RIVERSIDE FOREST PRODUCTS LIMITED

TREE FARM LICENCE NO. 49

PROPOSED MANAGEMENT PLAN NO. 4

JANUARY 1, 2005 – DECEMBER 31, 2009

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RIVERSIDE
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1.0 INTRODUCTION

Tree Farm Licence No. 49 (TFL 49) referred to as the "Okanagan Tree Farm Licence" is held in the name of Riverside Forest Products Limited (Riverside) of Kelowna B.C. The primary importance of TFL 49 to Riverside is its capability to produce timber values within an integrated resource management (IRM) framework. Wildlife, cattle grazing, water values, and recreational activities are ranked high in importance in certain parts of the TFL. Identifying, ranking, and incorporating these resources into harvesting plans are the challenges of IRM.

The planning process for management of a Tree Farm Licence involves several steps designed to ensure that all resource uses are given appropriate consideration. The process culminates in the management plan, which describes the strategic objectives and operating procedures for the TFL, and provides the data and analysis necessary to identify appropriate harvest levels.

1.1 SCHEDULE AND PROCESS

Management Plan No. 3 for TFL 49 took effect January 1, 1999 and was to expire on December 31, 2003. On March 28, 2002 the expiry date of MP No 3 was extended to December 31, 2004 by order of Ken Baker, Deputy Chief Forester. Allowable harvest levels on TFLs have traditionally been set for the duration of the management plan. However, under legislation in force at that time, no extension of the AAC determination was allowed. On August 26, 2002, and under new legislation, Ken Baker postponed the AAC determination to April 1, 2005. With these changes, the AAC determination process is no longer tied to the management planning schedule.

After approval by the Chief Forester, *Management Plan No. 4* (MP No. 4) will take effect on January 1, 2005 and will be in force for five years.

Table 1.1 provides a summary of the key dates in the planning process.

Table 1.1 - Management planning schedule

Activity	Deadline Date
Regional Manager sends MP assessment and guidelines in effect	Aug 1, 2003
Submission of *Timber Supply Analysis Information Package*	Dec 1, 2003
Submission of *Draft Management Plan No. 4*	Dec 1, 2003
Advertise public review of draft plan	Dec 1, 2003
Regional Manager comments on the draft plan	Feb 28, 2004
Timber Supply Forester accepts or rejects the information package	March 1, 2004
Submission of summary of comments and actions with regard to comments	March 31, 2004
Submission of the *20-year Plan*	June 1, 2004
Submission of *Timber Supply Analysis Report*	June 1, 2004
Submission of *Proposed Management Plan No. 4*	Aug 31, 2004
District Manager accepts or rejects the 20-year plan	Sept. 1, 2004
Timber Supply Forester accepts or rejects the timber supply analysis	Sept 1, 2004
Chief Forester accepts or rejects the proposed plan	Oct 31, 2004
Expiry of *Management Plan No. 3.*	Dec 31, 2004
Redetermination of AAC	April 1, 2005

1.2 LOCATION

TFL 49 is located west of Okanagan Lake and covers approximately 144,000 ha (see Figure 1.1). The TFL was designated as a result of an amalgamation in 1984 of Tree Farm Licences No. 9 (Block A), No. 16 (Block B), and No. 32 (Block C). Management on this area-based licence has been conducted for over 50 years. Block A is situated west of Okanagan Lake to the height of land between the Okanagan and Nicola drainages, and north of Lambly Creek, to the Naswhito Creek drainage. Block B adjoins the north west portion of Block A, runs west of Bouleau Lake, bounded on the south by the Salmon River drainage, to Salmon Lake, north to Monte Lake and west to the Monte Hills and Weyman Creek drainage. Block C is separate from the rest of the TFL. It is located north of Falkland and east of Pillar Lake towards the Salmon River.

1.3 CHANGES FROM MP NO. 3

Management Plan No. 4 represents only an incremental change from *Management Plan No. 3*. However, four significant developments have been addressed in preparation of MP No. 4.

1. The Okanagan-Shuswap Land and Resource Management Plan (LRMP) has been approved (please see http://srmwww.gov.bc.ca/sir/lrmp/okan/). MP No. 4 reflects Riverside's commitment to the LRMP.

2. MP No. 4 has been prepared during a period of transition between management under the Forest Practices Code of British Columbia Act (FPC) and the Forest and Range Practices Act (FRPA). For the most part this plan reflects the FPC era, however, some topics such as forest development planning address FRPA changes.

3. Riverside has initiated, in partnership with the Provincial Government, an Ecological Forest Stewardship Project (the TFL Project) to develop and implement a total resource, results-based, sustainable forest management system (please see http://www.riverside.bc.ca/woodlands/index.htm). Regulations guiding operations under the TFL Project have been finalized. MP No. 4 has been prepared in order to meet obligations in the traditional planning framework, but it is anticipated that the plan will be superceded by an *Ecological Stewardship Plan* once the new plan is approved. MP No. 4 does not attempt to predict the management system or results-based regulatory framework to be defined by the TFL Project.

4. A predictive ecosystem mapping (PEM) based ecological inventory (see Map No. 1, Appendix VII) has been completed for the entire TFL area (Timberline, 2000). This new inventory joins the vegetation resources inventory (VRI) as a foundation inventory for management. The timber supply analysis will use the PEM to move modelling processes closer to operational reality in terms of silviculture management regimes, use of genetically improved seedlings, and more accurate stand productivity estimates.

1.4 ECOLOGICAL FOREST STEWARDSHIP PROJECT

As noted above, Riverside's Ecological Forest Stewardship Project, enabled under section 221.1 of the Forest Practices Code of B.C. Act has become known as the TFL Project. Although approval of the regulation for the TFL Project has been received, this proposed Management Plan No. 4 is submitted to complete the traditional TFL 49 planning process and as a vehicle for the re-determination of the allowable cut. However, during the period of MP No. 4 Riverside will make the transition from the current management plan and forest development plan framework to the *Ecological Stewardship Plan* as defined in the pilot project regulation.

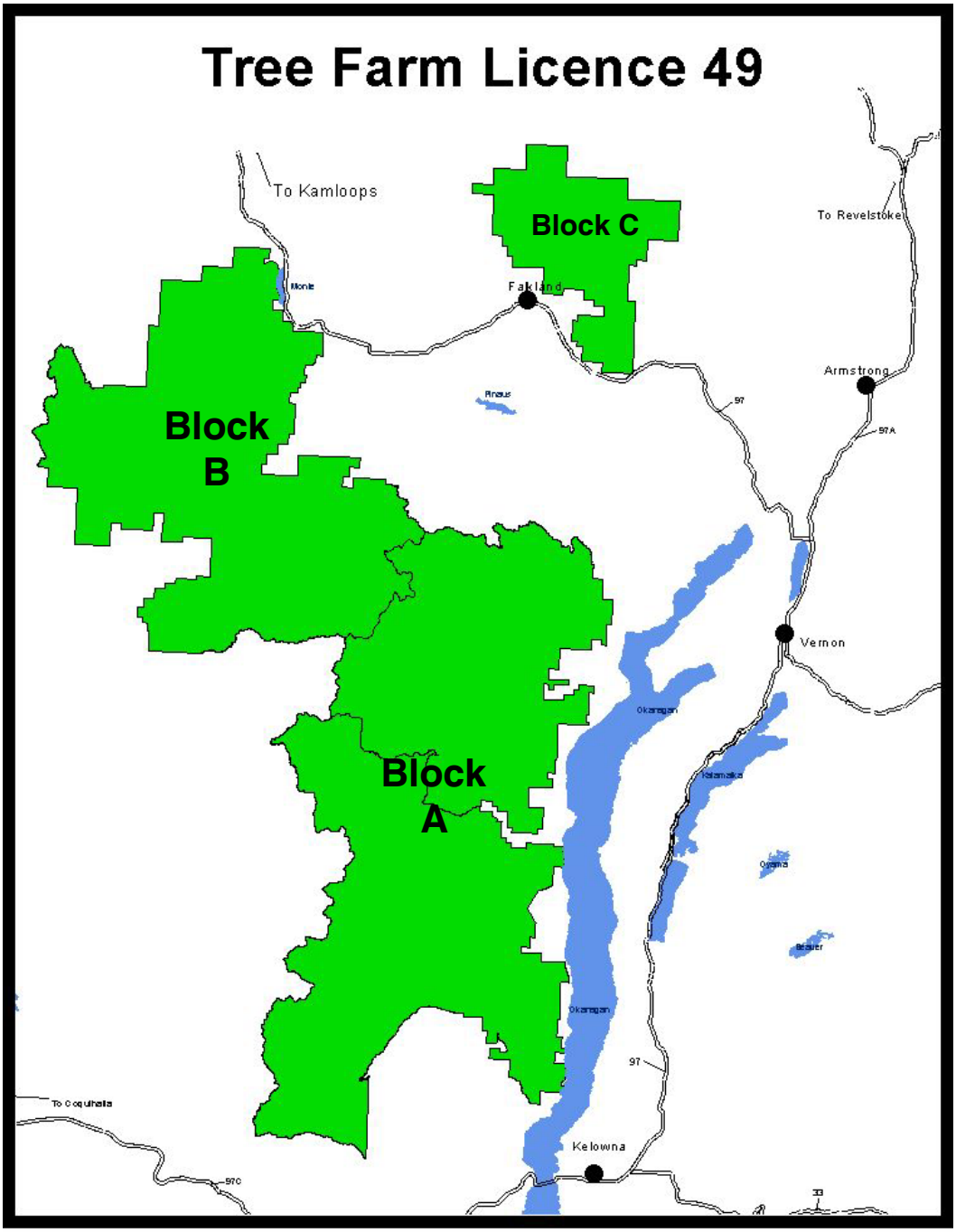

Figure 1.1 - TFL 49 location

1.5 ECONOMIC IMPACTS

Riverside is an integrated, publicly traded forest products company. Operations include manufacturing facilities at the following locations:

- Lumby. Lumby Division - green veneer plant and lumber recovery mill;
- Armstrong. Eagle Rock Reforestation Center - seedling nursery;
- Armstrong. Armstrong Division - plywood plant and studmill;
- Ashcroft. Ashcroft Facility - wood preservative treating facility;
- Williams Lake. Soda Creek Division - studmill, finger-jointing plant, and whole log chipping facility and a re-manufacturing plant;
- Williams Lake. Williams Lake East Division - three-line sawmill;
- Williams Lake. Williams Lake West Division - dimension sawmill;
- Winfield. Winfield Facility - secondary manufacturing;
- Kelowna. Kelowna Division - studmill and plywood plant; and
- Vancouver. Product trading operation.

Riverside's mill and woodlands employment base is relatively stable at approximately 2,170 employees with only slight variations due to seasonal demands. An additional 1,200 people working for independent contractors in silviculture and logging activities are employed in these operations.

Timber harvested from TFL 49 accounts for approximately 20% of the Armstrong and Kelowna mill demands. The employment base for TFL 49 includes the communities of Westwold, Falkland, Monte Lake, Armstrong, Vernon, Kelowna, Westbank, and the surrounding rural areas. Independent contractors carry out all timber harvesting on TFL 49.

