Integrated Stewardship Strategy for the Stuart TSBs (A, B, C) in the Prince George TSA

Tactical Plan

Version 1.0

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Project 419-37

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Executive Summary

The tactical plan document is the fifth in a series of documents developed through the Integrated Stewardship Strategy (ISS) for the Mackenzie TSA initiated by the British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development. The Tactical Plan integrates three plans generated by the Combined Scenario analysis for the Stuart ISS: reserve, harvest, and silviculture plans. Ultimately, it provides operational direction and bridges strategic, forest-level analyses, and operational planning processes.

This document describes the approach used to develop the tactical plan and summarizes the key results for the first 20 years of the planning horizon. In addition to this document, spatial datasets were prepared for scheduled and eligible activities, along with detailed statistics in an accompanying MS Excel file that includes detailed statistics of the key indicators that can be monitored over time.

In the first 5 years of the tactical plan, the forest estate model harvested approximately 83,000 ha; half of which were sourced from Timber Supply Block (TSB) 24B. By the end of year 20, the harvested area declined to 79,000 ha. With an annual budget of $3 million, the modelled results indicated that the fertilization tactic treated the most area overall. It helped ameliorate the mid-term harvest rate by increasing the volume available for harvest, lowering minimum harvest ages, and shifting stands throughout the planning horizon. The reserve plan locked a total of 8,432 ha (<1%) of the total timber harvesting landbase from being harvested over the first 40 years of the planning period; including the entire 20 years for Tactical Plan.

TSB	Harvested Area (ha)				Rehabilitated Area (ha)				Fertilized Area (ha)				Enhanced Area (ha)			
	Per 1	Per 2	Per 3	Per 4	Per 1	Per 2	Per 3	Per 4	Per 1	Per 2	Per 3	Per 4	Per 1	Per 2	Per 3	Per 4
24A	15,965	13,981	38,489	25,173	182	86	3	7	1	6	1,303	1,150	34	72	80	136
24B	47,118	43,037	40,722	45,615	2,806	2,317	308	119	623	5,077	9,879	11,333	483	1,392	430	1,575
24C	19,917	16,157	4,604	8,356	5,535	3,188	1,056	281	1,744	6,567	15,962	17,585	704	1,695	584	947
Total	83,000	73,175	83,815	79,143	8,523	5,592	1,368	407	2,369	11,650	27,143	30,068	1,221	3,159	1,093	2,658

Periods 1, 2, 3, and 4 correspond to Years 1 to 5, 6 to 10, 11 to 15, and 16 to 20, respectively.

These results are intended to guide planners towards stands where more detailed fieldwork can be done to assess potential treatment opportunities. Documenting the assumed operational criteria now and tracking how these are implemented over the next few years will assist in improving future modelling exercises that explore strategies to improve timber and non-timber values throughout the Stuart TSBs.

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Document Revision History

Version	Date	Notes/Revisions
1.0	March 31, 2018	First version distributed to project team for review and comment.

1 Introduction

The British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) initiated an Integrated Stewardship Strategy (ISS) – sustainable forest management analysis – in the Stuart Timber Supply blocks (TSB) of the Prince George Timber Supply Area (TSA). This document is the fifth in a series of seven documents prepared through the ISS process and describes the tactical plan developed over the first 20 years of the planning horizon. The Tactical Plan integrates three plans generated by the Combined Scenario analysis for the Mackenzie ISS: reserve, harvest, and silviculture plans. Ultimately, it provides operational direction and bridges strategic, forest-level analyses, and operational planning processes. In addition to this document, spatial datasets were prepared for scheduled and eligible activities, along with detailed statistics in an accompanying MS Excel file that includes detailed statistics of the key indicators that can be monitored over time. Note that to simplify implementation monitoring of this tactical plan, the areas reported in this document do not include aspatial reductions for stand level retention (i.e., 7.4% for MPB Conservation and 4.5% for In-block/matrix).

2 Data Gathering and Preparations

Data used for this project were derived from modelling outputs of the Combined Scenario analysis. Results were queried and linked to generate spatial data for the first 4 periods of the planning horizon (i.e., total of 20 years grouped into 5-year periods; labelled in all tables as the last year of each period). These results included treatment availability, as well as, the full extent of treatment areas scheduled. The spatial datasets were prepared similarly to operational planning datasets where scheduled blocks can be analyzed on additional operational criteria (e.g., potential benefits to non-timber values, the amount of remaining green volume, site productivity, distance from communities, access difficulties, and proximity to appropriate seed sources). Given the large number of landscape units and merged Biogeoclimatic Ecosystem Classification groups (mBEC) within Stuart, this document includes succinct summaries of the indicators. Detailed statistics for each of the indicators are included in the accompanying MS Excel workbook.

