



Omineca Spruce Beetle Harvest Summary 2012-2020

Executive Summary

The recent spruce beetle outbreak in the Omineca Region prompted guidance from the Ministry of Forests Office of the Chief Forester to recommend that harvesting priority by forest licensees be focused on infested, dead, or dying trees. The Office of the Chief Forester also recommended monitoring for the harvest prioritization guidance.

This report summarizes forest licensee-collected timber cruise data (collected to value planned harvested areas) between 2012 and 2020 in order to monitor the number of insect-infested or recently killed trees within, and outside of, a defined spruce beetle outbreak area. The data shows a proportional increase in harvesting of spruce beetle-affected stands since the outbreak was declared in 2015.

Table of Contents

Executive Summary.....	2
Table of Contents.....	2
List of Figures	2
Background – why do we need to monitor?.....	3
Data collection and processing method	3
Data Summaries.....	6
Conclusions	9

List of Figures

Figure 1 – The spruce beetle “outbreak area” between 2015 and 2020.	4
Figure 2 – The area defined as “outside the outbreak” are outlined in red. Cruises conducted within the red outline, but outside the shaded outbreak area were used as the “outside” the outbreak comparison areas.	5
Figure 3 - 2012 to 2020 spruce abiotic and spruce beetle damage. The percentage of net cruise volume, as damage to spruce. The damages are attributed to either abiotic causes (blue) or spruce beetle (orange), and both damages are combined in the grey bar. The bars are sorted by year and by location (inside vs. outside the infestation area).	6
Figure 4 - 2012 to 2020 percentage of cutting permits by spruce beetle abundance category. The percentage of cutting permits by 5 spruce beetle volume categories: 0-10%, 10-20%, 20-30%, 30-40%, greater than 40%. These categories match the thresholds in the The Chief Forester’s Expectations for Prioritization in Response to Spruce Beetle Outbreaks. The graph is broken down by year and by location (inside vs. outside the outbreak area).	7
Figure 5 - spruce beetle damage codes and un-infested volume by year. Spruce cruised by damage code: code 5 [strip (partial) attack], code 6 (full attack), and code 7 (grey dead). This was compared to un-infested total volume and spruce un-infested volume by year, inside vs. outside the outbreak area.	8
Figure 6 - spruce and pine beetle damage codes by year. Spruce beetle damage codes: code 5 [strip (partial) attack], code 6 (full attack), and code 7 (grey dead). The codes were summarized by year, in and outside of the outbreak area with the absence of un-infested volume and the presence of pine beetle damage codes: code 1 (green foliage – full infestation), code 2 (red foliage), and code 3 (grey dead).	9

Background – why do we need to monitor?

In October 2015, the spruce beetle population within the Omineca Natural Resource Region was declared an outbreak. To mitigate the resulting tree mortality, the Ministry of Forests and local forest licensees responded by prioritizing the harvest of dead and dying trees.

The Chief Forester's Expectations for Prioritization in Response to Spruce Beetle Outbreaks was released in June of 2020 and updated November 2020. Within this guidance, the Chief Forester stated expectations for land managers and ministry staff. The expectation for land managers consists of a matrix which prioritizes stands for harvest and an expectation as follows: "I expect that stands with little or no damage from biotic (e.g. spruce beetle, mountain pine beetle, western balsam bark beetle) or abiotic (e.g. wildfire, windthrow) factors will be retained for mid-term timber supply. Timber harvest must be focussed on dead, dying and damaged timber to ensure mid and long-term sustainability of timber resources." The expectation for Ministry staff is as follows: "I expect that the ministry will monitor and report regularly regarding this harvest prioritization guidance."

This report summarizes forest licensee-collected timber cruise data (used to determine the value of a stand to be harvested) to assess the number of insect-infested or recently killed trees within a defined spruce beetle outbreak area.

