

## WESTERN SPRUCE BUDWORM IN BRITISH COLUMBIA, 1993 AND FORECAST FOR 1994

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### DEFOLIATION

Based on aerial surveys, western spruce budworm, *Choristoneura occidentalis*, defoliation declined 88% to 43 000 ha from the 341 500 ha in 1992 and a peak of 800 000 ha in 1987. Most of the 265 separate infestations in mixed age-class Douglas-fir stands occurred in the Kamloops Forest Region; 40 were in the Vancouver Region, 7 in the Cariboo Region and none occurred in the Nelson Region. Defoliation intensities as forecasted, were also reduced, with 95% of the area in the light category and moderate in the remainder.

### KAMLOOPS FOREST REGION

The area of defoliation in Douglas-fir stands declined nearly 90% from 1992 to 39 000 ha, of which more than 37 000 ha were lightly defoliated and the rest moderately. The majority of feeding was in the Okanagan, Merritt and Lillooet TSA's. Trace levels of defoliation not visible during aerial surveys were present in many stands previously infested. In Okanagan TSA, mostly light defoliation extended south from Armstrong to Osoyoos in many areas previously infested. Infestations in Merritt TSA continued at reduced intensity levels from Mamit Lake south to Merritt, along Nicola River Valley and at Nicola Lake. While the total area of infestation in the TSA was lower than 1992, there was some expansion immediately south of Merritt. In Lillooet TSA, there was no defoliation in areas previously infested west of Lillooet except along Yalakom River.

Defoliation declined to light intensity along the Thompson River and south of Lillooet to Kwoiek Creek, including the Stein Valley. Infestations in Kamloops TSA declined to their lowest level since 1978. Aerial application of *Bacillus thuringiensis* (Bt) spray by the B.C. Forest service, contributed to defoliation reduction on 34 000 ha of managed forest in five forest districts.

## **VANCOUVER FOREST REGION**

The area of Douglas-fir defoliated by the budworm declined to 3275 ha of mainly light defoliation from 21 130 ha recorded in 1992. The majority of defoliation again occurred in the Soo TSA, where nearly 3000 ha were mapped, mostly northwest of Pemberton in the upper Lillooet River Valley. In the Fraser TSA, defoliation in the Nahatlatch River Valley doubled to 745 ha from 370 ha in 1992. Ground surveys also detected trace to light defoliation in the Birkenhead area, where the current infestation began in 1986.

## **CARIBOO FOREST REGION**

While larval numbers were up in beating collections, defoliation west of Clinton in the Kelly Lake-Cavanaugh Creek area was down. Only 360 ha of light defoliation were mapped in seven separate patches, compared to 410 ha in nine patches in 1992. Elsewhere in the Clinton area, populations continued at low levels without significant feeding damage.

## **NELSON FOREST REGION**

Budworm populations continued to decline in the southwest corner of the region. No new defoliation was observed during aerial surveys, although some trace defoliation of understory foliage was noted during ground surveys. Populations also declined to endemic levels in the Premier Ridge area of the Invermere TSA, where a small outbreak occurred in 1992.

## **PARASITISM AND DISEASE**

Disease incidence and larval parasitism were determined from late-instar larvae collected at 11 locations within the infested areas. Disease in samples averaged 35% (range 0 to 88%), up from 28% in 1992. The most common entomopathogens were bacteria and virus, but the fungus, Entomophthoraceae was also present in 4% of samples. Parasitism averaged 10% (range 2 to 19%), mostly by tachinids and hymenopterans, similar to 1992. While disease incidence and parasite levels were not significantly high, they did help to reduce spruce budworm populations, particularly in the Kamloops Region.

## **FORECAST**

The average number of egg masses obtained per 10 m<sup>2</sup> of foliage at each site, was 17% lower than 1992 at 30 locations sampled for two consecutive years (Table). Three additional areas were sampled for the first time in 1993. While this appears to indicate a general population decline, egg mass counts in parts of 100 Mile, Kamloops and Merritt TSA's are up from 1992.