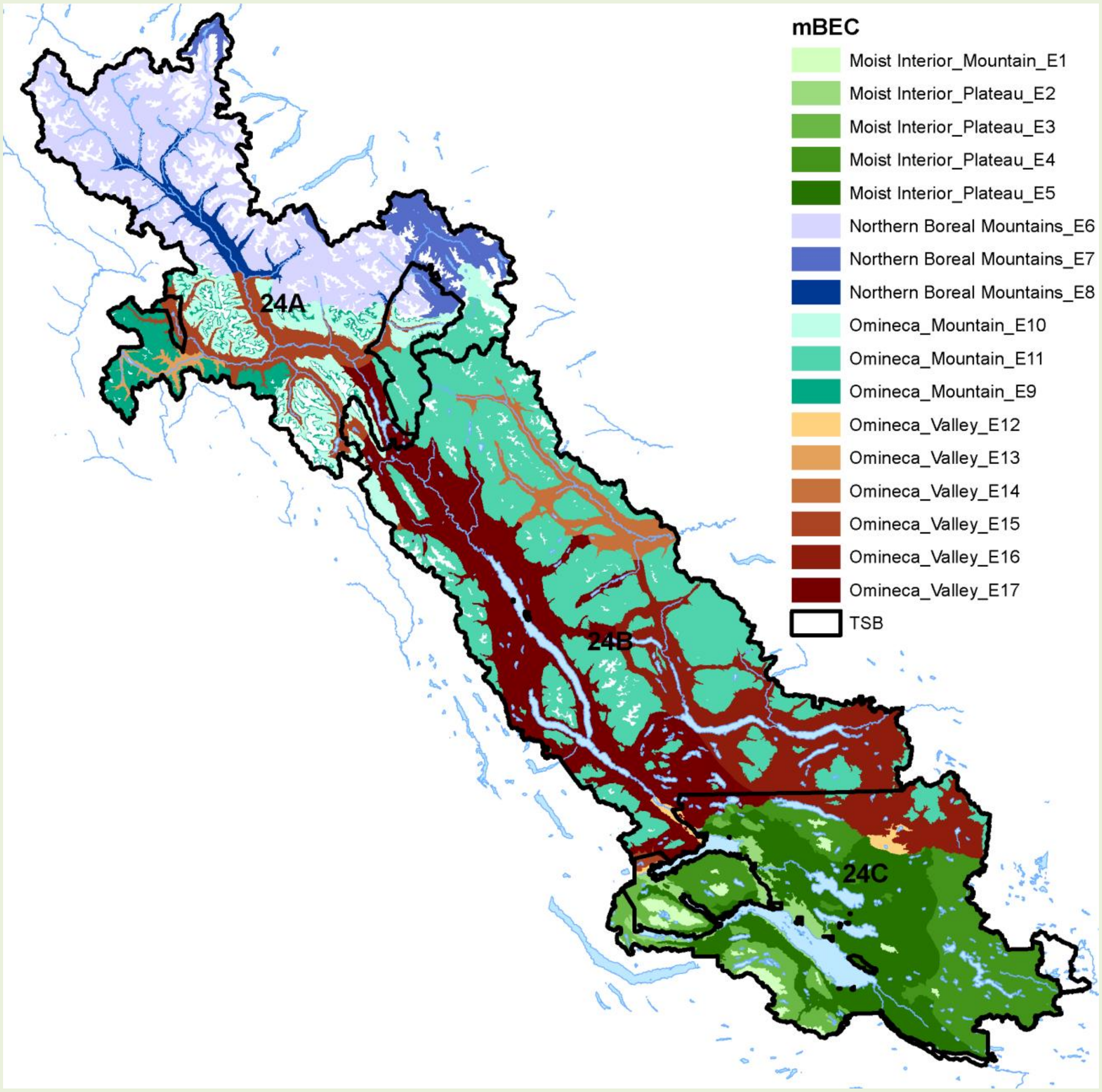


Figure 1 Timber Supply Blocks within Stuart Project Area

3 Reserve Plan

The Reserve Plan was designed to answer the question, "Where and how should we reserve forested stands to address landscape-level biodiversity and non-timber values while minimizing impacts to the working forest?" The underlying purpose of this scenario was to explore tactics aimed at maintaining the harvest area while providing a wide range of values on the land base (i.e., co-location). Candidate reserves were selected through a forest modelling exercise that assessed the combined score for each stand relative to multiple landscape-level thresholds and grouped them to maintain an appropriate spatial patter. In the Combined Scenario, these candidate reserves were locked from harvesting for the first 40 years of the planning period; including the entire 20 years of the Tactical Plan.

The area of the candidate reserves in the Timber Harvesting Land Base (THLB) that were locked for the first 40 years is 8,432 ha (<1% of the total THLB) (see Table 2, with seral stage definition in Table 1). The spatial location of the candidate reserves is included in the accompanying GIS layers. A summary of reserve areas by mBEC group is provided in Appendix 1.

Table 1 Seral stage definition by mBEC Group

mBEC Group	Young	Mid	Mature	Old
E1, E6, E7, E8, E9, E10, E11, E13	<20 years	20-120 years	120-140 years	140+ years
E2, E3, E4, E5, E12, E14, E15, E16, E17	<20 years	20-100 years	100-120 years	120+ years

Table 2 Reserved Areas by TSB and Seral Stage

mBEC Group	THLB Young	THLB Mid	THLB Mature	THLB Old	NHLB Young	NHLB Mid	NHLB Mature	NHLB Old
24A	3	62	20	1,070	49	8,583	1,869	94,111
24B	86	566	302	2,886	1,950	28,347	19,513	185,309
24C	315	373	137	2,612	4,244	11,120	6,798	85,770
Grand Total	404	1,001	459	6,568	6,243	48,050	28,180	365,190

THLB – Timber Harvesting Land Base; NHLB – Non-Harvestable Land Base

4 Harvest Plan

The Harvest Plan aimed to answer the question, “Which stands should be prioritized for harvest/salvage in the short-term (and what are the mid/long-term consequences of not following this strategy)?” The underlying purpose of this plan was to improve timber harvesting opportunities while mitigating the risk of economic loss to natural disturbances like insects and fire.

Table 3 shows that the area harvested is fairly steady over the 20 year planning period. A summary of harvested areas by mBEC group is provided in Appendix 2.

Table 3 Harvest Area by Timber Supply Block and Period

TSB	Period 1	Period 2	Period 3	Period 4
24A	15,965	13,981	38,489	25,173
24B	47,118	43,037	40,722	45,615
24C	19,917	16,157	4,604	8,356
Total	83,000	73,175	83,815	79,143

Note that these are gross areas; they include in-block retention.