The TFL is located in the Okanagan Shuswap Forest District of the B.C. Ministry of Forests (MoF).

1.6 OTHER IMPACTS OF THE PLAN

The timber supply analysis which accompanies *Proposed Management Plan No. 4*. models, through the integration of resource inventories and the use of forest cover constraints, the production of various timber and non-timber resources through an extended time period. By explicitly constraining harvest we ensure that IRM objectives, as expressed in the constraint regimes, are met. The analysis exercise ensures that Riverside's primary goal, namely to maintain a long-term, economically viable forest products operation while practicing sound integrated resource management, is met.

1.7 MANUFACTURING FACILITIES

Riverside's two main Okanagan manufacturing facilities supplied by TFL 49 are located at Armstrong and Kelowna. Logs that are not suitable for plywood manufacture, or do not fit the sawmill configuration, are sold or traded to other local manufacturers.

1.8 MOUNTAIN PINE BEETLE UPLIFT

There is currently a significant outbreak of mountain pine beetle (MPB) (*Dendroctonus ponderosae*) affecting mature lodgepole pine stands across B.C. TFL 49 is not immune to this infestation, and there is significant impact on the TFL, especially Block B. The TFL has been declared an Emergency Bark Beetle Management Area so that administrative benefits from the *Bark Beetle Regulation* can be utilized.

Riverside Forest Products Limited requests a temporary AAC uplift to minimize losses from MPB. Information in this section presents support for this uplift application, including hazard mapping and impact assessments.

Salvage operations to recover beetle-attacked wood are given priority over harvesting green timber on the TFL. As part of the timber supply analysis for MP No. 4, the impact of harvesting highly susceptible pine stands during the first 10 years of harvest was evaluated in order to understand the implications on the sustainable timber supply. Accelerated harvest for mountain pine beetle was found to have little impact on mid and long-term harvest levels and non-timber resources. Please see the *Timber Supply Analysis Report* (Appendix I).

The MPB outbreak has required a shift in harvesting priorities for the TFL. There will be a need to increase harvesting in MPB attacked and high-risk stands during the period of MP No. 4, as demonstrated by recent surveys, inventory review, and overview flights.

The MP No. 4 timber supply analysis has evaluated the impact of increasing harvest in MPB stands over the next five years to address the beetle outbreak. Increasing the AAC to 480,000 m^3/year will allow Riverside to fight the spread of the beetle and salvage affected timber on TFL 49. Increasing the annual harvest by 100,000 m^3/year does not negatively impact non-timber resources or the timber supply in the future as indicated by the timber supply analysis.

The following information summarizes the area and volume of timber by risk category for MPB attack. In addition, recent harvesting activity in MPB stands is provided to demonstrate the significance of the current outbreak on TFL 49 and Riverside's harvest performance to date.

1.8.1 Recent Harvesting Distribution

A large component of the annual cut has been directed into MPB attacked and high-risk stands for at least the past four years, as summarized in Table 1.2 below.

Table 1.2 - Harvest distribution on TFL 49 2000 - 2004

Harvest Year	Total Harvest (m^3)	MPB Harvest[2]		Forest Health Salvage		Conventional Harvest	
		Volume (m^3)	% of Total	Volume (m^3)	% of Total	Volume (m^3)	% of Total
2000	343,565	212,750	62%	38,408	11%	92,407	27%
2001	467,781	287,845	62%	69,490	15%	110,446	24%
2002	312,744	164,362	53%	46,812	15%	101,570	32%
2003	303,454	256,946	85%	17,786	6%	28,722	9%
2004 YTD[1]	175,876	130,035	74%	25,619	15%	20,702	12%
Total	**1,603,420**	**1,051,938**	**67%**	**198,115**	**12%**	**353,847**	**21%**

Source: Riverside Production System (scale) Data
Notes:
[1] 2004 YTD salvage includes 23,457 m^3 of fire salvage from the Cedar Hills Fire of August 2003.
[2] Includes negligible amounts of harvest for fir and spruce beetle and blowdown.
[3] The TFL has historically been managed by two Riverside woodlands units in different Forest Districts. Approximately 33% of the AAC was managed in the former Penticton Forest District, which had minimal beetle infestations early on in the decade. Management has now changed to one woodlands unit and AAC is more focused in the north end addressing MPB infestations.

The impact of MPB on the harvest distribution on TFL 49 is clearly shown by Table 1.2. At least 75% of harvesting during the past four years has been directed into stands affected by beetle attack or other salvage operations. During 2003 85% of the harvest on TFL 49 was in stands affected by pine beetle. Over the next few years a significant portion of the harvest is likely to stay in pine stands to address salvage and spread of the beetle. Harvest will focus on damaged and at risk stands and salvage of other pathogens to the degree possible given milling and marketing factors.

1.8.2 Inventory in MPB Attacked Stands

Riverside has completed a review of stands on TFL 49 affected by MPB. Regional overview flights provide the basic pest incidence data. Subsequent detailed aerial flights over TFL 49 confirm that the regional overview data is in the correct order of magnitude. Severity levels were assigned to stands based on inventory characteristics, and overview flights completed during the summer of 2004. Table 1.3 summarizes the current state of the inventory on TFL 49 with regard to MPB incidence. Note that the volumes have been adjusted by the average mature volume factor from the MP No. 4 timber supply analysis.

Table 1.3 - Inventory status by MPB severity class

Species & Status	Volume by Severity Class (m^3) [1, 2]				Total
	Low	Moderate	Severe	Very Severe	
Proposed Logging					
Pine	222,117	112,420	54,114	159,566	548,216
Douglas-fir	37,687	41,962	6,213	7,963	93,825
Spruce	29,890	22,834	4,502	8,676	65,902
Others	8,850	4,071	2,209	4,229	19,359
Total Proposed	**298,544**	**181,287**	**67,038**	**180,433**	**727,302**
No Proposed Logging					
Pine	493,857	305,863	143,826	110,192	1,053,737
Douglas-fir	309,307	281,572	37,844	35,707	664,430
Spruce	92,681	50,527	19,741	18,489	181,438
Others	38,398	18,643	5,118	6,118	68,277
Total Not Proposed	**934,243**	**656,604**	**206,529**	**170,505**	**1,967,882**
Grand Total	**1,232,787**	**837,891**	**273,567**	**350,938**	**2,695,184**

[1] A weighted average mature volume factor from the MP No. 4 timber supply analysis has been applied to volumes.
[2] Timber harvesting land base only.

MPB affected pine stands account for 75% of all proposed logging, and 54% of areas without existing plans for harvest. The approximate total volume of 2,695,000 m^3 is approximately five years of harvesting at the proposed AAC of 480,000 m^3/year.

2.0 MANAGEMENT OBJECTIVES

The primary goal of Riverside is to maintain a long-term, economically viable forest products operation while practicing sound integrated resource management. In order to reach this objective, Riverside is committed to pursuing a course of continued growth within the industry and to provide stable employment for our employees and contractors and socio-economic benefits for the residents of the local communities and for the Province of British Columbia. In setting this goal Riverside recognizes its commitments to forest stewardship, and to meeting various government policies and objectives. This section lists specific objectives proposed for TFL 49 to provide direction for planning and management.

2.1 EMPLOYMENT AND ECONOMIC OPPORTUNITY

Riverside remains committed to providing a stable employment base for local communities. It is in the social and economic best interest of Riverside to have available to it a stable and well-trained and educated work force.

Recognizing international economic pressures, it is expected that during the next 15 years primary manufacturing employment will decrease due to:

- Increased automation within the manufacturing process;
- Increased emphasis on integrated resource management in Provincial policy and regulations; and
- The continued removal of land from the working forest.

The estimated current levels of employment (2003) attributable to TFL 49 management activities (harvesting, silviculture, and manufacturing) as well as AAC, payroll and stumpage payments are shown in Table 2.1.

Table 2.1 - TFL 49 employment and economic activity estimates

Allowable Annual Cut (inclusive of BCTS portion) (m^3)	380,000
Riverside Full Time Employees	254
Riverside Contract Full Time Employees	88
BCTS Employment *	38
Total Payroll Inclusive of BCTS* ($)	25,000,000
Annual Stumpage Payments Inclusive of BCTS * ($)	8,000,000

*Estimate prorated on the basis of Riverside employment, payroll and stumpage payments.

In addition, many TFL 49 specific projects are initiated over time. For instance, the TFL Project has, since its inception, created an estimated 35 person years of employment. The preparation of the Timber supply analysis and management plan contributed one person year of employment.

2.2 CULTURE

It is the desire of Riverside to respect aboriginal interests and to develop effective strategies for sharing of information in planning for resource use activities that may be of concern to First Nations. Riverside

Forest Products Limited will participate fully in the consultation process, however it is the Government who has the primary responsibility to facilitate such consultation. Riverside will be consistent with the procedures outlined within its Standard Operating Procedure on Aboriginal Consultation as well as the Provincial Governments policy on Aboriginal Rights and Title.

Professional archaeologists, in consultation with the affected First Nations, conduct archaeological assessments. Planning will continue to follow MoF District directions on overview inventory implementation. Riverside has established protocols for archeological assessments with the Okanagan, Spallumcheen, Upper Nicola, Neskonlith, Adams Lake, and Little Shuswap Indian Bands. This protocol, resulting in review and assessment work being carried out on entire cutting permits; rather than on individual cut blocks, has been well received by the bands involved.

2.3 LAND USE AND INTEGRATED RESOURCE MANAGEMENT

Riverside is committed to the sustainability of the environmental, economic and social values of TFL 49 while maintaining an economically competitive enterprise. This commitment requires forest management standards to be in compliance with the FPC and FRPA, including protection of biological diversity at the stand and landscape levels.

Riverside supports the concept of IRM. We perceive integrated resource use as one or more users using the same unit of land concurrently or over time. Riverside co-operates with government resource agencies and the public on the identification, inventory and management of non-timber resources such as fish, wildlife, water, range, and recreation. Harvest planning incorporates the predetermined objectives for the land unit, and where other resource values are determined to be significant, the plans are modified to accommodate these values. As concerns are identified in our Forest Development Plan update process, they will be considered for incorporation into the Plan. When sites of archaeological significance are identified and recognized by the Province of British Columbia, measures will be taken to protect their special significance. These will be consistent with the *Heritage Conservation Act* as administered by the B.C. Ministry of Sustainable Resource Management.

Through the Forest Development Plan (FDP) review process, Riverside will solicit the concerns of all major resource users. Users include trappers, guide outfitters, range tenure holders, and other recognized resource users.

2.4 OKANAGAN-SHUSWAP LRMP

TFL 49 falls within the bounds of the Okanagan-Shuswap Land and Resource Management Plan (LRMP) (B.C. MSRM, 2001). Operations on TFL 49 will be consistent with the LRMP.

The LRMP is an approved strategic land use plan and forms official Cabinet policy. In conjunction with legislation, the Plan sets an integrated overall strategic direction for the management of crown lands within the Okanagan-Shuswap region. The LRMP was developed by over 30 public and government participants, including Riverside, representing a wide range of values such as water, timber, wildlife, fisheries, mining, recreation, tourism, conservation, and agriculture. First Nations expressed an interest in the process but chose not to participate.

