

Mackenzie TSA

AAC PARTITION DISCUSSION

December 2018

Ingenika River, Summer 2018



TODAY'S OBJECTIVES

- 1. Introductions**
- 2. Review 2014 AAC Decision**
- 3. Review Harvest Monitoring results**
- 4. Current state of the TSA**
 - Environmental Scan
- 5. Review Timber Supply analysis regarding AAC Partition Options**
- 6. Review Current Tenures**
- 7. Discuss Implementation and Monitoring**
 - Challenges and solutions

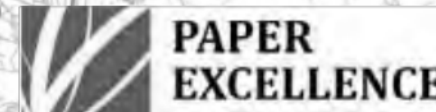
Mackenzie

Population: 3,738

Indigenous Population: 11.0%

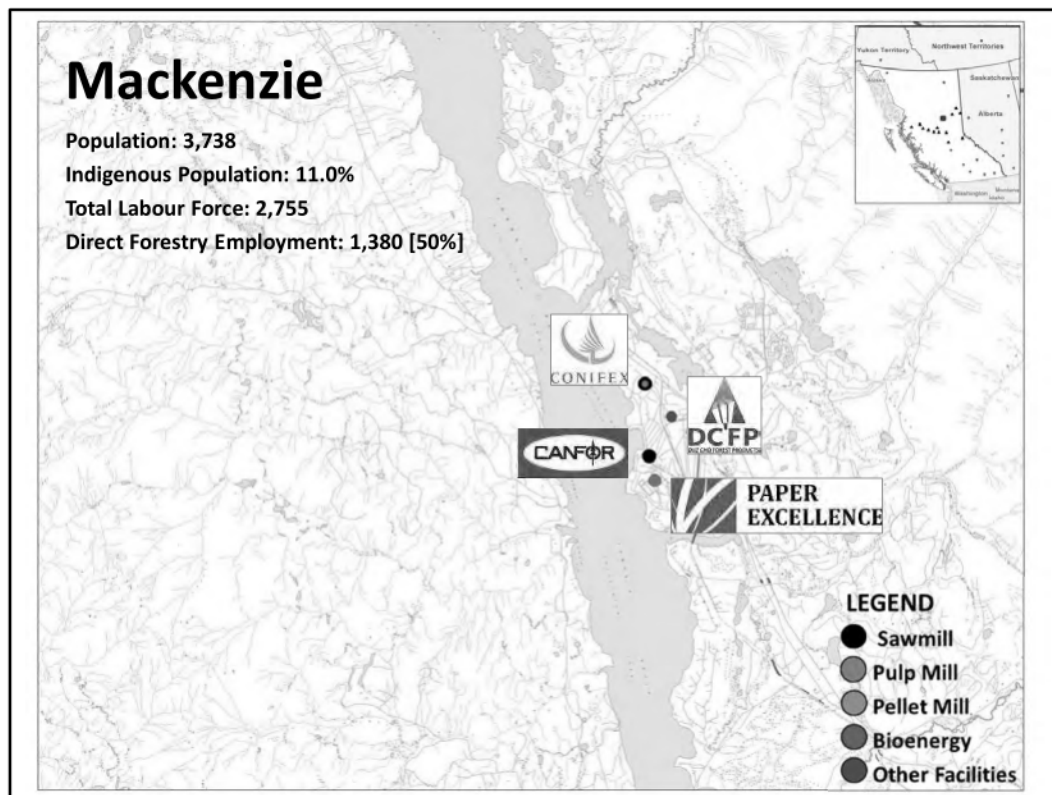
Total Labour Force: 2,755

Direct Forestry Employment: 1,380 [50%]



LEGEND

- Sawmill
- Pulp Mill
- Pellet Mill
- Bioenergy
- Other Facilities

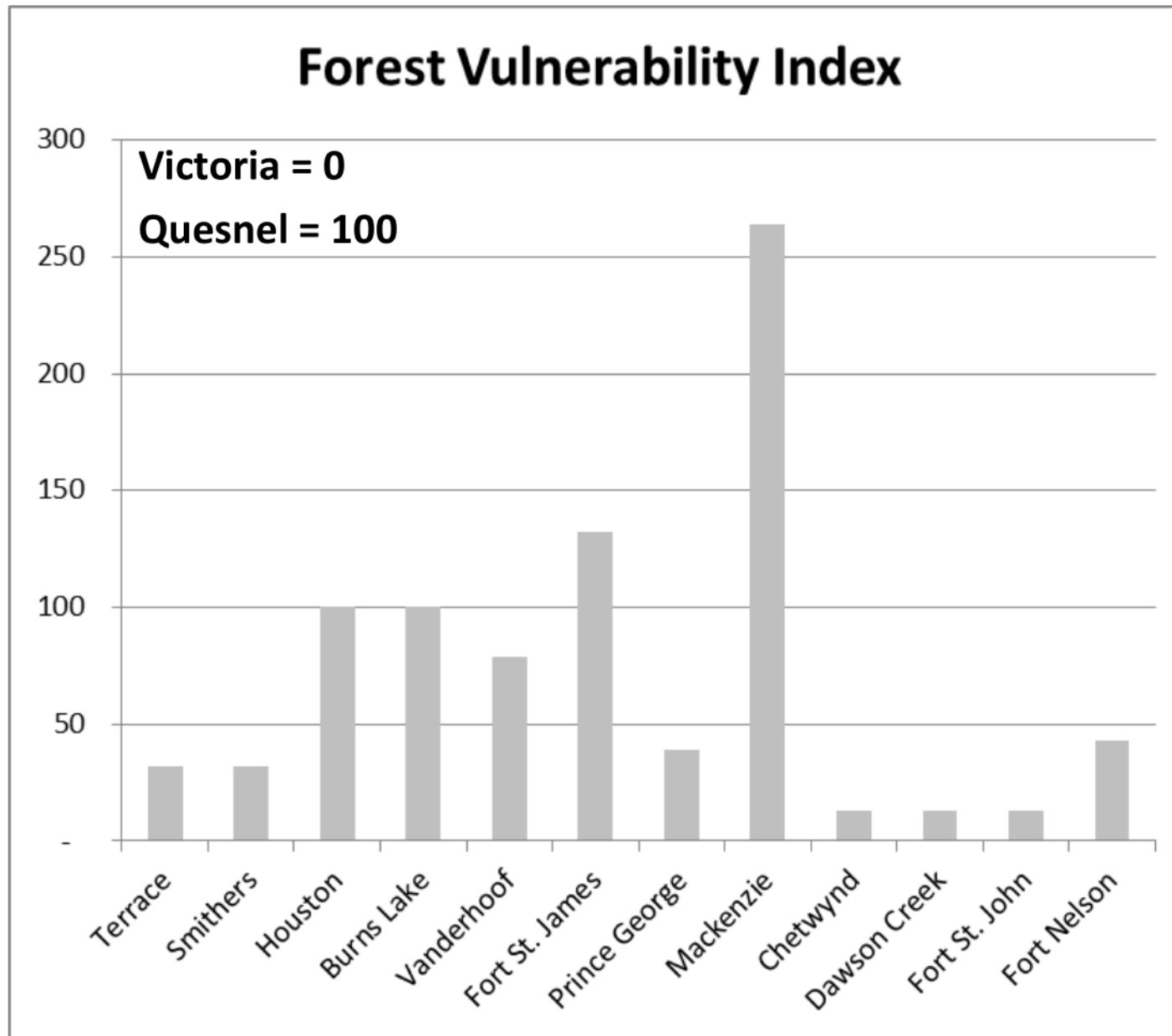


Population and Labour Force based on BC Stats 2006

Indigenous population based on 2011 Stats Canada (from Northern Health community health report)

- assessment indicates that most timber harvested in Mackenzie is processed in Mackenzie (exceptions are Dunkley, West Fraser)

Community Dependency on the Forest Industry





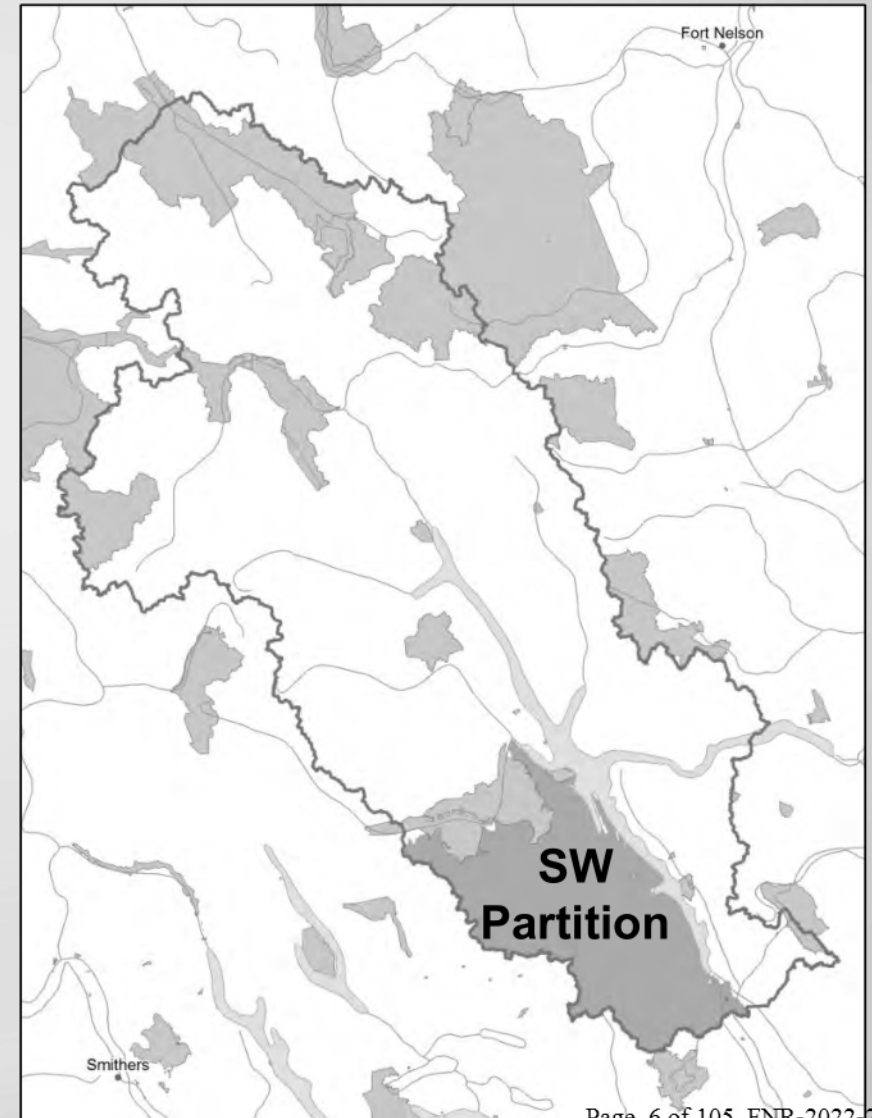
AAC DECISION

Effective November 14, 2014

AAC of 4.5 million m³/year

Partition:

- 950,000m³/year from non-pine leading coniferous stands
 - Of that partition, no more than 300,000m³/year attributable to non-pine leading coniferous stands from the south-west portion of the TSA





KEY CONSIDERATIONS

- Uplift ($1.5\text{M m}^3/\text{year}$) with expectation to focus on salvage of mountain pine beetle timber
 - Expectation that focus would be on $\geq 70\%$ pine stands
- Geographic partition to disperse harvest outside of the southwest portion of the TSA
 - Concentrated harvest
- Apportionment included $100,000\text{ m}^3/\text{year}$ for a deciduous-leading licence



HARVEST MONITORING

Elaine Bambrick

- Summary of harvest monitoring for current partition configuration





HARVEST MONITORING – all stands

Monitoring of all Stands in the TSA - Net Coniferous Volume (m3) issued								
Profile	PL70		PL Leading		Non-Pine Leading		Total Volume	
Date	Net Volume (m3)	% of Total	Net Volume (m3)	% of Total	Net Volume (m3)	% of Total	Net Volume (m3)	% of AAC Decision
Nov 2014 to Mar 2015*	946,991	49%	313,476	16%	663,227	34%	1,923,694	43%
April 2015 to Mar 2016	2,164,117	56%	711,620	18%	991,026	26%	3,866,763	86%
April 2016 to Mar 2017	1,890,620	40%	983,936	21%	1,837,906	39%	4,712,462	105%
April 2017 to Mar 2018	878,568	28%	658,577	21%	1,633,240	52%	3,170,385	70%
April 2018 to Nov 2018**	1,308,175	34%	856,898	22%	1,661,296	43%	3,826,369	85%
Total	7,188,471	41%	3,524,507	20%	6,786,695	39%	17,499,673	97%
Average	1,797,118		881,127		1,696,674		4,374,918	
AAC Decision	3,550,000				950,000		4,500,000	
FLNRO Monitoring based on cruise data								
* Partial Year; ** includes permits submitted for issuance (pending)								

PL70 = PL Dominant, ≥70% PL
 PL Leading = PL Dominant, PL 50-70%
 Non-Pine Leading = PL <50%



HARVEST MONITORING – pine

Monitoring of pine-leading Stands in the TSA - Net Coniferous Volume (m3) issued						
Profile	PL70		PL Leading		Total Volume	
Date	Net Volume (m3)	% of AAC Decision	Net Volume (m3)	% of total pine-leading	Net Volume (m3)	% of total***
Nov 2014 to Mar 2015*	946,991	27%	313,476	25%	1,260,467	36%
April 2015 to Mar 2016	2,164,117	61%	711,620	25%	2,875,737	81%
April 2016 to Mar 2017	1,890,620	53%	983,936	34%	2,874,556	81%
April 2017 to Mar 2018	878,568	25%	658,577	43%	1,537,145	43%
April 2018 to Nov 2018**	1,308,175	37%	856,898	40%	2,165,073	61%
Total	7,188,471	51%	3,524,507	33%	10,712,978	75%
Average	1,797,118		881,127		2,678,245	
AAC Decision	3,550,000		no target		3,550,000	
FLNRO Monitoring based on cruise data						
* Partial Year; ** includes permits submitted for issuance (pending); *** % of unpartitioned volume (3.55 million) if all pine-dominant stands are included.						

PL70 = PL Dominant, ≥70% PL
PL Leading = PL Dominant, PI 50-70%

Non-Pine Leading = PL <50%

AAC Decision Reminder:

4.5M m³/year of which 3.55M m³/year is not partitioned by profile:

- Expectation that harvest will be from pine-leading stands in which *pine represents at least 70% of the total stand volume* (or from deciduous leading stands)



HARVEST MONITORING

non-pine partition

Monitoring of Non-Pine Partition in the TSA - Net Coniferous Volume (m3) issued						
Profile	SW Partition Zone		Outside SW Partition		Total Volume	
Date	Net Volume (m3)	% of AAC Decision	Net Volume (m3)	% of AAC Decision	Net Volume (m3)	% of AAC Decision
Nov 2014 to Mar 2015*	656,841	219%	6,386	1.0%	663,227	70%
April 2015 to Mar 2016	701,198	234%	289,828	45%	991,026	104%
April 2016 to Mar 2017	1,234,269	411%	603,637	93%	1,837,906	193%
April 2017 to Mar 2018	1,276,995	426%	356,245	55%	1,633,240	172%
April 2018 to Nov 2018**	869,971	290%	791,325	122%	1,661,296	175%
Total	4,739,274	395%	2,047,421	79%	6,786,695	179%
Average	1,184,819		511,855		1,696,674	
AAC Decision	300,000		650,000		950,000	
FLNRO Monitoring based on cruise data						
* Partial Year; ** includes permits submitted for issuance (pending)						

NEW CRUISE PLANS

- SW Partition area:
 - ~ 570,000 m³ (6,000 ha & 95m³/ha avg.) in Sx-leading VRI polygons*
- Continued pressure on non-pine in the SW partition area.

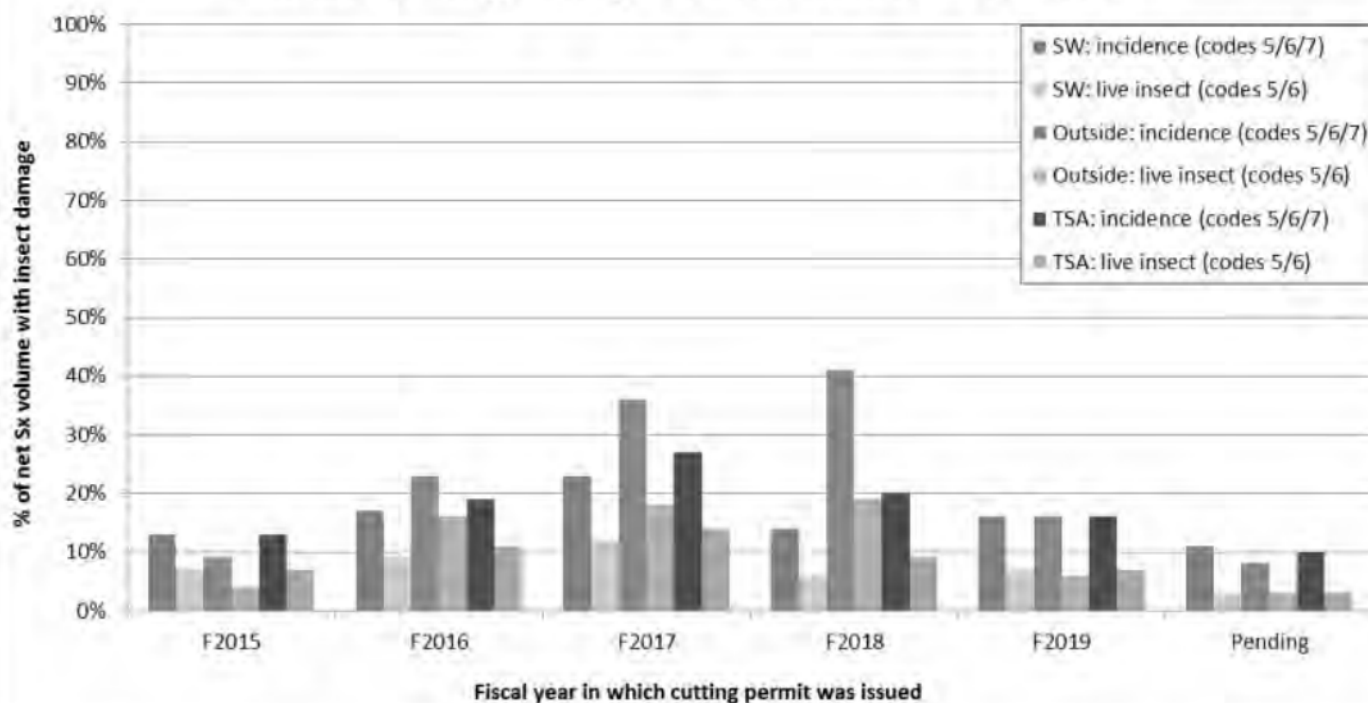
* Excludes BCTS



HARVEST MONITORING

non-pine partition & Spruce Beetle

Insect Damage on Spruce - Based on Cruise Data



Ground Surveys are Increasing!

Non-pine leading blocks submitted Nov, 2017 – Nov 2018

Total # of blocks	# Blocks Ground Surveyed
170	44

Percent of blocks ground surveyed: **26%**

Historically: **< 5%**



ENVIRONMENTAL SCAN OVERVIEW

Focus on:

- Spruce beetle outbreak
- Pine shelf life
- Caribou Recovery Program
- Economic operability
- Harvest performance – deciduous, balsam
- Collaborative stewardship initiatives – ESI, RSEA, CSF
- Landscape- and stand-level biodiversity
- First Nations – overview and tenures
- Other issues?




