

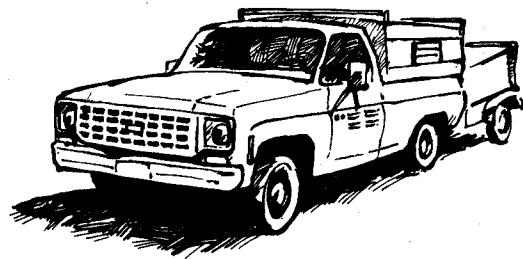


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1980 Forest Insect and Disease Conditions

Prince Rupert Forest Region
H.P. Koot, D.F. Doidge

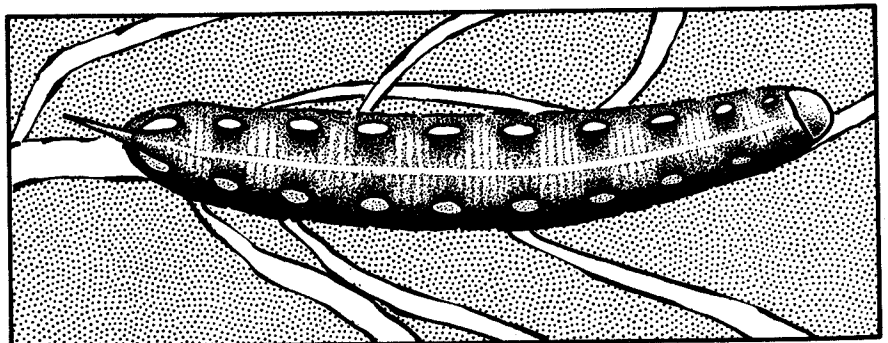
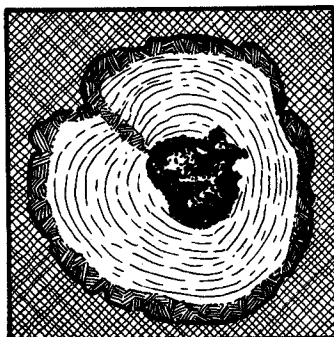


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SUMMARY

This report outlines the status of forest pest conditions in the Prince Rupert Forest Region for 1980. It emphasizes insect pests capable of sudden, damaging outbreaks, and diseases of greatest economic importance.

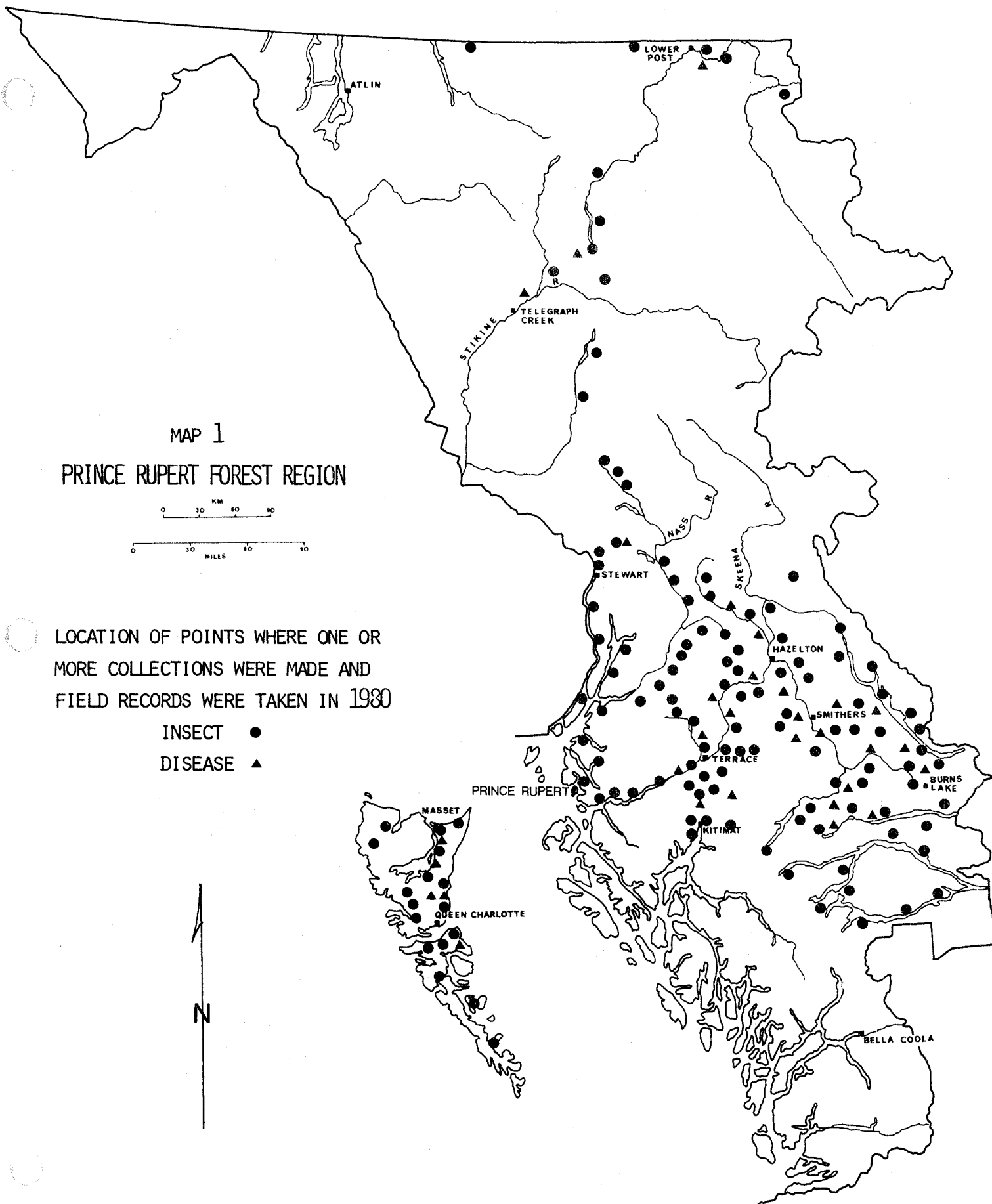
The most damaging insect in 1980 was mountain pine beetle which killed nearly 50,000 lodgepole pine, an increase of 67% over 1979. Spruce beetle infestations covered 12 700 hectares as compared to 11 170 in 1979. The western balsam bark beetle-fungus complex continued as a chronic problem in overmature spruce-balsam stands. Ambrosia beetles infested large diameter, western hemlock, amabilis fir and Sitka spruce blowdown over 1 200 ha along the Kitsault River. Spruce budworm lightly defoliated scattered areas of amabilis fir in the Kitimat Valley for the first time since 1969, and two-year-cycle spruce budworm caused light defoliation of alpine fir for 80 km along Highway 37 from Meziadin Lake to the second crossing of the Bell-Irving River and along the Kispiox River at Skunsnat Creek. Other pests which caused light defoliation included blackheaded budworm on alpine fir and white spruce at Morice Lake and Houston, a budmoth on alpine fir at Natlan Creek, conifer sawflies on western hemlock at Burdick Creek, spruce aphid on Sitka spruce on the Queen Charlotte Islands, and leaf beetles on alder near Terrace. Bruce spanworm caused moderate to severe defoliation of aspen and willow at Kitwanga.