The harvesting system was delineated on the based on slope class where stands on slopes up to 35% were considered ground system, while stands on slopes greater than 35% slope were considered cable system. The area harvested by each of these systems is outlined in Table 4.

Table 4 Harvest area by harvesting system.

Period	TSB	Cable	Ground	Total
1 (1-5 years)	24A	8,041	7,924	15,965
	24B	18,260	28,859	47,118
	24C	6,025	13,892	19,917
	Subtotal	32,325	50,675	83,000
2 (6-10 years)	24A	7,356	6,625	13,981
	24B	16,965	26,072	43,037
	24C	4,869	11,287	16,157
	Subtotal	29,190	43,985	73,175
3 (11-15 years)	24A	19,336	19,154	38,489
	24B	16,177	24,545	40,722
	24C	1,738	2,866	4,604
	Subtotal	37,251	46,564	83,815
4 (16-20 years)	24A	11,885	13,288	25,173
	24B	18,481	27,134	45,615
	24C	2,867	5,489	8,356
	Subtotal	33,232	45,912	79,144
Total		131,998	187,136	319,134

Two harvest partitions were applied in the harvest plan. Firstly, a deciduous partition limited the harvesting of species with low economic potential (<5.56% of harvest volume, Table 5). Secondly, a partition applied in the first 100 years limited the harvest rate from TSBs A and B to a maximum of 1.5 million m³/yr. Note that this partition never constrained the model so was not reported here.

Table 5 Harvested area from deciduous partition

Period	Area/yr (ha/yr)
1	150
2	331
3	639
4	605

Mitigating risk of loss due to wildfire was managed by influencing the forest estate model to focus harvesting, over the first 10 years, on stands identified with extreme risk of wildfire and conifer-leading stands within identified fuel breaks (Table 6).

Table 6 Harvested area to mitigate risk of loss due to wildfire

	Extreme Fire Threat		Conifer-leading within fuel breaks	
TSB	Period 1	Period 2	Period 1	Period 2
24A	312	2,218	6,302	3,753
24B	7,898	6,005	17,884	15,084
24C	12,431	10,861	7,784	6,290
Total	20,641	19,083	31,970	25,127

Finally, in each 5-year period, harvest opening sizes were controlled to reduce small openings and favour larger ones. Weights were carefully set for each size category to maintain an acceptable impact on harvest flow (Table 7).

Table 7 Opening size distribution for the first 20 years

Size Class	Target	Period 1	Period 2	Period 3	Period 4
0-1 ha	0%	0%	0%	0%	0%
1-5 ha	5%	5%	6%	3%	5%
5-20 ha	10%	12%	12%	10%	10%
20-50 ha	No target	28%	27%	18%	29%
50-100 ha	No target	24%	20%	14%	21%
100+ ha	Attractor	31%	35%	55%	36%

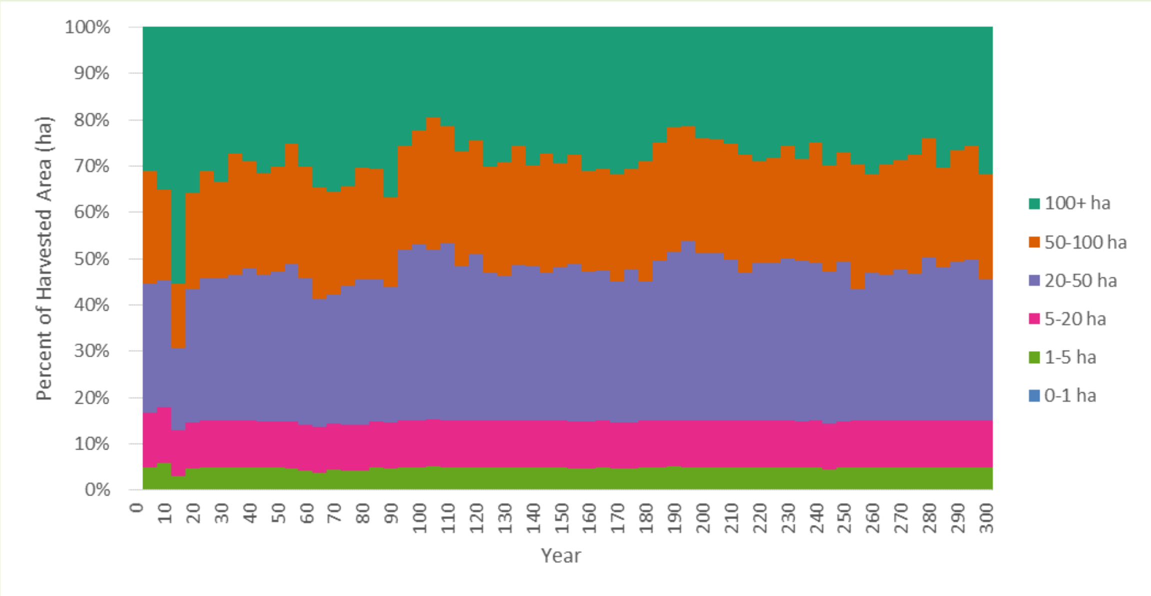


Figure 2 Harvest Opening Size Distribution over the 300 year planning horizon

A conservation uplift factor was applied, to accompany the timber salvage uplift as a result of mountain pine beetle salvage. This factor was based on the size of the harvested opening. A pre-processing exercise was done to estimate the opening size classification to which an area belongs. The unharvested areas (i.e., wildlife tree retention areas) within each salvage zone are shown in Table 8, along with the percent retention applied to each group.

