Amendments to Type I Silviculture Strategy TFL 15 2003 Vas Fire

Prepared for

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1. INTRODUCTION

1.1 BACKGROUND

In August of 2003, the Vas Fire burned approximately 2,005 hectares within Tree Farm License 15 (TFL 15). This included significant areas of regeneration and mature timber. Some of the mature timber within the fire will be salvaged and regenerated under the licensee funded program, costs to regenerate stands that had not yet achieved free-growing will be covered under Section 162.2 of the Forest Act,[1] and non-forested areas or areas outside the Timber Harvesting Landbase (THLB) will be left. This report outlines a plan to regenerate areas of immature stands past free-growing for which the licensee has either met all obligations or had no obligations in the past. Implementation of the plan will be subject to funding through FIA or some other government funded process. The impact of the fire on the timber supply is also considered.

A Type I silviculture strategy (Type I) for TFL 15 was completed in 2001[2] and this is an amendment to that report.

1.2 PROBLEM STATEMENT

- To determine an appropriate plan to regenerate stands burned in the summer of 2003 on TFL 15 that are eligible for FIA funding

1.3 OBJECTIVES

- To summarize impacts of the fire on timber supply, timber quality, and wildlife habitat.
- To determine stands that are eligible for FIA funding for regeneration.
- To incorporate recommendations from the Type 1 Incremental Silviculture Strategy for TFL 15.
- To determine appropriate treatments for these stands in consultation with Weyerhaeuser Company (Weyco) staff.
- To meet with Ministry personnel to determine strategies that will meet the objectives of the Okanagan-Shuswap Land and Resource Management Plan (OSLRMP),[3] including mule deer winter range, sheep, goat and elk range, and visuals.
- To make recommendations to rehabilitate these stands including proposed budgets.

1.4 TERMS OF REFERENCE

This report was completed by J.S. Thrower & Associates Ltd. (JST) for Sean Curry, *RPF,* Weyerhaeuser Company Ltd. (Weyco), Kamloops Division, and Ed Collen *RPF*, Weyco, Okanagan Falls and was reviewed by Steve Jones *RPF* of Southern Interior ForestCraft Ltd. The project team included Gordon Lester, *RPF,* Mary Lester, *RPF,* and Darryl Klassen *DoT, (GIS technician).* Maps were provided by the Weyco GIS department in Kamloops. Weyco funded this project from their allocation of Forest Investment Account (FIA) Landbase Investment program.

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[1] Bill 75, 2002. Forests Statutes Amendment Act (No. 2), 2002. Amendment to Section 162. 2.

[2] J.S. Thrower. 2001. Type I Incremental Silviculture Strategy. TFL 15. Version 2.0. Contract report WCK-071 to Weyerhaeuser Canada Ltd.

[3] Okanagan-Shuswap Land and Resource Management Plan. Approved Plan April 11, 2001.

2. BACKGROUND

2.1 STUDY AREA

The total area of TFL 15 is 46,411 hectares of which approximately 93% is within the productive forest landbase. The Vas fire burned over 2,005 hectares or approximately 4.3% of the area of the TFL in August of 2003. Just over one-half of the area burned is outside the THLB.

We divided the area burned in the fire into areas that will be rehabilitated by funding source; areas covered under Section 162.2 of the Forest Act, areas which will be harvested and regenerated under licensee funding, and areas where FIA funding may be available (Table 1). The area of interest in this report is the portion which is eligible for FIA funding, approximately 706 hectares.

Table 1. Breakdown of Vas Fire area.

Classification	Area (ha)
Section 162.2	7
Appraisal	217
WTPs	33
Deciduous	7
Non-THLB	1,035
FIA funding	706
Total:	*2,005*

2.2 CURRENT TIMBER SUPPLY

TFL 15 does not have a long-term timber supply problem. The Allowable Annual Cut (AAC) was set at 70,000 m^3/year effective July 29, 1999. The timber supply analysis at that time showed an increase in the harvest level to 96,000 m^3 by 2026 and a gradual increase to a long-term harvest level of approximately 115,000 m^3. The 2004 timber supply analysis shows a maximum harvest level of 66,570 m^3 increasing steadily to a long-term harvest level of 111,448 m^3.

