

## Forest Pest Conditions – Vancouver Forest Region 1999

### Summary

The most notable pest occurrence in the Vancouver Forest Region in 1999 continues to be the outbreak of western blackheaded budworm, *Acleris gloverana*, on the Queen Charlotte Islands (55,000 ha) and on the north end of Vancouver Island (5,800 ha). This is the fourth year of this outbreak and significant impacts are now being seen in immature stands of western hemlock, *Tsuga heterophylla*, on the Queen Charlotte Islands.

Infestations of mountain pine beetle, *Dendroctonus ponderosae*, have increased dramatically in Manning Park -1071 ha detected this year. Within the Squamish Forest District, mountain pine beetle continues to kill significant areas of lodgepole pine, *Pinus contorta*, (1168 ha). Fortunately most of the affected pine is either inoperable or unmerchantable and has not been included in the timber supply. The district is attempting to salvage the merchantable and accessible stands.

The forest health issue that received the most interest from the public this year, other than gypsy moth, is the drought damage that became evident this year as a result of the dry summer of 1998. Regional and district staff answered numerous enquiries from the public regarding the abrupt death of thousands of trees this spring. In addition to mortality, many trees also experienced top-kill and dieback. Although drought effects were widespread throughout the region, the eastern side of Vancouver Island seems to have been especially affected. Large areas of drought damage were also detected in the upper Lillooet River area. Younger trees, whose root systems were not well developed or deep, and tree species sensitive to changes in soil moisture were primarily affected. Western red cedar, *Thuja plicata*, was most affected, but western hemlock, grand fir, *Abies grandis*, and Douglas-fir, *Pseudotsuga menziesii*, were also commonly involved.

White pine blister rust, *Cronartium ribicola*, has spread into high-elevation stands of whitebark pine, *Pinus albicaulis*. Surveys to determine the disease incidence indicate over one-third of inspected trees are dead or infected.

Table 1. Vancouver Forest Region pest conditions summary – 1999 (hectares infested)

Forest District	mountain pine beetle	blackheaded budworm	spruce beetle
Chilliwack	1174		
Squamish	1168		356
Sunshine Coast			
South Island			
Campbell River			
Port McNeill		5,800	
Mid Coast	5506		
Queen Charlotte Is.		55,044	
totals	7848	60,844	356

## **Forest District Reports**

### **Chilliwack Forest District**

The most reportable forest health issue within the boundaries of the Chilliwack Forest District this year is the dramatic increase in the mountain pine beetle outbreak in Manning Park (1071 ha). As a result of exceptional beetle brood production and survival province wide during the winter of 1998/99, it is expected that the area of currently infested green trees has again increased in magnitude within the park. Control operations within the park were terminated in 1998 due to large beetle increases in the adjacent Merritt Forest District and the subsequent change in management strategies there.

Douglas-fir beetle, *Dendroctonus pseudotsugae*, populations continue to remain in very low numbers throughout the district. No significant outbreaks were detected this year.

Balsam woolly adelgid, *Adelgid piceae*, continues to spread and intensify throughout much of the district. It has now been found throughout most of the drainages along the Fraser River canyon. Within Utzlius Creek, it has been found within a kilometre of the Merritt Forest District boundary. It is also within the Harrison Lake area and all areas to the west. It has not been found within the Coquihalla Highway corridor, along the highway to Manning Park (and within Manning Park), the Skagit River Valley, and the upper portion of the Chilliwack River Valley. Although significant mortality of both amabilis, *Abies amabilis*, and grand fir, *A. grandis*, was reported to have occurred within the north shore watersheds of the Vancouver area in the 1960's, current impacts of this introduced insect at the forest or stand level seem to be minor.

### **Squamish Forest District**

Although the total area infested by mountain pine beetle decreased this year, from 2808 ha in 1998 to 1168 ha in 1999, largely as a result of host depletion within chronically infested areas, there were increases in some localities. Fortunately, most of the infested pine is unmerchantable and/or inoperable. In addition, pine within this district is patchy and limited in distribution, i.e., there are not the large expanses of mature pine that occur in interior districts.

Balsam woolly adelgid has also spread throughout this district. It is especially evident in the Whistler area. It has been found high on the Hurley River Road within a few kilometres of the Lillooet Forest District boundary. Although many individual amabilis fir have been heavily infested and killed, on a stand basis the impacts are not yet serious.

