Monitoring Harvest Activity Across 29 Mountain Pine Beetle Impacted Management Units

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Monitoring harvest activity across 29 mountain pine beetle impacted management units.

BC Ministry of Forests and Range
Forest Analysis and Inventory Branch (FAIB)
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Purpose:

The Province has responded to the Mountain Pine Beetle (MPB) epidemic by dramatically increasing Annual Allowable Cuts (AACs) to facilitate salvage of the impacted timber. Licensees have responded to this challenge by concentrating their harvesting operations in pine-leading stands. However, as the epidemic and salvage harvesting progresses licensees will exhaust that component of the dead pine resource that is economic to harvest. To determine whether the AAC increase is meeting its intended purpose it is necessary to keep track of what is being harvested in the affected areas. Monitoring harvest activity across MPB impacted management units is therefore critical to decide when AACs should return to more sustainable levels.

Introduction:

This report expands upon the original study titled “Monitoring Harvest activity across 16 Mountain Pine Beetle impacted Timber Supply Areas” released in June 2007. It expands the aforementioned report to include the Invermere, Bulkley, Arrow and Robson Valley TSAs and TFLs 8, 14, 18, 35, 42, 48, 49, 52 and 53. The timber harvesting land bases (THLBs) of the TSAs and TFLs presented are comprised of 13 percent or more lodgepole pine and are shown in Figure A. This report provides time series of harvest behaviour from January 1, 2001 to September 23, 2009 for TSAs and from January 1, 2006 to December 31, 2008 for TFLs.
Figure A. Management units (TSAs and TFLs) monitored for harvest activity.

Three statistics are presented by year for each TSA:

1. total harvest;
2. pine harvest; and
3. the harvest from pine leading timber marks. [A timber mark identifies the area where timber is authorized to be harvested. In a pine leading timber mark most of the harvestable volume is lodgepole pine.]

Two statistics are presented by year for each TFL:

1. total harvest; and
2. pine harvest.

For the TSAs, the rationale for presenting the third statistics is the assumption that the species composition of a timber mark reflects the composition of the stands that compose the mark. If the reader does not accept this assumption it is suggested they focus their attention on the total harvest, and pine harvest volumes.
Methodology:

The methodology underlying this report differs from the aforementioned 2007 report. The 2007 report used a GIS approach. Spatial cut block boundaries spanning a given time period were overlaid upon the provincial inventory to determine the composition of those cut blocks harvested. Obtaining comprehensive spatial cut block boundary data for all management units that spanned the same time period was not possible.

To avoid this problem, in this 2009 report, MoFR Revenue Branch harvest billing data and Resource Tenures & Engineering Branch data were used instead. These data were comprehensive and allowed licensee behaviour to be assessed over successive years. However, as previously mentioned the species composition of cut-blocks harvested has to be inferred using the species composition of the mark. Specifically, by timber mark, year and species, the “billed volume including avoidable waste harvested from provincial crown land” was extracted from the Revenue Branch database.

In the case of the TFLs, due to technical issues, it was not possible to determine “the harvest from pine leading marks” with any confidence so this statistic was omitted.

Results:

Time series data for the 20 TSAs and 9 TFLs are presented in figures 1 through 29. Two figures “a” and “b” are used to depict the harvest behaviour for a management unit. The absolute total harvest, pine harvest and harvest from pine leading marks are presented in figure “a”. The percentage of the total harvest that is pine and from pine leading marks is presented in figure “b”. In the case of TFLs reference to the harvest from pine leading marks is omitted from both graphs. The graphs have been ordered from highest to lowest percent pine using TSR2 and TSR3 data.

When viewing the graphs for the 20 TSAs, the reader should interpret the results for 2009 with caution as they only depict harvest activity for part of the year. The September 23rd date was the date of the data extraction from the Revenue Branch Harvest Billing database. It does not necessarily reflect actual harvest activity up to September 23rd but rather an earlier date.