2.3 RELEVANT RECOMMENDATIONS FROM TYPE I STRATEGY

Based on the Timber Supply Analysis completed for Management Plan 8 (MP8), the Type I recommended a strategy that focused on timber quality and wildlife habitat quality rather than on timber quantity. The main strategies were (1) to improve the product quality of lodgepole pine (Pl) stands; (2) to improve the quality and growth of dry-belt stands and, (3) to enhance wildlife habitat. Forest health issues were also very important and it was recommended that they be addressed in all silviculture treatments.

The recommendations in this report must meet several of the major silvicultural strategies identified in the Type I[4] as outlined in Table 2.

[4] From Type I Strategy. Section 1 of the Strategy at a Glance, Major Silvicultural Strategies.

Table 2. Major silvicultural strategies from Type 1 to be considered in developing a plan for areas burned in 2003.

Strategy:	Action:
1. Explore the use of natural disturbance types to determine appropriate silviculture regimes and stocking standards.	A report completed in 2004[5] recommends appropriate species selection and regeneration systems for the NDT4 on TFL 15. This protocol will help to determine appropriate treatments for this project.
2. In the PP/BG areas, management for wildlife and biodiversity values is important, as there are limited opportunities for harvest.	In the PP/BG subzones, maintaining wildlife and biodiversity values will be a higher priority than regeneration of burned stands.
3. In dry-belt Fdi leading stands, move towards even-aged management systems to reduce losses to forest health agents, increase crop tree quality, and increase growth.	Levels of mortality and forest health issues will be used to determine if even-aged management systems will be appropriate within the fire.
6. Plant genetically improved seedlings, as seed is available.	If planting is necessary, genetically improved seed will be used where it is available.
9. Rationalize reductions to the THLB and make rehabilitation of productive sites currently excluded a high priority.	Rehabilitation of productive sites where the existing stands were destroyed by the fire is a high priority.

In addition, the following stewardship objectives must be considered:

- In mixed stands within the dry-belt, mixed species should be promoted wherever possible. Lodgepole pine (Pl) should be kept as a smaller component, maintained at high densities or managed on a shorter rotation (keep basal area of Pl below 30%) to minimize buildup of Mountain Pine Beetle (MPB) populations.
- In Douglas-fir (Fdi) leading stands in the dry-belt, there may be more opportunities for a higher percentage of Fdi in the northern portion of the TFL (this includes the fire area) because of lower dwarf mistletoe intensities.
- Forest health issues are paramount – western spruce budworm and dwarf mistletoe point to even-aged management (there are also pockets of root rot to consider). Monitoring/controlling Douglas-fir bark beetle will be a priority as a result of trees being stressed by the fire.
- Aspen should be included as part of the mix.
- In the PP subzone, snags are very important for cavity-nesting birds: ponderosa pine (Py) and aspen snags are used more than Fdi snags. Cottonwood snags and large trees are very high value where present.
- In the PP subzone, all aspen should be retained, Fdi should be harvested over Py and older Py should be retained over younger trees.
- There may be opportunities for regenerating aspen on some sites within the PP subzone.

Weyerhaeuser has three objectives with respect to forest health issues on TFL 15:

1. To maintain a standing inventory of mature, standing, live trees to satisfy the inventory needs of Weyco, Okanagan Falls Division;
2. To minimize unsalvaged losses by addressing forest health problems in an environmentally sound and timely fashion; and,
3. To regenerate and tend young stands to achieve optimum productivity and diversity goals while maintaining healthy and productive stands through to rotation.

5 J.S. Thrower. 2004. Management Protocols for NDT4 Sites on TFL 15. Contract report WCF-036 prepared for Weyerhaeuser Ltd.

