Merritt TSA
Silviculture Strategy (Type 1)

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The consultants also wish to thank the participants in the workshop, listed below, whose contributions are the basis of this strategy.

	Name	Organization
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2	Dave McBeth	MoF – Merritt Forest District
3	Kathie Swift	SIFERP
4	Gord Lester	NSIFS
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9	Cathy Laursen	Aspen Planers Ltd.
10	Dennis MacDonald	Ardew Wood Products Ltd.
11	Bruce Hampton	Hampton Resource Mgmt.
12	Beverly Taylor	BC Environment
13	Ed Nedokus	MoF – Merritt Forest District
14	Bruce Pamplin	MoF - Kamloops

Preface

The development of silviculture strategies for TSAs and TFLs is motivated by the desire to clarify the relationship between investments in silviculture and the critical forest-level issues specific to the management unit.

The Type 1 analysis is workshop-based. It draws on the expert knowledge of the participants to identify the critical issues, derive objectives with respect to those issues, specify regimes to meet those issues, and identify the regime activities that can be implemented in the next five years. After consideration of the benefits and costs of each of the activities on each of the forest-level objectives, the participants rank the silviculture activities by priority. The result is a prioritized list of silviculture activities that are explicitly linked to the critical issues of the management unit.

Type 2 analyses are model-based, but the analysis process is fundamentally identical to the Type 1 analysis. A forest-level model is used to evaluate the impacts of regimes on the forest-level objectives, to identify the silviculture activities constituting the "preferred management scenario", and to rank those activities.

The Type 2 (model-based) analysis will result in a silviculture strategy that is considerably more appropriate and robust than the Type 1 approach, but it is more expensive and demanding of scarce modeling expertise. Hence the Type 1 (workshop-based) approach has been designed to produce an interim silviculture strategy that will serve until a Type 2 analysis can be completed.

In the absence of a silviculture strategy for a management unit, the Ministry of Forests' provincial level strategy *Incremental Silviculture Strategy For British Columbia (Interim)* has provided interim guidance. A summary of this document is included as Appendix 3 to this report.

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Strategy Summary

While many issues were proposed and discussed in the workshop, the participants developed six general strategies to address them.

Elements of the Strategy

1. Maintain or increase the THLB by restocking backlog and old fires, rehabilitating landings, restoring watersheds and confirming TSR operational adjustment factors.
2. Learn to manage dry belt Fd stands so that harvesting can be increased on these lands, completing studies already underway and resolving specific management issues (described in detail in the main body of this report).
3. Maintain or improve forest health and hence reduce losses, by improving detection and treatment systems for mountain pine beetle, fire proofing stands with unsalvaged losses, and managing root rot.
4. Adjust the harvest schedule of stands critical to maintaining the harvest level by reducing time required to meet green-up and ECA limits, reducing adjacency effects, and accelerating merchantability.
5. Clarify product objectives and implement management regimes to achieve those products.
6. Adjust stand structure to enhance critical habitat.

Tactical Priorities

The tactical priorities set by the participants represent a balance between the participant's strategic objectives for the management unit and the silvicultural opportunities available on the TSA in the next 5 years. Table S-1 lists activities identified by the participants, the strategies that each activity implements and the rank (priority) assigned to each activity.

Table S-1. Silviculture activities, the strategies they implement, their impacts on TSA objectives, and their priorities as determined by the workshop.

Activities/Treatments	Strategy Implemented	Opportunity (ha/year)	Workshop Rank	
Survey		5193		
General - 3X incremental program		1693		
Backlog reforestation		870		
Backlog impeded		2230		
LO Backlog		768		
Regen to FG				
Backlog planting	1	171 /3 yrs	3	
Backlog planting (legal obligation)	1	632 /1 yr	3	
Backlog brushing	1	80	3	
Landing rehab	1	16 / 1yr	3	
Spacing		1000		
Pl >10,000	4	200 /5yr	2	
Fd single layer + vets	4	325	4	
Fd, Pl >5000, single layer	4,6	325	4	
Fd >5000, multi layer	4,6	100	4	
Pruning		221		
Complete existing partial lifts	5	221	1	[1]
Fd, Pl spaced Fd, Pl	5	163	5	
Fertilization		1100 /5 yrs		
Fd, Pl spaced M sites, space and pruned	4	70	4	
Fd, Pl spaced M sites, space and natural in ECA-limited watersheds	4	150	3	[2]
Fd, Pl natural sites, 10 year before harvest	4	??	6	
Habitat		150		
SB ESSF spacing	6	??	3	
Studies				
Studies idenrtified as ongoing, on to-do list	all	50 / 5yr	1	
Forest Health		>10		
Probing; single disposal methods	3	8000 stem	1	
Adjust harvest flow to pine and de-emphasize other species	3	TSA	1	
Advanced roads and deactivation	3	beetle area	1	
Fireproof to reduce risk (e.g. burning)	3	see Table 3-1b	1	
Enhance detection - new photography	3	TSA	1	
Managing root rot in Fd with deciduous, larch, Py,	3	Fd Zone	3	
Current Fire				
Lawless Fire - 5000 ha	1		3	
Danger tree assessment survey, site prep, plant, brush				
Watershed restoration	1		3	

[1,2] priorities were questioned post-workshop

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1 Introduction

The Silviculture Strategy (Type 1) workshop draws on the expert knowledge of the participants to identify the key issues that should guide silvicultural planning on the TSA, derive objectives with respect to those issues, specify regimes to meet those issues, and identify the regime activities that can be implemented in the next five years. The key idea is that this line of logic from issues to silvicultural activities can be retraced when evaluating funding levels, ensuring that activities are funded that address critical TSA issues.

The first step in developing this line of logic is to identify the key issues that should guide silvicultural planning on the TSA. Next, the participants' objectives with respect to these issues are clearly stated. Strategies for meeting these objectives are identified, together with the silvicultural target (stand types) to which these strategies are to be applied. A plan of action, most often a silvicultural regime, is then developed to implement each strategy. This sequence constitutes the "strategic analysis"part of the workshop and the resulting compilation of issues, objectives, strategies and regimes is the silviculture strategy.

After developing the strategy, the workshop identifies opportunities to implement the regimes in the next five years and develops a program of silvicultural activities that is consistent with the strategy and is feasible with respect to the operational realities of the TSA. The impacts of these silvicultural activities on selected objectives are estimated by the workshop participants, and in a final step, the activities are ranked as to their importance with respect to the TSA issues. Development of the 5-year plan of silvicultural activity and estimating impacts and evaluating ranks of the activities constitutes the "tactical analysis"part of the workshop.

This report documents the results of a workshop to develop a strategy and a 5-year plan for the Merritt TSA. Following this introduction, section 2 summarizes the results of the strategic analysis and section 3 presents the analysis of the 5-year plan. Issues that influence silviculture planning on the TSA were obtained from a questionnaire sent to the District, the most recent Resource Management Plan, and other documents identified by the District. These issues were compiled prior to the workshop and are described in Appendix 1. Appendix 2 contains a detailed examination of the timber supply situation on the TSA, also prepared prior to the workshop, as some aspect of timber supply is often a guiding issue for silviculture planning.

2 Guiding Issues

This section identifies the critical issues that guide silviculture planning in the Merritt TSA. The issues prepared prior to the workshop (Appendix 1) were reviewed by the participants and modified, refined and ranked (Table 2-1).

Issues that were identified as requiring investigation prior to planning silvicultural action (the "to-do" list) are compiled Table2-2..

Table 2-1. Issues Guiding Silviculture Planning on the Merritt TSA

#	Issue Description
	High Priority
1	Backlog; Rehab of highway lands
2	High proportion of mature timber is Pl and will be held past desireable harvest age. Stabilty of Pl types. Risk to fire, reduced volumes. S/B succeptible to beetle. May result in a mid term trough.
3	Managing residual fir. Complex areas requires development of management regimes. Determine objectives for fir retention.
4	Three watersheds plus Lawless fire have exceeded ECA due to pine beetle salvage. Consequently the remaining timber is more constrained to offset lost values.
5	Mountain Pine Beetle, root rot, gall rust, mistletoe.
6	Temperature sensitve watersheds may require special management.
7	Rehab of suitable roads and landings (within cut blocks?)
	Medium Priority
8	Need to define the future portfolio of products that will provide current management guidance. What are we trying to achieve? E.g., High percentage of MSR.
9	Stocking standards and methods of site prep conflict with habitat requirements. Study if current practices are degrading habitat, benign or beneficial.
10	Mountain beaver may require change in practices; site prep, stocking standards
11	Impacts Fd management and is constrained in TSR.
12	Fuel management
13	High proportion of mature timber is Pl and will be held past desireable harvest age. Stabilty of Pl types. Risk to fire, reduced volumes. S/B succeptible to beetle. May result in a mid term trough
	Low Priority
14	VQOs will increasingly constrain supply.
15	Adjaceny will become increasingly limiting; natural vs planting

Table 2-2. "To-Do" List--Topics requiring further investigation, as determined by the workshop.

