



**NAVER  
TREE FARM LICENCE #53**


**MANAGEMENT PLAN #3**

**DUNKLEY LUMBER LTD.**

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**(for the period January 1, 2000 - December 31, 2004)**

**Submitted by:  
DUNKLEY LUMBER LTD.**

  
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**Doug Perdue, R.P.F.,**

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## List of Abbreviations

%	Percent
#	Number
+/- 50%	as little as one half of a target level or as much as one and one half times of a target level
AAC	Annual Allowable Cut
Aspen	<i>Populus tremuloides</i>
BC	British Columbia
Birch	<i>Betula papyrifera</i>
Bros.	Brothers
cm	Centimeter
Cottonwood	<i>Populus balsamifera</i>
CPP	Canadian Pension Plan
DBH	Diameter at Breast Height
Douglas-fir	<i>Pseudotsuga menziesii</i> var. <i>glauca</i>
Dunkley	Dunkley Lumber Ltd.
FPC	Forest Practices Code of British Columbia Act
FRBC	Forest Renewal British Columbia
ha	Hectares
Ht	Height
Inv.	Inventory
IGDS	InterGraphics Design System
INCOSADA	Integrated Corporate Spatial and Attribute Database
IU	Intermediate Utilization
kg	Kilogram
km	Kilometer
Lodgepole pine, pine	<i>Pinus contorta</i> var. <i>latifolia</i>
LRMP	Land and Resource Management Plan
LRSY	Long Run Sustained Yield
m	Meters
MAI	Mean Annual Increment
m <sup>3</sup>	Cubic meters
MELP	Ministry of Environment, Lands and Parks
MOF	Ministry of Forests
MP #2	Management Plan #2
MP #3	Management Plan #3
MSBTC	Ministry of Small Business, Tourism and Culture
MWP #1	Management and Working Plan #1
N/A	Not Applicable
NTD	Natural Disturbance Type
NRL	Non-recoverable Losses
NSR	Not Satisfactorily Restocked
PSB	Plug-styroblock
PSP	Permanent Sample Plot
PSYU	Public Sustained Yield Unit



RIC	Resource Inventory Committee
SBFEP	Small Business Forest Enterprise Program
SIBEC	Site Index Biogeoclimatic Ecosystem Correlation
SMOOP	Statement of Management Objectives, Options and Procedures
sph	Stems per hectare
Spruce	<i>Picea glauca</i> , <i>Picea engelmannii</i> or their hybrids
Subalpine Fir	<i>Abies lasiocarpa</i>
TEM	Terrestrial Ecosystem Mapping
TFL #53	Tree Farm Licence #53
THLB	Timber Harvesting Landbase
TIPSY	Table Interpretation Program for Stand Yields
TRIM	Terrain Resource Information Management
TSA	Timber Supply Area
US	United States of America
VDYP	Variable Density Yield Prediction
WTPs	Wildlife Tree Patches
yr(s)	Year(s)

## **1.0 Introduction**

### **1.1 Description of Tree Farm Licence #53**

Tree Farm Licence #53 (TFL #53) is an area based forest tenure granted by the Ministry of Forests (MOF) to Dunkley Lumber Ltd (Dunkley). Dunkley is entrusted with the management responsibilities for the area in exchange for the harvesting rights. Given this form of tenure, the benefits of good management of all the forest resources can be realized with the reward of a secure and expanding wood supply for the company.

The TFL is located in the Prince George Forest District south of the community of Hixon and north of Ahbau Creek on the east side of Highway #97. The eastern border of the TFL is located near the features of Ahbau Lake, Lodi Lake, and Stony Lake. Figure 1 presents a general location map of the TFL.

The landscape of the area is characterized by gently rolling plateaus intersected by stream networks, primarily within the Ahbau Creek and Naver Creek watersheds. The land is tree covered from the valley bottom to the top of the hills. Spruce and pine trees are the most common tree species, representing about 80% of the forest cover. Subalpine fir contributes about 15% of the tree cover. Minor amounts of Douglas fir, aspen, birch and cottonwood make up the remainder of the common tree species found on the TFL landbase.

Streams, lakes, beaver ponds, and wetlands make up most of the 6% of the TFL landbase not covered by trees. Stream gradients are generally less than 20%. Rainbow trout is the fish species captured most frequently in recent fish and fish habitat inventory work on the TFL. Ten other fish species were also identified in the recent inventory work.

Most (91%) of the TFL is located in the Sub Boreal Spruce (SBS) biogeoclimatic zone. Biogeoclimatic zonation is a Provincial level classification that defines ecosystems of similar regional climate. The Sub Boreal Spruce zone is generally found at elevations below 1200 meters. The climate consists of cool, snowy winters, and warm summers. The remaining portion of the TFL is in the Engelmann Spruce Subalpine Fir (ESSF) biogeoclimatic zone. This zone defines the higher elevation areas on the TFL generally above 1200 meters in elevation. The climate in this zone consists of long, cold winters and short, cool summers.

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MAP #1  
KEY MAP TO  
LOCATION OF T.F.L. 53

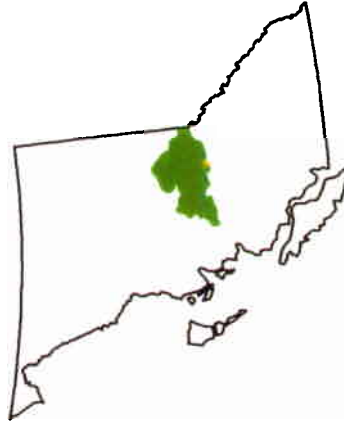
Scale 1 : 2 000 000

Legend

— Forest District Boundary

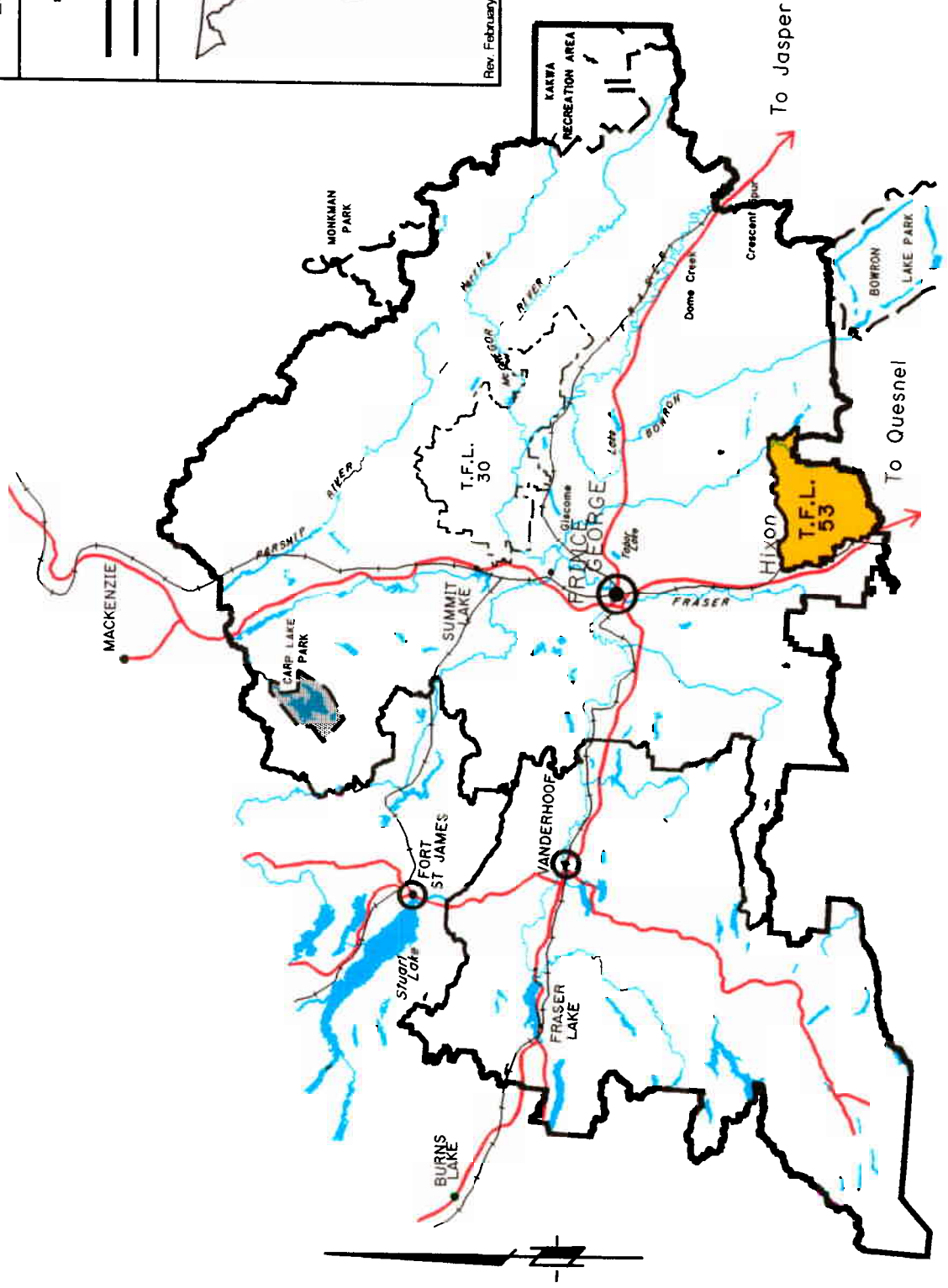
— Tree Farm License

Location Map



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IFS 980830



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The biogeoclimatic zones are further subdivided into subzones that reflect variations in local climatic conditions. The subzones are distinguished based on differences in the plant communities found on similar soil and moisture conditions. The subzones are also used to define the Natural Disturbance Types (NDT) which characterize stand replacement events such as the frequency and size of fires. NDTs are the basic classification used in landscape level biodiversity management. The biogeoclimatic subzones and NDTs are presented in Table #1.

**Table #1 TFL #53 Biogeoclimatic Sub Zones**

<b>Biogeoclimatic Sub Zones</b>		<b>Zone</b>	<b>Area (ha)</b>
Horsefly Dry Warm Sub-Boreal Spruce	SBS dw1	NDT 3	3,500
Moist Warm Sub-Boreal Spruce	SBS mw	NDT 3	19,300
Mossvale Moist Cool Sub-Boreal Spruce	SBS mk1	NDT 3	26,300
Willow Wet Cool Sub-Boreal Spruce	SBS wk1	NDT 2	30,700
Cariboo Wet Cool Englemann Spruce-Subalpine Fir	ESSF wk1	NDT 1	7,900
<b>Total TFL #53</b>			<b>87,700</b>

## 1.2 History of TFL #53

The lands that now make up TFL #53 have had a relatively long history of activity related to its natural resources. Mining boomed in the late 1800's and again in the 1930's. Logging and milling operations commenced in the 1930's and continue today. The forestry operations have consolidated over time. Small portable bush mills have gradually given way to larger, modern operations capable of supporting the needs of a forest industry that includes sawmilling, pulp and paper production, and value added manufacturing. This has been realized through more efficient utilization of the timber resource.

Dunkley set up operations at Strathnaver in 1951 and has been an active member of the Hixon-Strathnaver community ever since. Since the mid-1960's, Dunkley's quota position has been insufficient to meet its mill demands. Currently, the allowable annual cut satisfies approximately 30% of the sawmill requirements. It was for these reasons that Dunkley decided in 1978 that a TFL would be the most effective form of tenure to provide a secure timber base. A TFL would also provide a greater incentive to manage the forestlands and increase allowable cut levels, thereby maintaining the employment base in the

Hixon and Strathnaver area. Dunkley's forest licence was converted into a TFL, and TFL #53 came into existence in 1989.

The TFL is an essential component of the vision at Dunkley to improve the secured wood supply from the current level of 30% to 60% of the logs needed to run the sawmill. This level of security then allows Dunkley to be highly competitive in accessing the remaining log supply on the open market needed to maintain a two-shift operation at the mill. Attainment of this vision will provide long-term security to Dunkley, the employees, and to the local communities. To achieve this, Dunkley has undertaken a mandate to manage the forest resources with commitment and innovation.

