

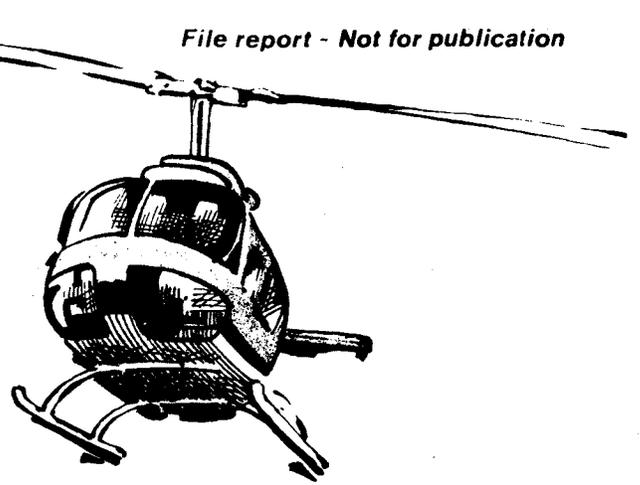


Environment
Canada

Environnement
Canada

Canadian
Forestry
Service

Service
canadien des
forêts



Forest Insect and Disease Conditions

Vancouver Forest Region 1981

R.O. Wood and R.D. Erickson

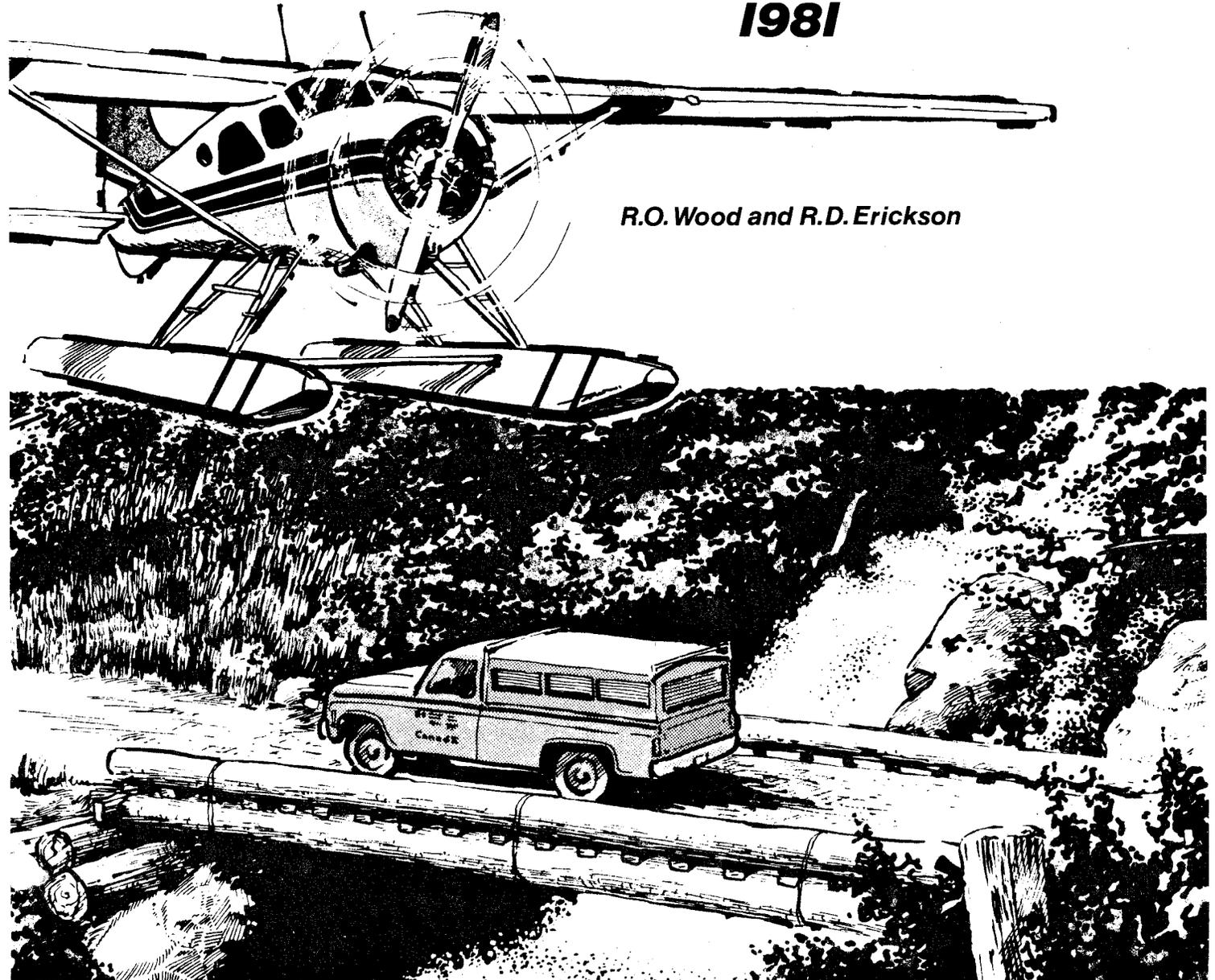


TABLE OF CONTENTS

	Page
SUMMARY OF PEST CONDITIONS	1
DOUGLAS-FIR PESTS	4
Western spruce budworm	4
Douglas-fir beetle	7
Tussock moths	8
Douglas-fir tip miner	8
Swiss needle cast	8
Nutrient deficiencies	10
Armillaria root disease	10
Phellinus root rot	10
Wind and ice damage	11
WESTERN HEMLOCK PESTS	12
Western hemlock looper	12
Western blackheaded budworm	12
Green-striped forest looper	12
Conifer sawflies	12
Hemlock dwarf mistletoe	13
Shoot blight	13
PINE PESTS	13
Mountain pine beetle	13
Pine sawfly	14
White pine foliage weevil	15
Pine needle casts	15
Atropellis stem canker	15
SPRUCE PESTS	15
Spruce weevil	15
Spruce bud moth	16
Spruce aphid	16
CEDAR PESTS	16
Western cedar bark beetle	16
Cedar leaf blight	17
PESTS OF MANAGED AND NATURAL SECOND-GROWTH STANDS AND PLANTATIONS	17

TABLE OF CONTENTS (Cont'd)

	Page
DECIDUOUS TREE PESTS	21
Winter moth	21
Western oak looper	21
Gypsy moth	21
Fall webworm	22
Poplar shoot blight	22
Dogwood leaf spot	22
APPENDIX I	23
Status of forest pests in Provincial Parks ^{1/}	23

^{1/} Appendix available from Pacific Forest Research Centre

SUMMARY OF PEST CONDITIONS

This report outlines forest insect and disease conditions in the Vancouver Forest Region for 1981 and forecasts population trends of potentially damaging pests.