More specific forest health concerns are included in Table 3

Table 3. Forest Health Considerations

Stand Age	Forest Health Considerations
1-20	Sites should be monitored for ongoing mortality of trees that were lightly or moderately scorched. Mortality of these damaged stems may occur in 2004 as a result of a local increase in secondary pests. Fill-planting may be required depending upon the extent of this second wave of mortality.
21-40	Depending on site conditions and fire severity, mortality may continue for another year or so. Damaged or otherwise stressed trees will be at risk to attack by local increases in secondary insects.
41-80	Damaged older Py may be predisposed to attack by red turpentine or western pine beetle. Damaged older Fdi may be predisposed to attack by Douglas-fir beetle. Sites should be monitored for primary insect activity i.e. bark beetles, where damaged living trees remain.
>80	Damaged older Py may be predisposed to attack by red turpentine or western pine beetle Damaged older Fdi may be predisposed to attack by Douglas-fir beetle. Damaged Pl may be attacked by red turpentine beetle or mountain pine beetle. Pl has thin bark therefore low fire tolerance and generally dies even in low severity fires. Douglas-fir beetle activity should be monitored and trap trees deployed if adjacent healthy stands are at risk of attack from local build-up in stressed trees. Monitoring is recommended.

2.4 TIMBER SUPPLY IMPACTS

A Timber Supply Analysis was completed for TFL 15 in January of 2004[6] to analyze the impacts of the Vas Fire on harvest flows. Four sensitivity analyses were completed. Two mortality levels were used (20% of the THLB and 50% of the THLB) on regeneration (stands less than or equal to 45 years of age) and on regeneration and mature (greater than 45 years) within the existing cutting permits. Details of the processes used to assign mortality are included in the timber supply analysis report (page 27).

The sensitivity analysis shows that mortality of stands 45 years of age and younger has no impact on harvest flows relative to the base case. 20% mortality over all age classes results in a 0.3% reduction in the short-term harvest flow. 50% mortality over all age classes results in 0.6% reduction in the short-term harvest flow.

2.5 OSLRMP CONSIDERATIONS

The OSLRMP sets cover requirements to meet mule deer winter range, sheep, goat, and visual constraints. Current harvest plans and plans for rehabilitating immature burned stands must consider these and, where possible, requirements will be met within the unburned forest. Table 4 summarizes the area covered by each constraint.

Table 4. Summary of extent of OSLRMP coverage within FIA areas.

OSLRMP constraint	Area (ha)
Mule Deer Winter Range	All
Sheep range	All
Goat range	112.7

[6] Curry, Sean. 2004. Timber Supply Analysis for Management Plan #9 on TFL 15.

3. PRIORITIES FOR TREATMENT

3.1 POTENTIAL TREATMENTS AND TREATABLE AREA

Many polygons within the FIA area were very small or were isolated within mature patches or within the non-THLB. These areas, as well as non-forest polygons, swamps and polygons with site index[7] (SI) less than or equal to 12.0, were removed from the area to be considered for rehabilitation under FIA funding.

Table 5. Breakdown of FIA area.

Classification:	Area (ha)
Total FIA Area:	706.1
NP, NTA, OR, R	1.5
Swamp	0.2
Area <=0.2 ha, isolated patches <1.8 ha	53.9
SI <=12.0	78.9
Remaining Area:	*571.6*

Within the remaining 572 ha, there is a wide range of age classes, SI, crown closure (CC), and stand height over three subzones. In order to determine priorities for treatment and potential habitat values, the 572 ha was divided into 8 groups as shown in Table 6. The groups are listed in order of priority for rehabilitation. Within each of these groups, stands are prioritized in descending order by subzone (IDFdm1>IDFxh1>PPxh1) and SI. Each group is discussed in further detail below.

Table 6. Summary of FIA area by subzone and group.

Group		Subzone			
Age	CC%	IDFdm1	IDFxh1	PPxh1	Total (ha)
0-20	All	50.2	58.0	2.7	110.9
21-40	All	23.6	40.2	58.5	122.3
41-80	<=25	24.8	44.6	6.1	75.5
41-80	>25	35.0	26.4	6.8	68.2
81-150	<=25	14.1	30.6	24.8	69.5
>150	<=25	9.8	5.4	0.0	15.2
81-150	>25	12.1	24.6	3.6	40.3
>150	>25	40.2	28.4	1.1	69.7
Total		*209.8*	*258.2*	*103.6*	*571.6*

A summary of the TEM and forest cover attributes of all polygons within the FIA area is provided in a CD at the end of this report.

