Spray Lake Sawmills

Ecosite (Wildlife Habitat Unit) Rarity/Abundance in comparison with the 15 Year Harvest from SLS's Preferred Management Strategy

Legend

- Main Roads
- Cataract Creek CTP Area
- Beetle Priority Zones
- Fire Hazard Zones
- Cities, Towns, Villages
- Compartments

FMA Wide Surge Cut - North FMU

- 2001-2006
- 2006-2011
- 2011-2016

South FMU Ecosite - Abundance Classes

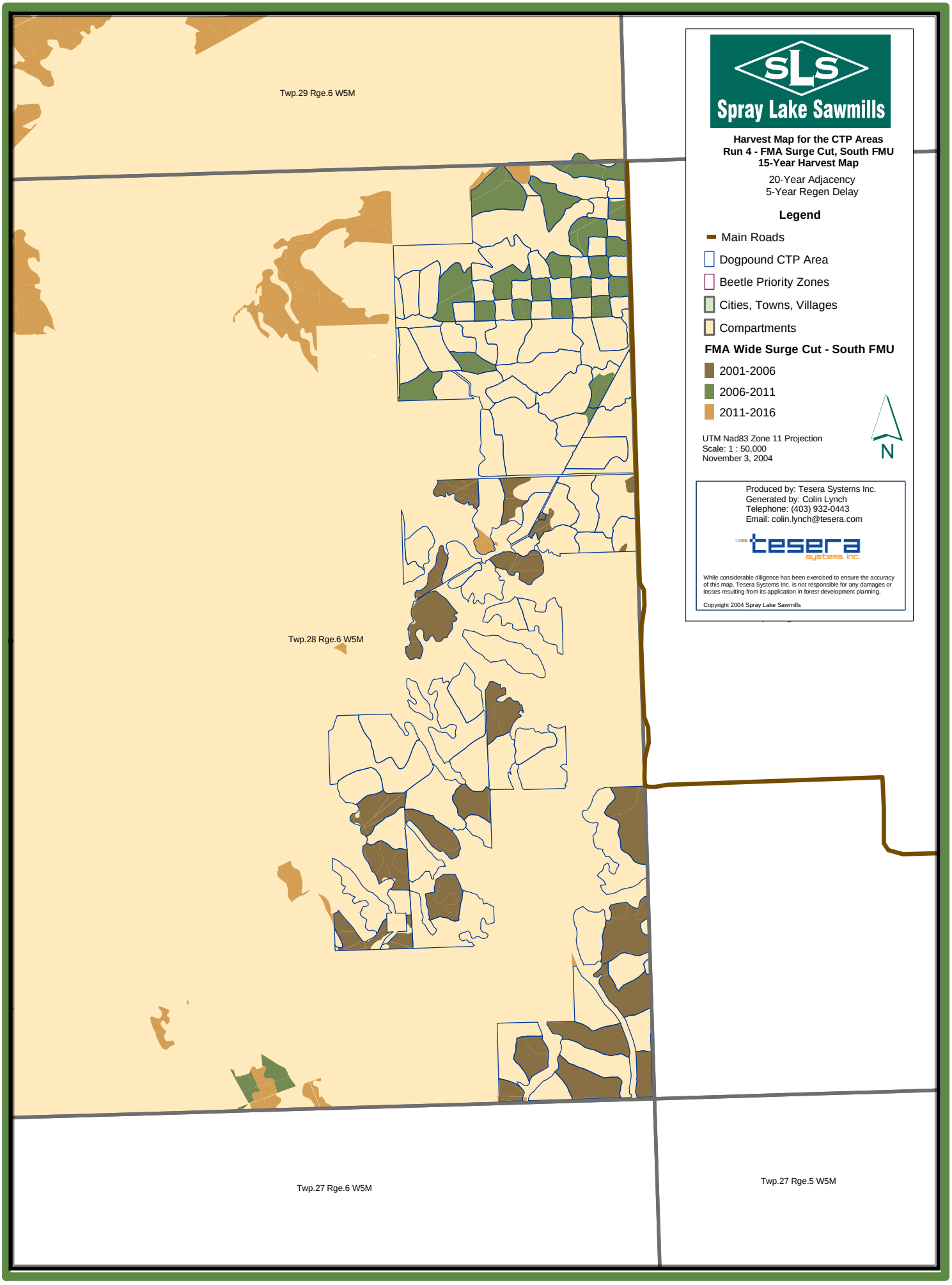
- Abundant
- Common
- Rare
- Scarce
- Uncommon

UTM Nad83 Zone 11 Projection
Scale: 1 : 125,000
November 3, 2004

0 0.4 0.8 1.6 2.4 3.2 4 Kilometers

N

Produced by: Tesera Systems Inc.
Generated by: Colin Lynch
Telephone: (403) 932-0443
Email: colin.lynch@tesera.com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Twp.27 Rge.6 W5M
Twp.27 Rge.5 W5M
Spray Lake Sawmills
Harvest Map for the CTP Areas
Run 4 - FMA Surge Cut, South FMU
15-Year Harvest Map
20-Year Adjacency
5-Year Regen Delay
Legend
Main Roads
Dogpound CTP Area
Beetle Priority Zones
Cities, Towns, Villages
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FMA Wide Surge Cut - South FMU
2001-2006
2006-2011
2011-2016
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UTM Nad83 Zone 11 Projection
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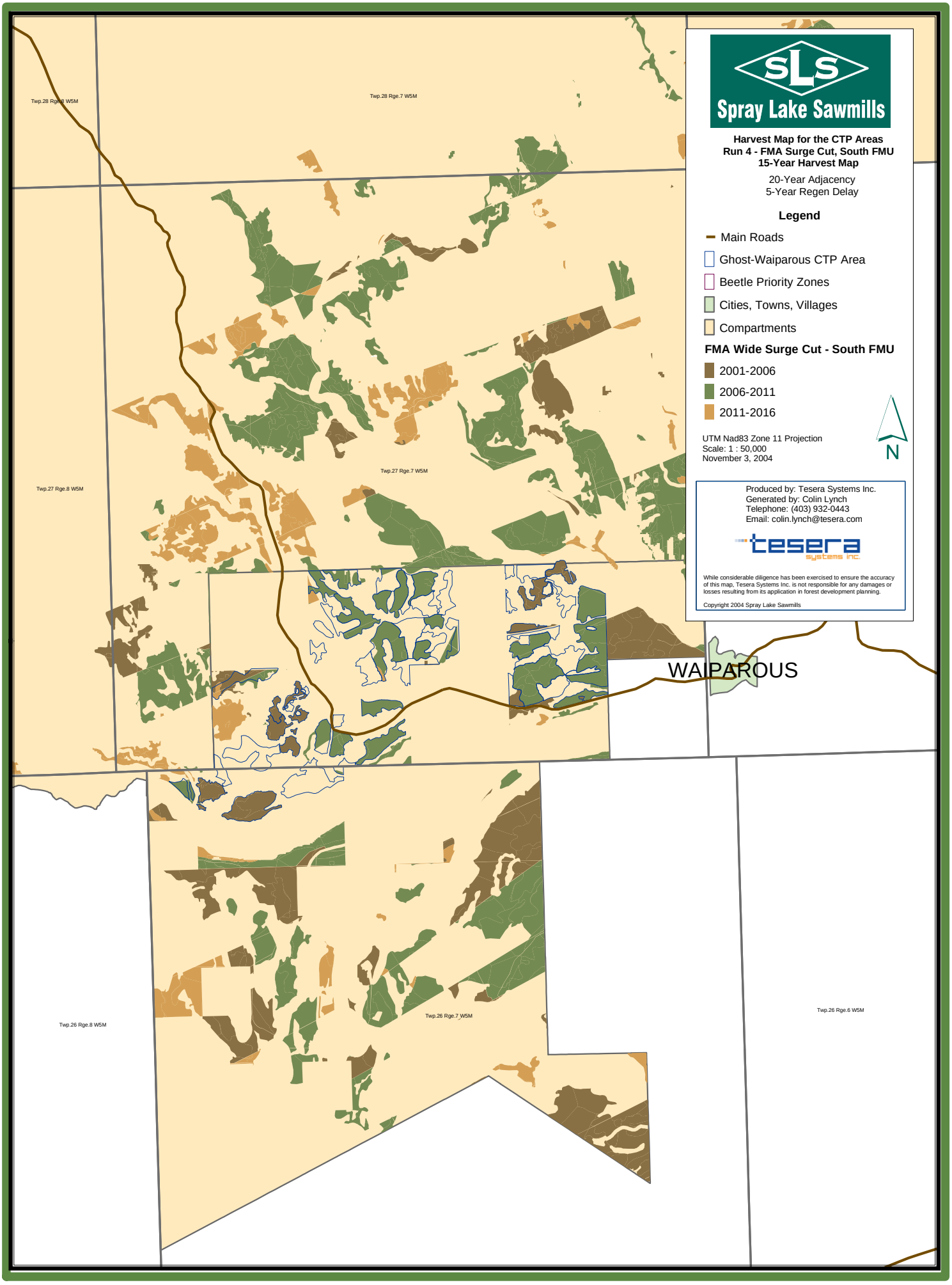
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Twp.27 Rge.7 W5M
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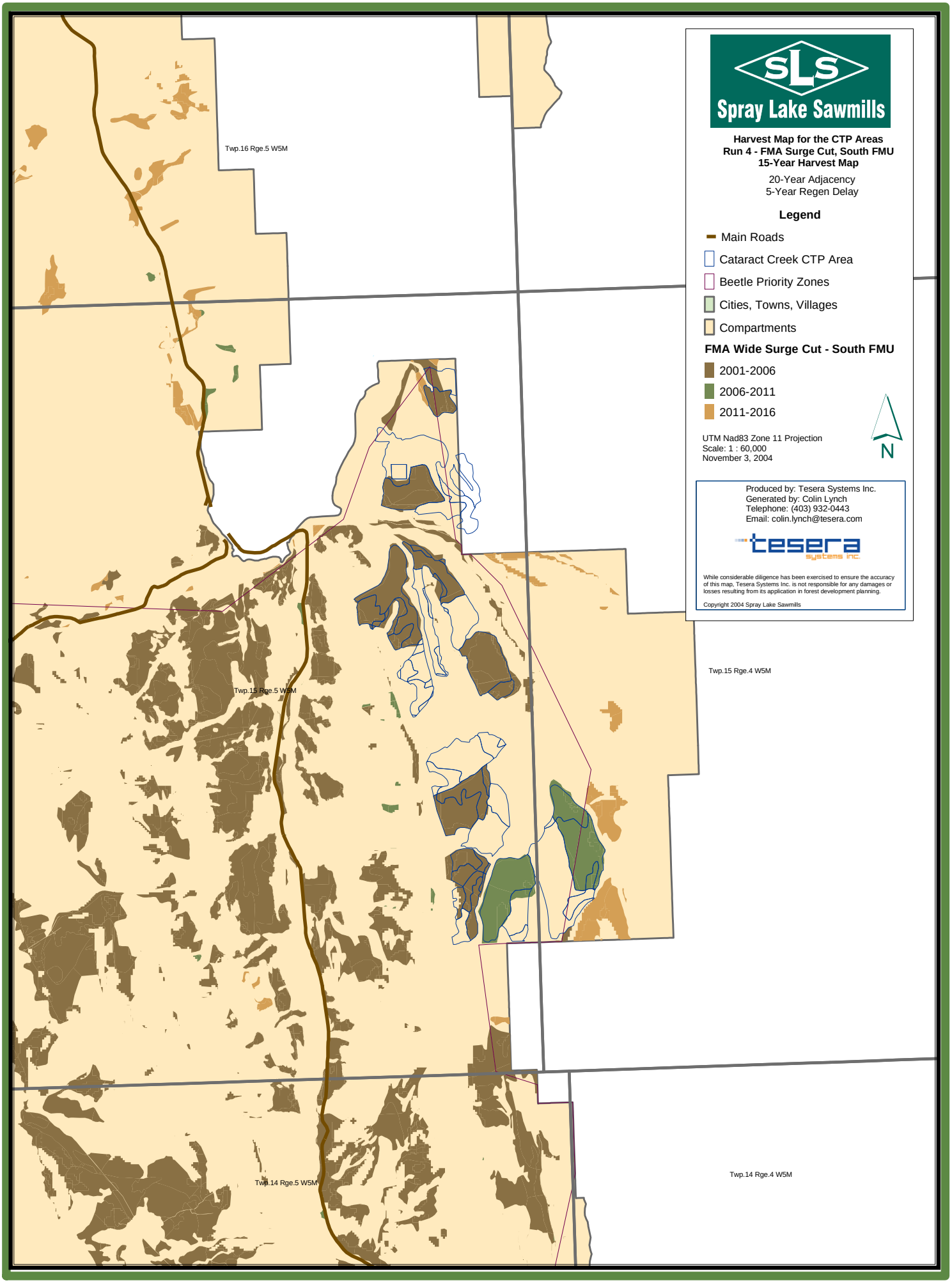
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Twp.16 Rge.5 W5M
Twp.15 Rge.5 W5M
Twp.15 Rge.4 W5M
Twp.14 Rge.5 W5M
Twp.14 Rge.4 W5M

Timber Supply Analysis Addendum – Preferred Management Strategy

Spray Lake Sawmills DFMP

Prepared for:

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Spray Lake Sawmills (1980) Ltd.

Submitted by:

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December 8, 2006

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1.0 Introduction

This addendum Timber Supply Analysis Report has been produced in accordance with the decision document received by Spray Lake Sawmills (1980) Ltd. (hereafter referred to by SLS) from the 2004 DFMP submission. The initial Timber Supply Analysis had been prepared as an integral component of Spray Lake Sawmill's (SLS) 2004 Detailed Forest Management Plan submission for DFMP #1. The focus of this addendum is on revising the Preferred Management Strategy from the 2004 analysis (Run4), including provisions for enhanced targeting of susceptible Mountain Pine Beetle stands.

In terms of modelling technology, this analysis used the same model that was used in the previous Timber Supply Analysis although there were some modifications of input data:

- The Net Land Base was re-done based on a request by Alberta Sustainable Resource Development (ASRD). All elements required for timber supply modelling were incorporated into the Net Land Base (NLB) process rather than have the components such as MPB Zones, Watersheds, etc. added after the NLB process was completed;
- An additional MPB priority zone was added based on consultations with SLS and ASRD and timings of harvest within these zones were agreed upon.
- Targeting of MPB Rank 1 and Rank 2 susceptible stands as per the Interpretive Bulletin Planning Mountain Pine Beetle Response Operations, version 2.6, September 2006.