Rank	#	Topic
High		
H,I	1	Fd misclassified.: Many Fd stands are misclassified. Current standards are inadequate.
H	2	ISIS/TSR : ISIS and forest inventory data bases are fundementally incompatible.
H,(I)	3	Need to define the future portfolio of products that will provide current management guidance. What are we trying to achieve?
H	4	Must determine a mechanism (AAC, appraisal issues, and reforestation obligations) to facilitate management of Fd. District and IFPA will provide suggestions.
H,I	5	Unsalvaged losses: Degrade makes stands uneconomic for salvage.Also, infested Pl in fir stands are undesireable due to stumpage rules. Exceeds 10% of base cut. Roading is an issue.
H,I	6	Underestimation of SI: Forest level -confirmation SI in TSA, e.g. OGSI; Stand level, e.g., growth intercept.
H,I	7	Regime studies: Review regimes with respect to current research, efficacy, cost efficiency, and trade offs. Focus with respect to ecosystems. PFTs and road and landing rehab. Monitoring Protocol by 2001.Develop guide to pre-Fg activities that address habitat concerns.--> SIFERP Southern Interior Forestry Extention and Research Partnership
H,I	8	Regime studies post FG: same as 13a
H,I	9	Confirm TSR OAFs. Investigate restocking voids.
Medium		
M	10	ESAs: Review ESAs to confirm in relation to soil mapping.
M	11	Cattle: Conflict of cattle with regeneration.
M	12	Site limiting factors: Impact of site limiting factors on regeneration delay, regen and stocking.
M		Study/develop/encourage logging systems to minimize landings - 1 - 2% gain in productive landbase
Low		
L	13	Deciduous management: How to treat decid.
L	14	Roads and landings: Confirm TSR allowances; rehab of roads and landings
L	15	Silviculture employment: Silviculture has provided employment to local economy. Long term treatment levelscoincide with silviculture objectives andwill provide a variety of opportunities.
L	16	Economic operability: Confirm economic operability.
L	17	FG Guidelines: Flexibility required.
Current Projects (all approved)		
	1	Pothole Creek — IFPA + MoF Research Branch
	2	Edgar Creek
	3	Shelterwood
	4	Pl Density and Branch
	5	Commercial Thinning Trials
	6	Fd retention/small mammal habitat
	7	Cattle Management
	8	Green-up studies
	9	Road Landing
	10	Fd PFT
	11	Pl Density and Small Mammals
	12	Road Density / Grizzly Areas

2 Strategies and Implementation

The participants analyzed issues that could be addressed with silvicultural actions by identifying: objectives with respect to each issue, strategies for meeting the objectives, the target stand types, and a list of activities to implement each strategy. Some of these detailed specifications of regimes are compiled in Appendix 4. The set of strategies and activities are categorized in the following sections as timber quantity, timber quality and habitat strategies.

2.1 Timber Quantity Strategies

Potential silvicultural strategies for maintaining or increasing future timber supply were reviewed and evaluated in the workshop. The strategies that were determined by the workshop to have positive impacts on the timber supply and opportunity for implementation in the next 10 years are listed below. The strategies are grouped according to the timing of their anticipated effects– the short, mid– and long-term periods (0-20, 21-100, and >100 years for the Merritt TSA).[1]

As discussed earlier in the document Merritt TSA has an abundant supply of mature timber, much of which is lodgepole pine. Presently Mountain Pine Beetle (MPB) infestations have caused the Chief Forester to allow an uplift of the AAC. This uplift will harvest stands that would have been available to later harvests. With this in mind and with the ongoing risk of carrying older Pl stands, a mid term trough or weakening of the long-term even-flow was identified.

Short-Term Strategies (Years 1-20)

Presently there are no limitations on short-term harvest levels (uplift in place). There may however, be opportunities to increase the short, mid and long term harvest levels if certain actions are followed.

Three major strategies emerged from the workshop regarding short-term timber supply[2].

S1. Improve forest health information (detection) to plan efficient harvesting to address MPB outbreaks. Probing and single tree disposal methods would be used to reduce MPB mortality and maintain harvesting options away from outbreaks. Specifically:

- Obtain new photography to enhance detection is a high priority for the entire TSA.
- Implement a program of probing and treating 8000 stems per year. This activity was given the highest priority by the workshop participants.

S2. Improve site productivity information regarding Pl on managed stands and small wood conversion stands. Increased site productivity will affect the long term yield predictions and could affect short term harvest levels. This is being addressed through ongoing studies, identified as high priority (e.g., OGSI).

S3. Presently, little harvesting is being done in dry belt Fd stands in the Merritt TSA (approx 19% of the timber inventory). Studies that are presently underway are considered high

[1] See Appendix 2 for a more complete explanation of the response framework for the Merritt TSA.

[2] All three strategies will also provide positive mid and long term timber supply effects.

priority by the workshop attendees and will assist in determining short and mid term options.

Issues that require resolution to enable the exploitation of the dry belt Fd include:

- better inventory, capturing variability and merchantability
- flexibility to use silvicultural systems and partial cutting approaches that meet the various objectives for the area (not just single tree selection as presently implemented by the MOF)
- retention levels and strategies to meet MOELP objectives – objectives need to be clearly defined
- better understanding of blow down and root rot risk and the resultant silvicultural options
- fire exclusion, its effects: what if anything can be done to reintroduce fire to reduce risk of catastrophic events
- stumpage re-evaluation for small operators and low volume removal
- better information on site productivity (likely underutilized and underestimated at present)
- better definition of product objectives and stem characteristics

Juvenile spacing has been recommended in both single and mulit-layer Fd stands to manage ungulate winter range and free up short- term harvest options. Spacing and harvesting combinations may be required to create desired stand structures for sustained habitat elements.

Fertilization of spaced stands in ECA limited watersheds was considered a high priority by the workshop participants to reduce the time to hydrologic green-up, freeing up timber constrained through agency. Road management was also recommended.

Mid-Term Strategies

Mid-term strategies have been devised to address a possible mid-term trough and reduce risk of future losses.

Strategies to increase mid-term timber availability include:

M1 Increasing the timber harvesting land base by rehabilitating backlog.

- Continue with backlog planting, brushing and landing rehabilitation. This program will bring on line approximately 700 ha into productivity, some of which will be available in the mid term. (Priority 3)
- Reforest the Lawless fire site to target levels (Priority 3). This requires surveying and reforestation treatments.

- Continue watershed restoration projects to provide flexibility of mid term harvest opportunities.

M2 Accelerating the merchantability of managed stands

- Juvenile spacing of stands with Pl density of greater than 10,000 sph (200 ha/5 yr) was considered a high priority by the group (Priority 2). Lower densities will provide reduced time to merchantability making some stands available in the mid term.
- Juvenile space Fd single layer stands with Vets (325 ha/yr). These stands are the result of intermediate utilization harvesting and fire exclusion. Juvenile spacing is prescribed to reduce time to merchantability and promote ungulate winter range attributes (Priority 4).
- Density control of Pl and Fd stands with densities between 5000 and 10000 sph to reduce time to merchantability (Priority 4).
- Reduce density of multi-layer Fd where layer three is greater than 5000 sph. This is a maximum density number that requires greater resolution based on forest and stand level objectives. Approximately 100 ha per year are targeted for treatment to provide more rapid recruitment of saplings into merchantable stems (Priority 4).

M3 Increasing the productivity of harvested stands

- Fertilization of spaced Fd and Pl stands (70 ha / yr) to reduce their minimum harvest age (MHA, priority 4).
- Fertilize spaced Fd and Pl (150 ha / yr) stands in ECA limited watersheds to attain hydrologic green-up sooner and reduce MHA (Priority 3).

