



PORT EDWARD TREE FARM LICENCE # 1

MANAGEMENT PLAN 9
JANUARY 1, 1999-DECEMBER 31, 2003

SUBMITTED TO CHIEF FORESTER, MINISTRY OF FORESTS
NOVEMBER, 1998

SKEENA CELLULOSE INC.

PREAMBLE

This management plan has been prepared by Skeena Cellulose Inc. Terrace Woodlands. A number of parties and individuals assisted in its preparation: Sterling Wood Group Inc. completed the 20 year plan and timber supply analysis. Significant contributions in completing this management plan were made by Randy Hall, HBScFor; B.F. Bodie, RPF; M.A. MacDonald, RPF; S.J. Macpherson, RPF; and S.M. Smith, PhD, RPF.

Professional Forester Certification

I certify that this work fulfils accepted standards and that I did personally supervise the work.



Submission to provincial Chief Forester:

Submitted on Nov 24 1998 on behalf of Skeena Cellulose Inc.


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DISTRIBUTION LIST

TFL 1 - MANAGEMENT PLAN 9

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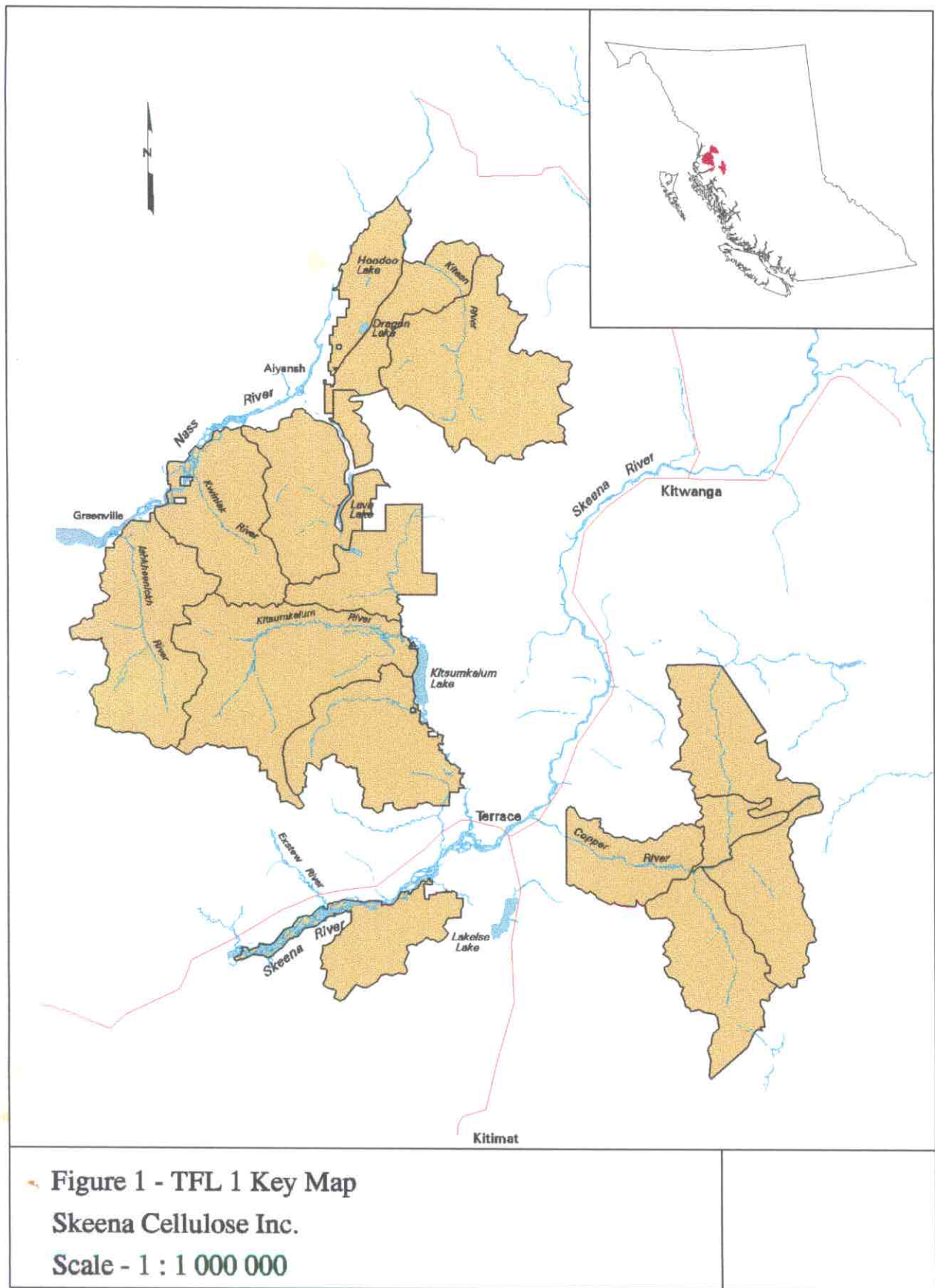




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1.0 INTRODUCTION

The Port Edward Tree Farm Licence 1 (TFL 1) was established in 1948 and has been administered under a series of forest management plans for the past 50 years. Each successive management plan has been built on the accomplishments of the previous plan and has maintained an integrated forest management approach mandated by the provincial government.

The term of this plan is the five-year period from January 1, 1999-December 31, 2003. This is the ninth management plan for TFL 1. Skeena Cellulose Inc. (SCI) was incorporated in 1986 and held the licence as a wholly owned subsidiary of Repap Enterprises Inc. (Repap) until Repap BC Inc. went into bankruptcy probation under the Companies Creditors Arrangement Act on March 3rd 1997. Since November, 1997 SCI has operated as an integrated forest products company under joint public/private ownership.

The tree farm licence document, issued to SCI in 1986, was replaced by the Minister of Forests with a new licence document dated January 1, 1998. Submission of this plan fulfils the obligation to submit a draft management plan under section 2.24 of the TFL document, and meets content requirements specified in section 2.25. Management Plan 9 (MP 9) is organized as follows:

Chapter 1.0 Introduction - Explains the purpose, describes the characteristics and history of the TFL, provides information about SCI, the role of the government resource agencies, and provides a summary of the plan with the goals and commitments.

Chapter 2.0 Resource Inventories - Describes the current status of all the timber and non-timber resource inventories and outlines plans for updating.

Chapter 3.0 Management Objectives - Outlines the management objectives for all the forest resources within the TFL.

Chapter 4.0 Integrated Resource Planning - Describes integrated resource planning at strategic and operational levels.

Chapter 5.0 Timber Resource Management - Outlines the goals and strategies for managing the timber resource, including the proposed allowable annual cut (AAC), harvesting, transportation, access management, silviculture, forest health and fire protection.

Chapter 6.0 Non-Timber Resource Management - Describes the integrated management strategies for non-timber resources, including recreation, visual quality, water, fisheries, wildlife, cultural heritage and minerals.

Chapter 7.0 Public Consultation - Describes the input received from the public in preparing this plan and the review strategy proposed for the next plan.

Chapter 8.0 Employment and Economic Opportunities - Explains the employment activities and opportunities generated from the management of the TFL.

Chapter 9.0 Special Projects - Lists and describes project planned during the next five years that are additional to the licence and legal obligations and are essential to the management of the TFL.

Chapter 10.0 Implementation - Describes the provision for monitoring and reporting on the implementation of the plan.

Appendices - Contains the supporting statistics and technical reports used to complete the plan.

1.1 PURPOSE

MP 9 sets out the objectives, goals and strategies that Skeena Cellulose Inc. intends to pursue in managing TFL 1 over the next five years (1999-2003). As a strategic plan providing for the integrated management of land and resources within the TFL, this management plan has been prepared to meet the requirements of the tree farm licence document, the *Forest Practices Code of British Columbia Act* (Code), and the *Forest Act*.

The management practices and standards followed will be in accordance with the Code and its regulations. The Code, the Forest Act and all relevant legislation is therefore implicit with the strategies and practices in this management plan.

not used in design
Landscape units have been established for the Kalum Timber Supply Area along with draft biodiversity emphasis objective. Completion of the Kalum Land and Resource Management Plan is expected during 1999. It is anticipated MP 9 will provide higher level planning direction until such time that the above initiatives are completed and approved.

The management plan is prepared at the forest level of planning. It is designed to provide a balanced, integrated forest land management plan that has considered the alternate levels of resource production and the suitability of the forest land for different kinds of resource use. The standards and guidelines outlined here are intended to meet the stated resource management objectives. The integrated resource management framework within which MP 9 will be implemented is described in section 4.0.



The standards, specifications and guidelines that are to be followed at an operational level or referred to are described in this plan. The implementation of MP 9 will be delivered through several operational plans that are required by the Code. Notably these are a forest development plan, silviculture prescriptions, fire protection pre-organization plans, cutting permits and road permits.

1.2 LOCATION & DESCRIPTION

The Port Edward Tree Farm Licence covers 610,691 hectares of Crown and private forest land in the Skeena/Nass region centred around the City of Terrace, BC. North of Terrace it reaches to the Nass Valley, including the Ishkheenickh and Kiteen drainages. To the east it encompasses the Copper River valley, and west of Terrace it includes the area south of the Skeena River near the mouth of the Lakelse River known as the Whitebottom. Much of the licence area is located on the west side of the Kalum Valley extending north of Terrace. Of the total area, 609,725 hectares are Crown land (Schedule B land), 468 hectares are private land owned by SCI, and 498 hectares is in timber licences (Schedule A land).

The licence lies east of the Coast Mountains and includes slopes and valleys formed by the Skeena Mountains and the Nass Basin. Topography varies from flat and undulating in the main valleys of the Kalum and Nass to steep and mountainous in the numerous branches.

The forests are predominantly old growth conifer stands of western hemlock and amabilis fir, with mixed stands of spruce, western red cedar and cottonwood occurring along the valley floors. The stands are very old and major forest fires rarely occur. As a consequence the merchantability and timber quality is low, yielding about 30-50% sawlog on average. Younger mature stands where they can be found are much better quality. Seral stands of lodgepole pine as well as subalpine fir are found in the Nass Valley, where wildfires have more influence on the forest structure and regeneration.

The climate is transitional between a coastal and interior climate. Temperatures are relatively mild, although extreme fluctuations in temperature are common. Commonly after a wet spring there can be a sudden dry short summer followed by heavy fall rains. The heavy rainfall and winter snowfall means that soil moisture deficits are uncommon. Although there is a winter snowpack in a normal year the ground is not frozen. Outbreaks of arctic air fluctuate during the winter, resulting in unstable winter operating conditions.

The Nisga'a Highway (provincial highway 234) runs north of Terrace through part of the TFL, providing access along the Tseax and Cedar River to the Nass Valley. Branch roads connect the TFL to the Alaska Highway 37 at Cranberry Junction. This road system links rural communities with the City of Terrace. Provincial Highway 16 runs east/west through Terrace, between Prince Rupert and Hazelton, while Provincial Highway 37A runs north/south between



Terrace and Kitimat. The key map illustrates the location of the licence area in relation to the main communities in the Terrace region.

1.3 HISTORY

TFL 1 was originally awarded in 1948 to Columbia Cellulose Company Ltd. It was the first forest management licence granted in the province. Although there have been changes in both the licence holder and licence boundaries, the basic intent of the licence has remained the same. Today TFL 1 encompasses 610,691 hectares of primarily Crown forest land in the Skeena, Kalum and lower Nass Valleys.

Since 1948 the TFL forests have been managed continuously. For 50 years it has been a key supplier of logs and fibre to the pulpmill at Port Edward near Prince Rupert and to sawmills in the Terrace area. During this time the forest management program has evolved and developed, guided by management strategies contained in eight successive management and working plans.

Management Plan #8 which took effect January 1, 1994 and expires December 31, 1998 had an AAC of 720,000 m³, of which 29,950 m³ is allocated to the Ministry of Forests small business program. At the AAC level of 720,000 m³/year the TFL provides 59% of the Company's Terrace sawmill annual sawlog requirements and 17% of the Skeena pulpmill's fibre requirements. For a complete history of TFL 1, see Appendix I.2.

1.4 LICENCE HOLDER

Skeena Cellulose Inc. is a fully integrated Canadian forest products company specializing in the production of premium northern softwood bleached kraft pulp and lumber. The corporate office of the Company is located in Vancouver while the Solid Wood Group and woodlands office is based in Terrace. The present ownership is held jointly by the provincial government, the Toronto Dominion Bank and the Pulp & Paper Workers of Canada, Local #4 (pulpmill employees).

SCI operates a bleached kraft pulpmill at Port Edward and produces export dimension lumber in sawmills at Terrace, Carnaby and Smithers, B.C. Only the Terrace sawmill processes significant amounts of timber from TFL 1. SCI has made capital investments of \$657 million in the purchase, modernization and expansion of its manufacturing facilities. A new automated export dimension sawmill was constructed at Terrace during 1988 at a cost of \$53 million. From 1987 -1991 \$225 million was spent to upgrade the Skeena Pulp Operations at Prince Rupert. This included a state-of-the-art effluent treatment facility, a rebuilt recovery boiler and production improvements in the pulpmill. The Company spent \$67 million to purchase the



Carnaby sawmill, the Smithers sawmill, forest licences from Buffalo Head Forest Products Ltd., and Orenda Forest Products Ltd. to enhance lumber business and improve fibre security.

Skeena Cellulose Inc. was established as a subsidiary of Repap Enterprises Inc. in 1986. Subsequently in 1996 a separate company, Repap BC Inc. was set up and continued to operate under that name until February, 1997 when Repap BC Inc. was forced into bankruptcy. Ownership was transferred to the Royal Bank of Canada and the Toronto Dominion Bank. At that time the Company was renamed SCI and was operated under CCAA by the receiver (Coopers & Lybrand). Ownership was restructured when the provincial government purchased the Royal Bank's share in November, 1997. SCI began operating without CCAA protection in February, 1998 after the creditors approved the restructuring plan.

1.5 COMMUNITY DEPENDENCE

The largest community within TFL 1 is Terrace (population 12,779, 1996 census). It is the service centre for many north-western communities, drawing shoppers from as far away as Smithers. The largest employer in Terrace is the service sector (e.g., department stores, supermarkets and hotels). Other major employers include the provincial and federal governments, School District #88, Mills Memorial Hospital, West Fraser Mills Ltd., Skeena Cellulose Inc., Northwest Community College, B.C. Telephone Company, and the City of Terrace.

Thornhill (population 4633) is a residential suburb of Terrace. Kitselas (population 108), and Kitsumkalum (population 190) are neighbouring Tsimshian communities. Several other small communities in the Greater Terrace area possess a collective population approaching 2,900. Many of these trace their beginnings back to gold mining or railway development at the turn of the century. Recently, these communities have become popular locations for rural living.

Terrace also functions as the regional centre for outlying Nisga'a communities in the Skeena and Nass Valleys including Gitlakdamix, or New Aiyansh (population 620); Gitwinksihlkw, or Canyon City (population 207); and Lakalzap (Greenville). There are also small resident European communities at Irene Meadows and Nass Camp. Such rural communities are dependent on the natural resources occurring in the Skeena/Nass region to provide jobs in the forest industry, fishing, mining, guiding, hunting, trapping and recreation. Arts and crafts operations, small stores, schools and Band offices provide additional employment.

SCI's operations create significant employment in the region. Terrace and Prince Rupert operations directly employ just under 900 people and provide work for another 300 under contract, representing a major economic contribution to the northwest BC economy. SCI has created employment opportunities in both woodlands operations and its manufacturing facilities.



The work force is primarily drawn from the communities of Prince Rupert, the Greater Terrace area and aboriginal villages in the Nass Valley.

The Company has always preferred to employ local residents when employment opportunities arise. Similarly, the Company prefers to use local contractors for on-going forestry work. It has encouraged Nisga'a people to form logging and silviculture companies, providing them with contracts and training.

1.6 ADMINISTRATION

TFL 1 is gazetted as a Provincial forest and is administered by the Ministry of Forests, under the authority of the Forest Act. The boundaries of TFL 1 lie entirely within the Kalum Forest District that is based in Terrace. Key provincial legislation administered by the Ministry of Forests is the *Forest Act*, *Range Act*, and the *Forest Practices Code of British Columbia Act*.

The licensee has the responsibility for ensuring that TFL 1 is operated in accordance with an approved management plan. The Ministry of Forests district manager monitors to ensure compliance with the approved management plan. Before the Company can initiate any harvesting a detailed forest planning process must be followed. This means that a series of different operational plans need to be submitted and approved by the Ministry of Forests. The Ministry of Environment, Lands and Parks (MELP) has a mandate to administer water, wildlife and fisheries resources and pesticide use on Crown land. Accordingly, this ministry closely reviews and comments on operational plans and cutting permit applications prepared by SCI. The Company has established direct communication and working relationships with this agency. The Ministry of Forests ultimately issues cutting permits, road permits and other operational plan approvals after the inter-agency review is complete.

The *Forest Practices Code of British Columbia Act* took effect in July, 1995. The Code with its accompanying regulations and guidebooks has had a significant influence on forest management particularly with respect to the areas of operational planning, forest practices and environmental protection and enforcement. This has added administrative complexity and increased the cost of Crown wood supply. There have been subsequent amendments to the Code and Regulations. The most recent was the Forest Statutes Amendment Act (Bill 47) of June 1997 and attendant regulation changes of April 1998. At this time it is still uncertain whether these changes will result in a significant reduction in wood supply costs.

Mining activity is regulated by the Mineral Tenure Act, Coal Act, Petroleum and Natural Gas Act and is administered by the Ministry of Employment and Investment, Energy and Minerals Division from a regional office in Smithers.



Fish habitat is also protected by the federal statute, Fisheries Act which is administered by the federal Department of Fisheries and Oceans from Prince Rupert, Terrace and Smithers. MELP has also taken on a greater role on fresh water fisheries.

1.7 MINISTRY OF FORESTS SMALL BUSINESS PROGRAM

The Kalum Forest District small business forest enterprise program (SBFEP) was established in 1988. It has been apportioned an annual harvest of 29,950 m³ per year from the TFL AAC. SCI has allocated the Limonite Creek in the central Copper River area as an operating area for the small business program. This area possesses timber profiles and net values comparable to averages for the TFL.

To date, the SBFEP has both undersold and undercut its allocation from TFL 1 (e.g. 81% undersold and 75% undercut between 1988 to 1991; 44% undersold and undercut from 1992 to 1996). In March 1998 the full undersold volume (130,000 m³) was sold as a Bid Proposal (Forest Act, Section 21) TSL to encourage remanufacturing in the Terrace area.

1.8 PREVIOUS ACCOMPLISHMENTS

The Company has made excellent progress in meeting the commitments made in management plan #8. Significant accomplishments during the term management plan #8 (January 1, 1994 to December 31, 1998) are described below. It was also, during this period, that the *Forest Practices Code of British Columbia Act* took effect (July 1995).

Resource Inventories

- Recreation and visual landscape inventories completed.
- Recreation Analysis and Management Strategy Report completed in 1997.
- Soil erosion hazard classification and Level C mapping completed for 80% of the TFL. Should be complete for the entire TFL by December 31, 1999.
- Existing stream and fisheries information converted to Code riparian standards.
- Terrestrial ecosystem mapping completed for 40% of the TFL.
- Heritage Resources Overview for TFL 1 completed in 1995.
- Archaeological overview assessment completed for the Kalum Forest District in 1996.
- Timber inventory database was updated to December 1996.
- New aerial photography completed for TFL 1 in 1998.
- Geotechnical study of the Ishkheenickh River drainage was completed.



Strategic Planning

- Timber Supply Analysis completed.
- Total chance plans were completed for 13 resource planning units.
- Twenty-Year Plan approved by the Kalum District Manager.
- Total Resource Plan completed for TFL 1.

Operational Planning

- Forest development plans completed for 2 year approvals.
- Silviculture and stand management prescriptions completed as required.
- Road permits and cutting permits submitted as required (1.8 years approved).

Annual Allowable Cut

- Cut control performance for the period ending in 1996 was 99.9%.

Harvesting

- Harvested 5167 hectares and 2,503,193 m³
- Helicopter logging in 1996 and harvested 20,501 m³.
- Harvested 182,356 m³ in the non-conventional operability zone.
- Non-conventional partition of 150,000 m³. Harvested 122 %.
- Harvested 2500m³ of cottonwood.
- Average cutblock size 32 hectares compared to Code maximum of 60 ha.
- Commercial thinning of 220 hectares produced 25,000 m³

Roads

- Constructed 291 km of roads
- Installed 34 bridges.

Silviculture

- Naturally regenerated 2,116 hectares.
- Site prepared 154 hectares.
- Planted 4,767 hectares with 4,280,000 million seedlings. Plantation survival was 89%.
- Mixed species planting.
- All backlog NSR land is now reforested.
- Reforestation of all current logged areas occurs within three years following harvest.
- Spaced 3,760 hectares.
- Pruned 518 hectares.
- Brushed 2,739 hectares.
- Site Index Study for hemlock completed.
- Six year seed supply obtained for all species except balsam.

2116
4767

6883 - 5167 some backlog



Forest Health

- Porcupine damage to second growth stands is decreasing.
- Small mammal damage to rehabilitated NSR plantations is under control.
- Spruce terminal weevil infestation has declined.

Fire Protection

- Small wildfires were contained, due to an effective fire control program.
- Salvage harvesting of windthrow minimized volume losses from insects and pests.

Recreation

- Established a recreation site at the fossil beds - Copper River.

Watersheds

- Watershed restoration work funded by FRBC totalled \$600,000.

1.9 RESOURCE ISSUES

In managing TFL 1, SCI is faced with an array of issues. These are described in detail in the SMOOP (Appendix IV), and are specific to the TFL 1 landbase. The following topics are covered in this management plan or will be the subject of further study during the term of this management plan.

Reduction in Area and Allowable Annual Cut.

There is considerable uncertainty in the AAC level beyond the next five years. TFL 1 is faced with an imminent reduction in area due to the pending Nisga'a land claim settlement, the withdrawal or set aside of the Beaver protected area and special management areas. The cumulative effect will be reduction in available timber supply through a lowering of the AAC.

High Logging Costs/Low Sawlog Content.

The low sawlog content quality of the timber resource combined with the high cost of logging make it difficult to keep operating through the fluctuations in the lumber and pulp market cycles. The Company must find ways to reduce the high logging costs while maintaining environmental standards established by the Code.

Economic Availability of Net Operable Landbase.