During the term of the first management plan (MWP #1): 1989-1994, a forest inventory specific to the TFL was completed and programs were implemented to reforest previously logged areas with the goal of increasing the amount of second growth forest (backlog NSR reforestation). In addition harvesting operations focused on salvaging stands damaged by fire, insects or windthrow (reducing non-recoverable losses). These activities resulted in a modest increase in the allowable annual cut on the TFL from 1994 to the present date.

For Management Plan #2 (MP #2): 1995-1999, strategies were developed and implemented to both maintain the area of productive forestland on the TFL, and to increase the growth of the trees on that land. Increased planting densities, reduced regeneration delays, and improved planting stock are activities designed to promote full site occupancy of the forest landbase. Road rehabilitation, the elimination of landing construction through conversion to roadside logging systems, and efforts to minimize site disturbance all help to maintain the productive forest landbase. Preventative measures such as trap trees and multi species planting, along with aggressive salvage programs, minimize the losses of the trees to insects, diseases and other natural causes.

In addition to these programs, the Forest Practices Code (FPC), biodiversity guidelines, and riparian management have been implemented during MP #2. These initiatives ensure the management of timber and non-timber resources are carried out to a high environmental standard.

As a result of these programs, the sustainable harvest level for TFL #53 has increased over the term of the past two management plans:

<b><u>Year</u></b>	<b><u>Allowable Annual Cut Level</u></b>
1989-1993	187,630 m <sup>3</sup> /yr
1994-1999	204,700 m <sup>3</sup> /yr
2000+	to be determined

### 1.3 Dunkley History

Dunkley was established in 1951 at Strathnaver, British Columbia (BC) by the Dunkley family. The extension of the BC Railway past Strathnaver in 1953 enabled Dunkley to improve the manufacturing facilities and concentrate on timber development. During the late 1950's and early 1960's, Dunkley purchased a number of small operations and acquired additional Crown timber positions in the former Naver II and Big Valley I Public Sustained Yield Units (PSYU).

Dunkley redesigned and modernized the sawmill starting in 1964 and was one of the first to take advantage of the Close Utilization policies that were introduced in 1969.

By 1972, Dunkley had converted its Crown timber holdings to Timber Sale Harvesting Licences and the Third Band tenures to Timber Sale Licences. In 1972 Dunkley's total allowable annual cut was 168,160 m<sup>3</sup>. Additional timber was purchased from private sources to augment the mill requirements.

In June of 1977 the Novak family, through Novak Bros. Contracting Ltd., bought all the shares of Dunkley from the Dunkley family. Ownership has been retained by the Novaks to the present day.

At the time of purchase, Dunkley also embarked on an active program of private timber purchases and a search for timber quota positions. This resulted in the purchase of quota from R. Sindia in the Carp and Parsnip PSYUs in 1980 that increased Dunkley's quota to 183,620 m<sup>3</sup>.

The apportionment of the allowable cut of the Prince George Timber Supply Area in April 1982 reduced Dunkley's quota to 167,380 m<sup>3</sup> per year.

In 1984, Dunkley continued a wide-ranging mill modernization program. The program began with the construction of a new maintenance and machine shop. In 1985, the large wood side was replaced with a highly efficient sawmilling system. During the period 1986 through 1987, a new dry kiln was installed. Lumber and log yard improvements, including blacktopping and equipment acquisitions, were ongoing. Commencing in 1988, improvements were made to the small wood side and the trimmer with the installation of optimizing equipment. A new planer mill complex was opened in 1989 as part of the continuing investment in Dunkley's future.

The constant upgrading of sawmill and planer facilities has continued through the 1990's. Chip-n-saw upgrades, optimization and improved scanning technology have been utilized to maintain and improve plant efficiency. The recovery of value-added material through such improvements as an expanded J-bar sorting system, cut-in-two programs, precision end trimming, and trim block retrieval have also been implemented. Dunkley now has one of the most modern, efficient and flexible mill complexes in the Interior of BC.



## 2.0 Inventory

### 2.1 Inventory Status

Dunkley has carried out inventories for a wide range of forest resources found on TFL #53. These inventories enable us to plan forest operations that take into consideration the variety of values found on the TFL. Table #2 outlines the inventory status for the various forest resources.

**Table #2 Forest Resource Inventory Status**

Forest Resource Inventory	Standard	Date Completed	Date Approved	Proposed Activities
Forest Cover	MOF(1)	Feb 93	June 93	Annual update, Non-recorded disturbance update, Improved site productivity information update.
Recreation, Rec Sites	MOF	Feb 94	June 94	None
Fisheries	RIC(2)	Nov 98	Sept 99 with requested revisions	Ahbau, and Willow Watersheds are complete. Complete Naver watershed Fish & Fish Habitat Inv.
Wildlife	RIC	Ongoing		Submit revisions and obtain approval.
Terrestrial Mapping Ecosystem	RIC	Ongoing		Submit revisions and obtain approval.
Landscape	MOF	Nov 98	Dec 98	None planned
Sensitive Soils	MOF	Feb 93	June 93	None planned
Range	N/A(3)	N/A	N/A	None planned
Cultural Heritage Resources	N/A	N/A	N/A	None planned
Terrain Stability	Level D(4)	1995	-	None planned

- (1) Ministry of Forests(MOF)
- (2) Resource Inventory Committee(RIC)
- (3) Not applicable as no inventory work has been carried out(N/A)
- (4) Air photo interpretation with limited ground samples(Level D)

## **2.2 Forest Cover Inventory**

During 1991-1993 the first forest inventory specific to TFL #53 was carried out. The inventory project resulted in a complete classification of the TFL landbase on a TRIM I mapbase. This inventory has been updated on an annual basis for harvesting and silviculture activities. These updates are submitted to the MOF in IGDS format. Dunkley uses Arcinfo format.

The MOF carried out an audit of the inventory in 1997. The audit results indicate that a comparison of volume estimates of inventory polygons is not significantly different from the audit volume estimates for mature stands. The audit also found that the inventory tended to underestimate the stand height for immature stands. This finding is consistent with the low site index applied in the inventory for many of these stands. The third finding of the audit was that non-forested polygons are not classified to current MOF standards. This does not affect the results of the Timber Supply Analysis and is not a priority for Dunkley to correct.

### **2.2.1 Annual Update**

During the term of MP #3 Dunkley will continue to update the inventory on an annual basis. Dunkley will submit the updated inventory in the MOF's digital format as required by MOF policy. This may require a formatting change of the inventory submissions to ensure the inventory is consistent with the INCOSADA database that is expected to be operational within the term of MP #3. This format is expected to improve information exchange and compatibility of the forest cover inventory.

### **2.2.2 Forest Cover Update Project**

Two inventory projects will be proposed for MP #3. Dunkley will work with the MOF to improve the inventory information on the immature stands on the TFL. The Site Index Biogeoclimatic Ecosystem Correlation (SIBEC) project has provided data on the potential site index of immature managed stands on the TFL. Dunkley would like to incorporate this information into the forest inventory. In addition, the immature inventory will be updated to correct the species label for specific stands, where silviculture treatments have reduced the deciduous component of a stand or where the indicated site index of a stand has been identified as incorrect. Both of these situations can be corrected with the completion and incorporation of new survey information.

The second project involves an update of the forest inventory for non-recorded disturbances such as windthrow, fire and beetle damage. This project will provide a quantitative value of Non Recoverable Losses (NRL's) that have occurred on the TFL from the time of the last inventory. The update will also identify significant changes in inventory attributes that have occurred gradually since the time of the last inventory. This project will extend the operational usefulness of the inventory by ensuring it represents the current status of the forest landbase.

## **2.3 Recreation Inventory**

The first TFL Recreation Inventory was completed in 1994 in preparation for MP #2. This inventory has been found to be of limited use in operational planning on the TFL. The few unique features that are identified are well known and incorporated into other planning processes. As a result, updating this inventory is a low priority. However, the MOF standards for recreation inventory were updated in 1998. During the term of MP #3 Dunkley will update the recreation inventory to the latest standards.

## **2.4 Fisheries Inventory**

A reconnaissance Fish and Fish Habitat Inventory has been completed for the Ahbau and Willow Watershed portions of the TFL. The planning phase for sampling the Naver Watershed is also complete. It is Dunkley's intent to initiate the sampling portion of the Naver Watershed to complete the fish and fish habitat inventory for the TFL during the term of MP #3. This project is contingent upon funding approval from a source such as FRBC. In the absence of such funding, which provides strategic planning level information, Dunkley will continue to gather site specific information at an operational level scale to assist in management of the fisheries resource.

## **2.5 Wildlife Inventory/Terrestrial Ecosystem Mapping**

The Terrestrial Ecosystem Mapping project on the TFL contains a wildlife component. This project is currently going through the quality assurance phase and should be completed in the near future. Additional revisions will be submitted as required to obtain approval of this project.

## **2.6 Landscape Inventory**

The Landscape Inventory was revised to follow the MOF Visual Landscape Inventory Procedures and Standards Manual (May 1997). This project was completed in November 1998. This inventory will be updated during the later stages of MP #3 to reflect minor changes that have occurred since the last inventory.

## **2.7 Sensitive Soils**

The Environmentally Sensitive Soils Inventory was completed as part of the 1993 forest inventory project. No further activity is planned during the term of MP #3.

## **2.8 Range**

Range is a very minor component of TFL activity and is not actively managed. No range inventory projects are planned during MP #3.

## **2.9 Cultural Heritage Resources**

Archaeological impact assessments have been made on six medium to high potential areas identified by an Archaeological Overview Assessment (AOA) provided by the Prince George Forest District. These assessments have not turned up any resources features. The MOF has identified a potential trail that runs through the TFL in a Cultural Heritage Resource Inventory. This inventory also identified one archaeological site on the TFL.

## **2.10 Terrain Stability**

A Level D Terrain Stability Assessment was completed on the TFL in 1995. This assessment is used as a key to identify where more detailed assessments are needed when planning forest operations.

### **3.0 Management Objectives**

Dunkley has developed a set of objectives to provide focus for activities and planning on the TFL. These objectives provide the overall direction in the management of TFL #53.

#### **Overall Objectives**

- To maintain Dunkley as a viable entity capable of providing a secure source of employment and economic benefits to local communities.
- To manage the forest lands as a "working forest" where the primary resource activity is timber harvesting and where forest management practices are aimed at the provision of a continuous and expanding timber supply within the framework of integrated multi-resource planning.
- To conduct management practices and to develop new procedures which will maintain and enhance the productivity of the forest landbase through which increases in the allowable annual cut will be achieved.
- To integrate the use of TFL forests for timber, range, recreation, fish and wildlife and other user groups.
- To conduct operations in an environmentally sound manner.

### **3.1 Management and Utilization of the Timber Resource**

#### **3.1.1 Harvest Method**

**Objective:** Dunkley's objective is to ensure that harvest methods are prescribed on a site-specific basis and that operations are conducted so as to minimize soil disturbance, soil compaction and other environmental concerns.

This objective has been a major focus of Dunkley's management activity during the term of MP #2. The productive soil resource is the main ingredient in producing successive forest crops on the TFL. Planning, scheduling, logging systems, and monitoring are all important components in meeting this objective.

### 3.1.1.1 Planning

#### Discussion:

In general, the soil and moisture conditions on the TFL dictate that the majority of conventional ground based harvesting using mostly feller bunchers and grapple skidders will occur in the winter. This provides conditions of frozen soils and/or adequate snowpack to minimize soil disturbance, rutting and soil compaction on the medium textured soils, which predominate on the TFL. Dry soil conditions also allow summer harvest scheduling for conventional equipment on the medium textured soils. However, the occurrence of dry soils are unpredictable in the area and create a large amount of uncertainty in carrying out summer logging with conventional ground based equipment. Where coarse textured soils occur on the TFL, summer harvesting can be scheduled with minimal risk to the soil resource using conventional ground based harvesting equipment.

Other harvesting methods such as overhead cable logging and helicopter logging allow more flexibility in the season of harvest, as the risk of soil disturbance is lower. The trade off with these systems is a reduction in work for the local loggers that rely on Dunkley for employment stability. These alternative harvest methods are prescribed in situations such as salvaging damaged timber, which must occur with minimal snowpack. Alternate harvest methods are also used frequently on steep and sensitive slopes to minimize environmental risk.