Important disease problems included poplar leaf and twig blight of aspen along the Skeena River, the Kispiox River and areas of the Bulkley Valley. Stalactiform rust, western gall rust and Atropellis cankers were common in juvenile spaced lodgepole pine stands at Byman Creek, the Perow Burn, and Ootsa and Goosly lakes. Rodents damaged or killed numerous sapling size lodgepole pine, birch and willow along the Telegraph Creek road and porcupines killed small groups of lodgepole pine in several areas along the Nass and Skeena rivers. Dessication of buds and shoots of spruce and hemlock seedlings caused by frost and wind was common along the Nass River. The needle cast and dieback disease Lophophacidium hyperboreum subsided after infecting white spruce plantations at Gonakwa Creek and Perow Burn the past few years. Foliar diseases such as spruce-Labrador-tea rust on Sitka spruce, Weir's spruce cushion rust and snow blight on white spruce were generally light as the warm dry weather in May and June was not conducive to their intensification. As the 1980 white spruce cone crop was poor, spruce cone rust infections were virtually absent.

The 1980 field season in the Prince Rupert Region extended from May 26 to October 10. The annual aerial detection and sampling surveys of the Queen Charlotte Islands was conducted between July 12 and 16; the coastal region north of Prince Rupert July 17 and the Interior July 29. A total of 14.5 hrs of flying time was logged for these surveys, while 27.6 hours of both fixed wing and helicopter time was provided by the B.C. Ministry of Forests for aerial mapping; flight lines are shown on Map 2.

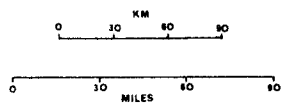
*Survey
approved*

A total of 353 insect and 59 disease collections was submitted to P.F.R.C. by the F.I.D.S. and B.C.M.F.; Map 1 shows the general locations of field collections.



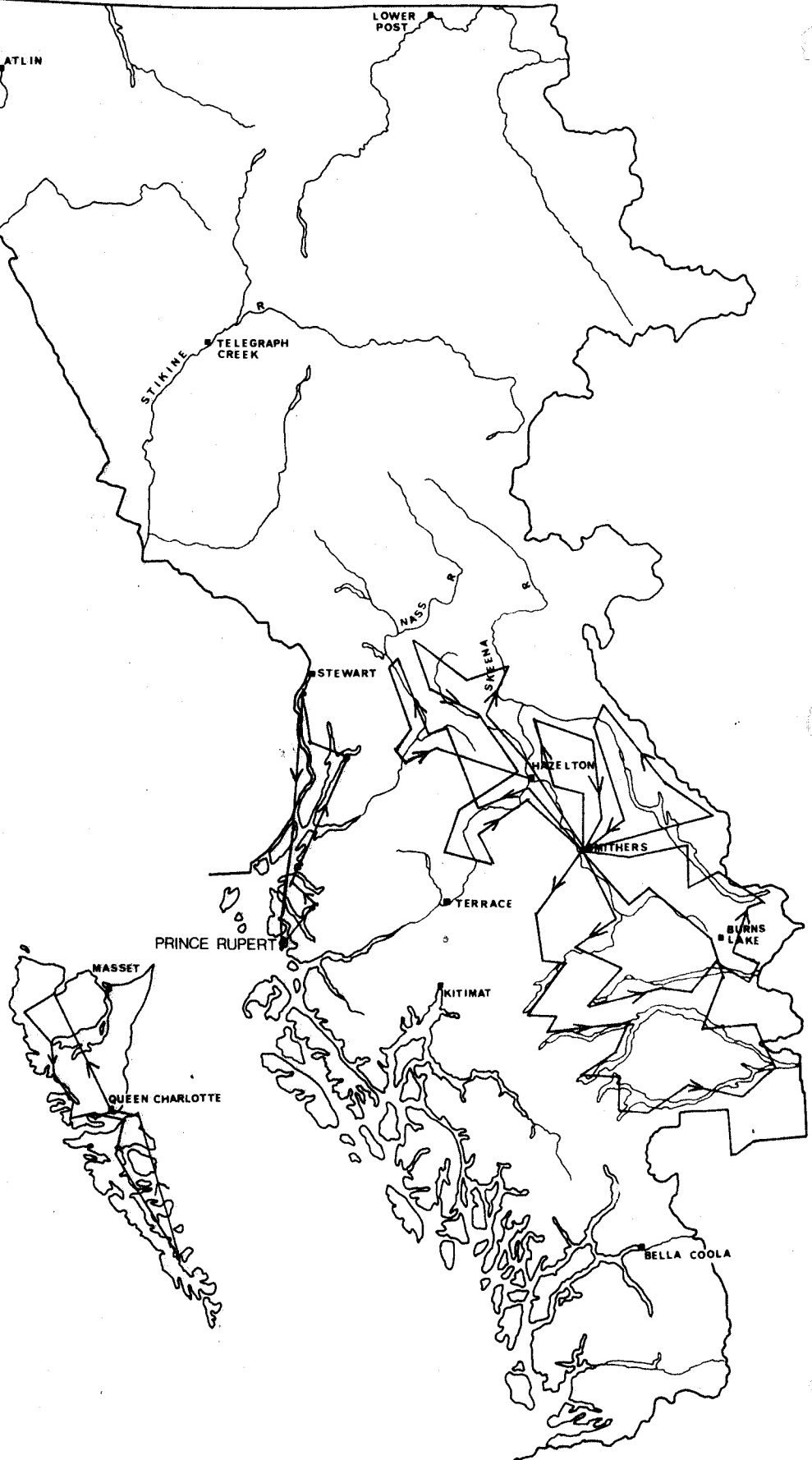
MAP 2

PRINCE RUPERT FOREST REGION



AERIAL SURVEY
FLIGHT LINES

1980



SPRUCE PESTS

Spruce beetle, Dendroctonus rufipennis

Spruce beetle infestations covered some 12 700 ha of mature spruce type in the Prince Rupert Forest Region in 1980 as compared to 11 170 ha in 1979 (Map 3). The largest of 133 infestations covered 1 800 ha at Eutsuk Lake in Tweedsmuir Park, and 1 700 ha of light to moderate infestation south of the Morice River in the Pimpnel - Bill Nye - Tagetochlain lakes area (Table 1). At Tsugwinselda Creek along the Cranberry River a 40 ha patch of severe attack was observed from the air, but difficult access prevented examination of the area.

