</b>	<b>Total (\$ millions/year)</b>
Provincial income tax	8.720	1,025,000	8.9
Industry taxes	8.664	1,025,000	8.9
Stumpage, rents and royalties <sup>3</sup>	16.653	1,025,000	17.1

<sup>1</sup> Source MoF and Price Waterhouse, Timber Supply Review - Fraser TSA Analysis Report, June 1998.

<sup>2</sup> Current AAC less 43,000m3 for SBFEP.

<sup>3</sup> Average stumpage, rent and royalty revenues are specific to the Fraser TSA.

In combination, income and revenue generated through Canfor's allocation and use of fibre from TFL 37 contribute a total of \$135.5 million, or \$132/m3, towards the provincial economy.

Canfor's coastal fibre assets have contributed substantially to the company's performance, although the related processing facilities have not been a strength in recent years. For the future, we have developed plans to refocus on fibre management to extract maximum returns from each log and the timber base in aggregate. This will involve

*forestry, logging, merchandising and some primary processing activities. We will also be reviewing partnership opportunities with a strong wood products processing partner as a way to create additional value, and to stretch our fibre supply.*

*Since the initial harvest rate in section 4.2.1.1 is assumed to be unchanged, no significant impacts are expected regarding economic opportunities on TFL 37. On the other hand, opportunities to mitigate a reduced AAC – should it be necessary, may involve the following initiatives:*

- Support the Forest Minister in adopting the VIRT team's recommendations (Section 2.2) which are expected to alleviate short-term harvest constraints.*
- Achieve sustainable forest management in TFL 37 (Section 4.5.3) to demonstrate to our customers that we were managing the forests entrusted to our care in a sound manner.*
- Undertake research and inventory projects through MYAs with Forest Renewal B.C. (Section 4.5.5) and in partnerships (Section 4.6) to improve our understanding of harvesting constraints over the landbase or develop more economical forest management practices.*

## 6. Public Involvement

*We provide open, accessible and comprehensive information to the public to solicit their involvement and encourage support for our management activities.*

*In the course of producing MP 8, we solicited public involvement according to an accepted public review strategy (Appendix III). The following sections summarise the response received from the public regarding key components of this plan.*

### **6.1 Summary of comments received from the assessment of MWP 7**

*Our objective was to solicit public input regarding the implementation of MWP 7 and incorporate the feedback into the draft SMOOP.*

*We invited the public to comment on our MWP 7 by advertising in local and Vancouver newspapers but received no responses.*

*We also hosted a field tour of TFL 37 for various MoF representatives to identify and discuss key management issues. On October 4, 1996, we received an assessment from the MoF Regional Manager that was complementary to the issues identified from the field tour. We then incorporated these comments into our draft SMOOP.*

### **6.2 Summary of comments received from the draft SMOOP**

*Our objective was to solicit public input regarding the draft SMOOP and incorporate the results into the proposed SMOOP submitted to the Regional Manager.*

*We conducted our public review in accordance with the accepted public review strategy. A total of twelve people visited our open houses and we received two written comments to the draft SMOOP.*

*No modifications to the draft SMOOP were required, based on the responses from our public review of the draft SMOOP.*

*As new information became available the following modifications were made to the draft SMOOP:*

- Interim Landscape Units and associated biodiversity emphasis options will likely be available for the timber supply analysis. The SMOOP was modified in a number of sections to reflect this recent change.*
- We modified the draft SMOOP to reflect comments from the Regional Manager received on February 28, 1997.*

### **6.3 Summary of comments received from the draft MP 8**

*Our objective was to solicit public input regarding the draft MP 8 and incorporate results into the proposed MP 8 submitted to the provincial Chief Forester. We followed our public review strategy to solicit input from resource agencies, stakeholders, First Nations and the general public.*

*We provided an information package and questionnaire to various stakeholders along with an invitation to review and comment on the draft MP 8. A total of 19 people visited the advertised open houses held in Port McNeill, Woss and Campbell River. We arranged consultation meetings and invited comments from 'Namgis, Tlowitsis/Mumtagila and Mowachaht/Muchalaht First Nations. The Tlowitsis/Mumtagila First Nation were unable to meet with us.*

*We did not receive written comments from any of these groups although comments made during the open houses and various meetings were positive and encouraging.*

*A thorough review of MP 8 by MoF district, regional and branch staff identified several wording problems and pointed out several items that required clarification in the text.*

## **6.4 Public review strategy for our next MP 9**

*We intend to follow a similar public review strategy for our next MP 9, approximately according to the schedule provided in Table 22.*

**Table 22      Approximate Public Review Periods for MP 9 (2004-2008)**

<b>Public Review</b>	<b>Approximate Date</b>
Assessment of MP 8 (1999-2003)	July – September, 2001
Draft for MP 9	November – January, 2002
Draft MP 9	July – September, 2003

## 7. Summary of Commitments

The commitments made in this MP reflect assumptions applied in the timber supply analysis information package (Appendix V) or in preparation for the next analysis for MP 9, to provide the provincial Chief Forester with appropriate information for developing an AAC rationale (Appendix VII). The commitments made in MP 8 are summarised below:

<b>Harvesting</b>	<b>Page</b>
<i>Harvest timber according to the requirements of our licence document (Appendix II) and the allowable annual cut determined by the provincial Chief Forester (Appendix VII). .....</i>	<i>14</i>
<i>Incorporate areas classified for unconventional harvest methods within our operational plans. ....</i>	<i>18</i>
<i>Target a seasonal cut policy of 50% winter/intermediate and 50% summer. ....</i>	<i>18</i>
<i>Continue to pursue cost-effective commercial thinning opportunities at an annual harvest of approximately 10,000 m<sup>3</sup> per year. ....</i>	<i>27</i>
<i>Harvest timber to specifications that incorporate, but are not limited to, the utilisation standards expressed in each cutting permit and the timber inventory. ....</i>	<i>28</i>
<b>Silviculture</b>	
<i>Meet the requirements of the basic silviculture strategy while basing investment levels on site quality. ....</i>	<i>29</i>
<i>Investigate the potential of restocking high elevation sites in CWHvm2 and MHmm1 using a combination of natural regeneration and fill planting. ....</i>	<i>30</i>
<i>Assess identified NSR lands on the ground and regenerate/reclassify accordingly. ....</i>	<i>34</i>
<i>Continue road rehabilitation program to meet target of 3.5% area netdown for future roads. ....</i>	<i>36</i>
<i>Maintain and re-measure all road rehabilitation trial installations according to the research plan schedule. ....</i>	<i>36</i>
<i>Assess deciduous stand types and develop strategies to rehabilitate, convert or enhance these stands. ....</i>	<i>38</i>
<b>Integrated Resource Management</b>	
<i>Reclassify all fish streams, lakes and wetlands to our new operational base. ....</i>	<i>47</i>
<i>Conduct a landscape level biodiversity analysis once the VIRT process is complete. ....</i>	<i>54</i>
<i>Update the recreation inventory and analysis to revised MoF standards. ....</i>	<i>55</i>
<i>Continue to actively harvest within scenic areas while maintaining the associated visual resource values. ....</i>	<i>58</i>
<b>Inventory and Planning</b>	
<i>Complete final terrain and terrain stability mapping of TFL 37. ....</i>	<i>64</i>
<i>Improve our forest level assumptions regarding the regeneration potential on colluvial areas. ....</i>	<i>64</i>
<i>Complete the ecosystem classification of TFL 37. ....</i>	<i>65</i>
<i>Improve the productivity and yield estimates by re-analysing SIBEC data with the final ecosystem mapping. ....</i>	<i>65</i>
<i>Monitor and incorporate estimates from natural, unsalvaged losses (after salvage) into harvest forecasts. ....</i>	<i>66</i>



## 8. Summary of Changes and Impacts

### 8.1 Comparison Summary Between MP 8 and MWP 7

Under section 2.25 (I) of the TFL 37 licence agreement (Appendix II), we must highlight the key similarities and differences between MP 8 and the management plan currently in effect, MWP 7. These key summaries are organised below according to where they are considered to impact the implementation of MP 8.

#### 8.1.1 Landbase

Table 23 summarises the key landbase similarities and differences between MWP 7 and MP 8.

**Table 23 Landbase comparison between MWP 7 and MP 8 <sup>1</sup>**

	<b>MWP 7</b>	<b>MP 8</b>	<b>Difference</b>
Total Area	189,851 ha	188,745 ha	-1,106 ha
Productive Forest Area	136,685 ha	153,607 ha	16,922 ha
Current Net Operable Area	107,439 ha	103,248 ha	-4,191 ha
Long-term Net Operable Area	107,295 ha	101,080 ha	-6,215 ha

<sup>1</sup> Data used in the base case of the timber supply analysis (Appendix V).

- Incorporated the licence boundary as provided by the MoF (Section 1.2).
- Removed protected areas established through the VILUP (2.1).
- Considered SMZ constraints and draft priority use zones within the context of the VILUP and the Code (2.2).
- Continued to incorporate skyline harvest systems and rehabilitate roads into forest production to aggressively maximise the long-term operable landbase as in MWP 7 (Sections 4.2.1.3 and 4.2.2.8).
- Re-classified streams, lakes and wetlands according to the Code and increased the size of riparian areas accordingly (Section 4.3.1).
- Continued to remove ungulate winter ranges from the operable landbase as in MWP 7 (Section 4.3.2.4).
- Protected known black bear dens and raptor nests by removing specific areas from the operable landbase (Section 4.3.2.4).
- Removed existing and potential areas for wildlife tree patches and illustrated the spatial distribution considers stand-level biodiversity (Section 4.3.3).
- Updated visual landscape inventory (Section 4.3.5.1).
- Refined environmentally sensitive areas with improved terrain, ecosystem and forest cover inventories (Section 4.4.3).
- Re-classified and re-inventoried timber resources (Section 4.4.3.1).
- Identified physically inoperable areas (Section 4.4.3.2.1).
- Revisited economic operability of the landbase and included areas classified as marginally economic (Section 4.4.3.2.2).
- Remapped and included areas classified as requiring unconventional harvest systems (Section 4.4.3.2.3).

### 8.1.2 Growth and Yield

Table 24 summarises the key growth and yield similarities and differences between MWP 7 and MP 8.

**Table 24 Growth and yield comparison between MWP 7 and MP 8 <sup>1</sup>**

	<b>MWP 7</b>	<b>MP 8</b>	<b>Difference</b>
Net area of existing mature stands	52,418	43,798 ha	-8,620 ha
Net area of existing immature stands	55,021	59,450 ha	4,429 ha
Commencement of managed stands (yr.)	1976	1960	-16 years
Minimum harvest age (MHA) <sup>2</sup>	81	77	-4 years
Mean annual increment at MHA <sup>2</sup>	7.6 m3/ha/yr	11.5 m3/ha/yr	3.9 m3/ha/yr
Net volume at MHA <sup>2</sup>	577 m3/ha	858 m3/ha	281 m3/ha

<sup>1</sup> Data used in the base case of the timber supply analysis (Appendix V).

<sup>2</sup> Weighted average results of future managed stands over the current net operable landbase.

- Re-examined management "eras" and developed yield tables for managed stands established since TFL 37 was awarded (Section 4.2.2.2).
- Re-classified ecological units (Section 4.4.3.4).
- Developed yield tables using TIPSy (Section 4.4.3.4).
- Improved estimates of site productivity through a statistically-defensible SIBEC analysis (Section 4.4.3.4).