Populations of Douglas-fir beetle, *Dendroctonus pseudotsugae*, within this district are low. However, spruce beetle, *Dendroctonus rufipennis*, is currently active in the Haylmore and Common Johnny drainages (total 356 ha; light 50 ha, moderate 120 ha, severe 186 ha). Salvage opportunities are being considered. Balsam bark beetle,

*Dryocoetes confusus*, is generally at low levels in high elevation forests in the northern part of the district.

A survey for pitch moth, *Synanthedon sequoiae*, was carried out in the district in 1998. The objective was to determine the distribution and incidence within lodgepole pine stands. Pitch moth was found to be widespread throughout the district with incidences ranging up to 33.5% of lodgepole pine stems attacked. Although some individual trees were significantly impacted - broken and deformed stems - impacts on a stand basis were judged to be within acceptable limits. Further long term monitoring would be useful.

### **Sunshine Coast Forest District**

Introduced populations of balsam woolly adelgid are now well established on the Sechelt Peninsula, and on Texada and Lasqueti islands. Although it is not yet been confirmed as established north of Jervis Inlet on the mainland, BWA symptoms have recently been reported in the Bunster Hills area, located to the north of Powell River. To date, impacts in the district have been minor.

Bark beetle populations within the district remain at low levels. There are a few small Douglas-fir beetle infestations of 1 to 5 trees within TFL 39. A few small areas of chronic mountain pine beetle infestation were detected in the Homathko River area within inaccessible and inoperable lodgepole pine.

A few small isolated outbreaks of hemlock sawfly within the Orford River drainage (50 ha), Paradise Valley (60 ha) in Bute Inlet, and in the Quatam (40 ha) and Bram (40 ha) river areas within Toba Inlet have now collapsed. Light to moderate defoliation during 1997 and 1998 has now resulted in low levels of mortality in amabilis fir. About 25% of the defoliated areas experienced mortality with mortality rates of 10% at worst.

Spruce weevil, *Pissodes strobi*, caused stand deformity remains high to extreme in most drainages containing Sitka spruce, *Picea sitchensis*, plantations. A few trials involving pruning and stand conversion have been established in the Eldred, Lois and Clowhom river drainages.

Tree girdling by black bear within young stands is continuing in the Quatam River and Ramsay Arm area. First detected in 1994, significant numbers of trees have now been killed over a widespread area (20 ha severe, 40 ha moderate, 250 ha light). New activity was noted in the originally affected spaced stand in Quatam River.

Porcupine damage in a young spaced stand within Scar Creek has now spread to about 20 hectares. The total proportion of stems killed has now reached approximately 10% to 15% and primarily involves Douglas-fir crop trees. No new areas were observed.

Damage by snow press and creep as a result of last winter's extreme snowpack is widespread in high elevation young stands. In one 200 ha area surveyed, approximately 25% of the stems were significantly damaged, e.g., broken, 90° bend.

Elk damage continues to be a problem on TFL 39 near Powell River and on the Sechelt Peninsula. The damage is caused by browsing and trampling in plantations, plus antler scarring and pushover in juvenile spaced stands. The most affected area is near Pender Harbour.

### **South Island Forest District**

Drought conditions, as a result of the dry summer of 1998, have resulted in the mortality of numerous conifers, especially on the eastern side of Vancouver Island. Western red cedar has been the most affected. Top-kill, branch dieback and flagging are also common. Mortality continued to occur throughout the summer and into the autumn following a second summer of dry weather.

Balsam woolly adelgid infestations continue to spread and intensify. It has now spread throughout most of the district, but has not yet been found on the western side of Vancouver Island north of the Alberni Inlet. Infestations within TFL 44 are causing significant mortality in old growth amabilis and subalpine fir forests. This is currently the most serious incidence of balsam woolly adelgid in the province. Bark beetles, *Pseudohylesinus grandis* and *Scolitis ventralis*, have been found attacking and killing chronically adelgid-stressed grand and amabilis fir throughout the district (low incidence).