Data collection and processing method

Licensee cruise data submissions were extracted from the E-Commerce Appraisal System (ECAS) to conduct a detailed analysis of insect-attacked trees identified for harvest within, and outside of, the outbreak area. Data was collected and processed in the following method:

1. Cruise data stored in a .csv file format in ECAS was collated into a dataset. The data spanned the period from 2004 to 2021. There were only a few cruises done between 2004 and 2011 inside the outbreak area. These years were therefore excluded from the final dataset.
2. A GIS analysis based on annual aerial overview flight data was completed that digitized a boundary around the spruce beetle outbreak area in the Prince George TSA up to 2020 (Figure 1).
3. Bark beetle damage codes collected as part of the timber cruise data were used as a means of determining green (live infested) volumes for spruce beetle, mountain pine beetle, Douglas fir beetle, and western balsam bark beetle. Dead or timber volumes were also used in this analysis.
4. Timber volume data (for dead trees and insect-attacked trees) from inside the outbreak area was compared to the data from outside at a cutting permit level (timber supply blocks E, F, and G in the Prince George Timber Supply Area). The cutting permit data was summarized by a single value for areas inside and outside the outbreak area boundary for each year in the dataset.
5. Volume data related to fire and windthrow damage (abiotic damage) was also extracted and summarized.

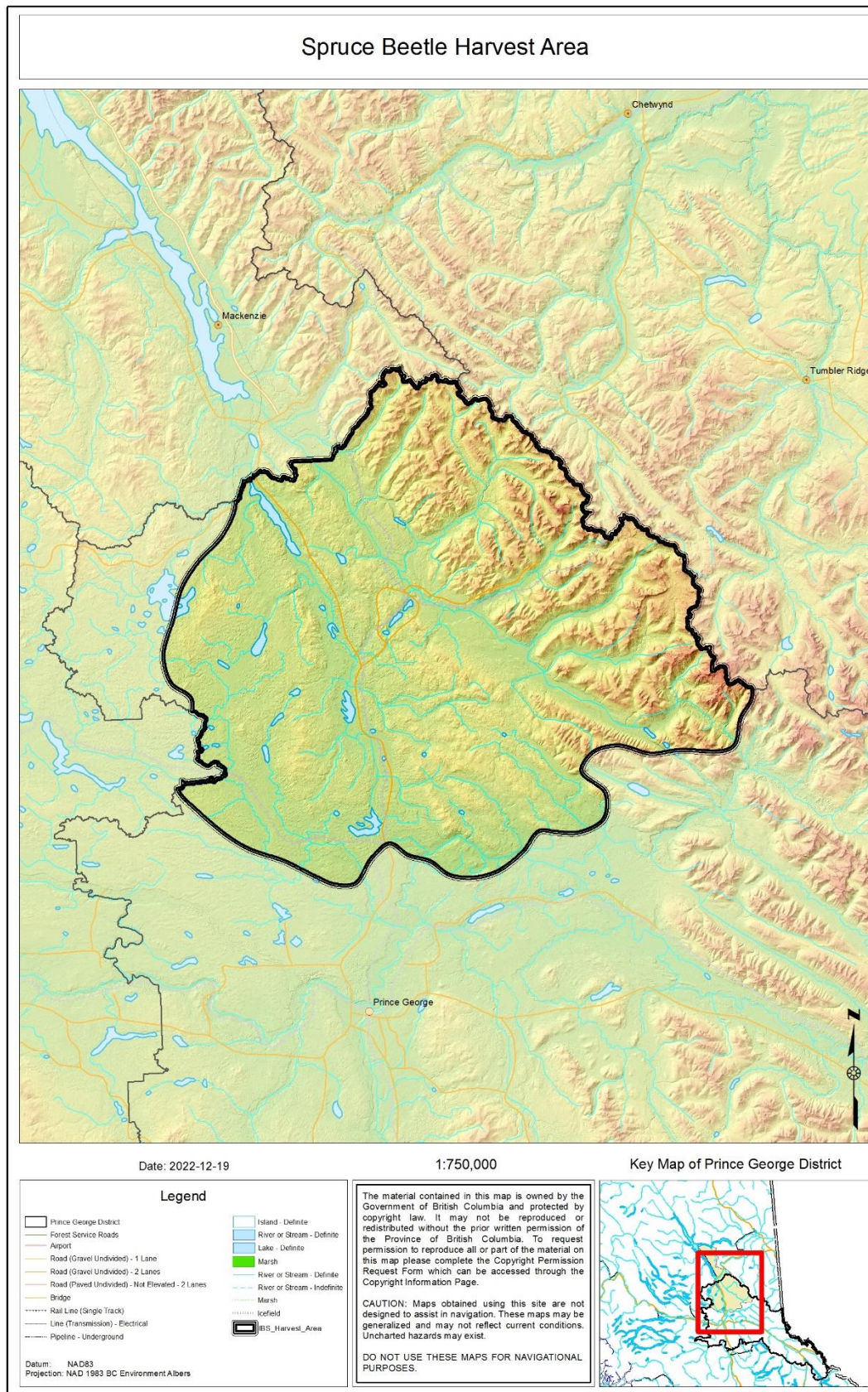


Figure 1 – The spruce beetle “outbreak area” between 2015 and 2020.