Table 8 Amount of unharvested area by TSB in each Salvage Zone Category

TSB	Small (<50ha) ~5.5% Retention	Medium (50-250ha) ~8% Retention	Large (250-1,000ha) ~15.5% Retention	Very Large (>1,000 ha) ~25.5% Retention
24A	150,245	7,192	6,268	4,956
24B	371,840	60,813	71,898	42,944
24C	153,307	35,016	20,002	4,896

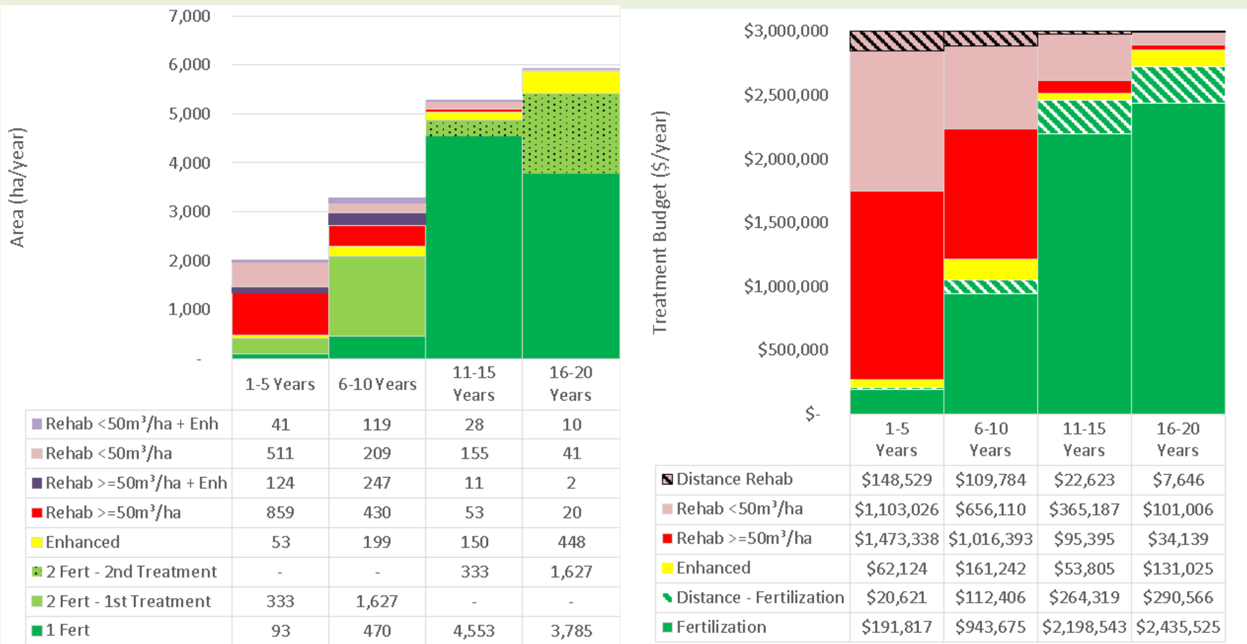
5 Silviculture Plan

The Silviculture Plan was designed to answer the question, “Are there alternatives to current basic silviculture practices that would benefit future outcomes (both timber and non-timber)?” The underlying purpose of this plan was to explore tactics aimed to enhance timber quantity and quality over the mid- and long-term, as well as, improve biodiversity, wildlife habitat, and cultural interests. The Project Team identified 3 tactics to be explored: 1) rehabilitation of MPB impacted stands, 2) fertilization, and 3) enhanced basic silviculture. These tactics were explored by applying average treatment costs (Table 9) and a funding level of $3 million per year for the first 20 years.

Table 9 Unit costs applied for silviculture tactics

Treatment	Unit Cost	Distance Cost
Marginally Economic Rehab (≥50m³/ha)	$1,500/ha	$50/ha each extra 2 hours (one way)
Uneconomic Rehab (<50m³/ha)	$2,000/ha	$50/ha each extra 2 hours (one way)
Fertilization (1 or 2 treatments)	$450/ha each application	$25/ha each extra 2 hours (one way)
Enhanced Silviculture	$285/ha	N/A

Figure 3 shows the treatment area (left) and costs (right) applied for each of the silviculture treatment options. The numbers in this figure reflect annual averages over each period.



	1-5 Years	6-10 Years	11-15 Years	16-20 Years
Rehab <50m³/ha + Enh	41	119	28	10
Rehab <50m³/ha	511	209	155	41
Rehab >=50m³/ha + Enh	124	247	11	2
Rehab >=50m³/ha	859	430	53	20
Enhanced	53	199	150	448
2 Fert - 2nd Treatment	-	-	333	1,627
2 Fert - 1st Treatment	333	1,627	-	-
1 Fert	93	470	4,553	3,785

	1-5 Years	6-10 Years	11-15 Years	16-20 Years
Distance Rehab	$148,529	$109,784	$22,623	$7,646
Rehab <50m³/ha	$1,103,026	$656,110	$365,187	$101,006
Rehab >=50m³/ha	$1,473,338	$1,016,393	$95,395	$34,139
Enhanced	$62,124	$161,242	$53,805	$131,025
Distance - Fertilization	$20,621	$112,406	$264,319	$290,566
Fertilization	$191,817	$943,675	$2,198,543	$2,435,525

Figure 3 Areas and costs associated with silviculture treatments [1]

The sections below briefly describe elements considered for modelling and subsequent mapping of treatment opportunities and priorities for each of the three tactics modelled (i.e., rehabilitation, fertilization, and enhanced basic silviculture), and summarize results for area treated (e.g., in each 5-year period and by TSB). Finer breakdowns (i.e., by mBEC) are available in the accompanying MS Excel workbook.

