Sustainable Forest Management

2012 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 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 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.

Statistics

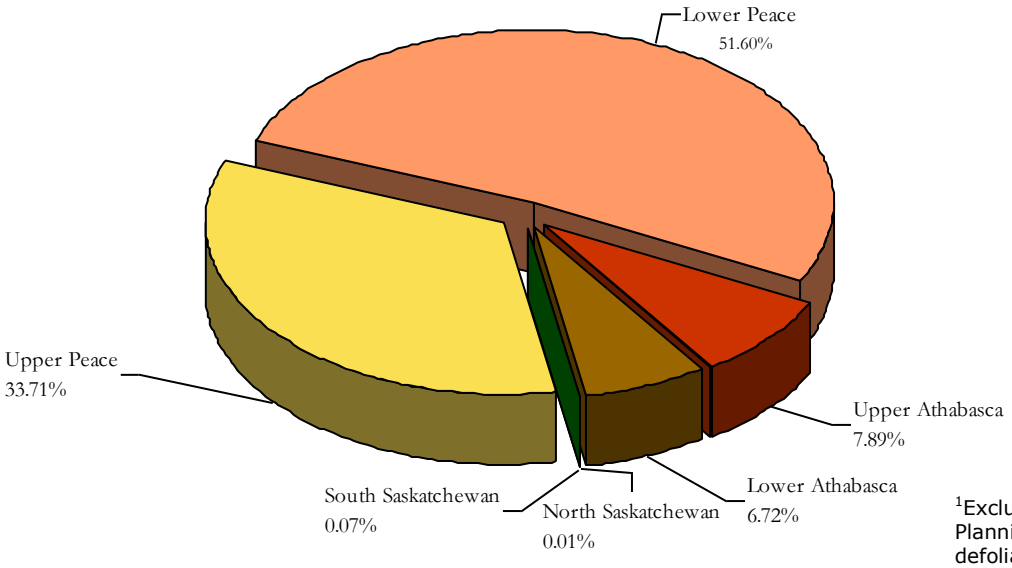
Table 1 and Figure 3 show the aspen defoliation in different Land-use Framework regions in 2012. In 2012 , most aspen defoliation was in the Upper and Lower Peace regions (85%). However, little tree mortality was observed with this defoliation. The forest tent caterpillar was the predominant aspen defoliator in 2012.

Table 1. The extent of aspen defoliation caused by insects on Alberta public land by severity category, 2012[1]

Land-use Framework Planning Region	Total area of scattered defoliation (ha)[2]			
	Light	Moderate	Severe	Region Total
Lower Athabasca	28,524	15,521	188	44,233
Lower Peace	56,065	132,691	150,656	339,412
North Saskatchewan	43	0	0	43
Red Deer	0	0	0	0
South Saskatchewan	0	473	0	473
Upper Athabasca	20,028	30,097	1,812	51,937
Upper Peace	47,693	23,881	150,229	221,802
Provincial Total	152,353	202,662	302,884	657,900

[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, 2012[1].



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

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 2012 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, 2007-2012

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[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.