The LRMP provides direction for the management of Crown land and resources within the plan area. The participants articulated a vision of balanced land use. The Plan includes general management, defines resource management zones (RMZs) with specific objectives and strategies, and 49 new protected areas.

Major items of interest are additional protection for fish streams, specific direction for managing for biodiversity, and the establishment of caribou reserves.

The *Timber Supply Analysis Report* for MP No. 4. will provide details on implementation of the LRMP in support of the determination of allowable harvest levels and MP No. 4. Specifics with which affect TFL 49 include:

- Designation of the Shorts Creek protected area (Map No. 4);
- Direction with regard to management of visual resources (Map No. 9);
- Landscape units and definition of landscape-level biodiversity requirements (Map No. 2);
- Resource management zones (RMZs) for mountain goat, and moose (Map No. 10);
- Resource management zones (RMZs) for bighorn sheep; and
- RMZs for mule deer winter range (Map No. 11).

The maps can be found in Appendix VII.

Although the LRMP has not been established as a higher level plan, and the provisions of the LRMP do not have the weight of law, Riverside will operate in a manner consistent with the objectives of the LRMP which are applicable to the TFL 49 area.

2.5 TIMBER MANAGEMENT OBJECTIVES

The short and long-term availability of timber on TFL 49 is examined in the *MP No. 4 Timber Supply Analysis Report*. The analysis evaluates how current management, including allowance for management of non-timber resources, affects the supply of harvestable timber over a 250-year period. It also quantifies the sensitivity of the results to uncertainty associated with modelling inputs. The timber supply analysis provides the technical basis for the Chief Forester of British Columbia to determine an AAC for TFL 49. The timber supply analysis supports a base harvest level of 380,000 m^3/year. It also supports an uplift for MPB as described in Section 1.8.

Logging methods will be based on site-specific requirements and may include conventional logging, roadside logging, cable yarding, helicopter logging or other systems.

The Forest Practices Code, the FRPA, and the TFL 49 Ecological Forest Stewardship Project (once regulations are in force) will guide activities conducted on TFL 49.

While Riverside is signatory to the LRMP and committed to the associated strategies, when the TFL Project is initiated alternate strategies associated with the *Ecological Stewardship Plan* will be implemented.

Riverside has evaluated the feasibility of additional intensive forest management activities to mitigate possible future reductions in harvest in the report *An Enhanced Silviculture Strategy for TFL 49*, (Olympic Resource Management, 2000).

Losses and damage will be minimized through rapid detection and suppression of fires and through early detection of abnormal insect and disease activity. Priority will be given to the harvest of merchantable and accessible damaged timber. The current outbreak of mountain pine beetle (MPB) (*Dendroctonus ponderosae*) will be evaluated in the timber supply analysis by modelling a number of scenarios related to susceptible pine stands within the TFL.

Historically, a portion of the BC Timber Sales AAC allocation has been used to address salvage of small volumes on the north (old Vernon District) of the TFL while Riverside has dealt with small volumes within the former Penticton District. A change in focus for the MoF and BCTS has resulted in cancellation of the small volume program in the north. In the future, Riverside is committed to addressing small salvage volumes throughout the TFL in order to reduce non-recoverable losses.

The long-term objective of Riverside is to produce logs of suitable species and quality for the profitable manufacture of lumber and plywood.

2.6 SILVICULTURE

Basic silviculture will be carried out on all harvested areas. The Forest Investment Account (FIA) will fund treatments on areas denuded prior to October 1, 1987. Where funds are available and appropriate incentives are in place, incremental (*i.e.* silviculture treatments over and above basic obligations) silviculture will be practiced.

Harvesting activities will be conducted in accordance with site-specific activities described in the FDP and site plans.

In keeping with the ecology of the TFL area and the silvics of the native tree species, most harvesting on the TFL is expected to be clear cut harvesting. Clearcuts include patch cuts, blocks with reserves within the block, blocks with wildlife trees within the block, shelterwood, and seed tree systems. Clearcut blocks may be harvested by ground, cable, or helicopter systems.

The only exception to clear cut harvesting will be management of stands with pre-existing components of multiple ages. This will typically be the dry Douglas-fir sites on which perpetuating the multi-age structure is beneficial.

Riverside will continue to emphasize the use of genetically improved planting stock, as it becomes available from ongoing tree improvement programs. The increase in stand volume attributed to the genetic gains is an input to analysis supporting AAC determination.

MP No. 3 included as an appendix an *Incremental Silviculture Plan (Simons Reid Collins, 1998)*. The plan was implemented with preparation of a total chance plan and execution of a modelling exercise to determine the spatial implications of various incremental silviculture regimes (genetics, juvenile spacing, and commercial thinning. The result was the *Enhanced Silviculture Strategy for TFL 49* (Olympic Resource Management, 2000) which indicated positive timber supply impacts associated with genetics and commercial thinning. Use of genetically improved tree seed, as required by provincial regulation, is now standard on the TFL. The strategy does not call for commercial thinning in the short term. To some extent, the TFL Project has superceded the strategy, with new management strategies being explored.

2.7 PROTECTION – FIRE AND PESTS

Rapid detection and suppression of fires will minimize losses and damage.

Insect and disease management objectives are to keep timber losses to a minimum. Currently there is a significant outbreak of mountain pine beetle (MPB) affecting mature lodgepole pine stands across B.C. Salvage operations to recover beetle-attacked wood are given priority over harvesting green timber on the TFL. As part of the timber supply analysis for MP No. 4, the impact of harvesting highly susceptible pine stands during the first 10 years of simulation was evaluated in order to understand the implications on the

sustainable timber supply. Accelerated harvest for mountain pine beetle was found to have little impact on mid and long-term harvest levels and non-timber resources. Please see the *Timber Supply Analysis Report* in Appendix I.

Local estimates of unsalvaged losses have not been produced.

2.8 ROADS

Most of the main road network is in place on TFL 49 (see Appendix VII, Map No. 13). Secondary and spur road construction will facilitate development of new cutting permits. It is Riverside's objective to construct, maintain, and deactivate roads following applicable guidelines and standards.

2.9 SOIL CONSERVATION

It is the objective of Riverside to minimize the forest land base occupied by permanent structures required to provide access to operating areas. Levels of soil disturbance will be in compliance with the appropriate guidelines.

2.10 RANGE RESOURCES

Range inventory and objectives are developed by the Ministry of Forests. The current potential grazing level is 10,000 animal unit months (AUMs). Increases above this level will not be supported by Riverside unless it is shown that the proposed level is sustainable and that the level of range management is such that basic silviculture obligations are not compromised.

2.11 BIOLOGICAL DIVERSITY

Following the concepts included in the FPC *Biodiversity Guidebook*, Riverside's objective is to maintain acceptable levels of landscape level biological diversity. Stand level biodiversity is also a priority for Riverside. As is noted in the Guidebook, however, not all elements of biodiversity can or should be maintained on every hectare.

Although old growth retention targets have been defined in the LRMP, no old growth management areas (OGMAs) have yet been defined for the TFL 49 area. Targets have been modelled aspatially.

2.11.1 Landscape Level

Landscape unit boundaries and biodiversity emphasis levels have been defined by the Okanagan- Shuswap LRMP process (see Map No. 2, Appendix VII). The timber supply analysis accompanying this plan has implemented these in consultation with government agencies.

2.11.2 Stand Level

Stand level biodiversity attributes will be addressed at the individual cut block level through the application of logging methods, utilization standards, site preparation, fuel management, and reforestation methods. Where feasible, and in consideration of the previously noted cut block issues, important structural attributes such as wildlife trees, coarse woody debris (CWD), tree species diversity and understory vegetation diversity will be enhanced.

2.11.3 Coarse Woody Debris

The B.C. Ministry of Water, Land, and Air Protection (WLAP) has expressed concerns with regard to balancing timber utilization and coarse woody debris goals on TFL 49 (see Harris 1998). Riverside recognizes that there is an ecological role for coarse woody debris (CWD) in the provision of habitat and nutrients. Within the utilization standards being used on the TFL, Riverside will attempt to maximize coarse woody debris on each cut block, provided that post treatment objectives, forest health, and fire hazard are not compromised. Riverside takes direction from the LRMP on CWD requirements.

The TFL Project addresses coarse woody debris. Downed wood (coarse woody debris) is one of eight habitat elements used as surrogates for key ecological aspects within the ecological forest resource management model. As management strategies developed within the TFL Project will address coarse woody debris, clarification of this issue will come with development of the *Ecological Stewardship Plan.*

2.12 WATER RESOURCES

Forest management activities will be conducted to minimize the impact on the water resources.

Total chance engineering will be used to minimize road construction activities.

Any concerns about the quality, quantity and timing of water produced from watersheds in TFL 49, will be addressed through meetings with the MoF, WLAP, Department of Fisheries and Oceans (DFO), Irrigation Districts, and local water users.

Watershed assessments are currently completed or planned for most major watersheds used for irrigation and potable water containment on TFL 49. These watersheds typically contain forest cover resulting from fire history. Water containment is mostly into a series of storage dams. Table 2.2 lists completed watershed assessments. Community Watersheds are displayed in Appendix VII - Map No.12.

Table 2.2 - Completed watershed assessments (Level 1 IWAP)

Community Watersheds	Year Completed	Area (ha)
Hope Creek	1998	153
Lambly Creek	2001	24,400*
Norris Creek	1998	170
Powers Creek	2001	13,900*
Silver Creek	1997	2,431
Total Area		**41,054**

Note: Area includes some area outside the TFL.

For both the Timber Supply and 20-year Spatial Feasibility analyses, disturbance limits will be placed on each of the community watersheds found on TFL 49. The constraint will be a maximum of approximately 30% of the productive forest below six metres in height. See Section 10.2 of the *Information Package* for details.

Intake stations within community watersheds are protected by a no-harvest zone 100 metres upstream from the intake. These no-harvest areas are recognized in the timber supply analysis spatial database and will be excluded from harvesting in the analysis simulations.

2.13 RECREATION USE AND VISUAL RESOURCES

Recreation use is important within the TFL. Unless otherwise directed by the Ministry of Forests, an open access policy will be maintained with minimum restrictions to the public. Riverside will work with the MoF to maintain the availability of recreational opportunities at current levels. Where public use warrants, the establishment of additional facilities will be considered jointly with the MoF. Forest management activities will be conducted to allow for the maintenance of the current level of satisfactory user days.

The LRMP has published scenic areas for the Okanagan-Shuswap including TFL 49 (see Map No. 9 Appendix VII).

2.14 FISH AND WILDLIFE RESOURCES

Close liaison will be maintained with the MWLAP and the DFO. The LRMP has identified high value fish and wildlife areas.

Areas having high fisheries or wildlife values will be identified in the course of business and operations will be planned accordingly. A large proportion of streams have been assessed and unassessed streams are dealt with during harvest planning. Required fish stream assessment work will be conducted prior to road and harvesting activities.

3.0 TIMBER MANAGEMENT STRATEGIES

This section presents timber management strategies which will drive management on TFL 49 during the term of this plan.