Spruce Beetle Outbreak

(Graham Burrows & Jeanne Robert)

- Update regarding outbreak status
- Shelf life study – preliminary results



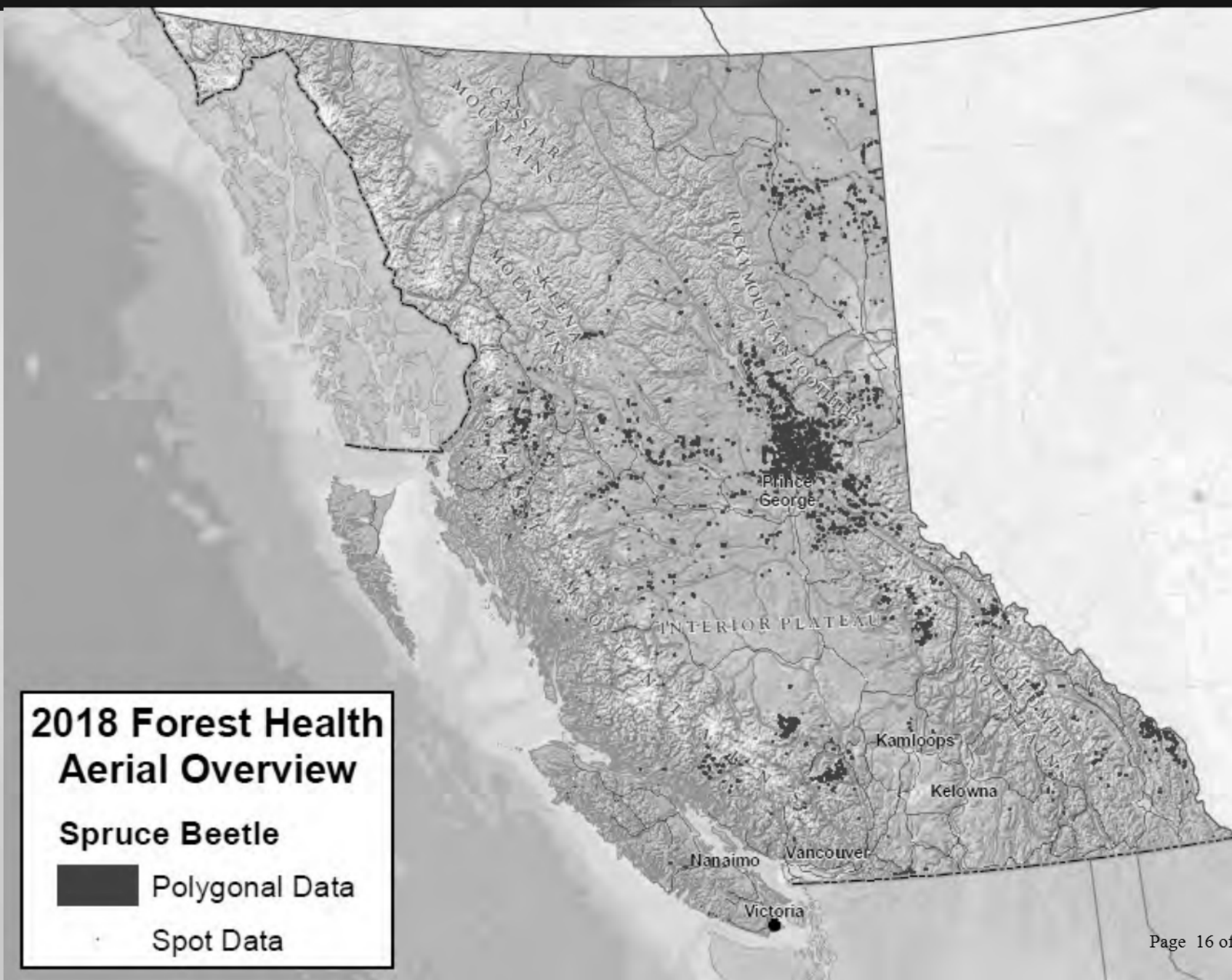
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Mackenzie A - change in:	Annual	Winter	Spring	Summer	Fall
Precipitation (%)	-21.2	-51.0	-9.1	-33.0	-4.2
Mean Temperature (°C)	2.0	3.6	1.4	2.0	1.2
Max Temperature (°C)	0.4	0.1	-0.6	1.0	3.7
Min Temperature (°C)	10.0	6.7	3.5	2.3	3.6
	1971-2018				
	Bold statistically significant $p < 0.05$				





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2018 Forest Health Aerial Overview

Spruce Beetle

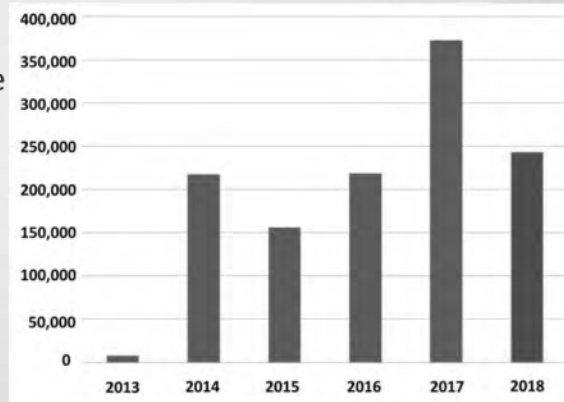
 Polygonal Data

 Spot Data



Omineca AOS

- **2014** – Infestation detection. ↑↑↑
- **2015** – Outbreak declared Mackenzie and Prince George Timber Supply Areas.
- **2016** – Growth continues in Omineca Region.
- **2017** – Continues to expand.
- **2018** – Reduced attack area

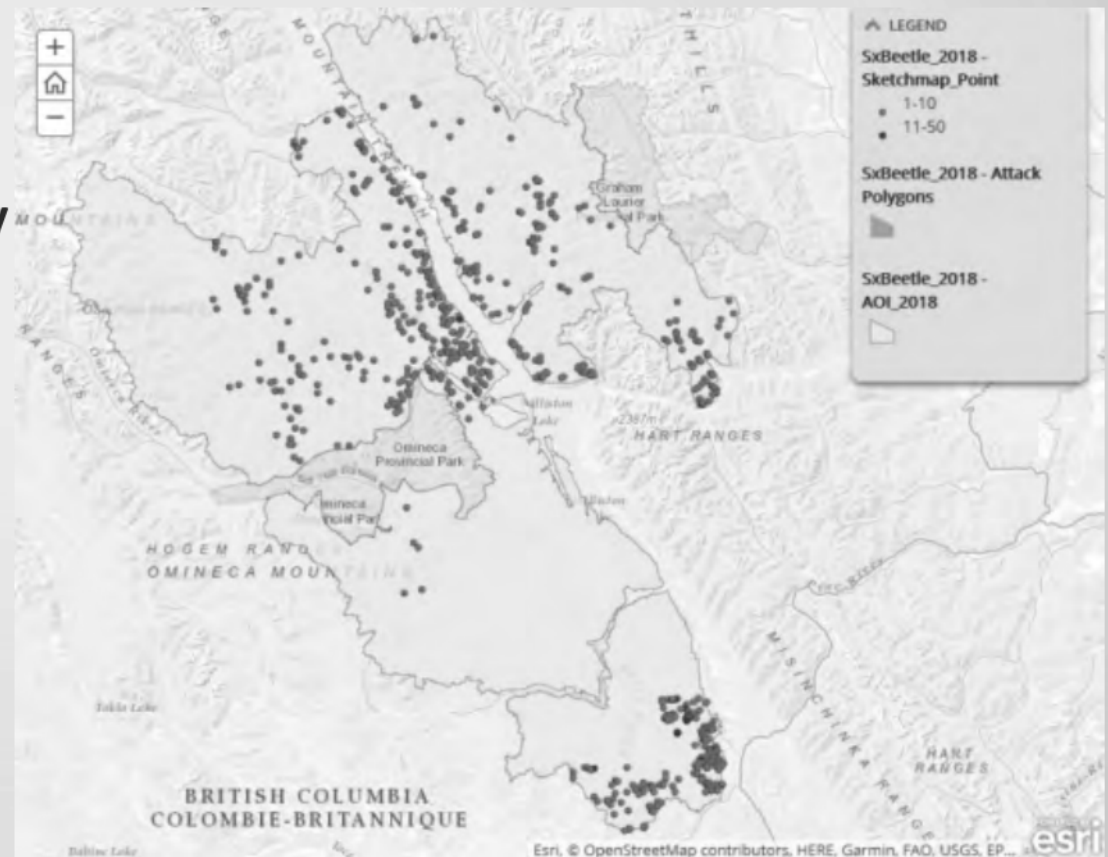


Take home is we are still very much in outbreak conditions, and it could go either way next year. Could see decrease,



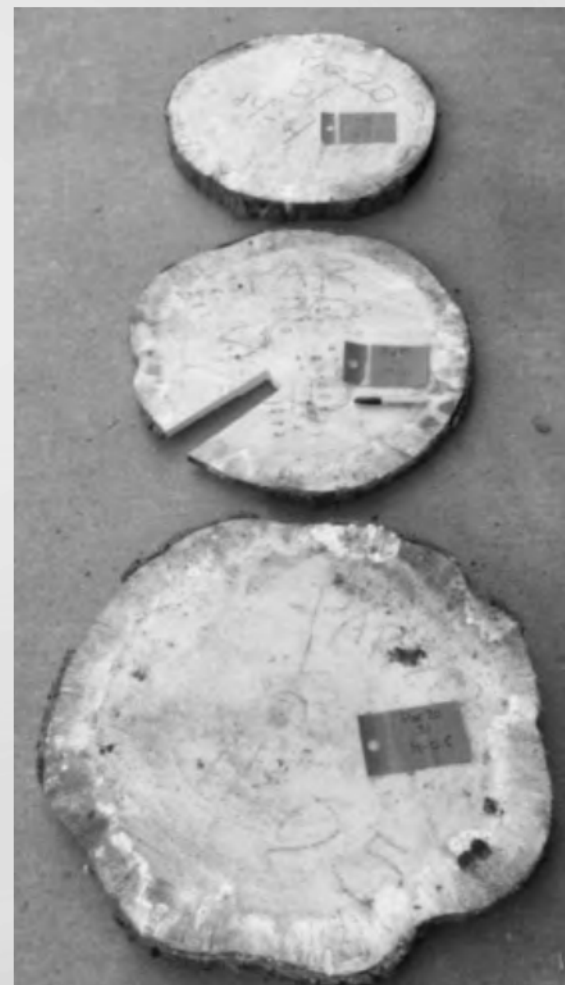
2018 DMK Surveys

- Heli-GPS focused in Northern parts of TSA
- Survey identified mostly points (1-10 trees)
- Ground surveys currently focused in Chunamon and Ospika (1860ha)





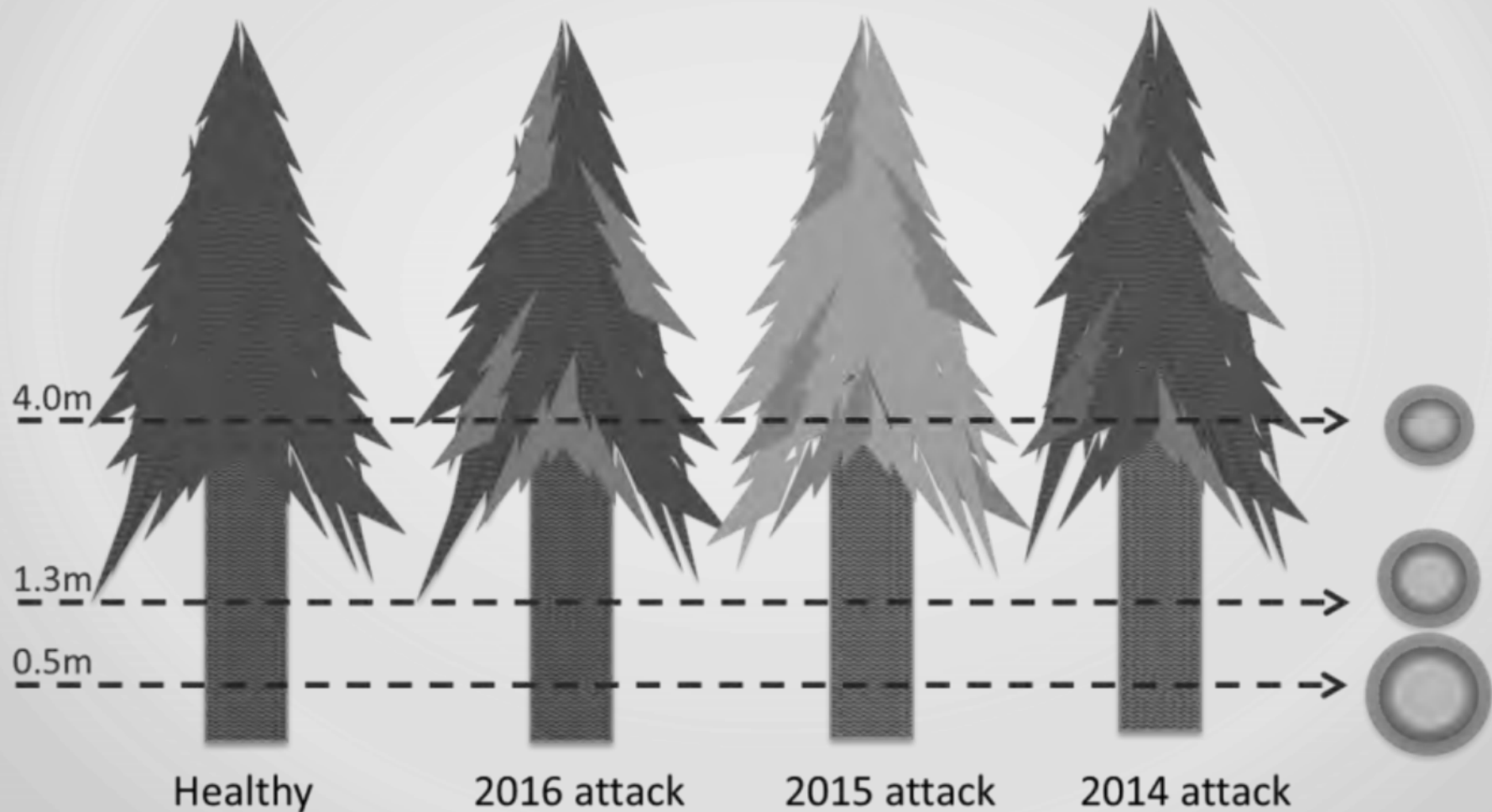
Research on Shelf Life





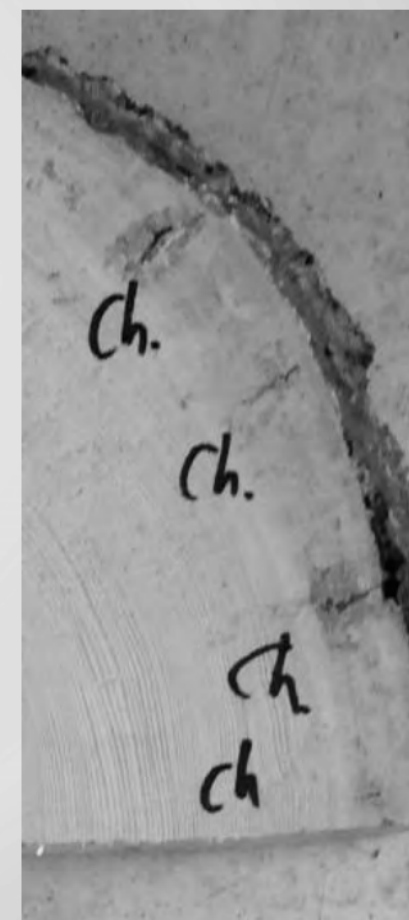
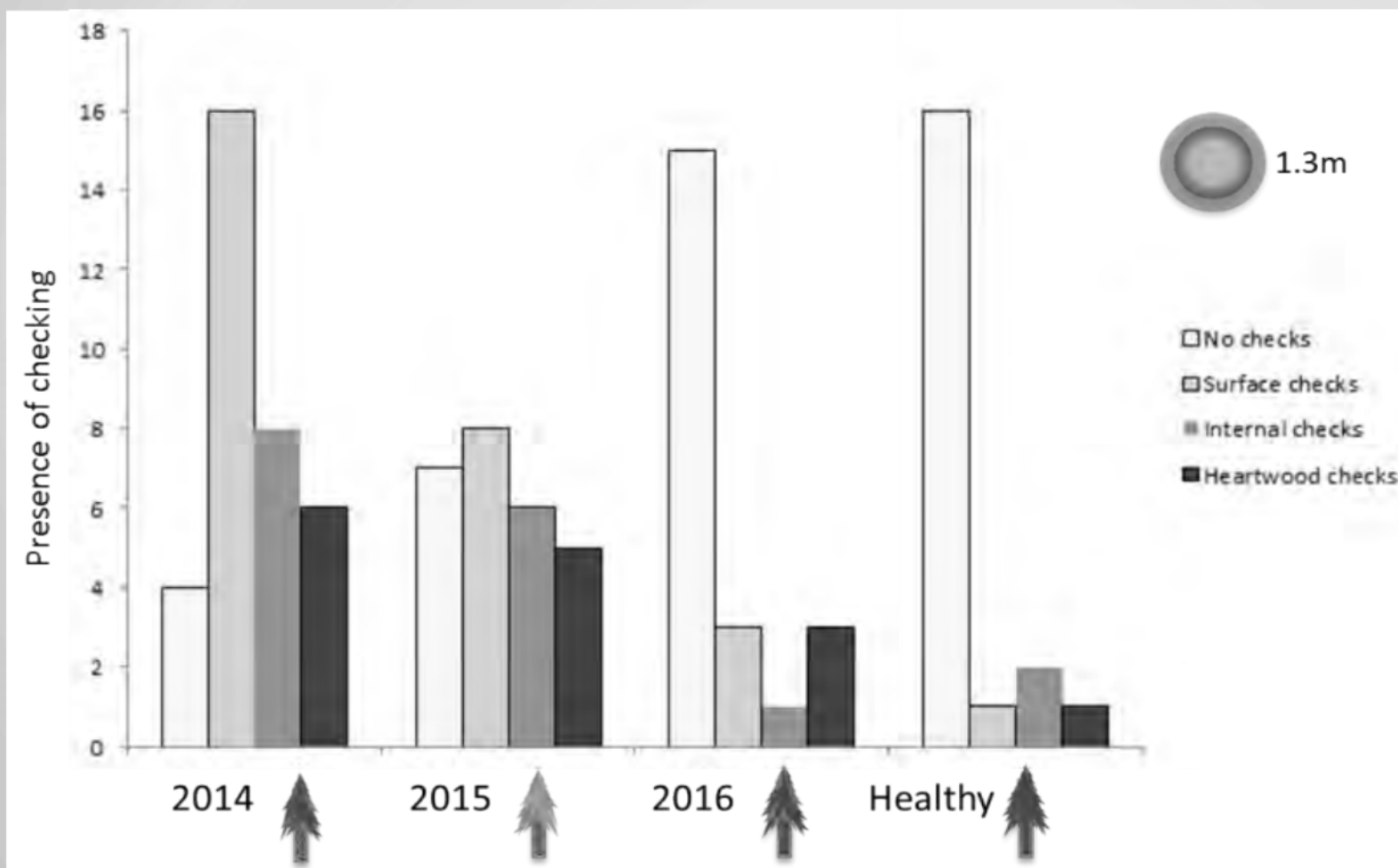
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Year 1 (2017) sampling: 20 sites north of Prince George



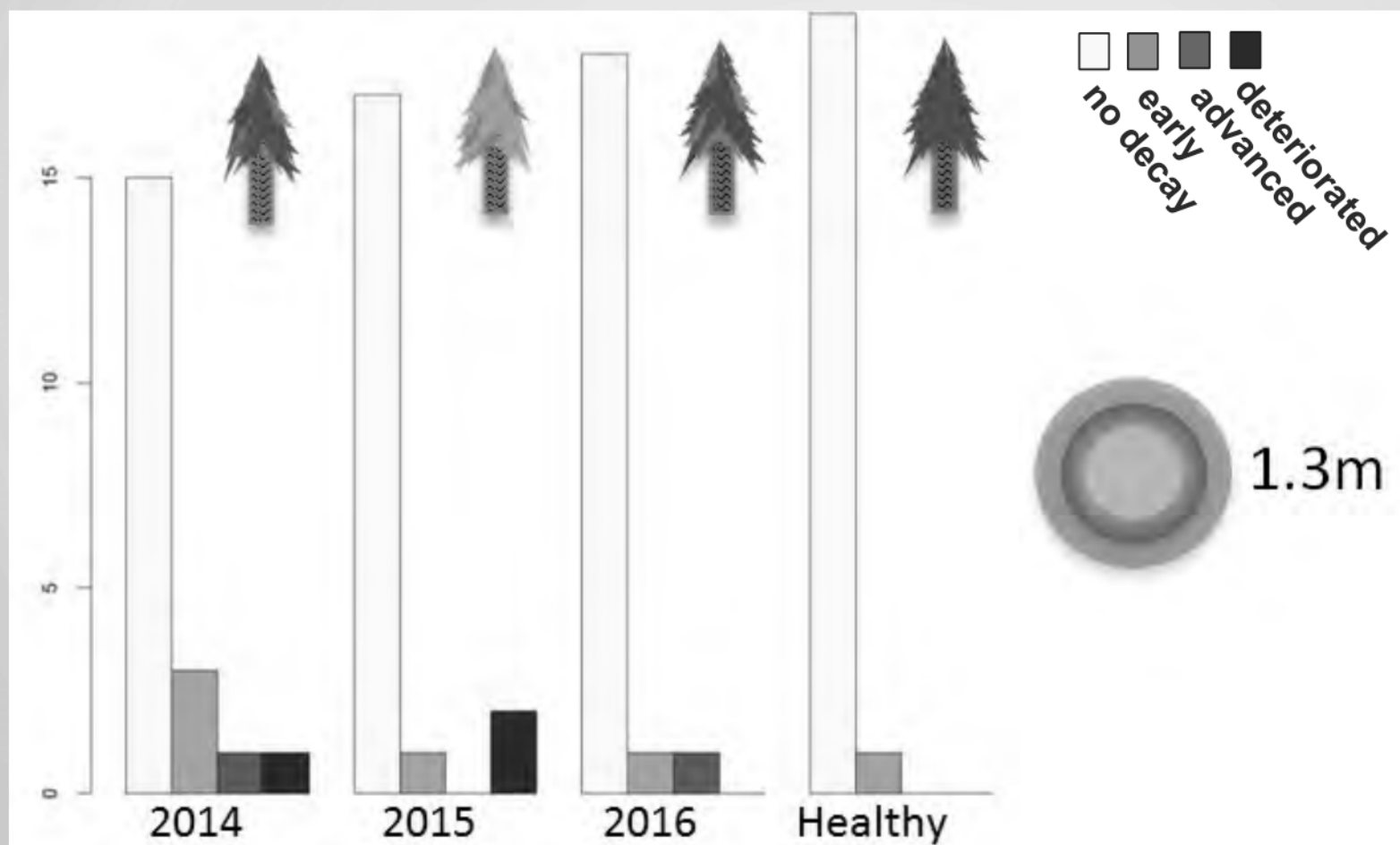


Checking



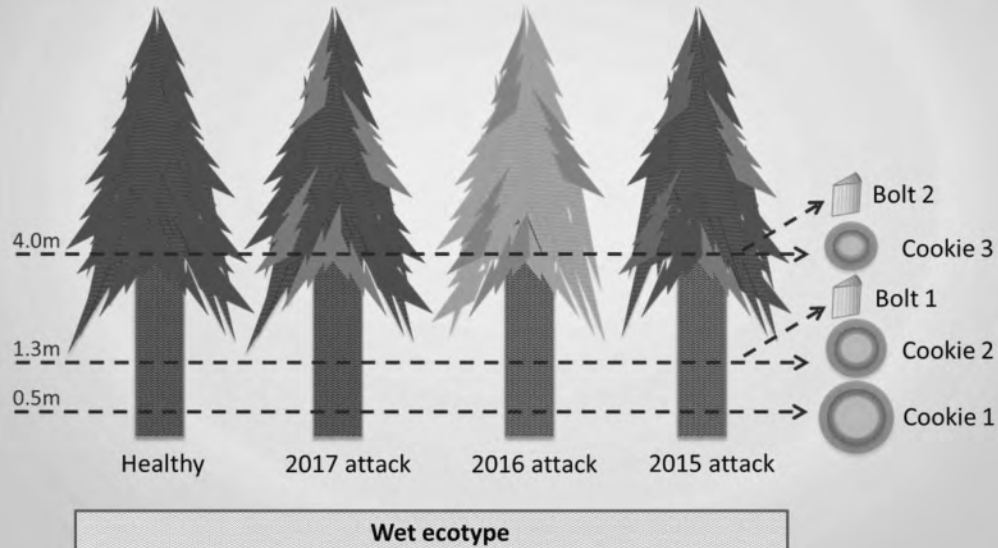


Decay





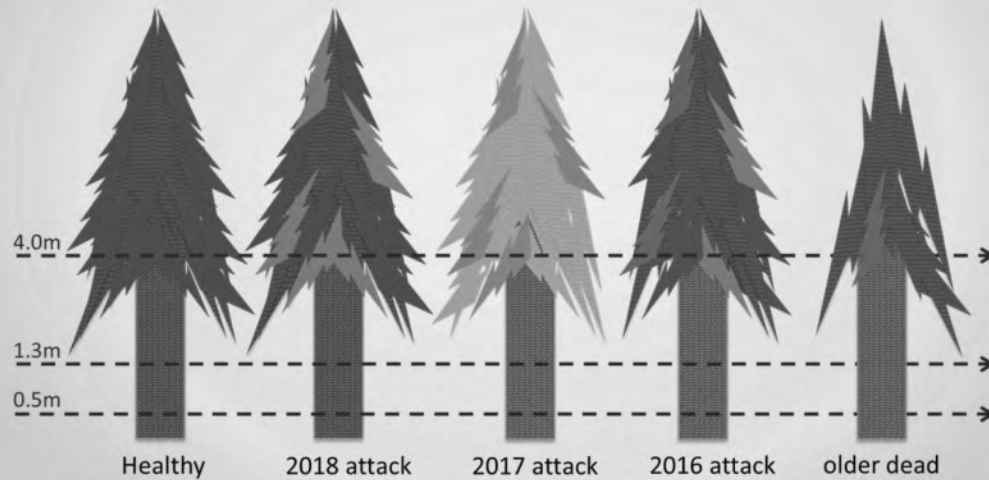
Year 2 (2018) sampling: 20 sites east of Prince George



2 bolts were used to sample for deisel staining.



