



Tree Farm Licence #18

Twenty Year Plan

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# MP 10 TFL 18 Twenty-Year Plan

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## Purpose

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As documented in the MP Guidelines (2001), the Twenty Year Plan (TYP) is a hypothetical operational plan to be considered by the chief forester in the AAC determination. It supports the timber supply analysis by spatially confirming a hypothetical sequence of cutblocks that could be harvested over a period of 20 years. Since there were no regional or district TYP guidelines, the **Guide for Tree Farm Licence Management Plans (20-month) and Calendar Year Reports (2001)** was used for direction in the preparation of this TYP.

## Content

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This TYP will identify:

- (i) **the timber harvesting land base.** The current THLB as modeled in the base case and the proposed management option is 63,812 ha and is illustrated within the TYP map (Appendix 1),
- (ii) **harvested areas.** The TYP map (Appendix 1) illustrates both previous, existing and proposed harvesting areas (NSR, SR, FDP and twenty year blocks),
- (iii) **existing and proposed road access within the net timber harvesting land base.** The TYP map (Appendix 1) illustrates existing and proposed roads (from FDP). No additional proposed roads are identified, as TFL 18 has mostly a complete mainline infrastructure in place and any future road development will be completed using a Total Chance Planning process. The entire land base for TFL 18 is considered physically operable,
- (iv) **areas subject to special integrated resource management constraints, such as use of the Licence Area for purposes other than timber production.** The Resource Emphasis map (Appendix 2) illustrates the additional resource management areas for TFL 18,
- (v) **the type and quality of timber.** The type and quality of timber is illustrated both within the TYP map and the tables provided in this report, and
- (vi) **the harvesting methods suitable to the terrain.** The harvesting methods are provided within the TYP map and the tables provided in this report.

## Development Process – TFL 18 Twenty Year Plan

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As documented in the timber supply analysis report (Section 7.1), the development of the TYP is based on a variation of Beetle Management Scenarios Alternative Flow #4 (Aggressive Salvage). The actual TYP (Appendix 1) was developed using the first twenty years of harvest from Alternative Flow #4, which were mapped and reviewed by

Canfor staff. Based on the review, non-feasible areas proposed for harvest were removed and adjacent proposed harvest areas were aggregated together creating logical harvest blocks. Additional blocks were also created to meet other short-term harvest objectives, which were not incorporated into the timber supply assumptions (salvage of trees killed by spruce bark beetle). The developed blocks were then fixed into the timber supply model (FSOS) and a new simulation run was completed to schedule their harvest during the first twenty years of the planning horizon. Canfor staff made final manual refinements to the modelled harvest schedule to reflect operational requirements. In order to assess the implications of the operational modifications to the original simulation results, the final twenty-year harvest schedule (Appendix 1) was fixed into a 500-year planning horizon, and the appropriate medium term harvest level was determined. This methodology creates a timber supply scenario that integrates a semi-operational spatial harvest plan with simulated long-term timber flows. The associated harvest level for this TYP is provided in Figure 49 in the analysis report.

## **Results – TFL 18 Twenty Year Plan**

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The harvest levels projected for the first 20 years of the Beetle Management Scenarios Alternative Flow #4 (Aggressive Salvage) illustrated spatially where harvest can be achieved (in 5-year increments) are represented in the TYP map (Appendix 1). These results adhere to the rules and data associated with the base case harvest level except for the proposed increase in the short-term harvest level target to 270,000 m<sup>3</sup>/yr and removal of VQO, Greenup, and LMZ constraints over the short term (15 years) to account for mountain pine beetle epidemic. Otherwise, this scenario includes all other rules and assumptions of the timber supply analysis base case (Section 4.2 of the analysis report).

A summarized version of the periodic results for the TYP are illustrated in Table 1. The detailed results by block and period are provided on the TYP map and Appendix 3.

**Table 1: Summary periodic results for TFL 18 MP10 Twenty Year Plan.**

<b>Period</b>	<b>THLB Area Harvested (ha)</b>	<b>Harvest Volume (m<sup>3</sup>)</b>	<b>Average Harvest Age (years)</b>	<b>Average Harvest Height (metres)</b>
<b>1 (2004 – 2008)</b>	3,691	1,287,567	171	29
<b>2 (2009 – 2013)</b>	4,183	1,333,913	146	29
<b>3 (2014 – 2018)</b>	4,711	1,336,454	160	29
<b>4 (2019 – 2023)</b>	2,627	937,602	199	31
<b>Total</b>	<b>15,212</b>	<b>4,895,536</b>		

Canfor’s forest development plan was incorporated into the first five-year period of the TYP, similar to the timber supply analysis.

## **Supplementary Twenty Year Plan Information and Reports**

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This section summarizes other relevant TYP reports. Where these reports or results are consistent with the timber supply analysis report they are referenced as such.

## Constraints, Objectives and Guidelines

As noted above, all assumptions, guidelines and constraints applied in the timber supply analysis base case were also applied in the development of the TYP except for the proposed increase in the short-term harvest level target to 270,000 m<sup>3</sup>/yr and removal of VQO, Greenup, and LMZ constraints in the short term (15 years). Key assumptions for the development of the TYP are provided in Table 2 while forest cover objectives are presented in Table 4 along with the applicable forest cover requirement, duration of application within the forecast and the area within the TFL to which the objective is applied.

**Table 2: Key assumptions for the development of the TYP.**

<b>Assumption</b>	<b>Description</b>
Current THLB (excluding OGMA's)	63,812 (57,470) ha
Long-term THLB (excluding OGMA's)	63,184 (56,927) ha
Growing Stock at Year 0	10,187,148 m <sup>3</sup>
Riparian Management Zones	Forest cover requirement
Regeneration delay	1 yr (ESSF); 2 yrs (SBS/ICH)
Site index for Natural Stands	Forest cover inventory
Site index for managed stands	Inventory SI (elevation >1550m); PSI adjustment (<1550m)
Utilization	30cm stump, 10cm top DIB, 50% firmwd std., min DBH 12.5cm (Pl)/ 17.5cm (others)
Deciduous	Utilize all deciduous volume
IU Balsam Yields	Customized VDYP Tables
OAF1	15%
OAF2	5%
Genetic gain	12% for Sx, 3% for Pl (prorated for ingress)
Unsalvaged losses	3,000 m <sup>3</sup> /yr
Old Seral management	Non-replaceable OGMA's with 10% sanitation harvest permitted
Watershed ECAs	None
VQO	Apply constraints to individual visual inventory polygons (no aggregation)
VQO-P	20 ha; avg 0.6% <3.7 m
VQO-R	487 ha; avg 3.1% <4.6 m
VQO-PR	6216 ha; avg 9.4% <5.0 m
VQO-M	487 ha; avg 20.4% <4.8 m
Harvest Rules	Relative poorest first
Minimum Harvest Ages	>125 m <sup>3</sup> /ha

Additional information regarding the Beetle information and assumptions used in this analysis is described in Section 6.1 of the analysis report and is provided below in Table 3.