[1] Note that the areas in this chart are net of in-block retention. The numbers in the tables below, will be larger, as they are gross area.

5.1 Rehabilitation

Rehabilitation focuses on ameliorating poorly performing stands severely impacted by MPB to provide more harvest opportunities during the forecasted timber supply shortage (mid-term) while increasing the effective landbase in the long-term.

Following the salvage period, some modelled stands do not reach the minimum harvest criteria (140 m^3/ha) to become available again for harvesting within the planning horizon. These stands effectively cease to contribute to the harvest flow (i.e., they are excluded from the THLB) unless they are rehabilitated. A continuum of stands exists within this profile where rehabilitation treatments are expected to provide uneconomic to marginally economic returns. The uneconomic stands are typically younger, small-diameter trees, higher percent dead, and require long haul distances. Marginally economic stands include some green merchantable volume, larger piece sizes to produce lumber, pulp chips, or possibly bio-fuel feed stocks. The Combined Scenario analysis showed that focusing rehabilitation on these poorly performing stands that are severely impacted by MPB provide more harvest opportunities during the forecasted timber supply shortage (mid-term) while increasing the productive THLB in the long-term.

Objectives

Rehabilitation typically involves the removal of standing and fallen trees, site preparation and reforestation of productive stands of suitable tree species. Key objectives of rehabilitation activities include:

- Accelerate the recovery of stands into productive forests that will be available for harvest sooner (e.g., younger stands without merchantable volume, including fire-damaged areas).
- Recover some merchantable (green) volume from unsalvaged stands that would not otherwise be harvested – particularly in the mid-term.
- Abate fire hazards associated with standing dead trees and damage to understory trees as the dead material falls.

Eligibility, Costs, and Responses

Criteria applied to identify and prioritize eligible stands, apply costs, and implement responses are detailed in Table 10. Operational criteria that should be used to identify or prioritize stands in the field include: 1) potential benefits to non-timber values, 2) amount of remaining green volume, 3) site productivity, 4) distance from communities, 4) access difficulties, and 5) proximity to appropriate seed sources.

Table 10 Rehabilitation Eligibility, Costs, and Responses

Element	Description	Criteria
Eligible Stands	Unlogged existing natural stands by the end of the salvage period	○ Conifer Leading ○ Slope <=35% (i.e., Ground Harvest System) ○ >=40% stand percentage dead ○ <=140 m^3/ha live volume at the end of salvage period, or live + dead volume during the salvage period ○ Stand Age >=40 yrs at time of MPB attack ○ BEC: SBS, ESSF ○ Inventory SI >=11
Timing	Period within the planning horizon	○ First 20 years
Treatment Response	Transition stands onto future managed stands as if harvested	○ Regular future AUs, or enhanced future AU (where stand eligibility overlaps)
Costs	Marginally Economic (>= 50m^3/ha) - Harvest/Knockdown/Site Prep/Plant	○ $1,500/ha (Knockdown and Site Prep ($500/ha) and Planting ($1,000/ha))
	Uneconomic (<50m^3/ha) - Knockdown/Site Prep/Plant	○ $2,000/ha (Knockdown and Site Prep ($1,000/ha) and Planting ($1,000/ha))
	Distance cost beyond 2 hrs (one way)	○ $50/ha each 2 hrs (one way)

In the field, other criteria that should be used to identify or prioritize stands include, but are not limited to: potential benefits to non-timber values, the amount of remaining green volume, site productivity, distance from communities, access difficulties, and proximity to appropriate seed sources.

Volume harvested through these rehabilitation treatments was not included in the overall harvest rate. However, some timber could be removed from these stands.

Stand response for rehabilitation was modelled by transitioning stands onto future managed stands from the treatment date. Accordingly, these responses take advantage of improved stocking, lower regeneration delay, and select seed to produce higher yields that achieve minimum harvest volumes much sooner. The Combined Scenario analysis showed that these stand regeneration improvements contribute to the harvest rate in the long-term and at the end of mid-term period. Moreover, some of the rehabilitated stands may undergo enhanced basic silviculture options that provide additional contributions to the harvest flow.

Challenges

A significant challenge with this strategy involves the identification of stands that would not otherwise regenerate into merchantable stands on their own, while maximizing return on investment. This is because the analysis data does not include some spatially-explicit, stand-level criteria required to distinguish the viability of some treatments.

Very little direct information was available to develop stand-level assumptions for rehabilitating non-salvaged stands so some aspects of the applied assumptions may not be operationally appropriate in all cases.

Operational plans for rehabilitation treatments should carefully consider potential issues related to non-timber values such as water quality where additional disturbance could exacerbate impacts from increased sedimentation.

The success of this activity depends, in part, on the proponents developing opportunities to improve utilization of merchantable material, improve markets for low quality fibre, and potentially claim carbon credits.

Results

Table 11 shows the area rehabilitated under the silviculture plan steadily decreases over the 20 year planning period. A summary of rehabilitated areas by mBEC group is provided in Appendix 3.

Table 11 Rehabilitated Area by Timber Supply Block

	Rehabilitation Marginally Economic (≥50 m³/ha)				Rehabilitation Uneconomic (<50 m³/ha)			
TSB	Period 1	Period 2	Period 3	Period 4	Period 1	Period 2	Period 3	Period 4
24A	143	68	3	0	39	18	1	7
24B	2,079	1,764	133	30	728	553	174	89
24C	3,240	1,937	217	97	2,295	1,251	839	184
Totals	5,462	3,769	353	126	3,061	1,823	1,014	281

Note that these are gross areas; they include in-block retention, whereas figures shown in Figure 3 do not.