Year 3 (2019) sampling: 20-60 sites near Mackenzie



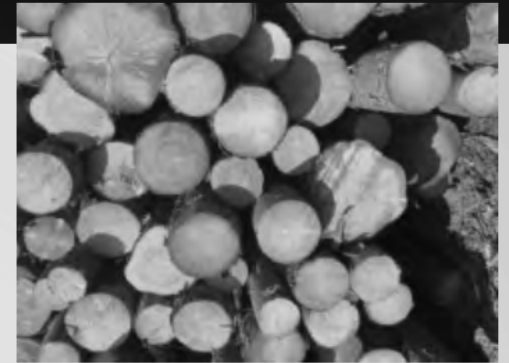
Contract process started

Take whatever money she has left. 20 sites per area, for three areas. Promised the mayor of Mackenzie. Can show



Pine Salvage

(Ryan Bichon & Trudy Tremblay)



- Mack Fibre license and NFLR's uplift for MPB took Pine vol.
- Licensee performance and upcoming harvest plans indicate a move to spruce leading.
- North TSA has healthy and longer shelf life in Pine
- Area SE may have vol of pine remaining (BCTS) affected by blowdown
- Cutblock configuration, not by stand, better pine component harvested leaving smaller poor quality not feasible to take later





Caribou Recovery Program

(Heather Wiebe)

Southern Mountain Caribou – Central DU

- Scott East, Moberly (Klinse-za), and Kennedy Siding herds
- Included in Section 11 and Partnership Agreement negotiations
- High elevation habitat protection
- Kennedy Siding LEWR WHA expansion
- BCTS is avoiding high elevation core habitat in the Southeast of TSA





Caribou Recovery Program

Southern Mountain Caribou – Northern DU

- Chase, Wolverine, Takla and Graham herds
- Habitat protection and GWMs established under UWR-7-007
- *BCTS TPG Best Management Practices for Forestry Activities Affecting Caribou in the Wolverine and Scott West Caribou Ranges* (Cichowski and McNay 2016)
- Protection of low to mid elevation habitat has been expressed as a priority by Tsay Keh Dene

Northern Mountain Caribou

- Finlay, Gataga, Frog, Thutade and Spatizi herds
- Low likelihood of development pressure from forestry



Economic Operability

(Ryan Bichon)

- Stumpage & Lumber Prices
- Log Quality (Pl vs Sx vs Bl) (Pulp)
- Lake Transport vs Truck Haul (distance, capacity, water levels)
- Infrastructure Investments -Remote camps, 3 new this year, 6 total
- Slope (cable/winch assist)
- First Nations & No-Go Zones
- Utilization Standards & Practices



Deciduous / Balsam Performance

(Darin Hancock)

Balsam

- TSA harvest monitoring (as reported by FAIB) indicates utilization of Balsam of $\sim 900,000\text{m}^3/\text{year}$, much of this is bycatch during harvest of spruce leading stands
- Canfor is regularly processing Balsam (semi-weekly runs)

Deciduous

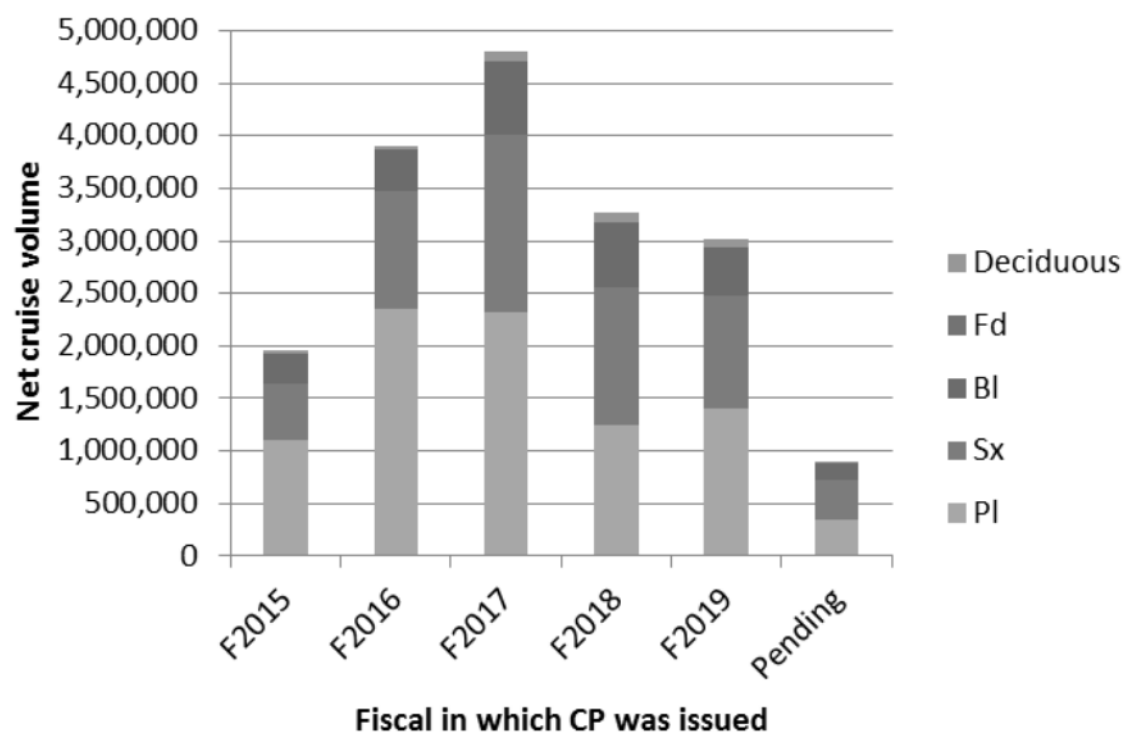
- Apportionment of 2014 included $100,000\text{m}^3/\text{year}$ category for deciduous licence
- Paper Excellence holds deciduous licence but no FSP submitted to date



Deciduous / Balsam Performance

(Darin Hancock)

Net cruise volume and species composition



Fiscal	BI	Deciduous
F2015	288,778	37,246
F2016	395,688	29,736
F2017	704,017	91,899
F2018	608,067	94,397
F2019	454,280	73,118
Pending	162,215	15,995
Total:	2,613,045	342,391



Collaborative Stewardship

(John Pousette)

Omineca ESI

- Moving forward on Immediate Measures
- Overlaps with X% of TSA16 THLB

Northeast RSEA

- Overlaps with X% of TSA16 THLB

Collaborative Stewardship Framework

- Working with Kaska (Kwadacha Nation) on collaborative management of wildlife
- Predominantly outside the THLB



Biodiversity

(Miodrag Tkalec)





Landscape Level Biodiversity

- Landscape level retention has 3 components in DMK
 - ❖ Ministerial Order for “Spatial Land Use Objectives on part of the Mackenzie Forest District Area” (OGMA’s),
 - ❖ Ministerial Order for “Non-Spatial Landscape Biodiversity Objectives in the Mackenzie Forest District”, and
 - ❖ “Order Establishing Provincial Non-Spatial Old Growth Objectives”



Landscape Level Biodiversity

OGMAs

- Established in following LU's: Twenty Mile, Gaffney-Manson River, Misinchinka, Tudyah B, Gillis, Klawli, Parsnip, Connaghan Creek, Eklund, Jackfish, South Germansen, Upper Manson and Kennedy.
- Spatial integrity of OGMA's is generally respected by all licencees.
- So far only minor amendments have been approved by DM to minimize safety risk and deal with unduly operational constraints. Impacted areas have been replaced.
- Major amendments to the two OGMA polygons in Cut Thumb and Tutu drainages have been requested recently.



Landscape Level Biodiversity

Non-Spatial Biodiversity Order

- Jointly monitored by all major licensees through Landscape Objectives Working Group (LOWG)
- Government has one representative in Mackenzie LOWG that has a role to support, provide direction and observe, and has no voting power.
- Latest analysis results are provided at the end of October 2018.



Landscape Level Biodiversity

Continued

- Licensees mostly meet the non-spatial Old Growth targets.
 - Seven (7) BEC groups in various LU are currently in Old Growth deficit state.
 - Only two (2) BEC groups are in deficit due to harvesting practice:
 - ❖ Nation LU (-57.9ha) – BEC 5 (SBS vk, SBSwk2)
 - ❖ Philip, Philip Lake Tudyah (-49.3 ha)– BEC group 5 (SBS vk, SBSwk2).



Landscape Level Biodiversity

Continued

- Spatial distribution of cutblocks:
 - ❖ Concentrated harvesting in south/SW,
 - ❖ Shift towards the larger patches.



Stand Level Biodiversity

- Licensee performance in period June 1st, 2014 – May 31st, 2018:
 - ❖ Average size of WTR = 15.2 ha,
 - ❖ Average cut-block size = 51.9 ha
 - ❖ Largest block was 445.2 ha in size with the WTR of 78.9 ha (17.7%),
 - ❖ Smallest block was 0.4 ha in size with the WTR of 0.1 ha (25%).

These number are generated from RESULTS application report:
“RSLTRPT_RSLT_WLDLF_TREE_RTN1A_CSV.rpt”



Landscape & Stand Level Biodiversity

Concerns:

- Disregard for existing secondary stand structure in pine and IBS salvage stands.
- Poorer utilization with the shift into green stands.
- Exceeding Old Growth target in some LU's,
- Commonly exceeding patch size distribution target, particularly in large patch size.



Imminent GAR Orders

(Kevin Hoekstra)

- Caribou WHAs
- Proposed and draft Fisheries Sensitive Watersheds
- Bull Trout WHAs
- Fisher WHAs

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s.13 ; s.16



LICENSEE COMMUNICATIONS

(Darin Hancock)

What is the District hearing from licensees?



TIMBER SUPPLY ANALYSIS

(Kelly Izzard)

- Kelly to provide overview of analysis work to date



TENURES & APPORTIONMENT

			<u>Partition</u>	
	Total m3	%	Conventional	%
Forest Licences Replaceable	2,015,404	44.79	2,015,404	44.79
Forest Licences Non-Replaceable	1,244,596	27.66	1,244,596	27.66
First Nations Woodlands Tenure	200,000	4.44	200,000	4.44
Non Replaceable Forest Licence - First Nations	100,000	2.22	100,000	2.22
BCTS Timber Sale	900,000	20.00	900,000	20.00
Licence/Licence to Cut				
Community Forest Agreement	5,000	0.11	5,000	0.11
Forest Service Reserve	35,000	0.78	35,000	0.78
Total	4,500,000	100.00	4,500,000	100.00



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C) COMMITMENTS

			Total m3	Conventional	Deciduous leading stands
Forest Licences Replaceable	A15384	CANADIAN FOREST PRODUCTS LTD.	1,082,904	1,082,904	0
	A15385	CONIFEX MACKENZIE FOREST PRODUCTS INC.	632,500	632,500	0
	A93631	1040806 B.C. LTD.	300,000	300,000	0
	A94309	TSAY KEH ECONOMIC DEVELOPMENT CORPORATION	100,000	100,000	0
Total			2,115,404	2,115,404	0
Forest Licences Non-Replaceable	A86661	THREE FEATHERS LIMITED PARTNERSHIP	88,000	88,000	0
	A90829	CHU CHO FORESTRY LLP	138,667	138,667	0
	A90832	CHU CHO FORESTRY LLP	9,924	9,924	0
	A93965	MACKENZIE PULP MILL CORPORATION	100,000	0	100,000
Total			336,591	236,591	100,000
Non Replaceable Forest Licence - First Nations	A94353	OBO FOREST MANAGEMENT LIMITED PARTNERSHIP	100,000	100,000	0
Total			100,000	100,000	0
Total Commitments			2,551,995	2,451,995	100,000

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s.13 ; s.16



AAC PARTITION MONITORING & IMPLEMENTATION

(Elaine Bambrick & Anthony Giannotti)

- Staff are exploring the option of implementing a partition order
 - Omineca staff are connecting with Cariboo Region staff regarding policy and procedures
- Monitoring will need to be transparent
- Monitoring options
 - ECAS vs. HBS vs. VRI based assessment
- Challenges and opportunities
- Reducing unforeseen consequences



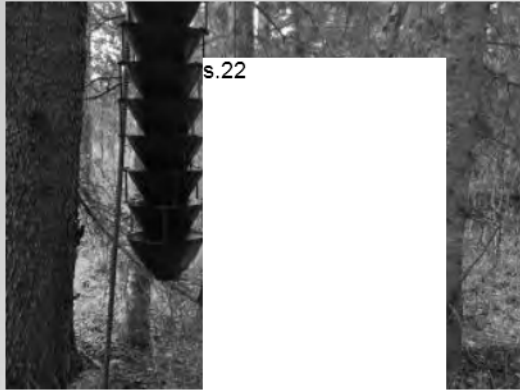
AAC PARTITION MONITORING

	VRI	ECAS	HBS
<i>Type of Information</i>	Inventory data	Cruise data	Scaled/billed data
<i>Details available:</i>	Species, volume, age, etc.	Species, volume, insect damage, live vs dead, etc.	Species, volume, log grades, etc.
<i>Limitations:</i>	Can differ significantly from what is on the ground	Volume differs from billed volume (scale-based permits)	No live/dead or insect information

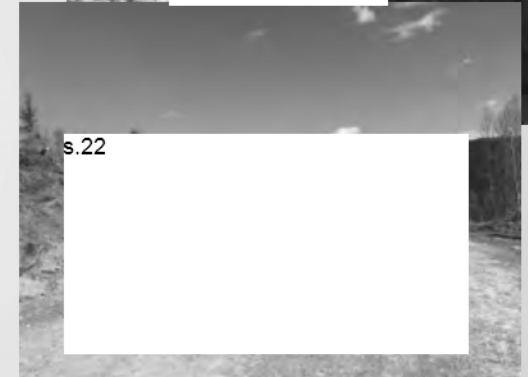
- Estimation/extrapolation may be required if partition relates to HBS data.
 - Depending on data needed (e.g. insect damage), manual data extractions may be required
- Methods need to be transparent and enforceable
- **TEST from CP stage all the way to cut control and volume attribution.**



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DISCUSSION





Canadian Forest Products Ltd.

and affiliated companies

December 7, 2018

Diane Nicholls, RPF
Chief Forester
PO Box 9352
Stn Prov Govt
Victoria, B.C. V8W 9M1

Re: Mackenzie Timber Supply Area AAC Partition Considerations

Dear Ms. Nicholls:

Thank you for taking the time to meet with the Licensees and allowing us to share our thoughts and concerns in regards to potential revisions to the current Mackenzie TSA AAC partition. During the meeting, several issues and considerations were raised and Canfor would like to take this opportunity to provide these to you now.

Below is a summary of the aspects of a future partition that was discussed and Canfor's perspective on proposed amendments to the existing partitions.

- 1) **Geographic Partition:** Several thoughts and concerns were identified with a revision to the geographic partition, however, it was generally agreed that one needs to exist. In short, the following are the key items for consideration:
 - a. Certain licensee operating areas have been disproportionately impacted by forest health factors, particularly those in the southern regions.
 - b. The level and nature of harvest within the southern zone over the last 5-7 years, focusing on pine salvage and spruce beetle impacted stands.
 - c. Limitations in the amount of volume that can be water transported, due primarily to capacity issues (both seasonal and infrastructure resources) and Williston reservoir level constraints.
- 2) **Tree Species vs. Stand Level (Damaged) Partition:** From Canfor's perspective, the partition should be established in order to promote the harvest of forest health impacted timber stands. It was identified that there needs to be some rigor and thought in defining exactly what constitutes a damaged stand and/or a priority forest health stand. It was further stated that whatever form a partition takes, it must not cause forestry practitioners to make poor forest management choices, as has been experienced in some cases. To illustrate, Licensees cited examples where timber was being alienated as foresters were being compelled to avoid prescribing harvest of non-damaged stands in an effort to target only those trees that were damaged.
- 3) **Partition Performance Monitoring:** In regards to monitoring the performance of the application of a partition, there appear to be no issues identified from a geographic perspective. However, concerns were expressed about how other partitions have been monitored and reported in the past, and hence the need to change the method for tracking and reporting was explored. Our suggestion was to not utilize a cut control or AAC-based tracking system (i.e. HBS). Rather, as noted above, if the partition was designed to encourage or direct harvest towards addressing priority timber stand types, then utilizing gross cruise volumes as the indicator of annual harvest performance would be a superior metric to use. Furthermore, it is our view that measuring and reporting harvest performance at the stand level requires that the entire stand volume be categorized as meeting the established criteria for being labeled a damaged or priority stand (e.g. 100% of a stand volume is counted as meeting the partition). This is consistent with how other TSA's (eg. Prince George) measure and report this indicator.



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- 4) Harvesting the TSA Profile: A key consideration in establishing any partition is to ensure that the harvesting will encourage operators to harvest the profile in a balanced and sustainable fashion. It is our view that any new or revised partition must take this into account by balancing the harvest profile across the TSA, over a reasonable time frame. This would include considerations for damaged stands, species, economics (I.e. geographic), and steep slope harvesting.

In conclusion, Canfor proposes the following as an example of an amended partition that will be implementable and achievable:

- Establish a geographic North-South split between truck and water transport (per attached map, following an East-West line just north of the Strandberg Log Dump).
 - o Establish a maximum volume of 3 million m³/yr within the South Zone.
- Of the 4.5 million m³/yr AAC:
 - o Establish a maximum amount of undamaged stand volume within the South Zone.
 - o This would be based on the available timber stands within that Zone, after accounting for the expired shelf life of dead pine leading stands and eventually, for dead spruce leading stands as well.

As noted earlier there remains some work in defining the attributes for priority stands, be they damaged stands or forest health stands, along with a methodology for tracking and reporting harvest performance in meeting the partition.

We suggest the partition volumes referenced above only as a starting point; there will undoubtedly be refinement of these values informed by more detailed analysis of the remaining timber inventory, harvest performance and consideration for the operating conditions and constraints within the Mackenzie TSA. We offer our assistance in working with FAIB staff in order to determine an appropriate value for any of the partitions that will ultimately be established.

Finally, we would be remiss in not taking this opportunity to point out the most recent regulation B.C. Reg.252/2018 – *Refusal of Cutting Permit or Road Permit Regulation* that is being brought into force on January 8, 2019. This Regulation is yet another example of a constraint that has the potential to hamper our ability to access certain priority stands in order to meet a partition requirement. We urge you to give careful consideration to this potential conflict as you determine an appropriate amendment to the existing partition.

Once again, we sincerely appreciate the opportunity to provide input to revisions to the Mackenzie TSA AAC partition. If you have any questions, please contact me at 250-962-3399.

Thank you for your consideration.