Severe defoliation is predicted at four sites, including the Merritt area, south of Kamloops, and west of Clinton. Moderate defoliation is forecast at eight locations in previously defoliated areas of the three regions. Trace to light defoliation is predicted at 16 sites, mostly in the Okanagan and Lillooet TSA's in Kamloops Region, and Soo TSA in Vancouver Region. No defoliation is expected in 5 areas sampled, all in the Kamloops Region. In the Nelson Region, pheromone trap catches at monitoring sites averaged 5% of 1992 levels, indicating that populations should remain low.

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Table 1. Average number of western spruce budworm egg masses on Douglas-fir from 1990-1993, and predicted defoliation in British Columbia in 1994.

	Predicted Defoliation	No. of Egg Masses Per 10m <sup>2</sup> Foliage <sup>1</sup>			
		1993	1992	1991	1990
<b>CARIBOO REGION</b>					
<b>100 Mile TSA</b>					
Cavanaugh	moderate	100	14	104	-
Kelly Lake	severe	292	-	-	-
<b>Average</b>		<b>196</b>			
<b>KAMLOOPS REGION</b>					
<b><u>Kamloops TSA</u></b>					
Pemberton Hill	trace	10	46	827	960
Niskonlith Lake	moderate	90	32	184	-
Shumway Lake	severe	340	208	818	-
McQueen Lake	nil	0	104	345	-
Criss Creek	moderate	100	115	185	111
Cherry Creek	light	20	112	596	105
<b>Average</b>		<b>93</b>	<b>72</b>		
<b><u>Okanagan TSA</u></b>					
Equesis Creek	nil	0	77	233	-
Postill Lake	moderate	73	41	447	43
Glenrosa	trace	7	8	370	357
Darke Lake	light	29	74	218	74
Peachland Main	trace	8	33	306	336
Apex-Yellow Lakes	trace	7	50	264	222
Blind Creek	nil	0	20	183	77
Mount Kobau	nil	0	35	454	521
Anarchist Mountain	light	17	92	256	-
Blue Lake	trace	8	12	74	143
<b>Average</b>		<b>15</b>	<b>53</b>		
<b><u>Lillooet TSA</u></b>					
Cayoosh Creek	light	30	32	-	-
Yalakom River	moderate	60	135	146	348
Fountain Valley	light	20	37	407	109
Gun Lake	nil	0	32	98	-
Botanie Creek	light	30	54	74	0
<b>Average</b>		<b>28</b>	<b>62</b>		
<b><u>Merritt TSA</u></b>					
Stephens Creek	severe	379	-	-	-
Kirby Creek	severe	190	-	-	-
Peter Hope Lake	light	20	89	505	-
<b>Average</b>		<b>196</b>	<b>89</b>		

cont'd

	Predicted Defoliation	No. of Egg Masses Per 10m <sup>2</sup> Foliage			
		1993	1992	1991	1990
<b>VANCOUVER REGION</b>					
<b>Soo TSA</b>					
Haylmore Creek	moderate	54	35	28	38
Blackwater Creek	moderate	52	38	21	-
Eight Mile Creek	light	20	46	119	-
North Creek	light	25	47	92	93
Birkenhead River	light	38	60	174	-
Salal Creek	light	37	73	-	-
<b>Average</b>		<b>36</b>	<b>50</b>		
<b>Fraser TSA</b>					
Hannah Creek	moderate	109	49	-	-

- 1 1 - 10 eggs/10m<sup>2</sup> - trace defoliation  
 11 - 50 eggs/10m<sup>2</sup> - light defoliation  
 51 - 150 eggs/10m<sup>2</sup> - moderate defoliation  
 151+ eggs/10m<sup>2</sup> - severe defoliation

# Western Spruce Budworm

Defoliation forecast for 1994