Western spruce budworm infestations, which have been epidemic since 1970, subsided and there was little current defoliation recorded in 1981. Mountain pine beetle infestations expanded and killed scattered pockets of pine trees over more than 1 500 ha on the Mainland and Vancouver Island. Douglas-fir beetles killed a minimal number of trees in the Region. Spruce aphid defoliated spruce trees at moderate to severe levels in many coastal areas. Spruce weevil severely damaged immature spruce trees in 11 plantations on Vancouver Island. Conifer sawflies defoliated western hemlock and amabilis fir on the north end of Vancouver Island. Phellinus root rot continued to be a major problem. Dwarf mistletoe infections were evident at scattered locations. Nutrient deficiencies resulted in damage to Douglas-fir in the Brittain River drainage.

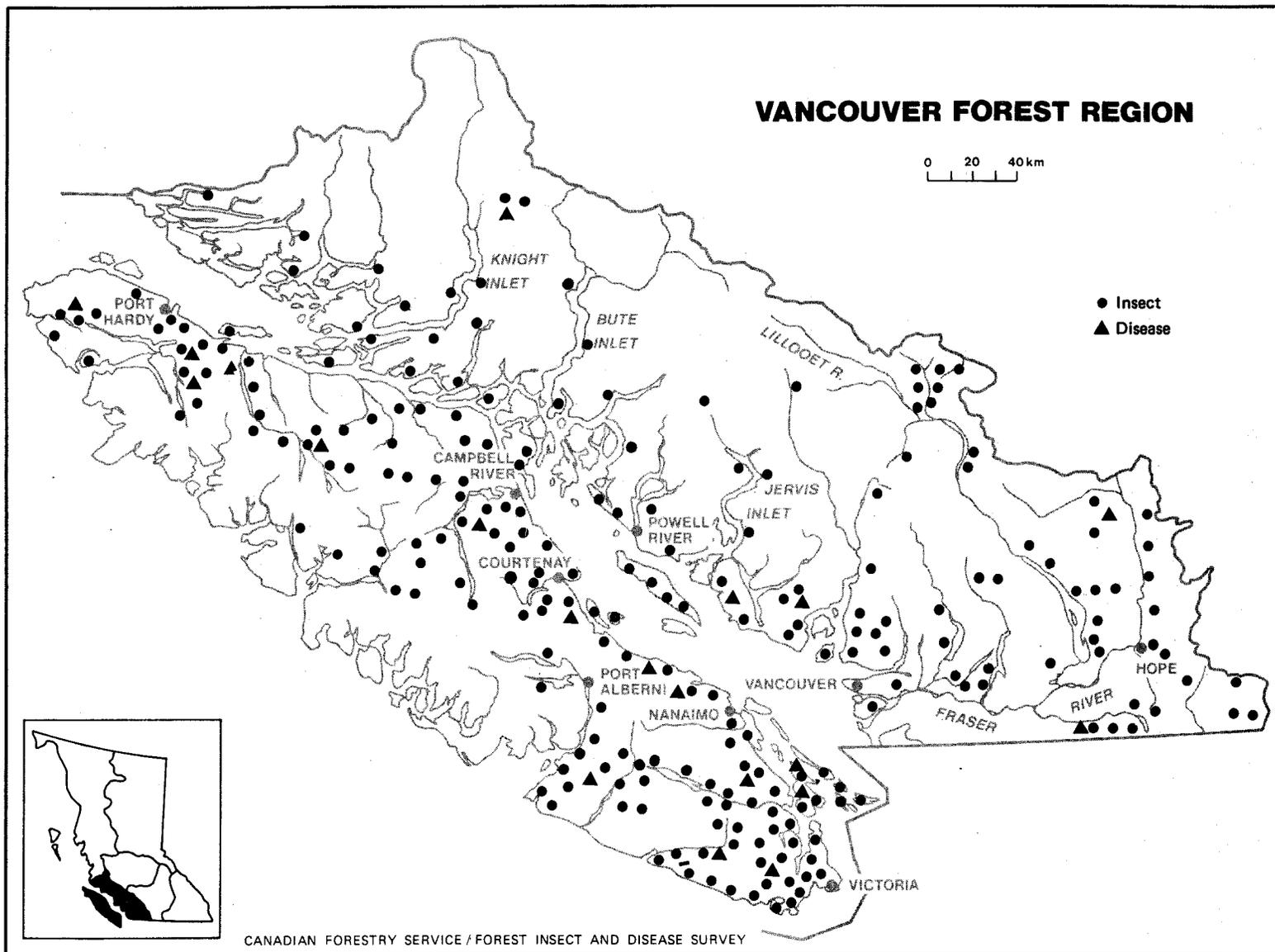
Field work in the Region began on May 1 and ended on October 7. Special surveys included sampling for distribution of Swiss needle cast on Douglas-fir, mountain pine beetle and spruce weevil cruises, examination of natural and managed second growth stands for pest problems, and monitoring gypsy moth adult populations in Provincial parks and campsites and assessment of parasite populations in the winter moth infestation.

A total of 403 insect and disease collections were submitted to Pacific Forest Research Centre by forest insect and disease survey personnel and 50 collections by other individuals or agencies. Map 1 shows general locations of field collection points.

On the mainland, the number of collections containing larvae increased from 56% in 1980 to 61% in 1981; on Vancouver Island, 66% of collections were positive, an increase from 56% in 1980.

Approximately 32 hours were flown in fixed-wing aircraft to appraise defoliators and bark beetles and to sample permanent sample plots along the mainland coast (Map 2).