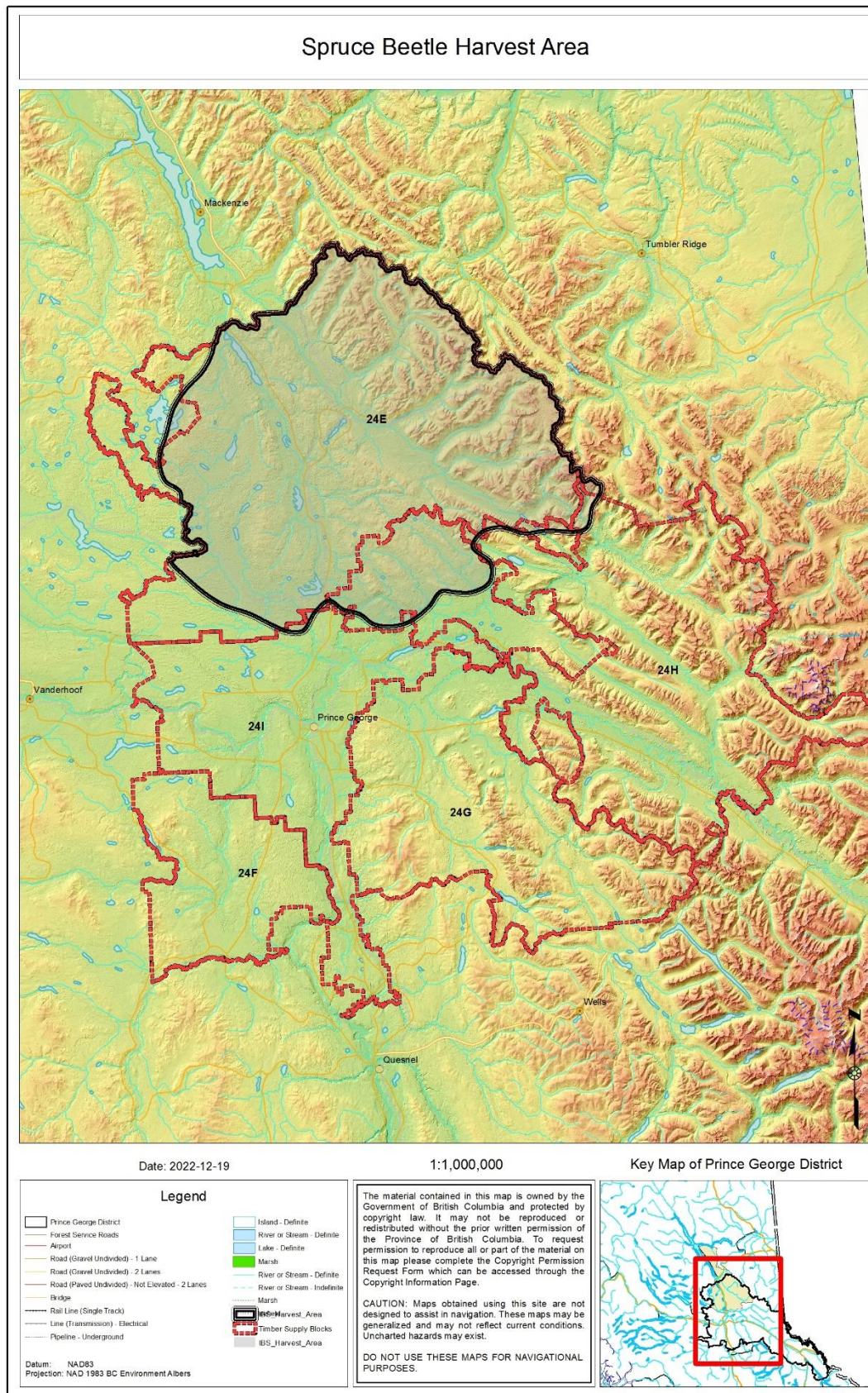


Figure 2 – The area defined as “outside the outbreak” are outlined in red. Cruises conducted within the red outline, but outside the shaded outbreak area were used as the “outside” the outbreak comparison areas.