M4 Protecting existing stands

- Implement forest health strategies to reduce uncertainty and maintain future options. Specifically treat 8000 stems per year (Priority 1).
- Fireproofing of stands to reduce risk of catastrophic fire was deemed a high priority for areas with unsalvaged losses (e.g., inaccessible MPB kill areas, budworm areas), areas near settlements and spaced stands. (Priority 1).
- Managing root rot in Fd with alternative species, e.g., Lw, Py, Deciduous (Priority 3).

Long-Term Strategies

Merritt TSA is presently undergoing TSR II along with an Innovative Forest Practices Agreement (IFPA). The IFPA has created an alternative base case to TSR II incorporating new information and practices beyond the considerations of the TSR process which indicates that long term harvest levels could be maintained or increased.[3]

[3] No formal information was available at the time of the workshop. Preliminary trends were discussed without specifics.

Using present information the following strategies were recommended within the workshop to increase the long term timber supply:

L1 Increasing the timber harvesting land base

- Continue with backlog planting, brushing and landing rehabilitation (Priority 3).
- Road rehabilitation – need to determine options and costs. Estimate of 2% increase in the THLB.
- Confirmation of TSR operational adjustment factors (OAFs)
- Restocking the Lawless Fire (5000 ha) will maintain the productive land base and provide long term fiber supply (Priority 3).

L2 Accelerating the merchantability of managed stands by reducing minimum harvestable ages (MHAs) or increase volumes at current MHA

- reduce time to regeneration delay to 0 or 1 year
- use class A seed or better, use larger planting stock
- implement a void management program (reduce OAF 1 by 5%)
- increase planting densities.

(Note that pre-free-growing treatments were not formally covered in the workshop, but are an important part of the TSA's silvicultural strategy.)

L3 Protection of existing and regenerating stands

- Juvenile space single and multi-layer high density Fd blocks. This will help maintain stand vigor to provide long term harvesting options (Priority 4).
- Manage MPB through enhanced detection, single tree disposal methods, harvest flow decisions favoring pine (de-emphasizing other species for the time being), create advanced roads to harvest incipient bug kill (along with appropriate road deactivation). These treatments are meant to ensure MPB effects are kept to a minimum and handled efficiently. Once harvested all blocks would be reforested promptly, providing long term harvest options. If not managed efficiently, timber will be become non-merchantable with the resultant being less regeneration and flow to the long term (Priority 1)
- Management of root rot in Fd should be part of the Fd strategy identified above. Vigorous Fd stands are the intention for long term harvest potential (Priority 3).

2.2 Timber Quality Strategies

There is a need within the TSA to determine what future portfolio of products is to be created. The workshop participants felt this was a high priority and is on the To Do list. There is a study in place within the TSA to look into Pl density and branch size. Without further guidance the following strategies were identified to enhance timber quality within the TSA.

Q1 Manage densities to produce MSR wood

- Post spacing densities should be prescribed to create conditions for MSR wood – i.e., low taper, small branch sizes. These densities (2500 to 3000 sph) may also be suited to commercial thinning depending upon the site potential. Simulation runs should be created to determine if these densities would provide the desired product sizes within the MHA being modeled.

Q2 Manage Fd zone for sawlogs

- Because of the numerous non-timber objectives in the Fd zone, a portion of the profile will undoubtedly be harvested past the MHA and will provide "quality" Fd sawlogs. This could become a specified objective providing a planned supply of quality Fd over time.

Q3 Manage for clear wood

- Pruning has been practiced over a limited area within the district. Pruning early, prior to achieving a 3 m lift was common practice. Completing the lift to 3 m is seen as a high priority (Priority 1 – 220 ha / yr).
- Pruning of already widely spaced Pl and Fd stands will promote high quality clear wood (160 ha per year, Priority 5).
- Reforesting backlog sites was seen to provide higher quality timber than would have been available without treatment (Priority 1).

2.3 Habitat Strategies

Mountain beaver are a blue listed species and may require change in practices for site preparation and stocking standards. Maintenance of grizzly bear habitat was identified as an issue and requires assessment to determine if current practices are degrading, benign, or beneficial.

Development of regime options to promote habitat features for the above two species are considered a high priory by the group.

3 Silviculture Impacts and Priorities

The silviculture activities required to implement the strategies identified in Table 2.1 are summarized below in Table 3.1, together with their impacts on selected TSA objectives. The workshop determined the opportunity area (i.e., the area available for treatment for the next 5 years), the impacts on timber supply quantity and quality, and habitat effects for each treatment. The employment effects and costs are based on district and licensee records. The rank (priority) of each treatment was determined through consideration of the impacts of each activity on each objective, and represents a consensus of the participants.

4 Silviculture Program

4.1 Tactical Priorities

The rankings of Table 3.1 represent a balance between the participant's strategic concerns and the silvicultural opportunities available on the TSA in the next 5 years.

The highest ranked activities are forest health activities related to mountain pine beetle, completing partial lifts, and completing the ongoing studies on the "to-do" list.

Spacing dense pine (> 10 000 sph) was ranked second, while backlog activities, landing rehabilitation, spacing SB in the ESSF, and fertilizing in ECA-limited watersheds were all ranked third.

The remaining spacing activities and fertilizing spaced-pruned Fd and Pl sites were ranked fourth while pruning and late rotation fertilization were raked fifth and sixth, respectively.

4.2 Program Costs and Benefits

Table 4-1 contains the area treated by activity and year.

Table 4-2 contains the expenditure by activity and year, based on the unit costs recorded in the treatment table (Table 4.1).

Table 4-3 contains the silviculture employment benefits associated with the program.

Table 3-1a. Issues, silviculture activities, their impacts and ranks, as determined by the workshop.

Issues		Activities	Opportunity Area (Ha/Yr)	----- Timber Supply Effects ---- Short	Mid	Long	Qual	Habitat Effects	Jobs Days/ha	Cost $/ha[1]	Workshop Rank (s)	
				0-20	21-100	100+						
Survey			**5193**						**0.04**	**15**		
	1	general - 3X incremental program	1693									
	2	Backlog reforestation	870									
	3	Backlog impeded	2230									
	4	LO Backlog	768									
Regen to FG												
	5	Backlog planting	171 /3 yrs		+	+	+	++/-	2	660	3	
	6	Backlog planting LO	632 /1 yr		+	+	+	++/-	2		3	
	7	Backlog brushing	80		+	+	+	+/-	2	400	3	
	8	Landing rehab	16 / 1yr		+	+			?	2000	3	
Spacing			**1000**						**3**	**450**		
8,2,5	9	Pl >10,000	200 /5yr		+		+	+/-			2	
2,11	10	Fd single layer + vets	325	+	+	+	+	+			4	
2,11	11	Fd, Pl >5000, single layer	325		+		+	+/-			4	
5,11	12	Fd >5000, multi layer	100	+	+	+	+	+			4	
Pruning			**221**						**8**	**1200**		
8	13	complete existing partial lifts	221				+	+/-			1	1
12	14	Fd, Pl spaced Fd, Pl	163				+	-			5	
Fertilization			**1100 /5 yrs**							**175**		
2,8	15	Fd, Pl spaced M sites, space and pruned	70		+		+	+/-			4	
14,15	16	Fd, Pl spaced M sites, space and natural in ECA-limited watersheds	150	+	+			+/-			3	2
2	17	Fd, Pl natural sites, 10 year before harvest	??								6	
Habitat												
9	18	SB ESSF spacing	50 / 5yr		-	-		++			3	
		Studies	>10									
	19	Studies idenrtified as ongoing, on to-do list									1	
Forest Health												
2	20	probing; single disposal methods	8000 stem	+	+	+		+/-			1	
2	21	adjust harvest flow to pine and de-emphasize other species	TSA	+	-?	+		+/-			1	
2	22	advanced roads and deactivation	beetle area	+	-?	+		+/-			1	
2	23	Fireproof to reduce risk (e.g. burning)	*		+	+		+/-			1	
2	24	Enhance detection - new photography	TSA	+		+		+/-			1	
3,5	25	Managing root rot in Fd with deciduous, larch, Py,	Fd zone		+	+		+			3	
Current Fire												
2	26	Lawless Fire - 5000 ha				+	+		+			3
	27	danger tree assessment survey, site prep, plant, brush										
	28	Watershed restoration				+			+			3

Notes:

+, - indicates, respectively, a positive or negative impact on the indicated objective.

+/- indicates that the activity could have a positive or negative effect, depending on its circumstances of application

[1,2] priorities were questioned post-workshop

Table 3-1b. Issues, silviculture activities, their impacts and ranks, as determined by the workshop.