### 8.1.3 Planning

- Continued to include commercial thinning volume within the proposed harvest level as in MWP 7 (Section 4.2.1.11).
- Continued to refine silviculture strategies towards ecosystem-based prescriptions as in MWP 7 (Section 4.2.2).
- Refined minimum harvest ages associated with specific end-product objectives (Section 4.2.2.4).
- Considered biodiversity constraints associated with the Code (Section 4.3.3).
- Excluded volume associated with unsalvaged losses due to fire, wind and other natural losses (Section 4.4.3.5).
- Incorporated twenty year plan spatial constraints into the timber supply analysis (Section 4.4.4).

## 8.2 Impact Summary of Implementing MP 8

Section 2.25 (k and l) of the TFL 37 licence agreement (Appendix II), requires us to summarise the impact, if any, that implementing MP 8 may have on the factors given below.

Forest law, all relevant legislation, standards and procedures (Section 1.5), and the objectives proposed in higher level plans (Section 2) are fundamental to management practices and standards on TFL 37. Constraints imposed by these references are considered within our objectives, options and procedures (Section 3), as well as the strategies and standards (Section 4) described throughout the MP 8. Consequently, changes to these constraints may, in turn affect the expected impacts on these factors.

### 8.2.1 Harvest Levels

The harvest rate proposed for the period of MP 8 (Section 4.2.1.1) is approximately 18,000 m3 higher than the timber harvest projection developed in MWP 7 for the same period.

## **8.2.2 Economic Opportunities**

*Economic opportunities provided from TFL 37 (Section 5) are partly related to the allowable annual cut determined by the provincial Chief Forester (Section 4.2.1.1). Certainly, economic opportunities are more a function of the costs associated with manufacturing, marketing and delivering products to our customers and the sales price these customers are willing or able to pay.*

*By preparing MP 8 and fulfilling the requirements of sections 2.24 to 2.26 of our TFL 37 agreement (Appendix II), we expect the stability of this tenure will support shareholder confidence, assist in securing long-term contracts with customers and provide a basis from which to explore new markets.*

*In developing MP 8, we improved several inventories which has allowed us to refine our estimates of, monitor and incorporate the economic operability of timber resources within our timber supply analysis. This has helped us to identify and explore new opportunities to alleviate recent legislative constraints.*

*Canfor will continue to support initiatives that significantly reduce costs, enhance revenues and improve productivity. We will also continue to work with the MoF towards its fourth mandate to encourage a vigorous, efficient and world competitive timber processing industry in the province of British Columbia (Ministry of Forests Act - The purposes and functions of the ministry).*

## **8.2.3 Employees and Contractors**

*The number of persons directly and indirectly employed from TFL 37 operations (Section 5) is partly related to the allowable annual cut determined by the provincial Chief Forester (Section 4.2.1.1). Compared to the planned harvest rate developed in MWP 7, the proposed harvest rate for MP 8 should support a similar level of employment.*

*Spatial constraints and the current timber profile, however, require us to explore alternative harvest and silviculture systems (Sections 4.2.1.3, 4.2.1.5 and 4.2.1.11). At this time, it is uncertain how these systems will affect the number of persons employed, but it is increasingly apparent that reducing costs and improving efficiency must drive these analyses.*

## **8.2.4 Non-timber Values**

*The proposed AAC (Section 4.2.1.1) incorporates spatial constraints for timber harvesting and protecting non-timber resources. We expect that recent improvements in forest resource inventories (Section 4.4.1) will help us to plan and ensure that non-timber values are protected.*

## 9. Plan Distribution and Revisions

A complete copy of MP 8 will be distributed to the offices according to Table 25.

**Table 25 Distribution of MP 8**

Office	Ministry	Division	Address
Chief Forester <sup>1</sup>	MoF	Forestry Division	4th Floor, 595 Pandora Avenue Victoria, B.C., V8W 3E7
Regional Manager <sup>2</sup>	MoF	Vancouver Forest Region	2100 Labieux Road Nanaimo, B.C., V9T 6E9
District Manager <sup>2</sup>	MoF	Port McNeill Forest District	PO Box 7000 Port McNeill, B.C., V0N 2R0
Senior Habitat Biologist-Forestry <sup>2</sup>	MoELP	Vancouver Island Region	2080-A Labieux Rd. Nanaimo B.C., V9T 6J9

<sup>1</sup> Submit proposed MP 8 only.

<sup>2</sup> Submit both draft and proposed MP 8.

Under circumstances described in section 2.34 of our TFL document (Appendix II), the provincial Chief Forester may require that the MP be amended. Alternatively, we may prepare revisions under the same circumstances, to achieve our management objectives. For example, some of the initiatives discussed under Special Projects (Section 0) may require an amendment.

Copies of any amendments or additions to MP 8 will be distributed to the above offices. A copy of our MP 8 will also be available for public review at our divisional and corporate offices.

## 10. Annual Report of Operations

By March 31 of each year, we intend to submit an Annual Report of Operations to the District Manager, Port McNeill Forest District. This report will report our management activities and MP 8 commitments with respect to TFL 37 and their status over the previous year.

Copies of our annual report of operations will be distributed to the offices according to Table 26.

**Table 26**      **Distribution of annual report of operations**

Office	Ministry	Division	Address
District Manager	MoF	Port McNeill Forest District	PO Box 7000 Port McNeill, B.C., V0N 2R0
Regional Manager	MoF	Vancouver Forest Region	2100 Labieux Road Nanaimo, B.C., V9T 6E9

A copy of our annual report of operations will also be available for public review at FDP and MP open houses, and at our divisional and corporate offices.

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## 12. Glossary of Terms

**Adaptive management:** adaptive management rigorously combines management, research, monitoring, and means of changing practices so that credible information is gained and management activities are modified by experience.