The intent of the Timber Supply Analysis is to provide an assessment of the landscape's capacity to support harvesting while maintaining other resource values. Specifically, SLS was interested in the coniferous timber supply that could be sustained on the active land base. Additionally, SLS does have a requirement within the FMA agreement to provide for fixed volumes of coniferous and deciduous timber for the Community Timber Use program and Sundre Forest Products Ltd.

An output of the spatial modeling is an explicit 25-year harvest sequence, starting in 2001 and ending in 2026, which will be provided to ASRD in a set of maps. Additional summaries were provided in graphical or tabular formats.

2.0 Land Base Description

This analysis featured a land base determination by Tesera Systems Inc. (Tesera) with GIS support from Golder Associates Ltd. (Golder).

2.1 Timber Harvesting Land Base Determination

One of the most critical components of the Timber Supply Analysis is the netdown procedure used for determining the Timber Harvesting Land Base (THLB). Tesera completed this component of the analysis with assistance from Golder, which dealt with preparation of GIS data layers and netdown GIS processing. A detailed description of the NLB process is outlined in the report " Net Land Base Report, Detailed Forest Management Plan" and the finalTHLB summary table is provided in Table 1.

Table 1. Netdown Summary Table

Netdown Category	Position Number	Description	Area (ha)	Percent of Land base
Gross FMA/Quota Land Base	N/A	Total Resultant Gross Area	337,677.71	N/A
	N/A	Area outside the FMA	230.45	N/A
		Gross FMA Area	**337,447.26**	**100.00%**
Gross Areas of Restricted Operability Due to Land Status	1	IRP – Agriculture	67.00	0.02%
	1	IRP – Facility	171.77	0.05%
	1	IRP – Industrial	265.09	0.08%
	1	IRP - No esip (facility)	19.59	0.01%
	1	IRP - No esip (Patent)	9,006.65	2.67%
	1	IRP - Prime Protection	13,317.92	3.95%
	1	IRP – RMA 'A'	343.74	0.10%
	1	IRP - Special Use	2.03	0.00%
	1	IRP - Water	0.00	0.00%
	2	Recreation Areas	1,893.07	0.56%
	3	Permanent Sample Plots	90.00	0.03%
		Subtotal	**25,170.18**	**7.46%**
			312,277.08	**92.54%**
Gross Hydrography	4	Water (Non-Buffered Lakes)	1,298.02	0.38%
			310,979.06	**92.16%**
Non-Forested Land (excludes cutblocks)	5	Non-Forested Land	32,278.17	9.57%
			278,699.59	**82.59%**
Accessibility and Slope Constraints	6	Slope 46-55%	9,745.64	2.89%
	6	Slope 55+%	6,500.20	1.93%
	7	SLS Deletion	578.99	0.17%
		Subtotal	**16,823.55**	**4.99%**
			261,876.04	**77.60%**
Access Features (not captured in AVI)	8	Paved Roads	33.63	0.01%
	9	Railway	0.00	0.00%
	10	Gravel Roads	129.70	0.04%
	11	Pipelines	34.86	0.01%
	12	Truck Trails	109.47	0.03%
	13	Cutline/Seismic/Trail	1,881.19	0.56%
		Subtotal	**2,185.86**	**0.65%**
			259,690.18	**76.95%**
Riparian/Hydrography Buffers	14	Spillway Buffers	0.00	0.00%
	15	Buffered Lakes	1,578.04	0.47%
	16	Buffered Streams/Rivers	3,810.15	1.13%
		Subtotal	**5,382.59**	1.60%
			254,307.59	**75.36%**

Subjective Deletions (excludes cutblocks)	17	Non-merchantable	11,688.11	3.48%
	17	Larch Component	516.42	0.15%
	17	Black Spruce	1,115.77	0.33%
	17	Pine (<=6m & older than 1945)	5.30	0.00%
	17	Pine (6<=x<=12m & older than 1925)	17,575.72	5.21%
	17	Subjective Deletion – invalid AVI calls	9.37	0.00%
		Subtotal	**31,010.03**	**9.16%**
			223,297.56	**66.20%**
Horizontal Stand Reductions		Horizontal Stands	229.13	0.07%
Timber Harvesting Land Base		**Total Net Timber Harvesting Land Base**	**223,152.47**	**66.13%**

2.2 Age Classes in 2001

The age class distribution in the active and passive land base at Time 0 (2001) can be found in the report " Net Land Base Report, Detailed Forest Management Plan" . A map of the age class distribution can also be obtained from Appendix 8 of the " Net Land BaseReport, Detailed Forest Management Plan" .

3.0 Yield Tables

Yield curves were used within the Timber Supply Analysis to project stand volumes over time. Golder developed the yield curves from 2001 to 2004 and the processes used to develop the curves are detailed in the report "The Growth and Yield Component of Spray Lake Sawmills Detailed Forest Management Plan".

The yield curves were not re-calculated using the 2006 version of the Net Land Base since re-calculating the yield curves would have resulted in negligible differences in the final AAC coniferous volume outcome. There are two reasons why SLS maintains this conclusion:

1. A previous instance where the yield curves were re-generated and the AAC impact was determined for the Preferred Management Strategy in the Preliminary Forest Management Plan (PFMP). Removal of two (2) growth & yield plots within the subjective pine deletions resulted in a negligible change in overall Timber Supply using the information from the PFMP. See Appendix 1 for a summary of the analysis performed by Golder in August 2003.
2. The current active land base (vintage 2006) is actually larger than the 2004 active land base so the likelihood that a growth & yield plot would be removed in this version of the active land base would be remote although Tesera does not have access to the TSP point coverage to adequately assess this ascertain. Additionally, Table 2 also shows area and percentage within active area comparisons between Golder's yield strata in 2004 and Tesera's yield strata in 2006 to illustrate the insignificant strata differences between the active land bases, where an individual stratum had not changed by more than 0.12%.

Assigning yield curves to individual polygons was performed by Tesera during the Net Land Base processing. For those stands where the strata could not be determined (past cutblocks that pre-date spatial silviculture records, etc.), a composite curve was used to represent the stand. For information on how the composite curves were developed, refer to the Golder report, "The Growth and Yield Component of Spray Lake Sawmills Detailed Forest Management Plan".

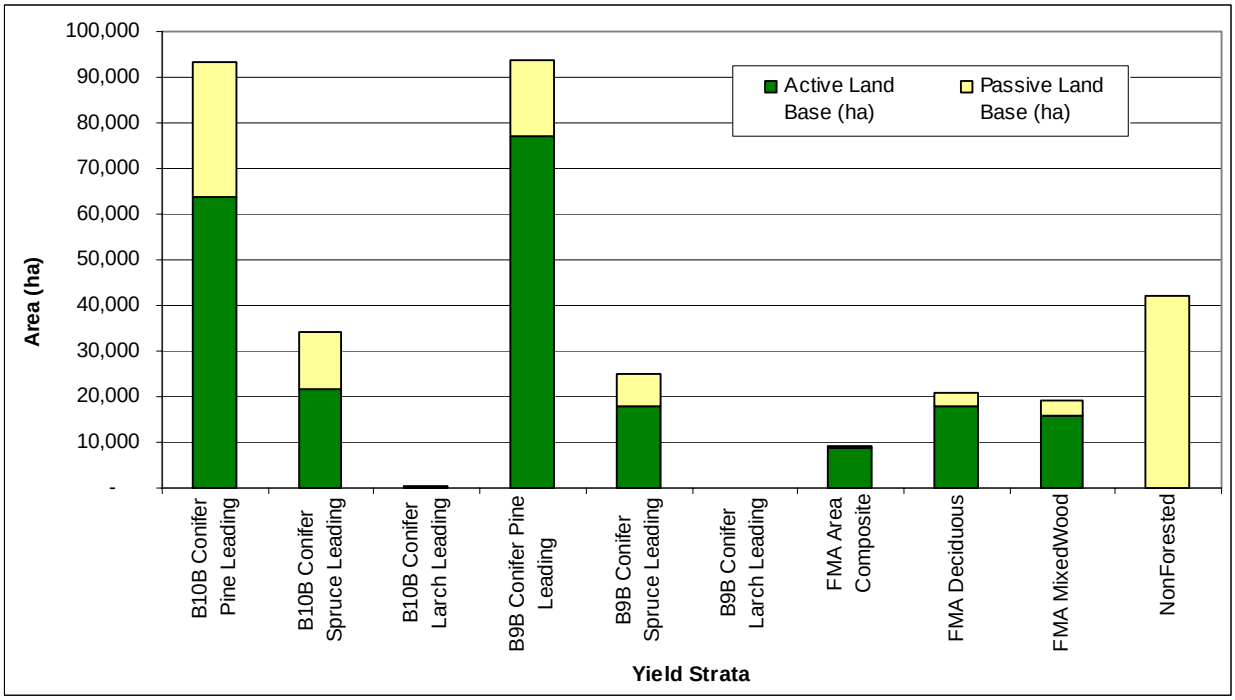
The yield curves developed by Golder were only projected to 300 years of age. During model projections, stands can remain on the land base for a duration exceeding 300 years. Therefore, stands older than 300 years of age were assumed to have the same values as the 300-year old stands. This assumption has a minimal effect on the active land base at Time 0 (2001), since 0.92 ha are over 300 years of age. During the planning horizon, these older stands were the first stands to be prioritized for harvest and then reset back to the same strata type, especially if they had an MPB Ranking of 1 and 2. Stands on the Passive Land Base greater than 300 years of age comprise approximately 105 ha at Time 0 of the analysis (2001). The yield strata assignments at Time 0 are shown in Table 2 and Figure 1.

For the Timber Supply Analysis, all stands were assumed to regenerate back to the same strata type. To model the entire land base including forested and non-forest area, "null-volume" curves were used. The null volume curves have a zero (0) volume and were assigned to non-forested stands as well as B10B and B9B Larch leading stands. Null-volume curves were assigned to the leading larch stands since it was known that leading larch stands were being netted-out of the Active land base, therefore Golder did not develop leading larch yield curves.

Table 2. Time 0 Area of Each Yield Strata

Strata	Active Land Base (ha)	Passive Land Base (ha)	% in Active	% in Passive	% Gross	Chapter 7 Active Areas	Chapter 7 % in Active	% Difference Chapter 7 and Revised Tesera NLB
B10B Conifer Pine Leading	63,925	29,501	28.6%	25.8%	27.7%	63,537	28.5%	0.12%
B10B Conifer Spruce Leading	21,748	12,400	9.7%	10.8%	10.1%	21,757	9.8%	-0.02%
B10B Conifer Larch Leading	0	251	0.0%	0.0%	0.0%	0	0.0%	0.0%
B9B Conifer Pine Leading	77,170	16,465	34.6%	14.4%	27.7%	76,778	34.5%	0.12%
B9B Conifer Spruce Leading	17,752	7,103	8.0%	6.2%	7.4%	17,937	8.1%	-0.10%
B9B Conifer Larch Leading	0	29	0.0%	0.0%	0.0%	0	0.0%	0.00%
FMA Area Composite	8,826	198	4.0%	0.2%	2.7%	8,909	4.0%	-0.04%
FMA Deciduous	17,847	3,019	8.0%	2.6%	6.2%	17,937	8.1%	-0.05%
FMA Mixedwood	15,885	3,114	7.1%	2.7%	5.6%	15,913	7.1%	-0.03%
NonForested	0	42,215	0.0%	36.9%	12.5%	0	0.0%	0.00%
Total	**223,152**	**114,295**	**100.0%**	**100.0%**	**100.0%**	**222,768**	**100.0%**	**0.00%**

Figure 1. Yield Strata Summary at Time 0 (2001)



In 2005, David Pelster was contracted to calculate the expected heights, diameters and densities of the strata based on work he had performed when he worked for Golder. These numbers are only estimates and are based on the volume equations and were **not** used in the Timber Supply Analysis in any way, though they were included in the yield curves to enable height/diameter and density projections for use in other projects such as visualizations, internal planning, etc.

4.0 Data Preparation

The Net Land Base process, model inputs and modeling criteria for use with TSM were developed using a combination of MS Access and data preparation executables developed by Tesera. Enclosed with this submission, is a CD/DVD containing the csv text files used by the TSM model for each scenario (Appendix 2). A data dictionary for each of the TSM input files is included in Appendix 3.

5.0 Timber Supply Analysis Parameters

The following sections will outline the parameters used for this analysis.

5.1 Harvest Periods & Planning Horizon

The Timber Supply Analysis model was run with a 200-year planning horizon incorporating 5, 7 and 10 year harvest periods as shown in Table 3.

Table 3. Periods with Corresponding Harvest Year

Period	Year	Period Length (years)
1	2001-2006	5
2	2006-2011	5
3	2011-2016	5
4	2016-2021	5
5	2021-2026	5
6	2026-2033	7
7	2033-2043	10
8	2043-2053	10
9	2053-2063	10
10	2063-2073	10
11	2073-2083	10
12	2083-2093	10
13	2093-2103	10
14	2103-2113	10
15	2113-2123	10
16	2123-2133	10
17	2133-2143	10
18	2143-2153	10
19	2153-2163	10
20	2163-2173	10
21	2173-2183	10
22	2183-2193	10
23	2193-2203	10

5.2 Forced Harvest

For this latest version of the Preferred Management Strategy a number of issues were handled through forced harvesting:

- SLS's existing Annual Operating Plans (AOPs) were assumed to be harvested within the first period (2001-2006);
- The Commercial Timber Use Disposition holder's operational plans were also incorporated;

- Harvest areas were assigned to quota and long-term permit holders such as Bell Pole, Ted Dietrich, etc. and fixed to be harvested based on their plans;
- Additional MPB areas were forced to be harvested based on agreements between SLS and ASRD; and
- Components of the 25-year spatial harvest sequence from 2004 were maintained where feasible with respect to the MPB ranking system and where existing operations were occurring.

