# Sustainable Forest Management

## 2013 Facts & Statistics

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Environment and Sustainable Resource Development

### Aspen Defoliators

The forest tent caterpillar (*Malacosoma disstria*) (Figure 1), the large aspen tortrix (*Choristoneura conflictana*) and the Bruce spanworm (*Operophtera bruceata*) are the most common insect defoliators of trembling aspen trees in Alberta. These insects cause the loss of aspen leaves (defoliation). Normally one of these insect species is the dominant defoliator at a given time and then get replaced by another.

Trees affected by these pests can be scattered over millions of hectares of aspen forest. These insects have temporary and sudden large-scale increases in populations, known as outbreaks or epidemics followed by low populations. This cycle continues over time. Bruce spanworm outbreaks last for two to three years while large aspen tortrix outbreaks can last for three to four years. The forest tent caterpillar outbreaks tend to last the longest, with some lasting up to seven years.

Defoliators cause tree growth loss by severely reducing the host tree's ability to convert water, nutrients and carbon dioxide into sugars, starches and oxygen through photosynthesis. The host trees react to pest defoliation by producing a second flush of buds, but the resulting leaves are smaller and do not adequately compensate for the loss of the first flush of leaves.

Aspen defoliators rarely kill host trees on their own. However, severe defoliation makes the host trees more prone to other pests, including insects, diseases and non-living damaging agents, such as drought. The widely dispersed aspen mortality in central Alberta can be partly attributed to repeated defoliation of drought-stressed trees.

Aspen defoliators, especially the forest tent caterpillar, can become nuisance pests. The caterpillars invade residences and campsites.

Figure 1. Forest tent caterpillar moth and eggmass

Also, they can become a traffic hazard by creating slippery road conditions when thousands of caterpillars (Figure 2) crossing highways are run over by vehicles.

The Alberta government routinely uses aerial surveys to monitor defoliator population levels. When outbreaks are identified, ground surveys are used to determine the exact pest responsible.

Figure 2. Forest tent caterpillar larvae on tree stem



Alberta Government

## Statistics

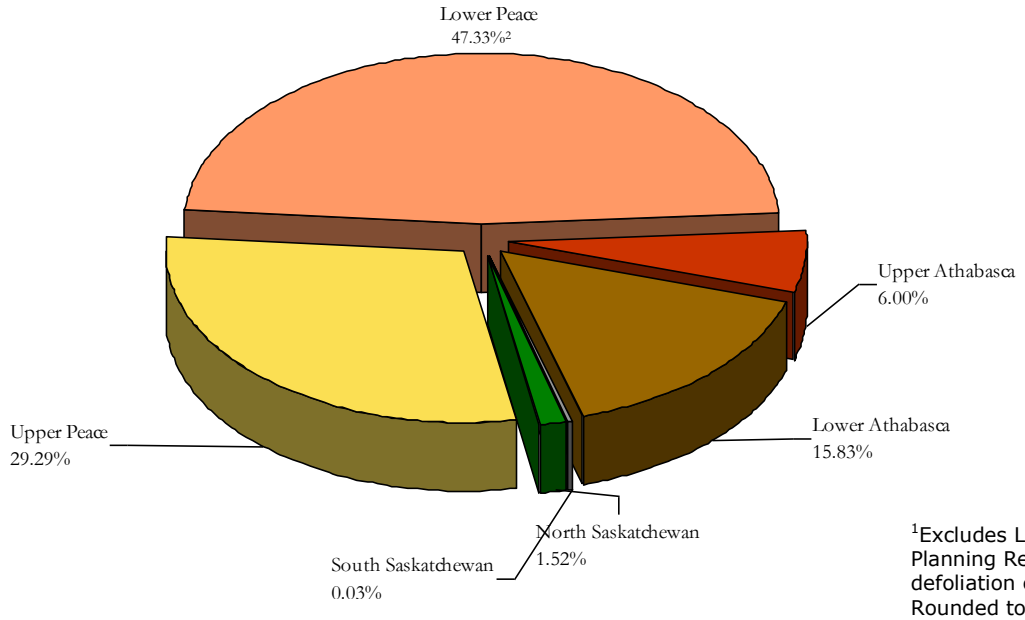
Table 1 and Figure 3 show the aspen defoliation in different Land-use Framework regions in 2013. In 2013, most aspen defoliation was in the Upper and Lower Peace, and Lower Athabasca regions (92.46%). The forest tent caterpillar was the predominant aspen defoliator in 2013. Surprisingly, the second largest amount of defoliation was caused by the aspen twoleaf tier (*Enargia Decolor*). Outbreaks of this pest have not been recently recorded in Alberta.