#### Strategies:

- Silviculture prescriptions shall be prepared in accordance with the Operational Planning Regulations of the FPC.
- Dunkley completed a Terrain Stability Assessment of the TFL in 1995. This assessment identifies areas on the TFL that have potentially unstable or unstable ground. Before prescribing harvesting activities on these areas, a detailed field assessment will be carried out by a qualified soil stability professional to ensure the plans minimize the risk of soil damage. The results of these assessments will be incorporated into harvesting plans and silviculture prescriptions.

- Harvest planning will incorporate site-specific information such as soil types, slope, soil moisture, and the desired state of the post harvest area in terms of tree retention. These factors will be considered when determining the harvest method on a site-specific basis.
- The designation of summer and winter harvesting will be determined in consideration of environmental factors, specialized harvesting equipment abilities, and other site-specific criteria.

### 3.1.1.2 Logging Systems

#### Discussion:

Logging methods will generally use conventional ground based systems on the majority of timber types scheduled for harvesting during MP #3. As sensitive sites are identified, logging methods will be modified to best suit the sites. Logging methods will continue to be prescribed on a site-specific basis and carried out so as to minimize soil disturbance, soil compaction and other environmental concerns.

Conventional ground based systems consist primarily of feller buncher/grapple skidding in combination with other equipment and methods used on a site specific basis as required. During MP #3 Dunkley will continue to provide information and training to the logging contractors to keep them up to date on efficient and effective equipment, and methods of logging in an environmentally sound manner. This program has resulted in a greater diversity of equipment and logging methods designed to minimize soil disturbance and to meet other objectives.

Excavators ("hoe chucking") and long-line skidding are used, for example, to move logs off steep pitches without the need to build skid trails. Low ground pressure equipment is utilized on sensitive sites where the risk of excessive soil disturbance is high.

The conventional logging contractors have also converted to roadside harvesting as the preferred logging method. This system eliminates landing construction and results in smaller reductions to the productive forest landbase from road and landing construction. It also reduces the amount of repeatedly used skid trails that were concentrated around landings. This practice of prevention rather than rehabilitation is a sound practice in meeting the harvest method objectives.

Overhead cable systems will be used as a method to reduce disturbance on steep ground and to minimize the impact on high-density stream and drainage areas. This system reduces the amount of skid roads and trails that would otherwise be required to harvest using conventional equipment. It also reduces stream crossings and ground disturbance where a high density of streams and drainages in a block occurs. This system will be considered when prescribing clear-cutting unstable or potentially unstable areas, where minimal ground disturbance is prescribed.

Helicopter logging will be used primarily where access is restricted. A partial harvest terrain stability area, where it is required to maintain a portion of the stand to minimize the risk of soil damage, is an example of an appropriate area. Helicopter logging is also a harvest method choice to carry out salvage logging, to avoid plantation damage, to reduce skid trails, and to minimize risk to the environment.

Strategies:

- Dunkley will continue to use and develop innovative harvesting systems.
- Logging methods will be planned on a site-specific basis to minimize soil disturbance, soil compaction and other environmental concerns.
- Information and training will be provided to our logging contractors to keep them up to date on efficient and effective equipment and methods of logging in an environmentally sound manner.

#### **3.1.1.3 Harvest Monitoring**

Discussion:

Awareness of soil disturbance objectives and monitoring activities are an important component of the strategies employed to meet the harvest method objectives. Soil disturbance awareness training has been carried out with logging contractor employees, regular block inspections are undertaken during operations to assess soil disturbance levels, and independent soil disturbance audits are completed. These methods provide guidance and feedback to the operators.

Strategy:



- Training and monitoring activities will continue to be used to ensure operations are conducted with the intent of minimizing soil disturbance.

### 3.1.2 Utilization Standards

**Objective:** During the term of MP #3 harvesting will be conducted to close utilization standards, as indicated in Table #3.

**Table #3 Utilization Standards**

Species	Min. DBH (cm)	Stump Ht.(cm)	Top Diam.(cm)
Spruce	17.5	30.0	10.0
Balsam	17.5	30.0	10.0
Douglas-fir	17.5	30.0	10.0
Lodgepole pine	12.5	30.0	10.0
Deciduous	17.5	30.0	10.0
			(or where branching habit of the species dictates, utilization to the first major branches as required.)

### 3.1.3 Allowable Annual Cut Partitions

#### 3.1.3.1 Balsam Intermediate Utilization (IU)

**Objective:** Dunkley's objective is to continue to rehabilitate low volume residual balsam stands.

**Discussion:** The total area of Balsam IU stands requiring rehabilitation is 1,819.5 net hectares.

A partitioned cut of 20,500 m<sup>3</sup> for Balsam IU stands was established for the term of MP #2. As of March 1, 1999 8,134 m<sup>3</sup> of Balsam IU stand volume has been harvested under this partition. This harvesting activity generates poor quality logs at a very high cost. These factors, in combination with market conditions and influences such as the US/Canada Softwood Lumber Agreement, have not made it possible to carry out a larger scale Balsam IU logging program.

During the term of MP #2, Dunkley treated 152.0 hectares of Balsam IU stands. 38.0 hectares of this were mechanically site prepared in 1998 and planted in the spring of 1999. 114.0 hectares have been successfully converted to young spruce and pine plantations through the Balsam IU logging program.

In order to respond quickly to favourable conditions, Dunkley has seven Balsam IU blocks under cutting permit and two additional Balsam IU blocks with approved Silviculture Prescriptions. These blocks in total contain 20,218 m<sup>3</sup> over 240.9 hectares.

The treatment and planning demonstrate Dunkley's commitment to undertake Balsam IU rehabilitation.

The base case (current forestry practices) in the Timber Supply Analysis included the Balsam IU rehabilitation project. The harvest rule used in the Timber Supply Analysis selects stands on an oldest first basis. As a result, the model did not select Balsam IU stands as a high priority. The Balsam IU rehabilitation program is a tool to help reduce the constraining timber supply period 50-60 years in the future. By taking volume from the Balsam IU rehabilitation program other growing stock is saved to fill in the "hole" in the timber supply which occurs 50-60 years from now.

The Regional Manager's letter of September 3, 1999 regarding Draft MP #3 expressed a desire to maintain Balsam IU stands in a partitioned cut rather than incorporating them into the harvesting land base. In response, Dunkley proposes a partitioned cut of 20,218 m<sup>3</sup> over the 5 year term of the Management Plan to facilitate harvesting of Balsam IU stands be incorporated into the AAC determination for MP #3.

The 20-Year Plan included approximately 200 hectares per five year period of Balsam IU harvesting. The Forest Development Plan contains sufficient area to meet this target harvesting areas as market conditions improve. The harvesting in these stands can still be tracked to monitor the level of activity in the Balsam IU rehabilitation program.

**Strategies:**

- To maintain 200 hectares of Balsam IU stands under Cutting Permit to enable harvesting operations when conditions are favourable.
- To treat 200 hectares of Balsam IU stands over the term of MP #3, if market conditions are favourable.

### 3.1.3.2 Deciduous Stands

**Objective:** To improve Dunkley's deciduous fibre supply.

**Discussion:** Dunkley proposes a partitioned deciduous cut to secure the deciduous fibre supply. The gross area of deciduous leading stands on the TFL totals 3,188.3 hectares. Of this, there are approximately 1,100 hectares of deciduous leading stands older than 40 years that have also had more than 20% of the volume in coniferous trees. These stands would eventually convert to leading conifer stands as natural succession takes place, as shown by our PSP data. The aspen would die out to be replaced by the longer-lived conifers. The base case timber supply forecast modelled these stands in this way.

The Timber Supply Analysis Report also explored the option of logging these stands to utilize the deciduous and coniferous components. This sensitivity analysis indicated that a modest increase in the short-term harvest level of 2,000 m<sup>3</sup>/year would be supported by harvesting the deciduous leading stands.

Operationally, Dunkley has one deciduous leading block under cutting permit and another one approved in the Forest Development Plan. The sawmill has a whole log chipper that utilizes the deciduous material when demand dictates. The supply for the chipper currently comes, in part, from the deciduous component of the conifer-leading stands and wood purchases off the TFL. Over the past five years, Dunkley has consumed over 50,000 m<sup>3</sup> of aspen.

The intermittent deciduous chip demand factors must be considered in structuring a partitioned cut for deciduous stands. The demand for deciduous chips is a factor outside Dunkley's control. The need for deciduous log supply is not always steady or predictable. As a result, a partitioned harvest would have to reflect this demand pattern. It is probable that rather than a steady harvest pattern of +/- 50% of an annual harvest level of 2,000 m<sup>3</sup>/year, a larger supply of up to 10,000 m<sup>3</sup> may be required in a short period, followed by longer periods with no demand. We can not guarantee that the demand will exist within a five year cut control period on a regular basis.

**Strategy:**

- As a result of the intermittent demand, Dunkley proposes that a partitioned cut of up to 10,000 m<sup>3</sup> be approved for the term of MP #3. This partition would be in addition to the coniferous stand AAC determined for the TFL. This is consistent with the sensitivity analysis conducted on harvesting deciduous leading stands showing an additional harvest of 2,000 m<sup>3</sup>/yr is possible. Dunkley is not willing to forgo coniferous volume to harvest in deciduous leading stands. The remaining deciduous harvest on the TFL would be part of the allowable annual cut, as it comes from coniferous landing stands included in the base case harvest forecast.

### **3.1.4 Proposed Allowable Annual Cut**

**Objective:** Dunkley's long term objective is to increase the allowable annual cut to supply at least 60% of the mill capacity.

This objective is different from the SMOOP, which stated that it is Dunkley's objective to increase the AAC to supply at least 50% of the mill capacity. The objective was changed to be consistent with the Jobs and Timber Accord Operating Plan (January, 1999) and the Strategy for Securing Long Term Jobs at Dunkley Lumber Ltd., submitted to the Minister of Forests December 16, 1997.

**Discussion:** This is a critical objective in order to maintain Dunkley as a viable entity, capable of providing a secure source of employment and economic benefits to the local communities. The 60% figure allows Dunkley to secure one shift, and be highly competitive in accessing the remaining wood for the second shift. From this base, Dunkley would also be able to continue to be an aggressive purchaser of logs from the Small Business Forest Enterprise Programme in the future.

The Timber Supply Analysis Report undertaken in support of MP #3 forecasts the TFL landbase supports a harvest level of 249,000 m<sup>3</sup>/year that can be maintained for 50 years. This is based on current management assumptions. The 20-Year Plan shows that this harvest level can be achieved within the forest landbase on the TFL. In the decade 51-60 years from now a small decrease in the mid-harvest level occurs to 240,000 m<sup>3</sup>/yr. The harvest level was structured in this way to indicate the "pinch point" in the timber supply. This period of reduced fibre supply can be addressed through private and SBFEP wood purchases (240,000 m<sup>3</sup>/yr is a 35,300 m<sup>3</sup>/yr increase over the current AAC base from which we purchase additional timber to meet mill supply).

needs.) In addition, silviculture investments such as fertilization may provide additional fibre to help fill the hole in the timber supply.

This harvest level is supported by the base case that modelled biodiversity management on the assumption that 45% of the TFL was low biodiversity emphasis, 45% was intermediate emphasis and 10% had high emphasis. The old growth requirement was modelled at the Natural Disturbance Type level rather than the biogeoclimatic variant level in the base case. A subsequent harvest simulation with the same biodiversity emphasis requirements at the variant level indicates a 50 year harvest level of 237,000 m<sup>3</sup>/year.

There are, however, several upward pressures that should be considered in determining the proposed AAC. The most significant of these is modelling the entire TFL with the draft Landscape Unit objective of low biodiversity emphasis at the variant level. This harvest simulation gives a harvest level of 249,000 m<sup>3</sup>/year for seventy years. After 70 years the harvest level can increase when managed stands become increasingly available for harvest.

Additional upward pressure on the level is indicated if the definition of old growth in the NDT 1 and 2 areas reflect site specific information provided through the TEM mapping on the TFL, rather than 250 years as suggested by the Biodiversity Guidebook.