The net operable landbase needs to be refined to reflect economic availability based on logging system, stand quality and fluctuating log values, particularly for pulplogs. Consideration needs to be made to establishing an AAC based on sawlogs. This requires defining a net landbase within the TFL for growing and harvesting sawlogs economically. Emphasis must focus on determining financial rotations for harvesting second growth, with less dependence of harvesting old growth in the future. This issue will not be addressed prior to the approval of Management Plan 9. Additional analysis will be conducted on second growth stands ~~stands~~ during the term of this management plan and incorporated into the next management plan.

Site Productivity of Second Growth Stands.

Obtaining more reliable production of the site productivity (site index) in relation to second growth stands is essential. This will help justify investments in enhanced silviculture and commercial thinning. It would also provide essential stand yield information needed for developing financial rotations and commercial thinning regimes.

Kalum Land and Resource Management Plan (KLRMP)

The land and resource planning process for the Kalum Forest District, which includes TFL 1, will be completed after MP 9 is approved. Similarly associated landscape unit plans are being completed in a separate planning exercise. The Company wants to ensure that land use planning compliments existing resource planning completed for TFL 1.

Commercial Harvest of Pine Mushrooms.

The gathering of pine mushrooms has become an annual commercial harvesting event every fall. This event attracts large number of pickers and results in overcrowded campsites and concentrations of temporary campers scattered all over the TFL. This mushroom harvest currently is unregulated. Most of the pine mushroom area lies within the Nisga'a AIP lands.

Cottonwood:

SCI made a commitment to harvest 20,000 m³ over the period of MP 8. It is not likely that this target will be achieved by the end of 1998 as log prices have been too low to harvest cottonwood stands profitably. SCI recommends that no target harvest level be set for harvesting cottonwood in MP 9 as the cottonwood market historically has only been profitable within TFL 1 on a 5-7 year cycle.

Visual Landscape Corridors:

Harvesting is presently constrained along well-travelled highway corridors due to the management for visual quality. The Company will manage these visual areas to mitigate impacts on timber supply by improved visual landscape design, using minimum effective greenup tree heights and pursue alternative silviculture systems where economically feasible.



1.10 SUMMARY OF GOALS AND COMMITMENTS

Resource Inventories

- Maintain an updated forest inventory.
- Continue to co-operate with the Ministry of Forests to implement a growth and yield program on TFL 1.
- Undertake a three-year program to assess site productivity of second growth stands pending Forest Renewal BC funding.
- Acquire or maintain accurate non-timber resource inventories.
- Secure Forest Renewal BC funding to complete required non-timber resource inventories.

Strategic Planning

- Continue total resource planning initiative to support AAC rationalization and management of key resource values.
- Continue to manage the TFL on the basis of existing resource management zones and resource planning units. *ie not use Landscape Units?*
- Strive to incorporate TFL objectives into the Kalum LRMP process and other government initiatives.
- Continue to co-operate with the Ministry of Forests to ensure that the planning and administration of the small business forestry enterprise program (SBFEP) is carried out in harmony with TFL operations management strategies and objectives.

Operational Planning

- Submit an updated forest development plan to the district manager for two year approvals.
- Submit required operational planning documents annually or as needed.
- Achieve two years of standing timber inventory in approved cutting permits.
- Submit an annual report each year to the district manager.

Harvesting

+ 29,950 = 719,950

- Log 690,000 m³ annually between 1999-2003, where economically feasible in compliance with cut control, partitioned cut and contractor clause requirements.
- Select appropriate silvicultural systems and harvesting methods to minimize site disturbance and/or meet other resource objectives.
- Assign appropriate harvesting priorities that reflect harvest profile, forest health, landscape design, biodiversity and other resource objectives.
- Conduct operations in accordance with requirements of the *Forest Practices Code of British Columbia Act* and cutting permit obligations.

- Meet MoF utilization standards where economically feasible (residue and waste volumes are charged to cut control and billable waste is charged to the licensee)
- Update operability classification
- Harvest 150,000 m³ over the term of this plan in the non conventional operability landbase

Transportation

- Construct, maintain and deactivate roads and crossings in a manner that minimizes the impact on the environment.
- Maintain a road network that provides economical access to timber and is safe for industrial users and the public.

Silviculture

- Reforest recently logged cutblocks with ecologically suitable species in accordance with prescribed stocking standards.
- Reforest all cutblocks within three years, on average after the completion of harvesting through a combination of artificial and natural regeneration.
- Balance harvesting and reforestation so that the area regenerated each year would be equivalent to the annual area harvested.
- Collect sufficient seed, utilize appropriate stock types and prescribe appropriate treatments to meet basic silviculture commitments.
- Manage competing vegetation in plantations and naturally regenerated areas to meet free growing target dates.
- Meet basic silviculture program goals per Table 19.
- Employ appropriate treatments to maintain or increase future stand values where economically feasible.
- Provide labour-intensive employment opportunities through incremental silviculture treatments with FRBC funding.
- Realize incremental volume recovery through commercial thinning. *not modelled*
- Meet enhanced silviculture program goals per Table 25 with FRBC funding.
- Obtain funding from Forest Renewal BC for incremental silviculture activities.

Forest Health

- Monitor insect and disease activity at both the forest and stand levels.
- Employ sanitation spacing, density control and other preventative measures in managed stands to reduce the risk of infestation and disease.
- Implement pest-specific control strategies, utilizing silvicultural systems, biological control techniques and the latest pest control technology wherever possible.
- Promptly salvage windthrown, diseased and insect damaged timber where economically feasible.



Fire Protection and Environmental Protection

- Annually update and submit a fire pre-organization plan with oil spill response and erosion control plans.
- Implement appropriate fire prevention measures and fuel management practices to reduce the risk of forest fire.
- Maintain a high standard of fire preparedness and an efficient fire fighting organization.
- Conduct preparedness and suppression activities in accordance with the *Forest Fire Prevention and Suppression Regulation*.

Recreation

- Co-operate with the Ministry of Forests to provide recreation opportunities for the public.
- Provide access to recreation sites and general recreation areas. Keep designated roads open and maintained.
- Maintain and upgrade existing recreation sites with funding from FRBC.
- Develop new recreation sites with funding from FRBC.
- Maintain recreation inventory.

Landscape

- Apply forest landscape design principles to manage visual resources along highway corridors and other scenic areas. Maintain visual landscape inventory.
- Employ appropriate silviculture systems, harvest methods and road building practices to meet goals for visual landscape design.

Soils and Terrain Stability

- Complete overview terrain stability Level C mapping for the remainder of the TFL.
- Follow standard operating procedures for planning, logging, road construction and rehabilitation and employ appropriate measures to conserve soils and maintain soil productivity.

General Biodiversity

- Implement appropriate practices and measures to maintain landscape and stand level biodiversity.
- Plan for operations in a manner consistent with assigned landscape unit/resource planning unit biodiversity emphasis options and stated objectives for old growth retention, patch size and distribution and wildlife tree patches.



Watersheds

- Conduct required watershed assessments as the need arises.
- Follow standard operating procedures for planning, road and bridge construction and logging to guide activities around streams.

Fisheries

- Conduct overview fish stream inventories.
- Identify, classify and map streams; and prescribe appropriate riparian reserves and management zones in accordance with the Code.
- Follow standard operating procedures for logging, road building and maintenance, and employ appropriate measures to maintain streambank integrity and protect fish habitat.

Wildlife Habitat

- Complete predictive ecosystem mapping for the remainder of the TFL (contingent on FRBC funding).
- Implement appropriate practices and measures to maintain landscape and stand level biodiversity.
- Provide information regarding big game habitat use to MELP.
- Maintain an active dialogue with interested individuals or groups.

Cultural/Heritage

- Refer forest development plans to local First Nations through the MoF.
- Conduct site-specific cultural/archaeological surveys where evidence of aboriginal activity is found.
- Stop work activities and report discovery of archaeological sites to the provincial government.

Mining

- Respond to requests from mineral claim holders regarding planned forest developments.

Public Consultation

- Maintain an “open door” policy to facilitate discussion with interested parties.
- Implement a comprehensive public review and consultation strategy.



Economic and Employment Opportunities

- Hire local contractors/employees wherever possible.
- Encourage consulting firms to establish branch offices in Terrace.
- Encourage contractors to hire First Nations people wherever possible.
- Assist in the development of the existing native workforce.

1.11 COMPARISON WITH MP 8

This section summarizes the key similarities and differences between MP 9 and the previous MP 8. It is presented by the topics required to be covered under section 2.25 of the TFL document. This comparison is made without considering the impact of the draft Nisga'a land claim settlement. It is also made in advance of the AAC determination by the Chief Forester.

Overall the forest management goals and strategies in MP 8 and MP 9 are very similar. The differences are minor, as opposed to being significant. The issues of operating a business dealing with a low quality timber resource, high landbase logging costs and government regulations remain the same.

The total landbase increased by 1487 hectares from that in MP 8. This area change occurred from a recalculation of the TFL boundary on the TRIM/NAD 83 mapbase. The net productive landbase decreased by 11 % in MP 9 due to higher netdowns than in MP 8.

Harvest Level

SCI is proposing an AAC of 720,000 m³/year, similar to MP 8. This AAC is based on maintaining harvest levels within the Nisga'a AIP lands.

The company will continue to use the same configuration of logging equipment and logging systems. Temporary roads will be rehabilitated where feasible in order to maximize the productive area.

Employees/Contractors

The number of people directly and indirectly employed is to a large extent a function of the AAC, to be set by the provincial Chief Forester. Employment levels should remain constant assuming there is no decrease in proposed AAC and market conditions can sustain the company's processing facilities.



Economic Opportunities

The economic situation during the last 2 years of MP 8 has been difficult for the company. Contractor employees in particular were impacted with the work available becoming uncertain and sporadic for some. Return to full time steady employment requires the return of a strong market demand for the company's pulp and lumber products. The Forest Renewal BC multi-year agreement is estimated to provide 65,000 mandays for the next five years through projects under enhanced forestry, inventories and watershed restoration.

Protection/conservation of non-timber values

The company feels that there will be a subtle improvement in protecting these values in MP 9. This is due to improved resource inventories for fish habitat, mapping of potentially unstable terrain, terrestrial ecosystem mapping, updated landscape and recreation inventories. It will enable the company to continue to refine landscape level planning for the resource planning units.

2.0 MANAGEMENT OBJECTIVES

The management objectives for the TFL provide a comprehensive vision of how the licence will be managed for the next five years (1999-2003). They are a continuation and refinement of the objectives pursued during the previous planning period. The specific goals and strategies for the various activities can be found in the relevant section of the plan.

Corporate

To operate the Company's manufacturing facilities to maximize the return on capital.

To operate the Company's manufacturing facilities as an internationally competitive producer of pulp and lumber products.

To maintain and operate manufacturing facilities that ensure high quality products, long term cost efficiencies and flexibility in meeting our customers' changing needs.

To commit the Company to responsible forestry and environmental management, and to conduct our business in an acceptable and safe manner in the eyes of the public and the consumers.

Land Use

To manage and protect the forest resource by practising environmentally balanced, integrated resource use within the context of government resource use legislation.

To implement sustainable forest development and harvesting practices that maintains the natural biological and ecological diversity of the flora, fauna and landscape values.

Timber

To pursue forest management and harvesting strategies that will ensure a sustainable long-term fibre supply and maintain the forest productivity.

To harvest an annual volume of 720,000 m³ of fibre (sawlogs, pulplogs and minor products) using harvesting techniques that maximize the economic utilization of fibre.

To co-operate with the Ministry of Forests in the administration of the Small Business Forest Enterprise Program AAC apportionment of 29,950 m³.

Silviculture

To continue a basic silviculture program that regenerates all logged or denuded forest lands in accordance with the Silviculture Practices Regulation.



Forest Health

To maintain the forest in a healthy condition by pursuing pest management strategies that minimizes the activity and outbreaks of pest infestations and disease.

Fire Protection

To pursue a fire protection program that minimizes losses to the timber resource from wildfires.

Recreation

To ensure that a broad range of recreational opportunities continue to be available for the public.

Visual Quality

To maintain visual quality along highway corridors and the defined visual polygon within Nisga'a AIP lands.

Soils

To minimize site disturbance and maintain the long term productivity of forest soils.

Biodiversity

To maintain biological diversity over the landscape and recognize that the continuance of forest biodiversity will ensure a sustained timber resource.

Water

To minimize adverse effect of forestry practices on the stream network as they pertain to water quality, quantity and flow, fish and wildlife habitat, recreation, aesthetics and designated water users.

Fish Habitat

To maintain the aquatic biological productivity of streams providing anadromous and resident fish habitat.

Wildlife

To maintain a broad diversity of wildlife habitat capable of supporting wildlife species.



Aboriginal Bands

To co-operate with First Nations people in assisting with identifying opportunities for training and employment in the forest industry.

Public Involvement

To increase the participation of local communities in the Terrace region in key resource decisions that affect management of the TFL.

Integration with Other Licensed Users

To seek input from other licensed Crown tenure holders when preparing operational plans.

3.0 RESOURCE INVENTORIES

A comprehensive set of both timber and non-timber inventories has been assembled. The status of these various inventories is summarized in Appendix II, with plans for further updating and completion.

The goal is to complete present resource inventory gaps during the next five years to satisfy the requirements of the Code.

3.1 TIMBER

A re-inventory was completed in 1992 and is loaded on an ARC/INFO GIS digital based system. The most recent update is to December 31, 1996 with polygon labels projected to 1997 for use in the timber supply analysis.

The re-inventory meets and exceeds Ministry of Forests standard inventory specifications. The classification of immature forest cover types has been greatly improved, as well as the reliability of the forest cover maps. The updated timber inventory statistics are in Appendix II.1. The inventory consists of:

- Area and volume statistics.
- 85 forest cover maps (at 1:20 000 scale).
- 24,979 forest cover polygon with attributes.
- 2 400 typed aerial photos (1:20 000 scale dated 1988).
- 4 500 field samples (air calls and grounds calls).
- 85 TRIM base maps (1:20 000 NAD83).

During 1995 the Ministry of Forests Resources Inventory Branch (RIB) undertook an inventory audit of the 1992 re-inventory (see Appendix II.1). The audit found that the VDYP model produced volume estimates close to actual volume when ground measured stand attributes were used in the model. The audit did not calculate VDYP volumes using stand attributes from the 1992 re-inventory. When reviewing volume predictions used in the previous yield analysis the audit concluded that they were high and recommended caution in the new yield analysis.

Audit results for the immature component of the inventory suggest an acceptable level of accuracy for site index assignment in young stands. However, low inventory site index assignment may potentially result from under-estimation of regenerated stand heights.



The assessment of the non-forest classification identified poor stratification of height class 1 and 2 forested stands within alpine and snow-slide areas. This is to be anticipated, as alpine forest does not require the same emphasis and level of classification in a standard inventory as merchantable forest. However, this has no impact on the productive forested area available for timber harvesting.

Since 1994 the RIB has been developing and redesigning a new inventory standard known as the Vegetation Resources Inventory (VRI). SCI has no plans at this time to retrofit the TFL inventory to VRI standards. During this planning period the Company's focus will be on completing the second growth inventory.

The 1:20,000 UTM map grid is depicted in Figure 2. The total TFL 1 land area is listed by category in Table 1, while the productive forest area is summarized by age class and volume in Tables 2 and 3 respectively.

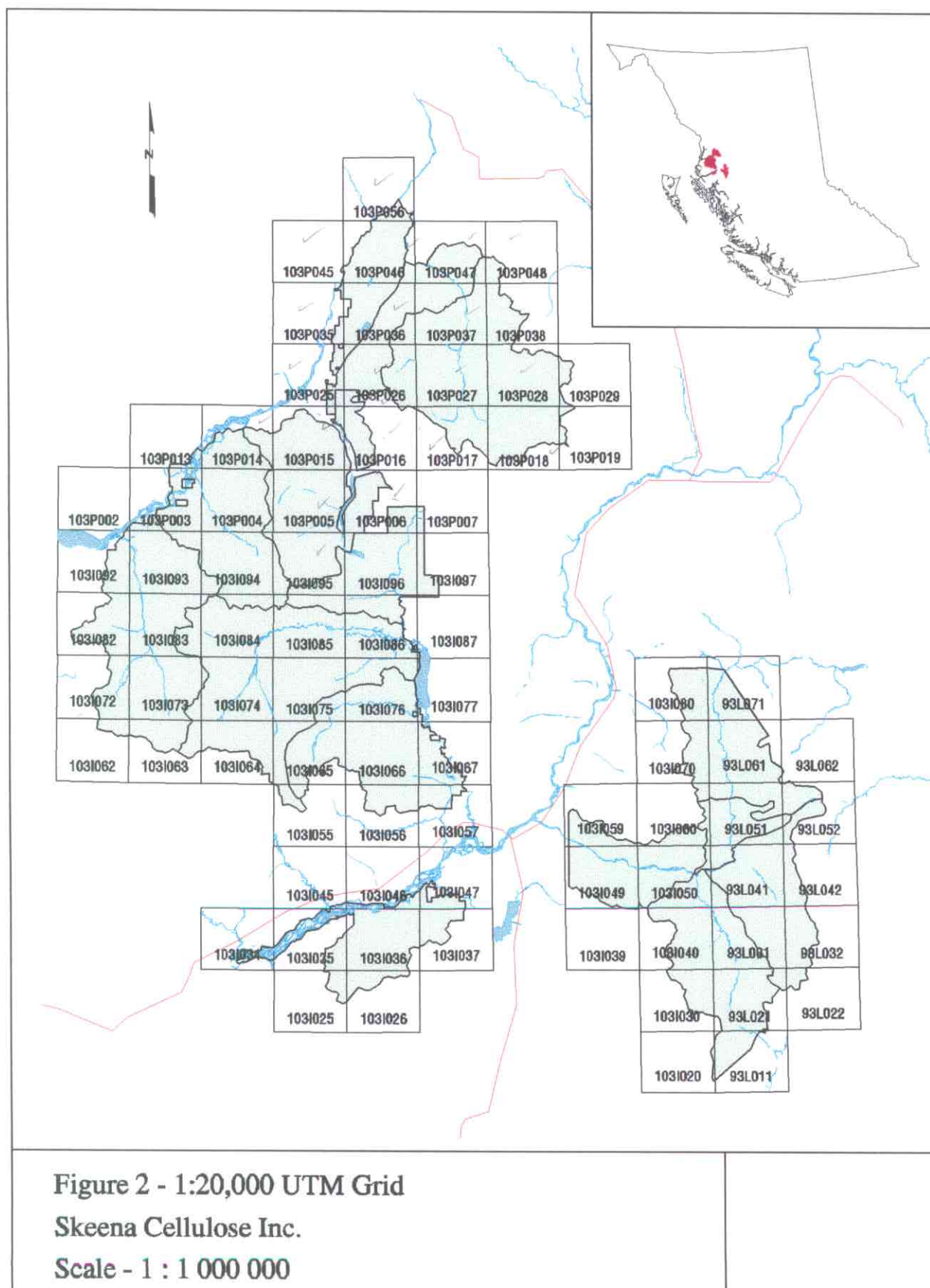


Table 1: TFL 1 Land Base

	Area (ha)	Volume (m ³)
Total Area	610,691	84,698,611
Non-Forest	321,055	4,484,513
Forested Area	289,636	80,214,098
Non-Productive Forest	17,039	504,468
Productive Forest	272,597 ✓	79,709,630
Reductions for Low Site, ESAs, operability	137,956	38,573,982
Net Productive Forest*	134,641	41,135,648

*includes roads

Table 2: Productive Forest Area By Age Class (hectares)

Type Group	1	2	3	4	5	6	7	8	9	Other	TOTAL
Conifer types	20,850	29,772	2,138	1,373	7,641	5,358	3,743	23,377	163,423	0	257,674
Deciduous	2,220	4,213	1,224	569	690	555	237	1,265	250	0	11,223
NSR	0	0	0	0	0	0	0	0	0	2,692	2,692
NC-Br	0	0	0	0	0	0	0	0	0	1,008	1,008
TOTAL	23,070	33,985	3,362	1,942	8,331	5,913	3,980	24,642	163,673	3,700	272,597 ✓

Table 3: Productive Forest Volume by Age Class (m³)

Type Group	1	2	3	4	5	6	7	8	9	Other	TOTAL
Conifer types	1,911	436,157	208,276	151,514	1,257,440	1,333,515	976,063	7,909,258	66,191,525	0	78,465,658
Deciduous	4,605	238,304	223,793	106,663	146,676	109,355	56,947	301,567	54,955	0	1,236,865
NSR	0	0	0	0	0	0	0	0	0	7,106	7,106
NC-Br	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6,516	674,461	432,069	258,177	1,398,116	1,442,870	1,033,010	8,210,825	66,246,480	7,106	79,709,630

Inventory summary reports for the net operable area and volume by species are listed by resource planning unit in Appendix II.1. The volumes have been compiled using the VDYP model. Utilization standards are close utilization minus decay, waste and breakage.

Inventory Maintenance

The inventory is loaded on an ARC/INFO GIS system and will be updated periodically for changes due to logging depletion, other disturbances and regeneration status during the management plan period. The reliability of inventory prediction will also be monitored by a comparison with the volumes harvested, including residue.

Environmentally Sensitive Areas

Not all areas within the productive forest land base are available for timber production. Many areas are either environmentally sensitive or have significantly high non-timber resource values. Environmentally Sensitive Areas (ESA) have been identified using photo interpretation and ground sampling techniques. The ESA classification for the TFL was completed in 1992 for all classes except wildlife habitat, Ew, and has been approved by the regional manager. No additional updating is required. ESAs are summarized by category and class in Table 4.

Table 4: Environmentally Sensitive Areas

ESA Category	ESA Class	Rating	Definition	Productive Area (hectares)
Soil	Es ₁	High	Area showing extremely fragile or unstable soils.	12,377
	Es ₂	Moderate	Area showing significantly fragile or unstable soils.	31,603
	Esp ₁	High	Areas of extreme steepness and fragile soils with potential severe regeneration problems.	21,738
Forest Regen	Ep ₁	High	Severe regeneration problems caused by climatic factors.	47,972
	Ep ₂	Moderate	Severe regeneration problems caused by biotic factors.	6,884
Snow Avalanche	Ea ₁	High	Areas having severe snow chute and avalanche problems.	170
Watershed	Eh ₁	High	Very high water values and high sensitivity.	-
	Eh ₂	Moderate	High water values and high sensitivity.	262
Recreation	Er ₁	High	Exceptionally high recreation values.	76
	Er ₂	Moderate	High recreation values.	382
Wildlife*	Ew ₁	High	Areas having critical importance to wildlife.	11
	Ew ₂	Moderate	Areas having high value for wildlife.	257
Combination	Esa ₁	High	Soil and avalanche areas.	15
	Esh ₂	Moderate	Soil and water areas.	27
	Esp ₂	Moderate	Soil and regeneration problem areas.	3148
	Esr ₂	Moderate	Soil and recreation areas.	108
				125,028

* Not mapped to Ministry of Forests Inventory standards.