3.1 PLANNING

To meet our management objectives it is important to understand the planning process and its relationship to our operations. *Management Plan No. 4* outlines broad goals and objectives and states commitments towards forest management practices on the TFL during the five-year period. The *Forest Development Plan* indicates the location of harvesting.

Our practices are conducted in accordance with the FPC, the FRPA, the LRMP, and the TFL 49 Ecological Forest Stewardship Project once the Ecological Stewardship Plan is approved.

Riverside needs to monitor the impact of the BC Timber Sales Program (BCTS) activities to ensure that the BCTS Forest Development Plans incorporate the intent of this management plan. Riverside acknowledges the Ministry of Forests' BCTS policy for harvesting within the TFL.

3.1.1 Forest Development Plans

The FDPs in place are consistent with the planning framework identified in this management plan. The concepts and guidelines covering all of the resource values existing on the TFL 49 land base have been provided for in other sections of this management plan.

Riverside will move to ecosystem stewardship planning under the TFL Project prior to expiry of the FDP.

In their final form, these plans will include a summary of input from all appropriate resource agencies and the public, and the actions to be taken in response to that input.

3.1.2 Operating Areas

Harvest operations will be dispersed throughout the TFL so that operations will not adversely affect other resource values due to concentrated harvesting. Exceptions to this policy will happen where emergency harvest operations are necessary due to fire, insects, or disease outbreaks.

3.1.3 Local Resource Use Planning

There are currently no local resource issues requiring special plans for this planning period. Should the need arise, Riverside will actively participate in the local resource use planning process. Although not requiring special plans at this time, some areas that may warrant special consideration are the Lambly Creek and Powers Creek Community Watersheds.

3.2 RATE OF HARVEST AND TIMBER SUPPLY ANALYSIS

A "Base Case" option in the *Timber Supply Analysis Report* will form the basis for the proposed allowable annual cut. This option reflects the current status of Riverside's management activities on TFL 49. Riverside is proposing an AAC of 380,000 m^3/year based on that timber supply analysis base case (unchanged from the previous level) and a further 100,000 m^3/year temporary uplift to mitigate the impacts

of the current mountain pine beetle infestation. This elevated harvest is required for five years barring any significant cold weather event.

3.3 ALLOCATION OF THE ALLOWABLE ANNUAL CUT

The allocation of the allowable annual cut (AAC) is indicated in Table 3.1. Proration between Schedule A (0.496%) and Schedule B (99.504%) land is by the MP No. 4 timber harvesting land base (614 ha and 123,142 ha respectively). The allocation to BCTS in the Okanagan Shuswap Forest District is also provided and based on the allocation in MP No. 3. The temporary MPB uplift volume is reported separately at the bottom of Table 3.1.

Table 3.1 - AAC Schedule B Prorate

Licensee	Volume from Schedule A Lands (m^3)	Volume from Schedule B Lands (m^3)	Total	Percent
Riverside	1,702	341,393	343,095	90.29
BC Timber Sales	0	36,905	36,905	9.71
Total	**1,702**	**378,298**	**380,000**	**100.00**
Riverside MPB temporary uplift	**0**	**100,000**	**100,000**	**n/a**

3.4 FOREST RESOURCE INVENTORIES

This Section documents the status of all resource inventories. Full details are available in the *Timber Supply Analysis Information Package* Section 5.0 (Appendix I to the *Timber Supply Analysis*). Resource inventory maps can be found in Appendix VII.

3.4.1 Vegetation Resources Inventory

Completed in 1997 (Timberline ,1997), the TFL 49 Vegetation Resources Inventory (VRI) includes forest cover attributes to MoF Phase I standards in a fully digital and spatial format compatible with the Provincial inventory database. Colour photography flown in 1994 was used to delineate strata to VRI standards. Non-productive polygons were delineated to a minimum 0.5 of a hectare and in some cases smaller areas were identified.

The B.C. Ministry of Sustainable Resource Management (MSRM) performed the phase 2 sampling during the field season of 1997. A key component of the VRI project is the adjustment process using the phase 2 data. An adjustment procedure has been developed (Timberline, 2002) and the results confirm an underestimation of stand volumes when predicted using inventory attributes and the MoF Variable Density Yield Prediction (VDYP) yield model. The adjustment procedure for TFL 49 was performed following the Fraser Protocol. The Fraser Protocol outlines a specific methodology through which the phase 2 data are used to adjust the phase 1 age, height and volume data.

The accuracy of the adjustment process can be improved by applying the adjustment through a stratification system. A system that stratified by mature and immature stands and further stratified the mature stands into three leading species groups was selected. This system provided the best balance of maintaining reasonable sample sizes while minimizing age related bias.

Before the phase 2 volume estimates can be used to adjust the phase 1 data, a volume correction must first be applied. Two approaches to correcting volume estimates were potentially applicable to the TFL 49 VRI: the traditional loss factor (LF) approach and the newer net volume adjustment factor (NVAF) approach. The biggest difference between the two approaches is that the NVAF approach attempts to correct the bias in the volume estimation using an adjustment factor.

A comparison with local destructively sampled trees found that the LF approach overestimates volume by 4% while the NVAF approach overestimates volume by 12%. The smaller volume overestimation indicates that the LF approach produces the most accurate volume estimates for TFL 49. An investigation of the estimated impact of each approach found that the LF approach resulted in a positive inventory adjustment of approximately one million cubic metres more than the adjustment using the NVAF approach. These results are unusual compared to other results from across the province.

The LF approach is not statistically based and does not maintain the VRI requirement of being statistically defensible. Therefore, the TFL 49 inventory was adjusted using the NVAF approach for submission to MSRM. However, in the interest of using the most accurate data, the TFL 49 inventory was adjusted using the LF approach for use in the timber supply review.

In order to undertake analysis for MP No. 4., a depletions layer was used to provide updated information on disturbances to July 2003. A full update of the VRI was not undertaken. The forest cover data was projected for growth to July 1, 2003.

3.4.2 Environmentally Sensitive Areas

A 1991 inventory of environmentally sensitive areas (ESAs) covering the entire TFL was captured digitally as an overlay to the forest inventory. Areas are classified as non-contributing to harvest based on:

- Actual or potential sensitive or unstable soils;
- Severe regeneration problems caused by geoclimatic factors; or
- Areas having critical importance to wildlife.

This survey remains the most reliable inventory of sensitive soils on the TFL. Terrain stability mapping on the TFL is considered to be poor quality by Riverside staff. Only the mapping in the community watersheds is marginally reliable. Riverside is initiating a program in the government 2004/05 fiscal year to upgrade the terrain stability mapping. Until such time as this is ready, Riverside will continue to use soils ESAs which represent best available information.

3.4.3 Recreation and Landscape

Recreation (see Map No. 5 Appendix VII) and landscape inventories are complete to MoF standards for the entire TFL area. For timber supply analysis, visual quality objectives as determined by LRMP scenic areas are used to identify management zones in which visual management will be emphasized.

3.4.4 Biogeoclimatic Ecosystem Classification (BEC)

Mapping of biogeoclimatic zones and subzones/variants is based on predictive ecosystem mapping (PEM) which was undertaken across the TFL (Timberline, 2000) (see Map No. 1 Appendix VII) and approved by the MoF for use in timber supply analysis (Meidinger, 2003). The PEM provides ecological mapping to the site series level with approved reliability without grouping.

3.4.5 Roads Classification

Riverside has previously committed to implement a computerized road information system and to link it to a geographic information system to track all road activities. This project is incomplete. Some backlog data entry is required and no map linkage is yet in place.

In order to address this information gap, all roads and trails have been classified based on MoF standard categories of main road, secondary road, and trail. In addition to this, roads are classified according to width to reflect area lost to the long-term production of trees. This information has been digitally captured as input to the analysis (see Map No. 13 Appendix VII).

3.4.6 Interim Forest Practices Code Riparian Classification

In order to model riparian reserves as required by the Forest Practices Code, streams and wetlands must be classified using the FPC system. Formal classification based on field verification has been completed on approximately 90% of the streams in the former Penticton Forest District and 60% of the former Vernon District. Where this formal classification is not available, estimates are based on local knowledge provided by Riverside's engineering staff. This represents the best available information. Riverside will continue to build a complete inventory of streams, wetlands and lakes to FPC standards.

As outlined in the LRMP, *enhanced riparian reserves* (ERRs) are required on TFL 49 to contribute to the total ERR budget defined for the Okanagan Shuswap Forest District. The TFL must provide 1,236 hectares of ERR.

The location of ERRs is in progress, therefore, for the purposes of the timber supply analysis, additional reserves were placed on streams to account for the total area requirement. The following areas contribute to the 1,236 hectare budget, as described in the *Riparian and Wetlands* section of the LRMP:

- Six hectares in mapped wildlife tree patches;
- 304 hectares in fish-bearing S4 streams; and
- 399 hectares in S5 streams.

Therefore, an additional 527 hectares of riparian reserve area was established around all stream classes that have an existing reserve (S2 – S5). This amounted to a 20% increase in reserve width.

Lakeshore management zones have been identified around specific lakes on TFL 49. These areas, extending 200 metres from the shore, will be modelled in the timber supply analysis with limitations on harvesting similar to those used in visually sensitive areas.

3.5 GROWTH AND YIELD

Estimates of stand productivity are improved over those available for MP No. 3. Site index is correlated to site series using the PEM-based ecological inventory. This ensures the use of the best available site index information for regenerated stands to compensate for old growth site index bias.

Yield curves for stands of natural origin have been prepared using the MoF program VDYP, version 6.6d. These are referred to as natural stand yield tables. Managed stand yields have been prepared for stands regenerated and conforming to minimum stocking standards. These managed stand yield tables were created using the Table Interpolation Program for Stand Yields (WinTIPSY) version 3.0.

Permanent sample plots within the TFL have been incorporated into the MSRM growth and yield program. More recently government has chosen to suspend the remeasurement program and these plots are not being remeasured.

Complete details on growth and yield will be found in the *Timber Supply Analysis Information Package* (Appendix I of the *Timber Supply Analysis*).

There are always opportunities to improve growth and yield estimates. MP No. 3 committed to developing a growth and yield program addressing issues such as local volume adjustment factors, green-up ages and complex stand volumes. In the meantime Riverside has begun development of the TFL Project. Until such time as management regimes are developed for this new approach to management, the future needs for a growth and yield program cannot be known.

3.6 ENGINEERING DEVELOPMENT

The majority of the main road network is in place on TFL 49. Secondary and spur road construction will facilitate development of new cutting permits identified in FDPs. As stated in the *Timber and Silviculture* section of the LRMP, permanent site disturbance should be minimized, where practical, when constructing new forest roads.

Roads will be constructed, maintained and deactivated to MoF standards. Haul roads will be deactivated, as required, after harvesting and reforestation operations have been completed. The FPC and the LRMP where appropriate, will be used as guides in construction, maintenance, and deactivation of roads.

3.7 HARVESTING

3.7.1 Harvesting Systems

The purpose of this section is to document the silviculture systems that are applied on the TFL. Various alternative harvesting and silvicultural systems are employed across TFL 49. Typically, clearcuts of various sizes are treated by site preparation as required. Harvesting methods include conventional, cable, and helicopter systems. Prompt regeneration is achieved through either planting with the best available planting stock, or in some cases natural regeneration on some lodgepole pine and Douglas-fir sites.