The Timber Supply Analysis also explores the results of changing the input assumptions in the timber supply model. Forest management is constantly evolving and this creates uncertainty in some of the data used in the analysis. The short term harvest level in the Timber Supply Analysis undertaken in support of MP #3 was insensitive to changing the input data in standard MOF sensitivity runs. In other words, the short term harvest level is not expected to change given the level of variability normally expected in the input assumptions. These scenarios include:

- ▶ Uncertainty in minimum harvest ages
- ▶ Uncertainty in natural stand yield estimates
- ▶ Uncertainty in managed stand yield estimates
- ▶ Uncertainty in forest cover objectives (adjacency)
- ▶ Uncertainty in landscape level biodiversity requirements
- ▶ Uncertainty in forest cover objectives for visual quality
- ▶ Uncertainty in the size of the Timber Harvesting Landbase (THLB)

An example of the uncertainty in the data inputs is the yield of the second growth managed stands. The MOF expressed a concern that the volume

predicted to be harvested from the second growth managed stands may be over-estimated by 10-20%. Until these stands grow and are harvested it is impossible to know with certainty if the predicted volume is 100% accurate or not. To test this uncertainty a sensitivity run that adjusted the managed stand yields downwards by 10% was carried out. The short term harvest level was not affected. This result is predictable because the managed stands are not being harvested in the short term as they will not reach maturity for 40 years or more.

The proposed harvest level is a result of the investment and hard work Dunkley has put into this TFL. The programs to manage the TFL incorporate two major strategies:

1. To maintain the productive forest landbase
2. To maximize fibre production (tree growth and full site occupancy)

To maintain the productive forest landbase, methods to minimize soil disturbance such as the conversion of ground based logging to roadside harvesting and an expansion of the cable and helicopter logging systems has taken place. An expansive road rehabilitation program has been implemented to maintain the productive landbase on the TFL.

Fibre production is maximized by high density planting targeting 1800-2000 sph and a one year regeneration delay to promote full site occupancy. Large stock types, genetically improved seed and mixed plantations, using pine where ecologically appropriate, favour good survival and growth of plantations. Follow up treatments to maintain the growth potential of a site in future crop trees are used to promote full site occupancy.

Section 8.0 of the Timber Supply Analysis Report discussed the social impacts and the technical results of the Timber Supply Analysis. It is a good review of the benefits of and the reasons for the proposed allowable annual cut of 249,000 m<sup>3</sup>/year. The section is repeated as follows:

#### ➤ Social Impacts

The allowable annual cut set for TFL #53 will impact the social and economic well being of over 260 people directly. Children, wives, and other dependants have not been factored into this equation. The owners of Dunkley have a long-standing commitment to the employees their families, and the communities. The employees have responded by working to help evolve Dunkley into a highly productive

organization, both in the sawmill and in the woods. It is a working environment of which employees and managers are immensely proud. Part of Dunkley's "social contract" to the employees is to provide long-term job security. This is directly tied to a secure fibre source.

The security of the local community depends not only on the TFL, but also on Dunkley's ability to acquire sufficient wood supply to meet our current fibre requirements of 600,000 m<sup>3</sup>/year. Currently, 30% of this fibre demand is met by a secure tenure (i.e., TFL #53) and 10% is met under short term non-recoverable forest licences. The remaining volume must be acquired on the open market, over which Dunkley has little control. Thus, to the local communities of Hixon and Strathnaver, the importance of the TFL, and the ability to increase harvest levels, can not be overemphasized.

At a Provincial level, TFL #53 has much to offer to the people of BC, in terms of the revenues generated through taxation, stumpage, and the spin-offs from the wages to local employees. If an allowable annual cut were set at 249,000 m<sup>3</sup>/year for the duration of MP #3, the 21.6% increase in harvest would accrue the following benefits:

- provide a keystone towards improving sawmill job security;
- create additional full time equivalent jobs in forest management;
- create additional full time equivalent jobs in timber harvesting;
- create new jobs in secondary employment;
- \$1,533,600 in annual wages and benefits would be generated;
- \$716,000 annually in personal income taxes;
- \$67,000 in personal employment insurance and CPP benefits;
- \$433,000 of additional purchases of good and services could be forecast;
- \$2,746,600 of additional stumpage revenue would be generated for the Crown based on the TFL 1998 average stumpage rate.

The current allowable annual cut contributes only 30% of the annual fibre requirements to the Dunkley sawmill. The base case harvest flow would represent a significant gain to Dunkley's secure, long-term fibre supply. The importance to the local economies and the livelihood of more than 260 manufacturing and forest workers and their families can not be overstated. This increase can be achieved within the

framework of the FPC and biodiversity management, and can help to better meet the social and economic objectives of the Crown.

#### ➤ Technical Results

The sustainable harvest level reported for TFL #53 has increased over the term of the past two management plans. Given the advent of the FPC, biodiversity guidelines, and riparian reserve zones, and visual landscape inventories that are constraints on timber supply, why has this happened? There is no "one" answer to this question, but a multitude of factors, which include:

- a substantial investment by Dunkley in managing the TFL for all resources;
- better analysis and estimations of site productivity - present and future;
- a change in modelling philosophy, which includes allowing the entire forested landbase (rather than just the commercially defined THLB) to contribute to forest cover constraints;
- a change in the forest estate model;
- good local knowledge of the landbase;
- a historic harvest level below the long run sustained yield.

The actual productivity of the landbase has not changed. However, the assumptions with which timber supply analysis work is undertaken have improved with regard to the growth and yield of a stand, the impact of various management strategies on the visual aesthetics of the landscape, and the impact of harvesting on old growth and wildlife habitats. These assumptions will continue to change through research and development until the "right" answer is reached. In the meantime, as long as the allowable annual cut is set at a level below the maximum non-declining yield, mature merchantable stands of timber, beyond that which is required for old growth, aesthetics and wildlife, will continue to grow and contribute to a higher LRSY at each subsequent Timber Supply Analysis.

The Timber Supply Analysis supports a harvest level for TFL #53 of 249,000 m<sup>3</sup>/year. This is a 21.6% increase over the current allowable annual cut set in 1993. The technical information supporting this harvest level exceeds the information used in previous management plans. Few timber supply areas in BC have a knowledge base that exceeds the information that was used in this analysis. All indications are that a higher base case harvest level can be achieved in MP #4. In light of this, a harvest level in keeping with the sustainable level of



timber production of the TFL, and the nature, production capacity and timber requirements of the established timber processing facility is recommended.

**Strategy:**

- Dunkley proposes a harvest level of 249,000 m<sup>3</sup>/year. This best reflects the current management strategies, biological conditions, and social and economic objectives for TFL #53.

### **3.1.5 Small Business Forest Enterprise Program**

The MOF Small Business Enterprise Program (SBFEP) has operated within TFL #53 since the inception of the program. The MOF and Dunkley have worked in concert in developing a continuous five-year plan for this program.

During the term of MP #3 the SBFEP will continue to be administered as per the "Memorandum of Understanding for the Administration of the Small Business Forest Enterprise Program" (Appendix 8).

Dunkley will ensure that the SBFEP receives the same harvest profile and similar logging chance as Dunkley. The Forest Development Plan will continue to provide estimates of the total species profile, and similar logging chance applicable to both Dunkley and the SBFEP program.

## **3.2 Protection and Conservation of Non-Timber Values**

### **3.2.1 Visual Quality**

**Objective:** The objective for visual management on the TFL is to plan and conduct forest operations to meet the Visual Quality Objectives (VQO's) as determined by the District Manager for known scenic areas.

**Discussion:** As required by legislation, a visual impact assessment will be carried out when proposing to harvest timber or construct/modify roads, or when proposing visually modifying operations in known scenic areas with established VQO's. Visual simulations will be carried out when proposing to harvest timber or construct/modify roads, or when proposing visually modifying operations in known scenic areas without established VQO's, as required by the District Manager.

Dunkley has now completed a Visual Landscape Inventory to identify visual areas on the TFL from viewpoints along Highway 97 and from the recreation sites on the TFL. The Timber Supply Analysis Report

examined the impact of the Landscape Inventory on the harvest level to provide information to the District Manager on how best to manage the visual resources on the TFL.

**Strategy:**

- During the term of MP #3, Dunkley will continue discussions with the District on how to manage the visual resources within the context of integrated resource management.

### **3.2.2 Biological Diversity**

**Objective:** Dunkley's objective is to manage and conserve biological diversity on TFL #53.

**Discussion:** Dunkley will strive to comply with the FPC and Regulations to manage and conserve biological diversity. District policy and guidebooks also provide direction on the management of biological diversity. While Dunkley supports the intent of the policy and guidebooks, we have concerns that the prescribed methodologies at times does not reflect the local conditions on the TFL and, as a result, may not be the best way to meet the biological diversity objective.

To address these concerns the Timber Supply Analysis Report explored three options regarding biodiversity management on the TFL. These scenarios are:

1. Assess the impact of removing (a) the Prince George Forest District policy of additional lake shore reserves around Class A and C lakes, and (b) eliminating wildlife tree patch management.
2. Assess the impact of applying a low biodiversity emphasis to the TFL.
3. Assess the impact of reducing the age that the FPC Biodiversity Guidebook has defined as old seral stage forest for NDT's 1 and 2. In this scenario old seral stage forest was defined as stands in NDT 1 or 2, having an age greater than 180 years.

The first scenario was proposed to address Dunkley's concern that District Policy for biodiversity management may be having a larger impact on timber supply than was envisioned with the introduction of the FPC. The base case accounts for the legislated requirements of the FPC through riparian deductions of 2,478.8 hectares. This is 3.5% of the THLB on the TFL. The deductions resulting from District Policy impact only 0.3% of the THLB in additional lakeshore reserves, and 4% of the landbase in extended rotations. This may seem to be a minor impact, but the impact

of these policies is to reduce the short-term harvest level on the TFL by 7,000 m<sup>3</sup>/year.

In operational practices, Dunkley is concerned that the District Policies may not result in the best management for maintaining biodiversity on the TFL. Requirements for wildlife tree patches (WTPs) to meet distance to cover criteria, without consideration of windfirm stand characteristics, is counterproductive to maintaining long term mature forest reserves. WTPs are reducing growth potential on otherwise unrestrained forestland. To address these concerns, Dunkley will continue to work towards a TFL specific biodiversity plan that reflects local conditions.

The second scenario studied in the Timber Supply Analysis Report assessed the impact of applying a low biodiversity emphasis to the TFL. This scenario was undertaken in anticipation of the establishment of landscape unit objectives during the term of MP #3. Indications from the MOF and the MELP are that the TFL will be a low biodiversity emphasis area if landscape unit objectives are officially established.

Modelling a low biodiversity emphasis option results in a 3.2% increase in the short-term harvest level (8,000 m<sup>3</sup>/year) above the base case. The effect on old growth retention of designating the TFL as a low biodiversity emphasis option is minimal in the long term (i.e., 140 years and beyond). The amount of forest cover in old growth differs from the base case by less than 1%, and the old seral stage age class distribution is almost identical to that which would be a result of the base case harvest forecast. This happens because reductions to the productive land base reserve sufficient forests to provide for old growth forest requirements. As these forests age through time, mature and old growth goals are achieved. Dunkley supports the designation of the TFL as a low biodiversity management zone if the official designation of landscape units is sanctioned provincially during the term of MP #3.

The third scenario explores the option of reducing the age to define old seral stage forest in the NDT 1 and 2 areas on the TFL. The Biodiversity Guidebook uses an age of 250 years to define stands with old growth characteristics in NDT 1 and 2. The TFL contains only 157.0 hectares of stands greater than 250 years. Dunkley has gathered structural stage data for the TFL as part of the Terrestrial Ecosystem Mapping project. This project shows that old growth characteristics are found in many of the stands older than 180 years on the TFL. Using this TFL specific data provides more flexibility in managing biodiversity on the TFL. If old growth management areas must be delineated on the TFL as part of the Provincial implementation of landscape unit planning, using stands older than 180 years to delineate old growth in NDT 1 and 2 areas will allow

flexibility to distribute OGMA's to achieve both biodiversity goals and to minimize the impact of these objectives on the timber supply. Dunkley supports the use of stands older than 180 years old to designate OGMA's, if official designation of landscape units and objectives is implemented provincially during MP #3.