3.1.1 Stands 20 years of Age or Younger.

Approximately 111 ha of stands are 20 years of age or younger (Table 7). Most of these stands are areas that were harvested, regenerated, and had achieved free-growing prior to the fire and are the highest priority for rehabilitation. Mortality in these stands is variable and cannot be fully assessed until July of 2004. It is estimated that 50% of these stands will require site preparation prior to planting. We have prioritized polygons within this group by subzone and SI.

[7] Potential site index (PSI) was available for polygons in the IDFdm1 only.

Table 7. FIA area less than or equal to 20 years of age.

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%
	IDF dm1	IDF xh1	PP xh1				
082E023 61	11.26			11.26	13	19	20
082E023 83	8.04			8.04	12	19	8
082E023 58	15.17			15.17	13	19	24
082E023 47	14.25			14.25	14	18.8	8
082E023 60	1.50	12.84		14.34	12	18	20
082E033 18		4.12		4.12	18	22	17
082E023 37		7.45		7.45	9	18	12
082E023 79		2.89		2.89	11	18	35
082E023 48		13.19		13.19	12	18	10
082E033 27		3.62		3.62	15	16	10
082E023 28		3.20		3.20	8	14	3
082E023 773		4.48		4.48	8	14	3
082E023 774		3.36		3.36	8	14	3
082E023 775		2.25		2.25	8	14	3
082E023 776		0.58		0.58	8	14	3
082E033 306			1.44	1.44	19	14	20
082E033 307			1.21	1.21	19	14	20
Total Area:	*50.22*	*57.99*	*2.65*	*110.85*			

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.2 Stands Between 21 and 40 Years of Age

There are approximately 122 ha of stands between 21 and 40 years of age (Table 8). These stands will require more costly site preparation than the younger stands, mainly to deal with snags. It is estimated that 50% of the stands in this group will require site preparation prior to planting. Priorities are determined by subzone and SI.

Table 8. FIA area between 21 and 40 years of age.

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%
	IDF dm1	IDF xh1	PP xh1				
082E023 107	7.14			7.14	33	19.8	35
082E023 736	0.88			0.88	33	19.8	45
082E023 737	0.79			0.79	33	19.8	30
082E023 105	0.72			0.72	22	19.8	30
082E023 85	2.40			2.40	33	19.2	45
082E023 735	1.20			1.20	33	19.2	35
082E023 91	1.33			1.33	21	19.2	15
082E033 212	1.61			1.61	34	19	30
082E033 97	2.65			2.65	34	17	30
082E033 462	1.16			1.16	34	17	40
082E033 465	0.41			0.41	34	17	8
082E033 466	2.19			2.19	34	17	8
082E033 467	1.14			1.14	34	17	25
082E033 279		18.19		18.19	29	20	30
082E033 94		3.14		3.14	21	17	6
082E033 57		13.27		13.27	27	17	15

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%
	IDF dm1	IDF xh1	PP xh1				
082E033 246		2.48		2.48	29	17	10
082E033 498		1.50		1.50	29	17	50
082E033 305		1.25		1.25	38	15.1	10
082E033 395		0.40	2.56	2.96	39	14	7
082E033 530			3.41	3.41	29	14	10
082E033 323			0.49	0.49	32	14	8
082E033 6			2.97	2.97	39	14	30
082E033 15			9.70	9.70	39	14	15
082E033 17			21.94	21.94	39	14	10
082E033 321			6.26	6.26	39	14	6
082E033 390			3.14	3.14	39	14	10
082E033 391			3.22	3.22	39	14	10
082E033 392			0.99	0.99	39	14	10
082E033 393			1.63	1.63	39	14	10
082E033 394			2.21	2.21	39	14	25
Total Area	*23.61*	*40.23*	*58.51*	*122.35*			

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.3 Stands 41-80 years of age, CC <=25%

There are 75 ha of stands between 41 and 80 years of age with CC less than 25%. They are prioritized by subzone, site index, and in decreasing order by crown closure (Table 9). It is estimated that only about 10% of these stands may be suitable for rehabilitation that would include falling, piling, and possibly burning prior to planting. If seed sources are available, natural regeneration of Py, western larch (Lw) and, in the IDFdm1, Pl should be expected. Surveys to determine stocking of natural regeneration cannot be done for at least 5 years and snags will be an issue in carrying out these surveys.