An overall summary of the trends from 2007 to 2008 is provided in Table 1 which will be subsequently discussed (page 34).
Figure 1A: Total harvest, pine harvest and the harvest from pine leading marks. (Quesnel TSA—67% pine)

Figure 1B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Quesnel TSA—67% pine)
Figure 2A: Total harvest, pine harvest and the harvest from pine leading marks (Lakes TSA—64% pine)

Figure 2B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Lakes TSA—64% pine)
Figure 3A: Total harvest, pine harvest and the harvest from pine leading marks (Williams Lake TSA—54% pine)

Figure 3B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Williams Lake TSA—54% pine)
Figure 4A: Total harvest, pine harvest and the harvest from pine leading marks (100 Mile TSA—52% pine)

Figure 4B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (100 Mile TSA—52% pine)
Figure 5A: Total harvest, pine harvest and the harvest from pine leading marks (Prince George TSA—51% pine)

Figure 5B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Prince George TSA—51% pine)
Figure 6A: Total harvest, pine harvest and the harvest from pine leading marks (Merritt TSA—51% pine)

Figure 6B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Merritt TSA—51% pine)
Figure 7A: Total harvest, pine harvest and the harvest from pine leading marks (Cranbrook TSA—47% pine)

Figure 7B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Cranbrook TSA—47% pine)
Figure 8A: Total harvest, pine harvest and the harvest from pine leading marks (Morice TSA—43% pine)

Figure 8B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Morice TSA—43% pine)
Figure 9A: Total harvest, pine harvest and the harvest from pine leading marks (MacKenzie TSA—41% pine)

Figure 9B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (MacKenzie TSA—41% pine)
Figure 10A: Total harvest, pine harvest and the harvest from pine leading marks (Lillooet TSA—39% pine)

Figure 10B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Lillooet TSA—39% pine)
Figure 11A: Total harvest, pine harvest and the harvest from pine leading marks (Invermere TSA—37% pine)

Figure 11B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Invermere TSA—37% pine)
Figure 12A: Total harvest, pine harvest and the harvest from pine leading marks (Boundary TSA—35% pine)

Figure 12B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Boundary TSA—35% pine)
Figure 13A: Total harvest, pine harvest and the harvest from pine leading marks (Dawson Creek TSA—29% pine)

Figure 13B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Dawson Creek TSA—29% pine)
Figure 14A: Total harvest, pine harvest and the harvest from pine leading marks (Kamloops TSA—28% pine)

Figure 14B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Kamloops TSA—28% pine)
Figure 15A: Total harvest, pine harvest and the harvest from pine leading marks (Okanagan TSA—27% pine)

Figure 15B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Okanagan TSA—27% pine)
Figure 16A: Total harvest, pine harvest and the harvest from pine leading marks (Kootenay Lake TSA—22% pine)

Figure 16B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Kootenay Lake TSA—22% pine)
Figure 17A: Total harvest, pine harvest and the harvest from pine leading marks (Bulkley TSA—19% pine)

Figure 17B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Bulkley TSA—19% pine)
Figure 18A: Total harvest, pine harvest and the harvest from pine leading marks (Arrow TSA—16% pine)

Figure 18B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Arrow TSA—16% pine)
Figure 19A: Total harvest, pine harvest and the harvest from pine leading marks (Golden TSA—14% pine)

Figure 19B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Golden TSA—14% pine)
Figure 20A: Total harvest, pine harvest and the harvest from pine leading marks (Robson Valley TSA—13% pine)

Figure 20B: Percent of harvest that is pine and percent of harvest that comes from pine leading marks (Robson Valley TSA—13% pine)
Figure 21A: Total harvest, pine harvest  
(TFL 8 (Interfor)—49% pine)

Figure 21B: Percent of harvest that is pine  
(TFL 8 (Interfor)—49% pine)
Figure 22A: Total harvest, pine harvest
(TFL 14 (Tembec)—46% pine)

Figure 22B: Percent of harvest that is pine
(TFL 14 (Tembec)—46% pine)
Figure 23A: Total harvest, pine harvest
(TFL 49 (Tolko)—43% pine)

Figure 23B: Percent of harvest that is pine
(TFL 49 (Tolko)—43% pine)
Figure 24A: Total harvest, pine harvest (TFL 35 (Weyerhauser)—39% pine)

Figure 24B: Percent of harvest that is pine (TFL 35 (Weyerhauser)—39% pine)
Figure 25A: Total harvest, pine harvest
(TFL 42 (Tanizul)—36% pine)