5.2 Fertilization

Despite the limited number of stands currently available to treat, fertilization treatments play an important role in the overall strategy. The Combined Scenario analysis showed that while fertilized stands significantly contribute to the harvest flow in the mid-term, there is no immediate incentive to fertilize since there is a time gap between the fertilization application and final harvest. However, early and successive applications of fertilizer can improve mid-term harvest flows even more.

Objective

Key objectives of fertilization activities include:

- Accelerate the rate of stand development;
- Increase merchantable yield and value of stands harvested within the mid-term.

Eligibility, Costs, and Responses

Criteria applied to identify and prioritize eligible stands, apply costs, and implement responses are detailed in Table 12. Within this 20-year tactical plan, eligible stands can undergo one or two consecutive applications 10-years apart. To maximize return on investment, harvesting fertilized stands is avoided for 10 years following application.

Table 12 Fertilization Eligibility, Costs, and Responses

<table>
<tr><th>Element</th><th>Description</th><th>Criteria</th></tr>
<tr><td rowspan="4">Eligible Stands</td><td>Young natural stands</td><td>○ Age 26 to 60</td></tr>
<tr><td>Existing managed stands</td><td>○ Age 16 to 25</td></tr>
<tr><td>Current/future managed stands</td><td>○ Age 0 to 15</td></tr>
<tr><td>Other criteria</td><td>○ Sx + Pl >=80%
○ SBS, ESSF
○ Managed SI >=14
○ Slope <= 35%</td></tr>
<tr><td>Timing</td><td>Minimum and Maximum age defining opportunity window, for up to 2 applications, every 10 years</td><td><table><tr><th>Applications (every 10 yrs)</th><th>Age Window (yrs)</th></tr><tr><td>1</td><td>25 - 75</td></tr><tr><td>2</td><td>25 - 65</td></tr></table></td></tr>
<tr><td rowspan="3">Treatment Response</td><td>Growth increase 10 years after application (entire stand) – existing natural stands</td><td>10m³/ha for each application.</td></tr>
<tr><td>Growth increase 10 years after application (entire stand) – existing managed stands</td><td><table><tr><th>Applications (every 10 yrs)</th><th>Sx-Leading (m³/ha)</th><th>Pl-Leading (m³/ha)</th><th>Efficiency</th></tr><tr><td>1</td><td>17</td><td>17</td><td>100%</td></tr><tr><td>2</td><td>36</td><td>34</td><td>100%</td></tr></table></td></tr>
<tr><td>Transitions to future stands</td><td>Locked from harvesting, 10 years after last application.</td></tr>
<tr><td>Costs</td><td>Fertilization costs for all stands</td><td>$450/ha for each application
$25 per hectare each extra two hours (one way).</td></tr>
</table>

Challenges

Operational plans for fertilization treatments should carefully consider potential issues related to non-timber values such as fish and water quality where riparian buffers are required to prevent fertilizer from entering streams and lakes. Additional buffers from other features and other measures may be required to address First Nations' concerns with applying fertilizer to stands within their traditional territories.

Results

Table 13 shows the area fertilized steadily increases over the 20 year planning period, but this does not distinguish between how many treatments were applied to each stand (i.e., 1 vs. 2). The costs associated with treatment of fertilization are dependent on distance travelled; therefore, treating stands in TSB 24A are the most expensive while stands in TSB 24C are the least expensive. A summary of fertilized areas by mBEC group is provided in Appendix 4.

Table 13 Fertilized Area by Timber Supply Block

TSB	Period 1	Period 2	Period 3	Period 4
24A	1	6	1,303	1,150
24B	623	5,077	9,879	11,333
24C	1,744	6,567	15,962	17,585
Total	2,369	11,650	27,143	30,068

Note that these are gross areas; they include in-block retention, whereas figures shown in Figure 3 do not.

5.3 Enhanced Silviculture

Enhanced basic silviculture activities are most attractive on stands regenerated from salvage harvesting as the incremental volumes are expected to contribute to the harvest at the end of the mid-term trough. In addition to the timber supply benefits, the higher density stands developed through these treatments are expected to improve timber quality through lower knot size, reduced risk of damage from agents and climate change, and increased opportunities for future stand management.

Objective

Key objectives of enhanced silviculture activities include faster growth and increased volume from planting stands with improved seed at higher densities.

Eligibility, Costs, and Responses

Criteria applied to identify and prioritize eligible stands, apply costs, and implement responses are detailed in Table 14.

Table 14 Enhanced Silviculture Eligibility, Costs, and Responses

Element	Description	Criteria
Eligible Stands	Existing natural and managed stands.	○ Leading Species: Pl, Sx ○ BEC: SBS, BWBS ○ SI (managed) >=14
Timing	Period within the planning horizon	First 40 years
Treatment Response	Transition to future enhanced managed stands that remain enhanced after the 20-yr period	
	Regeneration method	100% planted
	Density	Increase to 1,700 stems/ha
	Genetic gains	No changes from current
	Regeneration delay	From 2 yrs to 1 yr
	OAF1	From 85% to 89%
Costs	Incremental planting of trees sown with select seed	$285/ha

Challenges

While there is currently no direct funding allocated for the enhanced basic silviculture activities, other regions have developed processes to utilize operational cost allowances through the stumpage appraisal system. Implement a similar approach here may take up to 5 years to develop.

Results

Table 14 shows the area treated with enhanced basic silviculture fluctuates over the 20 year planning period. A summary of areas treated with enhanced basic silviculture by mBEC group is provided in Appendix 5.