5.3 Harvest Priorities

Harvest priorities refer to how the model prioritizes the harvest queue, in other words, how the model sorts and determines which stands should be harvested. In this case, the harvest queue was sorted using a combination of methods in the order indicated below:

1. Stands having a forced harvest as identified in section 5.2 were harvested.
2. The model then evaluated the remaining stands with respect to whether they had a cover constraint acting on them, which would prevent them from being harvested. If they were not capable of being harvested then they are removed from the qualified list.
3. Rank 1 and 2 stands were prioritized based on the MPB Rankings described in the "Net Land Base Report, Detailed Forest Management Plan" document.
4. The model then checks for stand deferrals. In this case, MPB Rank 3 stands not in approved blocks, CTU Disposition Holders or Fire Smart Areas were deferred from harvest until 2026. Using this deferral option ensured that stands that had lower pine species compositions were harvested last in the harvest queue since they don't experience the potential volume losses associated with MPB. These stands will also help to mitigate any short or mid-term trough in timber supply, if any.
5. The remaining stands were sorted by the "Relative Oldest First" harvest rule. The Relative Oldest First harvest rule, attempts to minimize the loss of volume on a stand by sorting the polygons based on oldest first, and then calculating the volume loss of each fragment for the period. The fragments that are losing higher proportions of volume were sorted higher in the harvest queue. This differs from the "Oldest First" harvest rule, whereby Oldest First just assesses the age of the stand and not the volume loss. Typically, Relative Oldest First is used so that stands of older age classes and declining volume losses are prioritized for harvesting prior to stands that are old but are still maintaining volume or are not experiencing significant volume losses.

5.4 Cover Constraints

Given the fact that this was SLS's first DFMP and data in terms of appropriate targets and thresholds were unknown at this point, SLS decided that the best approach would be to develop an annual monitoring program to assess these indicators rather than develop hard targets or thresholds. This initial monitoring program will be based on using professional judgment of specialists to manage the resources accordingly.

Growing stock was treated as "indicator only" in this analysis and harvest opportunity was not limited based on minimum required growing stock levels – the intent of this analysis was to ensure sustainable growing stock and harvest levels over time.

To correctly apply the horizontal stand reductions within the land base area, a unique capability of TSM enabled a cover constraint to be used to calculate the aspatial reductions for the horizontal stands.

Other issues modeled within this analysis acted to limit harvesting opportunities on the land base, such as adjacency, spatially identifying areas netted out of the land base (including riparian buffers, subjective deletions, etc). This will be described in subsequent sections.

5.5 Adjacency

The ASRD provincial default guideline of 20 years of age for coniferous stands was used for this analysis. Based on SLS regeneration/free growing surveys, this green-up age of 20 years corresponds to trees reaching an approximate green-up height of 3 metres.

The same adjacency parameters were used as per the previous Timber Supply Analysis, where blocks greater than or equal to 4.0 ha were used in the adjacency file listing.

In reviewing the DFMP comments from 2004, it was noted that a sensitivity testing the adjacency assumptions was requested. In that light, a sensitivity was developed that tested adjacency impacts of using 2 ha minimum block size rather than 4 ha minimum block size used in the PMS. The harvest flow for the sensitivity can be found in the section 7 of this report and the 25-year harvest map for the sensitivity can be found in the Appendices.

5.6 Regeneration Delay

The regeneration delay for this analysis was set at 5 years. Regeneration delay is the period of time from harvest to declaration of the stand being fully stocked. SLS studies confirmed a 5-year regeneration delay was appropriate using the silviculture records and the regeneration delay model developed by ASRD.

5.7 Maximum Block Size

Generally, the maximum block size used for this analysis was 100 ha and a bulk of the blocks were indeed below this threshold. However, there were a number of reasons for stands being over the 100 ha limit:

1. Forced Harvesting – Blocks that were forced tobe harvested as per the reasons outlined in section 5.2 were not adjusted to meet the block size restrictions and were harvested regardless of other modeling parameters including minimum age, block size restrictions or adjacency. The largest contiguous block within the active land base was 272.5 ha due to forced harvesting on MPB priority stands.
2. Aggregation to reduce stand isolations - in a few instances where a particular stand was surrounded on three sides by areas not within the THLB, the stand was combined into a unit that was already at the 100 hectare limit – creating blocks greater than 100 hectares.

5.8 Minimum Harvest Age

The minimum harvest age for existing stands and regenerating stands was set to 80 years of age. The minimum harvest age is only a minimum and does not imply that all stands would be harvested at 80 years of age. The relative oldest first harvest priority rules and constraints on the land base were enforced thereby stands would not be harvested if they did not meet minimum age or adjacency or other constraints prevented harvesting. If the stand was above the minimum harvest age and other criteria allowed harvesting, then the stand would be harvested if the periodic target volume was not yet met.

5.9 Silvicultural Systems

The clearcut harvest method was the only silvicultural system modeled in this analysis. As such, retention percentages were not provided – they willbe applied and monitored external to the modeling exercise.

5.10 Cull Reductions

Cull reductions were not applied within TSM and were applied externally to the model in developing the spatial AAC level. For details on the cull reductions, refer to Golder's report titled The Growth and Yield Component of Spray Lake Sawmills Detailed Forest Management Plan".

6.0 Preferred Management Strategy

The objective of this strategy was to determine the capacity of the land base to sustain a coniferous surge cut on the entire FMA for the first 20 years of the planning horizon, followed by a harvest level that would be sustainable for 180 years. The strategy is broken down into two parts, (1) an aspatial scenario (Run 9) and (2) a spatial scenario (Run10).

In the aspatial scenario, the management objectives which were modeled were:

- Priority Harvesting of MPB High Risk Areas and targeting of MPB susceptible stands from 2006 to 2026.
- The incidental coniferous within the deciduous stands will not contribute to the coniferous AAC.
- The deciduous volume required as part of the FMA agreement, was generated from deciduous components of mixedwood stands and incidental deciduous within coniferous stands.
- Regeneration delay of 5 years; and
- Operational harvest sequencing.

The spatial scenario consisted of the above issues, plus:

- Green-up adjacency requirement of 20 years and a minimum 4 ha block size within the adjacency file listing; and
- Reductions due to cull and other values/resources.

The input, output and result summary files for each of the runs are in Appendix 2, (CD-ROM/DVD). The input files for each run consist of the following text files (csv format) located in a directory named after the run. The files along with a brief description are listed below:

- Batch.txt – the set-up file used to provide instructions to the model regarding the type of run, harvest priorities, etc.
- Block Adjacency.csv – lists the blocks adjacent to each other.
- Curves.csv – yield curve file.
- Fragment Adjacency.csv – lists thefragments adjacent to each other.
- Fragments.csv – the land base file, links resultant polygons to yield strata, identifies THLB at Time 0 and provides area summaries at Time 0 and into the future.
- Greenup.csv – lists the green-up parameters, andblocks that contribute to the assessment of green-up.
- Prescribed.csv – lists the blocks forced to be harvested.
- Priorities.csv – sets the harvest priorities within the model, based on geographic zones or standgroups.
- Targets.csv – lists the targets to be met in the analysis. This includes constraint targets and patch size targets. This file also includes a fragment list, which indicates the assessment area that the targets will be evaluated against
- Treatments.csv – lists the regeneration pathways and the regeneration delays to be used within each strata.

- VolumeFlowTargets.csv – lists the Volume Flow targets to be met in the analysis. This is where the coniferous volume request is located. This file also includes a fragment list, which indicates the fragments that can contribute to the volume target.
- Zone Priority.csv – used in combination withthe priorities.csv file, to identify the geographic units used (Access Unit, Zone, Range and Block) and how these geographic units relate to the land base.

7.0 Analysis Results and Discussion

The following sections summarize the results for the various scenarios of this analysis. Detailed report summaries from the Aspatial and Spatial Preferred Management Strategies can be found in Appendix 4a and 4b respectively in hardcopy format (additional summaries can be found in digital format on CD/DVD, Appendix 2). The results are contained within directories for each run, summarized using AccessXP and graphed using ExcelXP. The tables within the AccessXP databases correspond to the standard TSM reports, for TSM version number 2006.02.01:

- FragmentStatistcsByPeriod; and
- HarvestScheduleByPeriod.

All the summaries were derived from the FragmentStatisticsByPeriod and HarvestScheduleByPeriod files. Tesera developed AccessXP Routines to classify the future land base according to age class naming conventions and provided summaries by compartment and yield strata.

The FMA already had areas removed from the gross land base during the net land base process to account for issues such as riparian buffers, subjective deletions, slope stability concerns, etc. The area within the FMA dropped from 337,447.26 ha (gross area, not including FMU = " OUT") to 223,152.47 ha (active land base area), representing a 34.0% reduction of the land base which is not available for timber harvesting. The incorporation of adjacency also allows stands to be utilized for other resource values until such time as adjacency issues within the FMA or portions within the FMA are resolved.

Given the spatial nature of the modeling and the relationship between the harvest levels and the growing stock, the growing stock was monitored but not limited in any way. The main issue was to ensure that the growing stock and corresponding harvest levels were sustainable over time (Pers. Comm., Bev Wilson-ASRD September 2004). To address this issue, the land base was modeled aspatially for 400 years using the aspatial Preferred Management Strategy coniferous harvest request of 356,000m^3/yr for 20 years and 323,000 m^3/yr for the rest of the planning horizon. Under this scenario, coniferous growing stock was sustainable over the 400-year timeframe and was not an issue.

7.1 Run 9 - Aspatial Preferred Management Strategy Results

7.1.1 Harvest Summaries

Table 4 and Figure 2 show the aspatial harvest level that is sustainable on the land base for 200 years. The graph and table illustrate the coniferous harvest volume on the FMA, including incidental deciduous volume from mixedwood and coniferous stands. No attempt was made to balance the volumes (coniferous or deciduous) between north and south FMU' s. The deciduous volume reported in the harvest summaries was assumed to be harvested during the coniferous harvest. More detailed breakdowns of the results can be found in Appendix 4a.

The 75-year harvest database file for the aspatial preferred management strategy is located on Appendix 2, in the aspatial results summaries.

Figure 2. Aspatial Harvest Flow

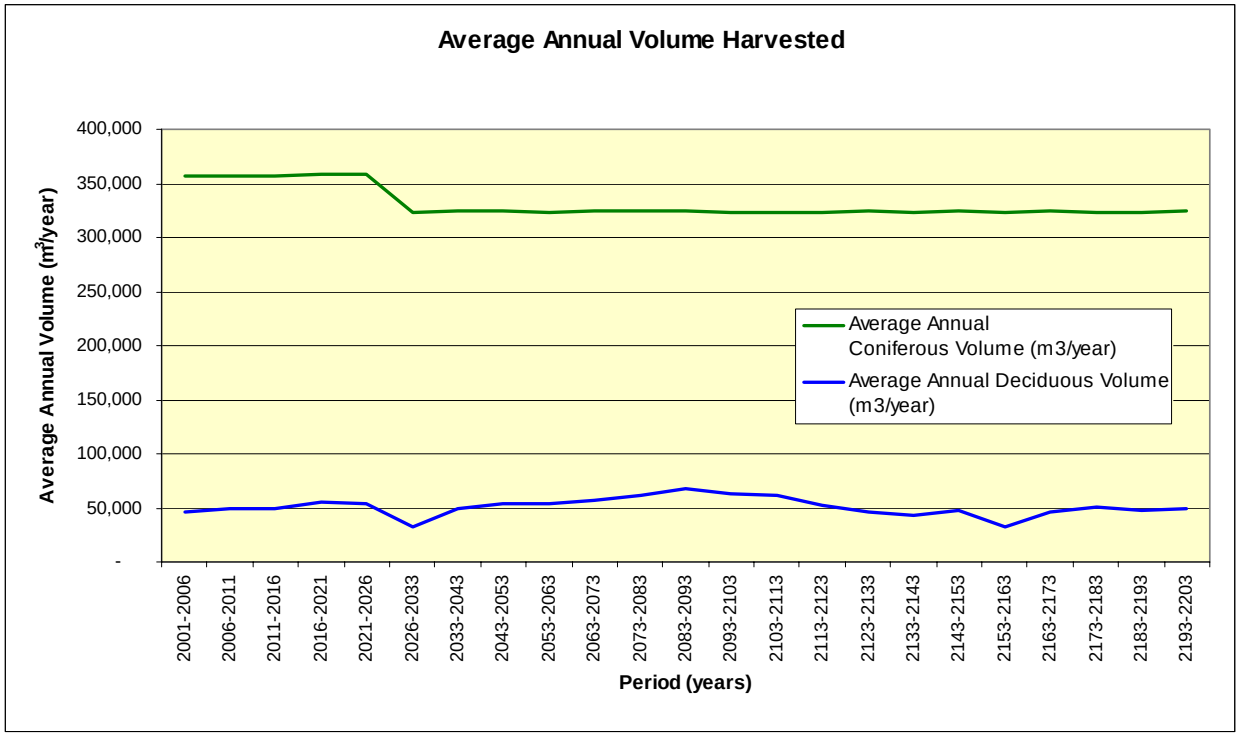


Table 4. Aspatial Harvest Flow Data Table

Period	Average Annual Coniferous Volume (m^3/year)	Average Annual Deciduous Volume (m^3/year)
2001-2006	357,396	46,400
2006-2011	357,246	49,753
2011-2016	356,918	49,624
2016-2021	357,693	55,840
2021-2026	358,181	53,457
2026-2033	323,722	31,583
2033-2043	324,056	48,746
2043-2053	323,968	53,180
2053-2063	323,657	54,243
2063-2073	323,883	56,196
2073-2083	324,003	60,953
2083-2093	324,533	67,050
2093-2103	323,771	62,885
2103-2113	323,737	62,012
2113-2123	323,629	52,874

Period	Average Annual Coniferous Volume (m^3/year)	Average Annual Deciduous Volume (m^3/year)
2123-2133	323,890	45,593
2133-2143	323,733	42,941
2143-2153	323,920	47,931
2153-2163	323,775	32,693
2163-2173	324,049	45,921
2173-2183	323,786	50,914
2183-2193	323,639	47,168
2193-2203	323,908	48,931

7.1.2 Other Values/Resources that Effect AAC & Cull Deductions

Wildlife thresholds and targets were not developed for this analysis. To account for this, SLS has provided guidance to make volume deductions (therefore harvesting less area) to the calculated harvest level to account for areas set aside for other values/resources within the FMA. Volume reductions due to cull were not integrated into the yield tables and were not modeled in the scenarios – cull will be reduced in an aspatial volume reduction outside the timber supply model.