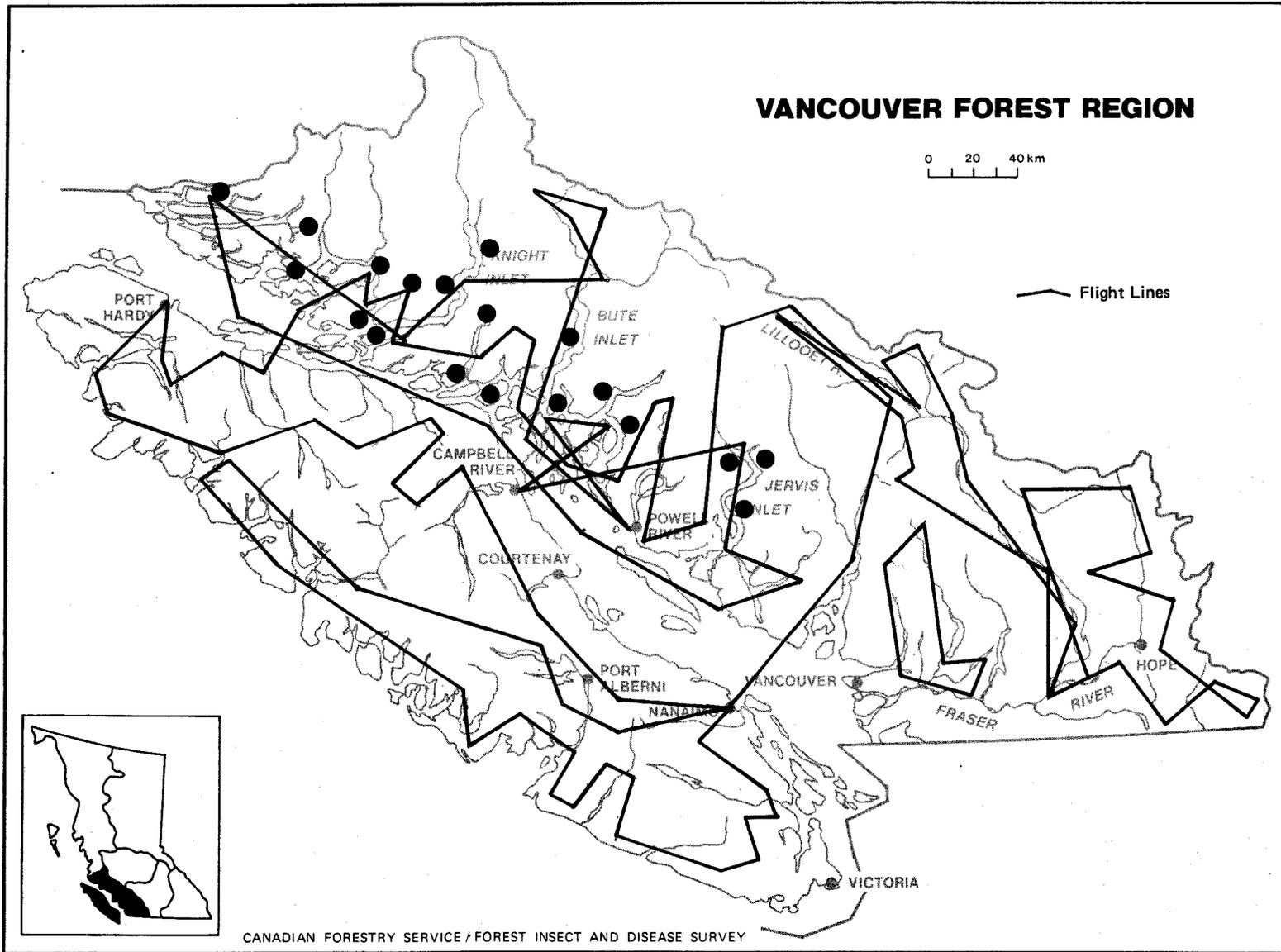
Details on individual problems follow by importance and host tree species.



Map 1

**Collection Locations
1981**

Locations Where One or More Insect or Disease Samples Were Collected



Map 2

**Aerial Survey and Collection Locations
1981**

Locations Where One or More Insect or Disease Samples Were Collected

DOUGLAS-FIR PESTS

Western spruce budworm, Choristoneura occidentalis

Compared to the 27 300 ha of defoliation of Douglas-fir stands recorded in 1980, the amount recorded in 1981 was slight; 40 ha of very light defoliation at Haylmore Creek in the Pemberton area and 380 ha of severe defoliation at Urquhart Creek, a tributary of Spuzzum Creek in the Fraser Canyon.

There was no evidence of spruce budworm on Vancouver Island in 1981.

Examination of 100 Douglas-fir buds at each of 13 locations in May, to evaluate budworm populations, indicated that defoliation would be comparable to that of 1980 in some areas (Table 1). However, subsequent wet, cool weather was believed to have affected larval feeding which resulted in little defoliation.

Table 1. Percentage of Douglas-fir buds infested with spruce budworm larvae, Vancouver Forest Region, 1979-81.

Locality	Percentage of buds infested		
	1979	1980	1981
<u>Fraser Canyon Area</u>			
Kookipi Cr	4	2	11
Keefers	-	15	4
Mowhokam Cr	8	10	5
Anderson R	7	12	20
Gilt Cr	8	23	28
Siwash Cr	-	25	26
<u>Hope - Princeton Highway</u>			
Sumallo R	1	7	17
Rhododendron Flats	10	36	30
Cedar Cr	-	27	22
Skaist Cr	-	40	12
<u>Coquihalla River</u>			
Boston Bar Cr	14	22	7
Ladner Cr	-	46	-
<u>Silver - Skagit Area</u>			
km 45 Silver - Skagit Rd	7	12	5
Shawatum Cr	12	58	12
<hr/>			
Averages	8	24	15

The number of larvae in 3-tree beating samples from Douglas-fir on the Vancouver mainland decreased from 40 per positive sample in 1980 to 4.5 in 1981. The decline was attributed to a wetter than normal June, which affected sampling, and possibly resulted in an inaccurate assessment of the budworm population.

Figure 1 shows population fluctuations of western spruce budworm on the Vancouver mainland from 1970 to 1981, and indicates the years 1970 to 1980 when populations were at outbreak levels.

Egg populations were assessed in August to predict population trends and defoliation in 1982. Egg masses were counted on two 50-cm branches from each of three Douglas-fir trees at eight locations (Table 2).

Table 2. Number of spruce budworm egg masses on Douglas-fir foliage and predicted defoliation of Douglas-fir stands.