Intensity of attack^{1/} in infestation areas was 63% light, 30% moderate and 7% severe as compared to 64, 27 and 9% respectively in 1979.

Spruce beetle populations began to build up in 1973 in windfalls, with initial attacks on standing trees probably occurring in 1975, particularly at Smithers Landing. Salvage logging of infested standing and windfall trees commenced in 1977 and continues to date. Severe additional blowdown occurred in November 1978 in the Chapman-Bristol lakes, Walcott and Fulton-Guess lakes areas. Near the Smithers Landing infestation and along the Morice River, 2000 white spruce were felled from 1977 to 1979 as part of a trap tree program by the B.C. Ministry of Forests. Under this program beetle hazard appears to have been successfully reduced in these areas. A similar program on a smaller scale is underway along the Cranberry River; trap logs are expected to be removed prior to the 1981 spring flight period.

In the Prince Rupert Forest Region, spruce beetles normally have a two-year-cycle, i.e., overwinter the first year as a larva and the following winter as an adult, before attacking the following spring. However a small percentage of the brood will mature in one summer, due possibly to favorable climatic factors such as warm temperatures on specific portions of the tree as may be caused by an opening in the forest canopy or by reflected heat.

Assessments of brood and incidence of attack indicated infestations would continue at reduced levels in 1981, precluding any climatic impact such as an extremely cold winter, combined with light snowpack, which has been known to wipe out infestations. However, large beetle broods in blowdown at Walcott could pose a threat to adjacent timber if the wood is not removed prior to the May 1981 spring flight.

Spruce aphid, Elatobium abietinum

Defoliation of shoreline Sitka spruce occurred intermittently from Tlell south to Queen Charlotte City and between Alliford Bay and

^{1/} Light = 2-5% trees in stand killed
Moderate = 6-30% trees in stand killed
Severe = 31+% trees in stand killed

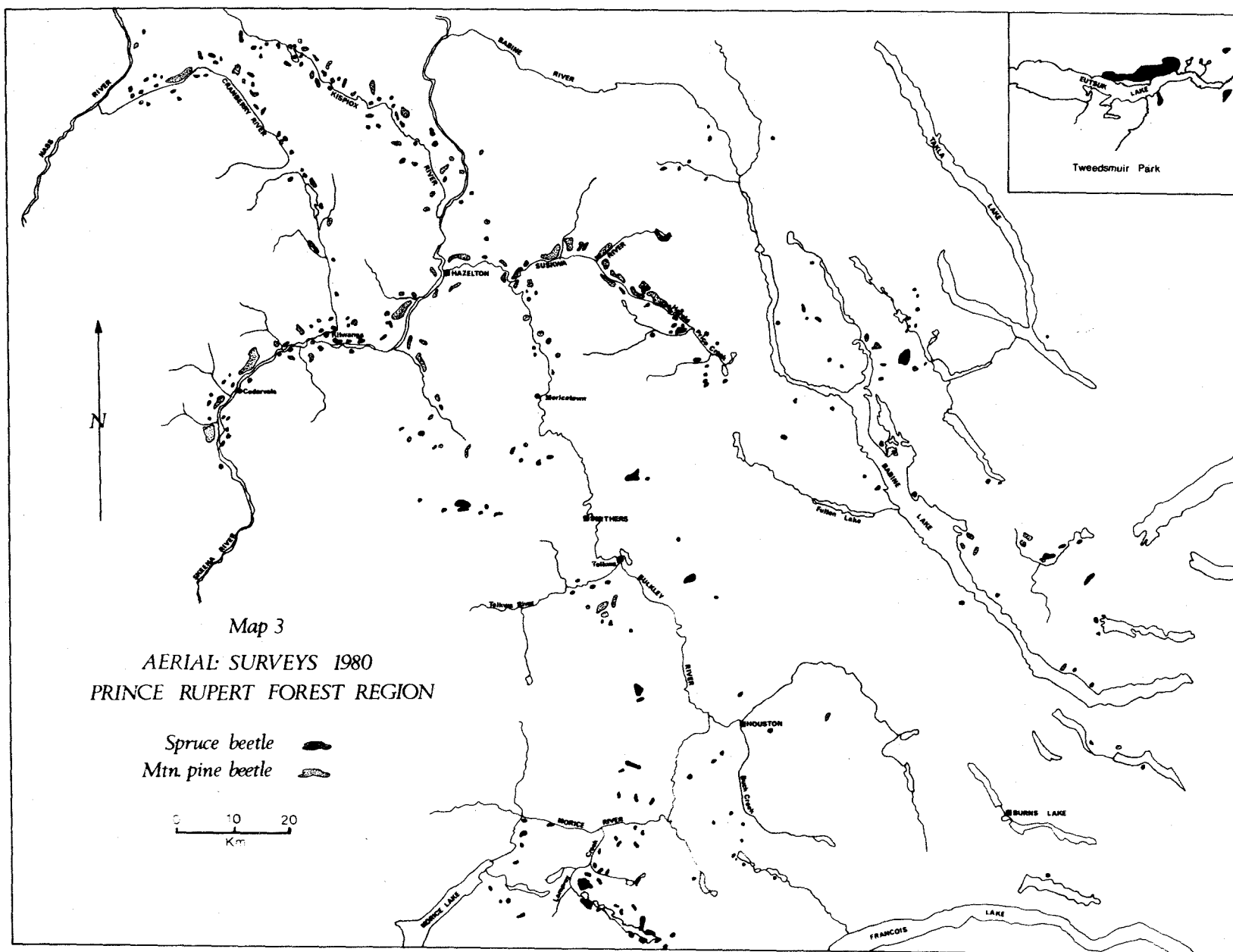


Table 1. Area of spruce beetle infestations in Prince Rupert Forest Region, 1978-80.