Infestations of the introduced jumping gall wasp, *Neuroterus saltatorius*, continue to spread northward up Vancouver Island. The gall wasp was found in north Courtenay this summer for the first time and now covers most of the range of Garry oak on the island. Infestations in the Nanaimo and Nanoose Bay areas noticeably increased in intensity this year. Fortunately, however, the intensity of infestations in the Victoria area was significantly reduced this year. This is thought to be the result of a build-up of natural control factors, e.g., predators and parasites, that are finally reducing gall wasp populations to more acceptable levels.

### **Campbell River Forest District**

The outbreak populations of hemlock sawfly, *Neodprion* spp., that have been active in the district since 1995 have declined back to normal levels. Over 10,000 ha of amabilis and hemlock stands were defoliated in the Phillips River drainage between 1995 and 1997 and over 4,000 ha were defoliated near Sayward on Vancouver Island between 1996 and 1998. Salvage harvesting has removed the most severely damaged stands. Originally there was concern about a potentially serious build-up of *Pseudohylesinus* bark beetles in the stressed trees. This was reported to have been a major problem following a similar

sawfly outbreak near Sayward in the late 1970's that lead to significant mortality and salvage logging. Fortunately, this has not materialized this time.

Although balsam woolly adelgid has spread into the district, no new areas of infestation were found this year. Within the district it can be found on the east coast of Vancouver Island south of Campbell River and on West Thurlow Island. Symptomatic trees have also been detected on the mainland north of West Thurlow Island, but the insect itself has not yet been found.

An outbreak of fir root bark beetle, *Pseudohylesinus granulatus*, in the Tahsish River area was removed via harvesting operations in 1998 and is no longer a concern.

### **Port McNeill Forest District**

The western blackheaded budworm, *Acleris gloverana*, outbreak on northern Vancouver Island has started to decline, from 27,300 ha in 1998 to 5,800 ha this year (3800 light, 2000 moderate). Initially, in 1997, defoliation was most pronounced in immature stands of western hemlock, however, the following year, defoliation shifted to primarily old growth stands of western hemlock. Defoliation was mostly in old growth stands this year as well and limited generally to west coast inlets of Vancouver Island. It is expected that this outbreak will continue to decline to low population levels next year. All affected stands are expected to recover with only minor growth losses.

Mortality of yellow cedar, *Chamaecyparis nootkatensis*, has been discovered recently in mature stands dominated by yellow cedar on the mainland portion of the Port McNeill Forest District. Areas with the most significant mortality occur on Gilford Island and within the Seymour Inlet area. Mortality in 1999 is limited to less than 5% of the mature cover, but historical mortality can be seen throughout the stands and in some instances may be as high as 20%. The mortality patterns look to be characteristic of bark beetle attacks, with clusters of trees affected, but no causal agent has yet been identified. These areas are located on mid-elevation sites with variable aspects. It is suspected that this yellow cedar decline may be the same as has been reported previously from Alaska and may be the result of weather fluctuations and climate changes.

A bark beetle survey in 1999 of the upper Klinaklini River valley identified endemic levels of western balsam bark beetle. This coastal/interior transition zone of the Port McNeill Forest District has stands containing a significant component of sub-alpine fir. Historic damage is significant in some stands, with up to 25% mortality.

### **Mid Coast Forest District**

Except for mountain pine beetle near Sigutlat Lake (severe 230 ha; light 4560 ha) and the Turner Lakes Chain (light 140 ha) in Tweedsmuir Park, pest conditions in this district are in good condition. No Douglas-fir beetle infestations were detected and the spruce beetle

outbreak within Thorsen Creek (64 ha in 1997 and 1998) appears to have declined. No currently attacked spruce were detected. Mountain pine beetle outbreaks within the district outside of Tweedsmuir Park can be found in the Dean River drainage (460 ha) and near Ape Lake (256 ha). All high elevation stands of subalpine fir contain light levels of scattered attack by balsam bark beetle.

### **Queen Charlotte Islands Forest District**

The current outbreak of western blackheaded budworm, *Acleris gloverana*, has again increased in the Queen Charlotte Islands Forest District from 37,300 in 1998 to over 55,000 ha this year – 37,628 ha of light, 11,216 ha of moderate and 6200 ha of severe defoliation [aerial surveys by the CFS]. Numerous stands have now experienced four consecutive years of defoliation. Significant impacts, e.g., mortality, top-kill and growth losses, are now expected in many immature stands, especially those in the Alliford Bay area. Large adult moth populations this fall suggest that this outbreak will continue next year.