Table 15 Area Treated with Enhanced Basic Silviculture by Timber Supply Block

TSB	Period 1	Period 2	Period 3	Period 4
24A	34	72	80	136
24B	483	1,392	430	1,575
24C	704	1,695	584	947
Total	1,221	3,159	1,093	2,658

Note that these are gross areas; they include in-block retention, whereas figures shown in Figure 3 do not.

6 Discussion

This tactical plan provides guidance to forest professionals in developing operational plans that identify specific stands for treatment. It was developed using modelling outputs from the ISS Combined Scenario. It must be stressed that the spatial data used to develop the Combined Scenario were typically forest-level inventories and direct applications for operational and stand-level planning are limited. Rather, these data are appropriate for guiding planners to areas where more detailed fieldwork can be done to assess potential treatment opportunities. Ultimately, following the tactical plan should provide the best chance for achieving the future forest condition presented in the Combined Scenario.

The exercise of incorporating operational criteria into the tactical plan highlighted new constraints that could be added to future stewardship strategies. Documenting the assumed operational criteria now and tracking how these are implemented over the next few years will assist in improving future modelling exercises that explore strategies to improve timber and non-timber values throughout the Stuart TSBs.

In addition to this document, this tactical plan includes spatial datasets prepared for scheduled and eligible activities, along with detailed statistics in an accompanying MS Excel document.

Appendix 1 Reserved Area by Timber Supply Block and mBEC Group

TSB and mBEC Group	THLB Young	THLB Mid	THLB Mature	THLB OLD	NTHLB Young	NTHLB Mid	NTHLB Mature	NTHLB Old
24A	3	62	20	1,070	49	8,583	1,869	94,111
Northern Boreal Mountains_E6	0	7	11	124	0	2,357	973	35,681
Northern Boreal Mountains_E7	2	0	0	25	9	284	150	6,337
Northern Boreal Mountains_E8	0	17	0	190	0	486	90	8,106
Omineca_Mountain_E10	0	10	2	160	0	1,874	133	14,328
Omineca_Mountain_E11	0	0	0	80	0	552	178	7,367
Omineca_Mountain_E9	0	5	0	140	25	2,112	139	10,431
Omineca_Valley_E13	0	3	0	87	0	213	67	2,766
Omineca_Valley_E15	1	21	7	214	14	704	136	5,599
Omineca_Valley_E17	0	0	0	48	1	0	3	3,495
24B	86	566	302	2,886	1,950	28,347	19,513	185,309
Moist Interior_Plateau_E2	0	0	0	0	0	0	0	1
Moist Interior_Plateau_E4	0	0	0	0	0	0	0	3
Omineca_Mountain_E10	0	1	1	37	0	383	100	2,692
Omineca_Mountain_E11	4	211	146	1,027	84	19,589	10,338	109,536
Omineca_Mountain_E9	0	0	0	0	0	48	0	0
Omineca_Valley_E12	1	2	0	28	9	65	48	451
Omineca_Valley_E14	0	45	2	257	18	1,472	730	8,142
Omineca_Valley_E15	0	3	0	29	18	26	4	264
Omineca_Valley_E16	40	113	90	499	794	3,150	4,943	23,876
Omineca_Valley_E17	41	189	62	1,008	1,028	3,615	3,350	40,344
24C	315	373	137	2,612	4,244	11,120	6,798	85,770
Moist Interior_Mountain_E1	0	5	5	1,266	1	533	359	5,881
Moist Interior_Plateau_A13	0	0	0	0	0	2	0	0
Moist Interior_Plateau_E2	0	10	5	85	30	546	218	4,061
Moist Interior_Plateau_E3	16	22	2	51	204	304	375	9,271
Moist Interior_Plateau_E4	127	162	66	367	1,674	2,271	2,037	12,606
Moist Interior_Plateau_E5	99	85	30	442	1,593	3,183	2,083	15,366
Northern Boreal Mountains_E6	0	0	0	0	0	103	0	1,704
Northern Boreal Mountains_E7	0	0	0	0	0	525	194	4,179
Northern Boreal Mountains_E8	0	0	0	0	0	0	0	379
Omineca_Mountain_E10	0	0	0	0	0	547	560	7,845
Omineca_Mountain_E11	0	14	0	33	0	1,709	302	8,973
Omineca_Mountain_E9	0	0	0	0	0	68	4	889
Omineca_Valley_E12	1	3	13	39	54	136	95	1,036
Omineca_Valley_E13	0	0	0	0	0	0	0	11
Omineca_Valley_E15	0	0	0	0	0	130	49	8,931
Omineca_Valley_E16	37	63	11	240	529	942	272	2,899
Omineca_Valley_E17	35	8	5	90	158	121	250	1,738
Grand Total	404	1,001	459	6,568	6,243	48,050	28,180	365,190