**Table 3: Mountain Pine Beetle Assumptions and Source of Data.**

<b>Category</b>	<b>Central Question</b>	<b>Assumption</b>	<b>Key Sources</b>
<b>Susceptibility</b>	Which stands will get attacked by beetle?	All Stands >60 years old and >10% Pine Volume	Eng et al. 2004
<b>Timing of Attack</b>	How long will it take to for the beetle to spread throughout susceptible stands?	20% of Pine volume currently killed, and beetle runs its course by 2008.	Lorraine Maclaughlin, Personal Communication, November 17, 2004
<b>Shelf life</b>	How long will beetle-killed wood remain merchantable?	No loss for 3 years following attack, then linear decrease in merchantable pine volume until 13 years after attack.	Eng 2004. BCMPB (“conservative” assumptions for “moist” climates)
<b>Mortality</b>	How much of the pine volume in susceptible stands will be killed by the infestation	70% of the pine volume in susceptible stands killed by beetle.	Eng et al. 2004
<b>Stand Dynamics</b>	How will stands develop after beetle attack?	Pine volume is removed from yield tables. No yield recovery following attack. Stands with >60% pine break up naturally after shelf life and regenerate to the same NSYT with a 20-year regeneration delay.	Dave Coates, Research Silviculturalist, MoF (Smithers), Personal Communication, November 12, 2004
<b>Uniformity</b>	Are the above attributes expected to differ substantially depending on stand attributes, location, or climate?	Apply assumptions uniformly to all stands.	Marvin Eng, Research Landscape Ecologist, MoF, Personal Communication, November 12, 2004

Forest cover requirements were relaxed for the first 15 years of the analysis horizon for VQOs, LMZ and adjacency green-up. Starting in period 4 these constraints were then turned on and remained for the balance of the 500 year analysis horizon (Table 4). Equivalent clearcut areas (ECAs) were established in the model but not set as constraints only for red flag monitoring purposes.

**Table 4: Forest cover objectives as applied to the TYP.**

Resource	Criteria	Cover requirement	Duration	Applied to:	
				Zone	Cover type
Landscape green-up	Green-up height	No more than 33% of stands can be less than 3 meters in height.	16-500 years	TFL18	THLB
Visual quality	% denudation and visually effective green-up	No more than a specified percentage of each visual quality polygon can be less than the visually effective green-up height.	16-500 years	Visual quality polygons	Productive Forest
				Lakeshore Management Zones	Productive Forest
	% denudation and adjacency green-up	No more than a specified percentage of each Lakeshore Management Zone may be less than the cutblock adjacency green-up height of 3 meters.	16-500 years	Lakeshore Management Zones	Productive Forest
Landscape level biodiversity	Old Growth Management Areas	On average, at least 90% of the OGMA's in each BGC variant must be in old seral condition (minimum percent depends on variant).	1-500 years	OGMA's by BEC variants	Productive Forest
Riparian ecosystem functions	% mature forest in riparian management zones	Mature forest cover must be at least equal to the basal area retention levels recommended in the Riparian Management Area Guidebook.	1-500 years	Riparian Management Zones by Class	Productive Forest
Water quality	Equivalent Clearcut Area	Equivalent Clearcut Area should be kept below a specified threshold. <b><i>For monitoring purposes only: Not applied as a constraint.</i></b>	1-500 years	IWAP Watersheds	Productive Forest

Reports and guidelines used in the development of the TYP are provided in Appendix 4 – Reports and Documents Used for Preparation of the TYP.

No block or patch targets were applied as constraints or targets to the TYP as initially proposed. This is due to the mountain pine beetle infestation and current salvage activities over the next 10-15 years, which will require variable patch and block sizes. As such, block sizes for the TYP are provided for reference only (Table 5). The results illustrate the hectares within each block size group. For example the <5 ha cell for Period 1 is 23 hectares. This means that there are 23 hectares that occur within the < 5 ha block size group.

**Table 5: Block size distribution (ha) for the Twenty Year Plan.**

Period	< 5 ha	6 – 25 ha	26 – 50 ha	51 – 150 ha	151 – 250 ha	> 250 ha	Total
<b>1 (2004 – 2008)</b>	23	631	813	1537	819	0	<b>3823</b>
<b>2 (2009 – 2013)</b>	0	170	298	2547	635	532	<b>4182</b>
<b>3 (2014 – 2018)</b>	8	556	533	2805	808	0	<b>4710</b>
<b>4 (2019 – 2023)</b>	23	567	690	1352	0	0	<b>2632</b>

### Information Status and Type Used

The status, format and type information used in the preparation of the TYP consists of the same data as noted in the information package (Section 5) and analysis report (Section 3), which are summarized, in Table 6.