Vancouver Forest Region, 1981				
Location	Av number of egg masses per 10 m ² of foliage			Predicted defoliation for 1982
	1979	1980	1981	
Skagit River	-	95	39	light
Rhododendron Flats	343	25	0	nil
Gilt Creek	52	0	19	light
Kookipi Creek	-	0	12	light
Boston Bar Creek	11	0	-	nil
Haylmore Creek	0	0	0	nil
Owl Creek	0	0	32	light
Rogers Creek	-	-	17	light

The predicted levels of 1982 defoliation are based on the criteria that up to 50 egg masses per 10 m² of foliage could result in light defoliation, from 50 to 150 masses, moderate defoliation and more than 150 in severe defoliation.

The highest count of egg masses (39) was recorded in the Skagit River Valley but none of the samples indicated more than light defoliation in 1982.

Traps baited with one of three strengths, by weight, of a sex attractant pheromone, five traps of each strength, were located at each of eight Douglas-fir stands on the mainland to assess adult male budworm populations. The traps indicated that budworm populations persisted in all the areas (Table 3).

P E R C E N T

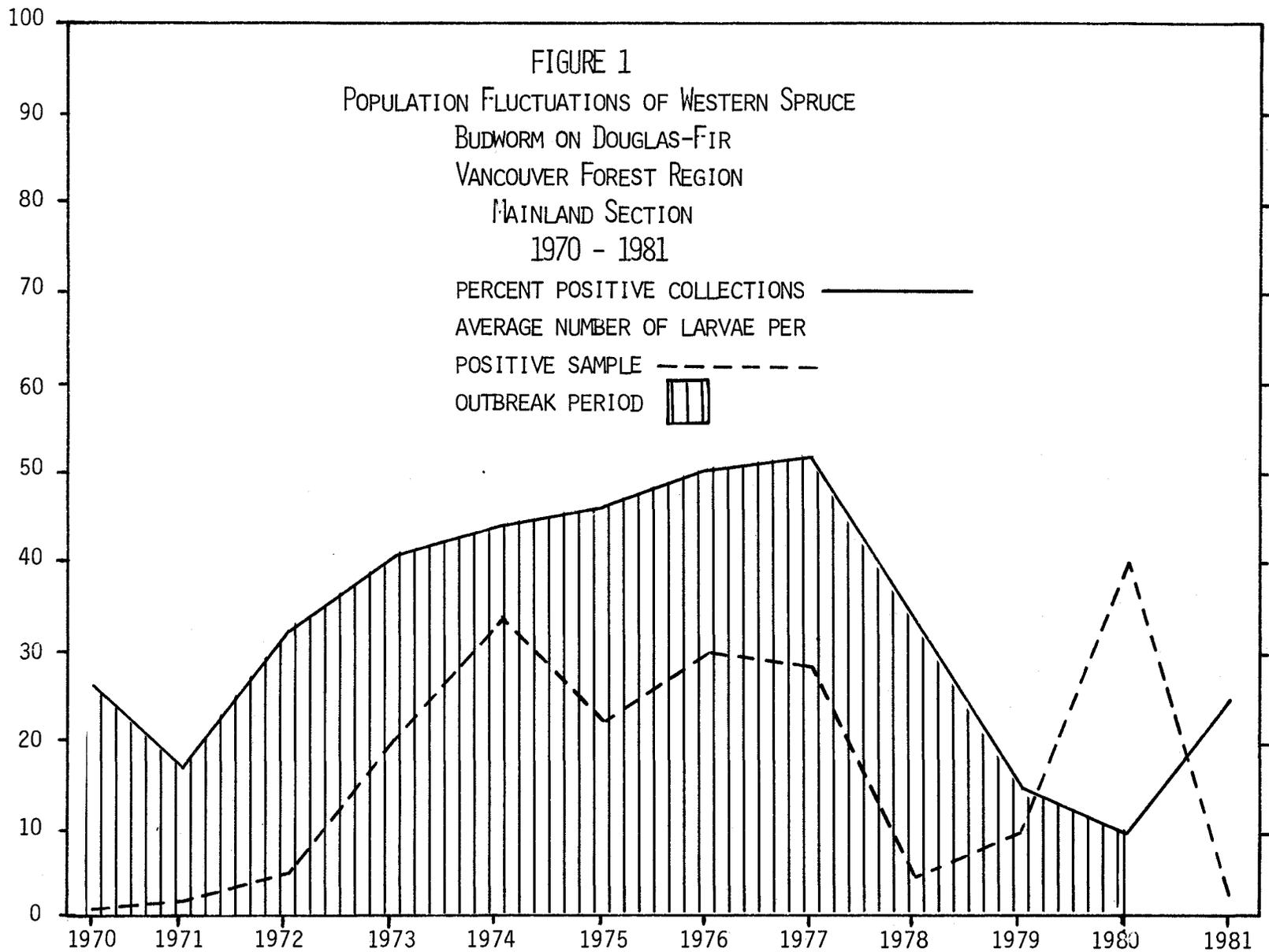


Table 3. Adult male western spruce budworm in pheromone-baited traps, Vancouver Forest Region, 1981.

Location	Average number and range of numbers of adults per trap by pheromone concentration					
	.001%		.01%		0.1%	
	Range	Average	Range	Average	Range	Average
Skagit R	0-0	0	2-16	8	9-17	12
Rhododendron Flats	0-2	0.4	5-9	7	9-40	33
Boston Bar Cr	0-0	0	0-0	0	1-6	2
Kookipi Cr	0-2	0.4	5-26	13	36-63	52
Gilt Cr	0-0	0	9-18	13	6-81	45
Owl Cr	0-2	0.8	7-27	17	24-76	58
Haylmore Cr	0-2	0.4	1-81	47	3-11	8
Rogers Cr	0-1	0.2	4-9	5	14-48	26

To date there is no data to indicate what conclusions should be drawn from the results of the traps. In some instances, sites which yielded the highest average number of adults in flight traps, i.e., Owl Creek, also produced a relatively high number of egg masses. At other sites, such as Skagit River, egg counts were relatively high but numbers of adults in traps were low. It was assumed that the pheromone was able to attract moths from a wide area, so the trap results should not be applied only to the local area. However, the presence of any adults in the traps indicated that some budworms are still present and defoliation may occur in 1982.

The two 100-tree plots established in 1973 to study the long term effects of budworm feeding were examined in 1981.