Wildlife habitat netdowns for the timber supply analysis were accounted by the netdown requirements for ESA's, wildlife tree patches, riparian reserves, biodiversity and visuals (greenup).

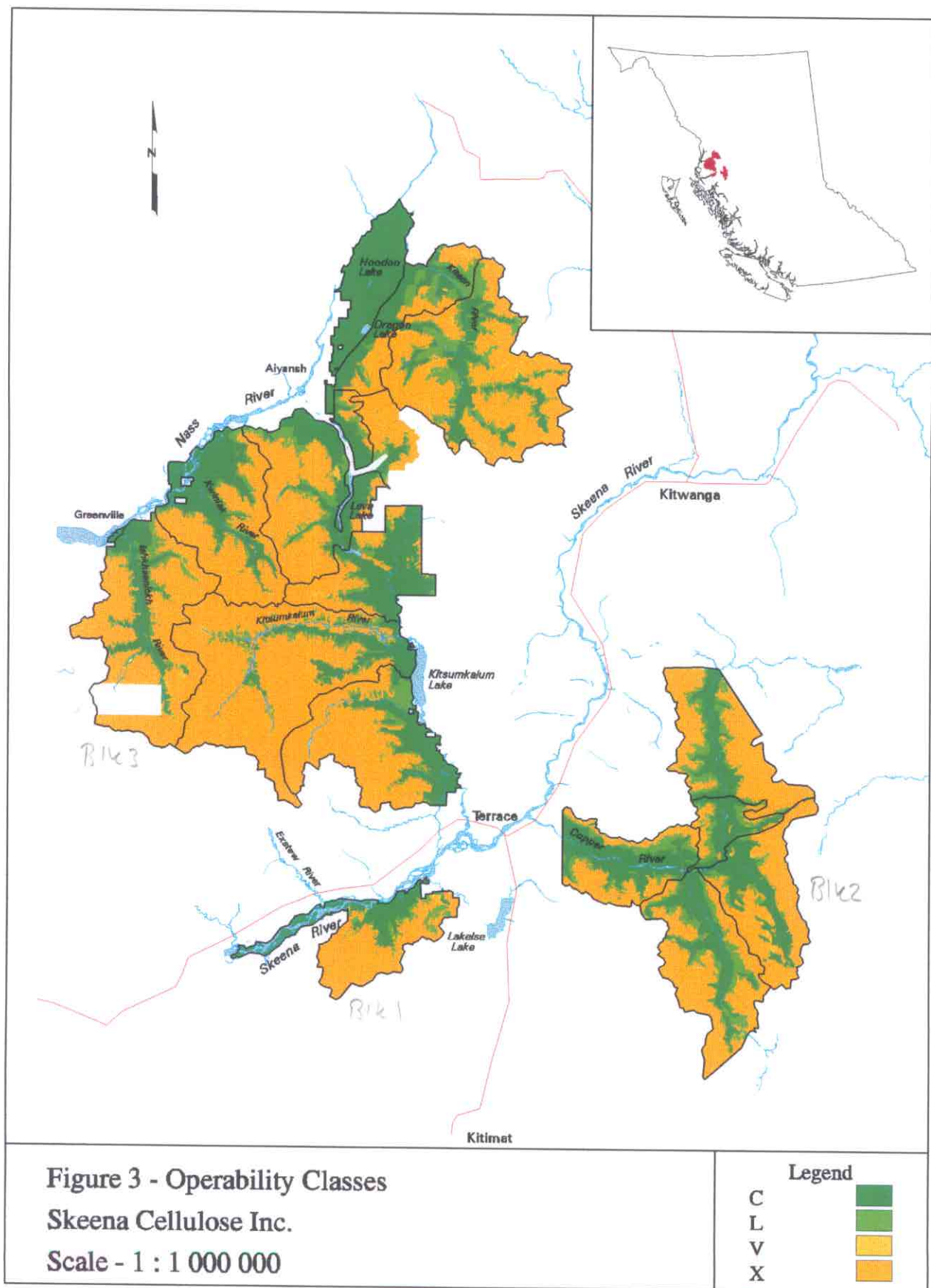


Operability Classification

The productive forest area was classified into operability classes in 1988. These classes are based on combinations of accessibility, harvesting systems, and merchantable volume. They do not address the economic feasibility of logging. Operability classes are used to stratify the productive forest area and to enable a netdown to operable landbase for use in yield analysis.

Table 5: Operability Classification (hectares)

Operability Class	Definition	Volume m³/ha	Productive Forest (hectares)
C-Conventional	Harvestable by ground skidding and cable systems.	>250	166,088
L-Non-conventional	Harvestable by helicopter, extended skyline or multi-span systems	>250	64,696
V-Low Volume	Marginal areas with volumes too low to log feasibly	<250	4,167
X-Non-harvestable/ Other	Areas not suitable for harvesting due to low volume and productivity	alpine	37,646
TOTAL			272,597



During the term of MP 8, SCI consistently logged areas in the non-conventional (L) and low volume (V) classes as well as in the conventional operable (C) landbase. Consequently, an adjustment has been made to include 14,782 ha of the non-conventional (L) operability class in the timber harvesting landbase for the timber supply analysis. Given the shift in operability since 1991, due to higher log values and advances in logging systems, it is anticipated that more productive forest area will enter the economic margin in the future. SCI will be updating and refining the operability classification during this planning period.

Loss Factors

Decay and rot reduce estimated gross tree volume to a net solid wood (merchantable) volume. To account for these volume reductions, Ministry of Forests zonal species loss factors are used to determine the net inventory volumes. These factors vary depending on the species, diameter and external decay indicators noted.

In 1989 SCI initiated a joint study with West Fraser Mills Ltd. and the Ministry of Forests to revise the loss factors for hemlock being used in the Kalum TSA. The results of this study were inconclusive and the interim loss factors derived by the Ministry of Forests have not been used at this time. A review of study results by Sterling Wood Group found that the percentage decay varied greatly between trees but that there was no significant correlation between decay and tree diameter and site attributes.

Growth and Yield

The purpose of the growth and yield program is to improve the reliability of estimates of growth rates and volume yields of the second growth forests. A series of PSPs were established in the late 1950s and early 1960s by Columbia Cellulose Company Ltd. Unfortunately, only some of the records and data from these installations have been kept. The program was refocused in 1991 with the establishment of 11 permanent sample plots (PSP) in natural regenerated hemlock stands. Further PSPs have been established in both unmanaged and managed stands (stands that have been spaced during the last 10 years) progressively over the next five years. The growth and yield program is now managed by the Ministry of Forests in co-operation with the Forest Productivity Council.

Establishment of more plots is needed in spaced stands so that the range of type groups, ages and site series is represented in the database. The collection, analysis and validation of growth and yield data is a long-term program. The continual addition of new and periodically re-measured installations will allow SCI to make revisions and refinements to yield predictions. It will improve the confidence in the prediction of the long-term fibre supply for the TFL.



Site Productivity Assessments

The Company intends to undertake a program to assess site productivity of second growth stands on the TFL. This would be a three-year program funded by Forest Renewal BC, commencing in 1998. The initial design and sampling will focus on stands in the coastal western hemlock (CWH) zone. Field sampling will be done to allow a correlation of site index with BEC site series at a stand level. Sampling would be carried out in stands from 5 - 80 years old.

A more reliable field verified assessment of site productivity will strengthen the utility of the second growth timber inventory in several ways:

- Making more accurate growth projections of stands
- Identifying stand management and/or future harvesting opportunities.
- Carrying out long-term planning and yield analysis.

3.2 RECREATION/LANDSCAPE

Recreation Inventory

The original recreation resource inventory was developed in 1987, consisting of 24 NTS mapsheets at a 1:50,000 scale. It was updated in 1997 with the completion of the *Recreation Analysis and Management Strategy Report, Tree Farm Licence 1* dated July 1997 by RRL Recreation Resources Ltd. The recreation analysis report has been approved by the Regional Manager in April, 1998 and is provided in Appendix IV. Coded symbols for mapsheet polygons describe biophysical features, recreational activities and significance, and management class. A 1:50,000 scale overlay showing the recreation opportunity spectrum (ROS) accompanies each mapsheet.

A wide variety of recreation pursuits are possible within the TFL. Popular activities include angling, boating, camping, canoeing, cross-country skiing, fishing, hiking, hunting, kayaking, mountain biking, mountaineering, mushroom picking, nature study, snowmobiling, trail bike riding and wildlife viewing, among others.

Recreation opportunity spectrum classes describe the types and range of potential recreational experience available within specific areas. Table 6 provides a summary of the distribution of area by ROS classes within TFL 1 as of November 1996. Note that changes will occur to the ROS class distribution over time as a result of the ongoing road development and harvesting.

Table 6: Recreation Opportunity Spectrum Distribution (hectares)

ROS Class	Area*	
Primitive	136,000	22%
Semi-primitive non-motorized	254,000	42%
Semi-primitive motorized	13,000	2%
Natural roaded	12,000	2%
Modified roaded	182,000	30%
Rural	12,000	2%
Total	609,000	100%

* Area is based on digital planimeter measure, of a 1:600,000 scale map. The total area varies from other more precise TFL measures due to slight errors in measurement (e.g., line widths and the scale of the exercise.)

A summary of key recreational features by RPU may be found in the recreation analysis. Existing recreation features in the TFL as described in Table 7 are campsites and trails.

Table 7: Existing Recreation Sites and Trails

Feature	General Description
Dragon Lake	Picnic site and campsite located on the lake. Campsite is located on the west side of the lake and has capacity for approximately 20 - 30 vehicles.
Pine Lake	6.1 km loop trail around the lake. Picnic and campsite. There are 2 - 3 campsites each with the capacity for approximately 2 -3 vehicles. (Trail takes 3 hours to walk). Potential for expansion of camping sites.
Sleeping Beauty Trail	6 hours round trip hike to lower meadows. Peak is a further 7 km. Excellent views of Terrace and Kitsumkalum Lake. Opportunities for extensive hikes to adjoining peaks and ranges.
Copper Fossil beds	Two semi-open campsites (one is overgrown). Potential for expansion to include more campsites and a trail down to the river. Jurassic Age fossils. Located 45 km from Highway 16 along the Copper River FSR.
Glory Hole	Small lake with wharf which is popular for swimming in the summer. Located approximately 11 km from Terrace on the West Kalum FSR.

The recreation analysis is a process for assessing recreation strategies and options. It summarizes key biophysical recreation features and landscape data outlined in the Landscape and Recreation Inventory reports and maps for TFL 1 and compares the supply of recreation features, activities, and settings with existing use and recreation demand. Recreation resources within and bordering the TFL are assessed on a local and regional basis in terms of current and future demand, activity trends and the availability of resources to meet these demands.

To assist in analysis of recreation management options, the report divides the TFL into ~~nine~~ recreation management units (RMU). Features that possess similar characteristics and management objectives are grouped or assembled by RMU. Proposed recreation resource management objectives (strategies) highlight key resource management issues. Rationale and implications of potential recreational developments are described.

Landscape Inventory

~~The~~ initial forest landscape inventory was developed in 1987, consisting of 54 mapsheets at a scale of 1:20,000. This inventory was subsequently updated in November of 1996. The landscape inventory and visual sensitivity is covered in the recreation analysis report.

Landscape polygons were mapped from three major road travel corridors. These three travel corridors are the Nisga'a Highway, the Nass Forest Service Road, and Highway 16. People using these well-travelled corridors are exposed to the visual effects of forest development activities (e.g., road construction, harvesting, plantations, second growth forests and silvicultural treatments). In these and other high-visibility areas, SCI plans harvesting and road construction operations in such a way to limit visual impact.

The completed visual landscape inventory identified recommended visual quality objectives (VQO), visual sensitivity (VS), visual absorption capability (VAC) and existing visual conditions (EVC) along the major travel corridors within TFL 1. This inventory will assist SCI in developing improved visual landscape design to adequately manage the visual resources on TFL 1.

3.3 BIOGEOCLIMATIC ECOLOGICAL CLASSIFICATION

TFL 1 has a variety of ecosystems ranging from the nutrient-rich, moist alluvial sites beside the Skeena, Nass, Lakelse, and Kitsumkalum rivers to high-elevation alpine meadows. Four distinct biogeoclimatic zones predominate: the Coastal Western Hemlock zone, the Interior Cedar-Hemlock zone, the Mountain Hemlock zone, and the Alpine Tundra zone.

The **Coastal Western Hemlock Zone (CWH)** is the wettest biogeoclimatic zone in BC and is characterized by an abundance of western hemlock, amabilis fir and, to a lesser extent, western red cedar and Sitka spruce. Red alder is widespread on disturbed sites while black cottonwood is typically found along large rivers with extensive flood plains.



The **Interior Cedar-Hemlock Zone (ICH)** is characterized by the highest diversity of tree species of any zone in the province. White/Sitka spruce hybrids, subalpine fir, western red cedar, and cottonwood comprise climax stands. Engelmann spruce, white spruce, various spruce hybrids, and subalpine fir are often climax species on specific soil types. Lodgepole pine, trembling aspen, and paper birch are common seral species.

The **Mountain Hemlock Zone (MH)** is characterized by short, cool summers and long, cool winters, with heavy snow cover for several months. Mountain hemlock, subalpine fir, amabilis fir (balsam), and yellow cedar are the most common tree species. Forests are not continuous in the Mountain Hemlock zone, and are largely confined to lower elevations.

The **Alpine Tundra Zone (AT)** is cold, windy and snowy, with low growing-season temperatures. This zone is often dominated by stunted vegetation. The most common stunted tree species are subalpine fir and mountain hemlock.

The approximate distribution by area of the four biogeoclimatic zones and associated subzones is included in Table 9. Boundaries are illustrated in Figure 4.

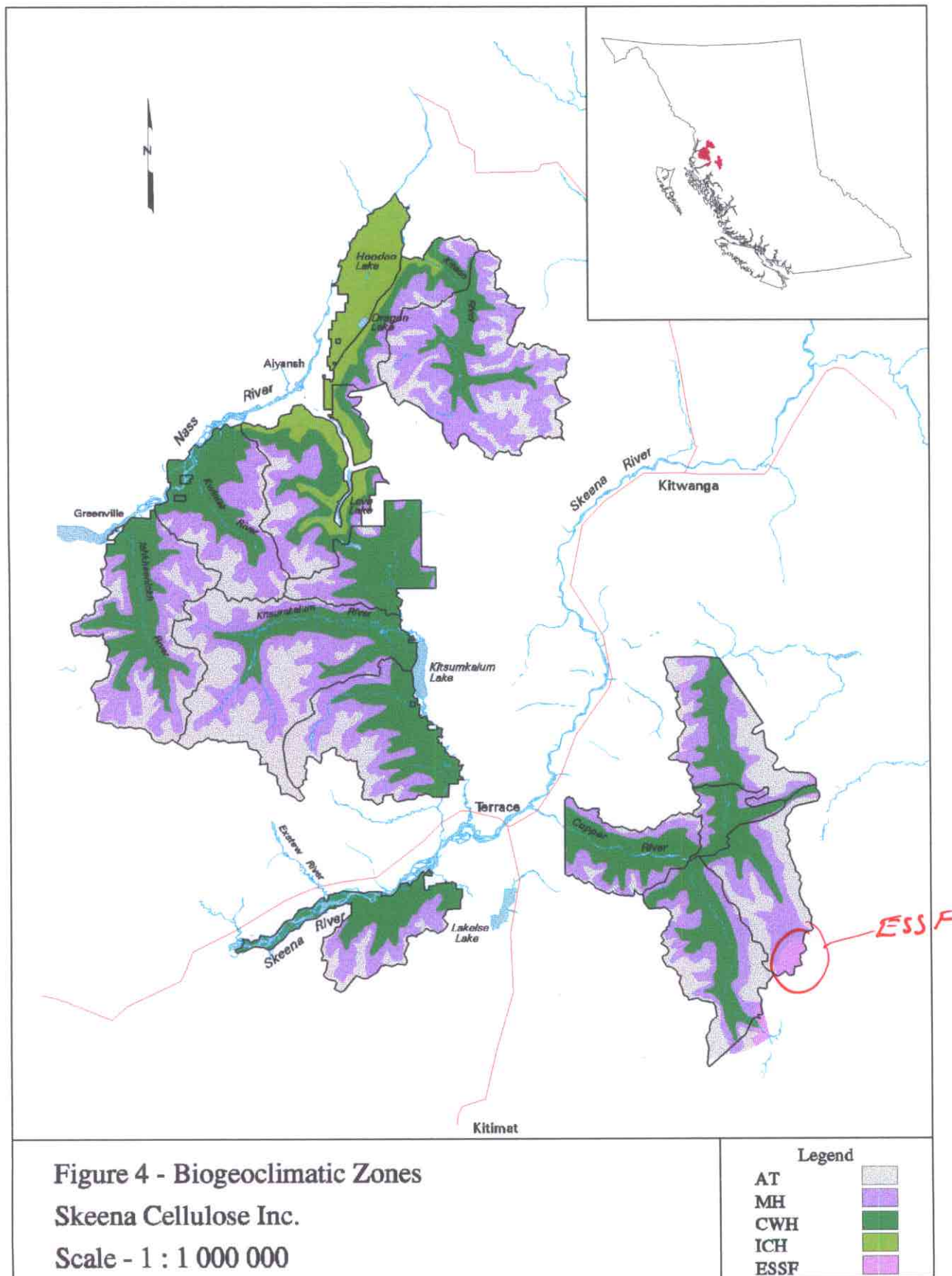


Table 8: Biogeoclimatic Subzones

Zone/Subzone		Variant	Gross Area	%	Productive Area
Unclassified			3,559	1	
AT	Alpine Tundra		132,970	22	2,527
CWHvm	*Coastal Western Hemlock Very Wet Maritime Subzone	-	1,522	0	723
CWHws ₁	Coastal Western Hemlock Wet Submarine subzone	Submontane variant	89,164	15	72,206
CWHws ₂	Coastal Western Hemlock Wet Submarine subzone	Montane variant	127,232	21	96,555
ESSFmk	*Engelmann Spruce - SubAlpine Fir Moist Cool Subzone	-	2,656	0	654
ESSFwv	*Engelmann Spruce - SubAlpine Fir Wet Very Cold Subzone	-	332	0	65
ICHmc ₁	Interior Cedar Hemlock Moist cold subzone	Nass variant	9,644	2	8,848
ICHmc ₂	Interior Cedar Hemlock Moist cold subzone	Hazelton variant	30,411	5	26,874
MHmm ₁	Mountain Hemlock Moist Maritime (Forested) subzone	Windward variant	27,525	4	4,167
MHmm ₂	Mountain Hemlock Moist Maritime (Forested) subzone	Leeward variant	185,677	30	59,977
Total			610,692	100	272,597

* Very Minor Occurrence - less than 1% gross area.

Note: Individual Zone/Subzone/Variant gross areas may not add up to total gross area due to rounding of decimals.

3.4 SOILS AND TERRAIN STABILITY

There are many distinct soil types in the TFL. These are best described by their occurrence in the four main biogeoclimatic zones. Each zone has its own characteristic soils:

Soils

The Alpine Tundra Zone (AT) is an area of active frost shattering, colluviation, soil creep and frost churning. Soils in this high elevation environment are primarily orthic and humic regosols, although brunisols can dominate in drier alpine areas. Wet habitats are usually characterized by ferro-humic podzols.



Mountain Hemlock Zone (MH) soils are predominantly ferro-humic and humo-ferric podzols and folisols with mor humus forms. Dominant processes affecting soil development are the heavy snowpack and continuously cool, wet conditions. Soils are acidic and highly leached, and fungal decomposition dominates. Many soils show signs of mottling or gleying because they remain moist or saturated throughout the year. Organic matter builds up because decomposition rates are slow. Wetlands with acidic, organic soils occur where terrain is less steep and the climate is particularly humid.

The Coastal Western Hemlock Zone (CWH) is characterized by cool wet weather and granitic parent materials which combine to produce strongly leached, nutrient deficient mineral soils with thick acidic forest floor layers. The most common are ferro-humic and humo-ferric podzols with humimor and hemihumimor humus forms. Folisols dominate.

The soils in the Interior Cedar Hemlock Zone (ICH) have developed mainly from morainal parent materials, although fluvial and colluvial materials are also common. Although there is less leaching and organic matter accumulation than in the CWH Zone, these processes are still very important. Orthic humo-ferric podzols with hemimor humus forms predominate, although brunisolic or podzolic gray luvisols occur on finer-textured morainal materials. Dystric brunisols may be found on coarse-textured colluvial or fluvial materials, while gleysols and regosols occur on wet and/or productive alluvial ecosystems. Organic soils are uncommon.

Terrain Stability Mapping

Terrain and soil erosion hazard classification and terrain stability Level C mapping has been completed for 80% of the TFL landbase. Only the Hoodoo/Headley and a portions of Kiteen and Lower Nass RPUs remain to be mapped. This overview mapping is scheduled to be completed by the end of 1999.

3.5 WATER

Two major rivers in northwestern BC flow through the TFL, the Skeena and Nass Rivers. The landbase is an integral part of the catchment basin of these rivers. There are several regionally important drainages with headwaters within the TFL that are tributary to these rivers. Notable tributary rivers to the Skeena River are Lakelse River, Kitsumkalum River, and the Copper River. Tributary to the lower Nass River are the Ishkheenickh, Tseax and Kiteen Rivers. The primary value of these waterways is in the aquatic habitat and the fishery resources it provides. The Skeena River system has four of five Class 1 waterways and 13 of 42 Class 2 waterways in the province.

Community Watersheds

The only designated community watershed in the TFL is that of Gitzyon creek, which supplies water to the community of New Aiyansh. It covers approximately 1496 hectares. No watershed assessment has been initiated for this area since no activities are planned within this watershed in the foreseeable future.

Domestic Water Supply Intakes

Although there are no water licences within TFL 1, several water licences in the vicinity of Irene meadows, Aiyansh and Canyon city are located within 2 km downstream of the TFL boundary. These licences are listed as follows:

Table 9: Water Licences in close proximity to TFL 1

C052440	C102151	C102150
C052441	C053177	C104172
C052562	C053178	C109205
C053173	C065498	Z110426
C053176	C067369	

The location of domestic water supply intake will be considered in the planning of road construction and harvesting activities. SCI will maintain a dialogue with any individuals or groups that demonstrate an interest to discuss planned or potential developments within the TFL. Such consultation is most likely to take place through the forest development plan referral process.