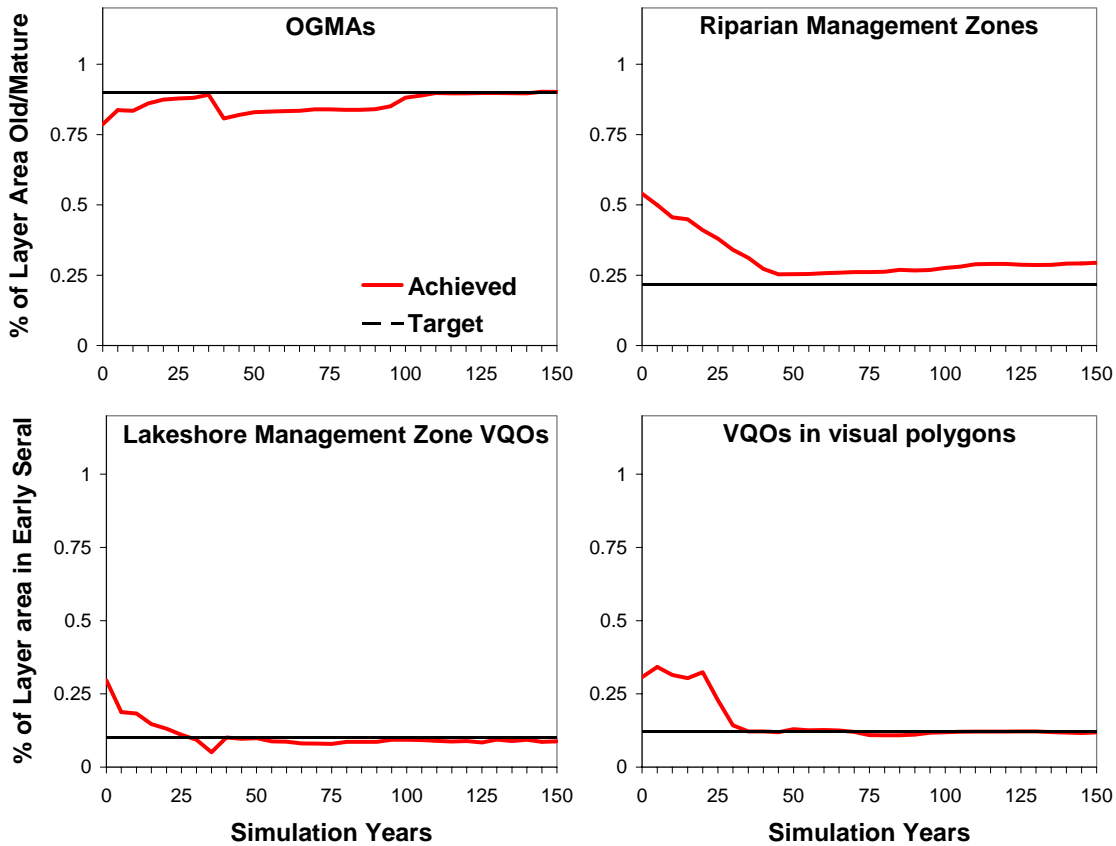
**Table 6: Information and status used in the TYP.**

Inventory Category	Description	Approval	
		Date	Agency Approval/Comments
Forest Inventory	Base	1994	Audit completed 1997, MoF Resources Inventory Branch.
	Depletions Update	-	Updated to January 2002
	Spatial Correction	2003	Reviewed by Linda Sapinski, GIS Analyst MSRM – Kamloops.
ESA's	Recreation, Regeneration, Avalanche	1994	Part of 1994 Forest Inventory
Recreation	Opportunity Spectrum	1998	
	Features	1998	
	Sites	2004	Reviewed with Headwaters District
Visual Inventory	TFL 18	1996	
	Headwaters District	-	Draft VLI – 2002/03
	Blended	2004	Reviewed blended inventory and potential management polygons with Kamloops Forest Region and Headwaters District.
Terrain	Terrain Stability	2003	Terrain Survey Intensity Level "C"
Ecosystem	Terrestrial Ecosystem Mapping	2001	Review by Dennis Lloyd, Research Ecologist, MoF Forest Sciences, Kamloops
	Old Growth Management Areas	Draft	Current Management
	Biogeoclimatic mapping	2001	Included with TEM
Fisheries	Lake Inventories	1996	Reconnaissance surveys
	Streams	1996	Local Area Agreement
Lakes	LRUP classifications	2003	Reviewed with Headwaters District
Cultural Heritage Resources	AOA Model	2003	Revised and updated LRMP AOA model provided by AOA Sub-committee.

## Objective Achievement

The main objectives to be achieved for the TYP include the attainment of the first 20 years of harvest from the proposed management scenario. This is illustrated by the block scheduling provided in the TYP map (Appendix 1). Other objectives include the maintenance of forest cover objectives and constraints for their desired duration, which are described in Table 4. Figure 1 illustrates the average condition of the resource emphasis areas and over time. The first 20 years of these results represent the TYP period and the remaining results are based on the harvest level forecast. As expected, there is violation of the constraints (OGMAs, LMZs and VQOs) over the short-term, which would be anticipated given the increased harvest and violation allowance required for salvage due to the beetle infestation. These violations are eliminated following within 20-25 years once the beetle assumptions are removed.

**Figure 1: Average condition of resource emphasis areas for TFL 18 for the proposed scenario and twenty year plan.**



## Conclusion

This twenty-year plan represents a hypothetical sequence of harvests driven by current management for the current beetle epidemic. Following operational reviews of the initial modeled result, Canfor refined the TYP to reflect operational requirements and feasibility. Application of Canfor's recent forest development plan ensures a logical



starting point for tactical planning for TFL 18. It also provides a reasonable starting point for the future development of a forest stewardship plan for TFL 18.