Sincerely,

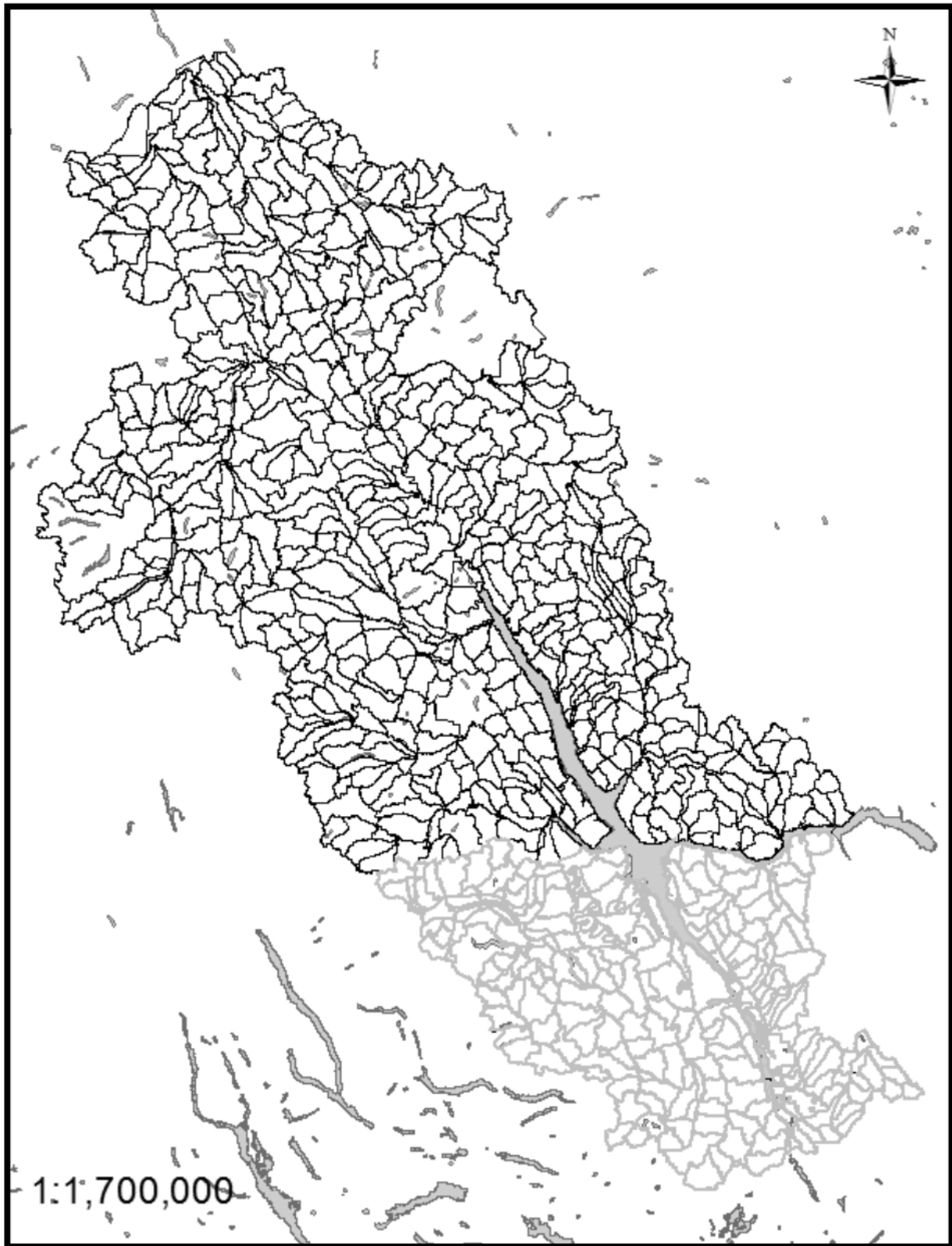
Kalin Uhrich
Chief Forester
Woodlands Canada

Cc: Greg Rawling, MFLNRORD Regional Executive Director, Omineca
Russ Martin, General Manager North Region, Woodlands Canada
Kevin Horsnell, Vice President, Woodlands Canada
Terry Lazaruk, Strategic Planning Coordinator, Woodlands Canada
Peter Baird, Director, Forest Planning, Woodlands Canada



Canadian Forest Products Ltd.

and affiliated companies





Date: February 6th 2019

Prepared by: Graham Burrows, FIT & Elaine Bambrick, RPF

RE: Monitoring BCTS Timber Sale Licenses awarded, posted, and planned in the 2018/2019 fiscal year.

Introduction

Epidemic levels of Spruce Beetle have been present in the Mackenzie TSA since 2015, which has been a contributing factor in harvest levels that currently exceed the existing non-pine leading partition in the southwest zone, as identified in the 2014 Allowable Annual Cut Determination for the Mackenzie TSA¹. Since the determination, the Mackenzie Natural Resource District (MNRD) has monitored the submission of cutting permits and Timber Sale Licenses (TSL), with specific attention being paid to harvest activity in the southwest partition zone. Of all major licensees in the Mackenzie TSA, BCTS has the highest proportion of spruce beetle infested stands in their operating area, with the highest concentrations outside the southwest zone, on the East side of Williston Lake south of the Peace Arm.

MNRD staff were recently made aware of a particular BCTS TSL currently advertised with a seemingly high volume of uninfested spruce being harvested in the southwest partition zone. A review of data available on this TSL was conducted, and subsequently precipitated a review of BCTS TPG Mackenzie's operations over fiscal 2018/2019. At the Mackenzie Spruce Beetle Working Group meeting in May 2018, BCTS Mackenzie committed to 1 million m³ of high priority spruce stands on their 2018/2019 Fiscal Year sales schedule, and presented their BCTS Mackenzie Spruce Beetle Action Plan which is described in more detail below.

Purpose

The purpose of this report is to summarize BC Timber Sales Prince George Business Area - Mackenzie Field Team TSLs with specific information regarding stand composition and Spruce Beetle management over the fiscal 2018/2019 year (April 1 2018 – March 31 2019). In particular, this report assesses the degree to which the BCTS Spruce Beetle Action Plan commitments are being met, and outlines a case study of the TSL of concern that was brought to MNRD's attention. Similar to a report that was created in October 2018, this report seeks to follow up with additional information and provide a more complete view of BCTS Mackenzie's fiscal year as it relates to the non-pine partition and spruce beetle management.

Overview

In the current fiscal year (April 1, 2018 to March 31, 2019), BCTS has awarded or posted (currently open for bidding) 24 TSLs in the Mackenzie Timber Supply Area (TSA). For each of the 24 TSLs, net area, partition zone

¹ 2014 TSR AAC Determination: A maximum of 950,000 cubic meters is attributable to non-pine leading coniferous stands. Of this partition, no more than 300,000 cubic meters is attributable to non-pine leading coniferous stands from the southwest portion of the TSA, west of Williston Lake and south of Omineca Provincial Park and Omineca Arm.

location, volume, species composition², and spruce beetle information has been summarized (Table 1). To create this summary, data was sourced from timber cruise compilations, Aerial Overview Surveys (AOS), Heli-GPS Spruce beetle surveys, the Forest Tenure Administration (FTA) application, the Official Notices System (ONS), as well as BC Bid. In addition to TSLs awarded or posted, there are three TSLs identified on the BCTS TPG sales schedule³ for the remainder of fiscal, and information has been summarized for these as well (Table 2). In total, there are 27 TSLs identified in the Mackenzie TSA: 25 are in the SW partition area and an estimated 387,894 m³ will contribute to the non-pine partition in the SW portion of the TSA (Table 3).

Table 1: BCTS TPG (Prince George Business Area) Mackenzie TSLs 'awarded' as well as those currently 'posted' on the ONS from 2018-04-01 to 2019-03-31. Rows highlighted in green are pine-leading TSLs and the row highlighted in blue is an aspen-leading TSL.

TSL	Posting End Date	TSL Status	TSL Pine Leading?	In SW?	IBS Aerial Polygon Overlap	TSL Net Area (ha)	TSL Species Distribution by Gross Volume	TSL Insect Damage to Spruce Volume	TSL net conifer volume (m ³)
A94362	2018-04-25	Awarded	Y	Y	0%	82.7	Pli: 72% Sx: 15% Bl: 13%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	16,654
A92411	2018-06-07	Awarded	N	N	100%	234.7	Pli: 2% Sx: 47% Bl: 49%	5-Grn-L: 5.4% 6-Grn-D: 14.4% 7-Gry-D: 21.9%	54,185
A84323	2018-06-20	Awarded	Y	Y	0%	338.1	Pli: 90% Sx: 8% Bl: 2%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	53,388
A95495	2018-06-22	Awarded	Y	Y	55%	156.9	Pli: 82% Sx: 8% Bl: 10%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	30,697
A92389	2018-06-28	Awarded	N	Y	85%	67.7	Pli: 5% Sx: 34% Bl: 61%	5-Grn-L: 4.7% 6-Grn-D: 2.9% 7-Gry-D: 3.5%	22,309
A84303	2018-07-03	Awarded	Y	Y	0%	203.4	Pli: 77% Sx: 18% Bl: 5%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	34,664
A95517	2018-07-04	Awarded	Y	Y	0%	265	Pli: 75% Sx: 23% Bl: 2%	5-Grn-L: 1.2% 6-Grn-D: 0.0% 7-Gry-D: 1.0%	54,371
A94393	2018-07-05	Awarded	Y	Y	0%	138.8	Pli: 85% Sx: 6% Bl: 9%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	32,232
A93644	2018-08-16	Awarded	N	Y	15%	190.7	Pli: 31% Sx: 36% Bl: 33%	5-Grn-L: 0.5% 6-Grn-D: 0.6% 7-Gry-D: 5.5%	35,721
A92402	2018-10-18	Awarded	Y	Y	0%	425.2	Pli: 59% Sx: 25% Bl: 16%	5-Grn-L: 3.5% 6-Grn-D: 0.0% 7-Gry-D: 3.5%	89,003
A92403*	2018-11-07	Awarded	Y	Y	0%	372.0	Pli: 58% Sx: 26% Bl: 16%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 10.2%	86,772
A92403*	2018-11-07	Awarded	N	Y	0%	51.4	Pli: 20% Sx: 42% Bl: 38%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 11.5%	14,211
A95497	2018-12-05	Awarded	N	Y	95%	91.5	Pli: 3% Sx: 51% Bl: 46%	5-Grn-L: 0.5% 6-Grn-D: 5.7% 7-Gry-D: 3.2%	33,267
A95751	2018-12-06	Awarded	N	Y	85%	150.7	Pli: 14% Sx: 57% Bl: 29%	5-Grn-L: 2.0% 6-Grn-D: 11.4% 7-Gry-D: 7.4%	48,568
TA0095	2018-12-12	Awarded	N	Y	0%	130.4	Pli: 11% Sx: 43% Bl: 46%	5-Grn-L: 0.0% 6-Grn-D: 2.0% 7-Gry-D: 2.4%	42,454
A92400	2019-01-14	Awarded	Y	Y	0%	186.4	Pli: 50% Sx: 30% Bl: 20%	5-Grn-L: 1.7% 6-Grn-D: 0.0% 7-Gry-D: 21.1%	31,855
TA0143	2019-01-16	Awarded	Y	Y	0%	212.9	Pli: 91% Sx: 7% Bl: 2%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 8.7%	31,780
TA0433	2019-01-17	Awarded	Y	Y	0%	151.8	Pli: 69% Sx: 24% Bl: 7%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 4.4%	28,215
A91705	2019-01-31	Posted	Y (aspen)	Y	0%	28.8	Pli: 18% Sx: 22% At: 60%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.0%	1,857
A95585	2019-01-31	Posted	Y	Y	0%	218.7	Pli: 73% Sx: 20% Bl: 7%	5-Grn-L: 5.6% 6-Grn-D: 0.0% 7-Gry-D: 6.6%	32,080
A94519	2019-02-06	Posted	Y	Y	0%	38.8	Pli: 60% Sx: 18% Bl: 22%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 5.9%	9,285
A94654	2019-02-13	Posted	Y	Y	5%	338.6	Pli: 81% Sx: 14% Bl: 5%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 0.6%	53,312
A94416	2019-02-20	Posted	N	Y	100%	25.4	Pli: 13% Sx: 34% Bl: 53%	5-Grn-L: 0.0% 6-Grn-D: 0.0% 7-Gry-D: 18.4%	5,890
A95627	2019-02-27	Posted	N	Y	0%	130.2	Pli: 16% Sx: 40% Bl: 44%	5-Grn-L: 0.0% 6-Grn-D: 5.5% 7-Gry-D: 0.0%	39,152
A95773	2019-03-14	Posted	N	Y	95%	269	Pli: 2% Sx: 54% Bl: 44%	5-Grn-L: 2.4% 6-Grn-D: 3.0% 7-Gry-D: 7.1%	104,694

* There are two entries for TSL A92403: one of three blocks is non-pine leading and therefore, some of the TSL volume will contribute to the non-pine partition

986,616

² Species composition is based on the gross cruise volumes of conifer species.

³ Source: https://www.for.gov.bc.ca/ftp/tpg/external/!publish/Sales_Schedule/!Fiscal%202019/ (Report Date: January 18, 2019)

Table 2: Remaining BCTS TSLs Listed on Sales Schedule to be sold January 1, 2019 to March 31, 2019 'Not Posted' to ONS as of January 31, 2019. Note that net area, species distribution and volume information is based on data listed on the sales schedule rather than the timber cruise compilation.

TSL	Posting End Date	TSL Status	TSL Pine Leading?	In SW?	IBS Aerial Polygon Overlap	TSL Net Area (ha)	TSL Species Distribution by Gross Volume	TSL Insect Damage to Spruce Volume	TSL net conifer volume (m ³)
A95499	pending	Not Posted	N	Y	15%	121.8	Pl: 12% Sx: 51% Bl: 38%	Not available	41,628
A95778	pending	Not Posted	N	N	No spatial Available	230	Pl: 9% Sx: 64% Bl: 27%	Not available	61,319
TA0544	pending	Not Posted	Y	Y	0%	270.5	Pl: 81% Sx: 10% Bl: 9%	Not available	41,587

144,534

Table 3: Summary of BCTS TSL volume in pine and non-pine leading stands inside and outside the southwest partition area as well as in the TSA. Note: all volumes represent net coniferous volume based on timber cruise compilation data for posted and awarded TSLs and sales schedule data for planned TSLs.

		Inside SW partition area	Outside SW partition area	Total for TSA
Awarded and Posted TSLs	No. of TSLs	23	1	24
	Non-Pl leading net volume	346,266	54,185	400,451
	Pl-leading net volume	586,165	0	586,165
	Total net volume	932,431	54,185	986,616
Planned TSLs - sales schedule	No. of TSLs	2	1	3
	Non-Pl leading net volume	41,628	61,319	102,947
	Pl-leading net volume	41,587	0	41,587
	Total net volume	83,215	61,319	144,534
Total:	No. of TSLs	25	2	27
	Non-Pl leading net volume	387,894	115,504	503,398
	Pl-leading net volume	627,752	0	627,752
	Total net volume	1,015,646	115,504	1,131,150

BCTS Spruce Beetle Action Plan

In spring 2018, BCTS TPG (Prince George Business Area) posted⁴ Spruce Beetle Action Plans for their operating areas in the Prince George and Mackenzie Forest Districts. The BCTS Spruce Beetle Action Plans consisted of a map that identified the following: Aerial Overview Polygons, planned development, previously harvested blocks, agreement volume, and confirmed unactionable area. The BCTS Spruce Beetle Action Plan, at the time of its creation, showed that BCTS Mackenzie had **13,466 ha** of spruce beetle actionable area (identified by the Aerial Overview Survey as per the 2017/2018 Omineca Spruce Beetle Committee). This plan further committed BCTS Mackenzie to planned harvest areas for each fiscal up to 2021/2022 and demonstrated how the actionable spruce beetle area would be addressed (Table 4).

⁴ https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/updates-information-releases/tpg_sx_beetle_action_plan_mackenzie_operating_areas.pdf

Table 4 BCTS TPK MK Spruce Beetle Action Plan summary (replicated from BCTS Spruce Beetle Action Plan).

Fiscal	BCTS MK Planned Annual Harvest Area (Ha)	Spruce Beetle Actionable Area (Ha)
2018/2019	5574	13466
2019/2020	4263	7892
2020/2021	4263	3629
2021/2022	3279	0
*Actionable area as per 17/18 Omineca Spruce Beetle Committee		
**Planned harvest area based on 305m ³ /ha as per Omineca Spruce Beetle Committee		

Assessment of the Spruce Beetle Action Plan from BCTS TSLs in the 2018/2019 Fiscal Year

All TSLs identified in Table 1 and two out of three TSLs in Table 2 (the third did not yet have spatial data available in FTA), were evaluated against Aerial Overview Survey (AOS) and/or Heli-GPS sketchmapping polygons (AOS and Heli-GPS sketchmapping polygons identify spruce beetle infestation and are the basis for the areas shown in Table 4). The percentage of overlap between TSLs and AOS/Heli-GPS sketchmapping polygons was approximated⁵ and included in the column “IBS Aerial Polygon Overlap” of Tables 1 and 2. To estimate the area actioned for spruce beetle in the 2018/2019 fiscal year, the TSL net area was multiplied by the % coverage of IBS Aerial Polygon Overlap. *Note that no spatial data was available for TSL A95778, however given its location, 100% coverage was assumed. The result is approximately 1168 ha of actionable area being harvested in the 2018/2019 fiscal year, which equates to 21% of what the BCTS Spruce Beetle Action Plan commits to in the current fiscal year (Table 5).* This assessment does not consider volume harvested under any agreements other than TSLs.

Table 5: Estimated Spruce Beetle Actionable Area that will be actioned through BCTS TSLs in the 2018/2019 fiscal year (April 1, 2018 – March 31, 2019). The estimated area actioned includes net area from TSLs sold, currently posted on the ONS or identified on the January 18, 2019 Sales Schedule as TSLs that will be advertised before March 31, 2019.

Fiscal	BCTS MK Planned Annual Harvest Area (Ha)	Spruce Beetle Actionable Area (Ha)	Estimated area actioned	% of planned area actioned
2018/2019	5574	13466	1168.3	21%

A95773 - BCTS TSL of Interest

MNRD staff do not assess individual BCTS TSLs to determine whether proposed harvest is consistent with best management practices and guidelines for spruce beetle management – a process that is completed for all cutting permits submitted to the District Manager for issuance. However, MNRD staff were recently made aware of TSL A95773 being put up for auction on BC Bid. Specifically, concerns about low levels of spruce beetle activity in the cruise (5-Grn-L: **2.4%** 6-Grn-D: **3.0%** 7-Gry-D: **7.1%**), large block size (**269 ha & 104,694 m³**), and a seemingly large amount of healthy spruce volume being removed were brought forward. While this scenario would warrant a request for additional information (e.g., beetle probe data) from other forest licensees, the process is not in place for District staff to request more information from BCTS.

⁵ Approximation is based on visual estimates in 5% increments. Estimates of percent cover were more liberal than conservative and are likely slightly higher than the exact coverage. This is especially so, for the assumption of 100% coverage of TSL A95778, where spatial data was not available at the time of this report.

Without asking for supplemental information from BCTS, a spruce beetle management assessment of A95773 was completed using publicly available information included with the TSL advertisement. Spruce beetle aerial data was reviewed, and a majority of the block was covered by 'Trace' and 'Light' severity AOS polygons. The Forest Health Comments in the Site Plan document states that "Spruce Beetle is generally <5% incidence" and goes on to say that "No future health problems of significance were noted during the SP field work". The TSL Highlights note that there is active spruce beetle in the block, that spruce beetle Hauling/Milling guidelines⁶ are to be followed, and that the TSL holder is encouraged to leave unattacked felled spruce logs during the spruce beetle flight to act as trap trees. No additional spruce beetle information could be found for this TSL. In summation, using the information provided (cruise/site plan/TSL advertisement highlights), there does not appear to be a significant spruce beetle infestation in the block, and the harvest of A95773 will contribute over 100,000 m³ to the southwest non-pine leading partition.

Conclusions

The data in Table 3 summarizes awarded, and planned-for-advertisement volumes, for the 2018/2019 fiscal year. It shows 627,752m³ of pine leading volume, and 503,398m³ of non-pine leading volume being advertised or planned. This demonstrates that the 1 million m³ of high priority spruce stands for the 2018/2019 fiscal year was not achieved through the sales schedule, and that roughly 55% of the volume advertised is still focused on pine salvage. It shows that only **2 out of the 27** TSLs advertised or planned were on the southeast side of Williston Lake where some of the highest concentrations of Spruce Beetle attack exist. This table also shows that (provided the TSLs in Table 2 sell) BCTS operations will remove **387,894m³** of non-pine leading volume from the southwest partition zone this fiscal year.

The data in Table 5 shows an approximation of what BCTS achieved in regards to their 2018/2019 planned annual harvest area in their Spruce Beetle Action Plan. It is important to note again, that any business to business agreements BCTS has made are not included in this assessment. From the sales schedule information alone, BCTS achieved approximately **21%** of their planned actionable area harvest in the fiscal 2018/2019 year.

The case study of TSL A97553 precipitated the overall review of 2018/2019 BCTS TSLs, and raised concern about uninfested spruce harvest in the southwest partition zone. Specifically, there is little to no indication that a high priority spruce beetle infestation exists in this block from the information available. Given the current state of the southwest partition harvest levels, further removal of >100,000m³ from this area without a demonstrable significant spruce beetle presence is not well justified, and confirmed the original concerns brought to MNRD staff.

⁶ The Spruce Beetle Hauling and Milling Guidelines are attached to the TSL posting.