3.6 FISH HABITAT

The Skeena River is well known as a major sport and commercial fishery and has provincially significant fish populations. The islands along the lower Skeena River are considered to be the richest growing sites in Kalum Forest District and they provide provincially rare habitat. There is a Skeena Islands Ecological Reserve. Flood plains along the river also provide areas of important biodiversity.

The Nass River system supports important sport, commercial and eulachon fisheries. It also provides wildlife habitat along the lower Nass flood plain, the Nass river estuary and the Nass Islands. Gingietl Ecological Reserve is situated on the west side of the river.



At least 11 species of anadromous and resident fish are found in the streams and lakes. They include pink, chinook, chum, sockeye and coho salmon, steelhead trout, rainbow trout, cutthroat trout, dolly varden, char, kokanee salmon, and mountain whitefish. Pink salmon is the most prevalent salmonid species in most rivers, with lesser numbers of the other three species.

The existing stream and fisheries information has been converted to the riparian classification outlined in the Code. Wetlands and lakes have been classified. Riparian assessments have been undertaken for the Copper Valley, Nass and Kalum Valley, with funding provided by Forest Renewal BC. The Company intends to continue with fish stream inventory during the term of this plan subject to Forest Renewal BC funding.

3.7 WILDLIFE HABITAT

Terrestrial Ecosystem Mapping

For the past four years, commencing in 1994, the Company has been undertaking terrestrial mapping of drainages both with TFL 1 and its adjoining Forest Licence A16835. By 1998 mapping has been completed for approximately 40% of the TFL. These areas include the North Kalum, South Kalum and the Whitebottom. Field sampling has been completed for another 20% of the TFL, including the Kiteen and Ishkheenickh. This work needs to be upgraded to current RIC standards. Completing coverage of the TFL is dependent on further funding by Forest Renewal BC.

The objective was to classify and map the natural ecosystems according to existing classification schemes and to provide interpretations for habitat values and use by wildlife. The intent is to use the information in planning for wildlife and biodiversity management.

Progress to date is summarized in the draft report *General Ecosystem Descriptions and Wildlife Interpretations for Portions of TFL 1 and Forest Licence A16835* by Madrone Consultants Ltd., 1997. Building upon four years of data collection and terrestrial ecosystem mapping, this draft summarizes general information collected and interpretations made.

Wildlife Species

Some of the more commonly found animals in TFL 1 include black bear, moose, mule deer, mountain goat, grizzly bear, wolves, bald eagle, marten, and beaver. Although precise inventories of the wildlife are not available, hunting and trapping data may be used to estimate populations and/or frequency of encounters.

MELP manages wildlife by sub-region management units (MU). TFL 1 lies within Skeena Region 6 and contains portions of MUs 6-9, 6-10, 6-14 and 6-15 within its boundaries. For the purposes of this management plan, hunting and trapping data from wildlife MU 15 may be considered the most representative for TFL 1, given the high degree of overlap with TFL boundaries and provides some insight into the relative abundance of wildlife.

Red and Blue Listed Species

Red listed species include any indigenous species or subspecies (taxa) considered to be extirpated, endangered or threatened in British Columbia. The only red listed species which may be found within the Kalum Forest District are the American Peregrine Falcon, Marbled Murrelet and Short-Eared Owl.

Blue listed species include any indigenous species or subspecies (taxa) considered to be vulnerable in British Columbia. Vulnerable taxa are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. There are 11 vertebrate animals and 17 vascular plants blue listed in the Kalum Forest District, including the grizzly bear, Stone sheep, fisher, wolverine, bald eagle, trumpeter swan, tailed frog and bull trout, among others. In addition, there are almost 40 rare plant communities (BEC subzone and variants) that may be found within the Kalum Forest District.

A complete listing of red and blue listed vertebrate animals and vascular plants, as well as rare plant communities is in Appendix II.2. A rare element occurrence report which summarizes documented occurrences of red and blue listed species is also included in this appendix.

Hunting

The majority of hunting is by local residents who hunt moose, black bear, mountain goat, and grizzly bear. Small numbers of wolf are also hunted. Assuming the hunting statistics from MU 15 are the most representative of TFL 1, a relative indication of the hunting effort can be gained. Hunters are 99% resident.

Annually, from 1991 to 1997, 337 hunters spent 1,662 days hunting moose and harvested 76. For black bear, each year, 98 hunters spent 488 days hunting and harvested 37 bears. 73 hunters spent 269 days hunting mountain goat and harvested 28 goats. 16 hunters spent 104 days hunting grizzly bear and harvested 4 animals. Game birds harvested on average annually were 492 ruffed grouse, 366 ducks, 120 spruce grouse, 46 geese, and 1 blue grouse.

Guided hunting effort is minimal within MU 15. Annually, between 1992 and 1997, an average of 16 days were spent hunting black bear, 9 days hunting mountain goat, 5 days hunting moose, and 5 days hunting grizzly bear.



Trapping

Most trappers see their activity as a lifestyle choice that provides supplementary income during the winter. Between 1986 and 1997, an average of 436 marten, 126 beaver, 37 squirrels, 17 weasels, 12 mink, 11 otters, 8 fox, 6 wolverines, 6 coyotes, 4 black bear, 4 muskrat, 3 lynx, 3 bobcats, 3 wolves and 1 fisher were harvested annually on MU 15.

3.8 CULTURAL HERITAGE

The *Heritage Resource Overview for TFL 1, Terrace*, dated January 1995, by I.R. Wilson, was prepared on behalf of SCI to assess heritage potential and sensitivity within the study area. The aim of the study was to define known cultural resources and to develop a model to predict the archaeological potential of unsurveyed areas. The provincial government maintains a register of known archaeological sites for the Skeena region.

An archaeological overview assessment (AOA) was undertaken by the Ministry of Forests in 1996 for the Kalum Forest District which included TFL 1. Site-specific archaeological impact analyses are being undertaken progressively where forest operations are proposed in high sensitivity areas. Based on known information to date, no significant exclusions or area netdowns are required for the purposes of timber supply analysis.

3.9 MINERALS

Although mineral deposits have been identified within TFL 1, especially in the Copper River and Kiteen River areas, none are of sufficient size or quality to warrant exploration. There are no active mines within the TFL.

The Ministry of Employment and Investment, Energy and Minerals maintains a database of mineral tenure holders containing information regarding client and tenure type, location, size and status of the mineral deposit. A database search for mineral tenures within TFL 1 confirms that there are no active mines in the area, although there are eight past producers. There are also 98 documented showings and six mineral prospects within the TFL. Mineral exploration and development in TFL 1 are negligible. (See Appendix II.2)

4.0 INTEGRATED RESOURCE PLANNING

4.1 STRATEGIC PLANNING

Integrated resource planning is a dynamic process. The landscape level planning initiated during the past five years will be continued during the next five years. A Total Resource Plan was completed for the TFL that included all 13 resource planning units (RPU). This plan enables strategic analysis in support of AAC rationalization and managing for key resource values. It has approximated the requirements of landscape level and biodiversity planning in the Code. The total resource plan was conceived and completed prior to the initiation of the land-use planning exercise for the Kalum Forest District LRMP process.

As part of the total resource plan exercise, resource management zones (RMZ) were defined. RMZ objectives will be regarded as higher level plans providing direction for the preparation of operational plans on TFL 1 until such time that they are superceded by the LRMP and LU processes. The Company will strive to incorporate the TFL objectives into these government initiatives as part of the public consultation process. The definitions, objectives and strategies for these six RMZs are outlined in the accompanying table.



Table 10: Resource Management Zones

Definition	Objectives	Strategies
ENHANCED FOREST MANAGEMENT ZONE (E)		
<p>Areas suitable for enhanced or intensive forestry operations, which includes the following:</p> <ul style="list-style-type: none"> Sites of medium to high productivity (site indices ≥ 21). Sites that favour economic road building, harvesting and intensive silviculture practices 	<ul style="list-style-type: none"> To maintain a secure forest landbase and a sustainable supply of timber. To maximize an economic return. To increase fibre production and stand/tree value in our second growth stands. To incorporate elements of biodiversity management. 	<ul style="list-style-type: none"> Actively promote a defined forest landbase. Complete economic analysis to meet shifting market demands. Implement incremental silviculture treatments on medium to high productivity sites based on positive economic analysis.
GENERAL FORESTRY ZONE (G)		
<p>Areas where integration of a wide array of resources and values is the greatest, which can include one or more of the following:</p> <ul style="list-style-type: none"> Areas where no single resource or value has been identified as having such significant value(s) to warrant a separate management strategy. Areas that would meet part of the Enhanced Forestry Zone criteria but have greater potential for integration with other resources and/or values. 	<ul style="list-style-type: none"> To maintain a secure forest landbase and a sustainable supply of timber. To manage in a balance approach the array of resources and values. To incorporate elements of biodiversity elements 	<ul style="list-style-type: none"> Actively promote a defined forest landbase. Complete economic analysis to meet shifting market demands. Pursue and carry out needed resource inventories.
VISUAL LANDSCAPE MANAGEMENT ZONE (V)		
<p>Scenic areas (visually sensitive areas or scenic landscapes). Examples include but are not limited to areas visible from Highway #16 and 37 and the Nisga'a Memorial Lava Bed Park.</p>	<ul style="list-style-type: none"> To maintain visual quality. To maintain a secure forest landbase and a sustainable supply of timber. Incorporate elements of biodiversity and wildlife management. 	<ul style="list-style-type: none"> Apply visual landscape design procedures at the cutblock level. Carry out visual impact assessments. Pursue and establish over time, visual landscape design at the landscape level. Pursue alternative harvest systems. Actively promote a defined forest landbase. Integrate biodiversity and wildlife needs into the landscape level visual design.



Definition	Objectives	Strategies
RIPARIAN MANAGEMENT ZONE (R)		
<p>Areas adjacent to fish streams, wetlands and lakes, which can include one or more of the following:</p> <ul style="list-style-type: none"> • Areas dominated by continuous high moisture content. • Adjacent upland areas. 	<ul style="list-style-type: none"> • To minimize or prevent impacts of forestry operations on fish and riparian habitat. • Incorporate elements of biodiversity and wildlife management. 	<ul style="list-style-type: none"> • Implement Forest Practices Code (FPC) reserve and management zone requirements. • Establish the most appropriate windfirm boundary to the reserve and/or management zone. • Where possible, retain important wildlife habitat attributes such as wildlife trees, structural diversity and food sources in the reserve and/or management zone.
FISHERIES MANAGEMENT ZONE		
<p>Water courses associated with sport and anadromous fish populations of special designation (e.g., Ministry of Environment Classified Waters).</p>	<ul style="list-style-type: none"> • To maintain water quality and fish habitat, and the promote angling experience. 	<ul style="list-style-type: none"> • Provide safe fish passage in all drainage structure designs. • Conduct all in-stream and wetted perimeter works during Department of Fisheries and Oceans (DFO) established timing of operations. • Identification and classification of all fish bearing streams. • Maintain existing access to promote angling experience
WILDLIFE HABITAT MANAGEMENT ZONE (W)		
<p>Areas potentially containing important and critical wildlife habitat. Indicator species include moose, mountain goat, grizzly bear, marten, bald eagle and beaver. These areas can include on or more of the following:</p> <ul style="list-style-type: none"> • Areas identified as having critical habitat potential. • Areas of known significance identified from local knowledge and documented sightings. • Areas in relatively low conflict with other resources and/or values. 	<ul style="list-style-type: none"> • To enhance, where possible the impacts of forestry operations on moose, mountain goat, grizzly bear, marten, bald eagle and beaver-critical habitat. • Where possible, facilitate connectivity. • Provide elements of biodiversity management. 	<ul style="list-style-type: none"> • At the stand level retain important wildlife habitat attributes such as wildlife trees, structural diversity and food sources. • Identify potential high elevation passes and corridors. • Incorporate biodiversity requirements into identified wildlife areas.



Resource Planning Units

The number of RPU has been reduced from 17 in MP 8 to 13 in MP 9 (figure 6). The SBFEP Limonite operating area is included within one of these RPUs. The RPU is the building block on which the detailed integrated resource planning is based. Subdividing the TFL landbase this way facilitates identifying unit specific objectives and features that need to be considered. They are more or less equivalent to landscape units. The summary of RPUs in Table 11 illustrates the scope of and the range of resource values.

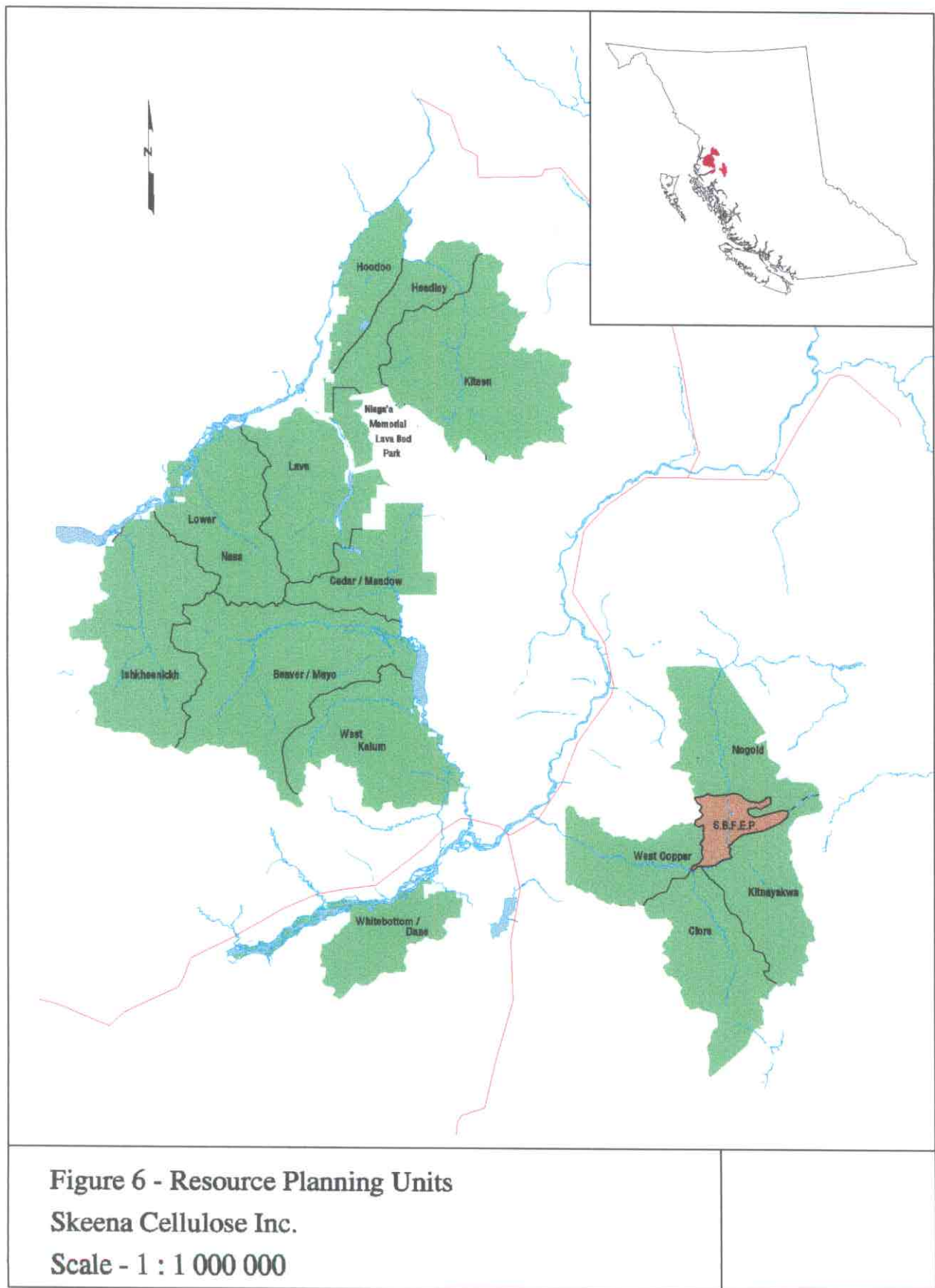




Table 11: Description of Resource Planning Unit Areas

	Name	Gross Area (ha)	Productive Area (ha)	Operable Area (ha)	% by Management Zone					Resource Features and Values
					G	E	R	W	V	
1	Beaver/Mayo	80,758	20,432	6,573	24	16	7	30	23	Extensive wetlands and swamps; hunting
2	Clore	42,111	21,938	10,386	45	36	5	14	0	Gentle terrain, winter harvesting; year round recreational and fishing usage of the Copper and Clore Rivers as well as mountaineering and hiking.
3	Hoodoo/Headley	44,912	33,817	21,612	22	44	3	16	15	Mountainsides above rolling bedrock controlled terrain, numerous small drainages; includes part of the Gitzyan Community Watershed.
4	Ishkheenickh	62,554	20,475	8,473	43	8	6	40	2	Lengthy history of logging.
5	Kiteen	70,682	25,874	9,451	59	3	2	36	0	Wildlife habitat for moose and goat.
6	Kitnayakawa	32,949	14,061	6,863	43	25	10	22	0	Winter harvesting, fishing usage of the Copper River; fossil beds and recreation sites.
7	Lava	48,708	25,020	13,229	23	9	2	5	62	Borders Nisga'a Memorial Lava Bed Park; visual quality along the Nisga'a Highway is of concern.
8	Lower Nass	45,820	21,303	10,974	33	28	6	27	6	Borders Nisga'a Memorial Lava Bed Park; visual quality from the Park is of concern; long history of logging.
9	Cedar/Meadow	28,930	19,256	12,599	14	52	4	11	18	Snowmobile usage of Sterling Creek area; fishing usage of Big Cedar River.
10	Nogold	47,194 [11,082]	23,428	11,918	39	22	7	33	0	Gentle landscape well suited to logging; Copper River possesses a Class 1 angling designation. Includes Limonite SBFEP operating area.
11	West Kalum	47,229	17,352	8,025	7	58	4	30	0	First pass and second pass logging.
12	West Copper	27,491	17,521	9,742	27	32	3	38	0	Long history of logging. Snowmobiling and fishing.
13	Whitebottom/Dane	31,354	12,758	4,797	29	33	4	3	31	Riparian area of the Skeena River; effects of logging on riparian areas and visual quality from Highway 16 is of concern.
	Total TFL 1	610,691	272,597	134,642						

* Includes Limonite SBFEP

- Note:
1. Individual RPU gross areas may not add up to total gross area due to rounding of decimals.
 2. Management Zone: G= General E= Enhanced R= Riparian W= Wildlife V= Visual

4.1.1 Timber Supply Analysis

A timber supply analysis has been undertaken to provide the provincial Chief Forester with harvest level projections and options for determining the AAC. An explanation of the structure, database, factors and management assumptions used in the analysis is outlined in the information package (Appendix V.1).

A forest landbase can produce different harvest rates depending on the management assumptions and the operable landbase chosen. This analysis provided different landbase tests. The results were tested by a sensitivity analysis by varying the yield tables, cover constraints, green-up heights, minimum harvest age and site index assignments for old growth areas.

Analysis options

Gross Operable Landbase - the productive forest area unconstrained by non-timber resource factors. This determines the theoretical biological harvest level.

Current Management - the net operable area covered the conventional and non-conventional operability areas and the cottonwood management area. The net operable area was divided into five management zones; general timber production, enhanced timber production, wildlife, visual and riparian. Net area reductions (netdown) and constraints were applied for adjacency and green-up, visuals, riparian reserve zones, landscape and stand level biodiversity, environmentally sensitive areas, roads and other non-merchantable areas. The management assumptions were structured to match the Forest Practices Code.

The forest cover constraints applied to the visual zone were those in the landscape inventory without any management considerations. The planned management strategy for visual areas was tested in a sensitivity analysis, and shown to be less constraining on timber supply.

Timber Supply Analysis Report

The timber supply analysis report in Appendix V.II provides a full description of the results. The harvest level for the current management options stays steady for 20 years, before declining at 10% per decade up to 50 years. This harvest level remains constant for another 120 years before beginning to increase. Based on these results, the present harvest level would need to be reduced gradually over the next 50 years. SCI is proposing that the AAC be maintained at 720,000 m³/year. This would apply for the next five years, after which a reduction would be considered. At that time a new yield analysis would be done that would take into account the full impact of the Nisga'a land claim settlement.

Nisga'a AIP Landbase

The Nisga'a final agreement was signed by the the provincial and federal governments and the Nisga'a First Nation on August 4, 1998. The Nisga'a AIP lands cover approximately 51,300 hectares of productive forest within TFL 1. Based on an average MAI of 5.5 this represents a maximum potential productivity loss of 282,000 cubic metres per year.

4.1.2 Twenty-Year Plan

A twenty-year plan for the period 1997-2016 has been completed and approved by the Kalum District Manager. It is a strategic level plan that illustrates one feasible pattern of development for the next twenty-year period. The AAC volume tested was 720,000 m³, which includes the SBFEP volume. It provides a link between the non-spatial assumption of the yield analysis prepared for this management plan and the operational requirements of the Code.

The results demonstrate that at the AAC level there is sufficient volume of timber available to meet the volume target level over the next 20 years. The twenty-year plan has been approved by the Kalum Forest District Manager.

Table 12 lists the projected volumes scheduled by RPU in each quarter. The thematic maps in the accompanying map folio illustrate the spatial distribution of the cutblocks in each RPU.

Table 12: Twenty-year Plan Summary

RPU		Gross Area	Volume Schedule by Period (m ³)				
			1997-2001	2001-2006	2007-2011	2012-2016	TOTAL
1	Beaver	1903	195,435	195,314	97,798	126,142	612,688
2	Clore	3372	173,875	364,592	394,643	251,276	1,184,387
3	Hoodoo	5379	398,288	420,487	575,468	514,017	1,908,260
4	Ishkheenickh	3424	312,509	315,847	284,083	252,277	1,164,716
5	Kiteen	4659	297,481	288,210	275,517	283,990	1,145,198
6	Kitnayakawa	3069	219,150	328,921	246,690	190,665	985,425
7	Lava	4426	336,266	406,784	379,045	334,003	1,456,098
8	Lower Nass	3471	296,942	126,530	329,315	348,037	1,100,824
9	Meadow	3068	288,755	194,046	270,551	358,710	1,112,061
10	Nogold	2912	254,634	267,590	249,956	283,877	1,056,057
11	West Kalum	1992	320,353	91,409	35,385	147,377	594,525
12	West Copper	2791	304,514	162,814	189,448	300,825	957,600
13	Whitebottom	2051	152,412	124,500	123,886	189,579	590,377
SCI		42517	3,548,615	3,287,044	3,451,784	3,580,773	13,868,215
SBFEP(Limonite)		1991	280,979	170,034	200,459	176,033	827,505
TOTAL TFL 1		44508	3,829,594	3,457,078	3,652,243	3,756,806	14,695,720

Cutblocks in the first period were taken from the 1997-2001 forest development plan for TFL 1 and the SBFEP. The remaining cutblocks were from the total resource plans completed for each RPU. Blocks were scheduled using an iterative approach to satisfy timber adjacency and green-up requirements. Further details concerning the twenty-year Plan report are provided in Appendix VI.