# Appendix 1

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See Attached Map 1 of 2

## **Appendix 2**

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See attached map 2 of 2

## Appendix 3

Period 1 (2004-2008)						
Block #	THLB Area (ha)	Harvest System	Harvest Volume (m <sup>3</sup> )	Age (yrs)	Ht (m)	Species Composition
2	25	Ground	8,740	132	28	P60 S12 B21 F5 C0 H0 D2
4	38	Ground	13,477	129	28	P76 S8 B13 F2 C0 H0 D1
13	22	Ground	6,123	185	26	P43 S37 B20 F0 C0 H0 D0
23	103	Ground	36,674	146	29	P57 S26 B11 F6 C0 H0 D0
26	20	Ground	4,939	170	25	P35 S35 B30 F0 C0 H0 D0
38	53	Ground	21,258	229	32	P66 S21 B13 F0 C0 H0 D0
44	30	Cable	11,260	202	31	P86 S8 B6 F0 C0 H0 D0
51	171	Ground	66,251	183	31	P77 S16 B6 F1 C0 H0 D0
63	22	Ground	5,945	87	24	P70 S20 B10 F0 C0 H0 D0
66	137	Ground	37,274	99	24	P79 S15 B5 F0 C0 H0 D0
91	63	Ground	30,654	199	35	P53 S35 B12 F0 C0 H0 D0
95	37	Ground	16,826	182	33	P61 S31 B8 F0 C0 H0 D0
106	50	Ground	21,716	148	31	P71 S21 B8 F0 C0 H0 D0
133	40	Ground	15,279	184	30	P67 S25 B4 F3 C0 H0 D0
142	26	Ground	12,640	227	35	P9 S66 B17 F0 C8 H0 D0
161	13	Ground	4,125	199	28	P57 S32 B11 F0 C0 H0 D0
162	137	Ground	54,289	131	30	P76 S13 B1 F5 C0 H0 D5
195	28	Ground	9,819	152	29	P79 S18 B4 F0 C0 H0 D0
203	31	Ground	10,290	216	29	P66 S24 B10 F0 C0 H0 D0
208	1	Ground	407	132	31	P70 S20 B0 F0 C0 H0 D10
215	0	Ground	12	135	31	P33 S57 B0 F0 C0 H0 D10
243	244	Cable	69,321	110	25	P83 S5 B6 F7 C0 H0 D0
264	22	Ground	7,713	113	28	P81 S1 B8 F10 C0 H0 D0
275	216	Ground	55,806	117	24	P80 S7 B3 F9 C0 H0 D0
284	15	Ground	3,558	102	23	P98 S1 B0 F0 C1 H0 D0
402	13	Ground	3,479	115	24	P40 S19 B16 F22 C0 H0 D3
409	26	Cable	9,729	95	28	P46 S22 B7 F25 C0 H0 D0
411	26	Ground	11,883	265	34	P0 S83 B17 F0 C0 H0 D0
424	31	Ground	8,269	152	25	P1 S34 B62 F2 C0 H0 D0
443	61	Ground	16,945	91	25	P49 S38 B4 F9 C0 H0 D0
452	139	Ground	35,835	162	25	P12 S42 B46 F0 C0 H0 D0
456	42	Ground	11,750	160	26	P14 S57 B28 F0 C0 H0 D1
491	20	Ground	4,608	88	22	P84 S14 B2 F0 C0 H0 D0
492	9	Ground	1,260	88	19	P20 S40 B40 F0 C0 H0 D0
498	36	Ground	11,077	177	27	P41 S46 B11 F2 C0 H0 D0
502	3	Ground	1,604	264	35	P0 S80 B20 F0 C0 H0 D0
504	23	Ground	7,549	237	29	P0 S63 B37 F0 C0 H0 D0
509	44	Ground	17,170	218	31	P33 S54 B13 F0 C0 H0 D0
513	6	Ground	2,318	211	32	P12 S74 B14 F0 C0 H0 D0
532	14	Ground	4,404	241	29	P1 S47 B53 F0 C0 H0 D0

536	35	Ground	10,462	211	28	P2 S55 B43 F0 C0 H0 D0
537	36	Ground	18,577	299	36	P0 S88 B12 F0 C0 H0 D0
539	47	Ground	17,900	290	32	P7 S63 B30 F0 C0 H0 D0
553	135	Ground	49,580	191	30	P18 S53 B28 F0 C0 H0 D0
556	135	Ground	47,607	182	29	P35 S39 B26 F1 C0 H0 D0
557	72	Ground	27,921	112	30	P40 S34 B0 F4 C0 H0 D22
589	18	Ground	10,597	215	39	P2 S83 B10 F0 C5 H0 D0
603	188	Ground	79,893	140	31	P16 S66 B0 F2 C0 H0 D14
610	37	Ground	13,002	167	29	P1 S50 B39 F9 C0 H0 D0
613	12	Cable	4,107	182	28	P6 S51 B35 F8 C0 H0 D0
614	0	Ground	95	124	30	P55 S30 B5 F5 C0 H0 D5
615	1	Ground	359	194	28	P10 S50 B40 F0 C0 H0 D0
617	1	Cable	363	169	31	P10 S50 B10 F30 C0 H0 D0
618	10	Ground	3,687	111	30	P54 S24 B0 F0 C0 H0 D22
622	17	Ground	6,714	283	32	P21 S71 B8 F0 C0 H0 D0
624	16	Ground	6,866	234	33	P15 S75 B10 F0 C0 H0 D0
625	12	Ground	5,069	246	33	P16 S79 B5 F0 C0 H0 D0
627	2	Ground	1,004	249	36	P36 S46 B18 F0 C0 H0 D0
628	1	Ground	396	249	33	P10 S90 B0 F0 C0 H0 D0
629	14	Ground	6,884	232	34	P33 S45 B22 F0 C0 H0 D0
631	6	Ground	2,293	220	31	P19 S68 B13 F0 C0 H0 D0
632	37	Ground	16,133	194	33	P30 S55 B10 F5 C0 H0 D0
634	3	Ground	1,151	249	33	P0 S80 B20 F0 C0 H0 D0
636	2	Ground	969	229	32	P20 S70 B10 F0 C0 H0 D0
638	15	Ground	6,107	229	32	P20 S70 B10 F0 C0 H0 D0
639	30	Ground	9,891	167	28	P24 S35 B40 F0 C0 H0 D0
640	0	Ground	59	249	31	P0 S90 B10 F0 C0 H0 D0
641	1	Ground	467	249	31	P20 S80 B0 F0 C0 H0 D0
648	31	Ground	12,425	183	31	P61 S32 B6 F1 C0 H0 D0
649	29	Ground	11,626	161	31	P34 S56 B10 F0 C0 H0 D0
650	24	Cable	8,715	212	30	P51 S27 B21 F0 C0 H0 D0
654	20	Ground	10,001	136	35	P23 S60 B5 F3 C0 H0 D10
656	56	Ground	15,637	138	26	P8 S36 B50 F6 C1 H0 D0
658	8	Ground	3,461	267	33	P0 S70 B30 F0 C0 H0 D0
660	7	Ground	2,622	244	30	P0 S64 B34 F0 C2 H0 D0
663	14	Ground	4,279	235	27	P0 S59 B40 F0 C1 H0 D0
664	21	Ground	9,632	152	33	P71 S15 B11 F2 C0 H0 D2
665	16	Ground	6,080	121	29	P55 S24 B12 F4 C0 H0 D5
667	12	Ground	4,105	118	27	P72 S14 B7 F0 C0 H0 D6
670	31	Ground	13,058	132	31	P42 S37 B11 F3 C0 H0 D6
672	8	Ground	2,003	129	24	P28 S23 B18 F31 C0 H0 D0
675	42	Ground	18,607	137	31	P26 S61 B11 F1 C0 H0 D2
677	80	Ground	31,618	146	30	P54 S27 B13 F4 C0 H0 D3
708	23	Ground	9,283	142	31	P11 S61 B20 F4 C1 H0 D3
715	50	Ground	15,484	107	27	P45 S10 B1 F32 C11 H0 D0
717	1	Ground	145	113	24	P95 S3 B2 F0 C0 H0 D0
721	14	Ground	5,238	136	30	P15 S46 B23 F12 C3 H0 D0
722	7	Ground	2,184	146	28	P37 S45 B18 F0 C0 H0 D0