Table 9. FIA area – stands 41-80 years of age, CC< =25%

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%
	IDF dm1	IDF xh1	PP xh1				
082E033 472	1.95			1.95	60	19.4	15
082E033 260	11.15			11.15	50	19.4	20
082E033 257	1.71			1.71	44	19.4	22
082E033 79	7.07			7.07	71	17	12
082E033 262	1.46			1.46	50	17	20
082E033 2980	1.44			1.44	72	14.9	6
082E033 2978		0.86		0.86	69	17	2
082E033 20		1.03	1.29	2.32	55	15.1	15
082E033 336		4.26		4.26	67	14.6	25
082E033 353		8.59		8.59	72	13.4	25
082E033 2981		5.27		5.27	62	12.4	9
082E033 2982		10.37		10.37	62	12.4	9
082E033 2983		7.96		7.96	62	12.4	9
082E033 2984		6.24		6.24	62	12.4	9
082E033 8			4.84	4.84	50	15.2	15
Total:	*24.78*	*44.56*	*6.13*	*75.47*			

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.4 Stands between 41 and 80 years of age, CC > 25%

Approximately 68 ha of stands between 41 and 80 years of age with CC greater than 25% are within the FIA area (Table 10). Site preparation will be more costly in these stands than in stands with lower CC. It is estimated that 20% of this area will require site preparation (falling, piling, and burning) prior to planting. These stands are a lower priority for treatment than stands with lower CC because of higher costs of rehabilitation.

Table 10. FIA areas 41 to 80 years of age, CC> 25%

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%	Height (m)
	IDF dm1	IDF xh1	PP xh1					
082E033 477	1.53			1.53	66	19.4	50	20.9
082E023 82	0.95			0.95	72	19.2	50	16.3
082E023 734	0.84			0.84	72	19.2	60	19.6
082E023 1001	0.66			0.66	61	19	50	14.3
082E023 71	3.55			3.55	68	19	60	16.6
082E023 100	1.03			1.03	72	19	60	19.6
082E023 147	3.06			3.06	59	19	65	14.4
082E023 999	0.93			0.93	61	19	65	14.5
082E023 140	4.81			4.81	61	19	70	14.5
082E023 1002	0.46			0.46	59	19	75	14.4
082E023 732	0.65			0.65	68	18.1	65	16.6
082E033 259	3.98	2.32		6.30	50	16.3	40	13.9
082E033 261	12.13	3.57		15.70	72	16	30	18.4
082E033 481	0.39	0.31		0.70	50	14.1	40	13.9
082E023 24		1.98		1.98	52	19.1	40	17.1
082E033 231		4.47		4.47	67	18.8	55	20.7
082E023 694		0.98		0.98	52	18	60	16
082E033 356		0.48		0.48	67	17.9	50	19.7
082E023 740		1.31		1.31	63	17.9	55	18.7
082E033 358		0.54		0.54	67	17	40	18.6
082E033 359		0.34		0.34	67	17	55	18.6
082E023 27		1.77		1.77	63	16.9	40	17.6
082E023 739		0.51		0.51	63	16.9	50	17.6
082E023 1010		0.81		0.81	72	16	30	18.4
082E023 15		0.55	1.81	2.36	57	15.8	70	16.4
082E033 310		1.16		1.16	76	15.5	45	19.8
082E033 37		1.30		1.30	72	15.1	35	17.3
082E023 1009		0.79		0.79	54	14.1	35	12.7
082E033 309		3.21		3.21	72	13.4	45	15.2
082E033 300			4.97	4.97	75	12.9	40	16.2
Total	*34.97*	*26.38*	*6.78*	*68.15*				

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.5 Stands 81 to 150 years of age, CC≤ 25%

There are approximately 70 ha of stands between 81 and 150 years of age with CC less than or equal to 25%. Weyco does not foresee doing any rehabilitation work in these stands as site preparation would be too costly. Natural regeneration of Lw and Py in all subzones and Pl in the IDFdm1 is anticipated where there are seed sources and regeneration surveys should be conducted in approximately 5 years to

determine stocking levels. Habitat values in these stands may be high. Polygons are sorted by subzone, site index, and in descending order of CC (Table 11).