These issues can not be dealt with in isolation, either from other biodiversity issues or from the larger picture of integrated resource management on the TFL landbase. As a result, a plan to incorporate site specific biodiversity management on the TFL will tie the many biodiversity initiatives together. This plan is scheduled for completion in September, 1999.

**Strategy:**

- Dunkley has initiated work on a TFL specific Biodiversity Plan for TFL #53 in co-operation with the MOF and the Ministry of Environment. The plan will contain strategies designed to manage biological diversity on the TFL that reflect and that are adapted to the conditions of the TFL. This plan, like the FPC itself, is envisioned as a "living document". As new information becomes available and strategies are developed that will better meet all of the objectives for the TFL, the Biodiversity Plan will be revised.

### **3.2.2.1 Deciduous Leading Stands**

**Objective:** To maintain deciduous leading stands on the TFL over time.

**Discussion:** Deciduous leading stands contribute to biodiversity and are a component of the variety of habitat types found on the TFL. With the proposed partitioned harvest of deciduous stands it is important that management to maintain deciduous leading stands on the TFL also takes place.

The amount of deciduous leading stands by 20-year age class ranges between 190 and 410 ha in stands up to 100 years old. The exception to this is 1,520 ha of 61 to 80 year old fire-origin deciduous stands. Deciduous leading stands older than 100 years are rare as natural succession leads to an increasing conifer component of the stands.

The majority (80%) of deciduous leading stands occur in patches less than 10.0 ha in size. 15% occur in patches 10.1 to 20.0 ha in size and 5% in patches greater than 20.1 ha. Most of the deciduous stands occur in the western third of the TFL.

The current amount and patch size characteristics of the deciduous leading stands have been considered when deriving the strategies for managing these stands on the TFL. The strategies are designed to maintain a sustainable seral stage distribution of deciduous leading stands throughout the TFL, while at the same time allowing harvesting in a portion of the deciduous leading stands.

**Strategies:**

- To maintain 200-300 ha of deciduous leading stands by 20-year age class on the TFL, up to age 80.
- To harvest priority should be in age class 5 stands.
- To mimic the existing patch size distribution of deciduous leading stands over time.
- To distribute the new deciduous leading stands throughout the TFL.

### **3.2.3 Soils**

**Objective:** Dunkley's objective is to protect soils and soil fertility by minimizing activities that cause soil degradation and by rehabilitating damaged sites.

**Discussion:** Maintaining soil productivity is a key factor in producing successive high yield forest crops. Maintaining the productive forest landbase will enable us to increase the harvest level on the TFL over time. Soil conservation is also a main component of the FPC. In order to meet our soil conservation objective we have implemented programs to prevent detrimental soil disturbance. This had led to both a reduction in summer logging when soils are more sensitive to disturbance, and a shift to roadside harvesting systems to reduce the area disturbed to process and truck logs. The elimination of broadcast burning has reduced disturbance from fireguard construction. Site preparation activity is carried out to leave the forest floor intact to preserve the nutrient bank and organic matter for the forest soils.

Where temporary access structures such as roads and trails are required, Dunkley has implemented soil rehabilitation programs to restore forest productivity on these sites. In addition to the environmental benefits, this program will increase the long term growing stock on the TFL.

**Strategies:** The management of the soil resource on TFL #53 is provided through the following strategies:

- Terrain Stability Mapping has been completed for the TFL. This work identifies "potentially unstable" (Class IV) and "unstable terrain" (Class V)

on the TFL. When considering harvesting or road building activities on Class IV or V terrain, a detailed terrain stability assessment is carried out by a qualified consultant to assess if logging can take place and to prescribe harvesting and road construction methods required to minimize the risk of soil degradation. Dunkley ensures that these prescriptions are implemented.

- Sensitive sites are addressed both in the planning and Silviculture Prescription process to ensure that logging equipment and season of operation is compatible to the site and soil conditions (i.e., winter versus summer, cable versus conventional).
- Soil disturbance surveys are conducted both after harvesting and silviculture operations to monitor soil disturbance and to provide feedback to our contractors.
- Appropriate equipment is used on sensitive soil types to minimize equipment disturbance.
- Soil exposed during road and trail construction or deactivation is grass seeded to minimize the risk of soil erosion.
- Roadside logging systems have been implemented to reduce losses to the net productive forest landbase.
- Dunkley has fully implemented rehabilitation of temporary roads and skid trails on the TFL. This strategy is designed to restore productive forest growth on these areas.

### **3.2.4 Water**

**Objective:** Dunkley's objective is to protect the quality and quantity of ground and surface water.

**Discussion:** The water resource and the associated fisheries values will continue to be a major focus during the term of MP #3. The watersheds in the TFL have been studied using the Interior Watershed Assessment Procedures (IWAP) to determine the health of the watersheds. An Interior Watershed Restoration Plan has also been completed to direct water quality management on the TFL. These studies help to plan forest management activities such as harvest scheduling and watershed restoration projects to maintain water quality and fish habitat on the TFL.

Planning for water quality is also assisted by Terrain Stability mapping that Dunkley has completed for the TFL. This mapping identifies, in part, potentially unstable and unstable areas. These areas are generally associated with the steep valley slopes on a few of the streams on the TFL. Detailed assessments are completed on these areas to ensure any planned operations are conducted with minimal risk to the environment.

Site specific planning for water quality takes place at the Silviculture Prescription level. The FPC outlines measures to protect streams, wetlands and lakes through riparian management areas surrounding these features. Dunkley incorporates these areas into prescriptions to manage and conserve water quality.

Road construction, maintenance and deactivation activities are also a key factor related to water quality. Dunkley has implemented a road deactivation program to ensure roads remain in an environmentally stable condition. Sediment control measures and erosion control plans are conducted during construction and deactivation activities, and during work in and around streams to protect water quality. Grass seeding of exposed soil is carried out to minimize soil erosion.

Road maintenance and monitoring activities are used to ensure drainage structures and water flow function as intended.

Strategies: During the term of MP #3, Dunkley will protect water quality when undertaking forestry operations by implementing the following:

- Level A Terrain Stability Assessments will be completed as required by the FPC, when considering road building or cutblock design activities in the potentially unstable or unstable areas.
- Site specific erosion control plans will be formulated for all major culverts, bridges, and road construction as well as deactivation or other engineered works on high terrain hazard areas ("unstable" or "potentially unstable").
- Contractors will be trained in the requirements of the Operational Planning Regulation, the Timber Harvesting Practices Regulation, and the Silviculture Practices Regulation as they relate to stream, wetland and Lake Management. Activities will be monitored to ensure plans and prescriptions are adhered to.
- Timely and effective road deactivation works will be carried out.
- Adequate buffer zones will be used to ensure that the integrity of pesticide free zones are maintained during herbicide applications.

### 3.2.5 Recreation Resources

**Objective:** Dunkley's objective is to manage the TFL recreation resources within the framework of developing and enhancing the timber resource.

**Discussion:** In 1997 Dunkley completed a Recreation Use Survey on TFL #53. The survey identified that fishing and camping are the most popular recreation activities. The survey also identified the use levels of the Forest Service Recreation Sites on the TFL, which were well below capacity. The use data, in combination with difficulty in obtaining adequate funding for recreation site maintenance, has resulted in the MOF's decision to close the Hay Lake and Yardley Lake Recreation Sites. This leaves five gazetted recreation sites on the TFL.

Maintenance of the recreation sites and the road access to the sites were identified in the survey as the area most needing improvement. Dunkley will maintain roads on which we are conducting operations. This often includes the majority of the main roads accessing the recreation sites. Maintenance of the recreation sites and the minor access roads to these sites is the responsibility of the MOF.

**Strategy:**

- To maintain the road network on which we are conducting operations to provide recreation access.

### 3.2.6 Cultural Heritage Resources

**Objective:** To maintain the cultural heritage resources on TFL #53.

**Discussion:** Cultural heritage values will be managed according to the protocol agreement on the Management of Cultural Heritage Resources dated July 15, 1994 between the MOF and the Ministry of Small Business, Tourism and Culture (MSBTC) and as directed by the FPC. Twelve assessments have been carried out to date. No archaeological resource features have been identified.

**Strategy:**

- Dunkley will conduct Archaeological Impact Assessments where required by the District Manager of the Prince George Forest District.



### **3.2.7 Range Land**

**Objective:** It is Dunkley's objective to not adversely impact range values at their present level of use (272 Animal Unit Months), while allowing for expansion should the need be identified.

**Discussion:** Range is and will likely continue to be a minor component of the TFL resources.

**Strategy:**

- It is Dunkley's intent to identify any potential interaction between planned forestry activities and the range tenures at the Forest Development Plan stage. Where the forestry activities could adversely impact range values, a solution to ameliorate the impact will be proposed.

### **3.2.8 Fish and Wildlife Habitat**

**Objective:** It is Dunkley's objective to conserve and enhance the fisheries and wildlife resources and associated habitats. We strive to plan and manage the land so as to reduce conflicts between wildlife and resource development activities.

**Discussion:** The TFL specific biodiversity plan will contain a wildlife habitat component. The intent of the plan is to develop management strategies to manage for wildlife. The species selected will include those identified in the Prince George Land and Resource Management Plan (LRMP). Fish habitat will be managed on a watershed basis.

**Strategy:**

- In general, the requirements for biodiversity contained in the FPC contain provisions that will manage and conserve fish and wildlife habitat. This has replaced the more site-specific approach used during MP #2.
- To incorporate strategies in the TFL Biodiversity Plan to manage for the species identified in the LRMP.

### **3.3 Integration of Harvesting Activities with Non-Timber Uses**

**Objective:**

Dunkley will integrate the timber, range, recreation, fish, wildlife, mining, and other uses of the TFL forests through ongoing integrated resource management planning processes.

#### **3.3.1 Trappers and Guide Outfitters**

**Discussion:** Dunkley maintains regular contact with registered trappers and guide outfitters who operate within the TFL. Dunkley invites these licensed users to provide input into this Management Plan and also encourages their input into the Forest Development Plan, the Access Management Plan, and Pesticide Use Permits. The intent of these referrals is to identify potential interaction between forestry activities and the activities of the trappers and guides. Most of the concerns identified by the trappers and guides relate to access management. Two roads have been kept in a temporarily deactivated state to provide winter access for trapping activities. One proposed road will have semi-permanent deactivation planned to maintain the viability of the main guiding area.

**Strategy:**

- To continue regular communications to maintain a good relationship with the registered trappers and guide outfitters.

#### **3.3.2 Range Tenure Holders**

**Discussion:** Dunkley has invited the range tenure holders to provide input into the Management Plan and encourages their input into the Forest Development Plan.

**Strategy:**

- To deal with site specific range issues through the Forest Development Plan referral process.

### 3.3.3 Mining

Discussion: Mining activities have been and continue to be active in portions of the TFL. Most of the mining activities involve placer technology and are generally smaller operations.

Dunkley is concerned that in periods of high timber values, more area is cleared for mining exploration than is needed to look for mineral potential. This results in productive forest land being left in a non-productive state that is not used for mining; nor is it reforested. To re-iterate, Dunkley supports bona fide mining activity, as long as the administrative system implemented by the Ministry of Energy, Mines and Petroleum Resources and the Prince George Forest District ensure that: 1) only the area to be mined is harvested, 2) the harvested trees are utilized, and 3) that there is reclamation of the mined area **to a forested status**. Authorization of mining and related harvesting activities that can not meet these criteria should not be permitted.

Dunkley has an excellent relationship with the mining community. We regularly provide companies with resource materials such as maps and aerial photographs. In return, Dunkley is kept informed of mining activities, which may impact our planning or operational activities. Dunkley will continue to foster the relationship we have with the mining community.

Strategy:

- To continue to foster a good relationship with the mining community through sharing of information regarding each other's operations.

### 3.3.4 Aboriginal People

Discussion: The TFL is located within the statement of intent area of the Lheidli T'enneh Band for treaty negotiations. In addition to the consultation activities carried out by the MOF, Dunkley refers the Forest Development Plan and Pesticide Use Permits to native groups to enquire if proposed activities infringe on traditional use activities.

Strategy:

- To assist the Crown in their fiduciary responsibility to consult with the First Nations by referring plans and permits to first nations bands that may have traditional interests in the TFL area.