4.1.3 Small Business Program

The SBFEP allows the sale of 29,950 m³ annually to independent logging contractors. Timber Sale Licences (TSL) are issued by the Ministry of Forests, the agency responsible for the associated protection and reforestation activities. Once TSL areas have been harvested and basic silviculture has been completed, the areas are turned over to company management. Close co-operation between SCI and Ministry of Forests is required to ensure that planning and administration of the small business program is carried out in unison with the overall operations of the licence.

Since its inception in 1988 the SBFEP on TFL 1 has been undercut and undersold for its first two cut-control periods. (see section 1.7). The Ministry of Forests has sold as Bid Proposals TSLs more than 100% of the entire allocation for the current cut-control period (e.g., 1997-2001) in 1998 to meet the five-year cut control target.

The responsibilities for administering the SBFEP are as follows:

Planning

The SBFEP has been allocated an operating area in the central Copper between Nogold and Limonite Creeks (RPU figure 6). The twenty-year Plan completed for this area, indicates that there is sufficient volume for this program over the next 20 years and beyond (see Table 12, section 4.1.2).

The Ministry of Forests also prepares a five-year SBFEP forest development plan that will be in harmony with the objectives of this management plan and meet the goals of the Kalum Forest District SBFEP. The plan is updated annually in April to provide for a continuous designated five years of Timber Sale Licences.

Development

The Ministry of Forests will be responsible for the design and construction of all primary access roads when they are to be used exclusively by the SBFEP. SCI and the Ministry of Forests will enter into a cost-sharing agreement for the design, construction and maintenance of primary access roads that will be used jointly.



Silviculture

The Ministry of Forests will prepare silviculture prescriptions that conform to the reforestation strategies and stocking standards referred to in this management plan. The Ministry of Forests will be responsible for all post-harvesting activities including slash disposal and basic silviculture until free growing status is reached. Proposed prescribed burning plans will be discussed and jointly inspected with the Company prior to their implementation.

Annual Report

SCI will include a section reporting the accomplishments of the SBFEP for the year in the TFL annual report. By January 31st every year, the Ministry of Forests will provide SCI with information on the SBFEP activities completed for the previous year.

4.2 OPERATIONAL PLANNING

Operational planning will be completed as a prerequisite to receiving cutting permit and road permit approvals from the Ministry of Forests. The goal is to achieve and maintain a two-year Standing Timber Inventory (equivalent to two years of AAC volume in approved cutting permits).

The various kinds of operational plans that are prepared are summarized in table 13.

Table 13: Operational Level Plans

Type	Purpose	Renewal
Total Resource Plan	Provides for long term integrated resource development of a resource unit and direction for five-year development plans	Prepared as needed
Oil Spill, Erosion and Fire Pre-organization Plans	Action plans that details the operational readiness to deal with oil spills, prevent erosion, and prevent, detect and suppress forest fires	Annually
Special Use Permit	Application to use or occupy Crown land for gravel pit, sort yard or facility	Annually
Forest Development Plan	Indicates proposed harvest cutblocks and road construction scheduled for a minimum five-year period	Two year approval
Cutting Permit	Approved application authorizes the logging of a group of cutblocks, under specific terms and conditions	Renewed as needed
Road Permit	Authorizes new road construction under specific terms and conditions	Renewed as needed
Road Use Permit	Authorizes use of forest service roads with responsibility for maintenance	Renewed as needed
Deactivation Prescription	Identifies operational roads to be temporarily maintained or deactivated	Renewed as needed
Silviculture Prescription	Prescribes the silvicultural system logging method, and regeneration plan for harvesting and reforesting a cutblock	Amend as needed
Stand Management Prescription	Prescribes silviculture treatments to be carried out on a free growing stand	Amend as needed

4.2.1 Forest Development Plan

A forest development plan is intended to implement the goals and strategies described in the management plan at a tactical level. It will outline details of proposed harvesting schedules by year for a minimum five-year period, describe regeneration and protection plans and the provisions made for non-timber values.

The cutblocks shown in year 1 will usually be covered by approved cutting permits, while those identified in year 5 will be in the initial planning stages. The company will seek 2 year approvals or revise when otherwise required by a major amendment. Forest development plans of a longer term than five years may sometimes be required. Updates will depict activities completed from the previous plan, adjustments resulting from field verification of proposed cutblocks, the collection of new data, and revisions resulting from comments received from resource agencies and the public. In this way it remains as a dynamic evergreen plan.

The process from review to approval is expected to take six months, from April to September every year. The plan will be advertised and made available for public viewing at the public library in Terrace. Comments and issues received will be taken into account before it is finalized. Joint reviews of the draft forest development plan will be held with the Ministry of Forests and MELP. It is expected that district manager approval will follow within three months of submission of the plan.

4.2.2 Cutting Permits

Cutting permit applications will be submitted to the Ministry of Forests throughout the year. They will be in accordance with the approved forest development plan. Sufficient cutting permit applications will be submitted to enable SCI to deliver a continuous and adequate log inventory for its sawmills over an operating year. As operations progress, amendments to approved cutting permits will be prepared as needed. Where required this will include amendments to the forest development plan and specific silviculture prescriptions. The objective is to have a volume equivalent to two years of AAC in approved cutting permits to allow for operational flexibility.

4.2.3 Road Permits

Applications for road permits will be submitted to the district manager to obtain approval for new road construction. Road applications contain the road plan and design, including bridges or major crossings and describe any special construction techniques.

4.2.4 Silviculture Prescriptions

Silviculture prescriptions will be prepared for all proposed cutblocks and submitted to the district manager for approval prior to commencement of harvesting. Each silviculture prescription provides a detailed classification of the ecological site series and a description of non-timber resource values. It also prescribes the silvicultural system, harvest method, reforestation treatments and stocking standards needed to produce a free growing crop and the measures to accommodate non-timber resource values. The prescription will be consistent with the objectives and strategies described.



4.2.5 Stand Management Prescriptions

Stand management prescriptions will be prepared for any free growing stand where incremental stand management activities (e.g., pre-commercial thinning, pruning, thinning, and fertilization) are planned. Each stand management prescription provides the ecological site series and a description of non-timber resource values. It also describes the silvicultural system harvest method (if applicable), treatment descriptions, post-treatment stocking standards, and other treatment specific details relevant to attaining the desired final product specifications at rotation.

Other measures to accommodate non-timber resource values are also included. The actions prescribed in stand management prescriptions will be consistent with the objectives outlined in this management plan.

5.0 TIMBER RESOURCE MANAGEMENT

Timber development and utilization has been taking place for the past 50 years. Management strategies and practices have been modified and adapted over time to changes in economic circumstances and manufacturing capacity. Road construction and logging techniques have become more efficient. Forest management practices and reforestation programs have received more emphasis, particularly in the past 15 years. During this planning period there will be even more focus on finding ways to economically utilize the timber resource and to lay the basis for managing the second growth forests that are approaching economically merchantable size over the next 20 years. The goals and strategies for moving forward in this direction are outlined below.

5.1 ALLOWABLE ANNUAL CUT

The proposed allowable annual cut (AAC) for the next 5 years is 720,000 m³/year. This annual harvest level is supported by the timber supply analysis (section 4.1.1) and verified by the 20-year plan (section 4.1.2). The final AAC will be determined by the Chief Forester in December, 1998.

Table 14: AAC Allocation (m³)

	Total AAC	Sched A	Sched B
SCI	690,050	1,787	688,263
SBFEP	29,950	--	29,950
TFL 1	720,000	1,787	718,213

The basis for the AAC allocation and partition of the AAC will be described in the provincial Chief Foresters AAC Rationale for TFL 1, of December, 1998 (Appendix V.3)

The prorate of the AAC for the contribution from Schedule A and Schedule B is based on current timber harvesting landbase statistics.

Two control periods span the term of MP 9; 1998-2002 and 2003-2007. Harvesting must be within the annual and periodic limits.

Table 15: Annual Harvest Forecast

Year	Volume (m³)
1999	800,000
2000	690,000
2001	690,000
2002	650,000
2003	650,000

5.2 HARVESTING

Harvesting takes place within the operable forest area, which has been identified by the delineation into management zones and operability categories. This approach allows for:

- Maintaining biodiversity requirements.
- Recognition of environmentally sensitive areas.
- Allowance for forest landscape and recreation values.
- Allowance for critical wildlife and fisheries values.
- Operability.

The terrain quality of the merchantable stands available influence the harvesting systems that can be used. The timber stands on the TFL are a mixture of species, primarily hemlock and balsam, with varying components of red cedar, spruce, lodgepole pine and cottonwood. Typically these timber stands are 250 years old or more. From a timber volume productivity perspective they are past their prime. Compared to younger (100-150 years) more stable stands they are of relatively poor quality and yield a lower proportion of sawlogs compared to pulplogs due to the high incidence of decay and rot. Harvesting patterns are determined after collecting information on all resource values.

5.2.1 Harvesting Guidelines

The choice of silviculture system depends on an assessment of silvicultural and ecological characteristics, tree species, terrain, site disturbance, net merchantable volume, economic factors and regeneration requirements.

The cutblock size and shape is determined by the topography of the area and information available on the non-timber resources at both a forest landscape and stand level.

Clearcut Silvicultural System

Clearcut harvesting will continue to be the main system used. Harvesting plans will be designed for each cutblock. This is the preferred silviculture system for most of the timber stands, except for those occurring in important riparian areas and other high-value habitat areas. Where practical, economical and safe to do so, small uncut patches, wildlife nesting trees and snags will be left. This can be difficult to achieve on steep ground where cable harvesting is planned.

Partial Cut Silvicultural Systems

Partial cutting systems may be used where the objective is to maintain a diversity of vegetation cover. This applies to riparian areas and cottonwood types on alluvial sites, when it is economically practical. A portion of the stand remains uncut in the harvest area. The trees that are removed may be cut in small patches or by selection of individual trees. This system may also be used where economically viable in site specific situations to achieve visual quality objectives or specific resource management prescriptions.

Cutblock Distribution and Pattern

The general principles to be followed when preparing cutting patterns are as follows:

- Cutblock pattern will be guided by the total resource plans completed for each resource planning unit, with first pass cutblocks dispersed throughout each unit as much as practical.
- Cutblock size will range from 25 to 250 hectares. Cutblock sizes greater than 60 hectares may occur in Natural Disturbance Types 1 and 2 as defined in the Biodiversity Guidebook. The opening size may vary, providing the needs of other resource values can be satisfied. (Between 1988 and 1997 the average cutblock size for the TFL has decreased from 55 hectares to 32 hectares).
- The first pass cutting pattern should not exceed 40% of the operable area in each RPU.
- The scheduling of adjacent leave areas (second or third pass cutblocks) is dependent on the regeneration of the first harvested cutblock reaching the free growing stage. In general, the timing of the second and third pass requires that the adjacent regeneration have reached a minimum of three metres in height. These adjacency requirements can be modified with approval by the resource agencies.

- Cutblock shapes will be designed to incorporate visual quality and wildlife habitat requirements at a landscape level. The boundaries will also be designed to minimize edge blowdown on the adjacent leave areas.
- Harvest schedule priority will be given to timber stands whose structure is breaking down from disease, blowdown or fire damage.
- Harvesting will be planned to minimize site degradation. Maximum site disturbance limits will be set for each cutblock depending on the specific terrain and soil conditions and the harvest system chosen.

Harvesting will continue to be geographically dispersed throughout the TFL. The planned annual harvest schedule at a detailed cutblock level will be submitted in the forest development plan (refer to section 4.2.1).

The standards for the engineering of cutblocks will be according to the specifications of *SCI Logging Engineering Guidelines*.

5.2.2 Harvesting Priority

Harvesting priorities and patterns are followed to address forest health, harvest profile requirements, visual sensitivity, biodiversity and to develop a balanced age class of second growth stands. Development planning includes several priorities:

- Merchantability and economic viability of candidate stands.
- Salvage of blowdown, disease or fire damaged timber.
- Log profile, volume and fibre requirements for the sawmill and pulpmill.
- Cut control and partitioned cut requirements.
- Logging contractor equipment requirements and limitations.
- Harvesting in visually sensitive areas.
- Phase-in of commercial thinning and second growth.

5.2.3 Logging Methods

Most of the logging is by either log length or tree length yarding systems. Currently 87% of the annual harvest production is done by cable methods (grapple, hi-lead and skyline), 7% by ground-based methods and 6% by aerial methods (helicopter). Mobile loaders are used to load the logging trucks at the landings. Extended-axle logging trucks with three metre bunks are used. These carry highway size loads (38 m³ average) to the Terrace sawmill. All log hauling is subject to Ministry of Transportation and Highways weight and road restrictions that apply during certain periods of the year.

← 0%
until 1998!

Since 1986 the company has acquired greater flexibility to log the variety of sites and terrain conditions encountered. Skyline logging, helicopter logging and hoe-chuck forwarding methods have been introduced. These logging methods provide the additional flexibility required to select the appropriate logging method for specific site conditions. In 1998 operational trials were successfully completed using intermediate support systems and double handling techniques.

Past, present and the likely future distribution of logging methods are as follows:

Table 16: Distribution of Logging Methods

Logging Method	1991	1995	1998	1999-2003
Grapple yarding	44%	45%	50%	50%
Hi-lead tower	25%	30%	28%	25%
Skyline ¹	0%	15%	10%	10%
Ground skidding ²	31%	10%	12%	10%
Helicopter	0%	0%	0%	5%

¹Skyline yarding includes motorized carriages, towers in shotgun configurations and grapples with carriages.

²Ground skidding includes any combination of tractors, rubber-tired skidders and excavators used for forwarding.



5.2.4 Utilization

The log utilization standards to be used are similar to the Kalum Forest District standards, as outlined in table 17.

Table 17: Log Utilization Standards

Utilization Standard	Commercial Species	Cottonwood
Minimum tree diameter - dbh	17.5 cm	22.5 cm
Stump height:	30.0 cm	30.0 cm
Minimum log length:	3.0 metre	3.0 metre
Minimum top diameter:	15.0 cm	15.0 cm
Minimum log volume:	50% sound fibre	50% sound fibre

These standards are used in the cruise compilations and cutting permits to ensure consistency is achieved across all levels of planning.

Cutting specifications and utilization will be provided in individual cutting permits. They may be varied by the district manager for situations such as salvage logging, selection cutting, including commercial thinning, and for deciduous species. Utilization of lumber rejects (Grade 04) to a 15.0 cm top diameter is mandatory. Discretionary utilization applies to dead and dry sawlogs (Grade 03), dead and dry lumber reject (Grade 05), undersized logs (Grade 06) and firmwood rejects.

Cutting permits specify a 15 cm top diameter and the AAC volume is based on a 10 cm top diameter, the difference in volume must be included in cut control reporting. For cut control purposes, scaling will measure to a 10 cm top. Residue surveys will measure the volume between 10 to 15 cm top remaining. The volume will be included in the AAC cut control record without any stumpage payable.

Residue Surveys

Residue surveys will be completed annually on a sample of cutting permits and logged cutblocks. A residue sampling plan will be submitted to the District Manager prior to commencement of surveys. The results will provide estimates of residue and waste for both inventory depletion and the cut control record.

Avoidable waste volumes will be reported to the District Manager by February 28 every year for inclusion in the annual cut control letter.

5.3 TRANSPORTATION NETWORK

The TFL is well roaded. The road network has been developed progressively over the past 50 years and now provides primary access to all main drainages in the TFL. More than 3200 kilometres of road and 150 major bridges have been constructed within the TFL to date.

The roads within the TFL are used extensively for a wide variety of purposes other than for logging and forestry activities. This includes access to traplines, aboriginal sustenance areas, mushroom picking, mineral exploration, camping, hunting and fishing, hiking and snowmobile trails. The Company maintains the transportation network within the context of two primary goals:

- Construct and maintain roads and crossings in a manner that minimizes the impact on the environment.
- Maintain a network that is safe to use by industrial traffic and the public.

5.3.1 Road Development

The primary function of the road network is to transport logs economically to the SCI sawmill at Terrace. Mainline roads also connect the lower Nass area with the Ginlulak log dump. Average log haul distances to Terrace for representative RPU's that range from 40 to 128 km, are provided in Table 18.

Table 18: Average log haul distance to Terrace

Resource Planning Unit	Cutting Permit	Distance (km)	Cycle Time (hr)
Kwiniak	64X	128.6	6.16
Kiteen	10B	85.5	4.83
Beaver	45H	58.2	3.93
Whitebottom	47K	40.6	3.39
Nogold	77M	61.3	4.14
Kitnayakawa	77G	64.9	4.30

Road and Bridge Construction

The majority of road construction activity over the next five years will take place in the Clore, Ishkheenickh, Kiteen, Kitnayakawa and Lower Nass RPU's where new mainline roads have been recently completed, or are near completion. Branch roads are being extended to develop side valleys or the back of drainages. On average about 90 km of operational roads and five major crossings are planned to be constructed annually.

All roads and bridges will be designed, constructed and maintained in accordance with the specifications stated in the *SCI Logging Engineering Guidelines*. Design and construction standards will meet the requirements of the *Forest Road Regulation*.

5.3.2 Maintenance

Maintenance of the TFL road network is essential to permit the safe operation of logging trucks and light industrial traffic, and to provide unfettered public access to crown land. A regular road maintenance and bridge/crossing inspection program is carried out for all active roads within the TFL. The results are used to develop annual road and bridge maintenance schedules.

Regular maintenance includes the grading of road surfaces, clearing ditches and cleaning and replacing culverts to ensure adequate water flow, inspecting and maintaining bridge crossings, removing slide and slough material, brushing and stabilising road banks and grass seeding, snow plowing and sanding, spot gravelling, sign maintenance, dust control, and minor flood and storm damage. Frequency of grading is dependent on the usage and the condition of the road surface. All mainlines will be maintained to a hauling standard and main branch roads to pickup access standard.

SCI is committed to the regular and periodic maintenance of all active mainline road systems within the TFL. All other roads will be deactivated when activities cease in the area.

A road maintenance plan is included with each update of the forest development plan. It identifies the maintenance activities to be carried out for the first year of the plan. Maintenance usually falls into one of the following categories: surface maintenance, structural maintenance and bridge and stream culvert replacements.

Maintenance Costs

Public access and road usage is free and at their own risk. Industrial users of the road network will be charged a road use fee to recover some portion of the maintenance costs. This fee is usually negotiated annually with each user. Charges are determined by prorating total maintenance costs by the relative volume of wood being hauled by the user. For example, if the SBFEP uses a road maintained by SCI for log hauling, a prorated road use fee will be charged to the small business licensee on the basis of the amount of volume hauled.

5.3.3 Deactivation

When roads are no longer required for harvesting or silviculture, they will be deactivated in accordance with the Code and the *Forest Road Regulation*. Deactivation activities include installing water-bars, cross ditches, removing culverts and unsafe bridges, ripping landings and grass seeding. In many cases, depending on the level of deactivation, roads will become impassable or passable only by four-wheel drive vehicles.

Deactivation work falls into three categories:

Temporary Deactivation is used for roads whose regular maintenance is to be suspended for up to three years. This is mainly water control in areas of sensitive and steep terrain or heavy rainfall. Waterbars and cross ditches to assist existing culverts, wherever necessary, and ensures that ditchlines, culvert inlets and outlets are functioning properly. Field inspection of road drainage structures will be conducted after major storms, during spring break-up, and prior to fall rains.

Semi-Permanent Deactivation is used for roads that are located in particularly isolated areas where there is a potential for landslides and regular maintenance is to be suspended for up to three years, or roads that will not be used until the next pass. Deactivation activities consist of removal of drainage structures at risk of failure, stabilization of cut/fill slopes, which if they failed, would result in significant environmental damage, and other activities as stated under temporary deactivation. Field inspections should be carried out, particularly after major storm events or after heavy usage by vehicles, to assess the adequacy of the deactivation works or repair any problem areas.

Permanent Deactivation is used for roads that are to be closed permanently. This can include works as mentioned for temporary and semi-permanent deactivation, as well as pullback of significant fill or cut slope material, removal of major stream crossings, including abutment removal and backsloping of approaches. Other functions could include full rehabilitation of road surfaces, recontouring to original sideslopes, and the establishment of new vegetation (e.g., hydroseed, plant seedlings) on the rehabilitated site.

Detailed plans for road deactivation plan are included in the forest development plan and will be updated annually. It identifies the specific road deactivation activities to be carried out in the first three years of the plan. Road deactivation proposals will be reviewed with the MoF and as needed with MELP

5.3.4 Access Management

SCI has an open road policy with respect to public use of the road network. The roads within the TFL and that of the adjoining forest licence operations are open throughout the year with only limited restrictions. This provides the public with broad scope to pursue and enjoy their recreation activities within the area. The public may use the logging roads at their own risk and are encouraged to avoid roads being actively used by logging trucks or to limit their use of such roads during working hours.

There are some limited access restrictions that may apply in certain circumstances, particularly during periods of high fire hazard. When such circumstances occur, it is the responsibility of the Ministry of Forests to notify the public of any road or general forest closure. This is usually done through announcements in the local newspaper and on the radio station. Situations for closure or restrictions are described as follows:

Fire Season

During fire season, depending on the fire hazard rating, partial or total road closures may be applied. Any decision to close roads will be made in consultation with the District Manager for the Kalum Forest District. The public will be advised of road closures by announcements on local radio stations and newspaper advertisements.

Active Logging

Some temporary access restrictions may be necessary for road maintenance and bridge repairs, and to protect contractors' logging equipment. Access will be restricted by the placement of gates on roads close to the active operations. The gates will be locked after working hours and on weekends.



Gate keys will be available for the public upon request at the company's woodlands office in Terrace.