Table 11. FIA Areas 81 to 150 years of age, CC≤ 25%

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%	Height (m)
	IDF dm1	IDF xh1	PP xh1					
082E023 73	9.62	2.36		11.98	99	19.2	24	10.7
082E023 86	2.13			2.13	99	19.2	24	10.7
082E023 997	0.39			0.39	132	17.2	20	21.6
082E033 2979	1.97	0.72		2.69	82	17	4	25.5
082E033 303		4.81	0.96	5.77	82	14.3	10	19.4
082E033 304		4.09		4.09	82	14.3	10	19.4
082E033 39		0.63		0.63	82	14.3	15	19.4
082E033 354		0.62		0.62	82	14.3	15	18.4
082E033 14		10.68	5.90	16.58	82	13.5	20	28.5
082E033 337		2.81		2.81	117	12.4	15	12.5
082E033 341		3.66		3.66	103	16.8	25	27.3
082E033 301			5.11	5.11	82	14.3	15	26.6
082E033 2955		0.26	5.67	5.94	130	14.1	6	22.6
082E033 2951			2.17	2.17	118	12.7	13	22.6
082E033 2952			1.52	1.52	118	12.7	13	22.6
082E033 2953			0.47	0.47	118	12.7	13	22.6
082E033 2954			3.04	3.04	118	12.7	13	26.6
Total	*14.11*	*30.64*	*24.85*	*69.6*				

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.6 Stands over 150 years, CC≤ 25%

There are less than 15 ha of stands over 150 years of age with CC less than or equal to 25%. Although these stands will not be rehabilitated, they have been mapped separately as they may have important habitat values. Natural regeneration of Py and Lw in all subzones and Pl in the IDFdm1 is anticipated and regeneration surveys should be carried out in about 5 years to determine stocking levels. Polygons are sorted by subzone, site index and in descending order of crown closure (Table 12).

Table 12. FIA areas over 150 years of age, CC≤ 25%

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%	Height (m)
	IDF dm1	IDF xh1	PP xh1					
082E023 93	2.32			2.32	283	19.2	20	33.1
082E023 1016	0.93			0.93	307	19	20	30.2
082E023 1015	2.42			2.42	307	19	25	32.2
082E023 77	2.13			2.13	157	18.6	20	30.6
082E023 33	0.85	1.06		1.91	187	17	15	23.3
082E023 31	1.17			1.17	207	17	20	23.3
082E033 46		3.41		3.41	190	15.2	25	33.4
082E033 45		0.96		0.96	172	13.2	20	21.9
Total:	*9.82*	*4.37*	*0.00*	*15.25*				

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.7 Stands 81 to 150 years of age, CC> 25%

An area of approximately 40 ha supports stands between 81 and 150 years of age with CC greater than 25%. As above, it is not anticipated that these stands will be rehabilitated but they may have important habitat values. Polygons are sorted by subzone, site index, and crown closure (Table 13).

Table 13. FIA areas between 81 and 150 years of age, CC> 25%.

Mapstand	Subzone			Area (ha)	Age	Site Index*	CC%	Height (m)
	IDF dm1	IDF xh1	PP xh1					
082E023 995	2.77	0.61		3.38	132	19	50	21.6
082E023 30	1.51			1.51	112	18.8	35	23.8
082E023 760	1.72			1.72	112	18.8	50	18.7
082E023 756	0.49			0.49	92	18.6	40	19
082E023 280	0.64	0.65		1.30	92	18.6	55	19
082E023 45	3.77			3.77	112	17.6	65	21.8
082E023 761	1.22			1.22	112	17	45	21.8
082E023 42		3.15		3.15	112	18.9	45	29
082E023 693		0.29		0.29	127	18.5	60	30.8
082E023 742		4.22		4.22	112	18.3	40	28
082E033 47		3.75		3.75	107	15.4	40	22.9
082E023 5		4.72		4.72	147	15.2	30	26.6
082E033 48		0.45		0.45	93	14.6	35	20
082E033 340		2.14		2.14	92	14.3	30	21.3
082E033 396		4.18		4.18	82	14.3	35	19.4
082E033 342		0.43		0.43	81	12.2	40	15
082E033 23			3.57	3.57	99	19.3	40	27.7
Total	*12.12*	*24.6*	*3.57*	*40.29*				