Issues		renumbered post worshop vities	Opportunity Area (Ha/Yr)	------- Timber Supply Effects ---- Short	Mid	Long	Qual	Habitat Effects	Jobs Days/ha	Cost $/ha[1]	Workshop Rank (s)
Survey			**5193**						**0.04**	**15**	
	1	general - 3X incremental program	1693								
	2	Backlog reforestation	870								
	3	Backlog impeded	2230								
	4	LO Backlog	768								
Regen to FG											
	5	Backlog planting	171 /3 yrs			+	+	++/-	2	660	3
	6	Backlog planting LO	632 1 yr			+	+	++/-	2		3
	7	Backlog brushing	80		+	+				400	3
	8	Landing rehab	16 / 1yr		+	+				2000	3
Spacing									**3**	**450**	
8,2,5	9	Pl >10,000			+		+	+/-			2
2,11	10	Fd single layer + vets			+	+	+				4
2,11	11	Fd, Pl >5000, single layer	325		+						
5,11	12	Fd >5000, multi layer	100	+	+	+					
Pruning			**221**						**8**		
8	13	compl	221				+	+/-			
12	14	Fd, Pl spaced Fd, Pl	163								5
Fertilization			**1100 /5 yrs**							**175**	
2,8	15	Fd, Pl spaced M site pruned	70		+		+	+/-			
14,15	16	Fd, Pl spaced M sites, space and natural in ECA-limited watersheds	150					+/-			
2	17	Fd, Pl natural sites, 10 year before harvest	??								6
Habitat											
9	18	SB ESSF spacing	50 / 5yr		-	-		++			3
		Studies									
	19	Studies idenrtified as ongoing, on to-do list									1
Forest Health											
2	20	probing; single disposal methods	8000 stem	+				+/-			1
2	21	adjust harvest flow to pine and de-emphasize other species	TSA	+	-?	+		+/-			1
2	22	advanced roads and deactivation	beetle area	+	-?	+					1
2	23	Fireproof to reduce risk (e.g. burning)	*		+	+					1
2	24	Enhance detection - new photography	TSA					+/-			1
3,5	25	Managing root rot in Fd with deciduous, larch, Py,	Fd zone					+			3
Current Fire											
2	26	Lawless Fire - 5000 ha			+	+		+			3
	27	danger tree assessment survey, site prep, plant, brush									
	28	Watershed restoration			+			+			3

ramp down: 520,100,100,100,50

ramp down (4160+1968+3220+910+892)

1500+692+1132+266+250

workshop: 101 /2yrs

subject to solving the appraisal /AAC problems; fir only

constrained by AAC and appraisal; and need to harvest beetle kill in short term

subject to solving the appraisal /AAC problems; fir only

increased mortality of small mamals, fur bearers, loss of food source; nesting, increased foreage opportunity for raptor population, possibly decrease linx habitat.

harvested in 60s; reguire harvest of remaining overstory, then space

pruned stands

Note: ramping up 196+174+177+456+100

ramping nup 0,100,200,300,500

increased mortality of small mamals, fur bearers, loss of food source; nesting

may benefit hydrological, riparian i.e. fish stocks

requires cut or appraisal incentive; requires opportunity for immediate attack; roads ahead

current budget allocated for 33% (cut and burn;estimate) See Pat Byrne MoF

requires sensitivity analysis

unsalvaged loss areas; settlement areas; budworm areas; risk reduction from spacing regimes

some ongoing around towns and settlements

Notes:

+, - indicates, respectively, a positive or negative impact on the indicated objective.

+/- indicates that the activity could have a positive or negative effect, depending on its circumstances of application

[1,2] priorities were questioned post-workshop

Table 4-1. Area (ha) treated by activity and year.

Year	Surveys* All	Landing Rehab	Backlog Planting	Backlog Brushing	Juvenile Spacing	Pruning	Fertilization	Total
1	7,873	16	683	80	1,010	196	-	15,568
2	4,453		50	80	1,010	174	100	11,577
3	6,145		70	80	1,010	177	200	13,392
4	2,969			80	1,010	456	300	10,525
5	2,885			80	1,010	100	500	10,285
Subtot Yr 1 - 5	24,325	16	803	400	5,050	1,103	1,100	61,347
6 - 10	2,885	-	-	80	5,050	1,103	500	18,273
Total Yr 1 - 10	27,210	16	803	480	10,100	2,206	1,600	79,620

* Includes prescription and layout

Table 4-2. Expenditure ('000 $) by activity and year.

Year	Surveys* All	Landing Rehab	Backlog Planting	Backlog Brushing	Juvenile Spacing	Pruning	Fertilization	Total
1	118	32	451	32	455	235	-	1,863
2	67	-	33	32	455	209	18	1,353
3	92	-	46	32	455	212	35	1,412
4	45	-	-	32	455	547	53	1,671
5	43	-	-	32	455	120	88	1,277
Subtot Yr 1 - 5	365	32	530	160	2,273	1,324	193	7,575
6 - 10	43	-	-	32	2,273	1,324	88	7,134
Total Yr 1 - 10	408	32	530	192	4,545	2,647	280	14,710

Table 4-3. Short term employment benefits (person-years) of the silviculture program, by year and activity.

Year	Surveys* All	Landing Rehab	Backlog Planting	Backlog Brushing	Juvenile Spacing	Pruning	Fertilization	Total
1	1.6	?	6.8	0.8	15.2	7.8	-	35
2	0.9	?	0.5	0.8	15.2	7.0	0.1	27
3	1.2	?	0.7	0.8	15.2	7.1	0.1	28
4	0.6	?	-	0.8	15.2	18.2	0.2	38
5	0.6	?	-	0.8	15.2	4.0	0.3	24
Subtot Yr 1 - 5	4.9	?	8.0	4.0	75.8	44.1	0.6	153
6 - 10	0.6	?	-	0.8	75.8	44.1	0.3	134
Total Yr 1 - 10	5.4	?	8.0	4.8	151.5	88.2	0.8	287

Note: Assumes 200 days of silviculture work = 1 job

Appendix 1
Issues Reviewed in the Merritt TSA Workshop

The objective of this section is to identify aspects of the timber harvesting land base and its management that govern the supply of timber from the TSA. This information provides the basis for identifying the constraining mechanisms that shape the timber supply forecast for the unit and for specifying possible silvicultural remedies. Unless otherwise indicated, the data in this appendix is drawn from the Merritt TSA Timber Supply Analysis (1993) .

A1.1 TSA Issues Impacted by Silviculture

Issues that can be addressed through silviculture were obtained from the District (District Enquiry), the most recent Resource Management Plan, and other documents identified by the District. These issues will be reviewed and expanded during the workshop.

A1.1.1 Timber Supply Issues

Pine Beetle uplifts - The current Mountain Pine Beetle outbreak has resulted in a 2-year uplift of 550 000 m3, 40% above the current AAC. This and future outbreaks may cause reductions in supply earlier than forecast in the TSR.

Pine Beetle salvage and ECA limits – Pine Beetle salvage in some watersheds has exceeded ECA limits for the watershed. There may be opportunities to reduce the time to hydrologic recovery through a range of silvicultural activities (e.g., rapid planting, large stock, fertilization at time of planting, planting at higher densities, using improved seed…).

Unsalvaged losses- Unsalvaged losses due to insects, wind and fire are forecast at 143 626 m^3 per year, or 12% of the current AAC. To determine what if any silvicultural strategies may be used the unsalvaged losses would need to be quantified and the limiting factor in harvesting them identified (e.g., ECA limit exceeded?).

Repressed fir sites –These IDF sites (43 000 ha) require rehabilitation or re-classification.

Visually sensitive areas - Visually sensitive areas were identified as an issue in TSR 1. Merritt district has installed research plots in visually sensitive areas. Results should be made available to enhance future planning within VQO zones.

Planting vs natural regeneration – [This issue will be clarified at the workshop].

PFT and small wood licences – Some of the problem forest types of TSR1 (height class2 Pl) are been harvested as smallwood licences (250 000 m^3/yr for 15 years). Studies are required to determine SI.

OGSI and managed Pl – Site indices of managed Pl should be confirmed.

***Spacing overstocked Pl ageclass 4 and* 5** – CT for posts and rails of Pl ageclass 4 and 5 may produce a lift in 20 years.

Juvenile spacing of overstocked (>5000 sph) Pl - There is concern over the long term impacts spacing Pl on derived wood products and discussions about appropriate densities. Studies of

yield, branch size, early/late wood%, wood density, tree taper, etc. of stands spaced to various densities are in progress.

