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Current Facts & Statistics

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Aspen Defoliators

The forest tent caterpillar (*Malacosoma disstria*) (Figure 1), large aspen tortrix (*Choristoneura conflictana*) and the Bruce spanworm (*Operophtera bruceata*) are the main 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 is then 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. 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.

Figure 1. Forest tent caterpillar moth and eggmass.

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

Current Statistics

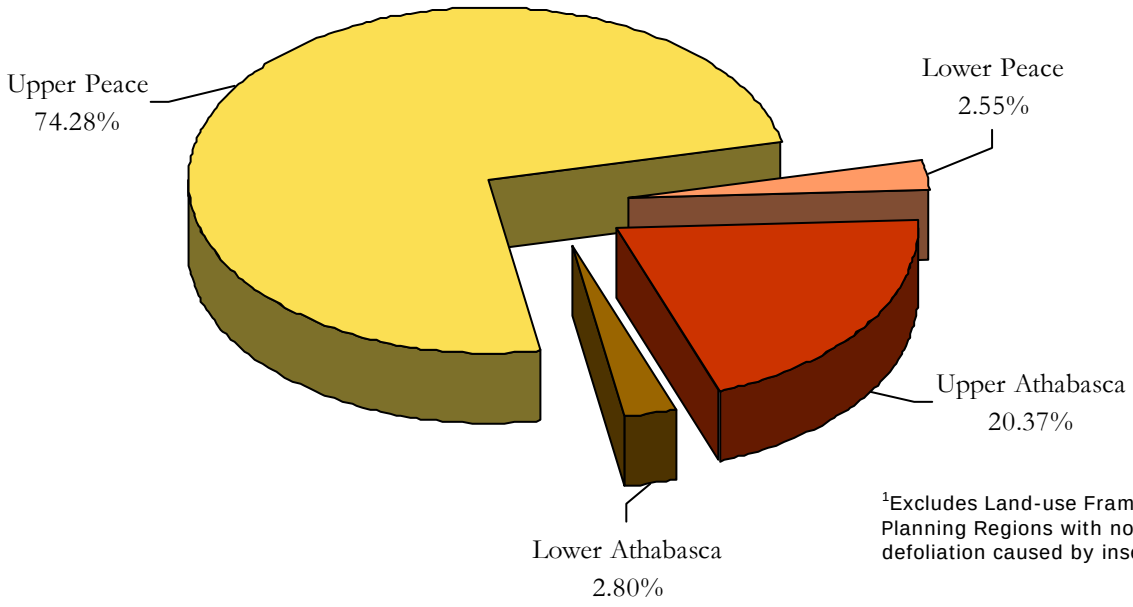
Table 1 and Figure 3 show the aspen defoliation in 2011. In 2011, most aspen defoliation was in the Upper Peace Region (74.28%). The largest infestation in the Upper Peace was scattered over 17,874 hectares. Similar to 2010, there has been little tree mortality observed with this defoliation. The forest tent caterpillar was the predominant aspen defoliator in 2011.

Table 1. The extent of aspen defoliation caused by insects on Alberta public land by severity category, 2011.[1]

Land Use Framework Planning Region	Total area of scattered defoliation (ha)[2] Light	Moderate	Severe	Region Total
Lower Athabasca	2,555	0	**0**	**2,555**
Lower Peace	2,202	121	0	**2,323**
North Saskatchewan	0	0	0	**0**
Red Deer	0	0	0	**0**
South Saskatchewan	0	0	0	**0**
Upper Athabasca	18,255	313	17	**18,585**
Upper Peace	14,955	42,146	10,650	**67,751**
Provincial Total	**37,967**	**42,580**	**10,667**	**91,214**

[1]Preliminary results. [2]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. Severity categories: Light = <35% defoliation; Moderate = 35-70% defoliation; Severe = >70% defoliation

Figure 3. Aspen defoliation caused by insects on Alberta public land by Land-use Framework Planning Region, 2011.[1]



[1]Excludes Land-use Framework Planning Regions with no aspen defoliation caused by insects.

Historical Trends

Historically, aspen defoliator populations have fluctuated widely across the aspen landscape. Table 2 shows the extent of the most recent outbreak. This 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. Based on the 2011 results, the defoliated area has begun to increase.

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, 2007-2011.

Year	Total area of scattered defoliation [1]
2007	3,255,338
2008	2,854,878
2009	207,243
2010	62,599
2011	91,214[P]

[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. The defoliation includes light, moderate and severe ratings. Severity categories: Light = <35% defoliation; Moderate = 35-70% defoliation; Severe = >70% [P] Preliminary results.

Future Outlook

Figure 4 shows typical aspen defoliation caused by insects in Alberta. The current aspen defoliator outbreak in northwest Alberta is expected to gradually increase with time.

Figure 4. Defoliation caused by forest tent caterpillar larvae.