

# Sustainable Forest Management

## 2015 Facts & Statistics

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Agriculture and Forestry

### Aspen Defoliators

The forest tent caterpillar (*Malacosoma disstria*) (Figure 1), large aspen tortrix (*Choristoneura conflictana*) and 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 are eventually 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 three to four years. Forest tent caterpillar outbreaks tend to last the longest at 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 severe 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. It does, however, leave the trees more prone to other pests, including insects, diseases and non-living 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 invading residences and campsites.

They can also represent a traffic hazard by creating slippery road conditions when thousands

Figure 1. Forest tent caterpillar moth and eggmass



of caterpillars (Figure 2) crossing highways are run over by vehicles.

Annual aerial overview surveys are conducted to record the gross area affected by aspen defoliation in the Green Area.

The objective of these surveys are to maintain an historical record of aspen defoliation over the Green Area. This data enables practitioners to follow the long-term trends of aspen defoliation in relation to changes in biological and environmental factors.

Figure 2. Forest tent caterpillar larvae on tree stem



## Statistics

Total aspen defoliation across the province amounted to 1.65 million ha in 2015 (Figure 3), a 45% decrease from the previous year. Defoliation was largely attributed to forest tent caterpillar (FTC), aspen twoleaf tier, Bruce spanworm, and large aspen tortix (Table 1).

FTC was the major pest defoliating approximately 1.5 million ha, a 51% decrease from 2014, and was largely responsible for high levels of defoliation in the Grande Prairie Forest

Area (Table 2). The FTC outbreak in the Peace River and High Level Forest Areas has collapsed though small pockets remain disturbed.

Defoliation by large aspen tortix increased from 1,389 ha to 54,444 ha in 2015 and occurred primarily in the Rocky Mountain House and Calgary Forest Areas.

Aspen twoleaf tier defoliation decreased from 295,089 ha to 536 ha for the period 2014 to

Table 1. The extent of aspen defoliation, in hectares, of aspen defoliation in Alberta recorded during aerial surveys conducted in 2014 and 2015; categorized by pest.

Aspen Defoliation by Pest	Total area of scattered defoliation (ha) <sup>1</sup>		
	2014	2015	Percent change
Forest tent caterpillar	3,294,041	1,586,486	-51
Large aspen tortix	1,389	54,444	>100
Bruce spanworm	0	3,564	>100
Aspen twoleaf tier	295,089	536	>100
<b>Provincial Total*</b>	<b>3,590,519</b>	<b>1,645,030</b>	<b>-54</b>

\* Total area defoliated by agent may include defoliation falling outside of the Green Area boundary. Total area surveyed will vary from year-to-year.

Table 2. Summary of aspen defoliation (in hectares) in 2015 by Alberta Forest Area. \*

Forest Area	Total area defoliated (ha)*
	2015
Calgary	34,843
Edson	941
Fort McMurray	101,855
Grande Prairie	528,922
High Level	71,635
Lac La Biche	246,678
Peace River	135,566
Rocky Mountain House	9,095
Slave Lake	288,547
Whitecourt	189,383
<b>Provincial Total</b>	<b>1,615,936</b>

\* Regional boundaries changed between 2014 and 2015 making direct comparison of defoliated areas by Forest Areas impossible.

Table 3. Area (ha) of aspen defoliation caused by insects on Alberta public land, 2009-2015

Year	Total Area of Scattered Defoliation*
2009	207,243
2010	62,599
2011	91,214
2012	657,900
2013	7,139,303
2014	3,590,885
2015	1,615,936

\*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.

## Historical Trends

Between 2005 and 2015, FTC was the most abundant aspen defoliator observed during aerial overview surveys. While there have been four main defoliators recorded during the last 10 years, FTC was responsible for 72% of cumulative defoliation during this time period.

FTC populations reached outbreak proportions in 2006 (5,271,489 ha). Though the outbreak was distributed throughout the province, the majority of defoliation occurred in the High Level FA.

Populations reached outbreak status again in 2013 (10,021,918 ha).

As noted during the previous outbreak, FTC was distributed throughout much of the province but the greatest amount of disturbed area occurred in the Peace River, Slave Lake and Grande Prairie FAs.

Some regions of the province have experienced repeated years of defoliation by FTC and when combined with the effects of drought, aspen decline may be a concern.

The health of aspen stands will continue to be monitored during aerial overview surveys and observations made on the ground.

### Defoliation caused by forest tent caterpillar



Figure 3.

Extent of aspen defoliation in Alberta in 2015 identified via aerial survey