Product objectives – Clarification of product objectives (e.g., msr or furniture versus sawlogs) is needed to guide silviculture.

Regenerated stand yields-- Is there potential for increasing the yield from regenerated stands?

Regeneration delay-- Is there potential for reducing regeneration delay?

Road and landing allowances -- Road and landing withdrawals from the timber harvesting land base may be reduced with future logging systems or rehabilitation.

A1.1.2 Forest Health Issues

Spruce Beetle, Fd Tussock moth, Fd bark beetle and root rot are present in the TSA but are not considered minor issues.

Mountain Pine Beetle – The large stock of mature pine timber on the unit and the intention to ration that stock for a period in excess of 100 years makes the supply vulnerable to catastrophic outbreaks of pine beetle (as is the present situation).

A1.1.3 Habitat Issues

Pine Beetle salvage and ECA limits – discussed in section 1.1.1.

Fir retention – How much fir should be retained for retention? This issue relates to pine salvage areas. Some agreement on stand structural objectives for the future need to be worked out to provide direction on how much Fd should be retained.

Grizzly Bear recovery plan – Grizzly bear habitat currently has no impact on the AAC.

A1.1.4 Employment Issues

Over-spacing – Spacing has provided local employment but there is concern that density targets have been set to achieve employment goals rather than to meet product objectives.

A1.1.5 First Nations Issues

Employment -- First Nations have benefited from the employment generated by silviculture but short-term employment is not an objective guiding the District's silviculture planning

Appendix 2
The Timber Supply Context of Silviculture in the Merritt TSA

The objective of this section is to further define timber supply issues and identify the constraining mechanisms that shape the timber supply forecast for the unit.

Timber supply is the rate at which timber is made available for harvesting, and it is "made available" through natural, administrative, and economic processes. The forest economy draws timber from the land base in response to consumer demand, and this flow of timber is limited by the rate at which the forest can physically grow trees, and by a variety of administrative constraints. The combined effect of these three processes is considered in the determination of the Annual Allowable Cut (AAC). Silviculture can modify directly or adjust the effect of each of the three underlying processes.

The base case of the timber supply review (TSR) forecasts future timber supply subject to current management practices, administrative constraints and market conditions. The purpose of this section is to identify the "pinch points" and constraining mechanisms that shape the timber supply forecast for the unit. Observations drawn from the TSR base case and selected sensitivity analyses are used to describe the timber supply dynamics of the management unit and to suggest how silviculture treatments might enhance timber supply.

A2.4.1 Timber Supply and the AAC

The 1994 TSR, upon which the current AAC determination was based, forecasts a harvest level of 1 204 250 m³ maintained for the first 11 decades (Figure A2-3). In the eleventh decade the harvest level declines 7% per decade until the long term harvest level is reached in decade 14. The long-term harvest level, the potential maximum that can be harvested in perpetuity, is 925 000 cubic metres per year, a 23% decline from the initial harvest level.

Figure A2-3. TSR1 Base harvest forecast, Merritt TSA, 1995.

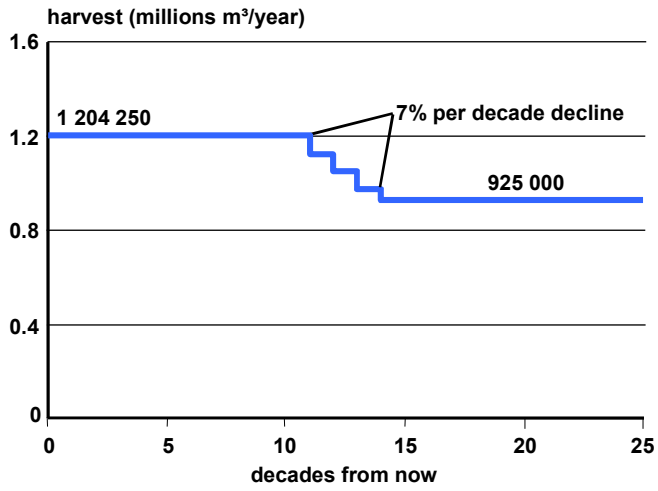


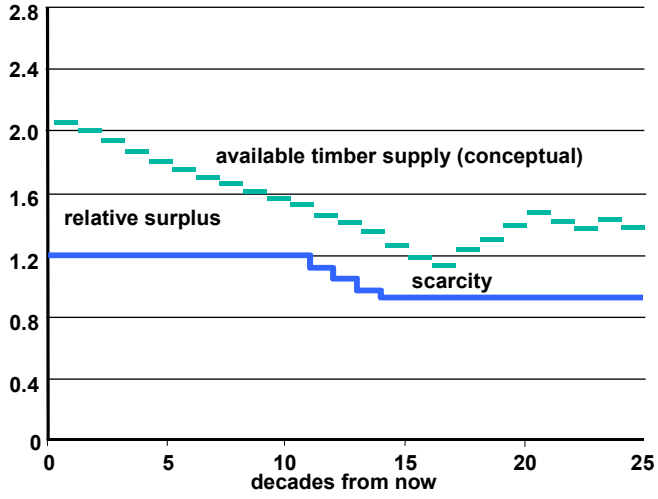
Figure A2.3 indicates the robustness of the base case harvest forecast. The initial harvest level can be maintained for 11 decades, and reduced gradually over 4 decades (7% per decade) down to the LTHL.

Figure A2-4 plots the likely volume of available timber.[4] Note that availability is not tracked by the TSR timber supply analysis and is estimated here to demonstrate the concepts of relative surplus and scarcity.

At this time there is a relative surplus of available timber. The surplus must be rationed until later periods when there is a scarcity of available timber. Timber rationing is the main objective of constraints placed on the rate of change of harvest levels.

The surplus will decline until there is a transition from natural to managed stands. This transition occurs around decade 14 when a majority of managed stands come on-line contributing to the amount of available timber.

Figure A2-4 Base case harvest and available timber supply (conceptual) forecast, Merritt TSA.



A2.4.2 Transition from Natural to Managed Stands

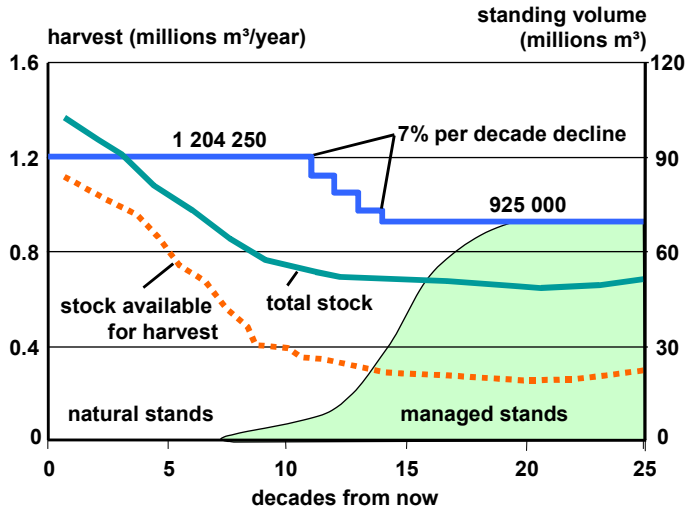
The transition of the harvest from old growth to predominantly second growth is plotted on Figure A2-5. Note that this transition line is an estimate – this information was not reported from the TSR1 analysis. The transition curve helps identify the response framework for Type 1 and Type 2 Silviculture Analyses– the end of the mid term and beginning of the long term is the point at which the harvest is predominantly dependent on managed stands. We have identified 140 years as the end of the mid-term for the Merritt TSA. The short term is arbitrarily defined as the first 20 years.

The growing stock curves on Figure A2-5 show that the growing stock will decrease steadily during the short to mid-term until the levels are stabilized in the long-term. The growing stock levels will be stabilized once the transition from natural to managed stands occurs at decade 14.

[4] Definition: Timber availability is the volume of timber that is available for harvesting in any period without constraint by harvest flow rules in that decade or subsequent decades, and assuming that harvesting has followed the base case harvest schedule to that decade. All other constraints (forest cover, minimum harvest age) still apply.

From period 15 onward, the growing stock reaches an even-flow level, therefore maintaining the long-term harvest level in perpetuity.

Figure A2-5. Total and harvestable growing stock and harvest composition, Merritt TSA.