Appendix 2 Harvested Area by Timber Supply Block and mBEC Group

TSB/mBEC Group	Period 1	Period 2	Period 3	Period 4
24A	15,965	13,981	38,489	25,173
Northern Boreal Mountains_E6	2,025	2,725	2,124	4,320
Northern Boreal Mountains_E7	1,297	994	179	818
Northern Boreal Mountains_E8	743	327	9,059	3,974
Omineca_Mountain_E10	3,812	2,968	2,440	3,080
Omineca_Mountain_E11	623	233	397	2,094
Omineca_Mountain_E9	834	807	502	1,474
Omineca_Valley_E13	219	287	3,505	765
Omineca_Valley_E15	5,418	5,400	18,412	7,164
Omineca_Valley_E17	993	242	1,872	1,484
24B	47,118	43,037	40,722	45,615
Omineca_Mountain_E10	1,262	1,648	388	1,034
Omineca_Mountain_E11	18,232	19,515	10,406	22,135
Omineca_Valley_E12	642	568	27	38
Omineca_Valley_E14	6,310	3,506	1,658	3,113
Omineca_Valley_E15	16	15	1,170	473
Omineca_Valley_E16	8,154	6,436	5,471	4,302
Omineca_Valley_E17	12,503	11,349	21,601	14,520
24C	19,917	16,157	4,604	8,356
Moist Interior_Mountain_E1	48	21	43	59
Moist Interior_Plateau_E2	372	1,426	380	529
Moist Interior_Plateau_E3	308	248	425	784
Moist Interior_Plateau_E4	6,522	3,518	1,175	1,944
Moist Interior_Plateau_E5	8,133	4,764	1,608	2,212
Omineca_Mountain_E11	85	1,195	202	1,865
Omineca_Valley_E12	760	392	10	39
Omineca_Valley_E15	0	0	1	0
Omineca_Valley_E16	3,300	4,464	608	763
Omineca_Valley_E17	389	129	151	161
Grand Total	83,000	73,175	83,815	79,143

Appendix 3 Rehabilitated Area by Timber Supply Block and mBEC Group

TSB and mBEC	Period 1	Period 2	Period 3	Period 4
24A	182	86	3	7
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	0	0	0	2
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	131	62	3	5
Omineca_Valley_E17	51	25	1	0
24B	2,806	2,317	308	119
Moist Interior_Plateau_E2	0	0	0	0
Moist Interior_Plateau_E4	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	279	509	31	11
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	13	0	0	0
Omineca_Valley_E14	58	22	6	0
Omineca_Valley_E15	6	0	0	6
Omineca_Valley_E16	1,346	1,224	113	68
Omineca_Valley_E17	1,103	561	158	34
24C	5,535	3,188	1,056	281
Moist Interior_Mountain_E1	18	0	0	0
Moist Interior_Plateau_A13	0	0	0	0
Moist Interior_Plateau_E2	30	43	33	0
Moist Interior_Plateau_E3	120	117	109	83
Moist Interior_Plateau_E4	1,009	748	591	80
Moist Interior_Plateau_E5	2,588	1,055	98	51
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	43	78	0	0
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	44	44	0	0
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	0	0	0	0
Omineca_Valley_E16	1,592	1,097	183	17
Omineca_Valley_E17	92	6	42	50
Grand Total	8,523	5,592	1,368	407

Appendix 4 Fertilized Area by Timber Supply Block and mBEC Group

TSB and mBEC	Period 1	Period 2	Period 3	Period 4
24A	1	6	1,303	1,150
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	5	0
Omineca_Mountain_E10	0	2	83	16
Omineca_Mountain_E11	0	0	0	0
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	0	2	1,214	1,088
Omineca_Valley_E17	1	2	1	46
24B	623	5,077	9,879	11,333
Moist Interior_Plateau_E2	0	0	0	0
Moist Interior_Plateau_E4	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	11	174	114	431
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	13	37	5	37
Omineca_Valley_E14	1	84	192	124
Omineca_Valley_E15	0	2	43	3
Omineca_Valley_E16	128	682	2,095	2,087
Omineca_Valley_E17	470	4,098	7,430	8,652
24C	1,744	6,567	15,962	17,585
Moist Interior_Mountain_E1	0	9	27	9
Moist Interior_Plateau_A13	0	0	0	23
Moist Interior_Plateau_E2	12	165	391	458
Moist Interior_Plateau_E3	180	728	1,903	1,665
Moist Interior_Plateau_E4	664	2,399	5,718	6,222
Moist Interior_Plateau_E5	287	1,752	3,693	5,324
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	10	47	10	47
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	73	122	287	225
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	0	0	0	0
Omineca_Valley_E16	397	1,278	3,236	2,587
Omineca_Valley_E17	123	67	697	1,024
Grand Total	2,369	11,650	27,143	30,068

Appendix 5 Area with Enhanced Basic Silviculture by Timber Supply Block and mBEC Group

TSB and mBEC	Period 1	Period 2	Period 3	Period 4
24A	34	72	80	136
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	60	26
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	0	0	0	0
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	22	46	19	27
Omineca_Valley_E17	12	26	1	83
24B	483	1,392	430	1,575
Moist Interior_Plateau_E2	0	0	0	0
Moist Interior_Plateau_E4	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	0	1	8	0
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	25	11	9	6
Omineca_Valley_E14	8	22	21	100
Omineca_Valley_E15	0	3	0	9
Omineca_Valley_E16	290	772	80	396
Omineca_Valley_E17	160	582	312	1,064
24C	704	1,695	584	947
Moist Interior_Mountain_E1	0	0	0	0
Moist Interior_Plateau_A13	0	0	0	0
Moist Interior_Plateau_E2	7	43	70	117
Moist Interior_Plateau_E3	34	51	69	225
Moist Interior_Plateau_E4	189	460	186	241
Moist Interior_Plateau_E5	316	715	181	201
Northern Boreal Mountains_E6	0	0	0	0
Northern Boreal Mountains_E7	0	0	0	0
Northern Boreal Mountains_E8	0	0	0	0
Omineca_Mountain_E10	0	0	0	0
Omineca_Mountain_E11	0	0	0	0
Omineca_Mountain_E9	0	0	0	0
Omineca_Valley_E12	6	43	0	4
Omineca_Valley_E13	0	0	0	0
Omineca_Valley_E15	0	0	0	0
Omineca_Valley_E16	150	372	51	141
Omineca_Valley_E17	2	11	26	17
Grand Total	1,221	3,159	1,093	2,658