**Advanced regeneration:** trees that have become established naturally under a mature forest canopy and are capable of becoming the next crop after the mature crop is removed.

**Aerial photography:** photos taken from the air at regular, spatial intervals and used in photo interpretation to provide much information about forests and landforms.

**Age class:** any interval into which the age range of trees, forests, stands, or forest types is divided for classification. Forest inventories commonly group trees into 20-year age classes.

**Allowable Annual Cut (AAC):** the allowable rate of timber harvest from a specified area of land. The chief forester sets AACs for timber supply areas (TSAs) and tree farm licences (TFLs) in accordance with Section 7 of the Forest Act.

**Aquatic habitat:** habitat where a variety of marine or freshwater flora and fauna occur for long periods throughout the year. Examples include tide pools, estuaries, bogs, ponds and potential underwater diving areas.

**Archaeological site:** a location that contains physical evidence of past human activity and that derives its primary documentary and interpretative information through archaeological research techniques. These resources are generally associated with both the pre-contact and post-contact periods in B.C.. These resources do not necessarily hold direct associations with living communities.

**Artificial regeneration:** establishing a new forest by planting seedlings or by direct seeding (as opposed to natural regeneration).

**Aspect:** the direction toward which a slope faces.

**Backlog:** a MoF term applied to forest land areas where silviculture treatments such as planting and site preparation are overdue. Planting is considered backlog if more than 5 years have elapsed since a site was cleared (by harvesting or fire) in the interior and more than 3 years on the coast of B.C..

**Base case:** the current socio-economic conditions related to the existing forest land management strategy and the expected socio-economic conditions if the strategy remains unchanged.

**Biodiversity:** The diversity of plants, animals and other living organisms in all their forms and levels of organisation, including the diversity of genes, species, ecosystems and the evolutionary and functional processes that link them.

**Biogeoclimatic ecosystem classification (BEC) system:** a hierarchical classification system of ecosystems that integrates regional, local and chronological factors and combines climatic, vegetation and site factors.

**Blue-listed species:** species identified as blue-listed by the Ministry of Environment, Lands and Parks; these are indigenous species of special concern as they are vulnerable or sensitive to human activities or natural events.

**Botanical forest products:** prescribed plants or fungi that occur naturally on Crown forest land. There are seven recognised categories: wild edible mushrooms, floral greenery, medicinal products, fruits and berries, herbs and vegetables, landscaping products and craft products.

**Broadcast burning:** a controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries, for the reduction of fuel hazard after logging or for site preparation before planting. Also called slash burning.

**Brushing:** a silviculture activity done by chemical, manual, grazing, or mechanical means to control competing forest vegetation and reduce competition for space, light, moisture, and nutrients with crop trees or seedlings.

**Bucking:** cutting a felled tree into specified log lengths for yarding and hauling; also, making any bucking cut on logs.

**Buffer zone (pesticide):** a strip of land between the 10 m pesticide-free zone and the pesticide treatment area for preventing entry of pesticides or pesticide residues by drift, runoff, or leachate into the pesticide-free zone.

**Canadian Forest Fire Weather Index (FWI) System:** A subsystem of the Canadian Forest Fire Danger Rating System. The components of the FWI System provide numerical ratings of relative fire potential in a standard fuel type (i.e. a mature pine stand) on level terrain, based solely on consecutive observations of four fire weather elements measured daily at noon (1200 hours local standard time or 1300 hours daylight saving time) at a suitable fire weather station; the elements are dry bulb temperature, relative humidity, wind speed, and precipitation. The system provides a uniform method of rating fire danger across Canada.

**Canopy:** the forest cover of branches and foliage formed by tree crowns.

**Clearcut:** an area of forest land from which all merchantable trees have recently been harvested.

**Clearcutting silviculture system:** a system in which the crop is cleared from an area at one time and an even-aged, replacement stand is established. It does not include clearcutting with reserves. Clearcutting is designed so that most of the opening has full light exposure and is not dominated by the canopy of adjacent trees (this produces an open area climate). The minimum size of a clearcut opening is generally considered to be 1 ha.

**Clearcutting with reserves:** a variation of the clearcut silviculture system in which trees are retained, either uniformly or in small groups, for purposes other than regeneration.

**Coarse Woody Debris (CWD):** sound and rotting logs and stumps that provide habitat for plants, animals, and insects and a source of nutrients for soil development.

**Colluvial:** loose deposits of rock-waste that were transported into their present positions by gravity. These landforms or modifiers include screes and landslip deposits.

**Cutblock adjacency:** integrated resource management requirements that specify the desired spatial relationships among cutblocks.

**Commercial thinning:** a silviculture treatment that 'thins' out an overstocked stand by removing trees that are large enough to be sold as products such as poles or fence posts. It is carried out to improve the health and growth rate of the remaining crop trees.

**Competing vegetation:** vegetation that seeks and uses the limited common resources (space, light, water, and nutrients) of a forest site needed by preferred trees for survival and growth.

**Conifer release:** to release established coniferous trees from a situation in which they have been suppressed by thinning out undesirable trees and shrubs which have overtopped them. Carried out to improve the growth of the coniferous trees released. See Brushing.

**Coniferous:** cone-bearing trees having needles or scale-like leaves, usually evergreen, and producing wood known commercially as 'softwoods'.

**Constraints:** integrated resource management requirements that specify the desired spatial and temporal relationships among cutblocks. Spatial adjacency constraints refer to the maximum size of the cut openings. Temporal adjacency constraints refer to the time period delay between harvesting adjacent blocks.

**Crop tree:** a tree in a young stand or plantation selected to be carried through to maturity until an interim or final harvest.

**Cut control:** a set of rules and actions specified in the Forest Act that describes the allowable variation in the annual harvest rate either above or below the allowable annual cut approved by the chief forester.