Hunting Access

The only vehicle restriction in the BC Hunting Regulation that applies within TFL 1 prohibits the use of snowmobiles to transport hunters or wildlife in MU 15 from April 15 to December 15. BC Environment has not required additional access restrictions. However there remains a possibility that future revisions to the Hunting Regulations may include some constraints on the kind of access used by hunters within the TFL.

Public Safety

During working hours Monday to Friday, as a safety precaution, the public are advised when travelling on active logging roads to follow a radio-equipped vehicle. Alternatively, the roads should be used during weekends or public holidays.

5.4 SILVICULTURE

The purpose of the silviculture program is to effectively regenerate cutblocks so that all sites are continually growing a crop of trees. Silviculture activities will be carried out to ensure that all harvested areas, and areas denuded by wildfire and pests are reforested with ecologically acceptable species. Forests will be tended to maintain growth rates and improve timber quality.

During the past several years, SCI has been successful in reforesting the area of backlog NSR. SCI's records show approximately 196 hectares of NSR backlog effective the end of June, 1998. Consequently, the basic silviculture program will concentrate on prompt reforestation of recently logged cutblocks, and effective tending of established plantations and regeneration until they are free growing.

The following strategies will be applied to manage the backlog NSR during the term of this plan:

- Plant all good to medium NSR sites by the year 2000. Investment in planting backlog sites found to be NSR after the year 2000 will be based on potential risk and expected return.
- Brush all backlog sites where necessary to ensure free-growing conditions are achieved as early as possible.
- Develop necessary files (including backlog SP's) for record keeping and database support planning.

5.4.1 Basic Silviculture

Basic silviculture refers to treatments required after harvesting to regenerate a new crop of trees, and ultimately achieve free growing status. Costs associated with basic silviculture for blocks harvested after October, 1987 are borne by SCI, while costs for cutblocks harvested prior to that date are borne by Forest Renewal BC. Basic silviculture will be carried out in accordance with the *Silviculture Practices Regulation*, while planning for silviculture will comply with the requirements of the *Operational Planning Regulation*.

The objectives of the basic silviculture program are:

- To balance harvesting and reforestation so that the area reforested each year either by planting or recruitment of natural regeneration would be equivalent to the area harvested each year.
- To ensure that on average all cutblocks are reforested within *three* years after the completion of harvesting. This will be achieved through a combination of artificial and natural regeneration.
- To ensure that regeneration and free growing target dates are met.

Stocking Standards

Standards for basic silviculture are generally consistent with Ministry of Forests' stocking standards and the *Establishment to Free Growing Guidebook, Prince Rupert Forest Region (1995)*. Variances from these stocking standards are approved on a site specific basis by the district manager for each SP. Projected basic silviculture program goals for the management plan (1999-2003) are provided in Table 19. These are updated every year and the revised projections will be provided in the forest development plan.

Table 19: Basic Silviculture Program Goals (hectares)

ACTIVITY	1999		2000		2001		2002		2003	
	SCI	FRBC ¹	SCI	FRBC ¹	SCI	FRBC ¹	SCI	FRBC ¹	SCI	FRBC ¹
Assessments										
Silviculture Prescriptions	1450	60	1450	60	1450	60	1450	60	1450	60
Survival/Regeneration	2000	200	2000	100	2000	100	2000	100	2000	100
Intermediate	1000	500	1000	400	1000	400	1000	400	1000	400
Free Growing	600	1500	900	1200	1200	1000	1200	1000	1200	1000
Site Preparation										
Mechanical	60	0	70	0	70	0	70	0	70	0
Burning	-	-	-	-	-	-	-	-	-	-
Stand Establishment										
Planting	1000	100	1050	0	1100	0	1100	0	1100	0
Brushing ²	500	300	550	200	600	100	600	100	600	100

¹ Indicates FRBC funding responsibility (previously funded by MoF-pre 1987)

² Includes conifer release

The achievements of the basic silviculture program will be outlined each year in the annual report. SCI will also report progress on the completion of silviculture activities to the Ministry of Forests by filing Major Licence Silviculture Information System (MLSIS) reports semi-annually.

5.4.1.1 Conifer Stand Establishment

Accurate ecological site classification at the silviculture prescription stage forms the basis for the stand regeneration on TFL 1. Prompt reforestation of cutover areas with ecologically appropriate species is ensured through a combination of artificial restocking and /or natural regeneration.

Natural regeneration is prescribed on treatment units where potential vegetation competition is low, an adequate seed source exists and/or sufficient advanced regeneration is expected to remain following harvesting. A regeneration survey is carried out no later than three growing seasons following harvesting and if necessary, fill planting is carried out to meet target stocking levels.

On sites where significant vegetation competition is expected, planting at target levels is carried out within two growing seasons after harvest (usually the following season). Sites that exhibit low potential for competition from vegetation but are expected to require planting are planted at target levels within 2-3 growing seasons from harvesting.

5.4.1.2 Mixedwood/Hardwood Stand Establishment

Mixedwood and/or hardwood management strategies may be chosen over softwood management strategies on ecologically suitable sites.

The hardwood management strategy is aimed at growing black cottonwood sawlogs on a 25 year rotation. At this age, and based on the specific site and target stocking standards listed below, a stand yielding approximately 250 m³/ha, of average diameter 30-35cm is achievable (interpreted *loosely* from Bunce, 1990 in *Black Cottonwood Manager's Handbook for BC*, McLennan, 1995). A minor component of Red alder is acceptable (less than 25 %) and is countable during surveys as an 'preferred' tree. Other hardwood species such as aspen and birch may be acceptable if identified in an approved prescription.

The site series considered to be suitable for hardwood management are: CWHws1,2/07,08; ICHmc1/05; ICHmc2/06. Hardwood stocking standards for recently harvested sites are shown in Table 20 below per the *Establishment to Free Growing Guidebook for the Prince Rupert Region* (1995):

Table 20: Hardwood Stocking Standards for Recently Harvested Sites

BGC subzone	Site Series	Species	Target Stocking*	Minimum Stocking*	RD (yrs)	FG (yrs) early / late
CWH ws1,2	07,08	Act	700	400	3	5 / 8
ICH mc1	05	Act	2000	1200	4	9/12
ICH mc2	06	Act	2000	1200	4	9/12

* 'Preferred and acceptable' species

On backlog sites, prior to 1987, acceptable hardwood species include those identified for the appropriate sites in the *Guidelines for Tree Species Selection and Stocking Standards for B.C., July 1993*. Minimum stocking standards for established backlog stands are 60% of the minimum broad-leaf standards for corresponding sites in the *Establishment to Free Growing Guidebook*.

For established mixedwood stands (e.g., virtually all rehabilitated backlog sites) composed of acceptable hardwood and softwood species (as above), survey and classification procedures shall be consistent with approved Ministry of Forests procedures outlined in, but not limited to, the *Establishment to Free Growing Guidebook*.

5.4.1.3 Site Preparation

The objective of site preparation is to break up slash accumulations, remove competing vegetation, improve soil growing conditions, and prepare sufficient numbers of suitable microsites for the establishment of ecologically suitable species. Generally most cutblocks on the TFL are planted without the need for site preparation.

Site preparation is normally prescribed on those sites where slash accumulations may impede reforestation to target stocking levels, or where soil or environmental conditions would significantly limit seedling survival and growth without treatment, e.g., thick duff layer, or high elevation, cold soils. The primary site preparation treatment consists of mechanical spot scarification or mounding using tracked-excavators.

Site preparation is rarely required to remove competing vegetation since recently logged cutblocks are promptly regenerated and most backlog areas have been rehabilitated. Broadcast burning is seldom used now as a site preparation tool since experience demonstrates it is very difficult to obtain the climatic conditions required to achieve the desired burning objectives. In general, it is possible to locate sufficient numbers of plantable spots on most cutblocks without site preparation.

5.4.1.4 Reforestation Methods

Both natural and artificial regeneration is relied upon to regenerate logged cutblocks. Natural regeneration is prolific in the coastal western hemlock (CWH) zone. As a general strategy, natural regeneration will be the preferred reforestation technique where an existing seed source is present and vegetation competition will not pose a problem. Fill planting may be necessary to ensure that the stocking standards are achieved.

Normally, planting is carried out from May to June at low elevations and late June at higher elevations. An estimated three million conifer seedlings will be planted during this five year period. The distribution of species to be planted is approximately: amabilis fir 30%, Western hemlock 30%, lodgepole pine 15%, Western red cedar 10%, spruce 10%, and subalpine fir 5%.

The selection of species for stand establishment is based on the three important criteria for future crops (Klinka & Feller, 1984):

- Maximum sustainable productivity;
- Crop reliability (resistance to a natural damaging agents), and
- Silvicultural feasibility (feasibility of treatment regime necessary to manage species).

The preferred species combinations listed in Table 21 have been selected to meet these objectives. **This list is intended as a guide**, and site specific conditions (e.g. frost, pests, and topographical aspect) may warrant variances. Other species may be planted, if prescribed in an approved silviculture prescription. Species are listed in order of priority, and bracketed species are intended to be a minor component only (less than ~20 % each).

Table 21: Species Combinations for Stand Establishment

Subzone and Site Series	Preferred Species Combinations	Comments
CWH ws1 02, 03	PI (Hw, Cw)	PI dominant, Hw evenly interspersed
CWH ws1 01	Ba, Hw (Cw, Sxs)	Ba, Hw alternating, Cw, Sxs interspersed
CWH ws1 04, 05, 06, 07	Ba (Cw, Sxs, Hw)	PI acceptable on 04 sites (frost)
CWH ws1 07, 08	Act (Dr ³)	Hardwood management
CWH ws1 11	Cw (Sx, Ba, Hw)	Alternating (elevated microsites)
CWH ws2 02, 03	Hw (Cw ¹)	
CWH ws2 01, 04-07	Ba (Hw, Sxs, Bl ² , Cw ¹)	
CWH ws2 11	Cw ¹ (Sxs, Ba, Hw)	
*ICH mc1 01, 03	PI, Hw (Sx, Bl)	PI dominant, Hw alternating
ICH mc1 02	PI (Hw, Bl)	PI dominant, Hw, Bl interspersed
ICH mc1 04	Bl, PI, Hw (Sx)	Bl or PI dominant in frost pockets
ICH mc1 05	Bl (Sx, PI)	Bl dominant, others interspersed
ICH mc1 06	Bl, Sx (Hw)	Bl dominant, others interspersed
ICH mc2 02	PI (Hw, Bl)	PI dominant
ICH mc2 01, 03	PI, Hw (Bl, Cw, Sx)	PI dominant, Hw alternating
ICH mc2 04, 05, 06	Bl, PI, Cw (Sx, Hw)	Bl or PI alternating, others interspersed
ICH mc2 07	Bl, Cw, Sx, (Hw, PI)	
MH mm 1/2: 01, 03, 04, 07	Ba (Hm, Yc)	
MH mm 1/2: 02,06	Hm (Ba, Yc)	
MH mm 1/2: 08,09	Hm (Yc)	

¹ Cw on lower elevation, south or southwest aspects.

² Bl where cold air ponding is a concern.

³ Dr acceptable as a minor component in post-1987 plantations, or as a major component in pre-1987 ('backlog') stands

⁴ Substitute Ba for Bl in ICHmc1a

Stock Types

Conifer seedlings are grown in British Columbia for the Company under contract by private nurseries. Seedling and stock type orders are determined by summarizing the prescribed size, type and seedling species from silviculture prescriptions for each cutblock. The most commonly prescribed stock types for specific planting sites are summarized in the following table:

Table 22: Commonly Prescribed Stock Types

Site Type	Stock Type
Dry, rocky sites	1-0 310
Moderate-high brush hazard sites and "backlog" fill plants	1-0 415 (Hw, Cw, Sx), or 2-0 415 (Ba, Bl) or 1+1 PBR transplants (Hw, Cw, Sx, Ba)
Low brush hazard sites and "current" fill plants	1-0 410B (Hw, Cw, Sx, Pl, Ba, Bl) or 2-0 410B (Ba, Bl)
Cottonwood sites	1m whips (prepared sites) or 2m whips (fill-plants)

Seed Supply

SCI's goal is to collect and maintain a sufficient seed supply for each species to supply the projected seedling requirements for a 5-7 year period. This approach will provide a sufficient seed inventory to cover characteristic variations in cone crop production. Depending on the species, cone periodicity varies from two to eight years.

The seed supply will continue to come from cone collections made from wild or natural stands, as genetically improved seed is not available from seed orchards. Cones are collected from trees that exhibit the best phenotypic quality within a stand. Various collection techniques are used, including helicopter cone rake and helicopter snipping. The Coastal Tree Improvement Council co-ordinates the program to establish and operate coastal seed orchards for producing genetically improved seed. As yet no plans have been made to establish a seed orchard to supply improved conifer seed for the seed zones and species that apply to the TFL.

Table 23 shows that the Company's seed inventory as of April 1998 is equivalent to approximately 13.6 million seedlings. In the fall of 1998, approximately 60 hectolitres of Ba cones were collected to address the shortage of balsam seed supply.

Table 23: Seed Inventory

SKEENA CELLULOSE SEED REGISTRY April 1998							
BEC Zone	Species	Seedlot	Location	Elevation (m)	BEC Subzone	Germ %	Potential Seedlings (000s)
ICH	Hw	39599	Dragon Lk.	220	mc2	92	678
	Hw	34965	Lava Lk.	500	mc2	85	179
	Hw	35564	Seaskinnish Ck.	350	mc2	68	549
	Bl	39591	Meziadin Lk.	500	vc	78	239
	Cw	34962	Lava Lk.	500	mc2	81	720
	Pl	32614	Sideslip Lk.	225	mc1	89	963
CWH	Hw	34964	Lava Lk.	750	ws2	83	290
	Hw	3919	Lost Lk.	225	ws1	84	2
	Hw	35575	Exstew R.	100	ws1	71	40
	Hw	43073	Exstew R.	100	ws1	89	221
	Hw	47417	Eskers	300	ws1	88	1,190
	Hm	4865	Mayo Ck.	683	ws2	87	108
	Cw	4857	S. Kalum	214	ws1	67	409
	Cw	34957	Douglas Ck.	500	ws1	80	156
	Cw	34961	Lava Lk.	750	ws2	88	590
	Cw	47457	Eskers	200	ws1	81	721
	Ba	32609	Amesbury	200	ws1	45	47
	Ba	35000	Douglas Ck.	700	ws2	27	101
	Ba	32615	Coldwater Ck.	700	ws2	37	6
	Ba	35561	Legate Ck.	775	ws2	81	108
	Ba	35567	Legate Ck.	925	ws2	84	187
	Ba	36022	Legate Ck.	775	ws2	70	58
	Ba	36024	Legate Ck.	675	ws2	70	5
	Ba	36025	Legate Ck.	925	ws2	78	258
	Ba	47454	Eskers	150	ws1	79	129
	Plc	28841	Rosswood	120	ws1	68	97
	Plc	34981	Douglas Ck.	200	ws1	88	175
	Plc	34993	Douglas Ck.	350	ws1	90	573
	Ss	34992	Oliver Ck.	150	ws1/mc2	99	438
	Sxs	35646	Legate Ck.	500	ws1/2/mc2	86	2
	Ss	36026	Oliver Ck.	150	ws1/mc2	97	554
	Sx	45352	Douglas Ck.	450	ws1	98	1,609
	Sx	45353	Douglas Ck.	800	ws2	97	2,082
	Ds	43083	Thornhill	85	ws1	56	91
	Ds	43087	Goat Ck.	400	ws1	79	80
TOTAL							13,655

SCI will continue to make cone collections to meet the Company goal for a 5-7 year seed inventory. In any given year, the species collected will depend on the supply needs and the size of the cone crop developed by the individual conifer species that year.

5.4.1.5 Silviculture Surveys

Silviculture surveys of all regenerating cutblocks are performed to monitor progress towards achieving free growing status. Information collected includes species, total and well-spaced numbers of seedlings, distribution, competing vegetation and qualitative remarks pertaining to forest. Survey results are used to prescribe follow-up silvicultural or pest management treatments as necessary.

The maximum period between assessments in stands that have not reached free growing is normally 5 years, except in rare circumstances where access is restricted. Types of silviculture surveys scheduled for each regenerating cutblock is described in the following matrix.

Table 24: Silviculture Survey Matrix

Survey	Sites	Intensity	Timing
Post Logging Assessment	All units prescribed for site preparation (e.g. high slash loading).	Thorough walk-through.	Season after harvesting.
Plantability	All sites scheduled for planting.	1 plot per ha.	<u>Brush hazard sites</u> : scheduled no longer than one growing season following harvest. <u>Other sites</u> : scheduled 1-2 growing seasons after harvest.
Survival	All planted sites.	1 plot per ha.	2 growing seasons after planting.
Regen/Stocking	All sites prescribed for natural regen.	1 plot per ha.	3 (low elev.) to 4 (high elev.) growing seasons after harvest.
Brushing	Moderate-high brush hazard sites.	Minimum 5 plots per stratum.	Scheduled as necessary after survival / regen survey.
Free Growing	All sites.	Minimum 5 plots per stratum.	Between earliest and latest assessment dates in SP.

It is possible to conduct many of the above surveys concurrently in the interest of both efficiency and cost effectiveness (e.g., regen/plantability and survival/brushing). Survey methodology follows the *Silviculture Surveys Guidebook*. More than one free growing survey may be necessary if competing vegetation is still growing vigorously during an early free growing assessment. Audits of all surveys are carried out each year to ensure consistency and to assist in improving standards and procedures.

5.4.1.6 Vegetation Management

The purpose of vegetation management is to control the growth of woody and herbaceous vegetation that is competing with crop trees. Brushing may be necessary to ensure that new plantations achieve the specified free growing stocking standards.

Brushing and weeding treatments are employed, where necessary, to ensure that regenerated stands can grow free of detrimental brush competition. The need for brushing treatment is determined by assessing both *site quality* during preparation of the silviculture prescription, and *seedling performance* as measured in silviculture surveys. Once an area has been identified as a candidate for brushing, a brushing survey is carried out to provide data on competing species so that the preferred treatment can be prescribed.

On sites where brush competition is considered detrimental to seedling survival or growth performance, manual methods of vegetation control are normally prescribed, as opposed to herbicides, provided such treatments can be carried out safely and at a reasonable cost. Herbicides have not been applied in the past decade due to public opposition. Manual treatments will continue to be favoured as long as they remain reasonably cost effective.

The most commonly used techniques are motor-manual (brush saws, chain saws) and manual (grass whips or similar). Where possible, site preparation and/or planting of large stock types are scheduled to mitigate detrimental competition and reduce the likelihood that a brushing treatment will be required. Effort is made during treatment to retain vegetation not considered detrimental to crop trees. Diversity of vegetation ensures, among other things, that a source of forage and cover for wildlife remains following treatment. The benefits of retaining deciduous species in riparian areas as preferred habitat and browse for wildlife, particularly bears, moose and birds, and as shade for fish streams is recognized. Brushing treatments are scheduled in these areas only if brushing surveys indicate that minimum stocking targets will not be met without treatment.

A vegetation management trial was established in 1995 on the TFL to better predict vegetation development and successional patterns on different sites, and monitor the efficacy of manual treatments. Monitoring of this trial continues annually and preliminary results are expected by the year 2000.

5.4.2 Enhanced Silviculture

Enhanced silviculture is any stand level treatment that will maintain or increase future stand value. Potential treatments on the TFL include pre-commercial thinning, pruning, fertilization and commercial thinning. These treatments are in addition to the basic silviculture program and are not a mandatory requirement of the *Silviculture Practices Regulation* (except for post April 1, 1994 regenerated stands with more than 10,000 stems per hectare at free growing, for which juvenile spacing is considered a basic activity). Incremental silviculture treatments are conditional upon Forest Renewal BC funding.

Stand tending has been an integral part of the silviculture program on TFL 1 ^{space} for two decades. More than 10,000 ha of young stands have been thinned since the early 1980's, and more than 600 ha pruned. All of these silviculture treatments are labour intensive, and as such provide the secondary benefit of job creation for local silviculture workers.

Table 25: Enhanced Silviculture Program Goals (hectares)

ACTIVITY	1999		2000		2001		2002		2003	
	SCI	FRBC	SCI	FRBC	SCI	FRBC	SCI	FRBC	SCI	FRBC
Stand Tending										
Pre-commercial thinning	-	1150	-	1150	-	1150	-	1150	-	1150
Pruning	-	100	-	100	-	100	-	100	-	100
Fertilization	-	-	-	-	-	-	-	-	-	-
Commercial Thinning	150	-	150	-	250	-	300	-	300	-

The primary objectives of the enhanced silviculture program are to:

- Improve the size and quality of timber harvested.
- Increase the availability of incremental fibre through commercial thinning.
- Maximize site productivity potential.

Stand condition, site productivity, geographic location and slope positions are some of the major factors that will be considered in the identification of candidate stands. Treatments will only be undertaken on good and medium productivity sites. No incremental silviculture treatments will be prescribed for poor productivity sites.

More specifically, the objectives of SCI's enhanced silviculture program are as follows:

- To produce 35-40 cm dbh sawlogs within the shortest time possible
- To increase total merchantable stand volume, including recoverable thinnings, above non-treated stands.
- To produce higher quality clear wood on select sites ($SI \geq 25$ m)
- To meet stand level biodiversity objectives identified in higher level plans.
- To maintain healthy, vibrant second-growth forests.

5.4.2.1 Pre-Commercial Thinning

Density control of young, excessively-stocked stands is scheduled, where necessary, to release suppressed stands from competition, meet specific product quality objectives, and provide future opportunities for commercial thinning.

A detailed stand tending plan for TFL 1 has guided activities since the early 1990's. This plan outlines forest level, stand level, and employment objectives, and details the expected treatment benefits. Growth models such as TASS and SPS (1990) have been used to help develop optimal treatment regimes. Regimes are based on the guiding principle of producing value without compromising volume. They are designed to provide sufficient growing space for crop trees while leaving enough stems to allow for future commercial thinning.

Stands will be assessed for pre-commercial thinning once they have reached sufficient age and height. Selection will be based on site index, height and density, i.e., the number of competing stems per hectare. Candidate stands should possess average or better productivity and be exhibiting competition for growing space that would benefit from spacing. Pre-stand tending surveys are completed for candidate areas. Treatment will only be prescribed for stands that have a low incidence of insect, mammal or pathogen damage.

Stand management prescriptions will be prepared for treatment for the selected stands. This includes the proposed pre-commercial thinning, pruning and/or fertilization treatments. The MoF publication *Guidelines for Maintaining Biodiversity during Juvenile Spacing* is used as a guide for the retention of specific wildlife habitat features.