723	16	Ground	5,506	158	28	P10 S59 B32 F0 C0 H0 D0
729	59	Cable	21,189	111	28	P82 S3 B0 F12 C0 H0 D3
731	35	Ground	9,180	120	24	P60 S11 B1 F24 C0 H0 D4
740	14	Ground	2,905	110	21	P84 S3 B1 F11 C0 H0 D0
742	107	Ground	28,294	113	24	P88 S2 B1 F7 C0 H0 D1
745	3	Ground	1,125	191	30	P2 S19 B0 F47 C32 H0 D0
754	19	Ground	6,728	108	28	P65 S3 B0 F28 C0 H0 D4
800	25	Ground	5,932	102	23	P70 S1 B0 F28 C0 H0 D0
839	0	Ground	78	102	25	P30 S0 B0 F60 C0 H0 D10

### Period 2 (2009-2013)

Block #	THLB Area (ha)	Harvest System	Harvest Volume (m <sup>3</sup> )	Age (yrs)	Ht (m)	Species Composition
1	142	Ground	41,268	128	27	P57 S21 B17 F5 C0 H0 D0
3	46	Cable	13,778	117	28	P62 S12 B0 F24 C2 H0 D0
15	208	Ground	66,090	140	29	P63 S22 B13 F2 C0 H0 D0
33	77	Cable	20,783	151	27	P61 S14 B11 F13 C0 H0 D0
37	67	Ground	28,249	215	32	P15 S58 B27 F0 C0 H0 D0
86	63	Ground	22,130	204	31	P67 S25 B8 F0 C0 H0 D0
87	27	Ground	9,747	186	32	P71 S16 B13 F0 C0 H0 D0
94	123	Ground	42,369	174	31	P55 S32 B7 F7 C0 H0 D0
97	532	Ground	177,691	155	30	P54 S29 B14 F2 C0 H0 D1
102	143	Ground	53,278	191	32	P57 S30 B11 F1 C0 H0 D0
103	76	Ground	23,398	117	28	P69 S16 B12 F1 C0 H0 D2
110	132	Ground	45,603	175	30	P55 S36 B9 F0 C0 H0 D0
115	61	Ground	20,504	158	30	P56 S27 B15 F0 C0 H0 D2
124	60	Ground	20,176	125	29	P69 S15 B12 F0 C0 H0 D4
126	14	Ground	4,236	104	27	P62 S22 B0 F0 C0 H0 D16
131	20	Ground	7,407	131	30	P66 S23 B1 F0 C0 H0 D10
138	72	Cable	23,331	201	30	P49 S37 B14 F0 C0 H0 D0
144	97	Ground	32,490	133	28	P27 S43 B20 F5 C0 H0 D4
151	48	Ground	19,176	171	31	P18 S61 B13 F4 C1 H0 D3
152	78	Ground	29,644	216	33	P65 S29 B6 F0 C0 H0 D0
156	42	Ground	17,153	187	33	P62 S29 B10 F0 C0 H0 D0
160	57	Ground	18,637	192	31	P71 S16 B12 F0 C0 H0 D0
169	13	Ground	5,169	119	31	P52 S37 B0 F0 C0 H0 D11
170	25	Ground	8,920	184	31	P54 S37 B9 F0 C0 H0 D0
174	10	Ground	3,323	255	31	P62 S30 B9 F0 C0 H0 D0
178	63	Cable	19,605	199	30	P54 S27 B19 F0 C0 H0 D0
186	64	Ground	19,325	151	27	P41 S6 B0 F20 C6 H27 D0
189	187	Ground	69,565	131	31	P53 S27 B2 F0 C0 H0 D18
202	125	Ground	21,642	101	20	P74 S3 B1 F12 C9 H0 D1
211	82	Ground	34,858	136	33	P56 S31 B2 F1 C0 H0 D11
214	113	Ground	37,965	136	30	P54 S32 B8 F4 C0 H0 D3
223	58	Ground	6,461	94	18	P90 S0 B0 F7 C0 H0 D2
228	48	Ground	18,641	129	32	P53 S39 B5 F0 C0 H0 D2

235	61	Cable	15,798	143	26	P46 S19 B7 F21 C0 H0 D6
240	66	Ground	26,258	153	33	P60 S20 B14 F5 C0 H0 D2
248	104	Ground	32,065	151	29	P62 S21 B5 F2 C0 H0 D10
253	12	Ground	4,883	143	31	P47 S43 B9 F0 C0 H0 D0
259	71	Ground	27,102	146	31	P46 S46 B8 F0 C0 H0 D0
262	240	Ground	58,036	119	25	P76 S8 B4 F10 C0 H0 D2
263	16	Ground	5,101	126	27	P8 S41 B51 F1 C0 H0 D0
266	84	Ground	19,965	123	25	P76 S11 B12 F1 C0 H0 D0
270	78	Ground	26,813	162	30	P58 S4 B1 F28 C0 H0 D9
272	36	Ground	10,322	116	26	P24 S53 B20 F1 C0 H0 D2
278	20	Ground	5,153	156	25	P0 S53 B45 F0 C0 H0 D2
279	43	Ground	15,443	148	31	P68 S6 B0 F21 C0 H0 D5
285	133	Ground	40,312	133	28	P60 S11 B1 F24 C2 H0 D3
286	39	Ground	6,795	95	20	P59 S6 B6 F26 C3 H0 D0
287	35	Ground	8,679	125	26	P85 S4 B2 F10 C0 H0 D0
288	38	Ground	12,755	129	30	P84 S1 B0 F15 C0 H0 D0
289	38	Ground	9,194	118	25	P65 S10 B2 F22 C1 H0 D0
295	18	Ground	5,297	102	26	P53 S0 B0 F41 C0 H0 D6
299	55	Ground	15,482	99	25	P36 S11 B1 F34 C0 H0 D19
304	8	Ground	1,437	99	21	P68 S0 B0 F27 C0 H0 D5
306	14	Ground	4,410	112	27	P25 S36 B8 F17 C3 H0 D12