Figure 25B: Percent of harvest that is pine
(TFL 42 (Tanizul)—36% pine)
Figure 26A: Total harvest, pine harvest  
(TFL 18 (Canfor)—26% pine)

Figure 26B: Percent of harvest that is pine  
(TFL 18 (Canfor)—26% pine)
Figure 27A: Total harvest, pine harvest
(TFL 52 (West Fraser)—26% pine)

Figure 27B: Percent of harvest that is pine
(TFL 52 (West Fraser)—26% pine)
Figure 28A: Total harvest, pine harvest (TFL 53 (Dunkley)—24% pine)

Figure 28B: Percent of harvest that is pine (TFL 53 (Dunkley)—24% pine)
Figure 29A: Total harvest, pine harvest
(TFL 48 (Canfor)—23% pine)

Figure 29B: Percent of harvest that is pine
(TFL 48 (Canfor)—23% pine)
For 2007 and 2008, the data presented in Figures 1B through 29B have been summarized to answer the following question. In percentage terms has the amount of pine being harvested and the amount of volume from pine leading marks (for the TSAs) increased or decreased between 2007 and 2008? To answer this question the percent value in 2007 was subtracted from the percent value in 2008. This yields a positive value if the percentage has increased and a negative value if the percentage decreased. For example, in the case of TFL 8, the percentage of the total harvest that was pine in 2007 was 47.8%. In 2008 that statistic was 57.4%—an increase of 9.6 percentage points. The resulting data is presented in Table 1.

Table 1: Trend in pine contribution to harvest (2007 to 2008)

<table>
<thead>
<tr>
<th>Management Unit</th>
<th>Proportion of Management that is pine</th>
<th>Trend in proportion of harvest that is pine</th>
<th>Trend in proportion of harvest that come from pine leading marks</th>
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<tbody>
<tr>
<td>Quesnel TSA</td>
<td>67%</td>
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</tr>
<tr>
<td>Lakes TSA</td>
<td>64%</td>
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<td>-1%</td>
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<tr>
<td>Williams Lake TSA</td>
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<td>-5%</td>
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<tr>
<td>100 Mile TSA</td>
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<td>2%</td>
</tr>
<tr>
<td>Prince George TSA</td>
<td>51%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Merritt TSA</td>
<td>51%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Cranbrook TSA</td>
<td>47%</td>
<td>-4%</td>
<td>-3%</td>
</tr>
<tr>
<td>Morice TSA</td>
<td>43%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>MacKenzie TSA</td>
<td>41%</td>
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<td>2%</td>
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<tr>
<td>Lillooet TSA</td>
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<td>Invermere TSA</td>
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<td>Boundary TSA</td>
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<td>Okanagan TSA</td>
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<td>Kootenay Lake TSA</td>
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<td>TFL 8 (Interfor)</td>
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<td>TFL 14 (Tembec)</td>
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<td>23%</td>
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**Conclusion:**

On the whole licensees are continuing to do a good job targeting pine for salvage. As can be seen from Figures 10B, 11B, 17B, 24B, 27B and 28B and Table 1, the emphasis on pine harvest declined by more than 5% for the Lillooet, Invermere and Bulkley TSAs and TFLs 35, 52 and 53 during the period 2007 to 2008. During the same period as evidenced by Figures 12B, 15B and 21B and Table 1, the emphasis on pine harvest increased by more than 5% for the Boundary and Okanagan TSAs and TFL 8. The emphasis on pine harvested essentially remained unchanged for the other 17 TSAs and five TFLs.

In those management units where the emphasis on pine salvage is declining, some investigation is needed to understand why this is happening. This could be due to the pine resource being exhausted or a change in harvest preference for economic reasons. The potential exists on TSAs to examine the inventory as well as the harvest billing data to explore this issue. In a number of cases this option is not available for TFLs as the licensee is the sole custodian of the inventory. However, even if we identify there is considerable growing stock left on the landscape (according to the inventory), the inventory will not tell us whether it is still of sufficient quality to salvage. To get a sense of the condition of these stands we will need to contact District staff and licensees familiar with local stand conditions to determine whether those pine stands are economically harvestable.

**Future Work:**

The plan is to repeat this study during spring/summer 2010 to include all the 2009 harvest billing data and to remedy the technical issue that prevented the volume harvested from pine leading marks being reported for TFLs.