At Haylmore Creek, no current defoliation occurred within the plot but accumulative defoliation from the previous eight years ranged from 10% to 50% on 29% of the trees, 23% had developed double tops, presumably from budworm outbreaks in the 1950's or earlier, 3% of the trees were dead and 68% had apparently recovered.

At Sumallo River, no current defoliation was recorded but accumulative defoliation ranged from 10% to 70% on 96% of the trees; 4% were dead, presumably from budworm feeding.

Douglas-fir beetle, Dendroctonus pseudotsugae

A total of 35 mature Douglas-fir trees, recently killed by the beetle, were recorded in 1981. On Vancouver Island, 10 dead trees were recorded near Wild Deer Lake west of Shawnigan Lake. On the mainland, a total of 25 red trees in three groups of five and one of 10 trees were mapped between East Anderson River and Uztlus Creek.

There were low populations of beetle (less than 1 per 81 cm²) in decks of recently-cut logs near D'Arcy, but none were found in surrounding standing trees.

Douglas-fir tussock moth, Orgyia pseudotsugata and Rusty tussock moth, Orgyia antiqua badia

Two Douglas-fir seed trees in the Pacific Forest Products Ltd., seed orchard in Saanichton on Vancouver Island were 10% defoliated. Sex pheromone-baited traps caught an equal number of male adults of both species. Adult male tussock moths were also caught in sex pheromone-baited traps in shade houses at Pacific Forest Research Centre. In these traps, 46% of the moths were O. pseudotsugata and 54% were O. antiqua badia.

Tussock moths are not considered to pose a serious threat in coastal areas.

Douglas-fir tip miner, Argyresthia pseudotsuga

Throughout the range of Douglas-fir from Victoria to Duncan, this insect killed between 1% and 40% of the branch tips on young and old trees. The most severe damage occurred to mature ornamental trees on private properties where up to 40% of the branch tips were killed on some trees.

Swiss needle cast, Phaeocryptopus gaeumanni

A special survey to assess the distribution and intensity of infection by this native needle disease was conducted in 1981. Samples of one branch from each of three Douglas-fir trees from each of 21 locations throughout the Region were examined and showed that the disease was widely distributed. The most severe infection occurred on two-year-old and three-year-old needles and ranged from 28% to 100% of the needles infected (Table 4).

Table 4. Infection intensity of Swiss needle cast on Douglas-fir, Vancouver Forest Region, 1981.

Location	Percent infection by year (age) of needles					
	2	3	4	5	6	7
<u>Mainland</u>						
Skagit R	45	60	42	0	0	-
Kookipi Cr	49	59	14	0	12	36
Rutherford Cr	49	47	38	35	30	11
Lund	85	75	43	22	10	26
Ruby Lake	50	47	44	33	29	19
Jervis Inlet (1)	74	54	90	-	-	-
(2)	28	68	56	71	-	-
Salmon Inlet	55	56	60	100	-	-
Loughborough Inlet	56	81	-	83	93	-
Raza Passage	79	81	84	-	-	-
E. Thurlow Island	52	40	84	89	52	24
Kingcome Inlet	86	64	76	80	-	-
Bute Inlet	71	79	82	-	-	-
Redonda Island	31	35	35	86	-	-
<u>Vancouver Island</u>						
Comox Cr	87	70	42	64	49	47
Gold R (1)	49	48	44	17	5	0
(2)	44	42	34	18	4	0
Kennedy R	96	100	-	-	-	-
Sarita R	99	100	-	-	-	-
Port McNeil	100	-	-	-	-	-
Mt. Washington	84	80	69	51	38	0
Averages	61	73	47	32	28	24

Chlorosis of needles and some loss of older foliage occurred at Scar Creek, a tributary of Homathko River and at one location along Hemlock Valley Road.

On Vancouver Island, infection by Swiss needle cast was also recorded at Waterloo Mountain, Blackjack Creek and Sutton Creek.

The pathogen is not considered to be an important pest in natural stands in British Columbia but infection can result in loss of older needles of Douglas-fir and is more of a threat in plantations.

Nutrient Deficiencies

Damage in the form of terminal dieback, needle loss, excessive branch development, resinosis and needle chlorosis occurred to Douglas-fir over 1 000 ha on the south slopes of Mount Cambridge in the Brittain River drainage of Jervis Inlet. The major cause of the damage was a deficiency of the trace element boron.

Armillaria root rot disease, Armillaria mellea

Small pockets of regeneration Douglas-fir trees, 1.5 to 4.5 m high, were killed over a total of 5 ha east of Gold River and along the Cameron River near Labour Day Lake.

Phellinus root rot, Phellinus weirii

This root disease pathogen continued to cause significant tree mortality in mixed age classes of coniferous stands throughout the Vancouver Forest Region. Surveys to determine the intensity of the disease were conducted by the B.C. Ministry of Forests at eight locations on the mainland and at six on Vancouver Island. On the mainland, the intensity of infection ranged from 3% to 45% of the area cruised at any one location. On Vancouver Island, infection ranged from 4% to 11% (Table 5).

Table 5. Location and intensity of Phellinus root rot in Douglas-fir stands, Vancouver Forest Region, 1981.

Forest District	Area (ha)	Area in root rot centers (ha) (% of area cruised)	
<u>Mainland</u>			
<u>Chilliwack</u>			
Klesilkwa R (1)	15	7	45
(2)	3	1	33
Skagit R	38	4	11
<u>Powell River</u>			
Powell R	6	1	17
Okeover Inlet	23	1	4
Scuttle Bay	49	4	8
Sliammon Cr	40	1	3
Sliammon L (1)	44	5	11
(2)	33	3	9
Lang Cr (1)	15	2	13
(2)	26	1	4
Totals	292	30	10

(CONT'D)

Table 5. Cont'd

Forest District	Area (ha)	Area in root rot centers (ha)	(% of area cruised)
<u>Vancouver Island</u>			
<u>Duncan</u>			
Mesachie L	61	7	11
McKay L (1)	171	7	4
(2)	105	8	8
Beaver L (1)	95	10	11
(2)	13	1	8
Shawnigan L	16	1	6
Stamp Falls	220	13	6
<u>Campbell River</u>			
Quinsam L (1)	13	1	8
(2)	20	1	5
(3)	12	1	8
(4)	18	1	6
Vancouver I. Total	744	51	7
Total for Region	1 036	81	8

Two additional root-rot infected Douglas-fir stands were recorded on the mainland from aerial surveys and later confirmed by ground checks; 760 ha at Uztilius Creek east of Boston Bar in the Fraser Canyon and 450 ha at Nepopekum Creek, northeast of Ross Lake. Symptoms typical of the root rot infection were also common throughout Douglas-fir stands along the Silver-Skagit Road from Highway 1 to Ross Lake but no ground examinations were undertaken.