Embodied within the Timber Supply Analysis is an allowance for traditional ground rule deletions such as streamside buffers, slopes over 45% and various merchantability criteria. This was part of the net land base process developed by Golder. The FMA area was reduced from a gross area of 337,447.26 ha to 223,152.47 ha, representing a 34.0% drop in available area to be harvested within the FMA. This 34% can be used for other multiple uses as well. The Timber Supply Analysis also accommodates an allowance for green-up or adjacency constraints and a regeneration lag period. On top of the 34% of the area already deducted, a 13.5% reduction in volume had occurred due to application of adjacency. While this volume reduction does not transfer equally well to area, it provides rationale to ascertain that area is also reduced by an additional 5-13.5% due to adjacency.

Beyond the constraints modeled within the various timber supply scenarios there are risks of other management strategies, or accommodation of other resource values, which may have a further impact on sustainable harvest levels. Spray Lake Sawmills has proposed to manage this risk by subjectively reducing the AAC for a variety of possible eventualities. The AAC reduction percentage suggested by SLS to account for other resources/resource users, has been through historical operations data within the FMA while SLS was a quota holder. Refer to Table 5 for percentage reductions.

Table 5. AAC Deductions Due to Other Values/Resources

Subject Area Causing Possible Impact	% Reduction in Harvest Level
Rare ecosites or rare plants	1
Structural Retention	1
W/L - licks, travel corridors, etc	0.5
Buffering of unidentified drainages	0.5
DEM inaccuracies	1
Inaccessible stands (due to costs or impracticalities)	2

Subject Area Causing Possible Impact	% Reduction in Harvest Level
Historical resources or unique areas	0.5
Integration with non-commercial forest uses	0.5
Integration with other Commercial Forest Users	0.5
Total	**7.5**

The volume deductions to account for cull were assessed by Golder, within the Growth and Yield component of the analysis. The cull deductions to be applied were calculated as 3.07%. More details regarding the cull deductions can be found in the Growth and Yield report prepared by Golder.

The total reductions to account for cull and other resource values was 10.57%. Table 6 provides the Spatial Coniferous AAC Target produced as a result if reducing the Aspatial Conifer Target by 10.57%.

Table 6. Aspatial Reduction and the Spatial AAC Target

Period	Aspatial Conifer Target Level (m^3/year)	Aspatial Reduction (%)	Spatial Conifer AAC Target (m3/year)
2001-2006	356,000	10.57	318,602
2006-2011	356,000	10.57	318,602
2011-2016	356,000	10.57	318,602
2016-2021	356,000	10.57	318,602
2021-2026	323,000	10.57	289,815
2026-2033	323,000	10.57	289,815
2033-2043	323,000	10.57	289,815
2043-2053	323,000	10.57	289,815
2053-2063	323,000	10.57	289,815
2063-2073	323,000	10.57	289,815
2073-2083	323,000	10.57	289,815
2083-2093	323,000	10.57	289,815
2093-2103	323,000	10.57	289,815
2103-2113	323,000	10.57	289,815
2113-2123	323,000	10.57	289,815
2123-2133	323,000	10.57	289,815
2133-2143	323,000	10.57	289,815
2143-2153	323,000	10.57	289,815
2153-2163	323,000	10.57	289,815
2163-2173	323,000	10.57	289,815
2173-2183	323,000	10.57	289,815
2183-2193	323,000	10.57	289,815
2193-2203	323,000	10.57	289,815

7.2 Run 10 - Spatial Preferred Management Strategy Results

The Spatial Preferred Management Strategy used the coniferous AAC target listed in Table 6. More detailed breakdowns of the results can be found in Appendix 4b.

7.2.1 Harvest Summaries

In the following tabular harvest summaries, the AAC was reported by North and South FMUs but there was no attempt to balance or target specific volumes between the FMUs during the modeling process. The harvest for the Preferred Management Strategy has been summarized in both graphical (Figure 3) and tabular (Table 7) formats.

In reviewing Table 7, the annual harvest volume was met throughout the planning horizon. In this case, the current AAC that was approved in 2004 was still met when using the revised net land base, deferring stands assigned as MPB Rank 3 for 26 years (from 2001) and not harvesting coniferous volume within deciduous strata.

In addition, the incidental deciduous volume was generated from the coniferous and mixedwood strata for the scenario have also been included as a separate line item within the output (Figure 3 and Table 7). There was no attempt to slow or smooth out the amount of deciduous harvest, the deciduous harvest was merely reported assuming it was harvested along with the coniferous and mixedwood stands.

A map indicating the 25-year harvest can be found in Appendix 5. A tabular file indicating the 75-year spatial harvest sequence for this scenario can be found in the results for this scenario in Appendix 2.

Figure 3. Preferred Management Strategy Harvest Flow

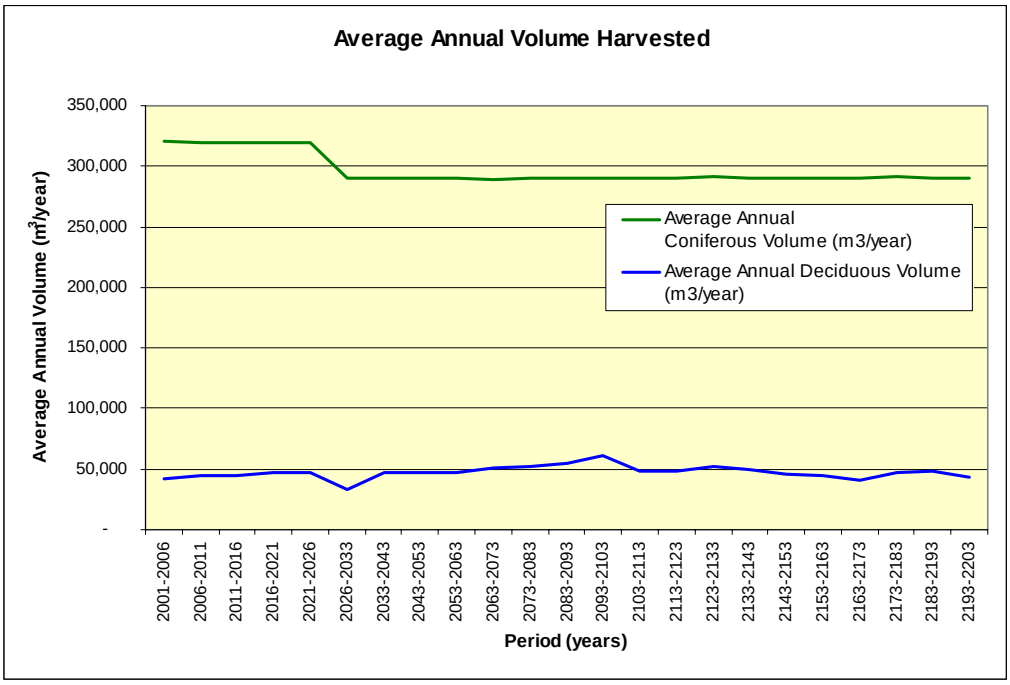


Table 7. Preferred Management Strategy Harvest Results

Period	Average Annual Coniferous Volume (m^3/year)	Average Annual Deciduous Volume (m^3/year)	Annual Coniferous Volume Request (m^3)
2001-2006	320,876	41,396	318,602
2006-2011	319,015	44,530	318,602
2011-2016	319,072	43,972	318,602
2016-2021	318,834	47,249	318,602
2021-2026	319,154	46,512	318,602
2026-2033	290,360	33,681	289,815
2033-2043	289,917	47,715	289,815
2043-2053	289,960	46,612	289,815
2053-2063	289,997	46,716	289,815
2063-2073	289,468	50,469	289,815
2073-2083	290,770	52,795	289,815
2083-2093	290,196	54,253	289,815
2093-2103	290,475	61,613	289,815
2103-2113	289,923	48,519	289,815
2113-2123	290,626	48,652	289,815
2123-2133	291,159	51,870	289,815
2133-2143	289,917	49,510	289,815
2143-2153	290,028	45,566	289,815
2153-2163	290,365	44,848	289,815
2163-2173	290,310	40,371	289,815
2173-2183	291,568	47,046	289,815
2183-2193	290,060	48,448	289,815
2193-2203	290,416	42,829	289,815

Under the FMA agreement, 15,500 m^3/yr of deciduous volume had to come from the Northern FMU. Table 8 shows that this requirement can be met through harvesting the incidental deciduous volume from the coniferous and mixedwood stands throughout the planning horizon.

Table 8. Deciduous Harvest in the North FMU

	Annual Deciduous Volume (m^3/year)						
Period	**Atkinson Creek**	**B9 Quota**	**Burnt Timber Creek**	**Coalcamp Creek**	**Ghost River**	**Grease Creek**	**Total for North FMU**
2001-2006	977	11,139	456	10,745	256	6,207	29,780
2006-2011	4,677	6,702	1,036	13,659	5,798	2,288	34,161
2011-2016	1,170	4,571	1,739	4,496	3,418	246	15,639
2016-2021	1,475	8,248	4,044	5,109	1,183	5,070	25,128
2021-2026	2,041	6,158	6,558	4,348	848	3,891	23,844
2026-2033	7,301	6,670	2,027	9,805	1,296	9,150	36,249
2033-2043	7,542	10,317	4,142	10,100	1,649	11,367	45,117
2043-2053	3,062	6,057	3,486	1,370	8,821	1,000	23,796
2053-2063	5,004	4,564	3,934	3,334	4,529	5,665	27,030
2063-2073	4,675	8,893	2,964	2,379	1,826	3,993	24,728
2073-2083	3,178	7,665	2,142	5,780	7,241	3,521	29,527
2083-2093	6,485	10,315	4,768	3,250	2,465	10,858	38,141
2093-2103	5,287	14,419	2,446	1,957	1,215	8,873	34,196
2103-2113	2,010	9,540	2,219	3,279	6,495	6,828	30,370
2113-2123	6,532	9,647	2,861	3,643	2,700	9,396	34,779
2123-2133	4,176	11,559	1,268	4,917	3,124	6,426	31,470
2133-2143	2,799	8,892	2,016	3,844	6,059	5,005	28,615
2143-2153	1,419	8,066	2,428	5,082	2,832	8,796	28,622
2153-2163	2,564	8,247	3,725	3,027	839	7,214	25,616
2163-2173	3,845	5,649	1,604	6,029	2,016	5,024	24,167
2173-2183	5,366	9,338	3,076	5,236	1,141	9,526	33,683
2183-2193	3,340	9,140	3,355	1,519	8,572	3,631	29,557
2193-2203	3,731	5,373	3,306	1,975	4,307	3,523	22,216

7.2.2 Average Harvest Age and Harvested Area

The area-weighted average harvest age of blocks harvested for each period is listed in Table 9. The table illustrates that while 80 years is a minimum harvest age, the lowest average harvest age occurred in period 1 (2001-2006), with the long-term average harvest age being around 140-150 years old.

Table 9. Area-weighted Average Harvest Age

Period	Area Weighted Harvest Age (years)
2001-2006	112
2006-2011	114
2011-2016	118
2016-2021	127
2021-2026	125
2026-2033	159
2033-2043	131
2043-2053	132
2053-2063	150
2063-2073	141
2073-2083	170
2083-2093	185
2093-2103	168
2103-2113	151
2113-2123	147
2123-2133	152
2133-2143	151
2143-2153	143
2153-2163	145
2163-2173	145
2173-2183	144
2183-2193	144
2193-2203	144

The area harvested during each period is listed in Table 10. As the land base becomes a normalized forest, the amount of area to harvest the required amount of volume also becomes regulated so that long-term the area harvested generally ranges from 14,000-15,000 ha. The area harvested has been summarized by north and south FMU's for information purposes but no attempt was made to balance the area harvested among the FMUs..

Table 10. Area Harvest per Period

Period	FMA Area (ha)	North FMU Area (ha)	South FMU Area (ha)
2001-2006	10,570	6,826	3,744
2006-2011	9,314	6,654	2,660
2011-2016	9,796	2,912	6,884
2016-2021	8,700	4,350	4,350
2021-2026	9,476	3,984	5,492
2026-2033	11,788	7,599	4,189
2033-2043	17,527	10,535	6,991
2043-2053	16,521	7,155	9,366
2053-2063	17,443	8,972	8,471
2063-2073	16,742	7,164	9,578
2073-2083	14,726	8,064	6,663
2083-2093	15,319	10,359	4,960
2093-2103	14,788	8,039	6,749
2103-2113	15,705	9,242	6,463
2113-2123	15,160	9,681	5,480
2123-2133	14,764	9,046	5,719
2133-2143	14,922	7,716	7,206
2143-2153	14,932	8,184	6,748
2153-2163	15,328	7,115	8,214
2163-2173	15,509	8,933	6,576
2173-2183	16,217	10,649	5,568
2183-2193	14,917	7,739	7,178
2193-2203	15,914	7,657	8,258
Total	**326,078**	**178,574**	**147,504**

7.2.3 Harvested Volume and Area within the MPB Ranked Stands

The rationale for integrating the MPB Ranking into the analysis was to specifically target MPB Ranked stands for harvest from 2006 to 2026 to reduce the potential impact to MPB losses. Refer to section 3.3.15 of the "Net Land Base Report, Detailed Forest Management Plan" report to gain an understanding of how the MPB Rankings were applied.

This analysis forms the baseline for MPB planning where the AAC was as per the harvest level submitted in 2004 of 318,602 m^3/yr until 2026 and 289,815 m^3/yr thereafter. The actual AAC level that was approved was rounded down by ASRD in the decision document to 318,000 m^3/yr until 2026 and 289,000 m^3/yr thereafter.

The MPB Summaries were broken-down by the amount of MPB Ranked Volume/Area within the high/priority areas (section 7.2.3.1) and FMA-wide (section 7.2.3.2).

7.2.3.1 High Priority Compartment Summaries

Table 11 provides a summary of the active and passive land base within each high priority compartment. This table is important to provide the context that even if SLS could harvest all of the area within the active land base within these zones, there would still be a portion of the Rank 1 and 2 stands left in the passive land base. The stands in the passive land base may be managed differently (using prescribed burning, etc.) when it comes to controlling MPB spread and will be assessed on a periodic basis.