Location	Area infested - hectares								
	Light ^{1/}	1978 Moderate ^{1/}	Severe ^{1/}	Light	1979 Moderate	Severe	Light	1980 Moderate	Severe
Eutsuk L (Tweedsmuir Park)							640	300	900
Tagetochlain L							575	500	
Hautet Cr		320		50			700		
Pimpernel Cr		160		120				640	
Houston Tormy Cr							575		
McDonell L							500		
Robin Cr				10			450		
Pimpernel L				120			400		
McBride L	525			180				325	
Bill Nye-Bittern L's			240		180	160	320		
Fleming Cr		1 420		600				320	
Saddle Hill				30			320		
Reiseter Cr	5			400			320		
Morice R (Ldg.)	30			12			320		
Parrott L							65	250	
Owen Cr				12			250		
Steep Canyon Cr				2			250		
Kitsequecla R							250		
Old Fort Mtn	1 000	650		440			200		
Parrott Cr							200		
Tochcha L		140		60			200		
Stephens L							200		
Goathorn Cr							150		
Hautet L				65			130		
Trout Cr				12			130		
Fenton Cr								125	
Pine Cr							125		
Dennis Cr							125		

(Cont'd)

Table 1. Area of spruce beetle infestations in Prince Rupert Forest Region, 1978-80

Location	Area infested - hectares								
	Light ^{1/}	1978 Moderate ^{1/}	Severe ^{1/}	Light	1979 Moderate	Severe	Light	1980 Moderate	Severe
Nanika R.							125		
Phipps L							125		
Lamprey Cr	40			75			125		
Frypan L		365		40			125		
Morice R		320			320		125		
Klate Cr							125		
Blunt Cr					120		125		
Cranberry R							60		40
Hatchery Arm		160		15			70		
Tenas Mtn								65	
Babine L				80			65		
Granisle				80		160	65		
Buck Cr							65		
Bras L							65		
Wan L							65		
Fulton R					120		65		
Torkelsen L	20			375			65		
Natowite L	345	1 400		60			65		
Big Loon L							65		
Footsore L							65		
Flatfish L				15			65		
Deep Cr							65		
Morrison Cr			2 265	50			60		
Totals ^{2/}	1 965	4 935	2 505	2 903	740	320	9 240	2 525	940

- ^{1/} Light = 2-5% trees in stand killed
 Moderate = 6-30% trees in stand killed
 Severe = 31 + % trees in stand killed

- ^{2/} Totals for 1978 and 1979 do not reflect all areas infested as some infestations not listed.

Sandspit. Cumulative defoliation since 1976 has resulted in some minor tree mortality, a few dead tops, and some trees with thinned foliage.

Infestations are expected to continue in 1981 unless reduced by a cold winter.

Cone and Seed Pests

The cone crops on Sitka and white spruce trees were generally poor throughout the Region, after an abundant crop in 1979 and nearly all available seed was infested (Table 2). Cones were suitable for collecting at only one location. In samples of 20 cones from each of five locations the most common insects found were a spruce seed worm, Laspeyresia youngana and a spiral-cone borer, Hylemya anthracina; both infesting all six spruce stands sampled. Less commonly detected insects were: a spruce seed chalcid, Megastigmus piceae, present in four locations; a spruce-cone axis midge, Dasineura rachiphaga, found in three areas; a spruce cone gall midge, Dasineura canadensis, found in two areas; a fir cone worm, Dioryctria abietivorella and a spruce seed midge, Mayetiola carpophaga each present in one location.

Infections of inland spruce cone rust, Chrysomyxa pirolata were light this year, being 9% at Byman Creek, 6% at McKendrick Creek and 4% at Division Lake.

Table 2. Cone damage in the Prince Rupert Region

Tree species	Location	Insect Damage			Area suitable ^{1/} for collection
		Percent cones attacked	Mean no. potential seeds damaged per slice	Mean no. seeds per slice	
White spruce	Paul Fire-Houston	50	1.6	7.0	Yes
	Byman Cr Rd Km 56, Perow	100	9.8	0.7	No
	Division Lk - Burns Lk	100	8.7	0.5	No
	Goosly Lk - Houston	100	8.7	0.2	No
	McKendrick Cr Charman Lk	100	11.6	0.1	No
	Telkwa R - Telkwa	100	15.8	0	No

^{1/} Area unsuitable for collecting if 51% or more cones infested.

LODGEPOLE PINE PESTS

Mountain pine beetle, Dendroctonus ponderosae

Aerial surveys of mountain pine beetle infestations revealed nearly 50,000 lodgepole pine trees killed on 13 200 hectares in 1980 (Map 3). This is a 67% increase over the 30,000 trees mapped on 4 800 hectares in 1979 (Table 3). The largest of 115 infestations in the Region continued in the Harold Price Creek area where 18,700 trees were killed on approximately 1 800 hectares. Other significant infestations include the Skeena River from Doreen to Hazelton, 9,900 trees on 3 900 hectares; Kitwanga, north to Nass River (Vandyke Island) 3,800 trees on 2 000 hectares; Kispiox River, 6,800 trees on 1 900 hectares; Suskwa River Valley, 4,500 trees on 1 200 hectares; Bulkley River Valley, 2,800 trees on 1 000 hectares; Babine Lake area, 2,600 trees on 1 000 hectares. Five small infestations appeared in the Houston area for the first time since the successful control program in 1974-75, and have the potential for spreading into surrounding susceptible stands. The infestation in Harold Price Creek, which has persisted since 1974, intensified in 1980 on the flats above the north side of the creek, and expanded in localized areas along the Fulton River toward Chapman Lake. Removal of infested timber in these areas will proceed this winter. Results of a co-operative survey with B.C. Ministry of Forests personnel, in infested stands above Harold Price Creek indicated an average 13% of stems newly (1980) attacked, whereas; in 1979 the number of current attacked trees was 11% (Table 4). Over a two year period the average stand depletion rate in these infested areas was 12% per year, but this rate may decrease in 1981 as a late beetle flight which results in fewer progeny will reduce the intensity of the 1981 beetle attacks.

Other notable increases occurred at Weegett, Fleming, Morrison and Goathorn creeks and along the Nass River, near Vandyke Island (Table 3). For the first time a few infested trees were found scattered along a lodgepole pine flat, just north of the Vandyke Camp. This is the most northerly occurrence of mountain pine beetle in the Region and requires careful assessment as there is a substantial amount of susceptible host in the area, with a potential for expanding the infestation.