**Cutblock:** a specific area, with defined boundaries, authorised for harvest.

**Deactivation:** measures taken to stabilise roads and logging trails during periods of inactivity, including the control of drainage, the removal of side-cast where necessary, and the re-establishment of vegetation for permanent deactivation.

**Deciduous:** perennial plants which are normally leafless for some time during the year.

**Diameter at breast height (DBH):** the stem diameter of a tree measured at breast height, 1.3 metres above the ground.

**Ecological classification:** an approach to categorising and delineating, at different levels of resolution, areas of land and water having similar characteristic combinations of the physical environment (such as climate, geomorphic processes, geology, soil and hydrologic function), biological communities (plants, animals, micro-organisms and potential natural communities) and the human dimension (such as social, economic, cultural and infrastructure).

**Ecological reserve:** areas of Crown land which have the potential to satisfy one or more of the following criteria: areas in which rare or endangered native plants or animals may be preserved in their natural habitat, areas suitable for scientific research and educational purposes associated with studies in productivity and other aspects of the natural environment, areas that contain unique geological phenomena and areas which are representative of natural ecosystems.

**Ecosystem:** a functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size—a log, pond, field, forest, or the earth's biosphere—but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem, old-growth ecosystem, or range ecosystem.

**End product:** refers to the primary merchandising of a log within the following categories: lumber, veneer, shakes, shingles, chips/pulp.

**Enhanced Development Zones (EDZ):** the government's announcement of the VILUP characterised EDZ priority use areas as "areas designated under the Code to allow companies to employ labour-intensive forest management to produce higher value and higher volumes of merchantable timber. This will provide greater harvests and more jobs on lands appropriate for intensive reforestation spacing m pruning, thinning and new harvest practices through the Forest Renewal Plan. These high yield forestry lands will be identified through local planning processes."

**Environmentally sensitive areas (ESA):** areas requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes. ESAs for forestry include potentially fragile, unstable soils that may deteriorate unacceptably after forest harvesting, and areas of high value to non-timber resources such as fisheries, wildlife, water, and recreation.

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**Fertilisation:** the addition of fertiliser to promote tree growth on sites deficient in one or more soil nutrients. Also used to improve the vigour of crop trees following juvenile spacing or commercial thinning.

**Foliar analysis:** chemical evaluation of the status of plant nutrients or the plant-nutrient requirements of a soil by the analysis of leaves or needles.

**Forest inventory:** an assessment of forest resources, including digitised maps and a database which describes the location and nature of forest cover (including tree size, age, volume and species composition) as well as a description of other forest values such as soils, vegetation and wildlife features.

**Forest licence (FL):** a forest licence allows orderly timber harvest over a portion of a sustained yield management unit, and the timely reforestation of harvested areas according to a strategic resource management plan prepared by the Forest Service for each timber supply area. The licence has a term of 15 to 20 years, generally replaceable every five years (some are non-replaceable) and operating areas that shift over time. Once an area is harvested and reforested the licensee moves to another part of the timber supply area. A forest licence specifies an annual allowable cut, requires a management and working plan, and specified management activities.

**Forest management:** the practical application of scientific, economic and social principles to the administration and working of a forest for specified objectives. Particularly, that branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation.

**Forest Practices Code (Code):** the Code is a term commonly used to refer to the Forest Practices Code of B.C. Act, the regulations made by Cabinet under the act and the standards established by the chief forester. The term may sometimes be used to refer to field guides as well. It should be remembered that unlike the act, the regulations and standards, field guides are not legally enforceable.

**Fragmentation:** the process of transforming large continuous forest patches into one or more smaller patches surrounded by disturbed areas. This occurs naturally through such agents as fire, landslides, windthrow and insect attack. In managed forests timber harvesting and related activities have been the dominant disturbance agents.

**Free-growing:** young trees that are as high or higher than competing brush vegetation with one metre of free-growing space surrounding their leaders. As defined by legislation, a free growing crop means a crop of trees, the growth of which is not impeded by competition from plants, shrubs or other trees. Silviculture regulations further define the exact parameters that a crop of trees must meet, such as species, density and size, to be considered free growing.

**General Management Zones (GMZ):** the government's announcement of the VILUP characterised GMZ priority use areas as "lands [that] will comprise the remaining commercial forest lands where the quality of land does not support high intensity use (EDL). This largest portion of the Reserve will be protected for sustained integrated resource use."

**Geographic information system (GIS):** a computer system designed to allow users to collect, manage and analyse large volumes of spatially referenced information and associated attribute data.

**Goal:** goals provide general purpose and direction. They are the end result of ultimate accomplishment toward which an effort is directed. They generally should reflect perceived present and future need. They must be capable of being effectively pursued.

**Greened-up:** a cutblock that supports a stand of trees that has attained the green-up height specified in a higher level plan for the area, or in the absence of a higher level plan for the area, has attained a height that is 3 m or greater, and if under a silviculture prescription, meets the stocking requirements of that prescription, or if not under a silviculture prescription, meets the stocking specifications for that biogeoclimatic ecosystem classification specified by the regional manager.

**Growth and yield:** a process by which the growth rates and volume yields of trees or stands are measured and predicted.

**Harvest forecast:** the flow of potential timber harvests over time. A harvest forecast is usually a measure of the maximum timber supply that can be realised, over time, for a specified land base and set of management assumptions.

**Harvest pattern:** the spatial distribution of cutblocks and reserve areas across the forested landscape.

**Harvesting method:** the mix of felling, bucking, and yarding (skidding) systems used in logging a stand of timber.

**Harvesting:** the practice of felling and removing trees or the removal of dead or damaged trees from an area.

**Higher level plan:** strategic or operational plans that provide direction to any lower level of plans, prescriptions or forest practices. Plans which might be declared to be a higher level plan by the minister or the lieutenant governor include plans such as Land Resource Management Plans and Local Resource Use Plans. Higher level plans include: a plan formulated pursuant to Section 4(c) of the Ministry of Forests Act, a management plan as defined in the Forest Act, an objective for a resource management zone, an objective for a landscape unit or sensitive area, an objective for a recreation site, recreation trail or interpretative forest site, and a plan or agreement declared to be a higher level plan by the minister or the lieutenant governor.