Western hemlock or amabilis fir leading stands with a pre-treatment density of approximately 3,500-10,000 stems per hectare on medium or better sites (e.g., SI > ~20m) are identified as high priority for enhanced treatment.

Stands will be thinned to the target stocking levels summarized in Table 26:

Table 26: Pre-commercial Thinning Stocking Levels

Stand Type	Potential Harvest Method	Age	Stocking (sph)	
			Pre	Post
Hw or Ba > SI 20 m	Ground Based	<25	3500-10000	1200
		>25	3500-10000	1000
	Cable Systems	<25	3500-10000	1000
		>25	3500-10000	800
Hw or Ba > SI 20m	No CT or Pruning Scheduled	All	3500-10000	800

5.4.2.2 Pruning

Low pruning of regenerated stands on TFL 1 was initially undertaken in 1987. Since then, more than 600 ha have been pruned. To produce higher quality clear wood on select sites (SI = 25m or better), pruning of hemlock/amabilis fir stands is scheduled. First-lift pruning to a height of 3-4 m is normally scheduled when stand height averages 6-8m, and second-lift pruning (up to 6m) is scheduled when stand height averages 10-12m. Stands are selected and prioritized in accordance with the *Pruning Guidebook (1995)*. Wood quality objectives and a detailed treatment schedule are incorporated in the TFL 1 stand tending plan, which is updated annually. An on-going pruning program is dependent on funding from Forest Renewal BC.

5.4.2.3 Fertilization

Fertilizer treatments may be prescribed to increase growth rates and produce merchantable-sized stands sooner. Screening trials established by SCI and the Ministry of Forests on TFL 1 have shown promising results in young stands, particularly amabilis fir leading stands. A 10 ha fertilization trial, established in 1996, will continue to be monitored to assist in better predicting the potential benefit of this treatment. If results of this trial are favourable, and Forest Renewal BC funding permits, operational fertilization will likely be scheduled in conjunction with other enhanced silviculture treatments.

5.4.2.4 Commercial Thinning

Commercial thinning is normally prescribed to produce sawlogs on shorter rotations and increase total stand merchantable volume by recovering mortality that would not otherwise be harvested. More specifically, low thinning will be prescribed in select stands to concentrate stand growth on fewer, more desirable stems, leading to greater piece size and value per stem; increase stand vigour, and increase harvestable volume through better utilization. Commercial thinning is now an integral part of SCI's harvesting program, with over 25,000 m³ harvested from 220 ha since 1994 on the TFL. Commercial thinning harvest volumes are scheduled to increase from approximately 15,000 m³ in 1998 to more than 50,000 m³ in 2005, depending on market conditions.

Stands will be selected for either ground-based or cable thinning on the basis of favourable slopes and terrain. Stands should be of above average site productivity (e.g., SI > 20m). The basic prescription will involve thinning from below to remove from 30% to 50% of the basal area, and approximately 100 to 150 m³/ha. Minimum diameters at breast height and target post-treatment stocking levels will be used as part of the criteria to select trees for removal. This approach will essentially salvage subdominant trees that would otherwise succumb to competition before the final harvest, plus a small percentage of co-dominant trees.

SCI is continuing to assess the second-growth potential for commercial thinning on TFL 1. During the term of MP 9, the Company will establish regimes for commercial thinning of second-growth stands on TFL 1 to ensure the best end product results for supplying the present and future needs of its manufacturing facilities.

Based on estimates from an inventory search of medium or better conifer leading sites, more than 25,000 ha have the potential for commercial thinning on TFL 1 over the next three decades.

Growth models and local experience support the concept that commercial thinnings in immature stands can provide a significant, sustainable source of fibre to augment the Company's current log profile harvest, and thereby help to maintain or increase future harvest levels.

5.4.2.5 Monitoring

A considerable number of permanent sample plots (PSP) have been established in treated and unmanaged stands on TFL 1 since 1960, with most established since 1990. Plots have been established in most sites and for the major species in the CWHws1 and ICHmc1/2 subzones, although some gaps still remain.

Further establishment has been postponed while an acceptable protocol for establishing PSPs in *treated* stands is developed by the Ministry of Forests. Plot establishment will ensure an adequate number of all species groups and treatment regimes are represented.

5.5 FOREST HEALTH

5.5.1 Status

Diseases and pests that are most active on TFL 1 are Western hemlock dwarf mistletoe, *Arceuthobium tsugense*, white pine terminal weevil, *Pissodes strobi*, and small mammals. Both Western hemlock dwarf mistletoe and white pine terminal weevil are having an influence on regeneration and stand management strategies employed for the TFL. In the past 10 years damage from porcupines, snowshoe hares and voles in regenerated stands and new plantations has become significant. Dealing with this problem has been the focus of most of the Company's control efforts.

Although *Rhizina undulatum* has caused some plantation mortality from time to time, it is not considered a serious threat. Its occurrence has been isolated since broadcast burning is rarely practised. Other endemic diseases that lower log quality and predispose trees to blowdown include several root rots: *Heterobasidion assosum*, *Armillaria ostoyae* and *Inonotus tomentosus*. However, none of these are considered to be a significant problem.

Similarly, the presence of insects such as Western hemlock looper, *Lambdina fiscellaria*, spruce budworm, *Choristoneura spp.* and black army cutworm, *Actebia fennica* have occasionally been identified in plantations on the TFL but have not been a forest health issue. Although mountain pine beetle and spruce bark beetle have caused heavy mortality in lodgepole pine and spruce stands in the lower Nass area in the past decade, populations have collapsed to endemic levels and activity is no longer a concern.

The forest health program is based on the detection and control of known pests considered to be significant on the licence area as listed in table 27.

Table 27: Significant Pests and Damaging Agents on TFL 1

Category	Pest		Main Risk Species
	Common Name	Scientific Name	
Insects			
Tissue feeders	White pine weevil	<i>Pissodes strobi</i>	Ss, Sb, Sx, Sxs
	Warren's root collar weevil	<i>Hylobius warreni</i>	PI
Defoliators	Western hemlock looper	<i>Lambdina fiscellaria</i>	Hw, Cw, Ss
	Western blackheaded budworm	<i>Acleris gloverana</i>	Hw, Ba, BI
	Spruce budworm	<i>Chroistoneura spp.</i>	Ba, BI, Sxs
	Black army cutworm	<i>Actebia fennica</i>	Sxs, PI, Ba, BI
Bark Beetles	Spruce bark beetle	<i>Dendroctonus rufipennis</i>	Ss, Sb, Sx, Sxs
	Mountain pine beetle	<i>Dendroctonus ponderosae</i>	PI
Diseases			
Branch, stem and broom rusts	Comandra blister rust	<i>Cronartium comandrae</i>	PI
	Stalactiform blister rust	<i>Cronartium coleosporioides</i>	PI
	Spruce broom rust	<i>Chrysomyxa arctostaphyli</i>	Sb, Sx, Sxs
	Fir broom rust	<i>Melampsorella caryophyllacearum</i>	Ba, BI
Stem cankers	Atropellis canker	<i>Atropellis piniphila</i>	PI
Mistletoes	Hw dwarf mistletoe	<i>Arceuthobium tsugense</i>	Hw
	PI dwarf mistletoe	<i>Arceuthobium americanum</i>	PI
Root diseases	Annosus root disease	<i>Heterobasidion annosum</i>	Sxs, Hw, Ba, Cw
	Tomentosus root disease	<i>Inonotus tomentosus</i>	Sxs, PI, Hw, Ba, BI
	Rhizina root disease	<i>Rhizina undulata</i>	Sxs, PI, Ba, BI, Cw
Mammals			
	Porcupine	<i>Erithizon dorsatum</i>	Sxs, Hw, PI
	Voles	<i>Microtus pennsylvanicus</i>	Sxs, Ba, BI, Hw, Cw, PI, Act
	Snowshoe hares	<i>Lepus americanus</i>	PI, Sxs
	Moose	<i>Alces alces</i>	Ba, BI, Cw,

In keeping with the forest health management objectives, SCI will maintain a program to protect and enhance the short and long term productivity of the TFL. A pro-active strategy will be adopted for detection and control of pests and diseases. This program will deal with activities and harvesting of second growth and mature stands, as well as regenerated stands. The forest development plan will include an update on the forest health status, and detail control measures that may be required.

5.5.2 Detection

The occurrence of insects and disease and their level of impact on forest resources are monitored each year. SCI co-operates with the Ministry of Forests to conduct surveys and receive information on pest occurrence specific to the company's operating areas. The forest insect and disease surveys (FIDS) program is no longer carried out by Forestry Canada and therefore, FIDS reports are no longer available to the Company. The extensive TFL road network enables the monitoring of pest activity from the ground. By using the results from reconnaissance flights in conjunction with ground confirmation, the Company is able to monitor new and potential infestations.

Information on pest incidence is noted when field data is collected for the preparation of silviculture and stand management prescriptions. For regenerated stands, forest health status is also monitored by silviculture surveys. Pest activity is one of the attributes noted on the survey cards. Survey methodology includes the collection of information regarding the forest health status of cutblocks.

To ensure that damaging pest, insect and disease activity is detected early, the following strategies are employed:

- All blowdown will be reported promptly to the forestry manager.
- Close annual monitoring will be done on areas with known pest, insect or disease problems and the results will be used to prepare actions plans and control treatments.
- Initial reconnaissance of proposed cutblocks will include data collection on present and potential pest activity; this information will be used in preparing silviculture prescriptions and harvesting plans.

- Surveys of affected areas will be carried out for use in preparing control plans, silviculture and stand management prescriptions; more intensive detailed ground surveys and transect lines will be used where necessary to assess small mammal populations and occurrences of insects and disease.

5.5.3 Prevention and Control

In general, it is not possible to eradicate pest and diseases from the forest. Rather, pest management strategies are more realistically designed to maintain incidence at endemic levels by preventing conditions that favour disease build-up and spread. These strategies include:

- Practising known biological control techniques
- Reforestation with ecologically suited species mixtures for the site.
- Sanitation spacing and density control in managed stands.
- Acquiring and maintaining knowledge regarding pest control technology, and applying new techniques as appropriate.

Pest control action plans will be drawn up in response to high pest populations or infestations. SCI will conduct a salvage program to harvest stands damaged by insects, disease or windthrow. First priority will be given to blowdown patches or other areas where volume loss is imminent. To effectively recover volume from damaged stands, prompt approval by the Ministry of Forests is required for salvage cutting permits applications.

Detailed control strategies for specific pests are described below.

Western Hemlock Dwarf Mistletoe

Western hemlock dwarf mistletoe is endemic throughout the TFL. Management strategies focus on limiting the spread of this disease to regeneration and second growth stands after harvesting. SCI practices block sanitation, or the knockdown of all mistletoe infected overstorey stems during logging. In addition, treatments such as juvenile spacing and commercial thinning target infected trees for removal. Infected trees are often girdled to create future wildlife trees. The potential impact of dwarf mistletoe on future plantations is also lessened by planting an ecologically suitable mixture of species.

White Pine Terminal Weevil

White pine terminal weevil has been a significant pest in spruce plantations established in the 1970-80s throughout the lower Nass, Kalum and Copper areas of TFL 1. These plantations have been especially prone to attack as they were established as monocultures. Although damage levels in these plantations are still being monitored through pest surveys, SCI anticipates that the threat posed by this insect will decline over time.

It is now generally accepted that lowering the percentage of spruce planted in the species mixture reduces the risk of attack in plantations. Since 1992 the strategy has been to limit planting of spruce to less than 20% of the seedling mixture planted on a cutblock. Furthermore, the retention of deciduous trees during stand tending is thought to provide overhead cover and protect spruce trees from attack.

Porcupines

Porcupines are currently one of the most significant pests in the TFL and the Kalum Forest District. Damage has been most prevalent in pole-aged stands (25-40 years old) of Western hemlock in the West Kalum Valley, lower Nass, Whitebottom and Copper River areas.

Over 30 km of transect lines and 100 temporary sample plots are in place within TFL 1. They are reassessed every 1 to 3 years to monitor damage levels. In addition, special surveys have been conducted throughout the TFL to better plan stand tending treatments. Trials to determine the relationship between stand density and stand feeding damage have also been established and continue to be monitored annually. Damage assessment surveys indicate a significant decline in porcupine activity in recent years, although most researchers who have studied this pest expect that the decline is only temporary.

Control strategies include:

- Planting tree species mixtures.
- Favouring tree species other than western hemlock during stand tending.
- Retaining previously damaged trees as “sacrifice” trees during tending.
- Avoiding the tending of stands with high levels of current feeding damage (>2%).

Snowshoe Hares

Significant damage by snowshoe hares has been occurring on rehabilitated and planted cutblocks along the Cedar River, upper Nass and upper Kalum areas since 1990. It is difficult to accurately predict damage, thus vulnerable plantations (especially lodgepole pine on rehab. units) are protected using vexar tubing. A number of trials are currently underway to assess the effectiveness of repellents (e.g., pinosylvin and weasel scent), vexar tubing, and the influence of raptor perches, on the snowshoe hare population.

Voles

The meadow vole has caused considerable damage on both current and backlog plantation sites throughout TFL 1. Substantial areas rehabilitated and planted since 1989, have been impacted by this pest, especially black cottonwood plantations in the lower Nass Valley. In this area, virtually all cottonwood plantations suffered moderate to heavy levels of damage. Control measures include cutting back damaged cottonwood stems to promote resprouting and protecting young seedlings with fine-mesh vexar tubing.

5.5.4 Non Recoverable Losses

Damage to timber caused by fire, insect, disease and other pests combine to cause losses in harvestable timber volumes. The size of the volume lost is difficult to define, although it is allowed for in empirical yield curves to some extent. Depending on the type of damage and accessibility, these losses can be both salvageable and unsalvageable. There have been no major fires since 1958 and nearly all the blowdown volume is salvaged. There have been no major losses from insect attacks. A net loss of 4500 m³/year was assumed in the timber supply analysis for this plan.

5.6 FIRE PROTECTION

SCI has an obligation to protect the forest resources of the TFL from damage or mortality caused by wildfire. Wildfire outbreaks have historically been sporadic, with the last major wildfire on the TFL occurring in 1958 following an unusually dry summer weather pattern. Six fires burnt 6,700 hectares of forest in the west Kalum and Kiteen drainages. A considerable volume of burnt timber was subsequently salvaged. During the past five years there has not been any major wildfires. Some minor spot fires caused by lightening strikes occurred, but were all extinguished quickly.



The objective of fire protection is to minimize losses from forest fires. This will be achieved in accordance with the *Forest Fire Prevention and Suppression Regulation*. The Ministry of Forests has designated a fire season from April 1 through October 30 each year. A high standard of fire preparedness and an efficient fire fighting organization will be maintained for the duration of the fire season. In general, the weather pattern over the TFL 1 is such that the fire conditions lie in the low to moderate range for most of the fire season, except for two short periods each year of high to extreme.

Prevention

The major fuel types consist of slash and residue from stand tending projects, felled timber on active logging areas, snags from previous wildfires and dry ground vegetation during periods of high or extreme fire hazard.

A reduction in fire hazard and the risk of forest fire will be achieved by actions taken to minimize the amount of woody fuel liable to catch fire. The accumulation of logging slash and woody debris at the roadside (from harvesting and silviculture projects) needs to be minimized to prevent a high build up. Snags identified as wildlife trees will be left standing, while dry woody snags will be felled, as a precaution against fires caused by lightning strikes.

Prescribed burning will be used as a fuel management tool. It will be limited to the burning of roadside slash accumulations and landing debris piles, unless the burning of logged cutblocks is recommended in a silviculture prescription.

Prescribed burning will take place only when Fire Weather Indices indicate weather conditions are right for a successful burn that will meet objectives. A burn plan for each block to be burned will be submitted to the district manager for approval and to obtain a burning permit. The plan will detail objectives, topographical features and light-up procedures. The district manager will be notified before a burn is started. Prescribed burning will take place only when the prevailing weather conditions indicate that resulting smoke will not adversely affect the ambient air quality. Any slashburning operations will follow the guidelines in the *Kalum Forest District Smoke Management Plan*.

Preparedness

A fire pre-organization combined with a Spill Response and Erosion Control Plan will be submitted to the North West Fire Control annually on April 1. To keep the plan current it will be reviewed and updated every year. The plan outlines all the action steps the company's woodlands organization will be prepared to undertake in the event of a fire. The plan covers:



- Organizing and reporting structure of all company and contract personnel in the event of a fire.
- Fire fighting equipment availability and location.
- Operating regulations during the fire season, including fire duty and standby roster, patrols and closure criteria.
- Fire detection methods, reporting and suppression of fire.
- Location of areas of operations of high-use and high risk.

Copies of the fire pre-organization plan are distributed to woodlands operations staff as well as contractors and MoF North West Fire Control. SCI will continue to train woodlands staff and contractors in fire prevention/suppression techniques.

During the fire season, as the Fire Weather Index approaches a high hazard rating, regular communication will be maintained with the North West Fire Control Duty Officer. The company obtains fire weather data from automatic weather recording stations maintained at Nass Camp and Rosswood by the Ministry of Forests and from the Environment Canada meteorological station at the Terrace-Kitimat Airport. The data is used to calculate and monitor the Fire Weather Index daily. It is also used for predicting suitable conditions for prescribed burning.

When the fire hazard reaches a moderate to high rating, fire preparedness meetings will be held weekly. The availability and status of initial attack crews are reviewed and fire tanker readiness checked.

As the fire hazard rating increases to high, forest closures and travel restrictions will be applied. Logging operations are placed on early shift on the third day of high hazard. They are shut down when the hazard reaches extreme. Ground and air fire patrols will be carried out co-operatively with North West Fire Control during periods of extreme fire hazard and after lighting storms.

Suppression

The company maintains a fire warehouse at Terrace. It holds an extensive inventory of fire tools, pumps, hoses and other fire fighting equipment. Fire tankers, trailers and pumps are stationed at the following locations:

- Nass - 3 tankers, 1 trailer and pumps.
- Terrace - 3 tankers, 1 trailer and pumps.
- Terrace woodyard - 1 tanker.
- Rosswood - 1 tanker.

All fire equipment will be maintained in good operation condition and the inventory checked regularly during the fire season. Communications and traffic related to or involved in fire suppression activity will have first priority in handling.



6.0 NON-TIMBER RESOURCE MANAGEMENT

The continuous development and management of the TFL landbase has facilitated and enhanced the use of non-timber resources. The provision of good access has enabled the growth of a variety of recreational activities enjoyed in particular by local residents. Good access has also enabled the seasonal mushroom picking trade to develop easily. The diversity of forest cover types and second growth forests created by the harvesting patterns has enabled wildlife to adapt and thrive in the new habitat created.

Although the commercial use of non-timber resources is fairly limited, maintenance of these resources is fundamental to sustaining a healthy productive forest. The strategies and direction for managing these resources is described in this chapter.

6.1 RECREATION

A wide variety of recreational opportunities are available to the public within the area of the TFL. Popular activities include, but are not limited to, fishing, camping, hunting, hiking, canoeing, and snowmobiling. The company's goal is to enable the public to pursue their recreational interests and to ensure that a broad range of recreational opportunities continue to be available:

- Provide access to recreation sites and general recreation areas.
- Keep roads open and well maintained.
- Continue to maintain existing recreation sites.

Presently the Ministry of Forests is responsible for maintaining Dragon Lake, Pine Lake and Glory Hole recreation sites. Development of any new recreation sites will be planned in co-operation with the Ministry of Forests. The recreation analysis report in Appendix IV depicts future recreation development potential. Some possible new or expanded recreation facilities are described in Table 28. Construction or upgrading of these facilities is contingent on funding from the Ministry of Forests.

Table 28: Potential Recreation Sites

LOCATION	DESCRIPTION
Sand Lake	Develop a camp site
Gainor Lake	Develop a camp site
Kitsumkalum Lake	Develop a camp site in the northwest section, south of the Beaver river
Treston Lake	Develop a campsite
Pine Lake	Upgrade existing facilities; develop a new camp site on the north side; extend existing trails to include nearby smaller lakes
Copper River	Construct a boat launch; develop hiking trails on the north side up to the OK range
Kitnayakawa River	Upgrade existing camp site
Kiteen River	Upgrade existing camp site; develop hiking trails on the Headley side.
Oscar Peak	Develop hiking trails

6.2 LANDSCAPE

SCI is committed to managing the visual resources along highway corridors when planning harvesting. Other travel corridors, including recreation sites, waterways and roads, may also be considered to be scenic areas. This includes the Whitebottom creek and Lava Lake areas. Forest landscape design principles will apply to all these areas.

Harvest blocks planned within visually sensitive areas will be clearly identified in forest development plans. Visual impact assessments, including photographic mosaics and other tools will be submitted for harvest blocks proposed within visually sensitive areas. The Company will ensure that forest practices are carried out to adequately manage the visual resources on TFL 1. Generally, this means that cutblock boundaries will be designed to blend in more naturally with the viewed landscape and clearcut size limited to correspond with logical landscape features. Alternate silviculture systems and partial cutting logging methods will also be considered for visual landscape design where conditions permit.



Cover constraints for landscape level biodiversity, wildlife habitat, slope stability, fisheries and water quality will frequently overlap with visually sensitive areas. In such cases, riparian reserves, riparian management zones and other designated reserves can also be designed to manage for visual quality.

6.3 SOIL AND TERRAIN STABILITY

The objective for soil management is to minimize site disturbance and maintain the long-term productivity of forest soils. This will be achieved through practices that will not degrade soil productivity or destabilize slopes, and by employing measures to maintain natural soil function and protect soil properties.

The sensitive soil classification provided with the forest inventory is generally adequate for the purposes of broad level planning. Also, terrain and soil erosion hazard classification and level C mapping has been completed for more than 80% of the TFL landbase.

Although few problems have been encountered in terms of soil conservation or the maintenance of soil productivity on the TFL, site disturbance due to road construction and harvesting practices is of potential concern because it can result in soil compaction and decreased site productivity. Close attention will be paid to matching the logging system and equipment configurations for each block to the season of logging and soil conditions encountered. The careful placement of landings is also essential to minimize site disturbance. Maximum site disturbance levels for each cutblock are given in the silviculture prescription.

After logging is complete, the degree of site disturbance will be visually assessed, or assessed by survey. Rehabilitation work may be required for spur and temporary roads, backspurs, trails, skid trails and landings to ensure compliance with site disturbance targets. Treated areas are usually planted and grass-seeded with erosion control mix.