The use of different silvicultural systems is evolving and includes clearcutting with prescriptions that include small blocks and green tree retention. Generally, lodgepole pine, Engelmann spruce, subalpine fir and western redcedar should be managed as even aged stands and are thus harvested by the clearcut system and reforested. The clearcut system will also be used in existing stands of western larch and Douglas-fir, with the possible exception of certain forest health situations as described in Section 3.9.2.

3.7.2 Planning and Layout

TFL 49 is completely covered by a total chance plan, which was completed in 1997 and has only been partially updated. Total chance layout is defined as planning for the best overall realization of all objectives over the entire development area. In this planning phase, the design of the cut block size, the percentage of area harvested in the first pass, and the timing of the harvest passes, each considers the implications upon the water, fish, wildlife, range, recreation, and other resource values. Proposed layout and rate of harvest are presented in detail in the FDP.

3.7.3 Logging Methods

Choice of logging method is based on specific site constraints and the economics of the logging chance. The appropriate harvesting method is selected to ensure that potentially detrimental soil disturbance is below the allowable level as indicated in Forest Practices Code guidelines. Conventional logging, roadside logging, cable yarding, helicopter logging, and other systems are considered.

Harvesting plans for environmentally sensitive areas will be considered on a site-specific basis with the objective of maintaining the integrity of the soil to allow growth of the new forest.

Riverside requires both summer and winter harvesting operations in order to provide balanced log delivery and employment. An appropriate balance of areas and season of logging will be developed to maintain the contractor force at optimum efficiency, while at the same time minimizing waste and environmental impact. The logging season will be determined on a site-specific basis. Several factors such as soil, moisture, slope and terrain will determine the time of year a block can be logged.

3.7.4 Steep Slopes, Harvest Profile, and Haul Distances

The total chance layout system addresses steep slopes and harvest profile. In the total chance layout, harvesting occurs on a variety of sites and timber types. In effect, the harvest profile (good and poor quality timber) and the site characteristics (steep, flat, wet sites, *etc.*) are incorporated into each development plan.

Based on the TRIM (Terrain and Resource Information Management) digital terrain model, the net area of mature timber (at the time of preparation of MP No. 3) on slopes 50% or greater was 5,488 ha or 8.6%. For slopes over 60% the figures were 2,891 ha and 4.5%. At the time of MP No. 3 Riverside committed to harvesting 5% of the volume cut from steep slopes. This commitment is maintained.

Evaluation of blocks harvested during the term of MP No. 3 in areas of steep slopes as defined by TRIM mapping indicates only 1% of the harvest area. It is not known what percentage of volume this represents. Also, the large resolution of the TRIM digital terrain model may underestimate area of steep slopes. An operational survey or review of block level data may be more instructive. A review of cable logging scales found that 3% of the harvest volume was logged in this fashion.

Harvest priorities are as follows: infested, diseased, or salvage stands; susceptible stands; over-mature stands; and mature stands. The economics of logging over-mature timber will be considered on a site-specific basis. In the near term, we may, to include low snow areas in the winter and early spring access, need to develop lower priority stands for winter and spring logging sites.

Priorities for harvest scheduling are dynamic. If stands suffer heavy mortality due to insects, disease, fire damage, or blowdown, these stands will become first priority harvesting areas. Stands that are highly susceptible to losses from insects and disease will also increase in harvest priority. Considering these

factors, we must also address the manufacturing requirements for a minimum of 43% of the annual harvest to be peeler size and peeler quality. These objectives continue to influence the balancing of harvest scheduling.

Traditionally, harvesting operations on TFL 49 have been balanced between near and far (from the Kelowna and Armstrong manufacturing facilities) operations. This approach will continue during this plan.

3.7.5 Soil Disturbance

The *Forest Practices Code Soil Conservation Guidebook* will be used in planning and harvesting decisions.

3.7.6 Utilization Standards

Specific utilization standards are indicated within each cutting permit. Generally, all trees and parts of trees three metres and over in length, which are better than sawlog-reject grade, are used. Some material below these standards may also be removed and used. The inventory volumes were compiled using the same procedures applied to cutting permit cruising and include standard MoF allowances for decay, waste and breakage, based on the 1976 metric diameter class factors developed by the Inventory Branch of the MoF.

All TFL operations are currently under scale-based stumpage assessment. Although Riverside no longer has authority under Section 106 of the *Forest Act* for TFL 49 to bill under cruise based stumpage, one cruise based cutting permit which has been grandfathered remains. This permit is being harvested in the fall of 2004. All cruising and scaling on TFL 49 will conform to MoF Provincial and Regional standards. Cutting permit documents, cruise reports, and appraisal data sheets will be submitted as required.

Utilization levels that will be used in the development of the yield tables are based on operational practice. These levels contradict the TFL document but represent improved utilization. They are documented in the table below. A utilization level of 12.5 cm dbh for all species reflects current management on TFL 49. Also standard practice on TFL 49 is a 20-cm stump, which is not available in all standard yield models. However, factors will be applied to adjust volumes in the timber supply analysis to account for this increased utilization.

Table 3.2 - Utilization levels

Stand Types	Utilization		
	Minimum DBH (cm)	Stump Height (cm)	Top DIB (cm)
Pine	12.5	20	10
All others	17.5	20	10

3.8 SILVICULTURE

Riverside is committed to ensuring that all areas harvested will be restocked with commercial species to a "free growing" state. This commitment to a basic forestry program will maintain an economically viable forest products operation in perpetuity.

3.8.1 Basic Silviculture

Basic silviculture activities, in accordance with the *Forest Practices Code of BC Act* and *The Forest Act* and regulations, will be carried out on all area harvested after October 1, 1987, unless exempted. Riverside is responsible for all activities to reach free growing status on these areas. Areas denuded before October 1, 1987 are known as "backlog" areas and are funded through FIA to meet free growing.

There is no backlog NSR (stands not sufficiently regenerated) on TFL 49. There are 1,563 hectares of current NSR lands on the TFL, primarily the result of harvesting activities within the past two years.

In the timber supply analysis all NSR lands are regenerated to the appropriate stand type within the first decade of simulation, with the necessary regeneration delay. All NSR areas are assigned an age of zero years upon input to the simulation model. As per all stands defined for the analysis, the PEM site series is used to define the regeneration assignment for NSR lands.

3.8.2 Stand Establishment

Riverside's objective is to regenerate all denuded, productive forest land to target stocking levels, within the regeneration period specified in the site plan (SP). On occasion, an area may not be restocked within the prescribed regeneration delay period, due to a variety of reasons, which may include adverse weather conditions, insect damage, cattle damage or mammal damage. Should the site not be restocked to the stated stocking objectives set forth in the SP, Riverside will propose and implement actions to meet the stated free growing commitment.

Where planting is the prescribed reforestation method, the planting will occur prior to the end of the regeneration delay period as indicated in the corresponding SP. Seedlings used in the planting program are either grown at the Riverside nursery near Armstrong or purchased from other nurseries.

Where natural reforestation regeneration is the planned reforestation method, the area will be stocked to the standards and within the regeneration delay period indicated in the corresponding SP. Areas found not sufficiently restocked after a stocking survey will be examined to determine the need for planting or to determine processes to rectify the area to become satisfactorily restocked within the prescribed delay period.

3.8.3 Seed Collection and Tree Improvement

Riverside will continue to emphasize the use of genetically improved planting stock, as it becomes available from ongoing tree improvement programs, for all lands within the TFL. The volume gains attributed to the genetic gains will be modelled in the timber supply analysis.

Estimates of future genetic worth and seedling availability are provided at the Seed Planning Unit (SPU) level. SPUs are the organizational units that form the basis for breeding and seed production planning carried out by the Forest Genetics Council and the Tree Improvement Branch of the MoF. SPUs are polygon features that geographically delineate the extent of biologically feasible seedling use for stock originating from specific seed orchards throughout the province. Each SPU identifies the area throughout which seedlings of a given species, originating from orchards within a specific region of the province, may be used in regeneration. Note also that each SPU lies within a prescribed elevation band.

The individual SPUs overlap each other in various combinations such that each unique combination of SPUs identifies a specific supply of seedlings of a certain species originating from specific orchards, each

with a particular genetic gain factor. Therefore it is these unique combinations of overlapping SPUs that act as the common denominator for targeting genetic gain factors in the timber supply analysis.

The approach to modelling genetic gains is provided in the *Timber Supply Analysis Information Package* (*Appendix I to the Analysis Report*). More detailed background is presented in *Tree Farm Licence 49 – Implementation Strategy for Forest Level Modelling of Genetic Gains* (Timberline, 2003). A list of the expected volume gains from planting genetically improved planting stock is provided in Table 3.3.

Table 3.3 - Tree improvement gains and seed availability

Species	Seed Planning Unit	Short-term Gain [1] (%)	Short-term Availability (% of SPU Requirement)	Long-term Gain (%)	Long-term Availability (% of SPU Requirement)
Lodgepole pine	Pli TO High	11	17%	16	100%
	Pli TO Low	9	18%	16	100%
Douglas-fir	Fdi NE High	22	0%	22	95%
	Fdi NE Low	26	0%	26	100%
Western larch	Lw NE Low	8	100%	12	100%
Interior spruce	Sx TO High	8	100%	15	100%
	Sx TO Low	8	100%	19	100%

[1] Percent gain in primary trait (stem volume).

With the exception of naturally regenerating areas, pine and spruce will be regenerated using genetically improved seedlings, where seed is available.

The tree improvement program is an important aspect of maintaining or increasing current harvest levels. Improved tree seed will result in both volume and quality gains when compared to ordinary wild stand seed collections.

Riverside has established both Engelmann spruce and lodgepole pine seed orchards. Riverside is completely self-sufficient with respect to Engelmann spruce improved seed requirements. Lodgepole pine improved seed is currently (2003) used for 50% of the lodgepole pine plantations on TFL 49.

3.8.4 Site Preparation

Site preparation will be carried out as necessary to facilitate reforestation, to control pests, and to reduce fire hazard. Prescribed burning and mechanical or chemical site preparation techniques (individually or in combination) accomplish this. Factors that influence the choice of site preparation techniques include:

- Slope;
- Fire hazard and risk;
- Expected brush competition;
- Site sensitivity to equipment and/or fire;
- Number of available or required planting spots;
- Minimization of impact on habitat;
- Pest or disease problems;

- Conditions desirable for best survival and growth; and
- Anticipated costs of alternatives.

Mechanical site preparation techniques will adhere to the intent of the recommendations in the *FPC Soil Conservation Guidebook*.

Smoke management is an important issue. Site preparation and harvesting methods that minimize the amount of smoke in sensitive areas, while at the same time accomplishing basic silviculture and protection requirements, are favoured. Prescribed burning is generally used on sites when it is ecologically beneficial for the site, including sites that are too steep or wet to treat mechanically. Burning is only conducted under atmospheric conditions that favour good venting. Burning is followed by rapid mop-up to reduce hang-over fires and smoke. The public is informed by radio broadcast in advance of broadcast burning.