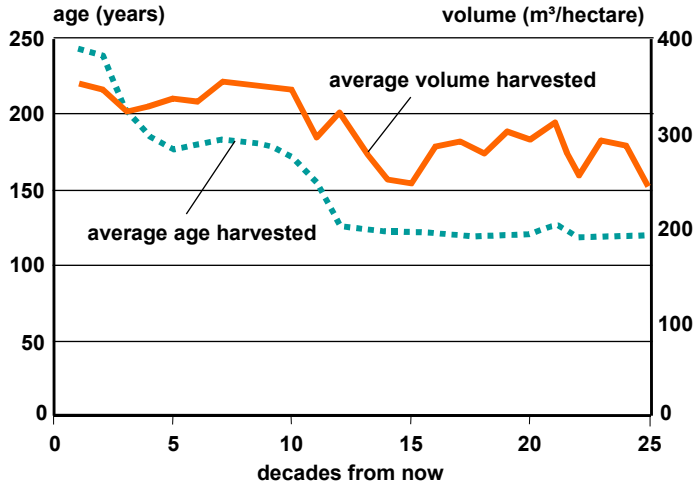


The average volume per hectare and average harvest age are plotted in Figure A2-6. If the TSA were under stress, which it is not, both of these levels would drop significantly reaching long-term levels much lower than the initial levels estimated. The average harvest age declines until period 5 when the average age reaches 180 years. This level will be maintained until decade 11 when the average age decreases to 120 years. At this time a majority of the managed stands come on stream.

The average volume per hectare will decrease from approximately 340 m³ per hectare to 280 m³ per hectare. The decline can be attributed to the harvest transition from natural to managed stands. This approximate level will be maintained in perpetuity.

The answer the question posed at the beginning of this section as to what shapes the timber supply forecast on the Merritt TSA, the harvest forecast is shaped mainly by the current high level of harvestable growing stock relative to the current level of cut. The growing stock slowly declines until it is reaches an even-flow level when managed stands come on-line. There are no apparent pinch points in supply except the distant transition and the TSR harvest flow conventions utilized by the chief forester.

Figure A2-6 Base case average harvest age and average volume harvested per hectare, Merritt TSA.

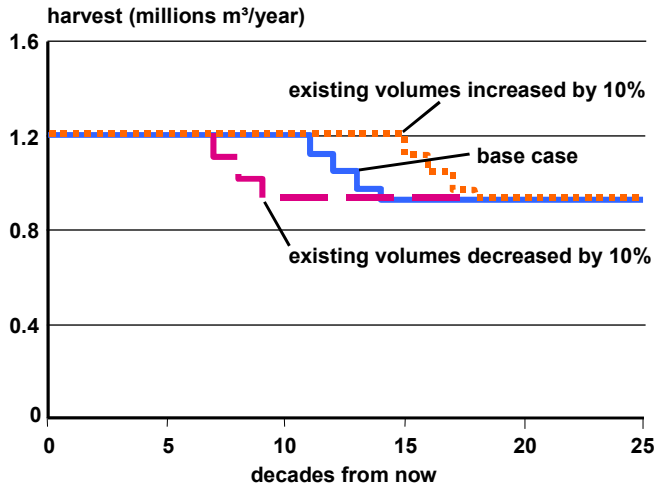


A2.4.3 Sensitivity to Existing Stand Volumes

Increasing existing stand yields has a significant effect on short to mid-term harvest levels (Figure A2-7). Since there is a majority of stands over the minimum harvestable age, increasing yield estimates will mean that increased volume will be obtained from these stands. The current harvest level can be maintained an extra 4 decades. As the older stands are used up, there will be a decline in the harvest, as seen with the base case. The effects of increasing existing stand volumes emphasize the opportunity for silviculture to increase the volume of standing timber.

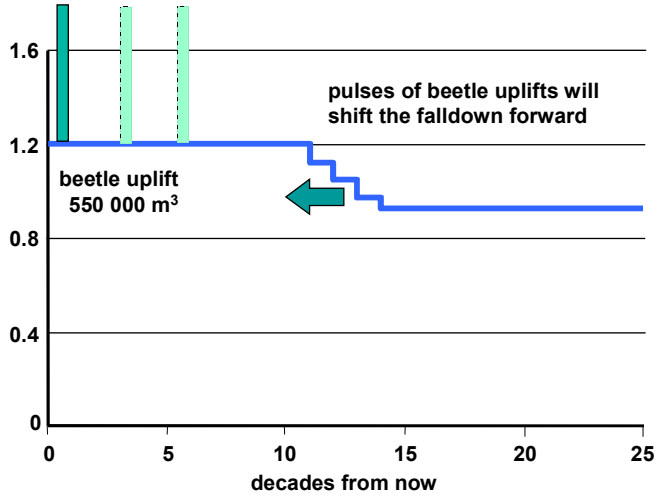
Decreasing the stand yields causes a drastic decline in the harvest level. The current harvest level can only be maintained for 7 decades. This can be attributed to the fact that the potential volume from the mature stands is lessened due to the decreased yield estimates. As these mature stands are harvested there is a steady decline in the harvest level. Decreasing stand volumes indicates the risk of loss in inventory or overestimation of merchantability.

Figure A2-7 Base case harvest forecast with existing volumes changed by 10%, Merritt TSA.



The Merritt TSA is susceptible to mountain pine beetle infestations. Figure A2-8 gives some indication of the current mountain pine beetle uplift, and possible future pulses of infestations. Infestations could forward bring the falldown occuring in the timber harvest forecast. A resultant trough could develop due to the shift in the harvest level. The number of years forward and severity of the trough depends on the level of infestation and the amount of silviculture applied to managed stands.

Figure A2-8 Possible impacts of mountain pine beetle infestations, Merritt TSA.



A2.4.4 Sensitivity to Regenerated Stand Volumes

Enhancing regenerated stand volumes by 11% deceases the number of years in the decline from the current harvest level to the LTHL (Figure A2-9). The LTHL will be approximately an 5 % increase from the base case LTHL. The 5% increase in forecast can be used to gauge the impacts of genetically improved seed (Figure A2-10). The Merritt TSA predicts genetic gain ranging from 7 to 11% for pine and 8 to 12% for spruce.

Decreasing regenerated volumes increases the number of decades in the decline from the current harvest level to the LTHL (Figure A2-9). The LTHL will be approximately 5% lower than the base case harvest forecast LTHL. Reductions in the regenerated stand volumes might occur due to overestimations in site productivity and increased pest infestations.

Figure A2-9 Base case harvest forecast with regenerated volumes changed by 10%, Merritt TSA.

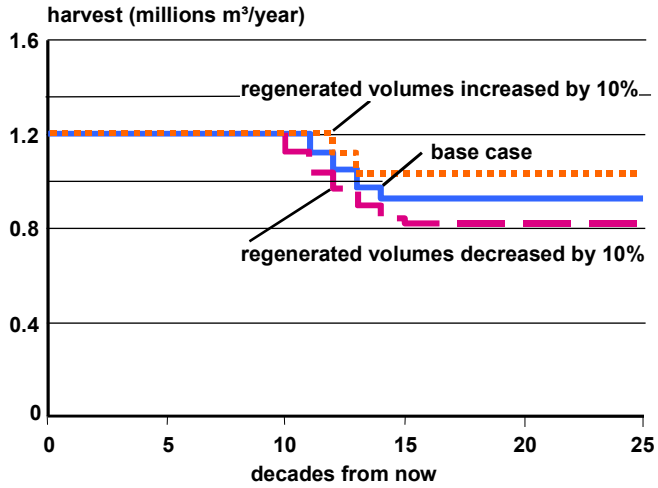
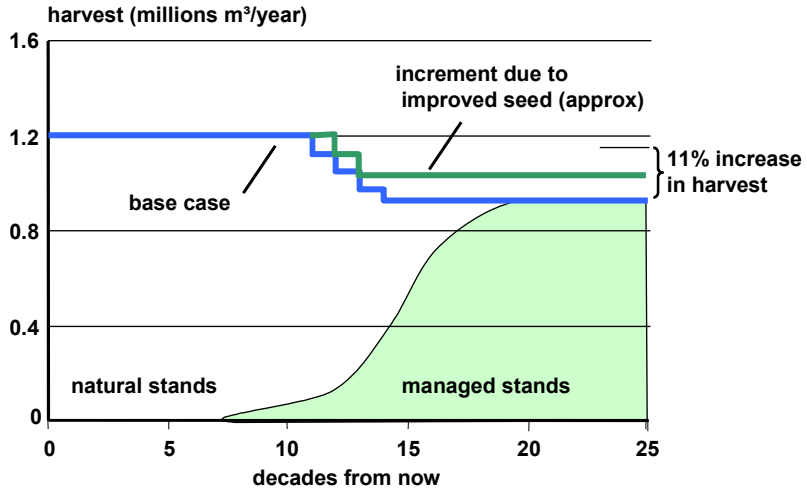