**Immature:** trees or stands that have grown past the regeneration stage, but are not yet mature.

**Indirect jobs:** jobs that are supported by direct businesses purchasing goods and services. A multiplier based on the number of direct jobs is used to estimate this figure (see Multiplier).

**Induced jobs:** jobs that are supported by employees of businesses spending their incomes on things such as groceries, automobiles, restaurant dinners and haircuts. A multiplier based on the number of direct jobs is used to estimate this figure (see Multiplier).

**Information package:** a TFL licensee submits a timber supply analysis information package which details the technical forest management information such as inventory, expected timber growth rates, fish and wildlife management and other current forest

management to be included in the timber supply analysis. This package is reviewed by the MoF and other agencies including the MoELP.

**Inoperable areas:** lands that are unsuited for timber production now and in the foreseeable future by virtue of their: elevation; topography; inaccessible location; low value of timber; small size of timber stands; steep or unstable soils that cannot be harvested without serious and irreversible damage to the soil or water resources; or designation as parks, wilderness areas, or other uses incompatible with timber production.

**Juvenile spacing:** a silviculture treatment to reduce the number of trees in young stands, often carried out before the stems removed are large enough to be used or sold as a forest product. Prevents stagnation and improves growing conditions for the remaining crop trees so that at final harvest the end-product quality and value is increased. Also called pre-commercial thinning.

**Landscape level:** a watershed, or series of interacting watersheds or other natural biophysical (ecological) units, within the larger Land and Resource Management Planning areas. This term is used for conservation planning and is not associated with visual landscape management and viewscape management.

**Landscape sensitivity:** a component of the landscape inventory that estimates the sensitivity of the landscape based on: the visual prominence of importance of features; conditions that affect visual perception; and social factors that contribute to viewer perceptions.

**Landscape unit objectives:** objectives established for a landscape unit to guide forest development and other operational planning. Landscape objectives are established by the MoF' district manager and a designated B.C. Environment official.

**Landscape unit:** a planning area, up to 100 000 ha in size, based on topographic or geographic features such as a watershed or series of watersheds. They are established by the MoF' district manager in consultation with a designated B.C. Environment official to ensure Crown land in a provincial forest and private land in a tree farm licence or woodlot licence are managed and used in accordance with Section 2 of the Code.

**Long-term harvest level:** the expected harvest level that can be maintained indefinitely given a particular forest management regime (which defines the timber harvesting land base and includes objectives and guidelines for non-timber values) and estimates of timber growth and yield.

**Long-term:** the portion of the planning period that occurs throughout the long-term harvest level. Regarding TFL 37, the long-term is considered beyond 130 years.

**Management plan:** a management plan or management and working plan approved under a tree farm licence, woodlot licence, pulpwood agreement or forest licence. Contains inventory and other resource data.

**Mature:** trees or stands that are sufficiently developed for harvest.

**Mean Annual Increment (MAI):** the average annual increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.

**Merchandising:** preparing log end products for marketing and sales by improving their quality and appearance, including sorting logs to customer specifications.

**Merchantable timber:** a tree or stand that has attained sufficient size, quality and/or volume to make it suitable for harvesting.

**Mid-term:** the portion of the planning period that occurs between the short- and long-terms, where a stable and lowest level in the harvest forecast is reached. Regarding TFL 37, the mid-term is considered between 20 and 110 years.

**Multiplier:** an estimate of the total employment supported by each direct job, for example, a multiplier of 2.0 means that one direct job supports one additional indirect and induce job.

**Net down procedure:** The process of identifying the net land base, which is the number of hectares of forest land which actually contribute to the allowable annual cut. The process involves "netting down" the gross area of the landbase to the gross forest area then to the net forest area. Areas and/or volumes are sequentially deleted or reduced from the gross land base for a number of considerations, including: private ownership, non- forest or non-productive, environmentally sensitive, unmerchantable and inaccessible.

**Net operable landbase:** see Net down procedure.

**Non-timber resources:** resources other than timber, such as recreation, aesthetics, wildlife, fish, forage, range, water, and soils.

**Normal forest:** an outdated concept, drawing on the idea of a norm or standard forest structure against which existing forest structures can be compared. A normal forest is a forest composed of even-aged fully-stocked stands representing a balance of age classes such that for a specified rotation period, one age class can be harvested in each year. At the end of the rotation, the stands that were harvested first in the cycle would be ready for harvesting again.

**Not Satisfactorily Restocked (NSR):** productive forest land that has been denuded and has failed, partially or completely, to regenerate either naturally or by planting or seeding to the specified or desired free growing standards for the site.

**Operability:** in a planning context, the term refers to the suitability of timber for harvesting under current physical, technical and economic constraints. Parameters to consider in assessing operability include: safety, terrain, timber quality, timber size, operating season, labour costs, development costs, and transportation costs.

**Operable timber:** timber which is available for harvest after due recognition of constraints to protect the environment and other forest uses.

**Operational plans:** within the context of area-specific management guidelines, operational plans detail the logistics for development. Methods, schedules, and responsibilities for accessing, harvesting, renewing, and protecting the resource are set out to enable site-specific operations to proceed. Operational plans include a forest development plan, logging plan, access management plan, range use plan, silviculture prescription, stand management prescription and 5 year silviculture plan.

**Option:** a set of assumptions representing a possible management direction. Options are constructed as a normal part of a planning process in order to provide a framework for analysis and to facilitate management decision-making.

