



Monitoring Harvest Activity across 16 Mountain Pine Beetle Impacted Timber Supply Areas

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Introduction

Traditional timber supply analyses conducted by the Ministry of Forest and Range (MoFR) attempted to model licensees' harvest behaviour. More recent expedited Mountain Pine Beetle (MPB) analyses however modelled desired harvest behaviour as licensees' response to the unfolding epidemic was unknown. Now in many impacted timber supply areas (TSAs), the epidemic is either near or past its peak so sufficient harvest depletion data is available to gain some insight into licensees' harvesting response to the epidemic.

Licensee response was assessed in the 16 most severely impacted interior TSAs. Two statistics are presented in this report to describe licensees' response:

- the extent of harvesting in stands with at least 70% pine content; and
- the extent of stands with at least 70% pine content across the timber harvesting land base (THLB).

These two statistics are of particular interest to the chief forester. In two recent MPB-related AAC decisions—100 Mile House and Williams Lake TSAs—he stressed the importance of focussing the harvest on stands with at least 70% pine content. The chief forester reasoned that while such stands have, albeit a reduced, economic value today, they contain insufficient volume from other species to be economically viable in the mid-term. The exception to this direction from the chief forester was stands with at least 70% pine content that have a well developed under-storey. It is thought that under-storey may grow through the dead canopy to become a mid-term harvest opportunity. Similarly, pine-leading stands with less than 70% pine may provide a mid-term harvest opportunity in times of scarcity despite their reduced volumes.

Methodology

The occurrence of pine across the landscape was determined using the provincial inventory. For a given TSA, data from the most recent timber supply analysis were used to determine the spatial location and extent of the timber harvesting land base. One of two sources of data was used to determine the spatial location of cutblocks:

1. satellite derived harvest depletion data; or
2. Reporting Silviculture Updates and Land status Tracking System (RESULTS) harvest depletion data.

The data was combined and queried using a geographic information system (GIS). For the most part, the assembly of data was part of a larger on-going project to assess mid-term timber supply for all 20 interior MPB impacted units.

The choice of depletion data by TSA is rationalized in Appendix 1. If RESULTS data was used, the harvest period assessed was 2005. If satellite derived harvest depletion data was used, the period assessed was (in most cases) summer 2004 to summer 2006. In all cases the assessment period was either completely (or predominantly) before the April 2006 lumber grade change.

The Prince George TSA was treated as a special case due to the sheer size of its annual allowable cut (AAC). Harvest behaviour is reported both for the TSA as a whole and for each of its three Districts—Vanderhoof, Fort St. James and Prince George.

A limited verification of this approach was conducted using Harvest Billing System (HBS) data (see Appendix 2 for details). In general, the two data sets compared favourably.

Results

Results for the 16 TSAs and the 3 districts within the Prince George TSA are presented in both tabular and graphical form (Table 1 and Figures 1 and 2).

Table 1. The proportion of the harvest composed of stands with at least 70% pine content compared to the frequency of those stands across the timber harvesting land base (THLB)

Admin. Unit	% THLB (Pine > = 70%)	% Harvest (Pine > = 70%)
Prince George TSA	37%	71%
<i>Vanderhoof District</i>	71%	85%
<i>Fort St James District</i>	26%	59%
<i>Prince George District</i>	26%	65%
Okanagan TSA	23%	36%
Williams Lake TSA	63%	79%
Quesnel TSA	73%	79%
MacKenzie TSA	23%	49%
Boundary TSA	34%	41%
Golden TSA	11%	52%
Kamloops TSA	22%	32%
Kootenay Lake TSA	16%	10%
Lakes TSA	57%	82%
Lillooet TSA	35%	75%
Merritt TSA	46%	77%
Morice TSA	34%	76%
100 Mile House TSA	38%	67%
Dawson Creek TSA	19%	44%
Cranbrook TSA	40%	57%

Figure 1 simply represents Table 1 as a simple bar chart.