Table 11. Active/Passive Land Base Summary within each MPB High Priority Compartment

Priority Compartments	Ranking	Active Land Base	Passive Land Base	% Active Within Each Compartment	% Passive Within Each Compartment
1	No Ranking	89.45	288.83	2.5%	8.0%
	Rank 1	2,003.51	912.62	55.2%	25.1%
	Rank 2	149.85	186.62	4.1%	5.1%
2	No Ranking	87.51	379.28	2.6%	11.1%
	Rank 1	2,315.74	158.85	67.5%	4.6%
	Rank 2	397.31	92.84	11.6%	2.7%
3	No Ranking	1,636.23	1,311.05	16.0%	12.9%
	Rank 1	1,551.21	1,438.02	15.2%	14.1%
	Rank 2	2,403.91	1,854.84	23.6%	18.2%
	Rank 3	-	5.18	0.0%	0.1%
4	No Ranking	81.26	-	3.2%	0.0%
	Rank 1	2,230.17	5.82	86.5%	0.2%
	Rank 2	259.90	-	10.1%	0.0%

Table 12, reveals the amount of harvested volume that SLS has committed to over the next 20 years, to 2026. This table summarizes the area harvested by period as well as providing a subtotal for periodic tracking and evaluation purposes. Note, there was minimal harvesting within the " No Ranking" classification for most high priority compartments since the Rank 1 and 2 stands have been targeted by the Timber Supply Model. However, approximately 1/3 of the area harvested was in the " No Ranking" classification in compartment 3 due to the harvest already occurring from 2001-2006 prior to the Pine Reduction Strategy developed by the ASRD in September of 2006. The reason for the minor amounts of harvest within the other compartments was due to the prescribed harvest (i.e. pre-blocks) where blocks proposed had a minor component of non-pine (non-ranked) strata within the proposed harvest units.

The reason why higher amounts of Rank 1 and 2 stands were not harvested in the High Priority Compartments was due to the Timber Supply Model maintaining current adjacency rules. If adjacency rules were relaxed in these areas then the amount of area capable of being harvested would be expected to increase.

Table 12. Summary of MPB Ranked Volume Harvested in the Priority Areas until 2026

Priority Compartment	Year	Rank 1 Area (ha)	Rank 2 Area (ha)	No Ranking Area (ha)	% Rank 1 and 2 Stands Harvested in Active LB	% of Harvest within Rank 1 and 2 by Compartment
1	2001-2006	-	0.04	-	0.00%	100.00%
	2006-2011	787.94	24.74	5.75	37.74%	99.30%
	2011-2016	-	-	-	0.00%	0.00%
	2016-2021	0.01	0.00	-	0.00%	100.00%
	2021-2026	0.00	0.00	-	0.00%	100.00%
Subtotal		**787.96**	**24.79**	**5.75**	**37.74%**	**99.30%**
2	2001-2006	-	-	-	0.00%	0.00%
	2006-2011	647.72	53.17	17.94	25.83%	97.50%
	2011-2016	477.51	126.13	55.91	22.25%	91.52%
	2016-2021	-	-	-	0.00%	0.00%
	2021-2026	11.36	5.14	-	0.61%	100.00%
Subtotal		**1,136.59**	**184.44**	**73.84**	**48.69%**	**94.71%**
3	2001-2006	635.34	586.08	716.83	30.88%	63.02%
	2006-2011	4.71	84.94	9.62	2.27%	90.31%
	2011-2016	57.74	63.96	5.74	3.08%	95.50%
	2016-2021	0.21	10.06	5.18	0.26%	66.48%
	2021-2026	61.01	137.14	13.22	5.01%	93.74%
Subtotal		**758.99**	**882.18**	**750.59**	**41.49%**	**68.62%**
4	2001-2006	-	-	-	0.00%	0.00%
	2006-2011	1,091.60	11.59	3.30	44.30%	99.70%
	2011-2016	151.80	-	-	6.10%	100.00%
	2016-2021	13.87	-	-	0.56%	100.00%
	2021-2026	17.15	2.71	5.01	0.80%	79.86%
Subtotal		**1,274.42**	**14.30**	**8.31**	**51.75%**	**99.36%**

Table 13 illustrates the amount of area within the Rank 1 and Rank 2 classifications, harvested from 2001-2026 as well as the amount remaining after 2026 in each compartment. It provides percentage breakdowns as well for each compartment and provides a summary for the area harvested and remaining in all compartments. Nearly half (44.77%) of the Rank 1 and 2 area capable of being harvested (i.e. Active Land Base) will be harvested in the high priority compartments by 2026, but that still leaves 55.23% to be harvested from 2026 onwards.

As mentioned previously, additional Rank 1 and Rank 2 stands would be captured and potential losses mitigated if adjacency was waived in these areas. This may be something to consider in the MPB modeling that will occur after the DFMP submission, since rapidly changing the age class structure in these high priority compartments may result in a lower chance of risk to the forest resource in the southern Alberta region as a whole.

Table 13. Summary of the MPB Ranking 1 and 2 Area Harvested & Remaining within each Compartment

Priority Compartments	Items	Value
1	Rank 1 and 2 Area on Active Land Base	2,153.36
	Rank 1 and 2 Area Harvested	812.74
	% Rank1 and 2 Area Harvested from 2001-2026	**37.74%**
	Remaining Rank 1 and 2 Area on Active Land Base	1,340.62
	% Rank1 and 2 Area Remaining after 2026	**62.26%**
2	Rank 1 and 2 Area on Active Land Base	2,713.05
	Rank 1 and 2 Area Harvested	1,321.03
	% Rank1 and 2 Area Harvested from 2001-2026	**48.69%**
	Remaining Rank 1 and 2 Area on Active Land Base	1,392.02
	% Rank1 and 2 Area Remaining after 2026	**51.31%**
3	Rank 1 and 2 Area on Active Land Base	3,955.12
	Rank 1 and 2 Area Harvested	1,641.17
	% Rank1 and 2 Area Harvested from 2001-2026	**41.49%**
	Remaining Rank 1 and 2 Area on Active Land Base	2,313.95
	% Rank1 and 2 Area Remaining after 2026	**58.51%**
4	Rank 1 and 2 Area on Active Land Base	2,490.07
	Rank 1 and 2 Area Harvested	1,288.72
	% Rank1 and 2 Area Harvested from 2001-2026	**51.75%**
	Remaining Rank 1 and 2 Area on Active Land Base	1,201.35
	% Rank1 and 2 Area Remaining after 2026	**48.25%**
All High Compartments	Rank 1 and 2 Area on Active Land Base	11,311.61
	Rank 1 and 2 Area Harvested	5,063.67
	% Rank1 and 2 Area Harvested from 2001-2026	**44.77%**
	Remaining Rank 1 and 2 Area on Active Land Base	6,247.94
	% Rank1 and 2 Area Remaining after 2026	**55.23%**

7.2.3.2 FMA-Wide Summaries

This section summarizes the MPB Rank statistics on an FMA basis since SLS' s activities will be evaluated based on the effectiveness of its Pine reduction strategy based on the FMA outcome, not just the High Compartment Priority Areas.

Table 14. Harvested Area Summary of MPB Ranked Stands

	North FMU				South FMU			
Period	MPB Rank 1 (ha)	MPB Rank 2 (ha)	MPB Rank 3 (ha)	% Harvested of Rank 1 and 2 from 2001-2026	MPB Rank 1 (ha)	MPB Rank 2 (ha)	MPB Rank 3 (ha)	% Harvested of Rank 1 and 2 from 2001-2026
2001-2006	10	882	88	2%	635	837	269	3%
2006-2011	1,758	1,772	505	7%	942	1,192	167	4%
2011-2016	657	1,280	166	4%	210	4,341	1,473	10%
2016-2021	218	2,968	285	7%	26	3,445	46	7%
2021-2026	126	3,066	101	7%	82	3,823	277	8%
Total	2,769	9,968	1,145	27%	1,894	13,637	2,232	32%

Table 14 provides the summary of the susceptible stands harvested by Rank and Period and reveals that 59% of the total harvested area during 2001-2026 came from Rank 1 and Rank 2 stands.

Table 15 shows the amount of MPB Ranked area in 2001, the harvested area from 2001-2006 in the MPB Ranked areas and MPB Ranked areas remaining after harvesting until 2026 (i.e. 25 years of harvest). These numbers provide a basis for comparisons for MPB Ranked and Non-Ranked classed areas based on SLS Preferred Management Strategy and the AAC request.

Table 15. Amount Harvested within each MPB Ranking Classification Over Time

Mountain Pine Beetle (MPB) Ranking	Time 0 (2001) Area	Area Harvested 2001-2026	% of Each Ranking Harvested from 2001-2026	Area Remaining in Each Ranking After 25-years of Harvest (2026+)	% of Each Ranking Remaining After 25-years of Harvest (2026+)
Rank 1	10,155	4,663	45.92%	5,492	54.08%
Rank 2	121,502	23,605	19.43%	97,897	80.57%
Rank 3	36,144	3,377	9.34%	32,767	90.66%
No Ranking	55,352	16,210	29.29%	39,142	70.71%
Total Area/Percent	**223,152**	**47,856**	**21.45%**	**175,296**	**78.55%**

The " Rank 3" or " No Ranking" stands were not forced to be harvested due to planning requirements/agreements with CTU Disposition Holders or the stands were fixed scheduled based on the 2004 spatial harvest sequence within the 10km FireSmart Boundaries. Also, with respect to stands harvested in 2001-2006 some of these were already harvested prior to the ASRD developing a MPB Strategy and were within the Rank 3 classification.

As previously mentioned, the intent of the MPB Ranking and the Provincial MPB Strategy is to reduce the area of MPB Rank 1 and 2 stands on the land base to 25% of current levels by 2026. This scenario informs SLS and the government as to the reduction levels that will be experienced using the current AAC and Preferred Management Strategy.

Table 16 indicates that 21.47% of Rank 1 and Rank 2 stands will be harvested from 2001-2026, it also indicates that 78.53% of the Rank 1 and Rank2 stands will remain if SLS maintains the harvest at the approved AAC level and adheres to the modeling parameters and adjacency requirements in the Preferred Management Strategy.

Table 16. MPB Rank1 and Rank 2 Reduction Levels

Items	Value
Rank 1 and 2 Area	131,657 ha
Rank 1 and 2 Area Harvested	28,269 ha
% Rank1 and 2 Area Harvested from 2001-2026	**21.47%**
Remaining Rank 1 and 2 Area	103,388 ha
% Rank1 and 2 Area Remaining after 2026	**78.53%**

Additional MPB planning after the DFMP submission will indicate the level of harvest required to reduce the 2001 MPB Rank 1 and Rank2 areas of 131,657 ha to 32,914 ha by 2026 (75% of the 2001 Rank 1 and 2 levels).

7.2.4 Standing Inventory Summaries

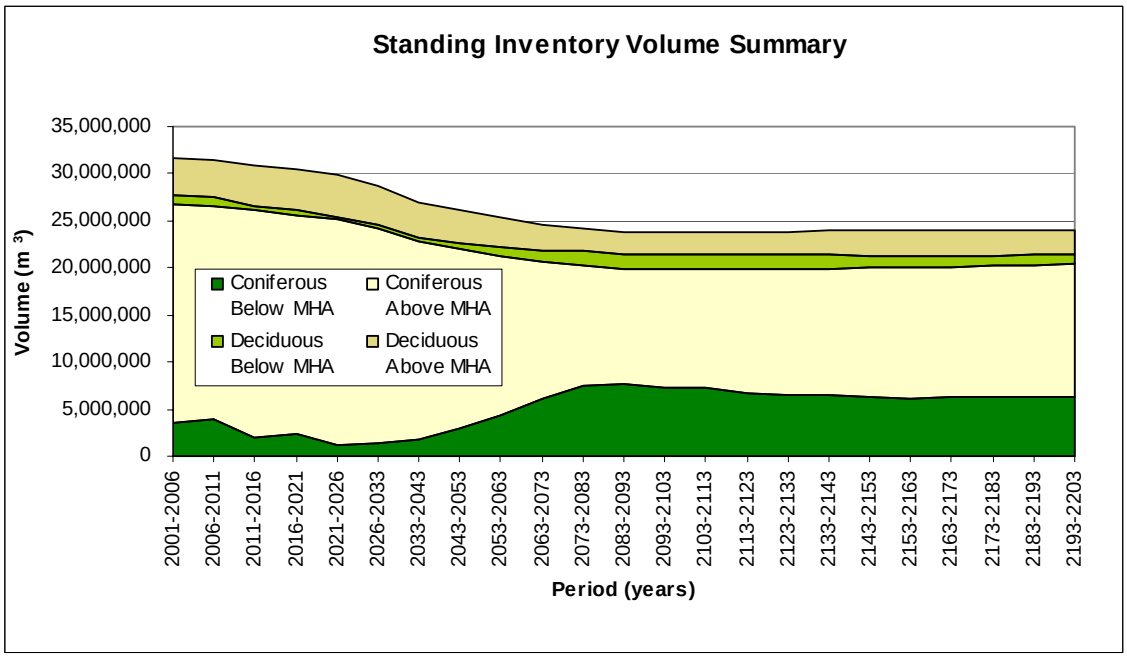
Table 17 and Figure 4, present the Preferred Management Strategy' s standing inventory volumes that were above and below the Minimum Harvest Age within the active land base. The standing inventory illustrates that the resulting harvest level prescribed in this scenario will be sustainable into the future based on current management assumptions.