3.8.5 Silvicultural Surveys

Many different types of surveys are conducted on each harvested area to assist in decision-making and to monitor progress towards meeting the silviculture obligations. The level of survey may vary from a walk-through to detailed sample plots, depending upon the information requirements.

a) Survival Surveys

Riverside monitors plantation survival using various field measurements or walk-throughs.

Usually each cut block is monitored during the summer following the first and second growing season. Weather, stock quality or other conditions may warrant further surveys.

b) Stocking Surveys

Where natural regeneration is planned, a post-harvest and/or post-site preparation assessment is completed to ensure site conditions and seed sources are appropriate for regeneration. Walk-through surveys are planned to occur two years after harvesting. Prior to the expiration of the regeneration delay period a stocking survey will be completed.

Areas that are greater than one hectare in size, and classed as NSR - current, will be examined and alternatives implemented to meet free growing commitments. Areas classed as NSR that are less than one hectare in size will be reviewed individually to determine the level of stocking and if additional treatments are practical or warranted.

For those areas that are being planted, a stocking survey is done concurrent with the planting inspection procedure. The area is reported as stocked and the regeneration delay is met. During the fifth year after planting, a stocking survey is conducted to confirm stocking status. Weather, brush concerns, or other conditions may also warrant additional stocking surveys.

c) Free Growing Surveys

Free growing surveys will be conducted to the standards and time frames indicated in the relevant SP. The time frame may be advanced where regeneration establishment is declared earlier than specified in the SP.

3.8.6 Brush Control

Brush control is carried out on a site-specific basis and is only undertaken on those sites where it is needed to prevent tree mortality or to ensure that the free growing status will be met. Brush control will be

accomplished by manual or mechanical means, grazing, or through the use of approved herbicides. All chemical work will be done under the direction of a Certified Pesticide Applicator, according to the terms of the *Pesticide Control Act (1978)* and the specific pest management plan.

All available options are considered prior to choosing the most appropriate brush treatment method. When the herbicide option is the desired option, the proposed treatment will be discussed with local resource users. Programs will be chosen and carried out with due regard to the environment and to the safety of the workers.

3.8.7 Incremental Silviculture

Incremental silviculture activities are optional treatments that will shorten rotations, increase future wood yield and/or increase stand value beyond that achievable through basic silviculture.

An *Enhanced Silviculture Strategy for TFL 49* (Olympic Resource Management, 2000) was prepared for Riverside. This report identified benefits to incremental programs. Riverside sees benefits to the genetics and commercial thinning elements recommended by the report.

Tree Improvement

Riverside currently maximizes the use of genetically improved seed in stand establishment on the TFL.

Commercial Thinning

Government of B.C. policy on stumpage and cut control effectively prohibit commercial thinning on TFL 49 at the present time. The *Enhanced Silviculture Strategy for TFL 49* does not call for commercial thinning in the short term.

Fertilization

Large-scale operational fertilization is currently not viewed as an economically viable treatment on TFL 49. Riverside will reassess the economics of fertilization as more test results are made available.

Juvenile Spacing

Juvenile spacing (or early stocking control) is a silviculture tool that provides for control of the final quality and yield from a forest stand. Through spacing, growth rates on remaining trees can be increased and merchantable volumes removed sooner. This can be beneficial in promoting desirable age class distributions, in order to improve harvest opportunities. At this time, no age class distribution problems have been identified which will affect operations in the immediate future. Please refer to the *Enhanced Silviculture Strategy for TFL 49* (Olympic Resource Management, 2000).

3.9 PROTECTION

3.9.1 Fire Control

Riverside places major emphasis on the protection of operational areas from fire. Riverside will adhere to MoF policy to take rapid initial attack on all wildfires with the goal of having the fire under control by 10:00 a.m. of the day following discovery.

A preparedness plan covering operational areas within TFL 49 will be submitted annually to the Kamloops Fire Centre. This plan includes statements regarding Riverside's commitment to initial attack and control of wildfire.

Since the granting of TFL 49, there have been only 15 fires over one hectare in size (as of December, 2003). The detailed listing of the specific fires is provided in Table 3.4. Because of salvage programs, timber losses from these fires have not been significant.

Riverside is committed to a program of fire management. Each year, all recently logged blocks are assessed to determine which treatments are needed for reforestation and hazard abatement. Where areas require treatment for hazard abatement only, consideration is given to not treat the area and instead accept some level of hazard and risk. Where the risk is too great, appropriate site preparation methods are implemented to reduce the hazard.

Table 3.4 - TFL 49 fire history

Year	Fire	Area (ha)
1952	Grouse Fire on TFL 9	324
1960	Goat and Stew Fires on TFL 9	4
1967	Arnold Fire on TFL 32	162
1970	Mer Fire on TFL 9	26
1974	Bolt Fire (escape) on TFL 32	375
1979	Wash Fire on TFL 9	13
1985	Monte Fire on TFL 49	9.9
1987	Mor Fire (escape) on TFL 49	5.8
1988	Brown Fire (escape) on TFL 49	14.2
1989	834/3 (escape) Fire on TFL 49	10.7
1994	Rett Fire (human caused)	1.3
1995	Dump Fire (human caused)	3.5
2001	Good Fire	21.9
2003	Pratt Fire	1
2003	Spruce Fire	1
2003	Pringle Fire	9.2
2003	Goodwin Fire	1
2003	Cedar Hill Fire	413

3.9.2 Pest Control

Riverside will continue its monitoring program to identify susceptible or infected stands. Annual pest surveys will be conducted to determine the incidence of pests within the TFL. These incidences will be reported and addressed in FDPs. Harvesting priority is given to active pest epidemics to minimize losses in damaged stands. Activities associated with mitigation of the current mountain pine beetle epidemic are

described in Section 1.8. Access will be developed into priority stands to expedite timber removal and to assist in the control of the spread of the specific pest. Appropriate treatments will be detailed in FDPs.

Insects

There is a significant beetle infestation affecting the TFL which is particularly severe in Block B. The TFL has been declared an Emergency Bark Beetle Management Area so that administrative benefits from the *Bark Beetle Regulation* can be utilized.

Every effort will be made to harvest beetle infestations on a priority basis to keep outbreaks at manageable levels. In the case of spruce bark beetle (*Dendroctonus rufipennis*), trap trees and/or pheromones will be used, where feasible, to concentrate and reduce beetle populations. The *Bark Beetle Guidelines* will be utilized for MPB (*Dendroctonus ponderosae*) management. Pheromone lures and single tree disposal (using Monosodium methanearsonate (MSMA) and single tree harvesting) will also be used in the management of the mountain pine beetle. Accelerated harvests associated with mitigation of the current mountain pine beetle epidemic are described in Section 1.8.

To some degree, western balsam bark beetle (*Drycoetes confusus*) continues to be a concern. Hazard rating of stands and management using pheromones will continue to reduce losses caused by this insect. Proposals to minimize losses from bark beetle will be submitted in FDPs.

Spruce budworm (*Choristoneura sp.*) has periodically been a problem. Growth and yield plots were established in 1987 to measure the long-term impact of this pest. Aerial spraying of *Bacillus thuringiensis* (Bt) has been used to control this insect during 1990, 1992, and 1993. Direct control using Bt will be considered only in thrifty, uneven-aged stands located on better sites or where stand tending investments have been made.

Management of sites prone to spruce budworm will favour the establishment of mixed species and single layer canopies in order to minimize the impact of this pest. The drier interior Douglas-fir ecosystems, in particular the IDFxh, are most susceptible to the budworm. Even-aged management will be practiced where appropriate.

Areas where some canopy is required for site protection will be harvested using shelterwood, seed tree, or group selection to promote even-aged stands and minimize the creation of multi-layered uneven-aged stands. Where planting is required in these zones, ponderosa pine or lodgepole pine will be favoured.

On sites that are uneven-aged, management will consist of favouring multiple species in an open grown state to promote full crowns and vigorous growth. Better growing sites in the IDF ecosystems will be ranked high in juvenile spacing programs. Spacing will not be carried out in these stands during periods of budworm outbreaks.

Populations of the Douglas-fir tussock moth (*Orgyia pseudotsugata*) are also a concern. If these insects become a management problem during the term of this plan, actions will be undertaken to manage the populations. The budworm management program will aid in reducing damage by this pest.

Disease

The most significant diseases within TFL 49 are the root rots (*Phellinus weirii, Armillaria ostoyae*, and *Leptographium wageneri* (particularly in the Siwash Creek drainage)). Where these diseases are found

within the TFL, the intent of the applicable guidebooks for the detection, management, and free growing criteria and assessment will be followed.

Mistletoe infestations from both *Arceuthobium douglasii* and *Arceuthobium americanum* must also be considered in some areas. These diseases will be identified during surveys or during pre-harvest assessments. All phases, from stand development through to reforestation, will take into account the presence of these and any other disease. The normal treatment will consist of harvesting with the clearcut system and sanitation removal of any remaining mistletoe infected stems.

Forest Health

Pest incidence surveys were conducted on Blocks B and C of TFL 49 between 1998 and 2000. These surveys were used to develop the *Forest Health Management Plan for TFL 49* (FHMP). The FHMP identifies historical and current pest activity, as well as management strategies to reduce the hazard and risk to future stands of timber. Forest health strategies are consistent with FPC guidebooks and/or input from MoF Regional forest health specialists (Hodge, 2001).

The plan states (Hodge, 1999):

> *Strategies required to restore ecosystem health will involve alterations to the fir dominated landscape through vegetation management and where possible, use of silviculture systems promoting even-aged patches. Stand modifications or removal of high hazard stands and regenerating to a species mix may be necessary in the IDFdk. The objective is to make forests less vulnerable to insects and diseases while maintaining or enhancing genetic, species and landscape diversity.*

3.10 ACCESS MANAGEMENT

Riverside recognizes the public's need for access to publicly owned forests. Therefore, a policy of unrestricted access is in place for the TFL. Where appropriate, road maintenance and road use agreements will be entered into with other resource users.

Road signs and kilometre markers will be installed and maintained in harvesting areas. During active harvesting, warning signs will be posted along with the operational radio frequency being used.

Road rights-of-way (RoW) will be seeded and RoW landings will be ripped and seeded. Some form of restricted access or deactivation may be necessary in the interest of safety, for environmental reasons or for wildlife management purposes. Roads in the Blackwell Lake area have been deactivated as part of a plan to maintain walk-in only status to that lake system. Road closures may also be necessary during periods of high or extreme fire hazard. Restrictions will be applied after consultation with the District Manager.

3.11 RESEARCH

To attain its major goals, Riverside is committed to pursue beneficial research projects, either on its own or in co-operation with the Ministry of Forests, other government agencies, other licensees, or other organizations.

3.11.1 Ecological Forest Stewardship Project

The TFL 49 Ecological Forest Stewardship Project represents an initiative undertaken by Riverside in partnership with the B.C. government to develop and implement a total resource, results-based, sustainable forest management system (Riverside, 2003). The project is based on application of research, into the ecological processes that operate within our forests. Details are available in the *TFL 49 Ecological Forest Stewardship Project, Project Summary* (Riverside, 2002).