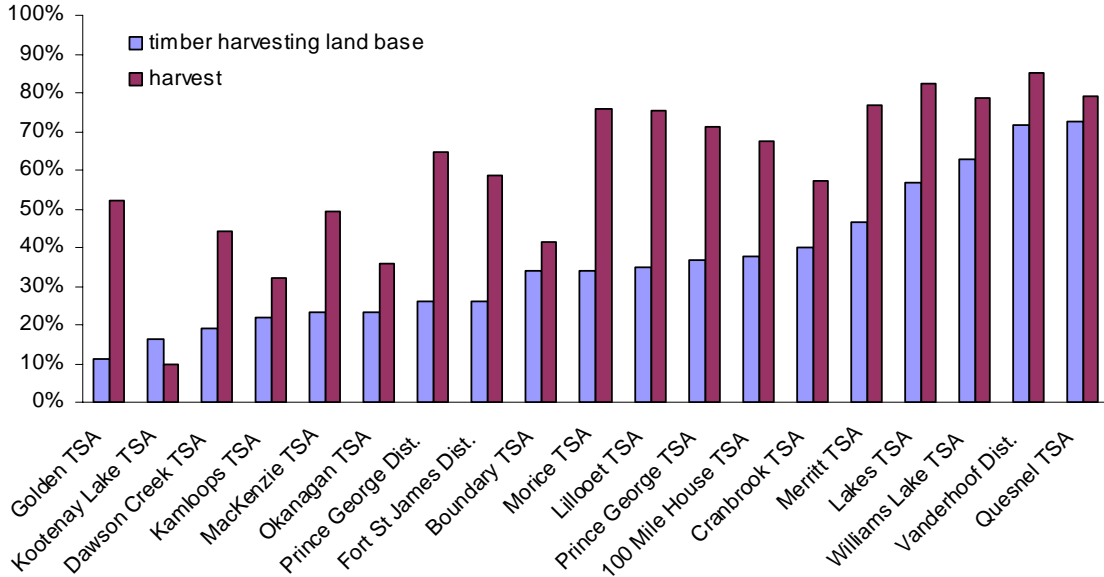


Figure 1. The proportion of the harvest composed of stands with at least 70% pine content compared to the frequency of those stands across the THLB (with TSAs identified).

Figure 2 portrays the same data but in a different way seeking to quantify how licensee behaviour changes with each percentage point increase of heavily pine dominated stands across the timber harvesting land base (THLB).