Larkin, Brenda FLNR:EX

From: Pike, Shannon FLNR:EX
Sent: February 13, 2019 12:14 PM
To: Larkin, Brenda FLNR:EX
Subject: FW: Questions from John Allan re Partition Amendment Mackenzie TSA

From: Nussbaum, Albert F FLNR:EX
Sent: Wednesday, February 13, 2019 12:07 PM
To: Pike, Shannon FLNR:EX
Cc: Hebden, Karen FLNR:EX; Izzard, Kelly D FLNR:EX; Konwicki, Ksenia FLNR:EX; Nicholls, Diane R FLNR:EX
Subject: RE: Questions from John Allan re Partition Amendment Mackenzie TSA

Shannon

Some answers to the questions that the Deputy posed



1. What will be the impact on Licensees?

- The total available fire volume does not change (AAC stays at 4.5 million) .
- They will need to focus on salvage of spruce beetle infested and killed timber rather than pine beetle killed timber.
- They will need to limit harvest in the southwest portion of the TSA and respect a limit of 2.0 million live, un-infested timber.
- No significant increases in logging costs expected although the portion changes will require some coordination and cooperation between licensees.

2. Will there be mill closures?

- Not as a result of this partition decision.

3. What will the impact on jobs be?

- None beyond the current curtailments.

4. First Nation Consultation?

- In-depth consultation with first nations was completed.

Cheers Albert

Albert Nussbaum, R.P.F.
Director, Forest Analysis and Inventory Branch
Ministry of Forests, Lands, Natural Resource Operations and Rural Development
Phone: 778 974 5490
Cell: 250 888 5609
Email: Albert.Nussbaum@gov.bc.ca

Page 060 of 105 to/à Page 065 of 105

Withheld pursuant to/removed as

s.16

FW: Mackenzie Partition concerns

From: Konwicki, Ksenia FLNR:EX <Ksenia.Konwicki@gov.bc.ca>
To: Izzard, Kelly D FLNR:EX <Kelly.Izzard@gov.bc.ca>, Prasad, Atmo P FLNR:EX <Atmo.Prasad@gov.bc.ca>, Nussbaum, Albert F FLNR:EX <Albert.Nussbaum@gov.bc.ca>
Sent: June 20, 2019 9:23:07 AM PDT
Attachments: Mackenzie Partition concerns June 17, 2019.pdf

FYI – we are starting to receive comments from licensees re: Mackenzie TSA partition. I will forward as they come in so that you are in the loop. Attached are comments from Dunkley which have also been CCed to Diane.

k.

Kessie Konwicki RPF, PAg
Ksenia.Konwicki@gov.bc.ca

From: Doug Perdue <dperdue@dunkleylumber.com>

Sent: June 20, 2019 9:09 AM

To: Rawling, Greg FLNR:EX <Greg.Rawling@gov.bc.ca>; Bichon, Ryan FLNR:EX <Ryan.Bichon@gov.bc.ca>; Nicholls, Diane R FLNR:EX <Diane.Nicholls@gov.bc.ca>; XT:Hodder, Cheryl FLNR:IN <cheryl.hodder@conifex.com>; XT:Fenton RPF, Curtis FOR:IN <cfenton@dunkleylumber.com>; Armstrong, Dyon FOR:IN <darmstrong@dunkleylumber.com>; Konwicki, Ksenia FLNR:EX <Ksenia.Konwicki@gov.bc.ca>; Sayle, Jim FLNR:EX <Jim.Sayle@gov.bc.ca>

Subject: Mackenzie Partition concerns

Hi Greg,

We attended a meeting yesterday regarding the potential Minister's Partition for the Mackenzie TSA. We continue to have concerns with both the structure of the current Chief Forester's partition and the implementation of a potential Minister's partition. We think that the economic and operational issues need to be addressed before proceeding with this initiative. We have attached a letter to outline our concerns. Given the fast track approach of this initiative we wanted to send the letter via email in order for our concerns to be considered.

Thank you
Doug Perdue



June 17, 2019

Greg Rawling
Regional Executive Director
Omineca Natural Resource Region
5th Floor 499 George Street
Prince George, B.C.
V2L 1R5

Dear Greg Rawling

Re: Partition Issues for the Mackenzie Timber Supply Area.

We are writing in response to Mackenzie Partition discussions that are occurring within the Mackenzie TSA group being facilitated by Ksenia Konwicki. We think we are hearing that there is a perceived need on behalf of Ministry Staff to put forward a recommendation on a Minister's Partition for the Mackenzie TSA.

Forest Licence A15385 is held by Conifex Mackenzie Forest Products Inc., and Forest Licence A93631, is jointly held by Dunkley Lumber Ltd. and Conifex Mackenzie Forest Products Inc.. Licence A93631 has been operating since 2017 under the name of 1040806 BC (104 BC) in the Mackenzie TSA. Harvesting under 104 BC takes place within the historic Conifex operating areas, north of the Omineca River and South of the community of Tsay Keh Dene. For the current five-year cut control period (2016-2020) Dunkley will be receiving all the volume from the 104 BC license. Consistent with current operating areas, all of the 104 BC harvesting in this cut control period is expected to occur north of the Omineca River.

Using the 104 BC operating area as an example, we would like to document the concerns we have, both with the data that informed the Chief Forester's amended partition effective February 14,th 2019 and with the potential for unintended consequences if a Minister's partition is set. These concerns were partially outlined to you in a January 8, 2019 letter Re: Partition Considerations for the Mackenzie TSA. This letter includes recommendations that we think are required to alleviate these concerns and reduce the uncertainty and instability that a Minister's partition would create.

The concerns with the derivation of the Chief Forester's Partition include the baseline VRI and the assumptions that were used in deciding on the partition parameters.

The Mackenzie VRI inventory is not accurate at the stand level or in the species description. In trying to meet the previous partition, large areas of pine in the VRI had to be dropped at the field recce stage as the species typing is not accurate. We

are not finding corresponding areas of other species in the VRI that actually turn out to be pine leading on the ground. This is a good news story in that it is likely there is less pine volume and more volume in other species than the VRI indicates. The bad news is that a partition based on the VRI data overstates the damaged fiber problem and unnecessarily impacts operations.

We have provided a spreadsheet of the inventory of cruised blocks to the Ministry that shows the large differences between VRI information and the cruise information. Until the baseline inventory uncertainty can be resolved it would be premature to put information before the Minister. Quite frankly, we do not think the damaged volume in the VRI is available in the amounts anticipated.

We are also not clear on the procedure the Chief Forester used to come up with the partition parameters. For example, in terms of polygons with a low volume per hectare of dead volume we don't understand the impact of discounting or including these stands in a partition decision. We note that of the total of 39 million m³ of dead volume in the AOS polygons, 12 million m³ of this has 0-50 m³/ha dead and 16 million m³ has 50-100 m³/ha dead. If the entirety of this volume was factored into setting the partition, there could be an overestimation of the recoverable dead volume available given the partition parameters. In other words, licensees will run out of live volume in the partition before the combined live/dead amounts can be harvested.

Another consideration in the partition conditions is the significant amount of dead volume that is in temporarily deferred areas. These areas require extended development communication and information sharing with First Nations and other stakeholders. We estimate that there is roughly 6 million m³ of dead volume that is unavailable in the next 3-5 year window. One million m³ of this is in polygons with greater than 100 m³/ha dead. These areas are still part of the THLB, but it will take time to operationally realize a plan to meet all the desired outcomes for the areas. Would including or removing this volume as a factor in the partition decision change the partition parameters?

In addition to the larger deferred areas, block by block reviews of proposed development areas by First Nations representatives lead to many potential blocks being dropped for the time being. It is typically not just a block being dropped, but a hold on additional development in a drainage sized area. Including or discounting all of this dead volume influences the partition parameters.

A third factor is the shelf life of the dead volume. We are finding that some of the pine leading stands in the northern areas have suffered significant blowdown events and are no longer economic to harvest. A Minister's partition that does not take the economics into consideration of the booming and towing areas may reduce overall activity in the TSA.

Dunkley has been fairly vocal in our concern with spruce shelf life as well. We do not think a long, sustained spruce beetle salvage operation is viable given the time that has elapsed since the beetle attack.

Our second set of concerns is in relation to the potential conditions if a Minister's Partition is put in place.

Even if the damaged wood can be identified and is actionable, the reality is that it will take a year or two to change course. Different partition rules and methodology for measuring, especially if retroactive to an earlier date, will increase the economic uncertainty and the ability to achieve the Replaceable Forest Licence cut control volumes.

104 BC and Conifex have invested significantly in infrastructure to operate under our licenses in northern part of the timber supply area including:

- Constructing a modern camp facility at Mesilinka and Swannell
- Constructing significant upgrades to the Chunnamon FSR
- Constructing a major structure across the Duckling river that accesses approx. 3-400,000m³ of partition volume.
- Reviving and upgrading dumping, booming and towing infrastructure
- Identified, Recced and initiated discussions with First Nations on approximately 3,000,000 m³ of planned volumes.

We are very concerned that a Minister's partition will lead to significant changes to operational plans in short order. We are under the gun to complete the current cut control volume. The lead time for block development is at least a year and a half and more typically two years plus. Even if the dead volume was available on the land base, changing block selections to meet revised partition rules would be a major disruption to achieving the cut control.

104 BC and Conifex are approaching the end of a five-year cut control period in 2020. We are currently behind an even flow volume delivery scenario and we are working hard to catch up in order to achieve the entire cut control volume by the end of the cut control period. We will need to harvest more volume proportionately than the annual calculation of cut in the time remaining to meet the five-year cut volume. A partition based on annual AAC would be out of sync with the cut control period.

Moving ahead, as the high pine component stands have been addressed, we are facing increasing difficulty locating damaged stands consistent with the Chief Forester's partition guidelines. A simple math exercise, with a maximum live harvest of 2 million m³ out of 4.5 million m³, limits the live harvest to 44% of the total. The damaged percentage in Cutting Permits will go down over time as we have addressed the highest percentage damaged stands first. The overall historic pine percentage in the operating areas that this license operates in is between 30% and 40%. Not all of the pine is damaged. The unintended consequence of reducing overall activity in the TSA does not bode well for community stability.

The spruce beetle infestation has also been primarily found to be in small localized patches in the northern operating areas. We have addressed SBB as it has been identified, but it is not widespread.

Our experience in the Prince George TSA is that changing operating areas is possible but is not a quick process and is not a simple solution for a short term 3-5 year partition window.

We spend a great deal of time and effort working on positive relationships with First Nations. These efforts assist in meeting the Provincial reconciliation objectives with First Nations. If a partition order leads to changes to plans and agreements that have been developed the trust and working partnerships with First Nations may be impacted.

If a package is indeed going forward to the Minister for a decision, we recommend that the following actions be implemented beforehand:

1. Given the uncertainty created by the VRI in Mackenzie a ground sampling program must be completed before proceeding further with this initiative.
2. Further analysis be completed to understand the implications of including stands with a low percentage of dead volume and to revise the partition to enable continued action in these stands.
3. Further analysis be completed to understand the implications of deferred areas of achieving the partition and to revise the partition to reflect these deferrals.
4. Further analysis be completed to understand the implications of shelf life and to revise the partition to reflect the shelf life.
5. The partition be revised to reflect the mixed species and mixed damage status of the stands that make up the Mackenzie TSA.
6. A transition period be applied to any partition decision to prevent the economic chaos that changing plans on the fly would create.
7. Any monitoring results for a Minister's partition be initiated with a starting point after the transition period has ended.
8. Partition accounting reflects the cut control status of the licences in the TSA.

We continue to focus planning and harvest activities on damaged stands as our highest priority. A new partition would add another layer of complexity that could disrupt our operations and that leaves us very concerned. We would welcome the opportunity to meet with you to discuss our concerns further before the Minister deliberates on the need for a partition. If you have any questions or concerns, please contact the undersigned at (250) 998- 4205

Sincerely
Dunkley Lumber Ltd.



Doug Perdue, R.P.F.
Chief Forester

Conifex Mackenzie Forest Products Inc.



Cheryl Hodder, RPF
Planning and Silviculture Manager

Cc: Ryan Bichon, District Manager, Mackenzie Natural Resource District
Diane Nicholls, Assistant Deputy Minister, Chief Forester
Jim Sayle, Director of Tenures and Pricing, Major Projects and Resource Initiatives

2019 Mackenzie AAC Rationale Impacts Analysis

July 2019

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February 6, 2020

Greg Rawling
Regional Executive Director
Omenica Natural Resource Region
5th Floor 499 George Street
Prince George, B.C.
V2L 1R5

Dear Greg Rawling

Re: Partition Issues for the Mackenzie Timber Supply Area.

We are writing in follow up to our letter of June 17, 2019 that outlined our concerns with the Mackenzie Partition discussions that are occurring with the Mackenzie TSA group. Three factors that have recently been made available form the basis of this follow up. These factors are:

1. The partition monitoring results released at the January 23, 2020 Mackenzie TSA meeting.
2. The ground sampling and mature volume audit report compiled for the Mackenzie TSA and presented on January 27, 2020.
3. The indication is that Ministry staff continue to move a Minister's partition process along.

1. Partition Monitoring Results

Elaine Bambrick presented the results of partition monitoring in the Mackenzie TSA. We commend Elaine on the monitoring methodology that was developed for this project. The process is transparent and eloquently developed.

At a TSA level, the results illustrate two important points.

First, the AAC in the TSA is significantly underutilized, with only 2,813,402 m3 of the 4,500,000 m3 AAC harvested. This fact demonstrates that the economics of the forest industry in Mackenzie is fragile. This point is further demonstrated by the curtailments in mill operations in the community in 2019. We urge the Ministry to fully consider the economic impact that a Minister's partition may have on the forest industry and community of Mackenzie. Upheaval of operating plans and the potential for penalties that would result from a Minister's partition will impact the economic stability of operating in Mackenzie.

Secondly, the overall harvest of live uninfected trees is only 69% of the Chief Forester's partition limit. However, the harvest in the SW geographic area of the TSA is 59%

greater than the Chief Forester's limit in this portion of the TSA. These percentages are based on the annual AAC partition level rather than a percentage of the actual harvest level in a given year.

An opportunity for improvement in the partition reporting would be to factor in the actual harvest level in the monitoring results. Doing so would show that both total live harvest and SW harvest is actually further offside in meeting the partition contained in the Chief Forester's AAC determination.

The live volume harvested is 49% (1,389,181/2,813,402) of the total volume measured as compared to 44% of the annual cut level (2,000,000/4,500,000). This illustrates that even at reduced harvest levels the partition was not/ could not be achieved. Until the underlying reasons for this are fully understood and addressed a Minister's partition should not be considered.

2. Inventory Audit Results

We are pleased to see that the Ministry undertook a ground sampling project to study some of the inventory uncertainty in the Mackenzie TSA.

The Ministry audit results validate some of the inventory concerns that we pointed out in our June 17, 2019 letter. We have previously outlined our concern that the pine is not as prevalent as the inventory presents. This makes meeting a partition largely predicated on pine mortality impossible to achieve. Table 5a confirms that only 10 of 29 of the grid samples confirm pine as the leading species. Likewise, the audit shows that live pine is over-represented in the inventory when compared to the ground samples.

There is dead volume in the Mackenzie TSA. The ground plots show it ranges in the 45 to 52 m3/ha range. The ground sample dead is higher than the inventory range of 22 to 32 m3/ha. The increase in dead volume is no surprise given that annual updates to the inventory do not incorporate endemic mortality or AOS information.

From a partition perspective the audit results reinforce our concern that a large portion of the mortality in the Mackenzie TSA occurs as a minor component of overall stand volume that is impossible to action separately from the green volume in the mixed stands, particularly given the operational complexities of Williston Lake. The partition does not address the stand composition issues. The expectation that the live harvest overall will be 44% of the total harvest at the TSA level, is not compatible with the live volume being in the 70 to 80% range at the stand level. This issue will increase in magnitude over time as the higher proportion dead stands have been harvested or degrade beyond sawlog recovery.

3. A Minister's Partition

We outlined our concerns with factors that are leading to the inability to meet the partition in our June 17th letter. These concerns remain valid as described below:

The concerns with the derivation of the Chief Forester's partition include the baseline VRI and the assumptions that were used in deciding on the partition parameters.

The Mackenzie VRI inventory is not accurate at the stand level and in the species description. In trying to meet the Chief Forester partition large areas of pine in the VRI had to be dropped at the recce stage as the species typing is not accurate. We are not finding corresponding areas of other species in the VRI that actually turn out to be pine leading. This is actually a good news story in that it is likely that there is less pine and more other species than the VRI indicates.

We are also concerned that after requesting and receiving our VRI data, the Ministry has not included this data in their analysis. Our data is linked to a population that we have identified as economically viable. Quite frankly, we do not think the damaged volume in the VRI is actionable in the amounts anticipated. This concern is supported by the ground sampling results and the licensee data.

In terms of polygons with a low volume per hectare of dead volume we don't understand the impact of discounting or including these stands in a partition decision. We note that of the total of 39 million m³ of dead volume in the AOS polygons 12 million m³ of this has 0-50 m³/ha dead and 16 million m³ has 50-100 m³/ha dead. If the entirety of this volume was factored into setting the partition, there could be an overestimation of the recoverable dead volume available given the partition parameters. In other words, licensees will not be able to achieve the full AAC and will run out of live volume in the partition before the combined live/dead amounts can be harvested. This concern is supported by the ground sampling results.

Another consideration in the partition conditions is the significant amount of dead volume that is in temporarily deferred areas. These areas require extended development communication as a result of the information sharing with First Nations and other stakeholders. We estimate that there is roughly 6 million m³ of dead volume that is unavailable in the next 3-5 year window. One million m³ of this is in polygons with greater than 100 m³/ha dead. These areas are still part of the THLB, but it will take time to come to agreement on a plan to meet all the desired outcomes for the areas. Would including or removing this volume as a factor in the partition decision change the partition parameters?

In addition to the larger deferred areas, block by block reviews of proposed development areas lead to many potential blocks being dropped for the time being. It is typically not just a block being dropped, but results in a hold on additional development in a drainage sized area. Including or discounting all of this dead volume influences the partition parameters.

A third factor is the shelf life of the dead volume. We are finding that some of the pine leading stands in the northern areas have suffered significant blowdown events and are no longer economic to harvest. A Minister's partition that does not take the economics into consideration of the booming and towing areas may reduce overall activity in the TSA.

Dunkley has been fairly vocal in our concern with spruce shelf life as well. We do not think a long, sustained spruce beetle salvage operation is viable given the time that has elapsed since the beetle attack.

The second set of concerns is in relation to the potential conditions if a Minister's Partition is put in place.

Even if a portion of the remaining damaged wood can be identified and is actionable, the reality is that it will take a year or two to change course. Different partition rules, especially if retroactive to an earlier date, will increase the economic uncertainty and the ability to achieve the Replaceable Forest Licence cut control volumes.

We are very concerned that a Ministers partition will lead to significant changes to operational plans in short order. We are under the gun to complete the current cut control volume. The lead time for block development is at least a year and a half and more typically two years plus. To change block selections to meet revised partition rules would be a major disruption to achieving the cut control.

104 BC is approaching the end of a five-year cut control period in 2020. We are currently behind an even flow volume delivery scenario and we are working hard to catch up in order to achieve the entire cut control volume by the end of the cut control period. We will need to harvest more volume proportionately than the annual calculation of cut in the time remaining to meet the five-year cut volume. A partition based on annual AAC would be out of sync with the cut control period.

Moving ahead, as the high pine component stands have been addressed, we are facing increasing difficulty locating damaged stands consistent with the Chief Forester's partition guidelines. A simple math exercise, with a maximum live harvest of 2 million m³ out of 4.5 million m³, limits the live harvest to 44% of the total. The damaged percentage in Cutting Permits will go down over time as we have addressed the highest percentage damaged stands first. The overall historic pine percentage in the operating areas that this license operates in is between 30% and 40%. Not all of the pine is damaged. The unintended consequence of reducing overall activity in the TSA does not bode well for community stability.

The spruce beetle infestation has also been primarily found to be in small localized patches in the northern operating areas. We have addressed SBB as it has been identified, but it is not widespread.

Changing operating areas is not a quick process and is not a solution in a short term 3-5 year partition window. We heard at the last TSA meeting that the Ministry's position is that because operating areas are not legal, they will not be considered as a barrier to achieving the partition. We challenge this view. Operating areas are a reality of our volume-based tenure system, providing the basis for operational certainty and the ability to address First Nation interests and management of other resource values for both licensees and the Crown. Ignoring the importance of operating areas will be counter productive to creating economic and stewardship stability in the TSA.

We spend a great deal of time and effort working on positive relationships with First Nations. These efforts assist in meeting the Provincial reconciliation objectives with First Nations. If a partition order leads to changes to plans and

agreements that have been developed the trust and working partnerships with First Nations are at risk.

All in all, there are more questions than answers when contemplating the partition in Mackenzie. A far more productive pathway is to undertake a new timber supply analysis for the Mackenzie TSA that can explore options for the future harvest.

4. Action Plan

We commend the Ministry for addressing the first of the eight actions we identified in our June 17, 2019 letter. We continue to think that a Minister's partition is not the right course of action for the Mackenzie TSA. If a package is indeed going forward to the Minister for a decision, we recommend that the remaining action items 2-8 be addressed beforehand:

1. Given the uncertainty created by the VRI in Mackenzie a ground sampling program must be completed before proceeding further with this initiative.
2. Further analysis be completed to understand the implications of including stands with a low percentage of dead volume and to revise the partition to enable continued action in these stands.
3. Further analysis be completed to understand the implications of deferred areas of achieving the partition and to revise the partition to reflect these deferrals.
4. Further analysis be completed to understand the implications of shelf life and to revise the partition to reflect the shelf life.
5. The partition be revised to reflect the mixed species and mixed damage status of the stands that make up the Mackenzie TSA.
6. A transition period be applied to any partition decision to prevent the economic chaos that changing plans on the fly would create.
7. Any monitoring results for a Minister's partition be initiated with a starting point after the transition period has ended.
8. Partition accounting reflects the cut control status of the licences in the TSA.