Decreases in the size of infestations, by host depletion apart from logging, occurred at only a few locations. At The Nipples the outbreak declined from 700 trees in 1979 to 480 in 1980 and at Seeley Lake from 300 trees to 270. At Woodcock, the infestation expanded north into smaller, usually less susceptible pines along rocky ledges, however declines are expected soon due to host depletion.

On a cruise strip at Woodcock, 82% of lodgepole pine were gray, 5% were red, 8% were attacked in 1980 and only 5% were healthy (Table 4).

Information from cruise strips and examination of beetle broods indicate infestations will continue to expand in 1981, but at a reduced rate from previous years.

Table 3. Location and numbers of beetle killed lodgepole pine trees in the Prince Rupert Region, 1978-80

Location	Number of dead (red) lodgepole pine			Estimated hectares of infestation, 1980
	1978	1979	1980	
Harold Price Creek	6,500	12,000	18,700	1 800
Kispiox River Drainage				
Ironside Cr			1,400	320
Elizabeth L			1,120	280
Murder Cr			670	20
Tenas Hill			650	250
Clifford Cr			540	180
Pinenut Cr			300	80
Flatfish L			300	70
Sammon L			270	110
Date Cr			250	80
Affleck L			250	50
Shegunia R			200	50
S. of Elizabeth L			170	90
Kline L			150	60
Cullon Cr			130	50
Swordgrass L			130	100
Opp. Sterritt Cr			120	40
Skunsnat Cr			90	80
Sunday L			50	30
Utsum Cr			40	30
Corral Cr			10	2
Kispiox River (Total)	1,200	3,600	6,840	1 972
Suskwa R Valley	1,600	3,200	4,500	1 200
Lorne/Quill crs	2,000	1,350	2,100	445
Nash-Y (Opp. Carnaby)	1,400	2,000	1,740	610
Woodcock	3,000	1,000	1,600	300
Weegett Cr	1/	250	1,000	140
Fleming Cr	-	350	960	290
Morrison Cr	-	400	900	380
Goathorn Cr	-	40	670	250
Price Cr	1,100	290	540	320
Vandyke	60	120	530	360
(Nass R)				
Calmin Cr	1/	150	500	230
The Nipples	350	700	480	270
Insect Cr	280	165	400	320

(Cont'd)

Table 3. (Cont'd)

Location	Number of dead (red) lodgepole pine			Estimated hectares of infestation, 1980
	1978	1979	1980	
Douse L/Douse Cr	<u>1/</u>	780	390	230
Two Mile Cr	-	-	340	70
Mill Cr	200	150	320	250
Sedan Cr	50	60	320	220
Four Mile Mtn	180	250	300	60
Beament	150	100	300	80
Juniper Cr N	250	125	280	120
Seeley L	600	300	270	80
Wilson Cr	60	60	260	120
Telkwa R	-	-	240	100
Blunt Cr	-	-	240	60
Kitwanga L	350	290	225	100
South Hazelton	150	150	220	100
Big Loon L	-	70	210	100
Burns L	-	-	210	110
Nass R (Micro Wave)	-	-	200	50
Boulder Cr	-	130	190	50
Keynton L	50	25	190	80
Boling Point	50	100	180	60
Flint Cr	200	170	170	190
Cranberry Jct.	<u>1/</u>	35	150	70
Kitsequecla R	-	-	140	70
Derrick Cr	<u>1/</u>	70	135	50
Sharpe Cr	20	150	120	50
Andimaul	-	-	120	110
Opp. Cedarvale	120	40	110	130
Kitwanga L	350	290	110	150
Sideslip L	-	-	110	65
Dungate Cr	-	-	100	40
Opp. Seaton	-	-	100	20
Natowite L	-	-	100	30
Bulkley Canyon	130	50	100	80
Juniper Cr S	-	-	100	50
Moonlit Cr	70	10	90	40
Tsugwinselda Cr	<u>1/</u>	120	90	100
Howal Cr	-	-	90	40
Kitsequecla L	10	30	80	50
Holland L	-	20	70	30
Pierre Cr	40	50	70	40
Doughty	-	-	60	50
Kitwanga	50	5	60	30
Boulder Cr W	-	-	50	90

(Cont'd)

Table 3. (Cont'd)

Location	Number of dead (red) lodgepole pine			Estimated hectares of infestation, 1980
	1978	1979	1980	
Ginmiltkun Cr	-	-	50	30
Cranberry Jct.	1/	35	50	15
Sterrett Island	-	20	50	15
Newman Peninsula	-	100	50	15
Sandstone Cr	-	-	50	20
Kitwancool Cr	120	15	50	110
Gullwing Cr	-	-	40	20
Peacock Cr	-	-	40	20
Hudson Bay Mtn	-	-	40	10
Nine Mile Cr	-	-	40	60
E. Derrick Cr	-	-	40	30
Cottonwood Island	-	-	40	20
S. Kitwanga	50	60	40	80
Specularite L	-	-	40	15
Doreen	50	40	30	15
Burdick Cr	50	40	30	10
Smithers Ldg	-	-	30	15
Opp. S. Hazelton	-	-	30	10
Heading Cr	-	-	30	20
Graphite Cr	-	-	20	5
Mathews L	-	-	20	5
Augier L	-	-	20	5
Taltapin L	-	-	20	5
Meed Cr	-	-	20	5
Trout Cr	-	20	20	5
Porkchop L	-	-	20	5
Luhk Cr	-	-	20	5
Ross L	50	50	20	10
Andimaul S.	-	-	20	10
Borden L	-	-	20	15
N McNight L	-	-	20	15
Kitwanga N	-	-	20	15
Carnaby	-	10	20	5
Opp Woodcock	-	-	15	20
Doris L	-	-	15	5
Kwun Cr	-	10	10	5
Taltzen L	-	-	10	5
Reiseter Cr	-	-	10	5
Wilkinson Bay	-	20	10	5
Canyon Cr	-	-	10	5
NW Froggy L	-	-	10	5
TOTALS	20,890 ^{2/}	29,665	49,810	13 197

1/ The Cranberry River area was not flown in 1978 due to inclement weather.

2/ Not all areas included in 1978 count.

Table 4. Status of lodgepole pine as determined by prism plots in stands infested by mountain pine beetles, Prince Rupert Forest Region, September, 1980.