### Period 3 (2014-2018)

Block #	THLB Area (ha)	Harvest System	Harvest Volume (m <sup>3</sup> )	Age (yrs)	Ht (m)	Species Composition
5	59	Cable	13,645	90	27	P44 S30 B8 F8 C0 H0 D10
6	44	Cable	10,100	110	25	P26 S35 B34 F4 C0 H0 D1
9	98	Ground	19,142	101	22	P0 S53 B47 F0 C0 H0 D0
11	56	Ground	20,966	260	32	P13 S68 B19 F0 C0 H0 D0
12	36	Ground	9,709	156	29	P42 S26 B29 F2 C0 H0 D1
18	51	Ground	10,636	95	26	P49 S34 B6 F7 C0 H0 D4
20	20	Ground	6,028	230	31	P33 S37 B30 F1 C0 H0 D0
25	74	Ground	11,488	89	23	P76 S17 B6 F1 C0 H0 D0
34	14	Ground	5,303	235	33	P30 S48 B23 F0 C0 H0 D0
35	134	Ground	41,158	247	33	P48 S30 B21 F1 C0 H0 D0
40	17	Ground	6,240	255	36	P38 S46 B16 F0 C0 H0 D0
41	108	Ground	33,330	241	33	P52 S28 B19 F0 C0 H0 D0
45	68	Ground	19,538	245	32	P48 S31 B22 F0 C0 H0 D0
48	21	Ground	3,857	94	23	P42 S38 B20 F0 C0 H0 D0
56	38	Ground	10,448	150	28	P41 S38 B21 F0 C0 H0 D0
57	13	Ground	4,127	193	30	P29 S44 B28 F0 C0 H0 D0
58	61	Ground	10,289	92	24	P55 S38 B7 F0 C0 H0 D0
61	42	Ground	14,779	212	33	P46 S40 B14 F0 C0 H0 D0
65	21	Cable	6,380	197	31	P41 S43 B16 F0 C0 H0 D0
68	28	Ground	9,844	217	33	P40 S45 B15 F0 C0 H0 D0
70	49	Ground	17,692	281	33	P23 S45 B31 F1 C0 H0 D0

72	177	Ground	52,262	199	32	P51 S31 B18 F0 C0 H0 D0
81	226	Ground	54,406	166	27	P51 S26 B17 F5 C0 H0 D0
83	37	Ground	10,540	195	30	P46 S35 B19 F0 C0 H0 D0
89	17	Ground	6,387	199	33	P32 S47 B21 F0 C0 H0 D0
90	174	Ground	63,460	232	35	P38 S37 B25 F0 C0 H0 D0
104	24	Ground	6,088	196	29	P45 S29 B26 F0 C0 H0 D0
105	79	Ground	24,830	192	32	P46 S41 B12 F1 C0 H0 D0
107	70	Ground	18,426	164	29	P54 S27 B18 F0 C0 H0 D0
111	115	Ground	36,941	211	33	P47 S36 B15 F0 C2 H0 D0
112	81	Cable	16,621	117	25	P43 S27 B19 F7 C0 H0 D4
119	63	Ground	15,795	162	27	P39 S27 B29 F2 C1 H0 D1
120	10	Ground	2,531	176	30	P41 S41 B6 F12 C0 H0 D0
121	12	Ground	4,171	126	34	P50 S43 B0 F0 C0 H0 D7
128	34	Ground	9,440	167	29	P33 S47 B16 F3 C0 H0 D0
130	108	Ground	36,138	126	33	P50 S41 B1 F0 C0 H0 D8
132	141	Ground	44,016	231	33	P45 S41 B14 F0 C0 H0 D0
137	68	Ground	24,312	156	31	P28 S51 B21 F0 C0 H0 D0
148	30	Ground	8,817	201	30	P34 S39 B27 F0 C0 H0 D0
159	20	Ground	5,979	119	29	P33 S40 B10 F5 C0 H0 D12
165	102	Ground	30,162	129	29	P51 S27 B4 F5 C1 H0 D12
167	231	Ground	72,633	126	31	P52 S31 B6 F4 C0 H0 D6
168	33	Cable	11,551	206	34	P47 S45 B8 F0 C0 H0 D0
172	22	Ground	6,437	181	31	P42 S41 B12 F5 C0 H0 D0
175	83	Ground	27,236	155	32	P47 S15 B9 F28 C0 H0 D0
176	28	Ground	11,092	258	32	P6 S38 B36 F9 C3 H8 D0
177	80	Ground	22,430	114	29	P49 S32 B4 F0 C0 H0 D15
179	61	Ground	19,976	226	33	P44 S46 B10 F0 C0 H0 D0
181	99	Ground	27,878	115	30	P56 S27 B3 F0 C0 H0 D13
184	59	Ground	16,752	114	29	P49 S27 B7 F1 C0 H0 D16
194	25	Ground	9,737	208	34	P40 S48 B12 F0 C0 H0 D0
196	91	Ground	23,616	150	29	P52 S21 B22 F5 C0 H0 D0
197	13	Ground	3,885	183	31	P43 S39 B18 F0 C0 H0 D0
198	131	Ground	43,760	135	32	P42 S33 B8 F2 C0 H0 D15
199	69	Ground	21,380	125	30	P36 S32 B18 F1 C0 H0 D12
201	17	Ground	4,624	158	30	P54 S43 B0 F3 C0 H0 D0
205	14	Ground	4,518	121	31	P45 S44 B2 F1 C0 H0 D7
209	60	Ground	12,948	114	28	P76 S2 B0 F21 C1 H0 D0
210	99	Ground	25,236	154	29	P49 S31 B10 F8 C0 H0 D2
218	31	Cable	5,480	160	23	P66 S21 B13 F0 C0 H0 D0
219	19	Ground	5,843	192	31	P39 S40 B16 F4 C0 H0 D0
220	10	Ground	2,043	128	24	P40 S20 B20 F20 C0 H0 D0
225	53	Ground	14,171	160	29	P47 S26 B18 F8 C1 H0 D0
230	94	Cable	22,830	140	27	P45 S3 B3 F38 C11 H0 D0
231	17	Ground	6,179	137	32	P37 S55 B1 F5 C0 H0 D2
232	69	Cable	19,114	155	29	P42 S31 B13 F14 C0 H0 D0
233	35	Ground	9,929	124	30	P53 S26 B10 F3 C0 H0 D8
236	17	Ground	3,841	156	28	P61 S12 B3 F22 C1 H0 D1
237	26	Ground	6,203	129	27	P44 S18 B23 F14 C0 H0 D1