We continue to focus planning and harvest activities on damaged stands as our highest priority. A new partition would add another layer of complexity that could disrupt our operations and that leaves us very concerned. We would welcome the opportunity to meet with you to discuss our concerns further before the Minister deliberates on the need for a partition.

Sincerely
Dunkley Lumber Ltd.



Doug Perdue, R.P.F.
Chief Forester

Conifex Mackenzie Forest Products Inc.



Cheryl Hodder, R.P.F.
Planning & Silviculture Manager

Cc: Ryan Bichon, District Manager, Mackenzie Natural Resource District
Diane Nicholls, Assistant Deputy Minister, Chief Forester
Jim Sayle, Director of Tenures and Pricing, Major Projects and Resource Initiatives

HAT458, HAT459	Baseline (all measure plots)			Measure Only 1 (1/4 of M plots)			Measure Only 2 (1/4 of M plots)			Measure Only 3 (1/4 of M plots)			Measure Only 4 (1/4 of M plots)			Measure & Count (1M:3C)			M&C from Comp. OUTPUT Files		
	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio
Gross Conifer Volume (m3)	39,209	8,415	0.2146	42,343	12,810	0.3025	36,531	8,570	0.2346	40,653	6,522	0.1604	36,971	5,749	0.1555						
Sampling Error (2 CI)																					
Net Conifer Volume (m3)	27,271	7,785	0.2855	30,422	11,883	0.3906	25,480	7,873	0.3090	27,790	6,051	0.2177	25,224	5,325	0.2111						
Sampling Error (2 CI)	10.2%	21.2%		20.5%	40.1%		26.5%	37.8%		17.3%	39.6%		21.2%	46.5%							
Average Basal Area (m2/ha)	31.5	7.8	0.2476	34.0	11.6	0.3412	29.7	8.4	0.2828	31.9	5.7	0.1787	30.2	5.6	0.1854	31.5	7.8	0.2476	32.9	9.2	0.2809
Sampling Error (2 CI)	9.0%	20.4%		19.0%	38.0%		23.2%	35.9%		14.5%	37.7%		18.9%	48.8%		9.0%	20.4%				16.3%
Cost (\$/plot)	#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$	
Measure Plots \$250	153	\$38,250		39	\$9,750		37	\$9,250		40	\$10,000		37	\$9,250		39	\$9,750		39	\$9,750	
Count Plots \$45	0	\$0		0	\$0		0	\$0		0	\$0		0	\$0		114	\$5,130		114	\$5,130	
Totals	153	\$38,250		39	\$9,750		37	\$9,250		40	\$10,000		37	\$9,250		153	\$14,880		153	\$14,880	
Confidence Change (from avg. Meas. Only)	App. Vol	LU Vol.	Cost													App. Vol	LU Vol.	Cost	App. Vol	LU Vol.	Cost
Net Volume	2.1	1.9	4.0																		
Basal Area																2.1	2.0	1.6			
Baseline	Original appraisal cruise of 153 full measure plots (on 100m x 100m grid) (Original cruise done in 2006, so Tree Class assignments may not be current, however this discrepancy affects only Net Volume, not Basal Area, calculations)																				
Measure Only	Three of every four plots removed; "Measure Only 1" retained top left plot of every square group of four plots, "Measure Only 2" retained top right plot, etc. All four permutations compiled to demonstrate potential range of results (and sampling errors) of fewer measure plots; in reality, we'd ever do only one permutation and never know the other potential outcomes																				
Measure & Count	Simulation of addition of count plots at a ratio of three count plots to one measure plot (equivalent of 100m measure plot grid with count plots added every 25m along the strip lines, or 200m measure grid with counts added every 50m) For Basal Area, the results are the same as the Baseline (for volume, the results would be one of the Measure Only permutations)																				
M&C from OUTPUT	Test of using outputs of current compilation version; simple calculations have an issue with zero-tree plots dropping out of denominator (for average BA/ha) and with weighting by timber type areas to roll up Cutting-Permit results Confirmed with Jim Wilson that IFS is developing an enhanced count plot compiler solution to use only Basal Area (to avoid tree measurement orphans)																				

MES602, MES603, MES605, MES606, MES607, MES608, MES609, MES610, MES612	Baseline (all measure plots)			Measure Only 1 (1/4 of M plots)			Measure Only 2 (1/4 of M plots)			Measure Only 3 (1/4 of M plots)			Measure Only 4 (1/4 of M plots)			Measure & Count (1M:3C)					
	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio	Appraisal Volume	Live Uninfested Volume	LU Ratio			
Gross Conifer Volume (m3)	66,306	12,425	0.1874	74,692	13,893	0.1860	67,518	12,691	0.1880	59,882	11,497	0.1920	62,131	11,330	0.1824						
Sampling Error (2 CI)																					
Net Conifer Volume (m3)	52,365	11,583	0.2212	58,735	13,025	0.2218	53,604	11,938	0.2227	47,404	10,716	0.2261	48,985	10,387	0.2120						
Sampling Error (2 CI)	6.2%	15.1%		11.2%	29.8%		12.8%	32.1%		12.2%	34.5%		14.0%	29.1%							
Average Basal Area (m2/ha)	31.5	6.9	0.2190	35.6	7.7	0.2163	31.4	6.9	0.2197	28.7	6.5	0.2265	29.9	6.4	0.2140	31.5	6.9	0.2190			
Sampling Error (2 CI)	5.7%	14.4%		10.8%	28.4%		11.7%	31.5%		10.8%	33.0%		12.1%	27.8%		5.7%	14.4%				
Cost (\$/plot)	#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$		#	Total \$	
Measure Plots \$250	227	\$56,750		57	\$14,250		57	\$14,250		57	\$14,250		56	\$14,000		57	\$14,250				
Count Plots \$45	0	\$0		0	\$0		0	\$0		0	\$0		0	\$0		170	\$7,650				
Totals	227	\$56,750		57	\$14,250		57	\$14,250		57	\$14,250		56	\$14,000		227	\$21,900				
Confidence Change (from avg. Meas. Only)	App. Vol	LU Vol.	Cost													App. Vol	LU Vol.	Cost			
Net Volume	2.0	2.1	4.0																		
Basal Area																2.0	2.1	1.5			
Baseline	Original appraisal cruise of 227 full measure plots (on 100m x 100m grid) (Original cruise done in 2007, so Tree Class assignments may not be current, however this discrepancy affects only Net Volume, not Basal Area, calculations)																				
Measure Only	Three of every four plots removed; "Measure Only 1" retained first, fifth, ninth etc. listed measure plot, "Measure Only 2" retained second, sixth, tenth etc. listed measure plot (plots ordered by block, type, strip, plot number), etc. All four permutations compiled to demonstrate potential range of results (and sampling errors) of fewer measure plots; in reality, we'd ever do only one permutation and never know the other potential outcomes																				
Measure & Count	Simulation of addition of count plots at a ratio of three count plots to one measure plot (equivalent of 100m measure plot grid with count plots added every 25m along the strip lines, or 200m measure grid with counts added every 50m) For Basal Area, the results are the same as the Baseline (for volume, the results would be one of the Measure Only permutations)																				

MK Partition - Basal Area Comp Files

From: Phil Smith <philip.smith@conifex.com>
To: Bambrick, Elaine FLNR:EX <Elaine.Bambrick@gov.bc.ca>, Willows, Rob FLNR:EX <Rob.Willows@gov.bc.ca>
Sent: June 20, 2019 7:25:15 AM PDT
Attachments: MES602-3-5-6-7-8-9-10-12 100x100 M4C0.ccp, LU_Percent_Reduction.pr, image001.png, a HAT458_9 100x100 M4C0 070402.ccp, c1 HAT458_9 100x100 M1EC3_TC-DAM.ccp

Hi guys,
Here are the comp files I think we'll need for our conversation this morning.
See you in a bit!
P/



Philip Smith, RPF, ATE
Timber Pricing/Fibre Analyst

Cell: 250.793.8891
Fax: 250.996.5425

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[illegible]

RE: MK Partition - Basal Area Proof of Concept

From: Phil Smith <philip.smith@conifex.com>
To: Bambrick, Elaine FLNR:EX <Elaine.Bambrick@gov.bc.ca>
Cc: Willows, Rob FLNR:EX <Rob.Willows@gov.bc.ca>
Sent: June 21, 2019 11:09:28 AM PDT
Attachments: MK Partition Basal Area Compilation Procedure 190621 DRAFT.docx, image001.png, image002.png

Hi Elaine and Rob,
Here's my first draft of the compilation procedures. I was focusing on the steps, not the formatting, so it looks a bit rough.
Any and all feedback welcome!
I'll work on the count plot procedure next.
P/



Philip Smith, RPF, ATE
Timber Pricing/Fibre Analyst

Cell: 250.793.8891
Fax: 250.996.5425

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From: Bambrick, Elaine FLNR:EX <Elaine.Bambrick@gov.bc.ca>
Sent: June 7, 2019 3:10 PM
To: Phil Smith <philip.smith@conifex.com>
Cc: Willows, Rob FLNR:EX <Rob.Willows@gov.bc.ca>
Subject: RE: MK Partition - Basal Area Proof of Concept

Hi Phil,

Thanks for providing this.

Rob and I have yet to have time to review it in detail, but we will soon and would like to take you up on your offer to go over it in person.^{s.22} so we can touch base at the meeting on the 19th and set up a time that works to discuss it in more detail.

Thanks again,

Elaine Bambrick, MSc, RPF

Authorizations Forester

Mackenzie Natural Resource District
250-997-2259



From: Phil Smith <philip.smith@conifex.com>

Sent: June 4, 2019 4:13 PM

To: Konwicki, Ksenia FLNR:EX <Ksenia.Konwicki@gov.bc.ca>; Willows, Rob FLNR:EX <Rob.Willows@gov.bc.ca>; Bambrick, Elaine FLNR:EX <Elaine.Bambrick@gov.bc.ca>

Cc: XT:Hodder, Cheryl FLNR:IN <cheryl.hodder@conifex.com>; XT:Alton, Ron FLNR:IN <Ron.Alton@conifex.com>

Subject: MK Partition - Basal Area Proof of Concept

Hi everyone,

Please find attached the proof-of-concept for using Basal Area to calculate the Live Un-infested Ratio.

- Results for two “cutting permits”
 - Compares “normal” appraisal cruise (Measure Only results) with augmenting the sample with four times the number of plots (both as count plots and as measure plots)
 - Gives an indication of the range of variability “normal” appraisal cruises might give in relation to the augmented sample
 - Gives an indication of the costs associated with improving the LU Ratio estimate with count plots versus with measure plots
- Appraisal compilation excerpts for both (denominator in the calculation)
- Live Un-infested Leave-Tree compilation excerpts for both (numerator in the calculation)
 - includes the compilation reduction inputs to capture the LU component of the stand

It would be best to review this in person to better explain what I did and what the results are.

I have confirmed with Jim Wilson that IFS is working on compiling enhanced count plots by Basal Area only (to eliminate the problem of orphan trees with no height/diameter measurements). Once this is done, all that would be required is to run the normal appraisal compilation and the Live Un-infested Leave-Tree compilation to get the Basal Area info for the calculation.

P/



Philip Smith, RPF, ATE
Timber Pricing/Fibre Analyst

Cell: 250.793.8891
Fax: 250.996.5425

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Partition Basal Area Compilation Procedure

P.R. Smith, RPF, ATE

2019/06/21

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July 2019

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Mackenzie TSA Steering Committee

Minutes

October 10 2019

1:15 P.M. – 3:30 P.M.

FLNRORD Nelson Room

Attendees: Dan Szekely, Paul Rendall, Andy Preston, Ryan Bichon, Kelly Favron, Cheryl Hodder, Jeremy Greenfield (by phone)

Opening

1. **Introductions**
2. Review Agenda (changes, additions?)
3. **Review Minutes/Actions from last meeting on June 19, 2019**

Action Item: Ryan to follow up regarding expedited License of Occupation. – ongoing.

- Lengthy process. Ryan will look into. Questions regarding happens when reservoir level is below the existing tenure?

Action Item: Ryan to report on roads meeting at next TSR Steering Committee meeting.

- Focus on access for communities. Discussion re: making Finlay FSR a MoT road. No commitment from province on funding.
- Kemess is likely to make an “investment decision” in December and are looking for exclusive maintenance to Mackenzie. This could be a good outcome for community access.
- Existing Milligan cost share on Connector is based on fixed tonne rate. Not clear how cost will be shared if Kemess successful.
- Concerns raised that if Kemess does not start up, not clear how community access will be maintained.
- Volume may be coming from Manson to town possibly till the end of January. Purchaser to be responsible for maintenance
- Kemess is planning industrial use of road every Friday for supply truck access
- Knut is trying to get more funding for access

4. FLNRO & Licensee Updates

FLNRO – Dan on board, others still in progress, will need to re-post FN advisor position.

- Potential cut-backs at MoF – expectation thru senior leaders gathering in Victoria next week where focus is to demonstrate BC is in cut back mode. All staff call to cut funds (likely focus will be on dollars not spent).

Canfor

- Indefinite curtailment still, 4 staff in Mack: Andy, Eric, Jeremy, Craig
- Still some wood coming down on the water. Transporter moving ~42,000 m from Ospika next week. New reporting structure. Russ Martin has been moved to a different position.
- No harvesting planned. Some wood coming out of bush in various places
- Working with 3rd parties to harvest CPs, mostly related to pulp. This will likely go on all winter
- A miner wants to put a camp on a cutblock – indication from DMK is that it's not possible to put a tenure on top of an existing CP tenure.

Conifex

- Mill is running
- 4 of 6 contractors working: 1 in Clearwater, 3 Nina – to centennial
- Maintaining 5 days of inventory, very tight
- Moving 3 contractors down to south CPs in Nation and other areas (Tony, Klawli) for winter
- Swannell camp is being used by Dunkley till freeze up (November planned closure)
- Osilinka camp open now, but will close Nov/Dec when loggers have been moved south
- Omineca not open

BCTS

- Business as usual, wrapping up multiphase, pushing field season
- Sales schedule ~20,000 shy on Q2 target, will make up in Q3
- Advertisements out by Christmas for Q3 and Q4 volume

Part 1 – Reconciliation

5. First Nations Relations – Land Use Planning

- Ryan has had meetings with Takla, Kwadacha, TKD – lots of information shared about stewardship
- LUP process kicked off with TKD: looks at how land is used – logging, riparian, protected areas, cultural values and more. Similar to ESI but not ESI (areas likely to overlap with ESI area)
- Caribou herd planning as well
- LUP/TSR/Herd planning = LLP or landscape level planning something similar to LRMP, 5-year plans, etc.
- TKD interested in this process being G to G then to include licensees and other stakeholders

6. Stewardship Initiatives – ESI, Takla BMPs, TKD Expectations

- TKD has released a draft expectations document – practices they expect to see, not yet signed by Chief and council

7. Road Maintenance on Finlay FSR

Covered in Action Item update above.

Part 2 - Economy

8. Permits, Approvals, & Timelines

- Conifex has CPs required with tight timelines
- Canfor has MackFibre CPs, Plateau CPs, pulp CPs as well

9. Partition and TSR Status

- Collaborative engagement with FNs during this process. Expected downward pressure on cut
- BC and FN (collaboratively) will make recommendations to CF
- Data package coming out in December
- 2-3 year process
- Partition likely still going through to hard partition
- There is a tie between TSR and LUP
- TSR is historically backwards looking however, the CF is willing to look forward due to FN requests (risks, sensitivity). Eg. increased riparian retention planned in future could result in lower AAC now.
- Expect AAC impacts as a result of LUP

Action Item – Ryan to follow up with Kessie and/or Jim Sayle, Greg Rawling, Anthony Giannotti to update licensees on partition status

10. Interior Forestry Revitalization / TSA Coalition

- TSA coalition – similar process to interior renewal, driven by industry, 3 TSAs in province selected to create local solutions. Joan Atkinson has said Ken Shields is willing to lead this in the TSA. All industrial players, mayor, government.

11. FRPA Changes and LLP

- Increased discretionary powers for DM likely thru FRPA changes
- Forest Operational Planning (FOP) with a Forest Operational Map (FOP) - the FOP coming soon

12. SUP Annual Rents

- Annual Rents costs have gone up and can be rolled under umbrella deposit for FL.
- Issues noted with old camps that have not been cleaned up and deposits that are insufficient to cover government liability
- Rates are by TSA, set by DM, and have been increased in DMK.

Part 3 - Stewardship

13. Caribou

- Herd planning with TKD captured through the Landuse planning process (under LUP and parallel to)

14. Guide-Outfitter Concerns

- Unknown who had a helicopter flying in Fraser MacDonald's area

15. Spruce Beetle

- Bark beetle summit planned for November
- Some indication FLNRO will soon be delivering the current AOS data to the group.
- Concerns have been raised that with the curtailments there is reduced ability to deal with beetle sanitation

Closure

16. Date for next meeting

November 28th, 1:15pm

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

APPSM 1, pl

Appraisal Summary Report

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:46:45PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Location : Chunamon

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

No Of Blocks : 9

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30

Immature Blocks:(cm) 12.0 10.0 30

Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length:(m) 5.00

Net Area: [All Treatment Units : 228.2]

All Method Summary

Species	Net Volume (m3)			Net Volume / ha			Decay%	Stud	LRF	All
Code Description	All	Live	DP	All	Live	DP		Log%		Burn%
BA Balsam	50	50	0	0.218	0.218	0.000	2	51	187	0
LO L.P. Pine	45259	37418	7841	198.329	163.969	34.360	10	71	139	0
SP Spruce	7056	6687	369	30.922	29.305	1.617	1	74	180	0
AS Aspen	175	171	4	0.767	0.749	0.018	34	0	157	0
BI Birch	9	9	0	0.039	0.039	0.000	23	0	169	0
CO Cottonwood	1	1	0	0.005	0.005	0.000	55	0	154	0
Conifer	52365	44155	8210	229.469	193.491	35.978	9	71		0
Total	52550	44336	8214	230.280	194.285	35.995	9	71		0

Harvesting Method Summaries

Species	Harvest	Net	Average	Net Vol	Net Vol/ha	Defect%	Partial	All	Heavy	Down	Dead
Code Description	Method	Volume	Slope%	/Tree		(DWB)	Cut%	Fire%	Fire%	Tree%	Useless%
All Species	SC	52550	5	0.26	230.280	21	97	0	0	4	1
	All Methods	52550	5	0.26	230.280	21	97	0	0	4	1
Conifer	SC	52365	5	0.26	229.469	21	100	0	0	4	1
	All Methods	52365	5	0.26	229.469	21	100	0	0	4	1

Insect Damage Net Volume (m3)

L.P. Pine All Other Conifer
Green Attack Red Attack Grey Attack Insect Damage
1193 31378 6034 0

L.P. Pine Red/Grey Attack % of Conifer by Block

602: 54.9% 603: 73.1% 605: 68.3% 606: 81.9% 607: 75.5% 608: 71.9%
609: 79.5% 610: 62.9% 612: 88.7%

Cutting Authority

See pre reduction compilation for statistics

Plots/Ha 1.0

Cruised Trees/Plot 5.9

Cruise Date (yy-mm): 07-06

Plots: 227 # <= 5yrs: 0 # > 5yrs: 0 # > 10yrs: 227 # no date: 0

Percent Reductions Applied

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:46:45PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Breakage

District: 04 - Mackenzie

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Version: 2018.00    IFS build
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0 IFS build 6202
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[illegible]

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

EXTCP 1, p3

Average Line Method Grades: MOF Computerized FIZ: I
 Computerized Decay PSYU: Finlay
 Computerized Waste Region: 6 - Omineca
 Project: Computerized Breakage District: 04 - Mackenzie

04-Jun-2019 01:46:45PM
 Filename: mes602-3-5-6-7-8-9-10-12 100x100
 Compiled by: conifex
 Cruised by: SHARP FORESTRY
 Version: 2018.00 IFS build 6202

Net Area: [A : 228.2]

Gross Area: [WTP : 23.7][Grand Total : 251.9]

		Total	Conifer	Decid	B	S	PL	AC	E	AT
Utilization Limits										
Min DBH	cm (M)				17.5	17.5	12.5	17.5	17.5	17.5
Stump Ht	cm (M)				30.0	30.0	30.0	30.0	30.0	30.0
Top Dia	cm (M)				10.0	10.0	10.0	10.0	10.0	10.0
Log Len	m				5.0	5.0	5.0	5.0	5.0	5.0
Volume and Size Data										
Gross Merchantable	m3	66685	66306	379	52	7320	58934	6	13	359
Net Merchantable	m3	52550	52365	185	50	7056	45259	1	9	175
Net Merch - All	m3/ha	230	229	1	0	31	198	0	0	1
Net Merch - Live	m3/ha	194	193	1	0	29	164	0	0	1
Net Merch - DP	m3/ha	36	36	0		2	34			0
Distribution	%	100	100	0	0	13	86	0	0	0
Decay	%	9	9	34	2	1	10	55	23	34
Waste	%	0	0	13		0	0	22	7	13
Waste(billing)	%	1	1	26		0	1	100	10	26
Breakage	%	12	12	4	2	2	13	4	4	4
Total Cull (DWB)	%	21	21	51	4	4	23	80	34	51
Basal Area / Ha	m2/ha	31.5	31.3	0.2	0.0	4.2	27.1	0.0	0.0	0.2
Net VBAR	m3/m2	6.937	7.295	0.416	0.581	7.201	7.291	0.026	0.100	0.417
Stems/Ha (Live & DP)		873.4	869.9	3.4	0.5	101.4	768.0	0.0	0.1	3.3
Avg DBH (Live & DP)	cm	21.4	21.4	25.9	25.5	22.9	21.2	41.8	26.1	25.8
Snags/Ha		7.3	7.2	0.1			7.2			0.1
Avg Snag DBH	cm	22.4	22.4	19.0			22.4			19.0
Gross Merch Vol/Tree	m3	0.33	0.33	0.48	0.42	0.32	0.34	1.39	0.41	0.48
Net Merch Vol/Tree	m3	0.26	0.26	0.24	0.40	0.30	0.26	0.27	0.27	0.24
Avg Weight Total Ht	m	23.4	23.4	24.7	21.0	21.2	23.7	29.9	22.2	24.7
Avg Weight Merch Ht	m	17.6	17.5	18.3	15.0	15.1	17.9	23.6	14.7	18.4
Avg 5.0 m Log Net	m3	0.11	0.11	0.08	0.14	0.12	0.10	0.07	0.10	0.08
Avg 5.0 m Log Gross	m3	0.12	0.12	0.14	0.14	0.12	0.11	0.28	0.14	0.14
Avg # of 5.0 m Logs/Tree		2.88	2.88	3.35	3.00	2.55	2.93	5.00	3.00	3.36
Net Immature	%	94.7	95.1		100.0	95.6	95.0			
Average Slope	%	5								
All Burn Volume	%									
Heavy Fire Volume	%									
Blowdown Volume	%	3.8	3.8			5.9	3.5			
Insect Volume	%	73.5	73.7				85.3			
LRF and Log Summary										
Net Merch - Stud	%	71.0	71.3		50.7	73.6	70.9			
Net Merch - Small Log	%	97.5	97.5	95.6	100.0	97.2	97.5	62.2	100.0	95.6
Net Merch - Large Log	%	2.5	2.5	4.4		2.8	2.5	37.8		4.4
Avg LRF All	bdfm/m3	144.4	144.3	158.0	186.8	179.8	138.8	154.0	169.4	157.4