Location	No prism plots/trees	Percentage of stems									
		Healthy ^{1/}		Current ^{1/}		Red ^{1/}		Partial ^{1/}		Gray ^{1/}	
		1979	1980	1979	1980	1979	1980	1979	1980	1979	1980
Woodcock	12/38	13	5	0	8	27	5	0	0	60	82
Upper Kispiox Ford Recreation Site	8/20	40	20	10	20	10	13	10	7	30	40
Clifford Cr (Kispiox R)	16/39	35	22	46	7	12	48	0	3	7	20
Shegunia R	12/29	48	52	14	0	35	12	0	4	3	32
Harold Price Cr	30/161	87	-	11	-	1	-	0	-	1	-
Harold Price Cr (S of Natatzul Cr)	41/115	-	85	-	11	-	2	-	0	-	2
Harold Price Cr (S of Maish Cr)	37/112	-	52	-	34	-	10	-	2	-	2
Harold Price Cr (S of Pask Cr)	33/134	-	91	-	4	-	2	-	2	-	1
Harold Price Cr (W of Maish Cr)	56/120	-	95	-	2	-	2	-	0	-	1
Telkwa (powerline)	47/155	-	75	-	18	-	5	-	1	-	1

^{1/} Current - attacked in 1980

Red - attacked and killed in 1979

Partial - 1980 attack on only one side of tree

Gray - Killed in or prior to 1978.

ALPINE AND AMABILIS FIR PESTS

Western balsam bark beetle complex, Dryocoetes confusus -
Ceratocystis dryocoetidis complex

This beetle-fungus complex killed an estimated 8,000 alpine fir in high elevation interior stands in the Region as compared to 7,000 in 1979, 8,300 in 1978 and 2,700 in 1977. Numbers of beetle-killed trees recorded vary annually due to limited aerial coverage rather than biological cycle. Some of the more noteworthy infestation areas and the numbers of trees killed were: McKendrick Pass, 1,250; Howson Creek, 1,200; Eutsuk Lake (Tweedsmuir Park), 1,100; Dome Mtn, 600; Nanika River, 500 and McDonnell Lake, 300.

Two-year-cycle spruce budworm, Choristoneura biennis

Spruce budworm defoliated up to 90% of the current years foliage of mature and overmature alpine fir and white spruce in stands along Highway 37, from the second crossing of the Bell-Irving River south to Meziadin Lake. However, total defoliation per tree was light, averaging only 5%. Light defoliation also occurred at Skunsnat Creek in the Kispiox River Valley. Elsewhere, larvae were common in interior portions of the Region, with 33% of collections being positive, averaging six larvae each as compared to only two in 1979.

Pheromone attractant traps baited with trans 11-tetra decenal were used to assess adult male budworm populations at six locations (Table 5).

Table 5. Average number of adult male spruce budworm per trap, Prince Rupert Forest Region 1972-80.

Location ^{1/}	Average Counts Per Trap								
	1972	1973	1974	1975	1976	1977	1978	1979	1980
Skunsnat Cr	69	3	-	(75)	17	(37)	116	(135)	84
Doris Lake	8	5	-	(74)	34	(23)	56	(64)	4
Telkwa R	-	-	-	1	3	1	8	2	62/
W Morice R	2	2	18	5	3	4	14	(8)	3
Babine R	-	-	-	-	-	-	-	(64)	44
Augier L	-	-	-	-	-	-	-	(11)	2

^{1/} 15 traps per location

^{2/} 4 of 15 traps destroyed by bears.

The number of moths captured in 1980 is considerably less than in 1979 even though 1980 was a flight year when larger moth flights would

be anticipated. Thus far it is difficult to establish a relationship between numbers of male moths trapped and subsequent population, especially since some confusion exists as to species identification.

As in 1979, 3 pheromone strengths were tested at the 6 trap locations to determine the most effective concentration required for attracting male moths at various population levels (Table 6).

Table 6. Comparison of effectiveness of various pheromone concentrations for trapping of spruce budworm sp. male moths, Prince Rupert Region 1980.

Location	Total Numbers of Moths Pheromone Concentration		
	.001	.01	.1
Skunsnat Cr	279	582	392
Doris L	0	1	51
Telkwa R	<u>1</u> /	0	18
W. Morice R	4	5	31
Babine R	56	251	341
Augier L	0	3	21

1/ Traps destroyed by bears.

Due to different sets of pheromone concentrations used in 1979 and 1980, direct yearly comparisons cannot be made of trap results.

Flight years are normally even years (1980), and eggs laid at that time hatch to produce larvae that overwinter in hibernaculae. Early instar larvae mine needles and buds during summer 1981, and overwinter as 4th instar larvae, completing their development by early summer 1982. Feeding damage caused by the early instar larvae in 1981 should be less noticeable than that caused by mature larvae in 1980.

A one-year-cycle spruce budworm, Choristoneura orae

Light defoliation of amabilis fir was evident in the Kitimat Valley for the first time since 1969, when moderate to severe defoliation occurred near Kitimat. The current years growth was up to 50% defoliated in the upper crowns of overmature amabilis fir in leave blocks at Onion Lake and Hirsch Creek. As most feeding occurred in the upper crowns, there was no damage to understory regeneration where beating samples contained 10 or less larvae. Elsewhere along the Kitimat River Valley larvae were common, averaging 1 or 2 per sample.

Previous history of epidemics in the area (1960-63 and 1968-69) suggest a continuation of above normal populations and the possibility of increased defoliation intensity for 1981.

A budmoth on alpine fir, Zeiraphera sp.

This budmoth defoliated 10-30% of the 1980 foliage of a few trees at Natlan Creek, and was common throughout interior portions of the Region.

Fir-fireweed rust, Pucciniastrum epilobii

New growth of alpine fir was infected up to 100% along Morice Lake road. Infections were light to moderate at Rainbow and Nadina lakes, Byman Creek and at Topley.

WESTERN HEMLOCK PESTS

Ambrosia beetles, Trypodendron lineatum and Gnathotrichus sulcatus

Ambrosia beetles infested approximately 80% of large diameter western hemlock, amabilis fir and Sitka spruce blowdown over 1200 ha along the Kitsault River, 140 km north of Prince Rupert. The trees were windthrown in the Fall of 1978, and the beetle population built up during 1979-80. Both species of beetles, T. lineatum and G. sulcatus were found, but the former accounted for 80-90% of the population.