Table 17. Standing Inventory for the Preferred Management Strategy on the Active Land Base

	Volume (m^3)			
Period	Coniferous Above MHA	Coniferous Below MHA	Deciduous Above MHA	Deciduous Below MHA
2001-2006	23,335,262	3,487,952	3,938,845	967,285
2006-2011	22,628,885	3,893,804	3,845,339	1,055,030
2011-2016	24,154,593	1,949,927	4,377,861	480,961
2016-2021	23,369,735	2,280,080	4,256,144	552,229
2021-2026	24,012,618	1,108,900	4,425,463	298,031
2026-2033	22,679,711	1,465,835	4,255,414	373,561
2033-2043	20,872,649	1,851,808	3,883,589	418,613
2043-2053	18,979,776	2,966,208	3,578,581	620,617
2053-2063	16,870,437	4,358,417	3,158,229	898,471
2063-2073	14,531,066	6,132,598	2,706,540	1,247,219
2073-2083	12,782,372	7,416,921	2,429,227	1,534,827
2083-2093	12,231,385	7,680,499	2,360,919	1,608,661
2093-2103	12,426,317	7,369,803	2,213,600	1,698,270
2103-2113	12,606,998	7,194,725	2,226,317	1,722,206
2113-2123	13,233,876	6,604,844	2,398,738	1,612,038
2123-2133	13,396,852	6,478,787	2,526,598	1,486,633
2133-2143	13,525,531	6,410,227	2,560,140	1,428,437
2143-2153	13,737,311	6,262,738	2,698,115	1,275,857
2153-2163	13,876,668	6,171,445	2,766,855	1,150,703
2163-2173	13,864,981	6,230,076	2,747,964	1,143,549
2173-2183	13,928,935	6,227,364	2,625,720	1,112,069
2183-2193	13,940,010	6,319,714	2,587,313	1,094,857
2193-2203	14,108,006	6,264,539	2,498,965	1,117,474

MHA (minimum harvest age)

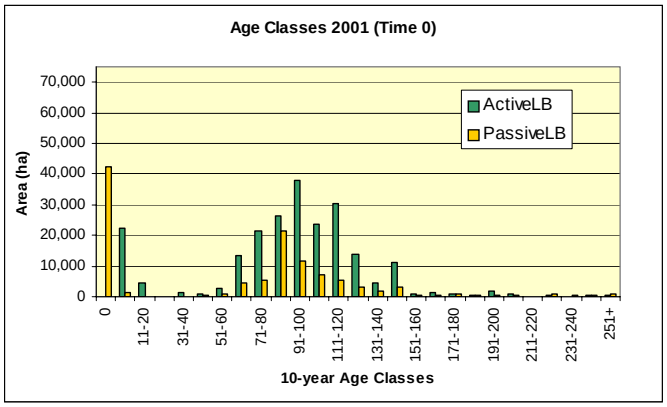
Figure 4. Preferred Management Strategy Standing Inventory on the Active Land Base

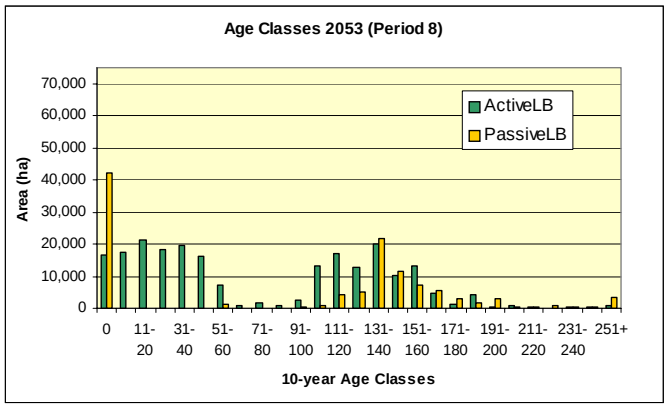


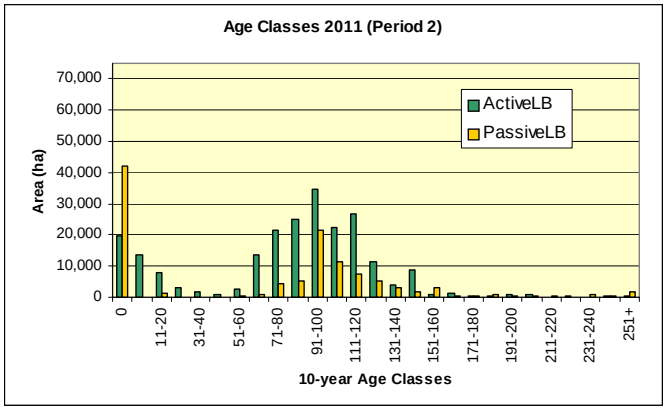
7.2.5 Age Class Distribution Summaries

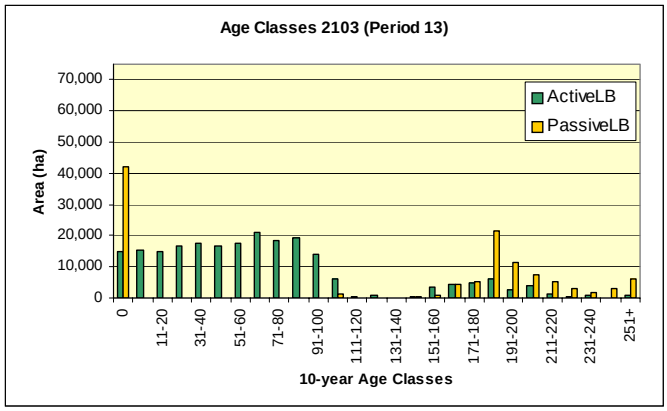
The age class distribution on the FMA for the Preferred Management Scenario have been listed in Figure 5 for six (6) time intervals in the planning horizon, specifically 2001, 2011, 2021, 2053, 2103 and 2203. A number of age class summaries by north & south breakdowns have also provided in Appendix 4. The age class distribution for the planning horizon has not changed significantly from the 2004 analysis.

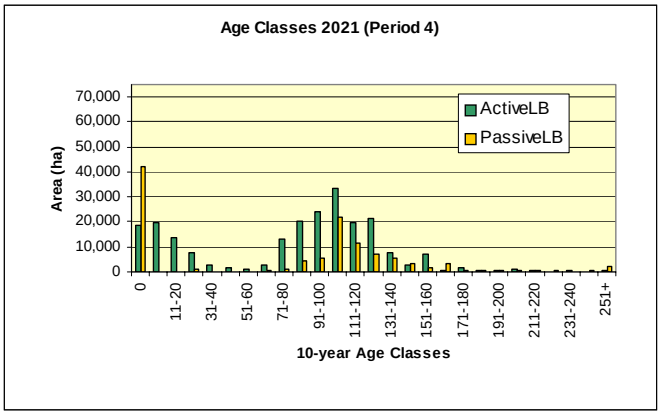
Figure 5. Age Class Summaries for the FMA

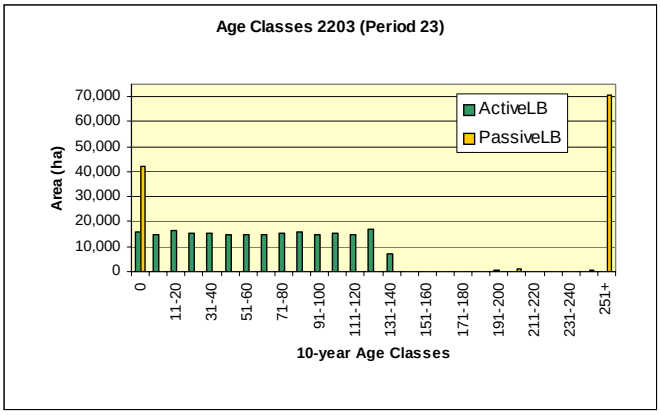












7.2.6 Seral Stage Summaries

The seral stages were derived from the Timber Supply Analysis results and were based upon the same age breakpoints as the previous seral stage analysis in 2004, which were developed by URSUS Ecosystems. Like the age class summaries, seral stages were provided for six (6) time intervals within the planning horizon, specifically 2001, 2011, 2021, 2053, 2103 and 2203. The seral stage summaries of the FMA for the specific points in time listed above are located in Figure 6.

The breakpoints used for the seral stage summaries were:

For Coniferous forest cover types:

- Young Seral: 20 to 70 years
- Mature Seral: 71 to 170 years
- Old Growth: >170 years

For Deciduous and Mixedwood (Conifer/Deciduous-dominated) forest cover types

- Young Seral: 20 to 50 years
- Mature Seral: 51 to 110 years
- Old Growth: >110 years

Figures 7 and 8 provide the seral stage summary for the north and south FMU's. Each FMU had experienced the same general trends in seral stage that were noted in the URSUS analysis for the preferred management strategy in 2004.

Figure 6. Seral Stage Summaries for the FMA

Figure 7. Seral Stage Summaries for the North FMU

Figure 8. Seral Stage Summaries for the South FMU

7.3 Spatial Preferred Management Strategy, with 2 ha Minimum Adjacency Sensitivity

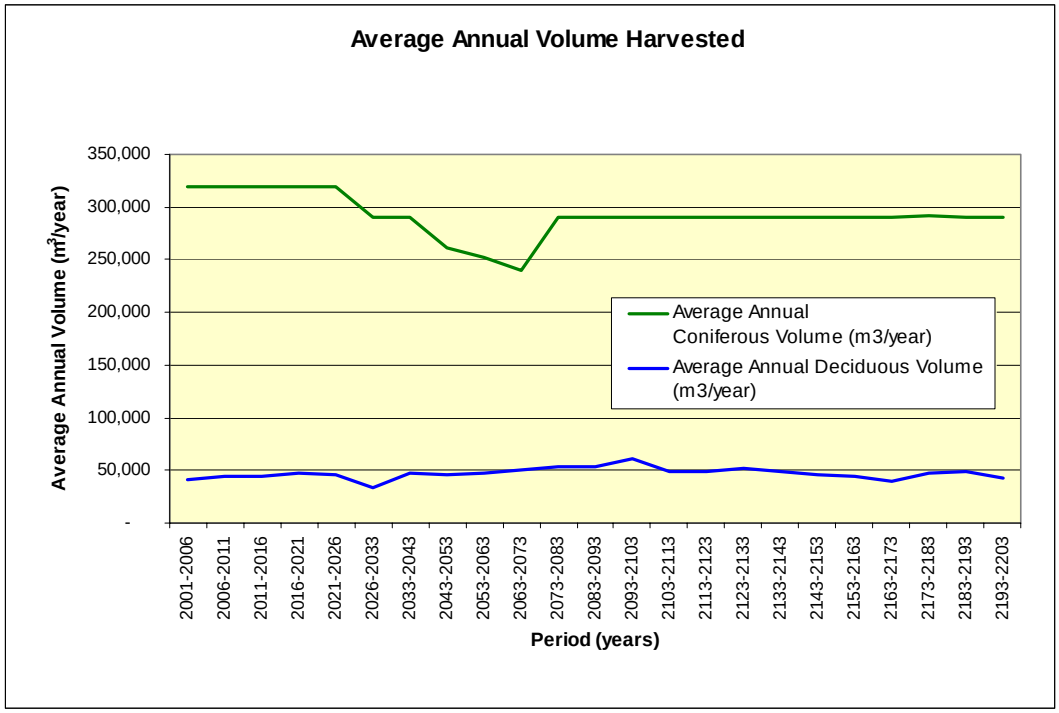
This sensitivity was developed due to an entry in the decision document comments which SLS only had to consider. SLS still prefers to operate based on the Preferred Management Strategy with the 4 ha Minimum Adjacency, but this sensitivity was developed to show the impact of applying a 2ha minimum block size rather than 4 ha minimum block size for adjacency purposes.

The results generated for this sensitivity has been limited to the harvest flow graph for the planning horizon and 25-year harvest map (Appendix 6).

7.3.1 Harvest Summaries

Figure 9 and Table 18, show that there was no significant difference in the coniferous harvest level that could be achieved using the 2 ha minimum block size and 20-year adjacency rule until 2043, however there was a 30-year trough in coniferous timber supply from 2043 to 2073 due to the 2 ha adjacency requirements. The long-term harvest level that can be sustained spatially, 289,815 m^3/yr was still the same as the spatial Preferred Management Strategy with the 4 ha adjacency minimum.

Figure 9. Harvest Flow of the Spatial Preferred Management Strategy with 2 ha Minimum Adjacency



To mitigate adjacency issues, other silvicultural systems could be utilized such as partial cutting which negates the need of a 20-year adjacency rule, since in a partial cutting system there is usually a dispersed amount of standing basal area (or volume) in the stand. Additionally, different size cutblocks could have different adjacency rules. The different options to alleviate adjacency issues will be assessed in SLS' s next DFMP, when the inventory information has been fully updated by SLS, there will have been a track record in terms of appropriate targets and thresholds to use and certainty regarding MPB' s impact on the land base will be known.

Table 18. Harvest Data for the Spatial Preferred Management Strategy with 2 ha Minimum Adjacency

Period	Average Annual Coniferous Volume (m^3/year)	Average Annual Deciduous Volume (m^3/year)	Annual Coniferous Volume Request (m^3)
2001-2006	319,563	41,396	318,602
2006-2011	319,425	44,530	318,602
2011-2016	319,167	43,972	318,602
2016-2021	319,399	47,249	318,602
2021-2026	319,369	46,512	318,602
2026-2033	290,101	33,681	289,815
2033-2043	290,010	47,715	289,815
2043-2053	261,215	46,612	289,815
2053-2063	252,854	46,716	289,815
2063-2073	240,341	50,469	289,815
2073-2083	290,344	52,795	289,815
2083-2093	290,122	54,253	289,815
2093-2103	289,976	61,613	289,815
2103-2113	289,947	48,519	289,815
2113-2123	290,453	48,652	289,815
2123-2133	290,015	51,870	289,815
2133-2143	289,946	49,510	289,815
2143-2153	290,175	45,566	289,815
2153-2163	289,927	44,848	289,815
2163-2173	290,221	40,371	289,815
2173-2183	291,711	47,046	289,815
2183-2193	290,030	48,448	289,815
2193-2203	289,931	42,829	289,815