### Table 1. The extent of aspen defoliation caused by insects on Alberta public land by severity category, 2013

| Land-use Framework Planning Region | Total area of scattered defoliation (ha)[1] | | | | | |
|---|---|---|---|---|---|---|
| | Aspen Twoleaf Tier | Bruce Spanworm | Forest Tent Caterpillar | Large Aspen Tortrix | Un-confirmed | Region Total |
| Lower Athabasca | 1,124,036 | 5,061 | 0 | 0 | 1,278 | 1,130,375 |
| Lower Peace | 192,974 | 0 | 3,186,393 | 0 | 0 | 3,379,367 |
| North Saskatchewan | 108,241 | 0 | 0 | 0 | 48 | 108,289 |
| Red Deer | 0 | 0 | 0 | 0 | 0 | 0 |
| South Saskatchewan | 260 | 0 | 0 | 1,820 | 0 | 2,080 |
| Upper Athabasca | 41,319 | 0 | 320,326 | 0 | 66,564 | 428,209 |
| Upper Peace | 651,388 | 0 | 1,438,024 | 0 | 1,571 | 2,090,983 |
| Provincial Total | 2,118,218 | 5,061 | 4,944,743 | 1,820 | 69,461 | 7,139,303 |

[1] Data have been rounded to the next nearest hectare and have been estimated for each Land-use Framework Planning Region. The data represent the boundary within which the defoliation is scattered. These surveys were conducted over forested public land where infestations are known to occur, for operational purposes. There may be additional defoliated areas that are yet to be detected. The area excludes Wood Buffalo National Park.

### Figure 3. Aspen defoliation caused by insects on Alberta public land by Land-use Framework Planning Region, 2013[1]




[1]Excludes Land-use Framework Planning Regions with no aspen defoliation caused by insects. [2] Rounded to 100%.

## Historical Trends

Based on the amount of defoliation recorded in 2012 and 2013 it is clear that some aspen defoliator populations are on the rise. What is unclear at this point is if populations will continue to rise in 2014, or if this year is the peak of the outbreak. Table 2 shows the area of defoliation over time. The previous outbreak was scattered over an estimated 3.3 million hectares across the province in 2007 and it collapsed to about 63,000 hectares in 2010. Populations have been building since that time, and the current outbreak is estimated to be two times the size of the previous one.

Most of the dramatic declines in aspen defoliator populations are caused by either unusual weather events (*e.g.,* late spring frost) or disease outbreaks that kill the caterpillars.

Table 2. Area (ha) of aspen defoliation caused by insects on Alberta public land, 2007-2013

| Year | Total Area of Scattered Defoliation[1] |
|---|---|
| 2007 | 3,255,338 |
| 2008 | 2,854,878 |
| 2009 | 207,243 |
| 2010 | 62,599 |
| 2011 | 91,214 |
| 2012 | 657,900 |
| 2013 | 7,139,303 |

[1] Data have been rounded to the next nearest hectare. The data represent the boundary within which the defoliation is scattered. These surveys were conducted over forested public land where infestations are known to occur, for operational purposes. There may be additional defoliated areas that are yet to be detected. The area excludes Wood Buffalo National Park.

## Future Outlook

It is unlikely that the current forest tent caterpillar outbreak will significantly decline in 2014. The future of the aspen twoleaf tier outbreak is more difficult to predict due to a lack of experience with this pest in Alberta. Based on reports from other prairie provinces, the twoleaf tier does occasionally outbreak, but the outbreaks have been short-lived.

Figure 4. Defoliation caused by forest tent caterpillar larvae