The intensity of attack throughout the area was moderate, averaging 15-20 entrance holes/0.1 m², however some large diameter stems contained up to 50 entrance holes/0.1 m².

The infestation was of major concern to a logging company that was exporting the wood as whole logs to Japan.

Severe attack also occurred on sawlogs in log storage areas at Kitimat and Juskatla; the problem was created by the availability of suitable overwintering sites and high log inventories during the early flight period. (Pest Report - "Ambrosia beetles in blowdown timber along Kitsault River, Prince Rupert Region," H. Peter Koot, June 23, 1980 - Appendix 1).

Green-striped forest looper, Melanolophia imitata

Larval populations on western hemlock and western red cedar increased for the third consecutive year, especially along coastal portions of the Region, but there was no defoliation.

The percentage of three-tree-beating samples containing larvae on western hemlock increased to 46% in 1980 from 33 in 1979 and the average number of larvae per positive sample went from two to four (Figure 1).

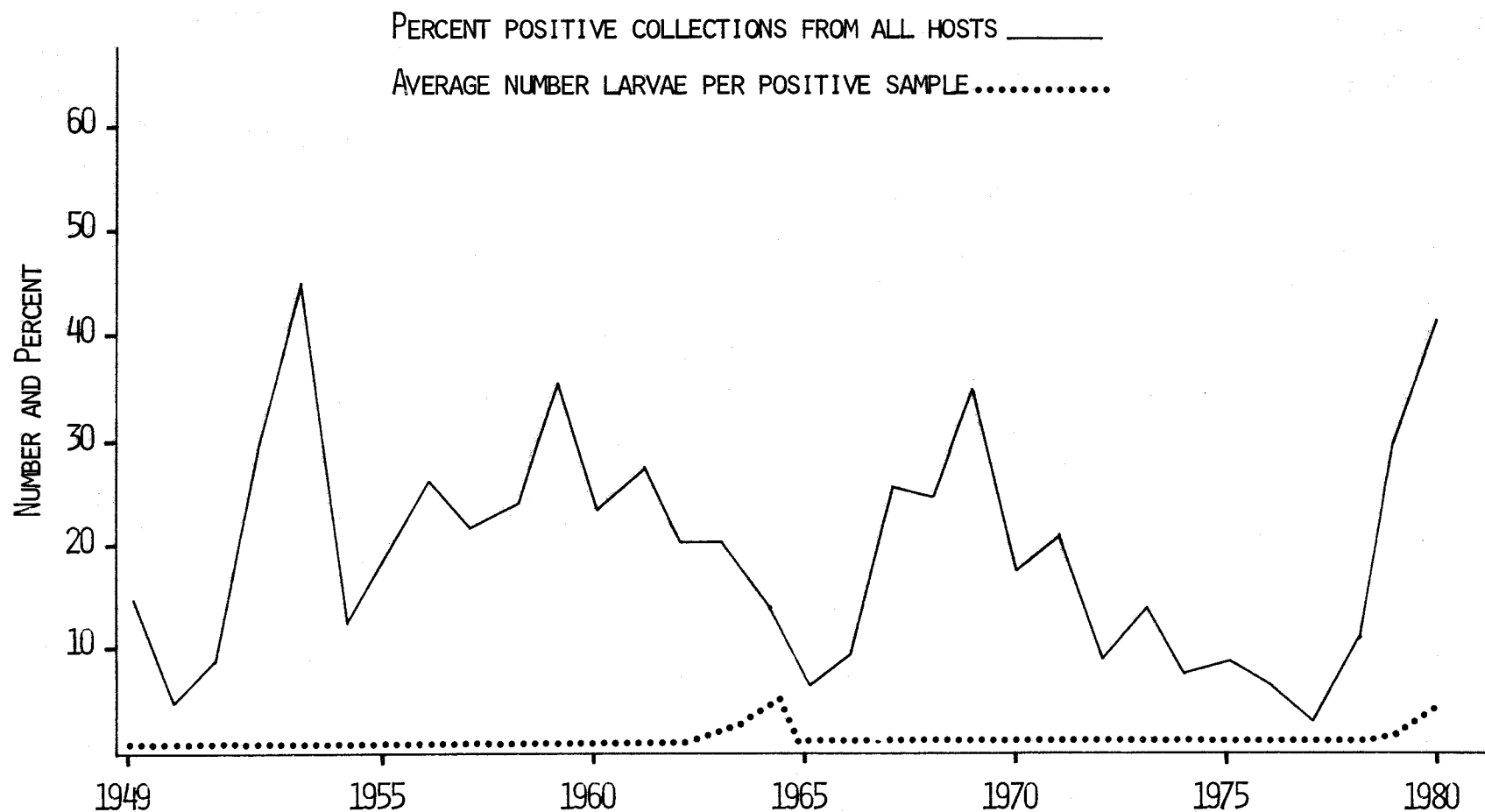


FIGURE 1. THE PERCENT POSITIVE COLLECTIONS FROM ALL HOSTS(WH,WC,SS,WS,AF,ALF) AND THE AVERAGE NUMBER OF GREEN-STRIPED FOREST LOOPER, MELANOLOPHIA IMITATA LARVAE PER POSITIVE SAMPLE, PRINCE RUPERT FOREST REGION, 1949-1980.

The highest populations, 43 larvae per sample, were on western red cedar at Giekie Creek on Graham Island, where severe defoliation and tree mortality occurred on 14 000 hectares in 1963 and 1964. Larvae were most numerous on the mainland at Tuck Inlet (23 larvae/sample) and between Prince Rupert and Terrace (up to 16 larvae/sample).

Past infestations on the west coast of Vancouver Island, in 1960; Queen Charlotte Islands from 1963-64 and in the Quatsino region from 1968-69 were characterized by rapid population increases resulting in severe defoliation in scattered isolated areas for one or two years, followed by the sudden collapse of populations. Based on historical and current data the populations may reach infestation levels in 1981.

Blackheaded budworm, Acleris gloverana

Blackheaded budworm larvae lightly defoliated up to 80% of the new growth of 50% of the branch tips of immature alpine fir, for a half km along the Morice FDR and at Byman Creek. Elsewhere in the Eastern portions of the Region there was minor feeding on alpine fir and white spruce at Fulton River and Chapman, Morice, and Pinkut lakes. There was no defoliation of western hemlock in coastal areas of the Region.

Larval populations were generally at endemic levels, with 13% of all beating samples containing an average of 5 larvae each (Figure 2).