Data Summaries

The following graphs illustrate aspects of the cruise volume data per year outside the outbreak area (white background) and inside the outbreak area (grey background). Although the data is available for the four major bark beetles, we focused in this report on the harvesting of spruce beetle-infested trees.

The volume data is organized graphically by year. General trends in harvesting activity (bark beetle as well as other damaged timber) inside and outside the outbreak area and bark beetle infested volumes were summarized but were not analyzed statistically.

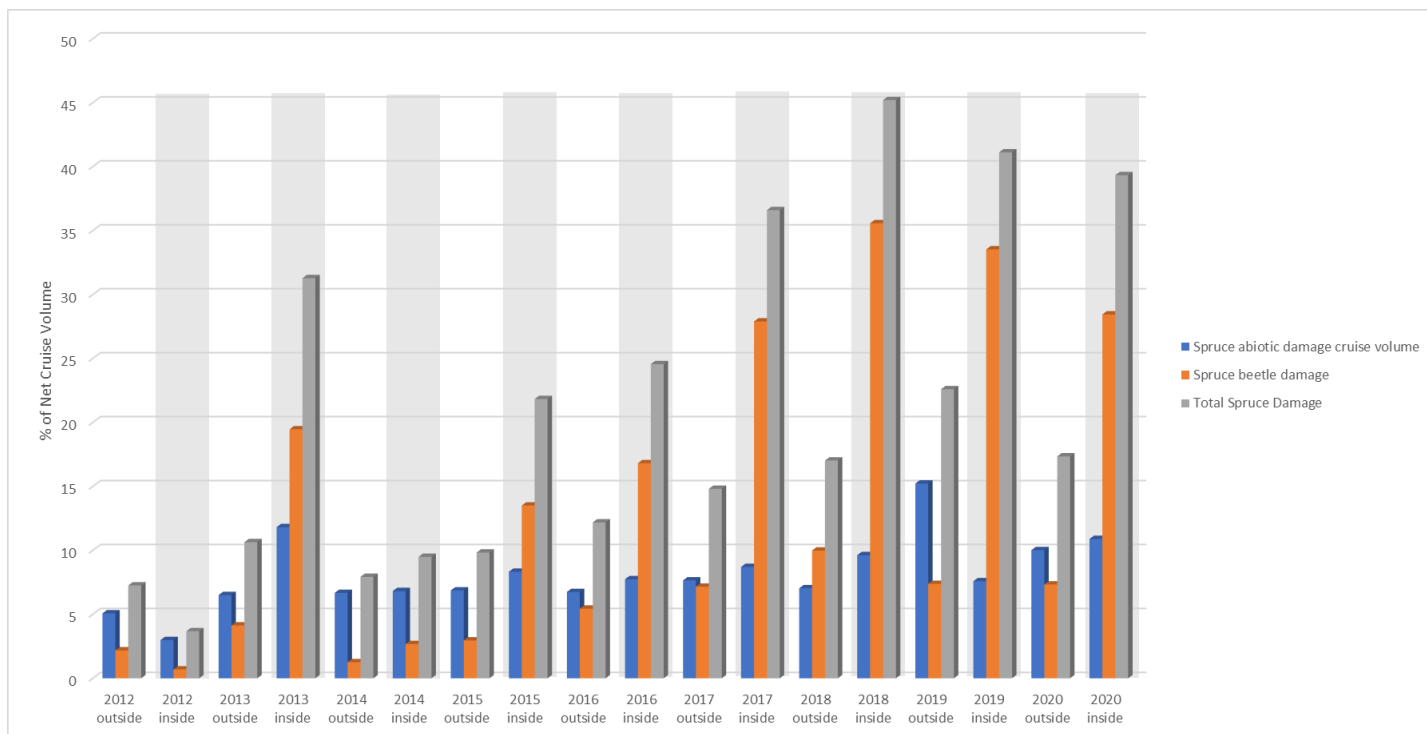


Figure 3 - 2012 to 2020 spruce abiotic and spruce beetle damage. The percentage of net cruise volume, as damage to spruce. The damages are attributed to either abiotic causes (blue) or spruce beetle (orange), and both damages are combined in the grey bar. The bars are sorted by year and by location (inside vs. outside the infestation area).

Figure 3 shows an increase in spruce beetle damage within cruised stands inside the outbreak area, beginning in 2015. It also shows that abiotic damage both within and outside the outbreak area has generally stayed between 5% and 10%.