Key areas of interest are:

- Identifying the primary causes of the natural disturbances that have allowed the various ecosystems to remain productive and be sustained;
- The frequency of occurrence, distribution, and severity of the natural disturbances, which results in a rate of renewal of the ecosystems and provides a heterogeneous pattern of forest cover across the landscape;
- How these disturbances influence the amount, type and distribution of structure (snags, island remnants, *etc*.) left within the new forests and the impact on biodiversity;
- A framework of criteria and indicators and related targets for environmental, social and economic values (based conceptually on the Canadian Council of Forest Ministers and tailored to reflect the objectives of the Okanagan-Shuswap Land and Resource Management Plan);
- Development of an Ecological Stewardship Plan and Site Level Plans;
- Implementation of adaptive management; and
- Development of regulations for management including compliance and enforcement.

3.11.2 Other Research

Riverside participates in other forms of research within the forest industry. Examples of these projects, which directly benefit operations on the TFL, include the following items:

- Riverside is an active member of the Forest Engineering Research Institute of Canada (FERIC);
- As a member of Forintek Canada Corp., Riverside also participates on applied research projects to enhance manufacturing processes;
- Riverside is a member of the Interior Tree Improvement Council that has cooperated in the past on progeny test sites required as a part of the tree-breeding program. In cooperation with the MoF Research Branch, Riverside is involved with establishing progeny sites for second-generation seed orchards;
- Trials are continuing to select the best high elevation stock types for cold soil conditions;
- In conjunction with MoF Research (Kamloops), Riverside is involved with a high elevation alternative harvesting system project. This project will impact harvesting systems in spruce/balsam forest types throughout the Southern Interior of British Columbia;
- Riverside is a member of the Southern Interior Growth and Yield Cooperative (SIGY), as well as the Forest Research and Extension Partnership Forrex (www.forrex.org) ; and

- Riverside is an active participant in a project entitled *Incremental Silviculture of Lodgepole Pine: Integrating Stand Density, Optimum Nutrition, Wildlife Habitat, and Range Resources*.

4.0 OTHER RESOURCES

Water, fish, wildlife, range, and recreation are important resources within TFL 49, and Riverside recognizes the impact of road building, harvesting, and silviculture activities on these resources.

The Forest Practices Code and the LRMP are used as a guide in planning for these resources. Referral (including advertising) of the *Draft Management Plan No. 4*, and forest development plans, provide opportunities for all agencies and concerned parties to ensure that specific concerns will be addressed in the integrated management proposals.

4.1 RANGE

Riverside believes that forest management goals can be achieved in harmony with goals of range management, provided there is good coordination and communication. A good working relationship will be maintained with range tenure holders. The impacts of grazing and/or domestic grass seeding on the establishment of conifers will continue to be monitored. Where possible, opportunities to achieve mutual benefits from integrated use management will be developed. Where functional range improvements (fences, cattle guards, corrals, loading ramps, trails, and water holes) are damaged as a result of harvesting, these will be repaired or replaced. Grass seeding, if necessary, will be applied for erosion control, rehabilitation and aesthetic purposes on newly developed roads, landings and skid trails in co-operation with the MoF's district office. The impact of cattle on attainment of silviculture goals will be monitored. Construction of cattle exclosures may be deemed necessary.

Riverside will continue to meet with grazing licencees to discuss and invite comments and proposals for:

- Range and Plantation Protection Plans (RAPPP);
- Forest development plans;
- Grass seeding and range improvement plans;
- Replacing natural barriers where breached; and
- The control of noxious weeds through cattle management, and rapid right-of-way seeding.

Grazing maps and reports, to be provided by the MoF, were not available for inclusion in this plan. We do not expect any increase in available animal unit months during the period of this plan.

4.2 FISH AND WILDLIFE

Maintaining wildlife populations depends on providing a suitable diversity of habitat across the forest landscape. Forest-level planning and operational practices ensure that continuing forest diversity is provided. At the forest landscape level the company is co-operating with the B.C. Ministry of Sustainable Resource Management (MSRM) to identify and map critical wildlife habitats such as winter range.

Close liaison will be maintained with the MWLAP and the federal DFO. Areas having high fisheries or wildlife value will be identified and considered in all phases of planning. Important fish streams are identified on the interim riparian classification (Map 14, Appendix VII).

In order to maintain populations of the various wildlife species, it is important that their habitat requirements are properly identified. This requires habitat inventory classification and identification at both the forest landscape level and at the stand level. Concepts on the management of wildlife habitat have

been progressing rapidly in the past five years. Riverside endeavours to stay abreast of new approaches and suggested guidelines, and to implement them as appropriate.

At an operational level, wildlife habitat requirements are considered in development planning and in cutblock design. Riverside has also adopted several specific operating practices in order to maintain wildlife habitat.

Wildlife migration patterns, breeding areas, thermal and protective cover requirements, as well as feeding requirements, will be considered in all resource plans. Of particular concern are mule deer and moose winter ranges. Ungulate winter range will be managed in a manner consistent with the LRMP.

Slash accumulations can provide habitat for small mammals such as pine marten. Scattered slash and woody debris piles may be left unburned to provide this cover. The amount of debris left intact will be decided specifically for each cutblock. The main concern is not to unduly increase the fire hazard.

Where control of access is identified as being critical to game management, Riverside will cooperate to implement acceptable proposals for controlling this access. Where trapping and/or guiding activities are identified as being active in an area scheduled for development and/or harvesting, Riverside will notify the affected parties in order to resolve potential resource use conflicts prior to commencement of operations.

Fisheries and water values will also be identified and integrated in development proposals. The B.C. Ministry of Water, Land, and Air Protection and the federal Department of Fisheries and Oceans are the government agencies responsible for managing the fisheries resource. The goal of these agencies is to ensure that the productive capacity of fish bearing waters is maintained. Our integrated management goal will be to maintain required quantity and quality of water within each watershed on TFL 49.

FPC riparian reserves and management zones will be given careful consideration in all phases of timber management to ensure protection of the resource as per the FPC, FRPA, and the LRMP. Prior to commencement of logging operations, practices to maintain streambank integrity and fish habitat will be reviewed with the logging contractor. Any special protective measures required will also be discussed.

Some lakes, creeks, and streams in the TFL contain resident fish populations. There continues to be an active fish-stocking program, undertaken by government, on the TFL. The company uses a number of practices to protect fish habitat. All streams and riparian areas within or adjacent to proposed cutblocks and roads will be identified and classified in accordance with the FPC. Riparian reserves and machine-free buffers will be shown on the logging plan maps. Boundaries of reserves and buffers will be marked in the field.

4.3 BIODIVERSITY

Landscape and stand level biodiversity are addressed in the management of TFL 49 as directed by the Forest Practices Code, and the LRMP. As signatories to the Okanagan-Shuswap LRMP, Riverside will follow LRMP direction for stand and landscape level biodiversity management.

4.3.1 Habitat Age Diversity

A major part of TFL 49 consists of even-aged stands of mature or over-mature timber. Harvesting increases the distribution and diversity of age classes of timber and their associated habitats.

4.3.2 Species Diversity

Efforts will be made to maintain the current diversity of species that exist on TFL 49. Most stands within TFL 49 contain more than one tree species. Riverside's practices have concentrated on planting the most ecologically appropriate species. The planting program includes both single species planting and mixed species planting.

Recent studies by the MoF have indicated that an increase in species diversity occurs within the first 15 years of the stand establishment. Planting a single species does not create a monoculture since natural regeneration will augment the planted trees.

4.3.3 Genetic Diversity

The seedlings planted on the TFL are generally grown from locally collected seeds or from our seed orchard. Seed produced in our seed orchard is registered with the MoF to ensure that genetic diversity is maintained or enhanced. Each of our many seedlots is made up of seeds from over 40 families or nearly 100 trees. This is sufficient to capture a large proportion (over 95% of the genetic diversity) of the existing stands. These seedlings, when augmented with natural regeneration, capture virtually all of the genetic diversity on the site. Using a number of different seed sources in our operations maintains genetic diversity and provides opportunities for new genetic crosses to occur. These additional genetic crosses will also increase genetic diversity.

4.4 RECREATION

TFL 49 is located in the Shuswap-Thompson and Okanagan drainages. Portions of the TFL (for example, the west side of Okanagan Lake) have aesthetic values important to local communities and tourism. However, the major recreation experiences on the TFL are on the plateau areas. Recreation activities are experienced primarily by local users, and to a lesser degree, by tourists.

a) Activities

The recreation activities enjoyed on TFL 49 include: fishing, hunting, firewood cutting, trail riding (motorcycle and horseback), viewing, camping, hiking, bicycling, ice fishing, nature studies, rock hounding, hang gliding, snowmobiling, sled-dog racing, cross country skiing, swimming, and picnicking. These uses are detailed in the recreation inventory. This inventory will be updated and improved as additional information is gathered.

b) Landscape

Recreation opportunity spectrums (ROS) and visual quality objectives (VQO) have been identified according to recognized Ministry standards to ensure visual quality objectives are met. Riverside recognizes these values and will consider them in all forest management activities. Riverside will work in cooperation with the MoF to develop plans that provide for maintenance and enhancement of these recreational opportunities. Specific recreational projects will be planned and included in the forest development plan. The visual landscape inventory in place for this MP is from the LRMP.

4.5 WATER

Riverside recognizes the importance of the water resource in the Shuswap-Thompson and Okanagan regions. Close liaison will be maintained with irrigation districts and water users to identify and address concerns regarding quality and quantity of water produced from the watersheds within the TFL.

There are five registered community watersheds (Lambly Creek and Powers Creeks in the former Penticton Forest District [Block A], as well as Hope Creek, Norris Creek and a small portion of Silver Creek in the former Vernon Forest District [Blocks B & C]) within TFL 49 (see Map No. 12 Appendix VII). In addition to these Community Watersheds there are several water licences for domestic and irrigation purposes, on creek drainages originating within TFL 49. Riverside recognizes the importance of these water resources, and will consider them in road construction, harvesting, site preparation, and reforestation plans. Where required, watershed analyses will be undertaken on specific watersheds.

5.0 CONTRACTING

Riverside complies with the *Timber Harvesting Contract and Subcontract Regulation*.

6.0 REVISIONS

Draft Management Plan No. 4 has been revised in accordance with MoF direction and public and First Nations input. These revisions form an integral part of the *Proposed Management Plan No. 4* and are based on correspondence documented in the *Public and First Nations Review Report* (Appendix III).

7.0 HISTORY OF THE LICENCE

Tree Farm Licence 49 was designated as a result of the previous Licensee's application of June 4, 1984 to amalgamate Tree Farm Licences 9, 16, and 32. The amalgamated Licence, referred to as the Okanagan Tree Farm Licence, has a 25-year term, beginning July 1, 1995.

The licence to manage the former Okanagan (West) Forest Management Licence (No. 9) was granted to S. M. Simpson Ltd. under a contract with the Province of British Columbia on August 16, 1951. The Licence was subsequently designated the Okanagan (West) Tree Farm Licence (No. 9) following amendments to the *Forest Act*. On December 1, 1970, S. M. Simpson Ltd. was acquired by Crown Zellerbach Canada Ltd.