### **3.3.5 Hixon Community Association**

**Discussion:** Dunkley's operations, both woods and mill, have been part of the Hixon Community since 1951. While other companies have shut mills and moved operations, a very close relationship has developed between Dunkley and the community. We are the only major employer in this community and almost half of our work force lives in Hixon and surrounding area. The remaining employees reside either in Quesnel or Prince George. This unique situation makes us a corporate citizen in all three communities.

**Strategy:**

- To maintain a regular exchange of information with the Hixon Community through avenues such as the Hixon Community Association meetings.

## **3.4 Forest Fire**

### **3.4.1 Fire Prevention**

**Objective:** It is Dunkley's objective to conduct its operations in accordance with MOF Policy and Regulations.

**Discussion:** The responsibility for the prevention and control of wild fires and the initiation of prescribed burns are embodied in the MOF's fire policy and regulations. Dunkley will conduct its operations in accordance with MOF Policy and Regulations.

**Strategies:**

- Dunkley will maintain appropriate fire equipment at the mill site. All contract crews and Dunkley crews will maintain prescribed fire equipment at the location of their operations. Dunkley will carry out periodic inspections of operations, both Company and contractor, to audit compliance with the Forest Fire Prevention and Suppression Regulation.
- Public access to hazardous areas, or the entire TFL area, may be controlled during periods of extreme fire danger at the direction of the MOF.
- A Fire Pre-Organization Plan will be prepared annually and will be submitted to the MOF Fire Centre in Prince George prior to the commencement of industrial operations on the TFL each year. The Plan

will include a duty roster and a list of available equipment. Prior to fire season, all fire tools, equipment, and pumps will be inspected.

- A program of fire weather index calculations has been implemented and co-ordinated with the District for the Regional fire weather network. Weather stations will be maintained to provide data for fire weather index calculations.

#### **3.4.1.1 Fire Suppression**

**Objective:** The objective of suppression will be to work in conjunction with the MOF to ensure fast initial action and to control any fires by 10:00 a.m. of the day following detection.

**Discussion:** Wildfires on the TFL tend to be small, occur infrequently, and result mostly from lightning strikes. Dunkley frequently undertakes patrol activities in periods of high fire hazard to reduce the risk of an undetected fire. Staff and contractors also respond to and undertake control and mop-up activities of fires on the TFL when assistance is requested by the MOF.

**Strategy:**

- Dunkley forestry staff and contractor employees will continue training to ensure that there are trained fire fighters available to respond to a wildfire.

#### **3.4.2 Prescribed Fire**

**Objective:** To carry out prescribed burning activities in accordance with an approved burning plan and burning permit as required.

**Discussion:** Smoke management concerns; changes to the open burning regulation, and management for biological diversity at the stand level have resulted in the removal of broadcast burning as the site preparation tool of choice on the TFL. Prescribed fire activities foreseen during the term of MP #3 are expected to be restricted to hazard reduction activities such as roadside debris and site preparation slash pile burning.

**Strategy:**

- To be familiar with prescribed burning regulations and requirements and to conduct operations accordingly.

### **3.4.3 Fuel Management**

**Objective:** To reduce the fire hazard resulting from forestry operations.

**Discussion:** Fuel hazard and risk assessments and hazard/risk reduction activities will be carried out as required by the FPC. Fuel management activities will be carried out in a timely manner as required.

**Strategies:**

- To carry out fire hazard reduction activities, when assessments indicate the need, on recently harvested areas.
- To conduct hazard reduction activities along public access corridors when silviculture activities such as spacing create a fire hazard.

## **3.5 Forest Health**

**Objective:**

The objective of the forest health program is to minimize endemic losses to forest stands through preventative measures and to minimize non-recoverable losses of the timber inventory.

**Discussion:**

The forest health program on the TFL can be divided into two components:

- 1) those designed to maintain the mature forest stands, and
- 2) those that are designed to optimize growth of the second growth forests by reducing losses to insects, disease and abiotic factors.

### **3.5.1 Disease Management**

**Strategies:** Disease management strategies are directed primarily at the second growth stands on the TFL.

- The risk of unacceptable long-term losses is reduced by the silviculture strategies of mixed species planting at densities of 1800-2000 sph. Mixed species planting reduces the chance that all the trees in the stand are equally susceptible to disease organisms. The higher

density plantation reduces the consequences of individual tree losses within the plantation.

- Manual brushing programs are used in part to reduce the incidence of infested trees within young stands. By removing infested trees the inoculation source of diseases such as rusts and cankers can be reduced.

### 3.5.2 Pest Management

**Discussion:** Spruce bark beetle and mountain pine beetles are serious threats to the mature timber stands in the TFL area. At the present time spruce bark beetle populations are at endemic levels. Mountain pine beetle populations are expanding in the forests surrounding the TFL and are a major concern. Where infestations occur on the TFL, single tree or patch logging may be applied in combination with trap trees and/or baits to control the problem. Where more serious outbreaks occur, harvest scheduling will be adjusted to control the pest damage and spread.

**Strategies:** In managing endemic pest and other forest health factors, Dunkley employs the following strategies:

- Harvesting of the oldest stands as a priority removes the stands most at risk to endemic and epidemic losses. This strategy is carried out within the confines of integrated resource management considerations.
- An aggressive salvage program on the TFL identifies stands damaged by factors such as insects, windthrow and fire, and harvests these as a priority. This strategy protects the mature forests on the TFL by preventing the spread of insects through their removal and by reducing the windthrow habitat that is beneficial to spruce bark beetles.
- Trap tree and bait tree programs will be continued to control endemic levels of harmful insects and to monitor fluctuations in the insect populations. The size and distribution of the trapping program will be adjusted on an annual basis in response to the monitoring program.
- Dunkley will comply with the current Prince George Forest Region Standard Operating Procedure on bark beetle responsibility and funding matrix. A minimum of one annual overview flight of the TFL in order to identify areas of insect attack, and indications of disease or other infestations will be done. These flights will also identify windthrow areas or other damage from which insects could become established and spread.

- Where changes in stand appearance are identified, ground surveys will be initiated to more precisely identify the problem, map the affected areas, and plan the most effective control measure.

Discussion: The importance of these strategies to the continued success of Dunkley's TFL management is paramount. The results of the strategies to meet these objectives is reflected in the low level of non-recoverable losses calculated for the TFL. The inventory audit conducted by the MOF also can be taken as an indication that endemic or minor losses occurring within the forest stands are at a low level, so that the stand volume is maintained at the amounts predicted by the growth and yield models.

### **3.6 Silviculture**

#### **Objectives:**

Dunkley's silviculture program has been guided by a set of objectives included in the first TFL management plan and repeated below. These objectives focus on enhancing the productivity of the forest landbase.

- To obtain maximum timber harvest for TFL #53 within the land capability and economic and social limitations.
- To maintain and enhance productivity of the forest landbase with a view to increasing allowable annual cuts.
- To restock and achieve free-to-grow status on all cutover lands to targeted stocking levels, with desired species and within a minimum time period to maximize fibre production.
- To restock all current and backlog NSR lands and maintain a "steady-state" silviculture program over time.
- To convert problem forest stands (excluded) into timber stands (contributing) with commercially acceptable species capable of maximizing yields.
- To enhance growth potential on the TFL by improving site occupancy through increased stocking levels and effective plantation maintenance.



### 3.6.1 Silviculture Strategy

Discussion: The silviculture strategy for MP #3 will address two components in order to achieve the silviculture objectives. These components are:

1. MOF funded obligations (Pre-October 1, 1987) - Backlog NSR
2. Basic Silviculture (Post October 1, 1987)

For both components, the silviculture objectives will be met by applying sound basic forestry practices.

#### 3.6.1.1 Backlog NSR

Discussion: Dunkley made significant progress in eliminating Backlog NSR during the term of MP #2. Backlog NSR has been reduced from 2,540.0 hectares at the start of MP #2 to 1,183.0 hectares today. Of the remaining NSR, 204.0 hectares were planted in 1998 and only requires a survey to confirm the area is now stocked. In addition, 153.0 hectares were site prepared in 1998 and planted in 1999. This leaves only 826.0 hectares to be dealt with.

Much of the remaining Backlog NSR consists of areas of high wildlife habitat. It is also extremely difficult to treat, given environmental factors such as proximity to, and distribution of, watercourses throughout the areas. The established vegetation communities require a heavy treatment regime such as mechanical site preparation followed by one or more brushing treatments to produce conditions favourable for establishing additional conifers. The heavy treatment regime may not always be the best course of action, given the other resource factors.

Strategy:

- Dunkley proposes that joint Dunkley-MOF inspections on the remaining Backlog NSR take place to verify the need for increasing the stocking density on these areas. Those areas not needing additional stocking or that will not be treated in consideration of other resource values will be reclassified in the inventory. The classification will reflect the stand attributes, but no longer label the area as NSR. For those areas needing additional stocking, a treatment prescription will be prepared and implemented upon availability of funding.

### 3.6.1.2 Basic Silviculture Activities

Discussion: The basic silviculture program will focus on enhancing the productivity of the forest landbase. This is achieved by directing the productive capacity of the forest stands into potential crop trees. During the term of MP #2 the results of these programs include:

- During the term of MP #2 the regeneration delay has averaged 14 months from the start of harvesting until the area is replanted. The regeneration delay over the last two years has been 11 months. This minimizes the area of current NSR.
- Planting densities of 1800-2000 sph.
- Purchasing seed orchard stock for all the spruce seedling requirements.
- Planting a higher component of pine, where ecologically appropriate.
- Using effective and timely vegetation management, where needed, to promote better survival and growth of the seedlings.

These achievements work towards meeting both short-term objectives of meeting free growing requirements and long-term objectives of enhancing the growth potential and increasing allowable annual cut levels.

Under policies established by the MOF, the licensee will meet all responsibilities for basic silviculture on lands cut after October 1, 1987. Costs of basic silvicultural activities will be allowed for in the appraisal system.

Basic silviculture activities covered by appraisal costs and conducted by Dunkley are:

- Seed collection
- Silviculture Prescriptions
- Site preparation
- Reforestation via natural, seeding, or planting methods

- Assessments
- Stand tending treatments to ensure plantations reach a free growing state. This phase may involve brushing and weeding and other treatments to prevent invasion of undesirable competition.

During the term of MP #3 all basic silviculture activities will be consistent with Silviculture Prescriptions prepared before harvesting an area.

#### 3.6.1.2.1 Seed Collection

The objective of the seed collection program is to ensure that a seed supply is maintained to meet planting requirements. The seed supply must follow the seed transfer guidelines produced by the MOF to ensure that the seedlings planted for an area are properly adapted to grow under local conditions.

The seed supply comes from two sources: natural stands and seed orchards. Seed orchards are designed to produce seed that will produce trees with better than average growth and pest resistance. Dunkley will use genetically improved seed orchard seed in the reforestation program, as it becomes available. Currently, Dunkley has a supply of orchard seed for spruce. It is anticipated that all spruce planted in the future will be seed orchard stock. The remainder of seed requirements will come from natural stands until such time as adequate supplies of orchard seed becomes available.

#### Strategies:

- To use genetically improved orchard seed, as it becomes available.
- To maintain an adequate supply of seed to meet reforestation requirements

### 3.6.1.2.2 Silviculture Prescriptions

**Discussion:** The Silviculture Prescription outlines the objectives and standards that an area will be managed for. It is prepared before harvesting an area and is submitted to the MOF for approval. The Silviculture Plan outlines the treatment method that will be used to meet the targets outlined in the Silviculture Prescription. Both of these documents are based on site-specific factors such as ecosystems, soils, and potential brush problems. Consideration of these factors allows treatments to be carried out that have a high probability of success and that ensure the protection of environmental resources.

**Strategy:**

- Prepare Silviculture Prescriptions and Silviculture Plans that will meet the objectives of the silviculture program and the FPC.

### 3.6.1.2.3 Site Preparation

**Discussion:** Site preparation activities are undertaken to make plantable spots available to meet the planting density target of 1800-2000 sph, to improve the rooting conditions for the seedlings, and also to reduce the fire hazard where heavy slash conditions warrant treatment.