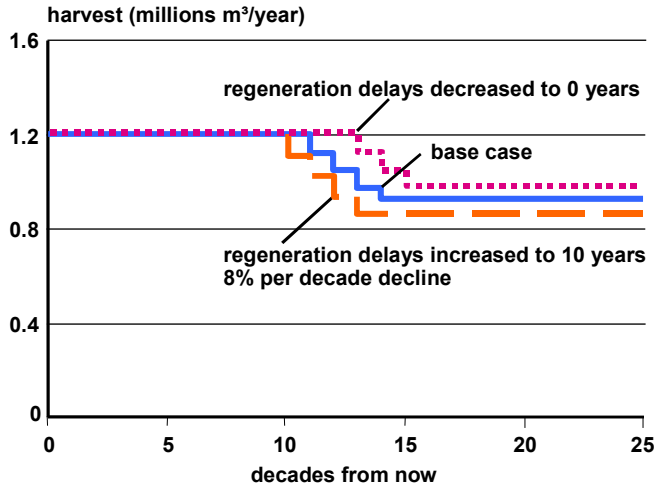
Figure A2-10 Base case harvest forecast and correction for improved seed, Merritt TSA.



A2.4.5 Sensitivity to Regeneration Delay

Another way of affecting managed stand volumes is increasing or decreasing regeneration delay (Figure A2-11). Silvicultural regimes can be employed to reduce the number of years to reach free-growing status. Pre-free growing regimes such as improved planting stock, site preparation, herbicide and fertilization are just a few examples of regimes which could lessen the number of years required to reach free-growing status.

Figure A2-11 Base case harvest forecast with changes to regeneration delay, Merritt TSA.

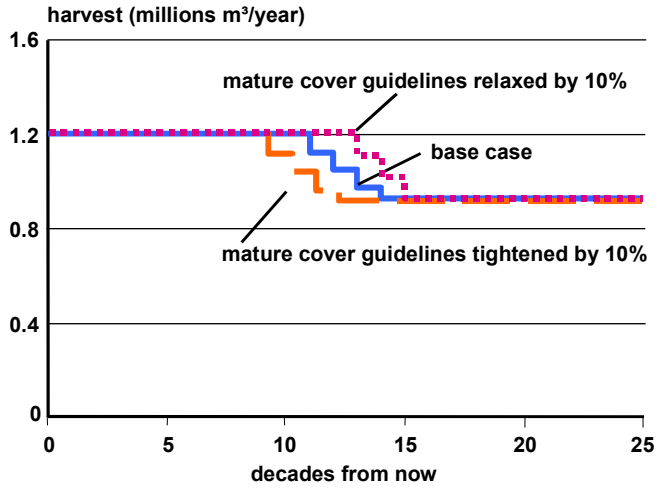


A2.4.6 Sensitivity to Mature Cover

Changing environmental and social values affects the harvest forecast because of constraints placed on the amount of stands older than a specified age (Figure A2-12). As old-growth forest cover requirements become increasingly restrictive, the area that can be less than mature age is reduced, and the harvest forecast to begins decreasing a decade earlier compared to the base case harvest forecast.

Lessening the amount of required mature forest cover allows the current harvest level to be maintained for an extra decade.

Figure A2-12 Base case harvest forecast with varying mature cover constraints, Merritt TSA.

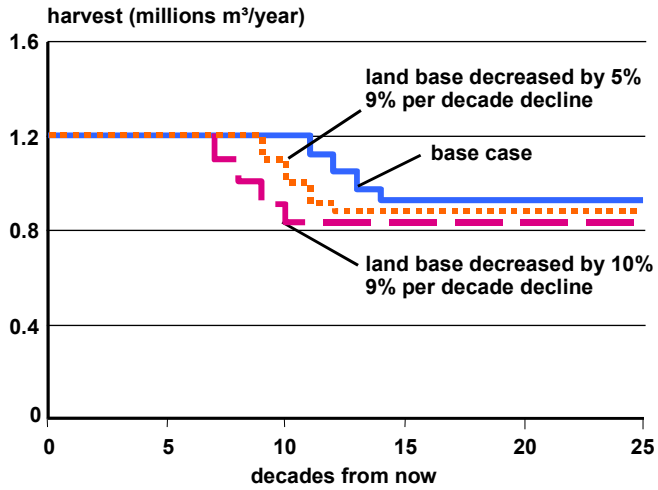


A2.4.7 Effects of Silvicultural Regimes Change the Landbase

Various silvicultural activities and shifts in forest product objectives can be interpreted as bringing land into the timber harvesting land base and so the TSR sensitivity analyses of the effect of increasing the timber harvesting land base (Figure A2-13) will provide information on the magnitude and timing of the benefits. Increasing the timber harvesting land base increases timber supply across the whole planning horizon.

It should also be noted that employing alternative silvicultural treatments aids in alleviating certain forest cover constraints. Several harvesting techniques and equipment could be used to retain merchantable older timber in a certain area, therefore lessening the number of green-up and old-growth forest cover constraints being violated. This allows the harvest forecast to capture additional volume from the surplus available.

Figure A2-13 Sensitivity of the land base to changes in the area retained in the THLB, Merritt TSA.



Timber Supply Dynamics - Summary

The main constraint on timber supply in the Merritt TSA is the physical scarcity of harvestable timber in the late mid-term. This scarcity requires that volumes of existing mature timber from unmanaged stands be rationed until managed stands are ready for harvest. Otherwise, timber supply on the Merritt TSA forecast is shaped mainly by the current high level of harvestable growing stock relative to the current level of cut. The growing stock slowly declines until it flattens out when managed stands come on-line. There are no apparent pinch points in supply except the distant transition and the TSR harvest flow conventions utilized by the chief forester.

The timber supply forecast is most sensitive to existing stand volumes and land base changes. Cleary any silvicultural investments that increases existing stand yields or emulates the increase of the timber harvesting land base will significantly affect supply. The timber supply is also sensitive to regenerated stand volumes, regeneration delay and mature cover constraints, all of which can be adjusted with silviculture activities.

Appendix 3
Executive Summary of The Incremental Silviculture Strategy For British Columbia (Interim)

STRATEGY AT A GLANCE

Purpose

This strategy provides guidance to the application of available funds for incremental silviculture activities. It is not tied to a specified funding level.

Government's Goals

- Sustainable Use
- Community Stability
- A Strong Forest Sector

Key Principles

1. Because the distant future cannot be foretold, the best and only course of action in managing the timber resource is that which minimizes risk and maintains options.
2. British Columbia's forests are important locally, provincially, nationally and glo bally and should be managed in this context.
3. Each generation of British Columbians becomes the steward of the province's forest resources and has a moral obligation to preserve this heritage for future generations.

Working Targets

Within the context of the guiding principles:

WT 1: Minimize the anticipated interim reduction in timber supply so that provincial annual harvests of at least 65 million m^3 can be achieved during this period.

WT 2: Create a long term timber supply capable of supporting a steady long term provincial harvest level of at least 75 million m^3.

WT 3: Over the long term, maintain the production of premium quality logs at or above 10% of total harvest.

Major Silvicultural Strategies

- Increase the use of alternative silvicultural systems and commercial thinning.
- Achieve earlier green-up of harvested areas.
- Increase regenerated stand volumes 20%.
- Eliminate all pre-1982 good and medium site backlog NSR and all 1982 to 1987 backlog NSR.
- Initiate a long rotation quality management program for stands where harvesting must be delayed.

Other silvicultural and non-silvicultural strategies must also be implemented to achieve the working targets.

Strategy Implementation

Regional and management unit strategies must be developed, followed by programs and plans to implement them.

Appendix 4
Regimes Developed By Workshop Participants

Douglas-fir Management (1)

Douglas-fir Management (2)

Forest Health – Root Rot

Pine Beetle and ECA

Mid-term Trough

Gall Rust Management

Regime Name – Douglas-fir Management (1)

Issue addressed by this regime

Douglas-fir management

Strategy

To realize more of the inherent site productivity, reduce forest health risks and produce a premium quality sawlog.