Wind and ice damage

Tree blowdown, broken stems and branch damage to Douglas-fir stands in the Fraser Canyon resulted from wind and ice storms during the winter of 1980-81. Personnel of the B.C. Ministry of Forests mapped damage in patches totalling more than 10 000 ha at Spuzzum Creek and along the Fraser River from Spuzzum Creek to China Bar.

Two damaged areas at Spuzzum Creek were examined for Douglas-fir beetle attacks but none were found.

WESTERN HEMLOCK PESTS

Western hemlock looper, Lambdina f. lugubrosa

At Coquitlam Lake, where the western hemlock looper defoliated and killed hemlock and western red cedar trees over 250 ha during 1969-73, beating samples from either host yielded a maximum of two larvae. No defoliation was observed at Coquitlam Lake or elsewhere in the Region during aerial surveys.

On Vancouver Island, where no defoliation by hemlock looper has been recorded since 1947, populations remained low.

Western blackheaded budworm, Acleris gloverana

Outbreaks of blackheaded budworm were last recorded in the Region during the years 1968 to 1974 when severe defoliation of western hemlock stands occurred on Vancouver Island.

In 1981, on Vancouver Island, the number of collections from western hemlock which contained blackheaded budworm larvae increased to 10% but the average number of larvae per positive sample was less than one; a low endemic level.

On the mainland, populations were also low; 7% of collections from hemlock were positive with an average of less than one larva.

Green-striped forest looper, Melanolophia imitata

No defoliation by this insect has been recorded in the Region since 1969 when severe defoliation of western hemlock occurred on north-western Vancouver Island.

In 1981, the percentage of collections from western hemlock which contained larvae increased to 19%, about the same level as in 1979. However, the average number of larvae per positive sample remained at less than one, a level it has maintained since the previous outbreak declined in 1970, and is considered to be at a low endemic level.

Conifer sawflies, Neodiprion spp.

In 1979, sawfly larvae severely defoliated mature western hemlock and amabilis fir over 4 400 ha in the Kelsey Bay area. Populations declined in 1980 but increased again in 1981 and moderately defoliated mature western hemlock and amabilis fir over 1 200 ha in the Haihte Lake area; lighter defoliation occurred from Kelsey Bay west almost to Adam River.

At Keta Lake, sawfly larvae in three-tree beating samples from western hemlock increased to 100 per sample which indicated a moderate population with the potential to defoliate trees in 1982.

In other areas of the Region, larvae were common in collections from various coniferous hosts but no defoliation was evident.

Hemlock dwarf mistletoe, Arceuthobium tsugense

Infected western hemlock was recorded in four stands in the Port McNeil area on Vancouver Island. In a 40-year-old, 21 m-high stand, south of Nimpkish River, 20 or more infected branches per tree were recorded on 100% of the trees examined over 5 ha; north of Port McNeil, in a 20-year-old, 7.5 m-high stand, 10 to 30 infected branches per tree were recorded on 100% of the examined trees over 5 ha; west of Port McNeil, 5% of a 3 m-high advanced regeneration stand was infected with one to three infected branches per tree over 5 ha. Near Rupert Inlet, in an 80-year-old, 45 m-high stand, 5 to 10 infected branches were recorded on 30% of the trees.

Three semi-mature western hemlock stands in the Beaver Cove area were examined for dwarf mistletoe but none was found.

On the mainland, dwarf mistletoe infected stands at Paleface Creek on Chilliwack Lake where 90% of the trees were infected over an estimated 5 ha. At Saltery Bay, on Sechelt Peninsula, 80% of the trees over 5 ha were infected.

Mistletoe infections occurred in mature stands in the drainages of the Seymour and Capilano rivers but no measures of intensity levels were taken.

Sirococcus shoot blight, Sirococcus strobilinus

Two areas of advanced western hemlock regeneration near Kelsey Bay on Vancouver Island were infected and damaged by this tip wilt disease.

At Keta Lake, 40% of the branch tips were killed on 90% of the trees examined over 2 ha and at Haihte Lake, 80% of the shoots were wilted on 100% of the trees examined over 2 ha.

Severe infection by this pathogen can result in branch dieback on larger trees while very young seedlings may be stunted or killed.

PINE PESTS

Mountain pine beetle, Dendroctonus ponderosae

The number of recently killed lodgepole pine trees recorded in the Region in 1981 decreased to 5,000 compared to 19,000 in the same infestation areas in 1980. However, the infestation areas increased to more than 1 500 ha from 650 ha in 1980. Table 6 shows infestation areas and number of dead pine trees recorded in 1981.

A new outbreak was recorded west of Mt. Berkeley along Read Creek between Read Bay and Shannon Lake where 300 red trees were recorded on 80 ha.

Table 6. Location, area and number of pine trees killed by mountain pine beetle, Vancouver Forest Region, 1981.

Location	Pine species	Area (ha)	Number of dead trees
Eastgate	lodgepole	130	300
Mowhokam Cr	"	100	120
West of Boston Bar	"	120	100
Specht Cr	"	40	200
Gates L	"	250	500
Haylmore-Spruce Crs	"	500	3,000
Blackwater Cr	"	150	100
Phelix Cr	"	65	50
Read Cr	"	80	300
Blackwater L	western white	65	200
Haylmore Cr	ponderosa	20	10
Adrian Cr (Vancouver Island)	western white, lodgepole	50	240
Totals		1 570	5,120

Infestations in the Gates River Valley, near Pemberton, are most severe at Haylmore-Spruce creeks where 96% of the pine trees recorded on one cruise strip was killed in 1980 or previously.

At Eastgate, in Manning Park, ground cruises in September showed that 30% of the pine trees were attacked in 1981, 4% were killed in 1979-80, 12% had been killed prior to 1979, and 54% were healthy.,

Many of the outbreaks in the Region were inaccessible, making it difficult to assess beetle population trends. However, precluding adverse climatic conditions, beetle infestations are expected to expand and increase in number in 1982, particularly in the Gates River and Manning Park areas.

Pine sawfly, Neodiprion sp.