As foreseen in MP #2, mechanical site preparation has become the most common site preparation method on the TFL. This method allows more site-specific management of stand level biodiversity retention than does site preparation treatments such as broadcast burning. Mechanical site preparation methods on the TFL consist primarily of excavator piling of debris to create plantable spots and mounding where soil warming or improved drainage is required to establish seedlings.

Significant portions of harvested areas on the TFL are also raw planted or in other words, planted without site preparation after harvesting. This strategy allows us to minimize regeneration delay on appropriate sites. It also reduces or delays the establishment of herbaceous competition such as fireweed and grasses that have the potential to impact seedling growth.

**Strategy:**

- To conduct site preparation activities in an environmentally sound manner to promote seedling establishment and growth.

#### 3.6.1.2.4 Reforestation

##### Discussion:

Dunkley's silviculture program utilizes a pine component in the planting program, wherever ecologically suitable. This is done to achieve faster green-up of harvested sites as well as to potentially increase the MAI on the regenerated stands as compared to pure spruce plantations.

Dunkley has increased initial planting densities to 1800-2000 sph. This increased planting density is used to target first year survival of 1600 sph. The reasons for this strategy are threefold:

1. By establishing a higher density plantation the site is more fully occupied with potential crop trees, which puts the growth potential of the site into wood fibre.
2. A spin-off benefit is a reduced risk of plantation failure and the subsequent need to fill plant.
3. This strategy will result in the creation of the option of commercial thinning. With higher densities, intermediate stand entries may be possible to ameliorate minor timber availability constraints that are forecast to occur 50-60 years in the future.

##### Strategy:

- Table #3 presents guideline stocking standards and species selection by site series proposed for both initial stocking and for target levels at free growing. The minimum stocking standards follow the Correlated Guidelines for Tree Species Selection and Stocking Standards for the Ecosystems of British Columbia (July 1993).

The minimum stocking standards remain unchanged in recognition that there is likely to be small areas in most plantations that will not achieve the target stocking. These areas are beneficial from an integrated resource management perspective, as they allow for increased vegetation diversity at the stand level. At the minimum stocking standards proposed, the integrated resource management objectives can be met without major impacts on sawlog production objectives.

Silviculture Prescriptions will form the basis for defining preferred and acceptable species. Table #3 defines pine and spruce planting guidelines. Other tree species such as balsam will occur from natural and advanced regeneration. Douglas-fir is planted as a minor stand component where it occurs naturally in the pre-harvest stand and other ecologically appropriate sites.

The licensee will grow seedlings at selected private nurseries, with stock types and species selected according to the site requirements. In general, large PSB 415B or 412A stock will be used for spruce seedlings and PCT 313 stock for lodgepole pine.

As Dunkley is committed to planting essentially all of the areas logged (exclusive of the SBFEP areas), the forecasted 650.0 hectares harvested per year and initial stocking levels averaging 1900 sph results in a yearly requirement of approximately 1,235,000 seedlings.

A portion of harvested areas require some form of stand retention to achieve management objectives for riparian management zones, visually sensitive areas, or areas of important wildlife habitat. Stocking in these areas is maintained through a combination of existing stocking and fill planting where gaps in the retention canopy occur.

Subzone	Site Series	Initial Stocking Guidelines*		Targets @ FTG	Minimum Standards @ FTG	Comments
		Pine	Spruce			
SBS dw 1 (k1)	01, 04-07	1200+	600	1600	700	<b>01-08 Site Series:</b> Douglas-fir to be planted to maintain pre-harvest levels and will be considered a primary source. <b>08,09 Site Series:</b> Balsam from natural and advanced regeneration will be considered as a secondary species.
	02	1600		1000	500	
	03	1800		1600	700	
	08	600+	1200	1600	700	
	09	600+	1000	1000	500	
SBS mw (c)	01,04-07	1200+	600	1600	700	<b>01-04,06,08 Site Series:</b> Douglas-fir to be planted to maintain pre-harvest levels and will be considered a primary species. <b>01,04-09 Site Series:</b> Balsam from natural and advanced regeneration will be considered as a secondary species.
	02	1600	1000	1000	500	
	03	1800	1600	1600	700	
	08	600+	1200	1600	700	
	09	600+	1000	1000	500	
	10	400	400	400	200	
SBS mk1 (e2)	01,05,07	1200+	600	1600	700	<b>01-04,06,08 Site Series:</b> Douglas-fir to be planted to maintain pre-harvest levels and will be considered a primary source. <b>01,07-09 Site Series:</b> Balsam from natural and advanced regeneration will be considered as a secondary species.
	02-04,06	1800		1600	700	
	08	600+	1200	1600	700	
	09	600+	1000	1000	500	
	10	400+	400	400	200	
SBS wk1 (j1)	01,04-06	1200+	600	1600	700	<b>01,03-05 Site Series:</b> Douglas-fir to be planted to maintain pre-harvest levels and will be considered a primary species. <b>01,04-10 Site Series:</b> Balsam from natural and advanced regeneration will be considered as a secondary species.
	02	1600		1000	500	
	03	1800		1600	700	
	07-08	600+	1200	1600	700	
	09-10	600+	1000	1000	500	
	11	400+	400	400	200	
ESSf wk1 (h1)	01,03-05		1800	1400	700	Balsam will form a component of the stand in this subzone. Establishment of Balsam will be through advanced regeneration and/or natural regeneration. Planting of Balsam may occur on a trial basis.
	02		1600	1000	500	
	06,07		1600	1000	500	
	08			Non-forested		

#### 3.6.1.2.5 Assessments

**Discussion:** Dunkley, as a guideline, schedules stocking surveys one and three years after planting to monitor plantation performance. The first year survey confirms the stocking status of the unit. The third year survey provides a measure of performance of the plantations, as well as information for proposed future treatment that may be required to meet basic silviculture objectives as outlined in the Silviculture Prescription.

**Strategies:**

- Dunkley will adhere to the MOF's policies and procedures regarding surveying and monitoring of plantation performance.
- A pre-free growing assessment will be scheduled three years before the earliest free growing date to assess the plantation and to provide information for any additional treatments that may be required to ensure a free growing plantation in the minimum possible time frame.

#### 3.6.1.2.6 Stand Tending

**Discussion:** In general, Dunkley plans the judicious use of aerial application of herbicides for vegetation management. This treatment has minimal impact on the soil resource. Through timely treatment, lower application rates of active ingredient per hectare can be used to achieve Silviculture Prescription obligations. Biodiversity and green corridors are maintained on treated units with the application of Pesticide Free Zones and non-treated buffer strips.

**Strategies:**

- Brushing will be done by mechanical, biological or chemical means, as required, to meet our obligations of establishing a free growing stand within the time period specified in the Silviculture Prescription. Any herbicide application will be done in strict compliance with the *Pesticide Control Act*.
- The impact of herbicide treatments on growth response and treatment efficacy will be monitored through the plot systems developed by the Northern Interior Vegetation Management Association, of which Dunkley is a member.



### **3.6.2 Intensive Silviculture**

**Objective:** The objective of the intensive silviculture program on the TFL is to increase the long run sustainable yield.

**Discussion:** Intensive silviculture includes stand treatments that will secure wood yields and values superior to those possible from basic silviculture alone. Activities are designed to increase the usable fibre available from the landbase. The gains realized through intensive forest management practices such as conifer release (cleaning), juvenile spacing, site rehabilitation, fertilization and the use of genetically superior seed will increase the long run sustainable yield.

#### **3.6.2.1 Plantation Enhancement**

The Timber Supply Analysis prepared in support of MP #3 indicates that the harvest flow for the TFL is most constrained in the period 50 to 60 years from present. At this point in time, the stands harvested are changing from primarily natural stands to second growth plantations as they reach a merchantable age. It is very important that the plantations established between 1972 and 1982 produce the yields predicted for these stands to minimize the impact on harvest flow. There are 6,686 hectares of managed stand plantations established in the 1972-1982 period. The majority of these stands are expected to grow to final harvest without any further silviculture interventions to achieve their predicted yield. This has been assisted by a large manual brushing program conducted through FRBC. Much of the 2,400 hectares of manual brushing conducted during the last five years was geared towards ensuring the growth potential on these sites is focused on the future crop trees.

Forest fertilization also holds much potential to increase the yield from these sites over and above that predicted by the growth and yield model. Dunkley treated 300.0 hectares of target plantations with an operational fertilizer program in 1997. We will need to collect more data on the treatment effect of fertilization on our plantations. Dunkley is co-operating with the MOF in a fertilization response trial on the TFL.

Strategies:

- During MP #3 Dunkley plans to establish additional fertilizer monitoring plots to quantify the growth response of plantations to fertilizer applications.
- Operational fertilization programs will be implemented, contingent upon beneficial results in response monitoring and program approval through FRBC.
- The remaining areas that could benefit from manual brushing will be completed through the FRBC program during the term of MP #3.

### 3.6.2.2 Road Reclamation

Discussion:

In 1993 Dunkley began operational trials in the reclamation of non-productive road grades no longer needed for access, as part of the road deactivation program.

Site preparation treatments included ripping, ripping with organic matter enhancement, and complete re-contouring of the former road surface. Planting of these areas commenced in 1994.

During the term of MP #2 road rehabilitation activities were expanded both on appraisal roads and on older roads no longer needed for access.

This program will enhance the timber resource for future generations by keeping more of the landbase as productive forest. It also has immediate benefits in meeting environmental and water quality objectives. Surface erosion is reduced and soil stability is enhanced by re-establishing a forest on these rehabilitated surfaces.

Strategy:

- To continue the road and trail rehabilitation program to minimize losses to the productive forest landbase.

## **3.7 Roads**

### **3.7.1 Road Construction/Maintenance**

**Objective:** The objective of road construction and maintenance is to provide access for forest management activities.

**Discussion:** The majority of the main and secondary road systems on the TFL are in place. With the exception of the south portion of the TFL, only minor extensions to existing mainline road systems are anticipated.

During the term of MP #2, a large effort was undertaken to assess, repair or replace culverts on the mainline road systems. Many of the drainage structures were established twenty years ago or earlier and required upgrading to ensure that they continued to function to protect environmental values.

In-block road systems also saw two major changes during the term of MP #2. These changes were introduced to meet the objective of maintaining the productive capacity of the TFL landbase:

- Harvesting has been converted to a roadside logging system. This reduces losses of the productive landbase through the elimination of landing construction.
- Road construction practices reflect the objective to restore productivity on the in-block roads not needed for long-term access.

**Strategies:**

- Road construction standards, planning and access development will continue to follow Provincial Engineering Standards. All roads used in forestry operations by Dunkley will be maintained when active. Routine maintenance will be conducted as and when necessary.
- All bridges in the TFL will be inspected regularly and maintained as required.

### 3.7.2 Road Deactivation

**Objective:** The objective of road deactivation is to maintain and enhance water quality, soil conservation and forest productivity.

**Discussion:** Roads constructed for current harvesting operations are deactivated when maintenance is no longer required to support anticipated forest activities. Consideration is given to range, guide outfitting, fish and wildlife, and other user groups in deactivating roads.

**Strategies:** Road deactivation strategies within TFL #53 include the following:

- Temporary deactivation: Upon completion of harvesting operations, on-block and access roads will be temporarily deactivated. This treatment is intended to minimize erosion by controlling surface drainage and establishing a back-up system for ditches and culverts. This will include constructing water bars, cross drainages, cleaning ditch lines, and crowning or outsloping road surfaces.
- Semi-permanent deactivation: Upon completion of site preparation and reforestation, all spur and access roads no longer required for operations will be semi-permanently deactivated. This will include removal or drainage structures, additional cross drainage installation, and returning water flows to original patterns, rehabilitating cut and fill slopes where required, grass seeding as necessary and any remedial works needed to ditch lines, road surfaces or original cross drains.
- Permanent deactivation: This work may include restoring natural surface drainage patterns, outsloping/insloping the surface of logging roads, pulling back side cuts where appropriate, ripping and tilling, and re-establishing vegetation. Permanent deactivation is often done in conjunction with road rehabilitation work designed to restore forest productivity to the road area.
- In addition to current roads, Dunkley has initiated access management planning and road deactivation activities on the entire TFL road network. Dunkley has deactivated roads no longer needed for forest management or other resource activities on the TFL. An Access Management Plan was completed March in 1999. The remaining road deactivation treatment is scheduled for completion during the term of MP #3 through Dunkley's Multi-Year Agreement with FRBC.