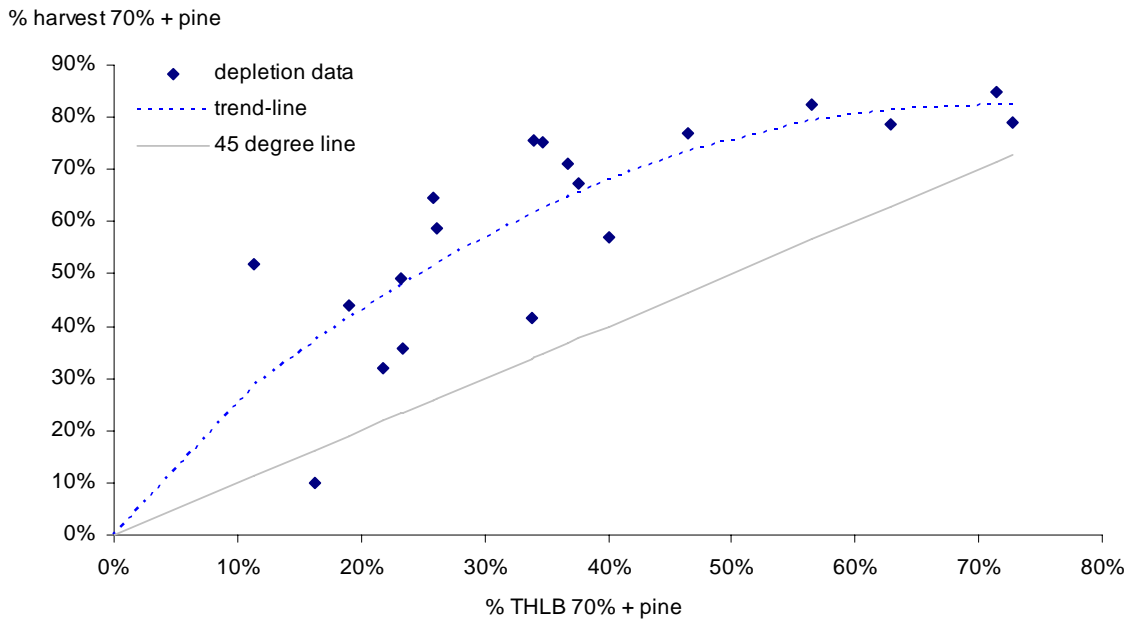


Figure 2. The relationship between the percent of the harvest composed of stands with at least 70% pine content and the frequency of those stands across the THLB.

A data point that falls near the “45 degree line” in Figure 2 implies that stand type was harvested in proportion to its occurrence across the timber harvesting land base in that particular TSA. This implies licensees in that TSA “on average” likely neither targeted nor avoided such stand types. A data point that falls above the line means the stand type was harvested more frequently than it occurred across the THLB—licensees likely targeted that stand type. Finally, a data point that falls below the line means the stand type was harvested less frequently than it occurred across the THLB—licensees likely avoided that stand type.

Discussion

As previously mentioned, the harvest activity reported reflects administrative and economic realities pre-summer 2006 and may reflect neither the current, nor future harvesting behaviour of licensees. Further, it must be emphasized that the data reported portrays the amount of volume harvested from stands comprised of at least 70% pine. The information reported does not portray the proportion of the total harvest that is pine.

Figures 1 and 2 show that licensees were targeting heavily pine-dominated stands prior to summer 2006 (with the exception of one TSA). The one anomalous TSA is Kootenay Lake. At the time of writing the reason for this anomaly was unknown however this was also the TSA where comparisons made to HBS data were unfavourable.

It appears that once the MPB clearly established in a TSA, licensees targeted pine stands but the ability or desire of licensees to target such stands declined if those stands dominated the landscape. Presumably, there is a limit to the amount of pine licensees can economically harvest, process, and sell. In addition, Table 1 and Figures 1 and 2 do not show that licensees in pine dominated TSAs and Districts (e.g.: Vanderhoof District, Quesnel TSA) have very large AACs. Therefore, a very large increase in pine harvest is required to change the percent pine harvest significantly.

Future work

The plan is to repeat this study on an annual basis for MPB impacted TSAs to inform strategic decision making in British Columbia.

Appendix 1 The use of RESULTS or satellite derived harvest depletion data by TSA

RESULTS harvest depletion information was used for a TSA when it could account for at least 80% of the 2005 harvest volume reported by the MoFRs Harvest Billing System (HBS). Further, the volume estimate for the pine harvest using RESULTS and the inventory had to be within 20% of the pine harvest volume reported by HBS. Where it could not do so, satellite harvest depletion data was used. The RESULTS comparison to HBS data was conducted in summer 2006. Since then, the comprehensiveness of RESULTS data may have improved significantly. Using RESULTS data everywhere would be preferable as it is generated through standard business processes while satellite harvest depletion data had to be specifically generated for this project.

The size of harvest, pine content, assessment period and data sources used are reported in Table 2.

Table 2. *Volume harvested, pine content, assessment period and data sources used*

TSA	Volume Harvested m ³ (HBS 2005)	% THLB Pine	Harvest Data Source	Assessment Period
Prince George	13,144,167	32	Satellite	2004-2006
Quesnel	3,687,064	69	Satellite	2005-2006
Williams Lake	4,170,286	55	Satellite	2004-2006
Lakes	2,114,538	65	RESULTS	2005
Merritt	2,225,706	52	RESULTS	2005
Kamloops	3,663,580	30	Satellite	2004-2005
100 Mile House	2,129,995	51	RESULTS	2005
Okanagan	3,664,048	27	Satellite	2005-2006
Mackenzie	3,073,988	32	Satellite	2004-2006
Morice	1,801,267	44	RESULTS	2005
Cranbrook	1,208,480	49	Satellite	2005-2006
Dawson Creek	1,943,444	28	Satellite	2004-2006
Boundary	722,372	44	RESULTS	2005
Kootenay Lake	664,353	22	RESULTS	2005
Lillooet	321,823	40	RESULTS	2005
Golden	403,009	15	RESULTS	2005

Although impacted by MPB, assessments of the Arrow, Bulkley, Invermere and Robson Valley TSAs were not conducted due to lack of both comprehensive RESULTS data and satellite data. The AACs for these four units are relatively small and their pine content low (with the exception of Invermere TSA at 36%).