Note: These summaries do not include pure deciduous stand groups

8.0 Summary/Conclusion

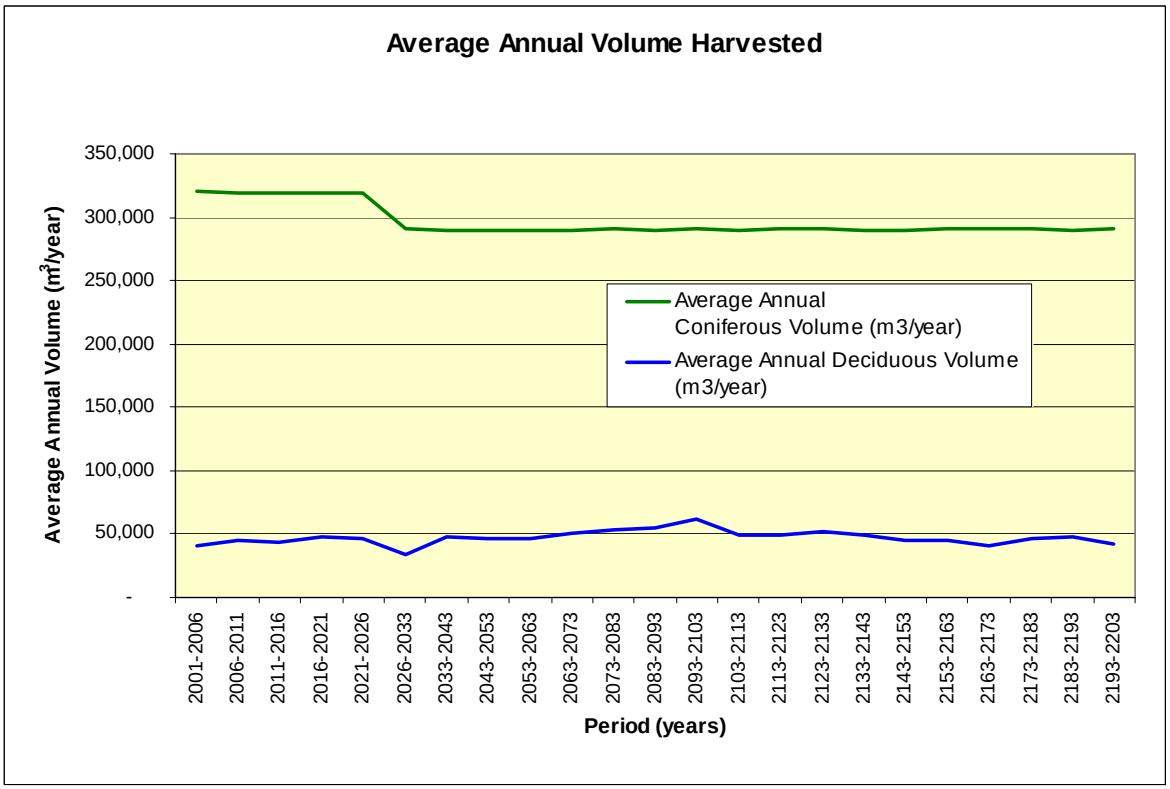
The coniferous timber supply for the Preferred Management Strategy depicted in Table 19 and Figure 10 was modeled as per the previous Preferred Management Strategy (Run 4) where a harvest level of 318,602 m^3/yr and dropping to 289,815 m^3/yr after 2026 was sustainable. This analysis (Run 10) with the adjustments made for the MPB and adjustments/corrections in the NLB process still support the previous Preferred Management Strategy Harvest Level (Run 4) that was submitted in the Timber Supply Analysis in November of 2004. The ASRD made the coniferous AAC level more conservative, by rounding down the AAC to 318,000 m^3/yr until 2026 and then 289,000 m^3/yr for the rest of the planning horizon – an annual reduction of another 0.002%. The annual deciduous volumes that will be generated from the harvest operations have also been indicated.

Table 19. Harvested Volumes from the Preferred Management Strategy

Period	Average Annual Coniferous Volume (m^3/year)	Average Annual Deciduous Volume (m^3/year)	Annual Coniferous Volume Request (m^3)
2001-2006	320,876	41,396	318,602
2006-2011	319,015	44,530	318,602
2011-2016	319,072	43,972	318,602
2016-2021	318,834	47,249	318,602
2021-2026	319,154	46,512	318,602
2026-2033	290,360	33,681	289,815
2033-2043	289,917	47,715	289,815
2043-2053	289,960	46,612	289,815
2053-2063	289,997	46,716	289,815
2063-2073	289,468	50,469	289,815
2073-2083	290,770	52,795	289,815
2083-2093	290,196	54,253	289,815
2093-2103	290,475	61,613	289,815
2103-2113	289,923	48,519	289,815
2113-2123	290,626	48,652	289,815
2123-2133	291,159	51,870	289,815
2133-2143	289,917	49,510	289,815
2143-2153	290,028	45,566	289,815
2153-2163	290,365	44,848	289,815
2163-2173	290,310	40,371	289,815
2173-2183	291,568	47,046	289,815
2183-2193	290,060	48,448	289,815
2193-2203	290,416	42,829	289,815

Note: These summaries do not include pure deciduous stand groups

Figure 10. Average Harvested Volumes from the Preferred Management Strategy



A map outlining the spatial sequence for the first 25 years (2001-2026) of the plan has been provided in Appendix 5. Refer to Appendix 4 (the hardcopy summaries), to gain a further understanding of the compartments where harvest operations may occur after 2026.

As with all analyses, the harvest levels are predicated on the accuracy of the data. There are a number of initiatives currently underway at SLS that will increase the accuracy of the data thereby providing better estimates of the sustainability of the forest resource for the next DFMP.

Part of the monitoring and stewardship reporting will include an assessment of actual losses in these various categories for both volume losses as well as on an area basis. Subsequent quadrants will then have a cut adjustment, up or down, in relation to the volume impacted outside of the 7.5% allowance. The first stewardship reporting period is proposed for the end of the 2006 - 2011 timber quadrant.

There are other management objectives and strategies which may have long-term impacts on harvest levels, however these are being dealt with through other mechanisms such as the company's growth and yield program, reporting of land base deletions, inventory updates, reforestation surveys or cut re-calculations as may be required as a consequence of fire or insect and disease losses.

The impacts of accommodating one resource value will not necessarily be exclusive of accommodating other values at the same time. As an example, buffering a mineral lick within a block may also be used to meet structural retention objectives or act to help improve a cut-block's aesthetics.

This approach to establishing and managing harvest levels is meant to add a degree of conservatism to the cut that will minimize possible risks in dealing with subject areas that have less than perfect knowledge.

Appendix 1 – Summary of the AAC Impacts from Yield Curve Adjustments performed by Golder Associates

Golder Associates Ltd.

145 1st Avenue North, Suite 200
Saskatoon, Saskatchewan, Canada S7K 1W6
Telephone (306) 665-7989
Fax (306) 665-3342

August 5, 2003

03-1363-005

Spray Lake Sawmills (1980) Ltd.
Box 100
Cochrane, Alberta
T0L 0W0

Attention: Mr. Ed Kulcsar
Strategic Planning Forester

RE: DETERMINING THE IMPACT TO THE ANNUAL ALLOWABLE CUT OF DELETING PLOTS FOUND WITHIN SUBJECTIVE PINE DELETIONS

Dear Ed,

Golder Associates Ltd. (Golder Associates) was retained by Spray Lake Sawmill's (SLS) to determine the impact to their annual allowable cut (AAC) if the plots located within the subjective pine deletions (based on a height / age relationship) were excluded from the yield curve development.

Golder Associates therefore re-developed the yield curves without these plots, and re-ran the timber supply analysis (TSA). The TSA was completed using the new yield curves although the same objectives and constraints that were submitted in SLS's Preliminary Forest Management Plan (PFMP) were used to allow for an appropriate comparison to the AAC submitted in the PFMP.

The analysis resulted in one additional run, in addition to the Preferred Forest Management Strategy submitted in the PFMP (Run 1 in Table 1). The impact of the new yield curves is detailed in Table 1.

Table 1
Scenario Results

Run	Description	Gross Conifer Surge AAC (m^3/yr)	Gross Conifer Even-Flow AAC (m^3/yr)	% Change from PFMS (Run 1)
1	The preferred management strategy from 2002 PFMP	377,921	343,563	0.0%
2	Preferred strategy with new yield curves (excluding plots in subjective pine deletion areas)	376,534	342,304	-0.4%

As shown in Table 1, changing the yield curves so they exclude the plots in the subjective pine deletion areas would have very little impact (less than 0.5%). Since the yield curve development is consistent with the net landbase "netdown", and the impact of these pine plots is very small, it is recommended that unless the net landbase changes, SLS should use the new yield curves. For your interest, figures depicting the new yield curves in comparison to both the yield curves submitted in the PFMP are also attached.

Golder Associates trusts that the above analysis meets your needs, however if you have any questions or concerns, please contact me at your convenience.

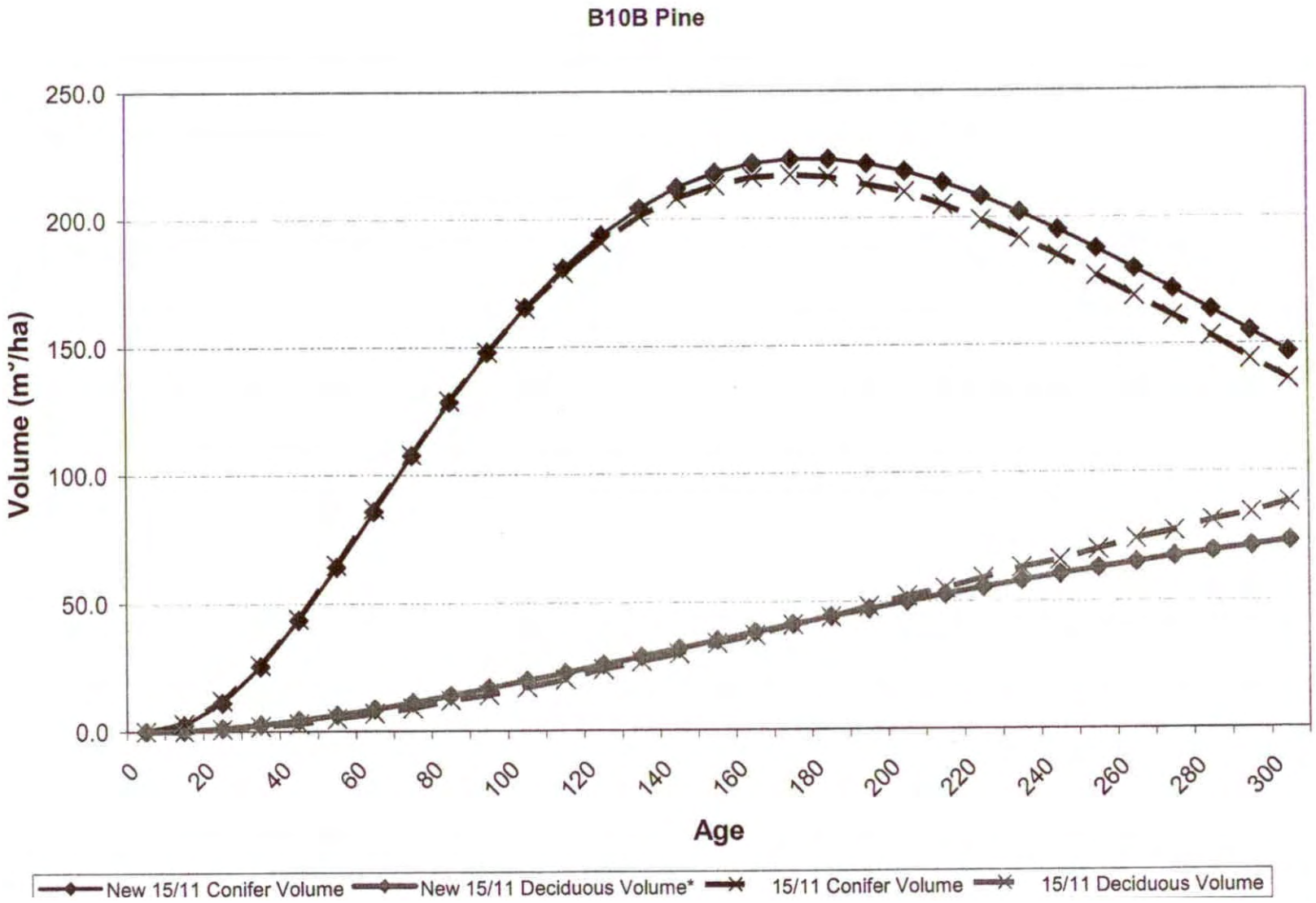
Yours very truly,

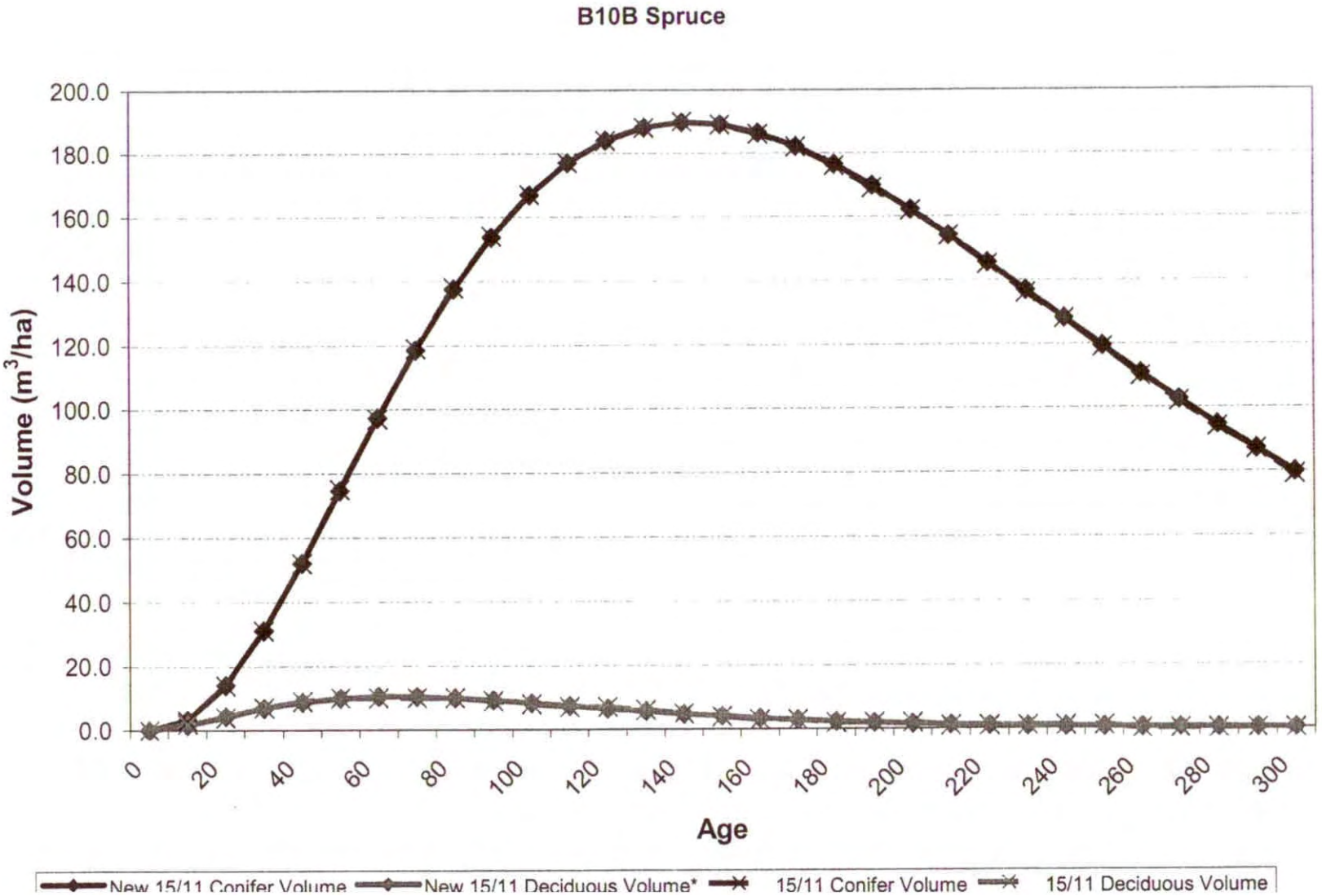
GOLDER ASSOCIATES LTD.