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.1.8 Stands > 150 years of age, CC> 25%

There are approximately 70 ha of stands over 150 years of age with CC greater than 25%. Although rehabilitation of these stands is not anticipated, they may have high habitat values. Because of the higher crown closure, lower stocking of shade intolerant natural regeneration may be anticipated on these stands than on stands with lower CC. This will be dependent on the intensity of the burn and the level of mortality. Polygons are sorted by subzone, site index and in descending order by CC (Table 14).

Table 14. FIA areas over 150 years of age, CC> 25%.

Mapstand	Subzone			Area	Age	Site Index*	CC%	Height (m)
	IDF dm1	IDF xh1	PP xh1					
082E023 145	3.32	1.11		4.42	172	19.8	40	27.4
082E023 996	2.95			2.95	311	19.8	55	33.8
082E023 67	1.69			1.69	207	19	40	31.2
082E023 1017	6.08			6.08	307	19	50	32.2
082E023 173	11.10	2.35		13.46	272	19	50	31.1
082E023 44	1.50			1.50	307	19	55	32.2
082E023 731	5.80			5.80	311	18.3	60	33.8
082E023 94	5.05			5.05	311	18.1	55	33.8
082E023 730	0.56			0.56	307	17	35	31.2
082E023 1018	2.18	1.30		3.48	307	14.4	35	32.2
082E023 50		4.30		4.30	171	18.6	50	34.5
082E023 52		6.78		6.78	311	15.1	40	33.8
082E023 41		9.79		9.79	257	15.1	60	32.3
082E023 4		0.31		0.31	257	13.2	40	28.2
082E023 780		2.48		2.48	187	12.3	30	27.4
082E033 40			1.13	1.13	190	13.5	30	16.4
Total	*40.23*	*28.42*	*1.13*	*69.78*				

*Potential site index (shaded) was used for polygons in the IDFdm1. This information is not available for the PPxh1 and the IDFxh1.

3.2 OTHER ISSUES

Burn severity varied from light under-burns to significant crown fires; mortality will be variable and may not be evident until the 2004 growing season. Mortality may continue beyond that time due to local increases in secondary pests following the fire. A more formal inventory will occur in the summer of 2004 to determine survival and stocking levels. New inventory labels will be established where acceptable stocking levels still remain. Polygons with large unstocked areas will be given a higher priority than polygons with scattered mortality that will be more expensive to treat.

Monitoring and control of Douglas-fir bark beetle populations may require additional expenditures that have not been included in the costs of rehabilitation. Bark beetle control programs will be part of a Ministry of Forests (MOF) district program.

Snagfalling or snag assessments are a potentially high cost that must be assessed on a site by site basis. Treatments and cost estimates must consider the habitat value of snags, the distribution of snags, and site potential.

The cost of preparing site plans or improving access has not been included in cost estimates presented in this report.

If money is available to carry out site preparation in 2004, any areas site prepared would be given the highest priority for planting in 2005, regardless of their ranking in the above tables.

4. REHABILITATION COSTS

Table 15. Estimate of rehabilitation costs for the Vas Fire on TFL 15.