**Orthophoto:** a completely rectified copy of an original photograph. All variations in scale and displacements, due to relief, have been eliminated, hence the name "ortho" (correct) photography. Orthophoto and orthophoto map are synonymous, an orthophoto is, very simply, a photo map.

**Partial harvesting:** a general term referring to silviculture systems other than clearcutting, in which only selected trees are harvested. Partial cutting systems include seed tree, shelterwood, selection, and clearcutting with reserves.

**Patch cutting:** a silviculture system that creates openings less than 1 hectare in size and is designed to manage each opening as a distinct even-aged opening.

**Permanent access structure:** a structure, including a road, bridge, landing, gravel pit or other similar structure, that provides access for timber harvesting, and is shown expressly or by necessary implication on a forest development plan, access management plan, logging plan, road permit or silviculture prescription as remaining operational after timber harvesting activities on the area are complete.

**Pest:** any forest health agent designated as detrimental to effective resource management.

**Productive forest land:** forest land that is capable of producing a merchantable stand within a defined period of time.

**Protected areas:** areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage.

**Pruning:** the manual removal, close to or flush with the stem, of side branches, live or dead, and of multiple leaders from standing, generally plantation-grown trees. Pruning is carried out to improve the market value of the final wood product by producing knot-free wood for the improvement of the tree or its timber.

**Pulp log:** a log that is suitable to produce only chips for an end product.

**Red-listed species:** species identified as red-listed by the Ministry of Environment, Lands and Parks; these are indigenous species that are either endangered (facing imminent extinction) or threatened (likely to become endangered if limiting factors are not reversed).

**Reforestation:** the natural or artificial restocking (i.e., planting, seeding) of an area with forest trees. Also called forest regeneration.

**Regeneration delay:** the maximum time allowed in a prescription, between the start of harvesting in the area to which the prescription applies, and the earliest date by which the prescription requires a minimum number of acceptable well-spaced trees per hectare to be growing in that area.

**Reserve:** an area of forest land that, by law or policy, is not available for harvesting. Areas of land and water set aside for ecosystem protection, outdoor and tourism values, preservation of rare species, gene pool, wildlife protection etc.

**Residue:** the volume of timber left on the harvested area that meets or exceeds the size requirements but is below the log grade requirements of the minimum utilisation standards in the cutting authority. It is part of the allowable annual cut for cut control.

**Right-of-way:** the strip of land over which a power line, railway line, road, etc., extends.

**Riparian management zone:** the area within and adjacent to riparian and other wetlands required to meet the structural and functional attributes of riparian ecosystems.

**Road deactivation:** measures taken to stabilise roads and logging trails during periods of inactivity, including the control of drainage, the removal of side-cast where necessary, and the re-establishment of vegetation for permanent deactivation.

**Rotation:** the planned number of years between the formation or regeneration of a tree crop or stand and its final cutting at a specified stage of maturity. Can be based on physical, biological, pathological or economic criteria.

**Sawlog:** a log that is suitable to produce at least 50% lumber or veneer end products.

**Second growth:** a forest or stand that has grown up naturally after removal of a previous stand by fire, harvesting, insect attack or other cause.

**Seed orchard:** a plantation of specially selected trees that is managed for the production of genetically improved seed.

**Seed tree silviculture system:** an even-aged silviculture system in which selected trees (seed trees) are left standing after the initial harvest to provide a seed source for natural regeneration. Seed trees can be left uniformly distributed or in small groups. Although regeneration is generally secured naturally, planting may augment it. Seed trees are often removed once regeneration is established or may be left as reserves.

**Seedling:** a young tree, grown from seed, from the time of germination to the sapling stage, having a DBH equal or less than 1 cm.

**Seedlots:** seed from a particular collection event, either from a single tree collection or a pooling of seed from many trees.

**Selection silviculture system:** a silviculture system that removes mature timber either as single scattered individuals or in small groups at relatively short intervals, repeated indefinitely, where the continual establishment of regeneration is encouraged and an uneven-aged stand is maintained. As defined in the Code's Operation Planning Regulation, group selection removes trees to create openings in a stand less than twice the height of mature trees in the stand.

**Shelterwood silviculture system:** a silviculture system in which trees are removed in a series of cuts designed to achieve a new even-aged stand under the shelter of remaining trees.

**Short-term:** the portion of the planning period that occurs as the initial harvest level decreases or increases to a stable level (Mid-term) before reaching a long-term harvest level. Regarding TFL 37, the short-term is considered to be the first 40 years.

**Silviculture system:** a process that applies silviculture practices, including the tending, harvesting, and replacing of a stand, to produce a crop of timber and other forest products. The system reflects a reproductive method but is named by the cutting method with which regeneration is established. The five classical systems are seed tree, shelterwood, single-tree selection, group selection and clearcut.

**Silviculture:** the art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

**Site index:** the measure of the relative productive capacity of a site for a particular tree species, based on height at a given reference or base age (50).

**Site rehabilitation:** the conversion of the existing unsatisfactory cover on highly productive forest sites to a cover of commercially valuable species.

**Slash:** the residue left on the ground as a result of forest and other vegetation being altered by forest practices or other land use activities.

**Small Business Forest Enterprise Program (SBFEP):** this program permits the MoF to sell Crown timber competitively to individuals and corporations who are registered in the SBFEP.

**Snag:** a standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

**Special forest products:** poles; posts; pilings; shakes; shingle bolts; Christmas trees; building logs; mining timbers, props, and caps; cribbing; firewood and fuel logs; hop poles; orchard props; car stakes; round stakes, sticks, and pickets; split stakes, pickets, palings, and lagging; and shake bolts, blocks, and blanks.

**Special Management Zones (SMZ):** the government's announcement of the VILUP characterised SMZs as priority use areas for sensitive management of wildlife, old growth, visual, recreation and other non-timber resources.