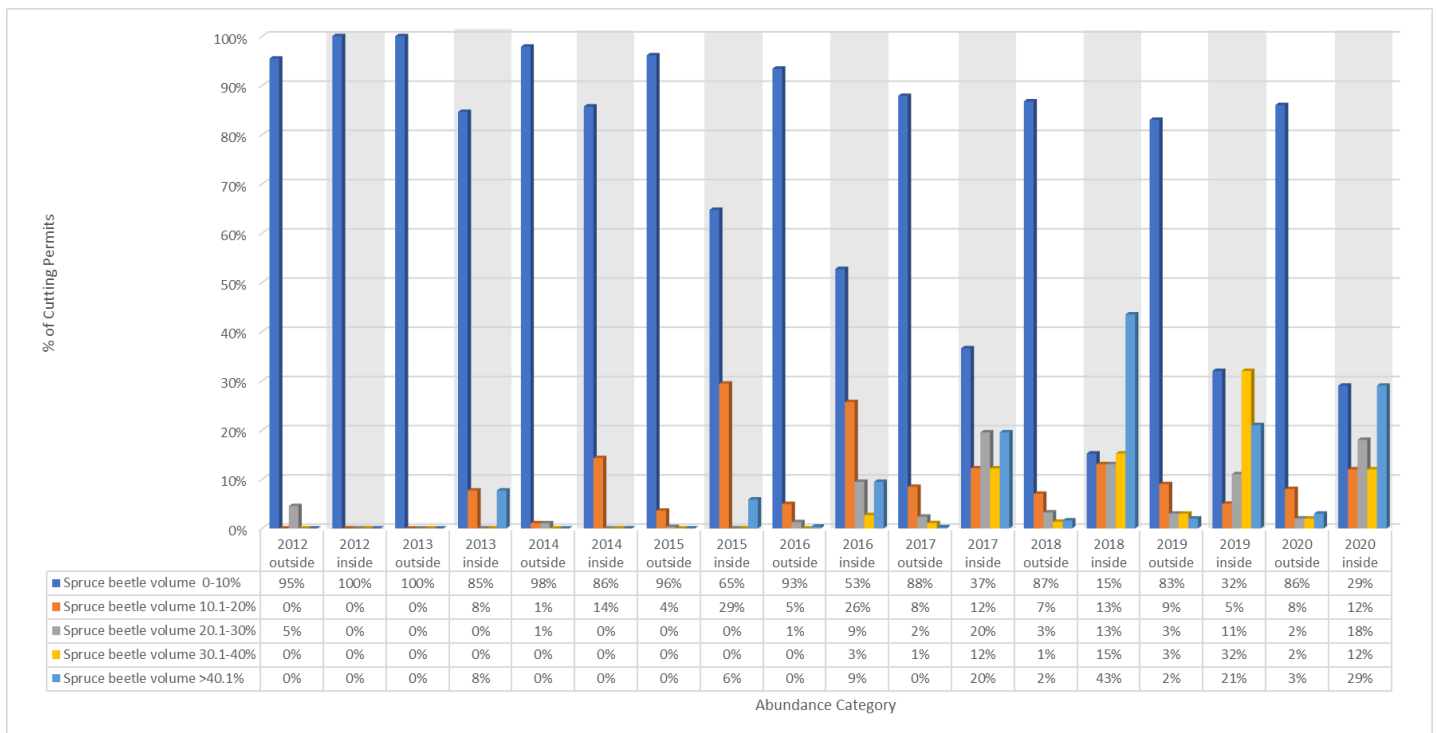


Figure 4 - 2012 to 2020 percentage of cutting permits by spruce beetle abundance category. The percentage of cutting permits by 5 spruce beetle volume categories: 0-10%, 10-20%, 20-30%, 30-40%, greater than 40%. These categories match the thresholds in the *The Chief Forester's Expectations for Prioritization in Response to Spruce Beetle Outbreaks*. The graph is broken down by year and by location (inside vs. outside the outbreak area).

Figure 4 shows a trend towards a higher percentage of cutting permits with increasing spruce beetle-infested cruise volume beginning in 2015, where 35% of cruised volume was greater than 10% infested. In subsequent years, up to 85% of timber harvested within the outbreak area was derived from spruce beetle volumes in excess of 10%.