Target

Drybelt Douglas-fir area (Selection Zone)

Three units

1. Forests suitable to be converted to even-aged management
2. Forests suitable to uneven-aged management
3. Old overgrown stands needing post harvest treatment

Regime Description

Various

Regime activities over 10 yrs		Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
Applicable units					
1	Use more SW(?), plant to address root rot, use patch cuts		Better site utilization	S+, L+	E+
2	Unmanaged – define units and implement single tree selection		Better site utilization	S+, L+ Q+	E+
3	Define large areas – log overstory, move to more even-aged structure		Capture volume, better site utilization	S+ L+	E+
3	Fill plant with Lw, Py		Better site utilization	L+	E+
3	Use spacing to leave the best trees		Reduced time to harvest	M+, L+, Q+	E+

To address this issue, needs clarification of issues, establishment of objectives, better information and new approaches. Outlined in "Protocols to Manage Fdi". Based on:

- New inventory data
- New G&Y understanding
- Throw out current guides
- Establish goals
- Understand blowdown/root rot risks

- Monitor

Definition of Douglas-fir management issues:

- Variability at the stand level
- Variability at the forest level
- Weakness of the inventory to describe managed stands
- Currently same system used everywhere due to bureaucracy
- Too many other issues are lumped into the selection system, partial cutting covers them all
- Current info underestimates productivity of these sites
- Too much within stand variation, treatments are complex
- MOELP policy seems to “save” fir with no clear rationale as to why
- Winter range rules
- Root rot
- Straighten out new TSR and stand level assumptions
- Need more ‘mom and pop’ type operators to treat areas more carefully
- Ecological mapping will help define mule deer winter range and some other key habitat types
- Stumpage problems, no breaks for small operators
- Fire exclusion
- Have documentation of productivity gain from problem forest type.

Regime Name – Douglas-fir management (2)

Issue addressed by this regime

Forest health issues in the Fd zone, specifically root rot and spruce budworm reducing the growth potential of the stands

Strategy

Address forest health issues and create high value stems with small knots.

Target

Drybelt Douglas-fir area (Selection Zone)

Regime Description

Harvest, plant, space, monitor, prune

Regime activities over 10 yrs	Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
Site series classification (mapping), stocking survey, forest health				
Log overstory with small patch cuts (small cats)	500 ha	Volume	S+	E+, L+
Space layer 3 stems from clumps with no spruce budworm (cut out lower quality stems)	200 ha	Timing of harvest, forest health	M+, L+	E+
Treat root rot areas (see also the regime Root Rot/Deciduous)		Timing of harvest, forest health	M+, L+	E+
Fill plant using obstacles to minimize cattle damage		Timing of harvest, forest health	M+, L+	E+
Monitor				
Prune some stands		Quality	Q+	

Regime Name – Forest Health – Root Rot/deciduous

Issue addressed by this regime

Reduce spread and incidence of root rot to maintain deer winter range habitat elements

Strategy

Plant deciduous and mixed conifers without stumping

Target

High risk ecosystems (IDF sites). Deer Winter Range and specific centers as selected by MOELP

Regime Description

Mix deciduous with conifers (tolerant to root rot). Concentrating deciduous in wetter sites

Regime activities over 10 yrs	Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
SP identified and prescribed as a basic activity – either accept a percentage of aspen or plant whips or suckers	200 ha / year	Reduce root rot, increase productivity	M+, L++	
		Improve deer habitat	S+, M+	

Regime Name – Pine beetle and ECA

Issue addressed by this regime

Watersheds are being overcut (ECA % allowable) because of beetle management (harvesting)

Strategy

To minimize additional clearcut harvesting in areas with higher than desired equivalent clearcut area, by using alternative beetle disposal methods and or prompt reforestation and enhanced early growth.

Target

All beetle susceptible stands in high ECA watersheds.

Regime Description

Alternative beetle disposal methods

Regime activities over 10 yrs	Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
Maintain annual aerial overview surveys	Merritt TSA	ID of problem areas	S++	
Identify watersheds approaching maximum ECA	Merritt TSA	ID of problem areas	S++	
Ground truth areas IDed and prescribe disposal methods	Merritt TSA	ID of problem areas	S++	E++
Implement				
MSMA	25% of IDed areas	Minimize additional CC	S++	E+, H+/-
Reserve all unaffected trees	50% of area	As above	S++	E+, H+/-
Small clear cuts	25% of area	As above	S++	E+, H+/-
Rapid reforestation	100% of harvested area	To achieve Green up ASAP	L+	E+, H+/-
Fertilization	?	Reduce time to GU	S+, M+, L+	E++, H+
Monitor	Merritt TSA	Track effectiveness	S++	E++

Regime Name – Midterm Trough

Issue addressed by this regime

Mitigate mid term trough in the timber supply

Strategy

Move stands ahead in the harvesting queue.

Target

Harvested areas to be managed for Pl

Regime Description

Prompt reforestation using genetically selected stock, manage density and fertilize.

Regime activities over 10 yrs	Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
Site prep and plant within 2 years of harvest. Plant improved stock at higher densities, considering ingress potential	2000 ha / year	Reduced years to merchantability by 20 years	M++	L+, E+
Space stands that are at or near repression (> 15 to 20,000 sph) at 10 years to 3000 to 5000 sph to have a CT option	500 ha / year	Increase merch vol. Reduce time to merch	M++	L+, E+, H++
Fertilize the best sites that are at 2000 sph at 10 to 15 years	700 ha / year	Reduce years to merch by 5 years	M++	L+, E+, H-
CT at 40 to 50 years	100 ha / year	Increase merch vol	M++	L+, E+, H+/-
Harvest at 70 years	2000 ha / year	Fill mid term trough	M++	

Regime Name – Gall rust management

Issue addressed by this regime

Gall rust infested stands – to space or not?

Strategy

Determine what rate of infection ratio impacts spacing densities.

Target

Young Pl stands

Regime Description

Trails of % gall rust infection, spacing density. Test for survival. Control leave unspaced. Add fertilization as a treatment to the spaced stands.

Regime activities over 10 yrs	Area of Op	Intended benefit	Timing/Wt of benefit	Side Effects
Research and control trials on gall rust infected stands	TSA	Funding management	S++	

Appendix 5
Workshop Feedback

	Please circle the number that best represents your view.				
1 Length of session	5 too long	4 (1)	3 just right (9)	2	1 too short
2 Level of detail of content	5 too much	4	3 just right (9)	2 (1)	1 not enough
3 Instructional method (style, interaction, clarity)	5 excellent (1)	4 (7)	3 adequate (2)	2	1 poor
4 Relevance to your interests/needs	5 extremely (4)	4 (5)	3 average (1)	2	1 not at all
5 Extent to which your needs were met	5 entirely (2)	4 (7)	3 average (1)	2	1 not at all
6 Usefulness of the handout graphics and texts	5 very (1)	4 (6)	3 adequate (3)	2	1 useless

What were the strengths of this workshop?

- Everyone was at the table.
- Seemed well organized. Good flow and participation. Good general background on timber supply and specifically timber supply situation in the District.
- Pulled together thoughts well from a diverse group.
- Had all agencies together (well, most). Look at forest level results.
- Group involvement, PowerPoint presentation, supporting info.
- Capable facilitators, well informed, lots of participation by attendees.
- Participant input good.
- Useful planning tool.
- Diverse group of people.
- Interaction and cooperation.

What were the weaknesses of this workshop?

- Requires lots of background inofrmation and knowledge to be informed on all topics discussed.
- Communicate and distribute workshop strategy and goals more in advance so the more upfront prep could have been done.
- Missing some key product objectives.
- The uncertainties of timber supply changes, natual events, economic changes, etc.
- More information is required (i.e.) to be developed in session #2.
- Lack of time to review regimes.
- Tended to get off into spacing too much.
- None.

How could this workshop be improved?

- More representation from other interests (First Nations, MoF protection, etc.)?
- Spend less time on developing individual regimes, as this was more of a distraction.
- Some modeling of current practices.
- Not sure.
- Availability of reference material referred to.
- A little too much focus on making silviculture strategy meet the MoF current RMP plan i.e. FRBC got a report justifying program like spacing etc., whereas a more critical approach would probably have shown spacing etc., to be unjustified according to costs/benefits.
- OK

Other comments? (use back if necessary)

- Very productive in providing direction for plans and identifying gaps in information and priorities.
- Overall workshop product seems to be good so far. Package of workshop results needs to be distributed for review and comment. Good job.
- Type quicker.
- Excellent product.