Sawfly larvae destroyed 60% of the foliage of lodgepole pine in a 6 ha, 1.5 to 3 m-high stand at Blackjack Lake near Nanoose Bay on Vancouver Island in 1981.

White pine foliage weevil, Scythropus elegans

Approximately 80% of the western white pine regeneration trees from Koksilah River to Clapp Creek on southern Vancouver Island were up to 15% defoliated by this insect in 1981. The infestation was scattered in pockets throughout the area and is the first reported damage by the weevil on Vancouver Island.

Pine needle casts, Lophodermella concolor and Davisomycella ampla

Discoloration and premature loss of 1981 lodgepole pine needles occurred in localized patches in lodgepole pine stands from Parksville to Campbell River. The areas affected and infection intensity included: Nanoose Creek - 50% of the needles discolored on 95% of the trees; Quinsam Lake - 30% of the foliage discolored on 30% of the trees; Little Qualicum Falls - 60% of the foliage affected on 30% of the trees; Snakehead Lake - 10% of the needles on 30% of the trees; Hornby Island - 30% of the foliage discolored on 80% of the trees.

The wet weather in the spring and early summer favored infection by these pathogens but with normal, drier weather in 1982, the trees should recover with no noticeable permanent injury.

Atropellis canker of pine, Atropellis piniphila

At Loon Lake, near Port Alberni on Vancouver Island, 2 to 30% of the branch tips were killed on 100% of the trees over 100 ha of lodgepole pine, 15 m high and 20 cm dbh. This was the only area in the Region where damage from this disease was recorded in 1981.

SPRUCE PESTS

Spruce weevil, Pissodes strobi

Sixteen Sitka spruce plantations from Head Bay to Port McNeil on Vancouver Island were examined to determine the extent of spruce weevil attack in 1981. An average of 100 trees were examined at each plantation. The percentage of trees attacked at 16 plantations ranged from 0% to 30% with an average of 7.5%. Five plantations in the Sarita-Bamfield area, had no attacks (Table 7).

Table 7. Location and incidence of spruce weevil attack in Sitka spruce plantations on Vancouver Island, 1981

Plantation Location	No. trees examined	Percent of trees attacked
Waukwors Cr - Port McNeil (3 plantations)	300	3,11,6
Truite Lake	100	1
Alice Lake	100	2
Ucluelet (Brice Main)	100	5
Sarita-Bamfield (5 plantations)	500	0
San Josef River (1)	100	20
" " " (2)	100	30
Malaspina Lake	100	6
Head Bay	100	30
Leugh Creek	100	6
Total	1,600	Average 7.5

Spruce bud moth, Zeiraphera sp.

Defoliation of up to 30% of Sitka spruce branch tips occurred in localized patches in the Tofino-Ucluelet area and from Sarita to Bamfield on Vancouver Island in 1981.

Spruce aphid, Elatobium abietinum

Discoloration and defoliation of Sitka and ornamental spruce on Vancouver Island was more severe and widespread in 1981. From Victoria to Port Hardy, 1 720 ha of spruce was 30% to 100% defoliated. Areas of noteworthy damage, in patches of less than 5 ha, included: Brooks Bay, 50% to 90% defoliation; Sooke to Point No Point, 30% to 80%; Ucluelet, 60-80% defoliation; west side of Malcolm Island, 60-80% defoliation and at Campbell River along Highway 19 and near Spit Road, 60-100% defoliation.

Although there has been no tree mortality recorded in these areas to date, it may be expected if successive years of defoliation persist.

CEDAR PESTS

Western cedar bark beetle, Phloeosinus punctatus

From 5% to 20% of the branch tips were killed by this beetle in yellow cedar regeneration in a 100 ha-logged stand at 750 m elevation on

Mount Washington. Affected trees ranged in height from 1.2 to 3 m. The incidence of this pest has rarely been recorded in previous years.

Cedar leaf blight, Didymascella thujina

This native needle/leaf blight infected up to 80% of old and new foliage on 50 to 90% of western red cedar trees at widely-separated areas throughout the Region (Table 8).

The infection resulted in discoloration and some premature foliage loss.

The long term effect of the disease on mature trees is to retard growth, but, in some plantations, tree mortality of trees under four years of age has been recorded.

Table 8. Locations and infection intensity of cedar leaf blight, Vancouver Forest Region, 1981.

<u>Location</u>	<u>Percent of trees affected</u>	<u>Estimated percent of foliage discolored</u>
McClure Lake	65	30
Roberts Lake	80	30
Denman Island	85	80
Comox Creek	90	40
Knight Inlet	60	30
Kingcome Inlet	50	30
Bute Inlet	75	45
Saltery Bay	80	20

PESTS OF MANAGED AND NATURAL SECOND-GROWTH STANDS AND PLANTATIONS

With the increased emphasis on the importance of the management of young stands, examinations were made to determine the status of insect and disease pests in managed and second-growth natural stands at 21 locations in the Region in 1981 (Table 9).

Table 9. Pests of managed and natural second-growth stands and plantations, Vancouver Forest Region, 1981.

Location	Stand type ^{1/}	Stand status	No. stands examined	Pest(s) found	Remarks
<u>Vancouver Mainland</u> <u>Green Lake</u>	D	planted	1	<u>Melampsora</u> <u>occidentalis</u> <u>Cytospora kunzei</u>	Needle rust- moderate infection on 12% of trees. Dieback, 1 tree infected.
Chilliwack R	D	managed	2	<u>Phellinus weirii</u>	Root rot - 1 tree with infection symptoms
Slesse Cr	D	managed	1	<u>Phellinus weirii</u>	Root rot - 2 trees on edge of thinned area.
Km 25 Silverhope Cr Rd	D	managed	1	no pest problems	
Hemlock Valley Rd.	D	managed	1	" " "	
Gray Cr Rd	D	managed	1	" " "	
N. of Rogers Cr (Lillooet L)	D	natural	1	<u>Phellinus weirii</u>	Root rot - scattered infection centers.
Statlu Cr	D	managed	1	no pest problems	
Jones L	WH	managed	2	Porcupine	Minor damage at one site.
Paleface Cr (Chilliwack L)	WH	natural	1	<u>Arceuthobium-</u> <u>tsugense</u>	Dwarf mistletoe- 90% of trees infected.
Saltery Bay	WH	natural	1	<u>Didymascella-</u> <u>thujina</u>	Needle blight - infection on 80% of trees-estimated 20% of foliage.