Management strategies to be employed for soil conservation and the maintenance of soil productivity includes:

- Conduct terrain stability field assessments where soil sensitive areas/steep slopes are indicated on overview maps, or where indicators of potential slope instability are observed during road location surveys, cutblock layout, or data collection for silviculture prescriptions.
- Evaluate the sensitivity of sites to soil degrading processes (e.g., soil compaction and puddling, soil displacement, forest floor displacement, surface soil erosion, mass wasting) using methodology provided in *Hazard Assessment Keys For Evaluating Site Sensitivity To Soil Degrading Processes Guidebook*, (1995.)
- Minimize the number of roads located through sensitive soils, and/or employ special road construction techniques (e.g., full bench construction, end-haul, pullback of oversteepened slopes and landings) to minimize potential impact.
- Avoid the placement of falling lines within Es areas.
- Ensure adequate yarding deflection.
- Prescribe logging equipment to match site conditions and the season of logging.
- Build roads and crossings to minimize mass wasting and erosion.
- Rehabilitate roads, trails and landings where required.
- Observe precipitation related shutdown criteria for heavy rainfall and saturated soil conditions.

6.4 GENERAL BIODIVERSITY

SCI is committed to the maintenance of biological diversity over the landscape, recognizing that forest diversity will ensure a sustainable timber resource. The Company will manage for landscape and stand level biodiversity using the principles and practices outlined in the *Biodiversity Guidebook*, (1995).

The overall pattern of developments must be planned in such a way to ensure maintenance of biological diversity. Conservation of natural biodiversity within the forests of TFL 1 is of the utmost importance to the Company since naturally diverse, thriving forests provide the timber for SCI's manufacturing operations.

To facilitate landscape level planning, the Kalum Forest District has been divided into a series of landscape units. Each landscape unit has been assigned either a low, intermediate or high biodiversity emphasis. Objectives for old growth retention, patch size and distribution, and wildlife tree patches are expected to be finalized during the term of MP 9. SCI has concerns that the landscape unit draft objectives and strategies



developed for Kalum Forest District will severely constrain timber harvesting activities in the West Kalum and Whitebottom RPU. SCI must be involved in establishing the final BEO designations for landscape units, objectives and strategies, and establishment of old growth management areas to mitigate this impact.

At the stand level, important stand structural attributes will be preserved through the retention of wildlife tree patches (WTP) and individual wildlife trees. Snags, culls and veterans provide valuable habitat for cavity nesting birds, raptors and small mammals while contributing to vertical diversity. Operations prescribed in the vicinity of WTPs containing dangerous trees will comply with the *Workers Compensation Board Occupational Health And Safety Regulation*.

6.5 WATERSHEDS

There are 12 river systems on the TFL that are part of two major watersheds, the Nass River and the Skeena River. Maintaining the water quality produced by these two watersheds is essential. At a regional level these two rivers provide a critical component of the ecological balance in the region. The rivers and streams on the TFL are important for domestic water supply and for providing fish for local consumption. The water quality particularly is a concern for residents in the Nass valley.

The objective for managing water quality is to minimize the potential for any adverse effects of forestry practices on streams pertaining to water quality, quantity and flow, fish and wildlife habitat, recreation, aesthetics and designated water users. SCI will act to ensure that forestry activities do not adversely affect water quality or quantity for dependent local communities.

Watershed Assessments

Level 1 watershed assessments have been undertaken for the Copper valley, the Nass, and the Kalum valley. These assessments will be used to provide information regarding cumulative forestry impacts on riparian and adjacent upslope areas, and the potential impact of proposed development. These projects were completed with Forest Renewal BC funding. Currently, there are no requirements to undertake a watershed assessment procedure for any other watersheds within the TFL.



Standard Practices

In addition to meeting the requirements of the Code and its regulations, SCI has a set of standard operating procedures to guide activities around streams. The general principles embodied in these procedures are:

- Forest planning and operations will be conducted in a manner to ensure the existing water quality is maintained.
- Roads and bridges will be constructed and maintained such that disturbance and impact on water quality is kept to a minimum.
- The Ministry of Environment, Water Management Branch, must approve any in-stream construction work such as the installation of bridges and major culverts before construction commences.
- During harvesting streams will be kept free of branches, bark and debris. Every effort will be made to minimize soil disturbance that could lead to increased runoff and sedimentation.

6.6 FISHERIES

The provincial Ministry of Environment, Lands and Parks and the federal Department of Fisheries and Oceans (DFO) are the government agencies responsible for managing the fisheries resource. These agencies have the mandate to ensure that the productive capacity of fish bearing waters is maintained. SCI is committed to maintain the aquatic biological productivity of all anadromous and resident fish bearing waters within TFL 1. This will be achieved through the completion of assessments, proper planning and adherence to standard operating procedures designed to avoid damage to fish habitat.

Assessments

Riparian assessments, funded by Forest Renewal BC, have been undertaken for the Copper, Nass and Kalum valleys. These assessments will provide information regarding forestry impacts on riparian areas. The Clore river system has also been the subject of a complete stream classification. No further assessments are planned at this time.

The Upper Copper (Nogold) river is a class 1 angling river. The Big Cedar, Copper and Clore rivers are also very popular for fishing. The outstanding angling potential of these rivers will be considered in any proposed developments. SCI will maintain four wheel drive access in these areas to promote the angling experience.



Planning

Streams and riparian areas within or adjacent to proposed cutblocks and roads will be identified and classified in accordance with the Code. The location of fish-bearing streams will be clearly marked on operational maps. Appropriate machine-free buffers will be prescribed in silviculture prescriptions. Riparian reserves and riparian management zones with special retention requirements will be marked in the field.

Forest development plans are referred to MELP and DFO for their comment. Operational concerns or issues raised by these agencies will be considered for each proposed development before finalizing plans. Field trips may be scheduled to visit areas of concern or special significance.

Operations

The Company will carry out standard practices and employ various measures to maintain streambank integrity and protect fish habitat. These will be reviewed with contractors prior to the commencement of road building and/or logging operations. Regular road maintenance, prompt repair and cleaning of debris from culverts and streams, and careful logging practices will all ensure that fish habitat is not adversely impacted by forestry operations. Special conditions or protective measures required by MELP or contained in the silviculture prescription will also be discussed.

6.7 WILDLIFE HABITAT

An abundance of wildlife species are found within the TFL. These include numerous birds, small mammals, furbearers and big game species. The public is mainly interested in the recreational hunting of big game, i.e., Moose, mountain goat and black bear, although many people are also interested in the provision of wildlife viewing opportunities. Many native people depend on hunting moose to maintain their traditional lifestyle, while registered trapline holders are interested in maintaining viable populations of furbearing mammals at harvestable levels.

SCI's primary goal is to maintain a broad diversity of wildlife habitat capable of supporting existing wildlife populations. In order to achieve this goal, SCI has been employing several strategies:

- ***Landscape level biodiversity*** - the provision of required habitats for various wildlife species is generally achieved through planning for biodiversity. SCI will vary cutblock size, shape and pattern, both temporally and spatially, in accordance with the principles embodied in the *Biodiversity Guidebook* for the appropriate natural disturbance types (NDT).



- ***Stand level biodiversity*** - relevant stand level wildlife habitat features and information will be collected in the field and detailed for each cutblock in silviculture prescriptions. Feedback from trappers and hunters will also be useful to help recognize and plan for important habitat values. Valuable wildlife cover and browse can also be provided within riparian reserves and riparian management areas with special retention requirements. Wildlife tree patches will be incorporated into cutblocks as required. Wildlife information will also be included in the forest development plan and cutting permit applications.
- ***Terrestrial ecosystem mapping*** - SCI has completed terrestrial ecosystem mapping (TEM) and wildlife interpretations for 40% of the TFL. Any future TEM will depend on FRBC funding and final objectives and strategies for the Kalum Landscape Unit planning process.
- ***Habitat requirements for identified wildlife species*** - it is important that critical habitat requirements for identified wildlife species are identified, classified and managed at both the forest landscape and stand levels. SCI will plan for the specific habitat requirements of identified wildlife species as required. No wildlife habitat areas (WHA) or general wildlife measures (GWM) have been established for TFL 1. The Company anticipates higher level planning direction from the Kalum Land And Resource Management Plan with respect to wildlife management strategies for grizzly bear and mountain goat.
- ***Agency liaison*** - SCI will co-operate with MELP to provide any information that may be required for refining the hunting regulations for Skeena region management units within the TFL. SCI will provide information regarding big game habitat use to MELP, consulting with trappers and guides where possible. Such information may be used by MELP to restrict access to specified areas within the TFL or adjust management unit boundaries.
- ***Public consultation*** - SCI will maintain an active dialogue with any individuals or groups who have indicated interest in discussing planned or potential developments of the TFL. Such consultation is most likely to take place through the forest development plan referral process. Registered trapline holders and guides/outfitters are not notified directly of planned operations. However, they are expected to respond to forest development plan notices and advertisements, contacting SCI directly if they believe that proposed operations will materially affect their operations.



6.8 CULTURAL/HERITAGE

There is a long history of aboriginal use and sustenance in the vicinity of the Skeena and Nass rivers. The primary strategies to accommodate First Nations concerns and address issues of aboriginal sustenance are:

- Referral of forest development plans to local first nations.
- Conducting site-specific cultural/archaeological surveys where evidence is found of significant aboriginal activity.

As a matter of standard practice, SCI provides copies of each forest development plan to local first nations, requesting that significant cultural heritage or sustenance sites be identified. Knowledge of such areas will allow for the protection of cultural and archaeological heritage features during the operational planning process.

An archaeological overview assessment (AOA) has been conducted to highlight areas in the TFL where cultural or archaeological heritage features or evidence of aboriginal activity is most likely to be found. Where evidence of aboriginal usage exists, SCI retains cultural/archaeological experts to conduct archaeological impact assessments (AIA) to determine the significance of evidence and recommend measures for its protection.

6.9 MINING

Several mining companies have mineral claims within the TFL. There are presently no active mines.

The Company does not receive referrals or information regarding mineral exploration from the Ministry of Employment and Investment, Energy and Minerals Division. It is expected that the Ministry of Forests will advise the Company of any mineral exploration plans that will impact on the operations of the TFL.

Similarly, SCI does not refer forest development plans or make any directed effort to contact and advise mineral claim holders of planned forest developments. It is expected that mineral claim holders will read public notices in local newspapers or hear advertisements on the radio before coming forward to express specific concerns to SCI.



7.0 PUBLIC CONSULTATION

Public consultation and involvement has two goals:

- To increase the participation of local people in the Terrace region in key resource decisions that affects the management of TFL 1.
- To seek input from other licensed Crown tenure holders in the review of operational plans.

The opportunity for the public to gain information on management activities concerning the TFL is continuous. The Company has an “open-door” policy with respect to meeting with people. Ad hoc meetings are held with interest groups whenever they are requested. Strategies are aimed at getting the public involved during the planning stages, providing more knowledge and understanding of TFL operations.

Activities that woodlands personnel are involved in implementing this strategy include:

- Tours of the woodlands operations and the Terrace sawmill.
- Writing articles of forestry interest and events for local newspapers.
- Being available for local radio and television interviews.
- Providing guest speakers and information to local schools.
- Contributing to Forest Alliance of British Columbia.

The Company also keeps a list of interest groups, organizations and individuals who have expressed an interest in being consulted. This includes several aboriginal bands.

List of Groups Consulted

BC Wildlife Federation - Northwest Region
Canadian Women in Timber
Irene Meadows Community Association
Kitimat-Stikine Regional District
Kitselas Band Council
Kitsumkalum Band Council
Nisga'a Tribal Council
Northwest Chapter of the Steelhead Society
Skeena MLA
Skeena Round Table
Terrace and District Trappers Association



Terrace Municipal Council
Terrace Rod & Gun Club
Terrace Snowmobile Club

7.1 REVIEW STRATEGY

Management Plan 9

Public review of this management plan was completed under the guidance of an approved review strategy (Appendix VIII.2). Opportunities were provided for the public to comment on the implementation of MP 8, to review the SMOOP and the draft MP 9. Only minimal responses were received. Details of the consultation process completed are provided in Appendix VIII.

Management Plan 10

The next management plan is scheduled to take effect in 2004. Preparation of MP 10 would commence in 2002. At this time SCI intends to follow a review strategy and public consultation similar to that completed for MP 9 when MP 10 is being prepared.



8.0 EMPLOYMENT AND ECONOMIC OPPORTUNITIES

SCI operations and business activities have been making a major contribution to the regional economy in northwest BC for the past 50 years. The pulpmill and sawmills as well as the associated woodlands operations have created a significant number of jobs in the region. This includes both direct and indirect employment, as well as induced employment in the retail and service sector.

The work force is primarily drawn from the communities of Prince Rupert, the Greater Terrace area, outlying aboriginal villages and the Hazeltons.

Present employment levels are relatively stable. For its manufacturing facilities, SCI prefers to hire local people when employment vacancies arise through turnover or retirements. This local hiring policy is implemented unless the required specialist skills cannot be found from amongst local residents.

Similarly for its woodlands operations, SCI uses local contractors wherever possible for road construction, contract logging and forestry work. The Company has also been encouraging engineering and forestry consulting firms to establish branch offices in Terrace to build up the range of expertise available locally. Where resource management expertise is not available locally, other forestry consultants are used for specific projects.

Log Volume Processed

All logs harvested from TFL 1 are processed at the Company's manufacturing plants. Sawlogs are sorted in the woods and delivered to the Terrace Sawmill. Pulplogs and lower grade sawlogs are delivered to the Poirier log yard in Terrace. These logs are merchandized to recover additional sawlog volume. Portable chippers process the residual logs into chips, which are transported to the Company's pulp mill.

The Company only utilizes minor volumes of cedar. The majority of cedar harvested is either traded or sold on the local market.

Based on the present AAC level, the destination of log transfers and sales are:

Table 29: Destination of log transfers and sales

TFL 1 - Annual log production		m³
	SCI	690,050
	SBFEP	29,950
Transfers and sales by destination		
transfer	Terrace Sawmill	410,000
transfer	Skeena Pulpmill	170,000
chips	Skeena Pulpmill	70,000
sale/trades	Terrace market	40,000
Total		690,000

Manufacturing Facilities

The current fibre requirements and production capacity of SCI manufacturing plants are:

Table 30: Fibre requirements and production capacity

<i>Terrace sawmill (operating days - 250)</i>	m³
Sawlog requirement	700,000
Company sources (TFL/FL)	615,000
purchase sources	85,000
Lumber production	300,000
Residual chip production	240,000
Sawdust to Eurocan pulpmill	80,000
Hog fuel to Skeena Pulp	120,000

TFL 1 provides approximately 59% of the log requirements for the Terrace sawmill. The majority of the sawmill production is manufactured for the export market, primarily Japan. A smaller amount is manufactured for the North American market. the majority of the lumber produced is manufactured and sold as HemBal. The sawmill residues are completely utilized; a portion of the sawdust is sold to Eurocan's pulpmill in Kitimat and the hog fuel is used by the Skeena pulpmill at Watson Island.



Skeena Pulp Operation (operating days 335)

The Skeena pulpmill consists of two pulp lines that have a combined capacity to produce 1,300 tonnes per day or 436,000 tonnes per year of northern bleached softwood kraft pulp.

Annual fibre requirements (chips/pulplogs)	2,300,000 m ³
Annual fibre supply	
Company sources (TFL - chips/pulplogs)	470,000 m ³
other company sources	1,022,000 m ³
purchase sources	808,000 m ³

Employment Levels

The current employment levels for operations at the Terrace sawmill and Prince Rupert pulpmill shown in the following table include estimated numbers of employees and contractors on the payroll.

Table 31: Employment Levels

		Employment Levels				
		Staff	Hourly	Contractors	Silviculture	Total
Manufacturing	Skeena Pulp	79	600	-	-	679
	Terrace Sawmill	28	160			188
Solid Wood Division	Terrace Operations	23	-	200	51 (FTE)	274

First Nations Employment

Since the acquisition of the TFL in 1986, SCI has been committed to providing opportunities for First Nations people. Several First Nations groups have villages and/or reserves adjacent to the TFL.

SCI encourages all of its contractors to hire First Nations people wherever possible. The Company has worked with various Band Councils in sponsoring training courses to develop a native workforce. Since 1988 the Company has focused on the development of First Nations contractors and this has resulted in steadily increasing employment. Most of the work takes place on TFL operations in the Nass Valley.



Employment opportunities are divided between silviculture and harvesting operations. Two native contractors undertake logging activities under stump to dump contracts for a combined volume of 50,000 m³ annually. Several native contractors presently undertake silviculture operations including tree planting, brushing and stand tending. Total silviculture mandays for the first nation work force have increased from 860 in 1994 to 3,675 in 1997. SCI will continue a strategy of training and developing a native workforce and providing technical assistance where required.

Forest Renewal British Columbia

Since 1995 SCI has secured over \$6.3 million in Forest Renewal BC funding for projects including watershed restoration, enhanced forestry, operational inventories and trials. In 1998 SCI signed a multi-year agreement with this government corporation for long term funding. This agreement provides for approximately \$3.5 million in annual funding until 2002. This funding is expected to provide over 65,000 mandays of employment over the 5 years for projects associated with backlog silviculture, enhanced silviculture, silviculture trials and operational inventories.

9.0 SPECIAL PROJECTS

From time to time issues may arise on the TFL that require special studies to deal with them. It is conceivable that a request for a special project may come from the government, the Ministry of Forests or the Ministry of Environment, Lands and Parks. Usually such studies are incremental to the contractual obligations outlined tree farm licence document. The Company is presently undertaking or involved in several projects that will continue on through this planning period. Other studies could become necessary during the next five years.

9.1 Kalum Land And Resource Management Plan

In 1996, the Ministry of Forests initiated a public process to begin preparation of a land and resource management plan (LRMP) for the Forest District. The mandate of the planning area was expanded in 1997 to include TFL 1 and West Fraser's TFL 41.

The purpose of the Kalum LRMP is to provide strategic land use and resource management direction for activities occurring on Crown land and water, within the boundaries of the Kalum TSA and the two Tree Farm Licences.

The LRMP is a consensus based decision-making process involving local interested parties including the general public, communities, interest groups, resource users, licensees and other government agencies. SCI is an active participant at the Kalum LRMP planning table.

Completion of the Kalum LRMP is not expected until the summer or fall of 1999. SCI expects that the planning objectives outlined in the LRMP will compliment the objectives already in place for TFL 1. The Chief Forester will approve MP 9 before the Kalum LRMP is completed. Therefore the objectives in MP 9 will provide higher level planning direction for the management of TFL 1.

9.2 Kalum Forest District Landscape Units

Ministry of Forests and MELP staff have begun to prepare a first iteration of landscape unit plans for the Kalum Forest District.

The district has been subdivided into 45 landscape units. These have been approved on an interim basis by the Kalum District Manager. Draft biodiversity objectives and associated strategies have been prepared for each landscape unit. These objectives are focussed on old growth management, old seral representation by natural disturbance type, patch size and distribution and wildlife tree patches. These are presently undergoing public review. It is intended to have them approved by late 1998, so they can be incorporated into forthcoming forest development plans.



There are 26 interim landscape units that overlap with the area of the TFL.

Table 32: Biodiversity Emphasis Areas

Biodiversity Emphasis	Landscape Unit
<i>High</i>	Nass River Kalum Skeena River Kalum
<i>Intermediate</i>	Kiteen Lower Seaskinnish Tseax Lower Tseax Upper Ansedegan Ishkheenickh Exstew Shames Cedar Beaver Kalum Lower Copper Lower Clore Limonite
<i>Low</i>	Kiteen Upper Zymacord Nelson Mayo Dasque Legate Chimdemash Kleanza Treasure Kitnayakwa

9.3 Nisga'a Agreement-in-Principle

Canada, British Columbia and the Nisga'a Tribal Council negotiated an Agreement-in-Principle (AIP) February 15, 1996 covering 193,000 ha in the lower Nass Valley . This agreement formed the basis upon which the final agreement is being negotiated. 87,719.1 ha of the AIP area lies within the boundaries of TFL 1. Once a final agreement is reached it must be ratified by Canada, British Columbia and the Nisga'a Nation. The ratification date is termed the effective date.



The AIP provides a five-year transition period beginning on the effective date. During this period, SCI will carry out forest management activities including road construction, timber harvesting and silviculture. These activities will be subject to provincial legislation under the jurisdiction of the various government agencies. The specific terms, however, are subject to change and are being negotiated as part of the final agreement.

The timber supply analysis for this management plan has assessed the impacts of this potential land withdrawal from the TFL on the timber availability.

9.4 Enhanced Forestry

SCI recognizes the value of second growth potential on TFL 1. With over 35,000 ha of productive forests between the ages of 20 and 80, SCI has embarked on a program of enhancing stand value on these areas. Between 1994 and 1998 over 2,900 hectares of TFL 1 have been pre-commercially thinned, 500 hectares have been pruned and commercial thinning has been carried out on 231 ha.

Assisted by Forest Renewal BC funding, SCI will continue to promote enhanced forestry on TFL 1 with continued pre-commercial thinning and pruning projects. As well, the Company has identified over 1500 hectares of potential commercial thinning areas in the present forest development plan. Commercial thinning will undertake on some of these areas as market conditions permit.

SCI will continue its inventory of second growth stands to aid the Company in:

- Making more accurate growth projections of stands.
- Identifying stand management and/or future harvesting opportunities.
- Carrying out long-term planning and yield analyses.



10.0 PLAN MONITORING

10.1 IMPLEMENTATION

The Company's annual operating plan will take guidance from the objectives and goals in this management plan. These are reflected in the operational plans and by the strategies pursued in activities performed. Performance against the goals and commitments is monitored by the Company annually.

10.2 REVISIONS

As provided for in clause 2.34 of the tree farm licence the provincial Chief Forester may require amendments or revisions in situations that arise that render a management plan inadequate. Alternatively the Company may prepare revisions at its own initiative. These situations include where there is:

- Damage to the timber from natural forces.
- Approval and/or replacement of a land and resource management plan.
- Serious or unforeseen damage to the natural environment.
- A change in AAC, a major change in the licence area, or other special circumstances.

The pending Nisga'a land claim settlement could be a reason for requiring a revision to MP 9 during the planning period.

10.3 ANNUAL REPORT

An annual report is a requirement of the TFL document. SCI prepares a combined annual report for TFL 1 and FL A16835. It reports on activities completed for the preceding calendar year including harvesting, road construction, forestry and silviculture, resource assessments, protection, recreation, contractor clause performance and research, community involvement and training. Copies of the annual report are distributed to the Kalum District Manager, Prince Rupert Regional Manager and Chief Forester