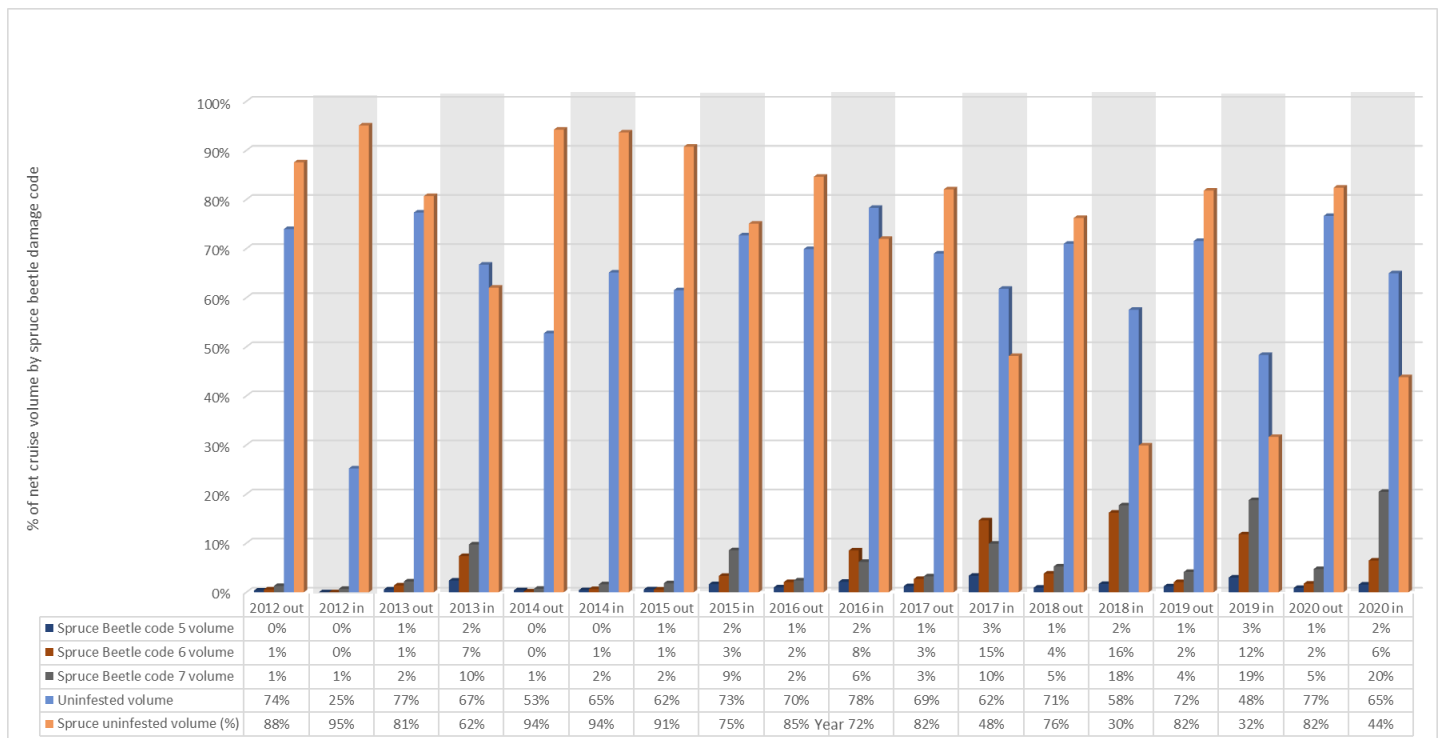


Figure 5 - spruce beetle damage codes and un-infested volume by year. Spruce cruised by damage code: code 5 [strip (partial) attack], code 6 (full attack), and code 7 (grey dead). This was compared to un-infested total volume and spruce uninfested volume by year, inside vs. outside the outbreak area.

Figure 5 shows an increase in spruce beetle code 7 (dead grey trees) inside of the outbreak area indicates increased harvesting attention towards dead spruce within the defined spruce beetle outbreak area. Inside the outbreak area since 2017, there was less green spruce harvested within the outbreak when compared to areas outside the outbreak area.