241	26	Cable	3,715	89	21	P44 S2 B0 F30 C23 H0 D0
242	28	Ground	8,575	148	29	P37 S42 B5 F0 C0 H0 D17
246	25	Ground	7,592	128	30	P42 S33 B9 F13 C0 H0 D2
247	47	Ground	13,038	138	31	P63 S26 B10 F0 C0 H0 D1
249	19	Ground	4,620	144	27	P33 S26 B37 F3 C0 H0 D1
250	12	Ground	4,089	139	30	P39 S41 B10 F0 C0 H0 D10
251	20	Ground	6,661	131	30	P38 S40 B6 F6 C1 H0 D10
252	16	Ground	5,922	195	34	P38 S49 B7 F6 C0 H0 D0
256	5	Ground	1,591	139	30	P40 S40 B10 F0 C0 H0 D10
258	21	Ground	6,316	131	29	P43 S37 B5 F6 C1 H0 D9
260	21	Ground	6,432	139	30	P36 S58 B6 F0 C0 H0 D0
267	125	Cable	20,338	104	23	P58 S12 B13 F16 C1 H0 D0
280	16	Ground	3,722	115	25	P36 S31 B33 F0 C0 H0 D0
293	18	Ground	5,285	119	28	P34 S26 B5 F30 C5 H0 D0
296	20	Ground	6,242	120	29	P34 S13 B2 F48 C1 H0 D1
298	37	Ground	9,084	126	27	P43 S22 B12 F22 C1 H0 D0
303	3	Ground	735	127	27	P50 S10 B0 F40 C0 H0 D0
305	25	Ground	5,152	105	24	P34 S10 B2 F40 C2 H0 D12

### Period 4 (2019-2023)

Block #	THLB Area (ha)	Harvest System	Harvest Volume (m <sup>3</sup> )	Age (yrs)	Ht (m)	Species Composition
7	58	Ground	20,695	236	33	P28 S53 B18 F0 C0 H0 D1
10	7	Ground	2,727	207	33	P21 S62 B18 F0 C0 H0 D0
16	32	Ground	12,075	274	33	P0 S65 B35 F0 C0 H0 D0
17	6	Ground	1,685	190	26	P3 S59 B37 F0 C0 H0 D0
21	41	Ground	11,963	179	28	P18 S48 B34 F0 C0 H0 D0
29	11	Ground	2,990	169	29	P23 S47 B29 F1 C0 H0 D0
30	25	Ground	12,279	298	36	P0 S90 B10 F0 C0 H0 D0
32	65	Ground	33,500	301	36	P0 S88 B12 F0 C0 H0 D0
36	21	Ground	6,146	212	29	P5 S59 B36 F0 C0 H0 D0
43	53	Ground	21,376	261	33	P6 S82 B13 F0 C0 H0 D0
47	63	Ground	25,538	301	33	P0 S58 B42 F0 C0 H0 D0
49	5	Ground	1,558	207	33	P36 S45 B15 F4 C0 H0 D0
50	27	Cable	5,151	110	25	P41 S27 B32 F0 C0 H0 D0
53	31	Ground	12,216	219	34	P17 S57 B26 F0 C0 H0 D0
54	14	Ground	3,663	88	26	P29 S27 B44 F0 C0 H0 D0
55	60	Ground	19,208	303	33	P25 S58 B17 F0 C0 H0 D0
62	54	Ground	23,862	224	34	P6 S61 B33 F0 C0 H0 D0
67	22	Ground	8,408	192	35	P30 S58 B12 F0 C0 H0 D0
69	16	Ground	6,322	224	31	P7 S50 B40 F3 C0 H0 D0
71	37	Ground	10,982	220	29	P16 S50 B34 F0 C0 H0 D0
73	48	Ground	12,168	186	29	P38 S35 B27 F0 C0 H0 D0
74	45	Ground	12,979	184	31	P32 S44 B25 F0 C0 H0 D0
75	53	Cable	12,533	95	27	P47 S36 B17 F0 C0 H0 D0
76	23	Ground	5,915	156	27	P15 S40 B46 F0 C0 H0 D0

77	25	Ground	12,694	316	35	P0 S35 B35 F0 C29 H0 D0
78	15	Ground	4,638	182	31	P23 S56 B21 F0 C0 H0 D0
80	23	Ground	7,183	205	32	P22 S49 B28 F0 C0 H0 D0
84	47	Ground	15,306	210	33	P34 S46 B20 F0 C0 H0 D0
85	58	Ground	19,998	226	31	P6 S48 B46 F0 C0 H0 D0
88	56	Ground	20,006	295	32	P11 S65 B21 F0 C3 H0 D0
93	134	Ground	64,108	326	36	P7 S65 B24 F0 C5 H0 D0
96	1	Ground	310	78	22	P3 S12 B85 F0 C0 H0 D0
98	25	Ground	10,559	231	34	P14 S59 B27 F0 C0 H0 D0
99	16	Ground	5,028	201	31	P26 S53 B21 F0 C0 H0 D0
100	50	Ground	17,375	207	31	P11 S54 B35 F0 C0 H0 D0
108	23	Ground	9,417	274	33	P0 S60 B40 F0 C0 H0 D0
109	15	Ground	5,609	273	35	P25 S51 B23 F0 C0 H0 D0
117	8	Ground	2,582	123	29	P8 S50 B2 F0 C0 H0 D40
118	26	Ground	7,487	197	30	P41 S44 B15 F0 C0 H0 D0
129	18	Cable	7,893	152	34	P15 S32 B20 F33 C0 H0 D1
136	13	Cable	4,230	166	30	P19 S56 B21 F4 C0 H0 D0
139	29	Cable	10,135	188	31	P16 S50 B23 F11 C0 H0 D0
147	49	Ground	17,183	148	30	P20 S59 B5 F0 C0 H0 D16
149	4	Cable	1,320	141	29	P2 S50 B27 F21 C0 H0 D0
154	45	Ground	16,432	262	31	P4 S61 B35 F0 C0 H0 D0
155	9	Ground	5,854	220	41	P0 S85 B10 F0 C5 H0 D0
157	24	Ground	12,498	278	36	P1 S80 B19 F0 C0 H0 D0
163	21	Ground	6,498	228	33	P33 S57 B10 F0 C0 H0 D0
164	57	Ground	18,698	221	32	P29 S53 B17 F0 C0 H0 D0
166	21	Ground	5,189	200	27	P15 S37 B47 F0 C0 H0 D0
171	31	Ground	10,193	165	31	P29 S54 B12 F5 C0 H0 D0
173	15	Ground	4,554	191	30	P21 S55 B22 F2 C0 H0 D0
182	41	Ground	9,654	170	26	P22 S42 B37 F0 C0 H0 D0
183	55	Ground	18,753	202	29	P0 S31 B43 F9 C15 H2 D0
188	50	Ground	15,905	109	29	P19 S35 B21 F2 C0 H0 D24
190	10	Ground	4,970	209	34	P0 S20 B6 F64 C10 H0 D0
192	65	Ground	18,794	120	30	P31 S25 B18 F0 C0 H0 D26
200	3	Ground	1,534	224	36	P5 S80 B15 F0 C0 H0 D0
206	13	Cable	5,273	228	32	P10 S59 B31 F0 C0 H0 D0
221	33	Ground	17,166	253	36	P0 S35 B17 F22 C27 H0 D0
222	29	Ground	10,573	219	34	P30 S51 B19 F0 C0 H0 D0
224	88	Cable	35,077	266	33	P0 S57 B43 F0 C0 H0 D0
234	48	Ground	18,018	212	32	P15 S59 B16 F10 C0 H0 D0
238	27	Ground	9,403	174	30	P17 S42 B15 F22 C0 H0 D4
244	23	Ground	8,708	266	32	P4 S26 B18 F5 C48 H0 D0
254	27	Ground	14,542	267	37	P5 S54 B5 F36 C0 H0 D0
261	37	Ground	11,877	151	31	P27 S66 B7 F0 C0 H0 D0
265	5	Ground	1,794	113	31	P32 S48 B20 F0 C0 H0 D0
268	27	Ground	12,722	153	34	P0 S38 B9 F38 C14 H0 D1
269	18	Ground	6,562	172	29	P0 S52 B48 F0 C0 H0 D0
271	28	Ground	5,310	116	24	P37 S36 B25 F1 C0 H0 D1
281	7	Ground	3,772	224	36	P0 S60 B20 F20 C0 H0 D0