Appendix 2 Verification of Results

Where possible, results from this project were verified using HBS data. This often proved problematic. A set of custom reports provided to Forest Analysis and Inventory Branch (FAIB) by Revenue Branch reported harvest activity by species and grade by calendar year from 2001 to 2005 for each TSA. Where satellite harvest depletion data was used in this project, summer to summer harvest activity was being compared to winter to winter HBS data.

Further, this HBS dataset did not identify the proportion of the harvest that came from stands with at least 70% pine content. This required the HBS comparison to be limited simply to proportion of the volume harvested that was pine. If the proportion of the total harvest compared favourably, it is assumed overlaying harvest depletion data over the inventory would also be reasonable for stands with at least 70% pine content.

Despite these weaknesses, if the HBS reports for 2005 were used as a benchmark, the proportion of the harvest (using depletion data) that was pine compared favourably for those TSAs whose boundaries either coincided with Forest District boundaries or were aggregates of Forest Districts. For those TSAs that were subsets of a Forest District, the comparison often appeared suspect suggesting a possible error in the HBS report for those TSAs. By default, HBS reports by Forest District.

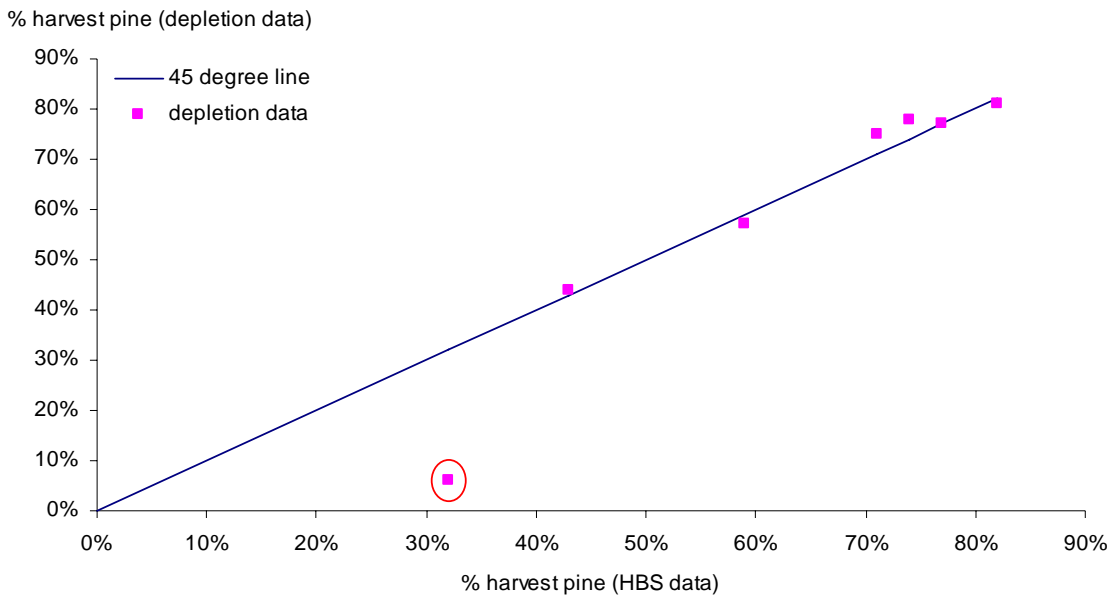


Figure 3. Comparison of the proportion of the harvest that is pine for those TSAs whose boundaries align with District boundaries using depletion data and HBS data.

Data points that fall along the “45 degree line” show good correspondence between the HBS and depletion data. The outlier in Figure 3 is the Kootenay Lake TSA. At the time of writing the reason for this anomaly was unknown.