Group	Subzone	Area	Treatment	Cost/ha	% to treat	Phase cost	Total Cost
Age 1-20		**110.9**	Site prep 50% of sites with v-plow, power disk trencher	$300	50	$16,635.00	
			Surveys	$30	100	$3,327.00	
	IDFdm1	50.2	Plant 1400 sph	770	100	$38,654.00	
	IDFxh1	58.0	Plant 1200 sph	660	100	$38,280.00	
	PPxh1	2.7	Plant 800 sph	440	100	$1,188.00	$98,084.00
Age 21-40		**122.3**	Site prepare 50% of sites - feller buncher, cable or windrow	750	50	$45,862.50	
			Surveys	30	100	$3,669.00	
	IDFdm1	23.6	Plant 1400 sph	770	100	$18,172.00	
	IDFxh1	40.2	Plant 1200 sph	660	100	$26,532.00	
	PPxh1	58.5	Plant 800 sph	440	100	$25,740.00	$119,975.50
Age 41-80, CC ≤25%		**75.5**	Site prepare - 10% feller buncher, some piling and burning	900	10	$6,795.00	
			Surveys	30	100	$2,265.00	
	IDFdm1	24.8	Plant 1400 sph	770	10	$1,909.60	
	IDFxh1	44.6	Plant 1200 sph	660	10	$2,943.60	
	PPxh1	6.1	Plant 800 sph	440	10	$469.70	$14,382.90
Age 41-80, CC>25%		**68.2**	Site prepare 20%, feller buncher, pile and burn	1000	20	$9,002.40	
			surveys	30			
	IDFdm1	35.0	Plant 1400 sph	770	20	$3,080.00	
	IDFxh1	26.4	Plant 1200 sph	660	20	$5,280.00	
	PPxh1	6.8	Plant 800 sph	440	20	$1,047.20	$18,409.60
Age 81-150, CC≤25%		**69.5**	No treatment				
	IDFdm1	14.1					
	IDFxh1	30.6					
	PPxh1	24.8					
Age>150, CC≤25%		**15.2**	No treatment				
	IDFdm1	9.8					
	IDFxh1	5.4					
	PPxh1	0.0					
Age 81-150, CC>25%		**40.3**	No treatment				
	IDFdm1	12.1					
	IDFxh1	24.6					
	PPxh1	3.6					
Age >150, CC>25%		**69.7**	No treatment				
	IDFdm1	40.2					
	IDFxh1	28.4					
	PPxh1	1.1					
Total area:		571.6					$250,852

5. OPPORTUNTIES TO IMPROVE TIMBER QUALITY

5.1 WEYCO TIMBER QUALITY OBJECTIVES

The Type I silviculture strategy set out the following objectives for timber quality:

Weyco:
Okanagan Falls Division of Weyco is focused on producing high quality lodgepole pine MSR 2x3 and 2x4s. This requires knots less than 7/8" in diameter, low juvenile wood percentage and high wood density. At present, Fdi, Lw and Py are shipped to Kamloops for processing. The main market is Home Depot and the product objective is appearance grade 2x4, 2x6, and studs. Future products will not be from large trees – Weyco is in the market to produce high quality, engineered wood products.

Ministry Objectives:
The Licensee sets the objectives and the strategy must be consistent with them.

Premium log concept:

- Premium product for TFL 15 is a Pl MSR product.
    - Premium product for Fdi and larch is not size.

5.2 POTENTIAL TREATMENTS

Treatments carried out under this plan will be consistent with the timber quality objectives set by Weyco.

6. HABITAT SUPPLY

6.1 HABITAT OBJECTIVES (QUANTITY AND QUALITY)

The Type I silviculture strategy set the following habitat objectives for TFL 15:

- To reduce the amount of ingress on PP/BG sites and increase the value of these areas as range for California Bighorn sheep.
- To ensure that snags and decadent stems are retained wherever possible. In order of importance for wildlife, these species should be retained: cottonwood, Lw, Py, Fdi, and aspen.
- To provide more variety in spacing regimes – to manage some areas to very low densities and others to very high densities to provide the maximum range in habitat.
- To provide mature cover requirements for mule deer winter range as outlined in the OSLRMP.

The Vas Fire provides several opportunities to help meet these habitat objectives including:

- Burns may promote the regeneration of *Ceanothus*.
- The fire has reduced the amount of ingress on over 100 ha of PPxh1, which will be valuable for sheep habitat.
- Many older mature stands that will not be rehabilitated will provide a large quantity of snags.
- The mix of natural regeneration and planting following the fire will provide a wide range of stand densities and should contribute to improved habitat.