The outbreak, however, has declined in the southern portion of Moresby Island where it first appeared in 1996. Most of this year's increases occurred in immature stands on Graham Island. The outbreak started in old growth stands on southern Moresby Island and over the past four years has advanced northward onto Graham Island and into immature hemlock stands. This is not meant to imply that the insect population itself has moved northward, but that local budworm populations reach outbreak proportions consecutively from south to north.

The Canadian Forest Service, with funding assistance from the South Moresby Forest Replacement Account, is currently studying the impacts of defoliation in immature hemlock stands.

Spruce aphid, *Elatobium abietinum*, populations on Sitka spruce were low this year allowing affected trees a recovery year following the heavy feeding of 1998.

### **Region-wide Reports**

#### **White Pine Blister Rust in Whitebark Pine**

During late 1998, the first phase of a province-wide assessment of whitebark pine began in southwestern BC. The survey was initiated due to concern that the survival of high-elevation stands of whitebark pine may be threatened by severe damage from white pine blister rust (*Cronartium ribicola*), a disease of five-needle pines. Whitebark pine is particularly valued for watershed protection, avalanche control, wildlife food and cover, and for maintaining high-elevation ecosystem diversity. The first year survey results are summarized in Table 2.

Of the 3450 whitebark pine trees examined, 794 (23%) were dead. Mortality on 226 (28.5%) of the dead trees could be directly attributed to blister rust. Due to the difficulty of diagnosing some dead trees, this figure is likely conservative as dead trees without obvious stem cankers were classified as dead due to other factors. These other factors include mountain pine beetle, abiotic site factors, and unknown or unidentified causes.

Table 2. Summary of 1998 whitebark pine survey results.

District	No. of trees	Tree Status							
		Live, Uninfected		Live, Infected by DSB <sup>1</sup>		Dead, from DSB		Dead, Other or Unknown	
Lillooet	2400	1476	61.5%	384	16.0%	168	7.0%	372	15.5%
Merritt	950	638	67.2%	99	10.4%	49	5.2%	164	17.3%
Squamish	100	35	35.0%	24	24.0%	9	9.0%	32	32.0%
Total	3450	2149	62.3%	507	14.7%	226	6.6%	568	16.5%

<sup>1</sup> DSB = white pine blister rust.

Of the remaining 2656 live trees, 507 (19.1%) were alive but infected with blister rust. Of these infected trees, 356 (70.2%) had stem cankers and will likely die within a few years. The remaining infected trees displayed branch cankers that may develop into stem cankers over several years.

The second phase of this survey was conducted this year in the Chilliwack, Mid-Coast, and Squamish Forest Districts; Cathedral, Manning, and Tweedsmuir Provincial Parks; and parts of the Bulkley-Cassiar, Chilcotin, Kispiox, Merritt, and Morice Forest Districts. These survey results will be available in the second Interim Report and next years pest conditions summary. A copy of the first Interim Report covering the 1998 field season is available from the Regional Pathologist.

## Drought Conditions

Regional and district staff fielded dozens of calls from the public this spring regarding the rapid demise of thousands of trees. Most calls concerned urban and semi-rural areas of eastern Vancouver Island, the Gulf Islands, and parts of the Sunshine Coast and Lower Mainland. The most commonly affected species were western redcedar, western hemlock, and Douglas-fir.

Field visits to several sites confirmed that the majority of affected trees had died because of drought conditions that occurred during the summer of 1998. Symptoms appeared delayed due to the onset of wetter winter weather and the usual lag time for needles to change from green to red. Most dead trees were either species that are normally drought-sensitive, or young trees with underdeveloped root systems, or trees that were growing on porous, well-drained soils.

The Comox airport weather station reports that between mid-July and early October of 1998 less than 10 mm of precipitation was recorded - less than 10% of normal. Such a low rainfall would contribute to killing young, shallow-rooted trees with poor access to ground water. Even trees growing close to an apparent water source (e.g., along a stream bank) were affected. Most of the moisture uptake by tree roots occurs within the top foot or two of soil. Trees already affected by insect or disease attack could also die as a result of the additional stress.

Unfortunately, once pronounced symptoms appear - foliage turning red and falling - it is usually too late to save the tree. Over-watering tends to encourage shallow rooting, which in turn prevents trees from developing much tolerance to drought conditions.