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

VLS 1, p4

Volume Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:46:45PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
 Immature Blocks: (cm) 12.0 10.0 30
 Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net Volume m3/ha	Proportional Volume	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(SAt) 53	0	46	46	45.0	281.8	0.24	0	302	302	146.2668	51.9	7.7	15.3
3 :Pl(S) 53	0	22	22	20.2	163.0	0.06	0	109	109	89.8473	55.1	11.7	24.4
4 :PlS 63	0	29	29	29.8	197.1	0.11	0	147	147	102.7788	52.2	9.7	19.8
6 :Pl(S) 63	0	12	12	11.1	246.3	0.05	0	69	69	116.2002	47.2	13.6	30.0
17 :Pl 532-	0	30	30	29.5	257.1	0.14	0	185	185	96.8416	37.7	6.9	14.1
20 :Pl(SAt) 531-	0	16	16	16.8	252.4	0.08	0	90	90	125.2296	49.6	12.4	26.4
32 :Pl(S) 532-	0	8	8	9.1	185.9	0.03	0	45	45	92.1727	49.6	17.5	41.5
36 :Pl(S) 532-	0	38	38	39.2	201.5	0.15	0	213	213	89.6775	44.5	7.2	14.4
38 :Pl(S) 532-	0	26	26	27.5	238.3	0.12	0	186	186	95.3241	40.0	7.8	16.2
TOTAL	0	227	227	228.2	230.3		0	1346	1346		47.8	3.2	6.2

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 6.2% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

BAS 1, p5

Basal Area Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:46:45PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm)	17.5	10.0	30
Immature Blocks: (cm)	12.0	10.0	30
Exception[PL]: (cm)	12.5	10.0	30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Basal Area m2/ha	Proportional Basal Area	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(SAt) 53	0	46	46	45.0	35.8	0.22	0	302	302	18.0544	50.5	7.4	14.9
3 :Pl(S) 53	0	22	22	20.2	24.4	0.07	0	109	109	11.8263	48.5	10.3	21.5
4 :PlS 63	0	29	29	29.8	30.2	0.13	0	147	147	12.8770	42.6	7.9	16.2
6 :Pl(S) 63	0	12	12	11.1	34.5	0.05	0	69	69	15.7970	45.8	13.2	29.1
17 :Pl 532-	0	30	30	29.5	34.5	0.14	0	185	185	12.8006	37.1	6.8	13.9
20 :Pl(SAt) 531-	0	16	16	16.8	32.1	0.07	0	90	90	14.7279	45.9	11.5	24.5
32 :Pl(S) 532-	0	8	8	9.1	27.6	0.03	0	45	45	10.2659	37.2	13.2	31.1
36 :Pl(S) 532-	0	38	38	39.2	27.2	0.15	0	213	213	10.8032	39.7	6.4	12.9
38 :Pl(S) 532-	0	26	26	27.5	33.9	0.13	0	186	186	12.8488	37.9	7.4	15.3
TOTAL	0	227	227	228.2	31.5		0	1346	1346		43.9	2.9	5.7

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 5.7% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

VBS 1, p6

Net VBAR Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:46:45PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm)	17.5	10.0	30
Immature Blocks: (cm)	12.0	10.0	30
Exception[PL]: (cm)	12.5	10.0	30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net VBAR m3/m2	Proportional VBAR	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(Sat) 53	0	46	46	45.0	7.154	0.20	0	302	302	2.8693	40.1	2.3	4.5
3 :Pl(S) 53	0	22	22	20.2	6.581	0.08	0	109	109	1.5710	23.9	2.3	4.5
4 :PlS 63	0	29	29	29.8	6.479	0.12	0	147	147	1.6031	24.7	2.0	4.0
6 :Pl(S) 63	0	12	12	11.1	7.140	0.05	0	69	69	1.5893	22.3	2.7	5.3
17 :Pl 532-	0	30	30	29.5	6.949	0.13	0	185	185	2.4300	35.0	2.6	5.0
20 :Pl(Sat) 531-	0	16	16	16.8	7.477	0.08	0	90	90	2.2018	29.4	3.1	6.1
32 :Pl(S) 532-	0	8	8	9.1	6.609	0.04	0	45	45	1.7843	27.0	4.0	8.0
36 :Pl(S) 532-	0	38	38	39.2	7.190	0.18	0	213	213	1.9427	27.0	1.9	3.6
38 :Pl(S) 532-	0	26	26	27.5	6.663	0.12	0	186	186	2.1520	32.3	2.4	4.6
TOTAL	0	227	227	228.2	6.937		0	1346	1346		31.0	0.8	1.7

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 1.7% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

APPSM 1, pl

Average Line Method

Grades: MOF Computerized

Appraisal Summary Report

FIZ: I

04-Jun-2019 01:48:03PM

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Project:

Computerized Waste

Region: 6 - Omineca

Compiled by: conifex

Location : Chunamon

Computerized Breakage

District: 04 - Mackenzie

Cruised by: SHARP FORESTRY

Version: 2018.00 IFS build 6202

No Of Blocks : 9

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30

Immature Blocks:(cm) 12.0 10.0 30

Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length:(m) 5.00

Net Area: [All Treatment Units : 228.2]

All Method Summary

Species	Net Volume (m3)			Net Volume / ha			Decay%	Stud	LRF	All
Code Description	All	Live	DP	All	Live	DP		Log%		Burn%
BA Balsam	50	50	0	0.218	0.218	0.000	2	51	187	0
LO L.P. Pine	4846	4846	0	21.236	21.236	0.000	8	86	163	0
SP Spruce	6687	6687	0	29.305	29.305	0.000	1	73	180	0
AS Aspen	0	0	0	0.000	0.000	0.000	0	0	0	0
BI Birch	0	0	0	0.000	0.000	0.000	0	0	0	0
CO Cottonwood	0	0	0	0.000	0.000	0.000	0	0	0	0
Conifer	11583	11583	0	50.759	50.759	0.000	4	78		0
Total	11583	11583	0	50.759	50.759	0.000	4	78		0

Harvesting Method Summaries

Species	Harvest	Net	Average	Net Vol	Net Vol/ha	Defect%	Partial	All	Heavy	Down	Dead
Method	Volume	Slope%	/Tree			(DWB)	Cut%	Fire%	Fire%	Tree%	Useless%
All Species SC	11583	5	0.23	50.759		7	21	0	0	4	0
All Methods	11583	5	0.23	50.759		7	21	0	0	4	0
Conifer SC	11583	5	0.23	50.759		7	22	0	0	4	0
All Methods	11583	5	0.23	50.759		7	22	0	0	4	0

Insect Damage Net Volume (m3)

L.P. Pine	All Other Conifer
Green Attack	Red Attack Grey Attack Insect Damage
0	0 0 0

L.P. Pine Red/Grey Attack % of Conifer by Block

602: 0.0%	603: 0.0%	605: 0.0%	606: 0.0%	607: 0.0%	608: 0.0%
609: 0.0%	610: 0.0%	612: 0.0%			

Cutting Authority

See pre reduction compilation for statistics

Plots/Ha 1.0

Cruised Trees/Plot 5.9

Cruise Date (yy-mm): 07-06

Plots: 227 # <= 5yrs: 0 # > 5yrs: 0 # > 10yrs: 227 # no date: 0

Percent Reductions Applied

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:48:03PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: confex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Criteria					DBH Class																																	
Spcs	Type	TU	Class	Block	Damage	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	200	250																
						15	25	35	45	55	65	75	85	95	105	115	125	135	145	175	225	275																
All	0	-			I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AC	0	-				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AT	0	-				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B	0	-	1			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B	0	-	2			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B	0	-	5			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B	0	-	8			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EP	0	-				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PL	0	-	1			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PL	0	-	2			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PL	0	-	5			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PL	0	-	8			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
S	0	-	1			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
S	0	-	2			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
S	0	-	5			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
S	0	-	8			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Average Line Method Grades: MOF Computerized
 Computerized Decay FIZ: I
 Computerized Waste PSYU: Finlay
 Project: Computerized Breakage Region: 6 - Omineca
 District: 04 - Mackenzie

04-Jun-2019 01:48:03PM
 Filename: mes602-3-5-6-7-8-9-10-12 100x100
 Compiled by: conifex
 Cruised by: SHARP FORESTRY
 Version: 2018.00 IFS build 6202

Net Area: [A : 228.2]
 Gross Area: [WTP : 23.7][Grand Total : 251.9]

		Total	Conifer	Decid	B	S	PL	AC	E	AT
Utilization Limits										
Min DBH	cm (M)				17.5	17.5	12.5	17.5	17.5	17.5
Stump Ht	cm (M)				30.0	30.0	30.0	30.0	30.0	30.0
Top Dia	cm (M)				10.0	10.0	10.0	10.0	10.0	10.0
Log Len	m				5.0	5.0	5.0	5.0	5.0	5.0
Volume and Size Data										
Gross Merchantable	m3	12425	12425		52	6934	5440			
Net Merchantable	m3	11583	11583		50	6687	4846			
Net Merch - All	m3/ha	51	51		0	29	21			
Net Merch - Live	m3/ha	51	51		0	29	21			
Net Merch - DP	m3/ha									
Distribution	%	100	100		0	58	42			
Decay	%	4	4		2	1	8			
Waste	%	0	0			0	1			
Waste(billing)	%	0	0			0	1			
Breakage	%	2	2		2	2	2			
Total Cull (DWB)	%	7	7		4	4	11			
Basal Area / Ha	m2/ha	6.9	6.9		0.0	3.9	2.9			
Net VBAR	m3/m2	1.518	1.604		0.581	6.660	0.796			
Stems/Ha (Live & DP)		220.6	220.6		0.5	94.2	125.9			
Avg DBH (Live & DP)	cm	19.9	19.9		25.5	23.1	17.2			
Snags/Ha										
Avg Snag DBH	cm									
Gross Merch Vol/Tree	m3	0.25	0.25		0.42	0.32	0.19			
Net Merch Vol/Tree	m3	0.23	0.23		0.40	0.31	0.17			
Avg Weight Total Ht	m	21.4	21.4		21.0	21.3	21.6			
Avg Weight Merch Ht	m	14.9	14.9		15.0	15.3	14.5			
Avg 5.0 m Log Net	m3	0.10	0.10		0.14	0.12	0.07			
Avg 5.0 m Log Gross	m3	0.10	0.10		0.14	0.13	0.08			
Avg # of 5.0 m Logs/Tree		2.44	2.44		3.00	2.58	2.33			
Net Immature	%	95.2	95.2		100.0	95.3	94.9			
Average Slope	%	5								
All Burn Volume	%									
Heavy Fire Volume	%									
Blowdown Volume	%	4.4	4.4			0.7	9.7			
Insect Volume	%									
LRF and Log Summary										
Net Merch - Stud	%	78.4	78.4		50.7	72.9	86.3			
Net Merch - Small Log	%	97.9	97.9		100.0	97.0	99.1			
Net Merch - Large Log	%	2.1	2.1			3.0	0.9			
Avg LRF All	bdft/m3	173.3	173.3		186.8	180.4	163.3			

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

VLS 1, p4

Volume Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:48:03PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: confifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
 Immature Blocks: (cm) 12.0 10.0 30
 Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net Volume m3/ha	Proportional Volume	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(SAt) 53	0	46	46	45.0	75.0	0.29	0	302	302	65.2897	87.0	12.8	25.7
3 :Pl(S) 53	0	22	22	20.2	38.6	0.07	0	109	109	60.9379	157.7	33.6	70.0
4 :PlS 63	0	29	29	29.8	67.9	0.17	0	147	147	66.2098	97.5	18.1	37.1
6 :Pl(S) 63	0	12	12	11.1	17.4	0.02	0	69	69	31.1680	179.0	51.7	113.7
17 :Pl 532-	0	30	30	29.5	40.4	0.10	0	185	185	48.5330	120.1	21.9	44.8
20 :Pl(SAt) 531-	0	16	16	16.8	74.5	0.11	0	90	90	89.5951	120.2	30.1	64.0
32 :Pl(S) 532-	0	8	8	9.1	9.0	0.01	0	45	45	16.7398	185.6	65.6	155.2
36 :Pl(S) 532-	0	38	38	39.2	32.2	0.11	0	213	213	50.6292	157.5	25.5	51.1
38 :Pl(S) 532-	0	26	26	27.5	51.8	0.12	0	186	186	51.5030	99.5	19.5	40.2
TOTAL	0	227	227	228.2	50.8		0	1346	1346		115.9	7.7	15.1

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 15.1% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

BAS 1, p5

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:48:03PM

Computerized Decay

PSYU: Finlay

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Waste

Region: 6 - Omineca

Compiled by: conifex

Project:

Computerized Breakage

District: 04 - Mackenzie

Cruised by: SHARP FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
 Immature Blocks: (cm) 12.0 10.0 30
 Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Basal Area m2/ha	Proportional Basal Area	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(Sat) 53	0	46	46	45.0	9.0	0.26	0	302	302	7.5631	84.0	12.4	24.8
3 :Pl(S) 53	0	22	22	20.2	5.5	0.07	0	109	109	8.0043	146.7	31.3	65.1
4 :PlS 63	0	29	29	29.8	10.1	0.19	0	147	147	8.5009	83.9	15.6	31.9
6 :Pl(S) 63	0	12	12	11.1	3.0	0.02	0	69	69	5.4272	180.9	52.2	114.9
17 :Pl 532-	0	30	30	29.5	6.0	0.11	0	185	185	7.2207	120.3	22.0	44.9
20 :Pl(Sat) 531-	0	16	16	16.8	9.4	0.10	0	90	90	11.3776	121.4	30.3	64.7
32 :Pl(S) 532-	0	8	8	9.1	1.3	0.01	0	45	45	2.3146	185.2	65.5	154.8
36 :Pl(S) 532-	0	38	38	39.2	4.6	0.11	0	213	213	6.9147	150.1	24.4	48.7
38 :Pl(S) 532-	0	26	26	27.5	7.1	0.12	0	186	186	6.9531	97.7	19.2	39.5
TOTAL	0	227	227	228.2	6.9		0	1346	1346		111.0	7.4	14.4

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 14.4% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

VBS 1, p6

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 01:48:03PM

Filename: mes602-3-5-6-7-8-9-10-12 100x100

Licence Number: A15385 CP: N19

Computerized Decay

PSYU: Finlay

Compiled by: conifex

Project:

Computerized Waste

Region: 6 - Omineca

Cruised by: SHARP FORESTRY

Computerized Breakage

District: 04 - Mackenzie

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
 Immature Blocks: (cm) 12.0 10.0 30
 Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net VBAR m3/m2	Proportional VBAR	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
2 :Pl(Sat) 53	0	46	46	45.0	1.905	0.25	0	302	302	3.5881	188.4	10.8	21.2
3 :Pl(S) 53	0	22	22	20.2	1.559	0.09	0	109	109	3.0235	193.9	18.6	36.8
4 :PlS 63	0	29	29	29.8	2.232	0.19	0	147	147	3.2886	147.3	12.2	23.8
6 :Pl(S) 63	0	12	12	11.1	0.505	0.02	0	69	69	1.6568	328.2	39.5	78.2
17 :Pl 532-	0	30	30	29.5	1.092	0.09	0	185	185	2.5836	236.5	17.4	34.1
20 :Pl(Sat) 531-	0	16	16	16.8	2.208	0.11	0	90	90	3.6449	165.1	17.4	34.5
32 :Pl(S) 532-	0	8	8	9.1	0.321	0.01	0	45	45	1.5065	469.8	70.0	140.1
36 :Pl(S) 532-	0	38	38	39.2	1.147	0.13	0	213	213	2.6617	232.0	15.9	31.2
38 :Pl(S) 532-	0	26	26	27.5	1.447	0.11	0	186	186	2.9884	206.5	15.1	29.7
TOTAL	0	227	227	228.2	1.518		0	1346	1346		199.7	5.4	10.7

Number of live & dead potential trees sampled is 1346

Number of dead useless trees sampled is 12

Number of live useless trees sampled is 0

The weighted sampling error is 10.7% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

PERCENT REDUCTION APPLIED

APPSM 1, pl

Appraisal Summary Report

Average Line Method
POPE & TALBOT LTD.
Licence Number: A77955 CP: KUZ
Project:
Location :

Grades: MOF Computerized
Computerized Decay
Computerized Waste
Computerized Breakage
No Of Blocks : 2

FIZ: I
PSYU: Stuart Lake
Region: 6 - Omineca
District: 03 - Fort St. James

30-May-2019 03:19:23PM
Filename: a hat458_9 100x100 m4c0 070402.c
Compiled by: conifex
Cruised by: FSJ FORESTRY
Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
Immature Blocks: (cm) 12.0 10.0 30
Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Net Area: [All Treatment Units : 136.7]

All Method Summary

Species	Net Volume (m3)	DP	Net Volume / ha	Decay%	Stud Log%	LRF	All Burn%
Code Description	All Live		All Live	DP			
LO L.P. Pine	22733 9226	13507	166.301 67.493	98.808	11	51	134 0
SP Spruce	4537 4138	399	33.192 30.273	2.919	3	68	182 0
AS Aspen	39 38	1	0.287 0.280	0.006	34	0	158 0
Conifer	27271 13365	13906	199.493 97.766	101.727	10	54	0
Total	27310 13403	13907	199.780 98.047	101.733	10	54	0

Harvesting Method Summaries

Species	Harvest Method	Net Volume	Average Slope%	Net Vol /Tree	Net Vol/ha	Defect% (DWB)	Partial Cut%	All Fire%	Heavy Fire%	Down Tree%	Dead Useless%
All Species	SC	27310	4	0.34	199.780	30	97	0	0	3	0
	All Methods	27310	4	0.34	199.780	30	97	0	0	3	0
Conifer	SC	27271	4	0.34	199.493	30	100	0	0	3	0
	All Methods	27271	4	0.34	199.493	30	100	0	0	3	0

Insect Damage Net Volume (m3)

L.P. Pine All Other Conifer
Green Attack Red Attack Grey Attack Insect Damage
4230 1349 12147 23

L.P. Pine Red/Grey Attack % of Conifer by Block

458: 47.7% 459: 56.6%

Cutting Authority

See pre reduction compilation for statistics
Plots/Ha 1.1
Cruised Trees/Plot 4.7
Cruise Date (yy-mm): 06-05
Plots: 153 # <= 5yrs: 0 # > 5yrs: 0 # > 10yrs: 153 # no date: 0

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

EXTCP 1, p2

Average Line Method

POPE & TALBOT LTD.

Licence Number: A77955 CP: KUZ

Project:

Grades: MOF Computerized

Computerized Decay

Computerized Waste

Computerized Breakage

Extended CP Summary

FIZ: I

PSYU: Stuart Lake

Region: 6 - Omineca

District: 03 - Fort St. James

30-May-2019 03:19:23PM

Filename: a hat458_9 100x100 m4c0 070402.c

Compiled by: conifex

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Net Area: [A : 136.7]

Gross Area: [Grand Total : 136.7]

		Total	Conifer	Decid	S	PL	AT
Utilization Limits							
Min DBH	cm (M)				17.5	12.5	17.5
Stump Ht	cm (M)				30.0	30.0	30.0
Top Dia	cm (M)				10.0	10.0	10.0
Log Len	m				5.0	5.0	5.0
Volume and Size Data							
Gross Merchantable	m3	39290	39209	81	4818	34391	81
Net Merchantable	m3	27310	27271	39	4537	22733	39
Net Merch - All	m3/ha	200	199	0	33	166	0
Net Merch - Live	m3/ha	98	98	0	30	67	0
Net Merch - DP	m3/ha	102	102	0	3	99	0
Distribution	%	100	100	0	17	83	0
Decay	%	10	10	34	3	11	34
Waste	%	2	2	13	1	2	13
Waste(billing)	%	2	2	28	1	3	28
Breakage	%	19	19	4	2	21	4
Total Cull (DWB)	%	30	30	51	6	34	51
Basal Area / Ha	m2/ha	31.5	31.4	0.1	4.9	26.5	0.1
Net VBAR	m3/m2	6.073	6.347	0.195	6.778	6.267	0.195
Stems/Ha (Live & DP)		592.3	591.0	1.4	104.6	486.4	1.4
Avg DBH (Live & DP)	cm	26.0	26.0	26.2	24.4	26.4	26.2
Snags/Ha							
Avg Snag DBH	cm						
Gross Merch Vol/Tree	m3	0.49	0.49	0.44	0.34	0.52	0.44
Net Merch Vol/Tree	m3	0.34	0.34	0.21	0.32	0.34	0.21
Avg Weight Total Ht	m	23.0	23.0	22.0	20.1	23.4	22.0
Avg Weight Merch Ht	m	18.0	18.0	16.4	14.7	18.5	16.4
Avg 5.0 m Log Net	m3	0.14	0.14	0.08	0.13	0.14	0.08
Avg 5.0 m Log Gross	m3	0.16	0.16	0.15	0.14	0.16	0.15
Avg # of 5.0 m Logs/Tree		3.08	3.08	2.99	2.41	3.23	2.99
Net Immature	%	49.3	49.4		51.6	48.9	
Average Slope	%	4					
All Burn Volume	%						
Heavy Fire Volume	%						
Blowdown Volume	%	3.2	3.2		1.4	3.5	
Insect Volume	%	65.0	65.1		0.5	78.0	
LRF and Log Summary							
Net Merch - Stud	%	53.7	53.8		68.0	50.9	
Net Merch - Small Log	%	93.8	93.8	95.5	95.1	93.6	95.5
Net Merch - Large Log	%	6.2	6.2	4.5	4.9	6.4	4.5
Avg LRF All	bdfm/m3	142.2	142.1	157.7	181.6	134.3	157.7

*** FOR APPRAISAL PURPOSES ***

P E R C E N T R E D U C T I O N A P P L I E D

EXTBS 1, p3

Extended Block Summary

Average Line Method

Grades: MOF Computerized

FIZ: I

30-May-2019 03:19:23PM

POPE & TALBOT LTD.