(CONT'D)

Table 9. (cont'd)

Location	Stand type ^{1/}	Stand status	No. stands examined	Pest(s) found	Remarks
Saltery Bay	wH	natural		<u>Arceuthobium- tsugense</u>	Dwarf mistletoe - infected 80% of trees.
<u>Vancouver Island</u>					
Little Oyster R	D	managed	1	<u>Armillaria- mellea</u>	Root rot - openings of 36 m ² over 4 ha.
Oyster R	D	managed	1	<u>Phellinus weirii</u> <u>Phaeocryptopus gaeumannii</u>	Root rot - infections over 1/4 ha. Swiss needle cast - infected 40% of foliage on 10% of trees.
Campbell L	D	managed	1	No pest problems	
Nanoose Cr	D	managed	1	mechanical injury	Many untreated scars of up to 225 cm ² .
Snakehead L	D,1P	managed	1	<u>Phaeocryptopus gaeumannii</u> <u>Lophodermium sp.</u> <u>Vespamima sp.</u>	Swiss needle cast - infesting 5% of D foliage. Needle cast - infesting 40% of 1P foliage. Pitch moth - 1-4 attack on 1P trees.
Quinsam L	D	managed	1	<u>Phaeocryptopus- gaeumannii</u> mechanical damage	Swiss needle cast - infesting up to 15% of foliage on some trees. Some scars of 450 cm ² not treated.
Beaver Cove	wH	managed	1	<u>Arceuthobium tsugense</u>	Dwarf mistletoe - moderate infection
Rupert Inlet	wH	managed	1	<u>Arceuthobium tsugense</u>	Moderate infection.

(CONT'D)

Table 9. (cont'd)

Location	Stand type	Stand status	No. stands examined	Pest(s) found	Remarks
Rupert Inlet	wH	managed		<u>Discocainia</u> <u>treleasei</u>	Canker disease - up to 30 infections per tree.
Nimpkish R	wH	managed	1	<u>Arceuthobium</u> <u>tsugense</u>	Moderate infection.
Port McNeil	wH	managed	2	<u>Arceuthobium</u> <u>tsugense</u>	Moderate infection at one site.
O'Connor L	wH	plantation	1	<u>Arceuthobium</u> <u>tsugense</u>	Enforcing 10 ft. clause.

1/ D - Douglas-fir
1P - lodgepole pine
wH - western hemlock

DECIDUOUS TREE PESTS

Winter moth, Operophtera brumata

Defoliation of a variety of deciduous trees, especially Garry oak, maple and fruit trees was severe from Victoria to Esquimalt and Sidney for the tenth consecutive year. The defoliation was comparable in extent and severity to that of 1980, with no noticeable effect from the parasite release program.

Late instar larvae were collected in 1980 and examined for parasites. Three adults of Agrypon flaveolatum were reared. However, the incidence of parasitism was less than 1%.

The parasite release program was continued in 1981 when 1,973 adults of Agrypon flaveolatum wasps and 2,561 adult Cyzenis albicans flies were released at 14 locations in Victoria and on the Saanich Peninsula.

Late-instar winter moth larvae were collected for parasite studies at eight locations where parasites were released in 1980. Larvae from seven of the locations were examined for disease at the Forest Pest Management Institute in Sault Ste. Marie but none was found.

Western oak looper, Lambdina f. somniaria

This native insect severely defoliated (60-100%) Garry oak and Douglas-fir trees over 16 ha in the Mount Maxwell Ecological Reserve on Saltspring Island in 1981.

The last outbreak of this insect in the Saanich-Victoria area occurred in 1958-61; and since then populations have been low.

Unconfirmed reports of the Provincial Ecological Reserve Unit indicated that defoliation of Garry oak occurred in 1980.

There was no tree mortality in the defoliated stands. However, one of 10 defoliated Douglas-fir trees was attacked by Douglas-fir beetle and more attacks could occur in weakened trees in 1982.

Moss samples from near defoliated Garry oak trees produced 65 eggs per 900 cm², which indicated a continuing population in 1982 with more defoliation expected.

Gypsy moth, Lymantria dispar

Sex attractant pheromone traps, to monitor male adult gypsy moth populations, were located by Forest Insect and Disease Survey personnel at several locations in the Region in 1981. The mainland locations were: Fraser Valley - 12; Fraser Canyon - 1; Howe Sound northeast to Pemberton - 3; a total of 16 traps.

On Vancouver Island, eight traps were located at three locations from Victoria to Little Qualicum Falls.

Traps and pheromones were supplied by the Canada Department of Agriculture as part of a cooperative program continuous since 1977.

No adults were caught during the survey.

Fall webworm, Hyphantria cunea

Defoliation of many varieties of deciduous trees and shrubs was conspicuous in the Region in 1981.

Damage occurred from Howe Sound east throughout the Fraser Valley and Fraser Canyon to Nahatlatch Lake and northeast to Pemberton and Lillooet Lake.

The highest incidence of defoliation and number of webs was recorded along the east side of Lillooet Lake between Mt. Currie and Rogers Creek.

The damage caused by fall webworm is of little economic importance but it can be a nuisance in populated or recreational areas.

Poplar shoot blight, Venturia populina

An estimated 80 ha stand of black cottonwood along the Fraser River near Agassiz was severely infected by this pathogen. Sixty to 95% of the foliage on 100% of the trees wilted and dropped by early August. Similar damage symptoms were also noted on roadside black cottonwood trees along the Fraser River from Hope to Boston Bar.

The unusually wet weather in June was conducive to development of leaf fungi, but no permanent damage is expected to result and, under normal conditions, trees should recover in 1982.

Dogwood leaf spot, Gloeosporium sp.

This disease discolored the foliage on small patches of native and ornamental dogwood trees in the Black Creek-Campbell River area on Vancouver Island. Severe infection also occurred on one tree at Squamish on the mainland.

Infected trees should recover in 1982 with little adverse impact.

STATUS OF PESTS IN PROVINCIAL PARKS

Insect and disease pests were monitored in Provincial parks as a cooperative survey with the B.C. Ministry of Lands, Parks and Housing. The results of the survey are shown in Table 10, Appendix 1.

Canada

Environment Canada
Canadian Forestry Service
Pacific Forest Research Centre
506 West Burnside Road
Victoria, B.C. V8Z 1M5

1982