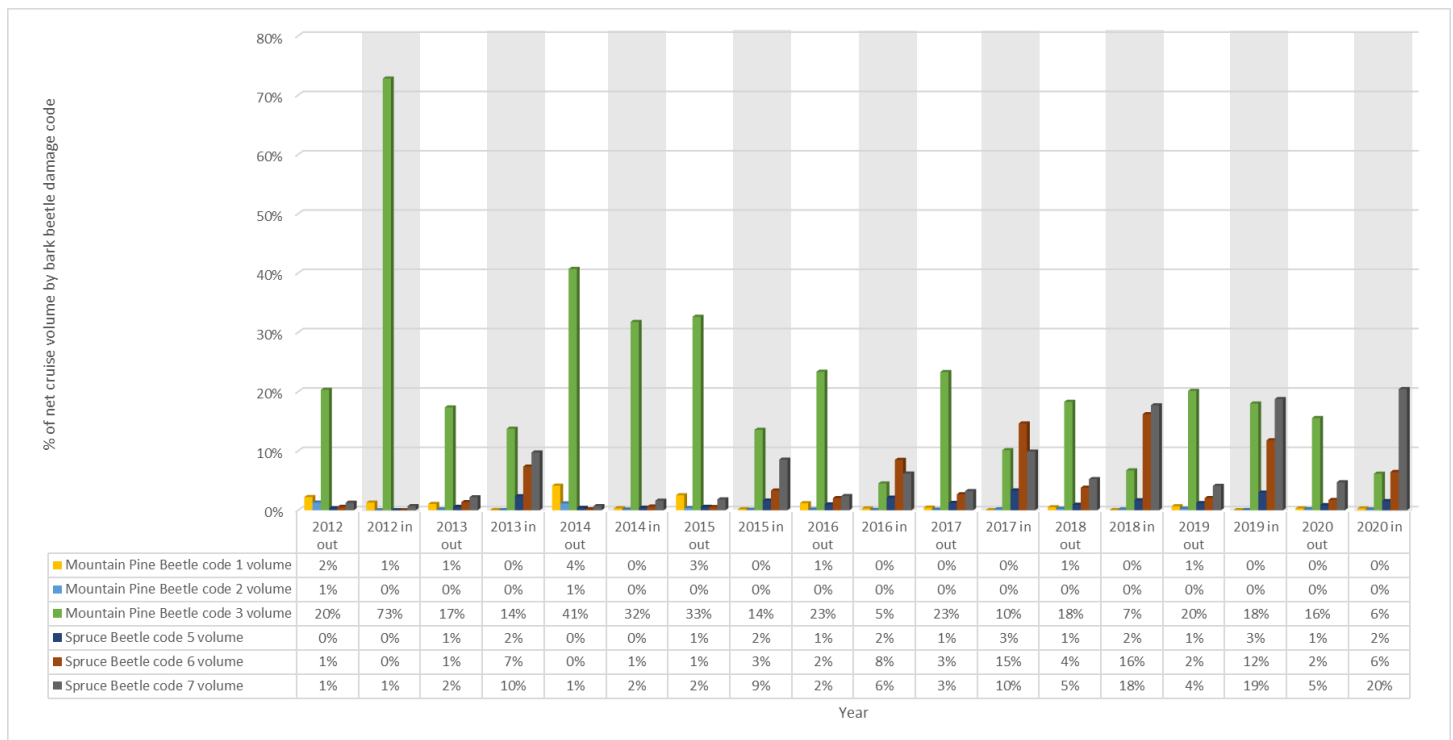


Figure 6 - spruce and pine beetle damage codes by year. Spruce beetle damage codes: code 5 [strip (partial) attack], code 6 (full attack), and code 7 (grey dead). The codes were summarized by year, in and outside of the outbreak area with the absence of un-infested volume and the presence of pine beetle damage codes: code 1 (green foliage – full infestation), code 2 (red foliage), and code 3 (grey dead).

Finally, Figure 6 shows that within timber cruises, the amount of infested pine volume has decreased steadily as infested spruce volumes have increased. Most of the pine is grey dead (code 3) and by 2020, a large part of the spruce cruised for timber is grey dead as well (code 7).

Conclusions

Monitoring the spruce beetle outbreak is both an expectation of the Chief Forester, and an important tool for tracking harvest trends over time. Using the best information available, from timber cruising and cutting permit submissions, the last ten years of harvest data have been analyzed. The compiled data shows a proportional increase in harvesting of spruce beetle-affected stands within the outbreak area since the outbreak was declared in 2015. Although dead and dying trees were harvested within the outbreak area, un-infested trees continued to be harvested as well, but with lower volumes than was harvested outside the outbreak area. It is likely that constraints around harvesting (e.g. biodiversity conservation, old growth conservation, the logistics of planning and harvesting) means that forest licensees are balancing multiple values, including Chief Forester guidance, when planning areas to harvest.