Computerized Decay

PSYU: Stuart Lake

Filename: a hat458_9 100x100 m4c0 070402.c

Licence Number: A77955 CP: KUZ

Computerized Waste

Region: 6 - Omineca

Compiled by: conifex

Project:

Computerized Breakage

District: 03 - Fort St. James

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Net Area: Block : (M) - 458:, Plots in Block: 122, TUs: [A : 108.3]

	Total	Conifer	Decid	S	PL	AT
--	-------	---------	-------	---	----	----

Utilization Limits

Min DBH	cm (M)			17.5	12.5	17.5
Stump Ht	cm (M)			30.0	30.0	30.0
Top Dia	cm (M)			10.0	10.0	10.0
Log Len	m			5.0	5.0	5.0

Volume and Size Data

Gross Merchantable	m3	30939	30872	67	3768	27104	67
Net Merchantable	m3	21722	21688	34	3542	18146	34
Net Merch - All	m3/ha	201	200	0	33	168	0
Net Merch - Live	m3/ha	102	102	0	29	73	0
Net Merch - DP	m3/ha	98	98	0	3	95	0
Distribution	%	100	100	0	16	84	0
Decay	%	10	10	33	3	11	33
Waste	%	2	2	13	1	2	13
Waste(billing)	%	2	2	25	1	3	25
Breakage	%	18	18	4	2	21	4
Total Cull (DWB)	%	30	30	50	6	33	50
Basal Area / Ha	m2/ha	31.5	31.4	0.1	4.8	26.6	0.1
Net VBAR	m3/m2	6.090	6.381	0.201	6.787	6.307	0.201
Stems/Ha (Live & DP)		609.0	607.4	1.5	107.4	500.0	1.5
Avg DBH (Live & DP)	cm	25.6	25.6	25.5	23.9	26.0	25.5
Snags/Ha							
Avg Snag DBH	cm						
Gross Merch Vol/Tree	m3	0.47	0.47	0.41	0.32	0.50	0.41
Net Merch Vol/Tree	m3	0.33	0.33	0.20	0.30	0.34	0.20
Avg Weight Total Ht	m	22.9	22.9	21.9	20.1	23.3	21.9
Avg Weight Merch Ht	m	17.8	17.8	16.2	14.6	18.3	16.2
Avg 5.0 m Log Net	m3	0.14	0.14	0.08	0.13	0.14	0.08
Avg 5.0 m Log Gross	m3	0.15	0.15	0.14	0.14	0.16	0.14
Avg # of 5.0 m Logs/Tree		3.04	3.04	2.94	2.38	3.18	2.94
Net Immature	%	48.5	48.6		44.0	49.5	
Average Slope	%	4					
All Burn Volume	%						
Heavy Fire Volume	%						
Blowdown Volume	%	3.7	3.7		1.8	4.1	
Insect Volume	%	63.5	63.6		0.6	75.9	

LRF and Log Summary

Net Merch - Stud	%	55.3	55.4		72.0	52.1	
Net Merch - Small Log	%	94.5	94.5	94.8	94.4	94.5	94.8
Net Merch - Large Log	%	5.5	5.5	5.2	5.6	5.5	5.2
Avg LRF All	bdft/m3	143.5	143.5	156.8	180.4	136.3	156.8

Average Line Method Grades: MOF Computerized FIZ: I
 POPE & TALBOT LTD. Computerized Decay PSYU: Stuart Lake
 Licence Number: A77955 CP: KUZ Computerized Waste Region: 6 - Omineca
 Project: Computerized Breakage District: 03 - Fort St. James

30-May-2019 03:19:23PM
 Filename: a hat458_9 100x100 m4c0 070402.c
 Compiled by: conifex
 Cruised by: FSJ FORESTRY
 Version: 2018.00 IFS build 6202

Net Area: Block : (M) - 459:, Plots in Block: 31, TUs: [A : 28.4]

		Total	Conifer	Decid	S	PL	AT
Utilization Limits							
Min DBH	cm (M)				17.5	12.5	17.5
Stump Ht	cm (M)				30.0	30.0	30.0
Top Dia	cm (M)				10.0	10.0	10.0
Log Len	m				5.0	5.0	5.0
Volume and Size Data							
Gross Merchantable	m3	8350	8337	13	1050	7286	13
Net Merchantable	m3	5588	5582	6	995	4587	6
Net Merch - All	m3/ha	197	197	0	35	162	0
Net Merch - Live	m3/ha	82	82	0	34	48	0
Net Merch - DP	m3/ha	115	115		1	114	
Distribution	%	100	100	0	18	82	0
Decay	%	10	10	37	3	11	37
Waste	%	2	2	18	0	2	18
Waste(billing)	%	3	3	43	0	3	43
Breakage	%	21	21	4	2	24	4
Total Cull (DWB)	%	33	33	59	5	37	59
Basal Area / Ha	m2/ha	31.7	31.6	0.1	5.2	26.4	0.1
Net VBAR	m3/m2	6.009	6.218	0.173	6.746	6.114	0.173
Stems/Ha (Live & DP)		528.8	528.1	0.7	93.7	434.3	0.7
Avg DBH (Live & DP)	cm	27.6	27.6	31.3	26.6	27.8	31.3
Snags/Ha							
Avg Snag DBH	cm						
Gross Merch Vol/Tree	m3	0.56	0.56	0.65	0.39	0.59	0.65
Net Merch Vol/Tree	m3	0.37	0.37	0.27	0.37	0.37	0.27
Avg Weight Total Ht	m	23.4	23.4	22.4	19.9	23.9	22.4
Avg Weight Merch Ht	m	18.4	18.4	17.3	14.9	18.9	17.3
Avg 5.0 m Log Net	m3	0.15	0.15	0.09	0.15	0.15	0.09
Avg 5.0 m Log Gross	m3	0.17	0.17	0.19	0.15	0.17	0.19
Avg # of 5.0 m Logs/Tree		3.29	3.29	3.38	2.57	3.45	3.38
Net Immature	%	52.4	52.4		78.9	46.7	
Average Slope	%	4					
All Burn Volume	%						
Heavy Fire Volume	%						
Blowdown Volume	%	0.9	0.9			1.1	
Insect Volume	%	70.6	70.7			86.1	
LRF and Log Summary							
Net Merch - Stud	%	47.5	47.5		54.0	46.1	
Net Merch - Small Log	%	91.2	91.2	100.0	97.4	89.9	100.0
Net Merch - Large Log	%	8.8	8.8		2.6	10.1	
Avg LRF All	bdfm/m3	136.9	136.9	162.8	185.7	126.3	162.8

*** FOR APPRAISAL PURPOSES ***				P E R C E N T R E D U C T I O N A P P L I E D				VLS 1, p5			
				Volume Statistical Analysis				30-May-2019 03:19:23PM			
Average Line Method				Grades: MOF Computerized				Filename: a hat458_9 100x100 m4c0 070402.c			
POPE & TALBOT LTD.				Computerized Decay				Compiled by: conifex			
Licence Number: A77955 CP: KUZ				Computerized Waste				Cruised by: FSJ FORESTRY			
Project:				Computerized Breakage				Version: 2018.00 IFS build 6202			
Utilization Levels:				Minimum DBH Top Diameter Stump Height							
Mature Blocks: (cm)				17.5 10.0 30							
Immature Blocks:(cm)				12.0 10.0 30							
Exception[PL]: (cm)				12.5 10.0 30							
Standard Log Length:(m)				5.00							

Forest Type	Plots			Area ha	Net Volume m3/ha	Proportional Volume	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	200.6	0.80	0	574	574	126.8972	63.3	5.7	11.2
9 :	0	31	31	28.4	196.8	0.20	0	145	145	134.3633	68.3	12.3	25.0
TOTAL	0	153	153	136.7	199.8		0	719	719		64.3	5.2	10.2

Number of live & dead potential trees sampled is 719
Number of dead useless trees sampled is 0
Number of live useless trees sampled is 0

The weighted sampling error is 10.2% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

PERCENT REDUCTION APPLIED

BAS 1, p6

Average Line Method

POPE & TALBOT LTD.

Licence Number: A77955 CP: KUZ

Project:

Grades: MOF Computerized

Computerized Decay

Computerized Waste

Computerized Breakage

FIZ: I

PSYU: Stuart Lake

Region: 6 - Omineca

District: 03 - Fort St. James

30-May-2019 03:19:23PM

Filename: a hat458_9 100x100 m4c0 070402.c

Compiled by: conifex

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels:

Minimum DBH

Top Diameter

Stump Height

Mature Blocks: (cm)

17.5

10.0

30

Immature Blocks:(cm)

12.0

10.0

30

Exception[PL]: (cm)

12.5

10.0

30

Standard Log Length:(m)

5.00

Forest Type	Plots			Area ha	Basal Area m2/ha	Proportional Basal Area	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	31.5	0.79	0	574	574	17.5370	55.7	5.0	9.9
9 :	0	31	31	28.4	31.7	0.21	0	145	145	19.2680	60.8	10.9	22.3
TOTAL	0	153	153	136.7	31.5		0	719	719		56.9	4.6	9.0

Number of live & dead potential trees sampled is 719
 Number of dead useless trees sampled is 0
 Number of live useless trees sampled is 0

The weighted sampling error is 9.0% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

PERCENT REDUCTION APPLIED

Net VBAR Statistical Analysis

VBS 1, p7

Average Line Method

POPE & TALBOT LTD.

Licence Number: A77955 CP: KUZ

Project:

Grades: MOF Computerized

Computerized Decay

Computerized Waste

Computerized Breakage

FIZ: I

PSYU: Stuart Lake

Region: 6 - Omineca

District: 03 - Fort St. James

30-May-2019 03:19:23PM

Filename: a hat458_9 100x100 m4c0 070402.c

Compiled by: conifex

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels:

Minimum DBH

Top Diameter

Stump Height

Mature Blocks: (cm)

17.5

10.0

30

Immature Blocks:(cm)

12.0

10.0

30

Exception[PL]: (cm)

12.5

10.0

30

Standard Log Length:(m)

5.00

Forest Type	Plots			Area ha	Net VBAR m3/m2	Proportional VBAR	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	6.090	0.79	0	574	574	2.0115	33.0	1.4	2.7
9 :	0	31	31	28.4	6.009	0.21	0	145	145	1.9454	32.4	2.7	5.3
TOTAL	0	153	153	136.7	6.073		0	719	719		32.9	1.2	2.4

Number of live & dead potential trees sampled is 719
 Number of dead useless trees sampled is 0
 Number of live useless trees sampled is 0

The weighted sampling error is 2.4% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

APPSM 1, pl

Appraisal Summary Report

Average Line Method
POPE & TALBOT LTD.
Licence Number: A77955 CP: KUZ
Project:
Location :

Grades: MOF Computerized
Computerized Decay
Computerized Waste
Computerized Breakage
No Of Blocks : 2

FIZ: I
PSYU: Stuart Lake
Region: 6 - Omineca
District: 03 - Fort St. James

04-Jun-2019 11:46:43AM
Filename: a hat458_9 100x100 m4c0 070402.c
Compiled by: conifex
Cruised by: FSJ FORESTRY
Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm) 17.5 10.0 30
Immature Blocks: (cm) 12.0 10.0 30
Exception[PL]: (cm) 12.5 10.0 30

Standard Log Length: (m) 5.00

Net Area: [All Treatment Units : 136.7]

All Method Summary

Species	Net Volume (m3)		Net Volume / ha	Decay%	Stud	LRF	All
Code Description	All	Live	DP	All	Live	DP	Burn%
LO L.P. Pine	3647	3647	0	26.679	26.679	0.000	8
SP Spruce	4138	4138	0	30.273	30.273	0.000	3
AS Aspen	0	0	0	0.000	0.000	0.000	0
Conifer	7785	7785	0	56.951	56.951	0.000	5
Total	7785	7785	0	56.951	56.951	0.000	5

Harvesting Method Summaries

Species	Harvest	Net	Average	Net Vol	Net Vol/ha	Defect%	Partial	All	Heavy	Down	Dead
Method	Volume	Slope%	/Tree			(DWB)	Cut%	Fire%	Fire%	Tree%	Useless%
All Species SC	7785	4	0.29	56.951	7	28	0	0	0	0	0
All Methods	7785	4	0.29	56.951	7	28	0	0	0	0	0
Conifer SC	7785	4	0.29	56.951	7	29	0	0	0	0	0
All Methods	7785	4	0.29	56.951	7	29	0	0	0	0	0

Insect Damage Net Volume (m3)

L.P. Pine All Other Conifer
Green Attack Red Attack Grey Attack Insect Damage
0 0 0 0

L.P. Pine Red/Grey Attack % of Conifer by Block
458: 0.0% 459: 0.0%

Cutting Authority

See pre reduction compilation for statistics
Plots/Ha 1.1
Cruised Trees/Plot 4.7
Cruise Date (yy-mm): 06-05
Plots: 153 # <= 5yrs: 0 # > 5yrs: 0 # > 10yrs: 153 # no date: 0

Average Line Method

POPE & TALBOT LTD.

Licence Number: A77955 CP: KUZ

Project:

Grades: MOF Computerized

Computerized Decay

Computerized Waste

Computerized Breakage

Extended CP Summary

FIZ: I

PSYU: Stuart Lake

Region: 6 - Omineca

District: 03 - Fort St. James

04-Jun-2019 11:46:43AM

Filename: a hat458_9 100x100 m4c0 070402.c

Compiled by: conifex

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Net Area: [A : 136.7]

Gross Area: [Grand Total : 136.7]

		Total	Conifer	Decid	S	PL	AT
Utilization Limits							
Min DBH	cm (M)				17.5	12.5	17.5
Stump Ht	cm (M)				30.0	30.0	30.0
Top Dia	cm (M)				10.0	10.0	10.0
Log Len	m				5.0	5.0	5.0
Volume and Size Data							
Gross Merchantable	m3	8415	8415		4351	4064	
Net Merchantable	m3	7785	7785		4138	3647	
Net Merch - All	m3/ha	57	57		30	27	
Net Merch - Live	m3/ha	57	57		30	27	
Net Merch - DP	m3/ha						
Distribution	%	100	100		53	47	
Decay	%	5	5		3	8	
Waste	%	0	0		0	1	
Waste(billing)	%	0	0		0	1	
Breakage	%	2	2		2	2	
Total Cull (DWB)	%	7	7		5	10	
Basal Area / Ha	m2/ha	7.8	7.8		4.4	3.5	
Net VBAR	m3/m2	1.731	1.812		6.175	1.005	
Stems/Ha (Live & DP)		199.2	199.2		92.5	106.6	
Avg DBH (Live & DP)	cm	22.4	22.4		24.5	20.3	
Snags/Ha							
Avg Snag DBH	cm						
Gross Merch Vol/Tree	m3	0.31	0.31		0.34	0.28	
Net Merch Vol/Tree	m3	0.29	0.29		0.33	0.25	
Avg Weight Total Ht	m	21.0	21.0		20.4	21.6	
Avg Weight Merch Ht	m	15.4	15.4		14.9	15.8	
Avg 5.0 m Log Net	m3	0.12	0.12		0.14	0.10	
Avg 5.0 m Log Gross	m3	0.12	0.12		0.14	0.11	
Avg # of 5.0 m Logs/Tree		2.51	2.51		2.44	2.58	
Net Immature	%	47.9	47.9		50.5	45.0	
Average Slope	%	4					
All Burn Volume	%						
Heavy Fire Volume	%						
Blowdown Volume	%						
Insect Volume	%						
LRF and Log Summary							
Net Merch - Stud	%	72.8	72.8		66.6	79.9	
Net Merch - Small Log	%	97.1	97.1		94.6	100.0	
Net Merch - Large Log	%	2.9	2.9		5.4		
Avg LRF All	bdfm/m3	177.0	177.0		182.4	171.0	

Percent Reductions Applied

Average Line Method
POPE & TALBOT LTD.
Licence Number: A77955 CP: KUZ
Project:

Grades: MOF Computerized
Computerized Decay
Computerized Waste
Computerized Breakage

FIZ: I
PSYU: Stuart Lake
Region: 6 - Omineca
District: 03 - Fort St. James

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04-Jun-2019 11:46:43AM
Filename: a_hat458_9 100x100 m4c0 070402.c
Compiled by: conifex
Cruised by: FSJ FORESTRY
Version: 2018.00 IFS build 6202
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[illegible]

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

VLS 1, p4

Volume Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 11:46:43AM

POPE & TALBOT LTD.

Computerized Decay

PSYU: Stuart Lake

Filename: a hat458_9 100x100 m4c0 070402.c

Licence Number: A77955 CP: KUZ

Computerized Waste

Region: 6 - Omineca

Compiled by: conifex

Project:

Computerized Breakage

District: 03 - Fort St. James

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm)	17.5	10.0	30
Immature Blocks: (cm)	12.0	10.0	30
Exception[PL]: (cm)	12.5	10.0	30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net Volume m3/ha	Proportional Volume	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	58.6	0.81	0	574	574	76.3212	130.3	11.8	23.1
9 :	0	31	31	28.4	50.8	0.19	0	145	145	75.6317	148.9	26.7	54.6
TOTAL	0	153	153	136.7	57.0		0	719	719		133.8	10.8	21.2

Number of live & dead potential trees sampled is 719

Number of dead useless trees sampled is 0

Number of live useless trees sampled is 0

The weighted sampling error is 21.2% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

BAS 1, p5

Average Line Method

POPE & TALBOT LTD.

Licence Number: A77955 CP: KUZ

Project:

Grades: MOF Computerized

Computerized Decay

Computerized Waste

Computerized Breakage

FIZ: I

PSYU: Stuart Lake

Region: 6 - Omineca

District: 03 - Fort St. James

04-Jun-2019 11:46:43AM

Filename: a hat458_9 100x100 m4c0 070402.c

Compiled by: conifex

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm)	17.5	10.0	30
Immature Blocks: (cm)	12.0	10.0	30
Exception[PL]: (cm)	12.5	10.0	30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Basal Area m2/ha	Proportional Basal Area	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	8.1	0.82	0	574	574	10.0223	123.9	11.2	22.0
9 :	0	31	31	28.4	6.8	0.18	0	145	145	10.1414	149.7	26.9	54.9
TOTAL	0	153	153	136.7	7.8		0	719	719		128.6	10.4	20.4

Number of live & dead potential trees sampled is 719

Number of dead useless trees sampled is 0

Number of live useless trees sampled is 0

The weighted sampling error is 20.4% at the 95% confidence level

*** FOR APPRAISAL PURPOSES ***

LEAVE TREE REPORT

VBS 1, p6

Net VBAR Statistical Analysis

Average Line Method

Grades: MOF Computerized

FIZ: I

04-Jun-2019 11:46:43AM

POPE & TALBOT LTD.

Computerized Decay

PSYU: Stuart Lake

Filename: a hat458_9 100x100 m4c0 070402.c

Licence Number: A77955 CP: KUZ

Computerized Waste

Region: 6 - Omineca

Compiled by: conifex

Project:

Computerized Breakage

District: 03 - Fort St. James

Cruised by: FSJ FORESTRY

Version: 2018.00 IFS build 6202

Utilization Levels: Minimum DBH Top Diameter Stump Height

Mature Blocks: (cm)	17.5	10.0	30
Immature Blocks: (cm)	12.0	10.0	30
Exception[PL]: (cm)	12.5	10.0	30

Standard Log Length: (m) 5.00

Forest Type	Plots			Area ha	Net VBAR m3/m2	Proportional VBAR	Trees			Standard Deviation	Coeff. of Variation	Sampling Error	
	Cnt	Mea	Tot				Cnt	Mea	Tot			1 SE%	2 SE%
8 :	0	122	122	108.3	1.778	0.81	0	574	574	3.2273	181.5	7.6	14.8
9 :	0	31	31	28.4	1.551	0.19	0	145	145	3.1486	203.0	16.9	33.0
TOTAL	0	153	153	136.7	1.731		0	719	719		185.5	6.9	13.6

Number of live & dead potential trees sampled is 719

Number of dead useless trees sampled is 0

Number of live useless trees sampled is 0

The weighted sampling error is 13.6% at the 95% confidence level