## **4.0 Consultation with Other Resource Users**

Dunkley maintains regular contact with people using the TFL for purposes other than timber production. As people or groups are identified that express an interest in TFL activities, they are added to our "TFL User List" for future referrals (Appendix 9). Dunkley also places advertisements in local newspapers to invite comments on proposed activities from interested parties that we are not otherwise aware of.

Consultation takes place as regulated by the FPC and the Forest Act. This includes the Forest Development Plan and the MP process as well as other required referral documents. In addition, Dunkley maintains an open door philosophy for informal discussions with TFL users to keep each other up-to-date on TFL activities. This informal process extends to meetings with the Hixon Community Association.

Dunkley also recognizes the Crown's fiduciary responsibility to consult with First Nations people. To assist in this responsibility, Dunkley refers Plans and Permits to the aboriginal groups identified to us by the Crown agencies to initiate the consultation process.

## 5.0 Impact Summary of MP Implementation

The manufacturing facility at Strathnaver utilizes approximately 600,000 m<sup>3</sup> of logs on an annual basis. The AAC approved for MP #2 provides only 29% of this requirement in the form of a long term secure timber supply. The proposed harvest level in MP #3 of 220,370 m<sup>3</sup>/year (net of TFL SBFEP) would improve the secure timber supply from the TFL to 37% of log consumption requirements. This increase, resulting from the application of progressive forestry practices, is a keystone in Dunkley's objective to secure 60% of the wood supply needed to maintain the employment level and economic activity that results from a two-shift operation at the sawmill.

An increase in the harvest level on the TFL will produce an increase in economic activity on the fixed landbase and will help maintain employment stability. As outlined in the Objectives and Strategies for Employment and Economic Opportunity (Appendix 1) the primary focus of Dunkley is to improve the secured wood supply as the basis of maintaining the existing jobs at Dunkley. The number of employees at Dunkley has been stable over the last twenty years and has actually increased. Over half of these employees have been working with Dunkley for ten years or longer. Dunkley is keenly aware of the "social contract" it has with the employees and strives to maintain its employment obligations. Critical to maintaining these jobs is the need to increase our volume of secured timber.

The same philosophy applies to the contractors in our woodlands operations that rely on the TFL for a large part of their job security. A higher AAC will extend the work season for the independent harvesting and silviculture contractors. More work will also improve the certainty needed to justify the large investments required to replace and upgrade equipment. This enables them to conduct operations in an efficient and environmentally sound manner.

We are proud of the fact that the proposed increase in the harvest level has resulted from our forest management activities that started many years ago and have continued through the heightened environmental period of the FPC of BC. While the additional protection of the soil resource, water quality, fish habitat and biological diversity set out in the Act and Regulations of the FPC has reduced the landbase available for timber harvesting, the investment by Dunkley in the remaining working forest has compensated for the landbase reduction.

## **6.0 Key Similarities and Differences between MP #2 and MP #3**

The current Management Plan (MP #2) has been proven to be a successful guide for achieving the overall objectives for the TFL. The harvesting, silviculture, protection, and planning strategies have shown continued success in managing the TFL as a working forest within the context of integrated resource management. These strategies are continued in this proposed Management Plan (MP #3). Small changes to them reflect the evolution of forestry knowledge and the policy framework within which our activities take place. These adjustments are more "fine-tuning" to optimize performance rather than a change in direction for the programs.

The major difference in the strategies, when comparing MP #2 and this proposed MP #3, are related to the introduction and implementation of the FPC. This has standardized the protection and conservation of non-timber resources including those on the TFL.

Fisheries and wildlife management has moved from the species specific management developed for MP #2 to more broadly base strategies designed to manage and conserve biological diversity. Stand level biological diversity policy and riparian management areas have replaced the strategies developed for the Resource Planning Units that were delineated on the TFL for MP #2. The challenge with the broad-brush approach of the FPC guidebooks is to ensure that local conditions and site-specific knowledge are incorporated into the strategies. This will increase the chance of success that the objectives of biological diversity will be achieved. Dunkley will continue to develop strategies that meet the objectives of biodiversity management while reflecting the local conditions of the TFL.

## **7.0 Public Review Strategy**

The following strategy is proposed for the next Management Plan #4:

### **7.1 Initial Advertising of the Management Plan**

- Advertisements will be placed in local newspapers inviting comments and identifying subjects to be addressed in MP #4. After advertising for two consecutive weeks, viewing will be available for a thirty-day period at the Dunkley Forestry Office.
- Letters will be sent to the TFL referral group inviting comments on the past Management Plan. The referral group includes trappers, guides, and other known tenure holders, aboriginal bands with a potential interest on the TFL and members of the public who have expressed an interest in the TFL.

### **7.2 Public Viewing of the Statement of Management Objectives, Options and Procedures (SMOOP) and Objectives for Employment and Economic Opportunity (OEEO)**

An advertisement describing the draft SMOOP, the OEEO and the opportunity for further public input will be published two times in one week in the Prince George and Quesnel newspapers upon submission of the documents to the MOF. In addition, letters will be sent to those groups on the TFL's referral list including resource users and First Nations bands.

The SMOOP and information regarding further scheduled events in the preparation of MP #4 will be available for viewing at Dunkley's Forestry Office during normal office hours for a two week period starting after the advertisements have been placed. Any oral or written submissions will receive replies and copies will be provided to the MOF.

Copies of the draft SMOOP will be submitted to the District, Region, and Branch of the MOF, the Ministry of Environment, Lands and Parks, and the Department of Fisheries and Oceans, Canada for comment.



### **7.3 Public Viewing of the draft MP and Proposals for Employment and Economic Opportunity**

After the Timber Supply Analysis has been approved and a draft MP #4 has been submitted to the Regional Manager, Dunkley will make arrangements for a public viewing and open house. An advertisement will describe the purpose of MP #4, the unapproved status of the draft version and the opportunity for public input. The advertisement will be published twice over a two-week period in the Prince George and Quesnel newspapers. Letters will be sent to those on the TFL referral list. A notice will be posted in the community of Hixon.

A scheduled one-day open house will occur in the community of Hixon during daytime and evening hours to allow ample time for public participation and comment in the review of MP #4. As well as the scheduled open house, the draft plan will be available for viewing at the Dunkley Forestry Office during normal office hours (or as otherwise arranged) for 30 days.

Public input will be collected during the review period for incorporation into the final submission of MP #4. Any submission will receive replies and copies will be provided to the MOF.

Copies of the draft MP will be submitted to the Regional Manager of the MOF for subsequent distribution to the previously mentioned resource agencies.

This review strategy will give the public opportunity to provide comments and become involved in the MP process. In the past management plan process, the concerns raised by the public have been minor or non-existent. We partake in ongoing, frequent communication with local resource users, neighbours and the community of Hixon so that concerns and issues are dealt with in a timely fashion.

## **8.0 Other Information**

### **8.1 Public and Agency Involvement**

This section will be completed following the review of the draft MP:

- Resulting from the referral to the Regional Manager and to resource agencies; and
- As a result of public comment.

### **8.2 Planning**

#### **8.2.1 Higher Level Plans**

There are no higher level plans in effect for the TFL area.

#### **8.2.2 Other Planning Initiatives or Approved Plans**

The Prince George LRMP (March 1999) has been approved by the Minister of Forests, the Minister of Energy and Mines, and the Minister of Environment, Land and Parks. This is a strategic level plan that is implemented through Government Policy. Dunkley supported the development of this plan through active participation as a member of the LRMP table and continues to support its implementation. To achieve implementation, Dunkley will give consideration to the objectives and strategies in the LRMP when preparing Forest Development Plans.

The Prince George Land and Resource Management Plan designated the TFL as an Enhanced Resource Management Zone. The management intent defined for this zone is to develop and enhance the timber resource consistent with the objectives of the RMZ. In an attempt to define what this zonation will mean operationally, Dunkley undertook the analysis of five scenarios in the Timber Supply Analysis Report (TSAR). These scenarios are:

- Explore the effect of an expanded commercial thinning program.
- Assess the effect of forest fertilization.
- The impact of doubling the road deactivation program was explored.
- Reduce the green-up delay across the TFL to equate to 2.5 metres.

- An enhanced level of plantation management assessed the impact of reducing the OAF's for managed stand yields by 1/3 for pine and 1/2 for spruce.

The modelling of these scenarios shows no short term improvement to the harvest forecast with the exception of a small increase of 1,500 m<sup>3</sup>/year resulting from a reduced green-up height of 2.5m. The absence of short term impacts results from two factors:

1. The growth response to the proposed treatment is not quantified. When the growth and yield response is not well understood, a conservative approach to modelling must be used. This method understandably downplays the impact of the scenario. This is especially true for the forest fertilization program.
2. The treatment effect is not realised until the second growth stand is harvested. With the exception of commercial thinning, the treatment options explored may produce more volume in the second growth stands, but this is not available in the short term to boost short-term harvest levels.

While these scenarios were not overly encouraging in their results, we will do further exploration of the forest fertilization option as described in Section 6.3.3.

The challenge remains to describe management options that will achieve the intent of the enhanced forest zonation for the TFL. To meet this challenge Dunkley undertook an additional enhanced forest zonation run in the TSAR. This run explored a combination of management options that can be further explored during the term of MP #3. These options include:

- Maintaining the fibre production potential of the TFL by managing biological diversity to the legislated requirements only. This would enhance the timber resource by reducing the impacts of District Policies.
- Apply a low biodiversity emphasis if landscape unit planning is implemented.
- Remove visual landscape management restrictions. Scenic areas would still be considered, but without the formal applications of visual quality objectives and the restrictions on the harvest levels that these bring.

- Reduce green-up height. This should release timber that is currently constrained by adjacency constraints.
- Apply operational adjustment factors derived from survey methodology rather than using default values. This will reflect such factors as the increased stocking densities used on the TFL.
- Carry out operational trials and install monitoring plots to study the impact of forest fertilization on forest growth and yield.

Enhanced forest zonation, by incorporating the assumptions above, provides a very promising outlook for the potential future harvest flow for TFL #53. A short-term harvest level of 276,000 m<sup>3</sup> per year is 11% higher than the current base case harvest level. The long-term harvest level is 7.5% higher than the base case. A harvest level of 371,000 m<sup>3</sup> per year is sustainable in the long term. These results provide some measure of the impact that an enhanced forest zonation could provide on the sustainable harvest flow, as a result of various management initiatives and changes to government policies. They also provide a target for forest managers to work towards using enhanced forestry activities on TFL #53.

### 8.3 Scheduled B Prorate

There is no Schedule A lands incorporated into TFL #53. The timber harvesting landbase of TFL #53 as described in the Information Package supporting the Timber Supply Analysis Report is 70,142.3 hectares in the base case.

## Conclusion

Management Plan #3 has been designed to achieve the overall objectives for TFL #53, as described in Section 3.0 of this Plan. Since the granting of the TFL, Dunkley has put in considerable effort and investment towards meeting these objectives. This effort is driven by the need to improve the secured wood supply for the manufacturing facility. Increased harvest levels from the TFL are the cornerstone to maintaining Dunkley as a viable entity. It also allows Dunkley to maintain our "social contract" by improving the job security and economic benefits that accrue to the employees of Dunkley Lumber Ltd., their families, and the local communities. MP #3 proposes a harvest level of 249,000 m<sup>3</sup>/year. This harvest level is the cornerstone in the building block approach of achieving 60% of the mill capacity in a secure supply. From that base, Dunkley is confident that a two-shift operation can be maintained into the future.

The TFL strategies also recognize that the TFL is managed as an enhanced resource management zone, primarily focused on producing a continuous and expanding timber supply. These strategies are designed in an environmentally sound manner to ensure all of the forest resources are managed on a long-term sustainable basis. Considerable effort is expended to ensure that water quality and the soil resources are a focus of attention in resource management activities. Consideration of these and other resource values occurs as a normal business practice, as directed by the FPC and the strategies in MP #3. Communication with the other resource users is also a component of standard practice on the TFL. Through these activities, care and consideration of the multitude of values found on the TFL occurs. Dunkley is proud of the fact that we can meet our objectives in the context of sound and sustainable forest resource management.