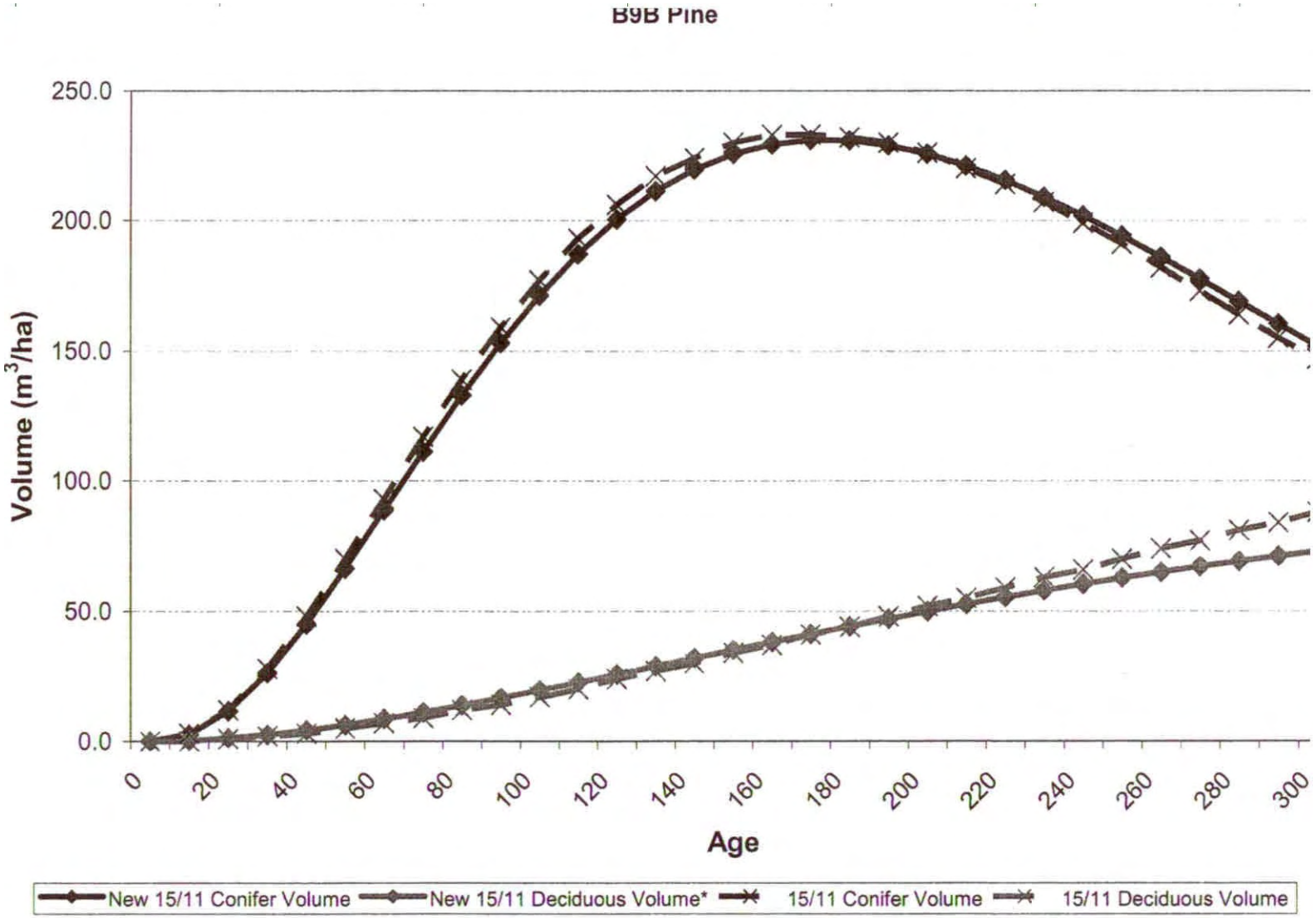
David Pelster B.Sc.F. RPF
Analysis Forester

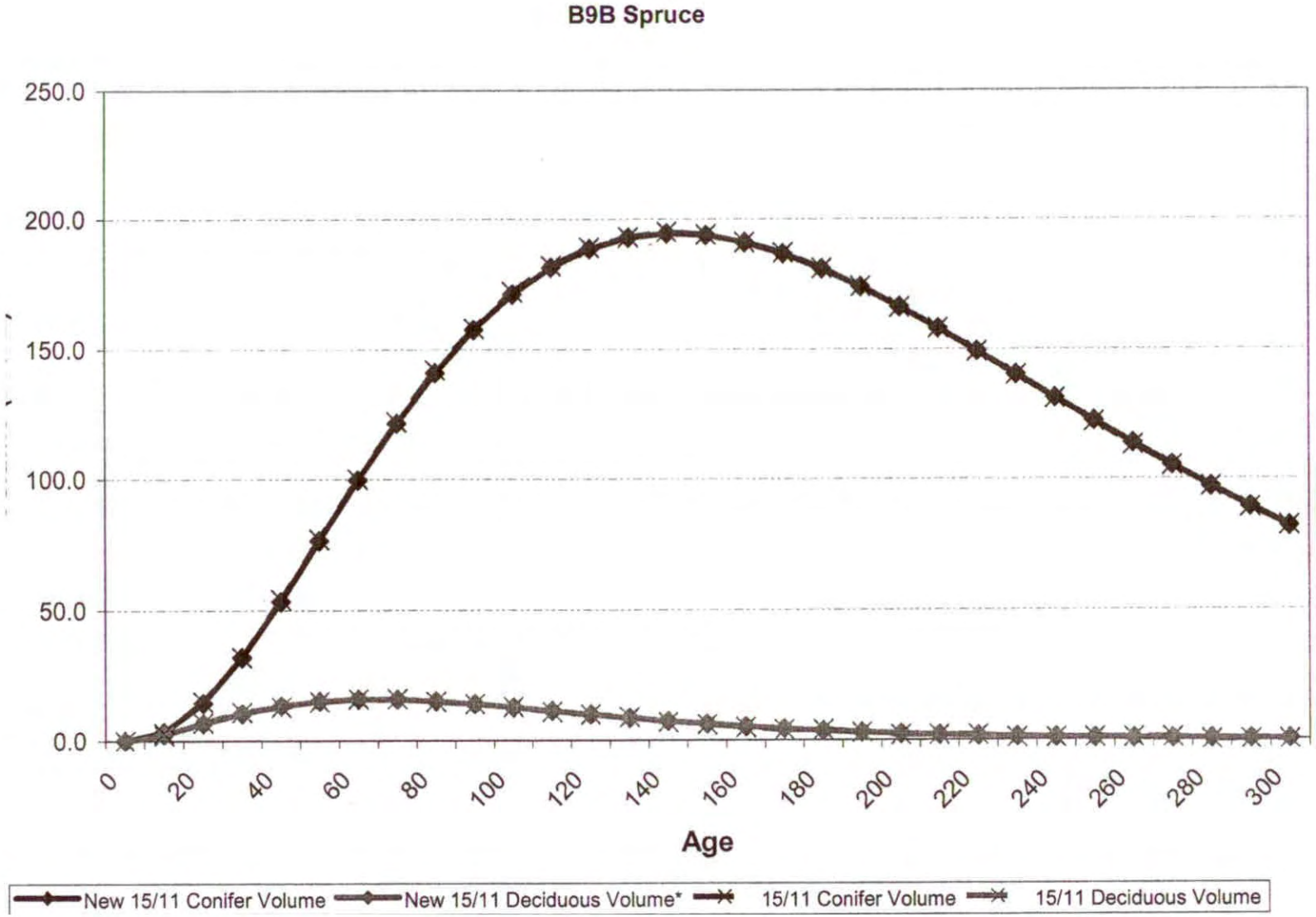
DP/pls

N:\ACTIVE\2003\1363\03-1363-005\3000 - G&Y\SUBJ DEL OUT\LET 03 AUG 05 IMPACT OF SUBJ PIN DEL 03-1363-005.DOC

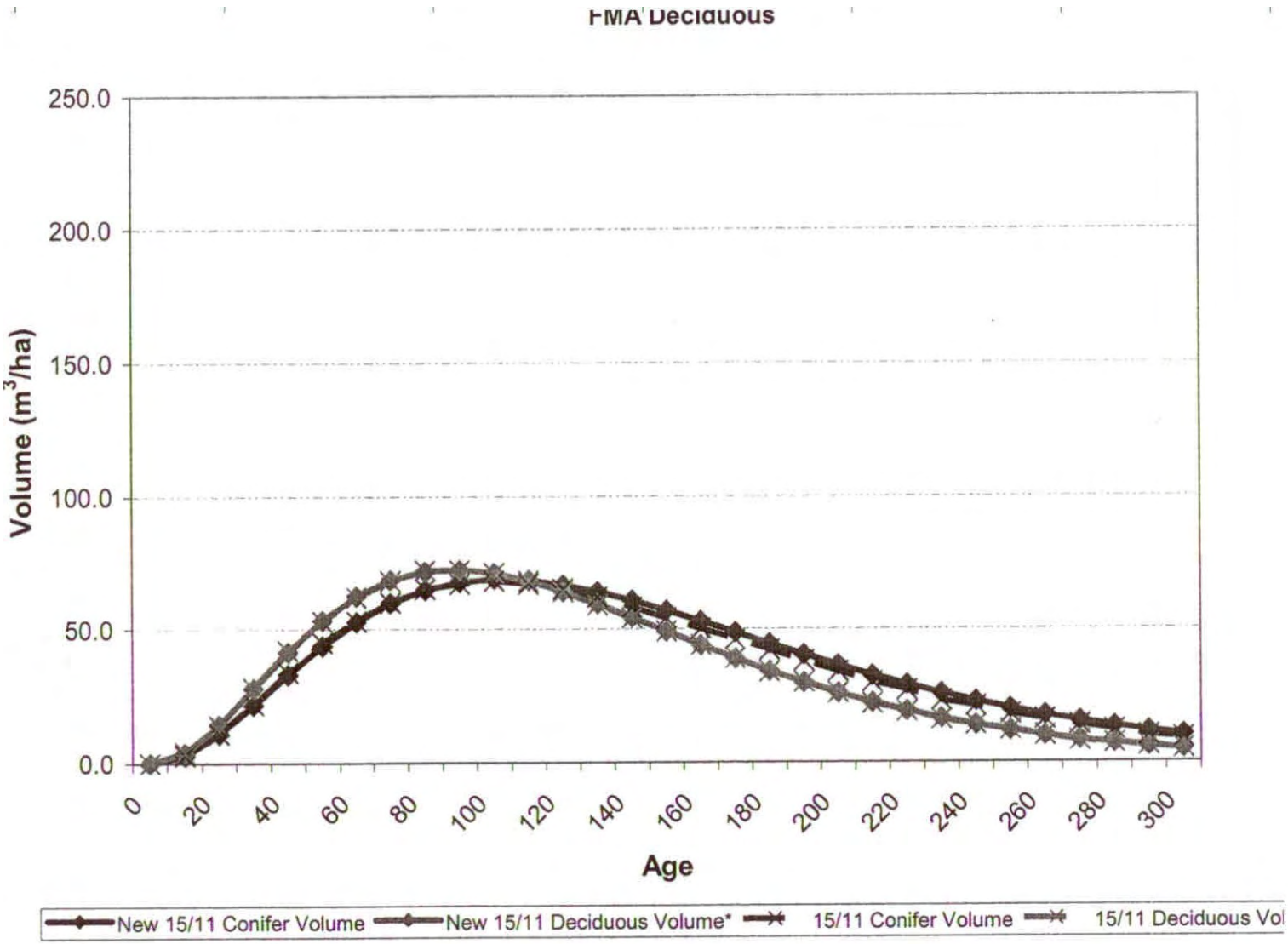

B10B Pine
250.0
200.0
150.0
100.0
50.0
0.0
Volume (m³/ha)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Volume


B10B Spruce
Volume (m3/ha)
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Volume


B9B Pine
250.0
200.0
150.0
100.0
50.0
0.0
Volume (m3/ha)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Volume


B9B Spruce
250.0
200.0
150.0
100.0
50.0
0.0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Volume


FMA Mixedwood
250.0
200.0
150.0
100.0
50.0
0.0
Volume (m3/ha)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Volume


FMA Deciduous
250.0
200.0
150.0
100.0
50.0
0.0
Volume (m3/ha)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Age
New 15/11 Conifer Volume
New 15/11 Deciduous Volume*
15/11 Conifer Volume
15/11 Deciduous Vol

Appendix 2 – CD/DVD of the Inputs Outputs and Summaries

Appendix 3 – Data Dictionary of TSM Input & Output files

Appendix 4a – Hardcopy Summaries for Run 9, Aspatial Preferred Management Strategy

Appendix 4b – Hardcopy Summaries for Run 10, Spatial Preferred Management Strategy

Appendix 5 – 25-Year Harvest Sequence for the Preferred Management Strategy with 4 ha Minimum Adjacency

Spray Lake Sawmills

25 Year Harvest Map
Preferred Management Strategy
North FMU

20-Year Adjacency w/ 4ha Minimum
5-Year Regen Delay

Legend

- Main Roads
- CTP Areas
- Fire Hazard Zones
- Cities, Towns, Villages
- Quota/Long-Term Permit Holders
- MPB Priority Areas
- Compartments

Preferred Management Strategy

- 2001-2006
- 2006-2011
- 2011-2016
- 2016-2021
- 2021-2026

SUNDRE
BERGEN
WATER VALLEY
WAIPAROUS
GHOST LAKE

UTM Nad83 Zone 11 Projection
Scale: 1 : 125,000
November 23, 2006

0 0.3 0.6 1.2 1.8 2.4 3 Kilometers

N

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tesera systems inc.