Tree Farm Licence No. 16 (the Monte Lake Tree Farm Licence) was first granted to Pondosa Pine Lumber Company Ltd. on April 22, 1954. On December 1, 1970, Pondosa Pine Lumber Company Ltd. was acquired by Crown Zellerbach Canada Ltd.

Tree Farm Licence No. 32 (the Bolean Tree Farm Licence) was granted to Vernon Box and Pine Lumber Company Ltd. on June 29, 1959. Vernon Box and Pine Lumber Company Ltd. was purchased by Armstrong Sawmills Ltd. in 1964, but no formal merger took place. In 1969, Crown Zellerbach Canada Ltd. purchased Armstrong Sawmills Ltd. and in December 1970 Tree Farm Licence No. 32 was registered in Crown Zellerbach Canada's name.

On March 30, 1983, Crown Zellerbach Corporation sold its interest in Crown Zellerbach Canada Ltd. to Fletcher Challenge Limited of New Zealand. As a result of the ownership change, Crown Zellerbach Canada Ltd. was renamed Crown Forest Industries Limited (CFIL), effective October 1, 1983.

Fletcher Challenge Limited subsequently acquired a majority interest in British Columbia Forest Products Limited, and on September 2, 1988, its shareholders approved a name change from British Columbia Forest Products to Fletcher Challenge Canada Limited (FCCL).

Coincident with the change of name was the implementation of a management agreement between FCCL and CFIL, whereby FCCL agreed to manage the assets and business of CFIL. The collective corporate entity was known as FCCL, and included the operation and management of TFL 49.

On November 14, 1992, certain assets of Fletcher Challenge Canada Limited, including the rights associated with Tree Farm Licence 49, were acquired by Riverside Forest Products Ltd. Riverside Forest Products Ltd. subsequently was organized as a public company, and the corporate name of the current licensee is Riverside Forest Products Limited Riverside).

8.0 WITHDRAWALS AND ALIENATIONS

Withdrawals and alienations from TFL 49 are listed in the following tables. There have been no legal alienations since MP No. 3.

Table 8.1 - Withdrawals Block A (former TFL 9)

Amendment Number	Date	SUP No.	Area Hectares	Location - Description
TFL9-1	Mar. 2/56	2431	0.6	Paynter & Dobbin Lakes cabin sites
TFL9-2	Nov. 7/56	939		Cancelled by Amendment #23
TFL9-3	Aug. 1/57	6531 3101	2.0 16.7	Blue Grouse TV transmitter site power line R/W
TFL9-4	Dec. 12/57	Unstated	27.9	Terrace Mt. L/O and access road
TFL9-5	Oct. 14/58	MN.219322	7.3	Bouleau Lake cabin site
TFL9-6	Feb. 24/59	2368	0.7	Esperon Lake cabin site
			0.3	Terrace Mt. (South of L.O.) cabin site, Cancelled June 28/79
			0.5	Loch Drinkie cabin site - Cancelled June 28/79
			0.1	Shorts Creek cabin site - Cancelled June 28/79
TFL9-7	Nov. 30/59	3699		Cancelled by Amendment #15
TFL9-8	Dec. 23/59	Schedule A	15.1	Bear Cr. - Lot 3749 Title 175791E
TFL9-9	Jan. 27/61	Unstated	23.9	Wilson Landing - (portion of L.2549) Girl Guide camp
TFL9-10	May 2/61	4163	1.7	Jackpine Lake – dam site
TFL9-11	Sep. 13/61	4155	0.3	Jackpine Lake - fishing camp
TFL9-12	Nov. 29/61	1970	0.2	Esperon Lake - campsite (CF)
TFL9-13	Nov. 26/62	4724	0.7	Blue Grouse Mt. (L.3748) Hydro R/W L. Replaced by Amendment 29
TFL9-14	Feb. 25/63	4824	2.4	Morden Cr. (L.2183) - R/W SUP expired
TFL9-15	May 9/63	Unstated		Cancelling Amendment #7 (Clause 9)
TFL9-16	May 30/63	Unstated	32.8	Whiterocks Mt. (L.3089) Blocks A & B returned to Schedule B
TFL9-17	Aug. 19/63	4969	7.3	Whiteman Cr. - Recreation SUP expired. Area Returned to the TFL
TFL9-18	Oct. 2/63	2431	0.5	Bear Lake - Cabin Site
TFL9-19	Oct. 2/63	5047	1.3	Bear Cr. - (L.2175) - R/W SUP expired. Area returned to the TFL
TFL9-20	Feb. 8/65	Schedule A	48.6	Whiteman – Bouleau Cr. Jct. (L.3789 converted to Schedule A)
TFL9-21	Mar. 25/65	5047	Unstated	Addendum to Amendment 19 SUP cancelled, area returned to the TFL
TFL9-22	Mar. 25/65	5499	0.2	Shorts Cr. - Cabin sites (2) SUP expired area returned to the TFL

Amendment Number	Date	SUP No.	Area Hectares	Location - Description
TFL9-23	Sep. 6/65	939		Cancelling Amendment #2
TFL9-24	Jan. 7/66	4949	2.3	Esperon L. – Campsite SUP expired area returned to the TFL
TFL9-25	Mar. 7/68	Unstated	15.0	Lambly L. - flood area
TFL9-26	Dec. 9/68	6267	1.6	R/W - Bear L.
TFL9-27	June 23/70	6615	1.0	Morden Cr. - Dept. Highways radio site (L2183)
TFL9-28	Mar. 23/71	n/a	n/a	Amendment of Clause 29 of TFL contract
TFL9-29	Mar. 12/71	3101	16.7	Hydro R/W (replaces Amendments 3 and 13)
TFL9-30	June 8/71	n/a	4.0	Stream gauging site - Whiteman Creek
TFL9-31	Mar. 6/72	7223	20.8	R/W - Powers Creek
TFL9-32	Dec. 16/74	3101	1.4	Hydro Line R/W
TFL9-33	May 30/77	8801	4.0	Sanitary landfill site deleted from TFL
TFL9-34	May 30/77	n/a	5.2	Dept. of Highways gravel pit. Deleted from TFL
TFL9-35				
TFL9-36	Aug. 5/81		3.1	D.L. 3789 Whiteman Creek Road R/W
TFL9-37	July 23/84	9676	2.1	N. of Whiteman Creek. Road R/W to L 3788
TFL 49	Sept. 16/92	Instr. 4	0.2	DL. 3746 Water Reservoir, Pine Point Developments
TFL 49	Sept. 16/92	Instr. 5	1.8	DL. 3746 Water Reservoir, Pine Point Developments

Table 8.2 - Withdrawals Block B (former TFL 16)

Amendment Number	Date	SUP No.	Area Hectares	Location - Description
TFL16-1	Feb. 28/56	n/a	n/a	Adjustment of metes and bounds
TFL16-2	Nov. 5/56	(939)	1.3	Woods Lake – Fishing Camp SUP has since lapsed
TFL16-3	May 7/66	3319	0.2	Near Stephen's Lake
TFL16-4	Sep. 20/61	n/a	n/a	Incorporated Pondosa Pine Timber Sales from Schedules A to Schedule B lands
TFL16-5	July 18/61	n/a	53.5	Incorporated (Lot 475) Lot 3 Plan 8176 to Schedule A of the TFL
TFL16-6	Jan. 24/64	n/a	2.3	Deleted area from TFL in vicinity Lot 511 on Douglas Lake Public Road
TFL16-7	Jan. 7/66	5651	2.2	Cancelled by Amendment #8
TFL16-8	Apr. 2/69	5651	2.9	Replaces area covered by #7, located in Sec. 23, TP 17, R14, W6M. SUP deleted July 27/84
TFL16-9	Mar. 19/71	n/a	n/a	Amends Clause #30 for TFL Licence document
TFL16-10	Dec. 19/78	n/a	8.2	Removal of area for Dept. of Highways gravel pit
TFL 49-1	Nov.25/85	n/a	78.0	B.C. Hydro R/W

Table 8.3 - Withdrawals Block C (former TFL 32)

Amendment Number	Date	SUP No.	Area Hectares	Location - Description
TFL32-1	May 2/61	n/a	n/a	Incorporated Timber Sale X80368 into the TFL
TFL32-2	July 29/74	n/a	232	Blair & Spa Lakes temporary map reserves. Returned to Schedule B
TFL32- 3	Oct. 20/70	464	1.2	Addition to existing SUP 464 (south end of Bolean Lake) Replaced by Amendment 5
TFL32-4	Mar. 19/71	n/a	n/a	Amends clause #31 of TFL Licence Document
TFL32-5	June 28/77	464	1.9 1.3 0.5	Bolean L. - Fishing Camp Blair/Arthur Lake. sub area 1 Spa L. sub area 2 Replaces Amendment 3
TFL32-6	Feb. 6/80	9194	1.0	Removal of garbage dump from the TFL (north of Bolean Lake.)
TFL 49-2	Jan. 23/86	n/a	1.82	F.S. Road #4123.06 R/W

9.0 ALLOWABLE ANNUAL CUTS

The following tables indicate the historical change in the Allowable Annual Cut (AAC) for each of the three former TFLs and TFL 49. Note that increases in AAC are mainly attributable to changes in utilization levels.

Table 9.1 - AAC TFL 9 (Block A)

Management Plan	Period	AAC (m^3/year)
No. 1	1951 - 1953	50,971
No. 2	1954 - 1962	47,573
No. 3	1963 - 1971	101,941
No. 4	1972 - 1979	210,395
No. 5	1980 - 1985	207,500

Table 9.2 - AAC TFL 16 (Block B)

Management Plan	Period	AAC (m^3/year)
No. 1	1954 - 1957	28,317
No. 2	1958 - 1962	28,317
No. 3	1963 - 1969	42,476
No. 4	1969 - 1973	65,129
No. 5	1974 - 1980	127,993
No. 6	1980 - 1985	135,000

Table 9.3 - AAC TFL 32 (Block C)

Management Plan	Period	AAC (m^3/year)
No. 1	1959 - 1964	15,574
No. 2	1965 - 1967	17,273
No. 2	1968 - 1969	22,937
No. 3	1970 - 1974	24,636
No. 4	1975 - 1980	33,980
No. 5	1981 - 1985	30,000

Table 9.4 - AAC TFL 49

Management Plan	Period	Licensee AAC (m^3/year)	SBFEP AAC (m^3/year)	Total AAC (m^3/year)
No. 1	1985	372,500	0	372,500
	1986 -1987	380,000	0	380,000
	1988	370,537	9,463	380,000
	1989 -1991	361,074	18,926	380,000
	1992	359,576	20,424	380,000
No. 2	1993-1998	343,095	36,905	380,000
No. 3	1999-2004	343,095	36,905	380,000
Management Plan	**Period**	**Licensee AAC (m^3/year)**	**BCTS AAC (m^3/year)**	**Total AAC (m^3/year)**
No. 4 Base	*2005-2009*	*343,095*	*36,905*	*380,000*
No. 4 MPB uplift	*2005-2009*	*100,000*	*0*	*100,000*
Total Proposed	2005-2009	443,095	36,905	480,000

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