**Stand conversion:** changing the species composition of a stand to more desirable tree species which are less susceptible to damage or mortality from certain insects or diseases.

**Stand level:** the level of forest management at which a relatively homogeneous land unit can be managed under a single prescription, or set of treatments, to meet well-defined objectives.

**Stand structure:** the distribution of trees in a stand, which can be described by species, vertical or horizontal spatial patterns, size of trees or tree parts, age, or a combination of these.

**Stand:** a community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.

**Statement of management objectives, options and procedures (SMOOP):** in preparation for writing a new management plan, a TFL licensee drafts the terms of reference, known as a SMOOP, as well as proposed objectives for employment and economic opportunity. These are made available for public comment in accordance with an approved review strategy.

**Stocking:** a measure of the area occupied by trees, usually measured in terms of well-spaced trees per hectare, or basal area per hectare, relative to an optimum or desired level.

**Strategy:** a broad non-specific statement of an approach to accomplishing desired goals and objectives.

**Stumpage:** is the fee that individuals and firms are required to pay to the government when they harvest Crown timber in B.C.. Stumpage is determined through a complex appraisal of each stand or area of trees that will be harvested for a given timber mark. A stumpage rate (\$ per m<sup>3</sup>) is determined and applied to the volume of timber that is cut (m<sup>3</sup>). Invoices are then sent to individuals or firms.

**Sustainability:** the concept of producing a biological resource under management practices that ensure replacement of the part harvested, by re-growth or reproduction, before another harvest occurs.

**Temporary access structure:** a structure that would be a permanent access structure except that it is not shown on a forest development plan, access management plan, logging plan, road permit or silviculture prescription as remaining operational after the completion of timber harvesting activities.

**Tenure:** the holding, particularly as to manner or term (i.e., period of time), of a property. Land tenure may be broadly categorised into private lands, federal lands, and provincial Crown lands. The Forest Act defines a number of forestry tenures by which the cutting of timber and other user rights to provincial Crown land are assigned.

**Timber harvesting land base:** the portion of the total area of a management unit considered to contribute to, and be available for, long-term timber supply. The harvesting land base is defined by reducing the total land base according to specified management assumptions.

**Timber licence (TL):** area-based tenures which revert to the government when merchantable timber on the area has been harvested and the land reforested. Many of these licences have been incorporated into tree farm licences.

**Timber supply analysis:** an assessment of future timber supplies over long planning horizons (more than 200 years) by using timber supply models for different scenarios identified in the planning process.

**Timber supply review (TSR):** the timber supply review program regularly updates timber supply in each of the 37 TSAs and 34 TFLs areas throughout the province. By law, the chief forester must re-determine the AAC at least once every five years to ensure AACs are current and reflect new information, new practices and new government policies.

**TIPSY (table interpolation projection program for stand yields):** a program that interpolates data from TASS (tree and stand simulator) – a computer model that simulates the growth of individual trees and stands. This program is based on growth trends observed in fully stocked research plots growing in a relatively pest free environment. The yields will be very close to the potential of a specific site, species and management regime.

**Tree farm licence (TFL):** a TFL is an agreement between the provincial government and a licensee which grants the licensee the rights to manage the land and harvest the timber on a defined area of Crown land in accordance with Section 35 of the Forest Act. A TFL has a term of 25 years and is eligible for replacement every 5 years.

**Tree improvement:** the control of parentage combined with other silviculture activities (such as site preparation or fertilising) to improve the overall yield and quality of products from forest lands.

**Twenty year plan:** a TFL licensee submits an operational timber supply projection that indicates the availability of timber by setting out a hypothetical sequence of harvesting over a period of at least 20 years, consistent with proposed management objectives. The main purpose of the plan is to demonstrate whether or not the harvests projected in the base case over the next 20 years are spatially feasible, taking into account constraining factors such as Code requirements, timber harvesting land base deductions and the volume assignments per hectare on each entry. This package is reviewed by the MoF.

**Unmerchantable:** of a tree or stand that has not attained sufficient size, quality and/or volume to make it suitable for harvesting.

**Unsalvaged losses:** the volume of timber destroyed by natural causes such as fire, insect, disease or windthrow and not harvested, including the timber actually killed plus any residual volume rendered non-merchantable.

**VDYP (variable density yield projection):** an empirical-based computer model for predicting timber growth and yield. This model projects the average yield of naturally regenerated stands which have not been treated.

**Veneer:** the product produced from a peeler block (log) on a rotary lathe.

**Visual landscape management:** the identification, assessment, design, and manipulation of the visual features or values of a landscape, and the consideration of these values in the integrated management of provincial forest and range lands.

**Visual Quality Objective (VQO):** an approved resource management objective that reflects a desired level of visual quality based on the physical and sociological characteristics of the area; refers to the degree of acceptable human alteration to the characteristic landscape.

**Visual sensitivity:** a component of the visual landscape inventory that estimates the sensitivity of the landscape based on the visual prominence or importance of features, conditions that affect visual perception, and social factors that contribute to viewer perceptions.

**Waste:** the volume of timber left on the harvested area that should have been removed in accordance with the minimum utilisation standards in the cutting authority. It forms part of the allowable annual cut for cut-control purposes.

**Wildlife tree patch:** an area specifically identified for the retention and recruitment of suitable wildlife trees. It can contain a single wildlife tree or many. A wildlife tree is synonymous with a group reserve.

**Wildlife tree:** a standing live or dead tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife. Characteristics include large diameter and height for the site, current use by wildlife, declining or dead condition, value as a species, valuable location and relative scarcity.

**Windthrow:** a tree or trees uprooting by the wind.

**Yarding:** in logging, the hauling of felled timber to the landing or temporary storage site from where trucks (usually) transport it to the mill site. Yarding methods include cable yarding, ground skidding, log-forwarding and aerial methods such as skyline and helicopter yarding.