282	6	Ground	1,955	139	28	P0 S30 B70 F0 C0 H0 D0
283	31	Ground	14,412	168	34	P0 S21 B8 F43 C25 H2 D0
290	33	Ground	8,582	145	27	P24 S32 B28 F16 C0 H0 D0
291	16	Ground	7,788	210	38	P26 S8 B13 F48 C5 H0 D0
292	33	Ground	7,354	109	27	P50 S12 B10 F24 C0 H0 D3
294	3	Ground	1,661	170	35	P0 S38 B3 F33 C26 H0 D0
297	10	Ground	2,765	110	27	P22 S20 B12 F39 C7 H0 D0
300	25	Ground	7,858	155	31	P31 S14 B1 F49 C0 H0 D4
302	17	Ground	4,872	127	29	P32 S18 B10 F29 C11 H0 D0
1001	90	Ground	24,276	178	26	P0 S41 B57 F0 C2 H0 D0
1002	51	Ground	16,758	227	30	P0 S48 B43 F0 C9 H0 D0

## Appendix 4 – Reports and Documents Used for Preparation of the TYP

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- B.C. Ministry of Forests, Forest Practices Branch. 1998. *Procedures for factoring visual resources in timber supply analyses*. Victoria, B.C. REC-029.
- BC Ministry of Forests and Ministry of Environment, Lands and Parks 1995a. *Biodiversity Guidebook*. Forest Practices Code of British Columbia. Victoria: Province of British Columbia.
- BC Ministry of Forests and Ministry of Environment, Lands and Parks 1995b. *Riparian Management Area Guidebook*. Forest Practices Code of British Columbia. Victoria: Province of British Columbia.
- BC Ministry of Forests and Ministry of Environment, Lands and Parks 1999a. *Landscape Unit Planning Guide*. Forest Practices Code of British Columbia. Victoria: Province of British Columbia.
- BC Ministry of Forests and Ministry of Environment, Lands and Parks 1999c. *Green-up Guidebook, 2<sup>nd</sup> edition*. Forest Practices Code of British Columbia. Victoria: Province of British Columbia.
- Bulmer, C.E. and M. Krzic 2003. Soil properties and lodgepole pine growth on rehabilitated landings in northeastern British Columbia. *Can. J. Soil Sci.* **83**: 465-474.
- Dobi, D. 2004. *Tree Farm Licence #18*. Management Plan #10 for the Term September 28, 2005 to September 27, 2009. Canadian Forest Products Ltd., Vavenby Division. May 27, 2004.
- Douglas, M.J., P.J. Courtin, C.E. Bulmer, and R.K. Scagel. 2003. Tree Growth on Rehabilitated forest Roads in Southwestern British Columbia: Year 8 Results. Research Section, Vancouver Forest Region, BCMOF. Nanaimo, BC. Extension Note EN-017.
- Eng, M. 2004. Provincial-level projection of the current MPB outbreak: salvage scenario specification. Unpublished internal document. BC Ministry of Forests, Victoria BC. November 10, 2004.
- Eng, M., A. Fall, J Hughes, T. Shore, B. Riel, P. Hall 2004. Provincial Level Projection of the Current Mountain Pine Beetle Outbreak: An overview of the model (BCMPB) and draft results of year 1 of the Project. Canadian Forest Service.
- Forsite Consultants Ltd. 2003. A Biodiversity Patch Size Distribution analysis for the Clearwater Forest District—Final Report. Contract report prepared for Licensees of the Clearwater Forest District. April 24, 2003.
- GEOWEST Environmental Consultants Ltd. 2001. Terrestrial Ecosystem Mapping for Slovan TFL 18-- Terrestrial Ecosystem Mapping with Expanded Legends for Terrestrial Ecosystem Units for Slovan TFL 18. Contract report prepared for Slovan Forest Products. March 2001.
- J.S. Thrower & Associates Ltd. 2003b. Growth & Yield of Residual Balsam Stands on TFL 18. Contract report prepared for Slovan Forest Products, Project: SGV-008. October 16, 2003.

J.S. Thrower & Associates Ltd. 2003c. Potential Site Index Estimates for the Major Commercial Tree Species on Tree Farm Licence 18. Contract report prepared for Slocan Forest Products, Project: SGV- 125-003. March 13, 2002.

J.S. Thrower & Associates Ltd. 2004. Yield Table Projections for Residual Balsam Stands on Canadian Forest Products Ltd. TFL 18. Contract report prepared for Canadian Forest Products, Project: SGV-009. June 17, 2003.

Silvatech Consulting Ltd. 2003a. Selection and Mapping of Old Growth Management Areas (OGMA)—Clearwater Landscape Unit. Contract report prepared for Slocan Forest Products, March 30, 2003.

Silvatech Consulting Ltd. 2003b. TFL 18 Forest Cover And Road Rectification Project. Contract report prepared for Slocan Forest Products, December 15, 2003.