Two plots of 100 trees each at Kwaikans Island and Deena Creek on Queen Charlotte Islands, established in 1974 and 1976 to study the effects of successive years of defoliation on western hemlock were re-examined. Cumulative tree mortality as a result of severe budworm defoliation in 1973 and 1974, was 68% on immature hemlock at Kwaikans Island and 34% in a mature stand at Deena Creek, which is an increase of 1% at each location over 1979. The increase in breakage and numbers of windthrown green trees was particularly noticeable at Kwaikans Island in 1980 and is probably due to winds penetrating the stand severely thinned by tree mortality.

Larval populations are expected to continue at endemic levels in 1981 without causing significant defoliation.

Historically, blackheaded budworm populations in coastal hemlock forests in the Prince Rupert Region, last from one to four years. The first recorded outbreak occurred in 1931 on the Queen Charlotte Islands, while the most recent epidemic began in 1972 on the Queen Charlotte Islands and adjacent mainland and collapsed in 1975. Mortality resulting from this latest outbreak was restricted to young growth hemlock on Kwaikans Island mature hemlock along Deena Creek and scattered individual trees along coastal inlets south of Prince Rupert.

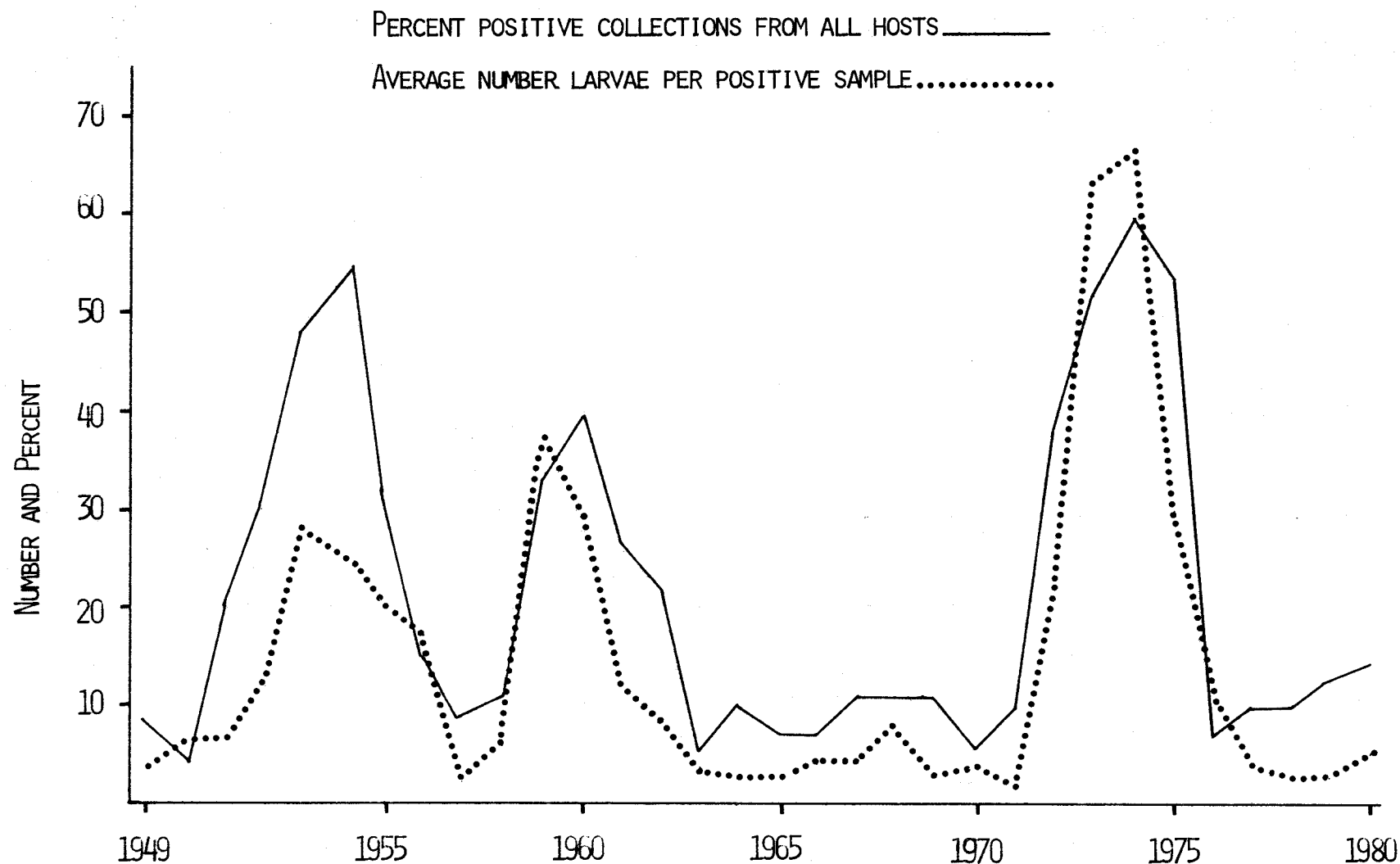


FIGURE 2. THE PERCENT POSITIVE COLLECTIONS FROM ALL HOSTS (WH,WC, AF,ALF,WS,SS) AND THE AVERAGE NUMBER OF BLACKHEADED BUDWORM, ACLERIS GLOVERANA LARVAE PER POSITIVE SAMPLE, PRINCE RUPERT FOREST REGION, 1949-1980.

Saddleback looper, Ectropis crepuscularia

Populations of saddleback loopers on western hemlock, Sitka spruce and western red cedar, increased significantly on the Queen Charlotte Islands, but there was no defoliation. The average number of larvae per positive sample increased to 12 in 1980 from 3 in 1979. The highest populations occurred along Dolomite Narrows (42 larvae), and at Rennell Sound (33 larvae) and were frequently found associated with Melanolophia imitata. Only one larva was found in collections from the vicinity of Kitimat, site of a former infestation in 1960 and 1961.

No defoliation is expected in 1981, but populations of this insect are capable of building up rapidly.

Conifer sawflies, Neodiprion sp.

Conifer sawflies defoliated up to 10% of the old growth of understory western hemlock between Burdick and Hazelton creeks. Elsewhere sawfly larvae were common in low numbers.

Hemlock dwarf mistletoe, Arceuthobium tsugense

Moderate to severe mistletoe brooming and stem swellings were common in mature western hemlock stands along Hoodoo Lake road and sections of the Kinskuch River road in the Nass Valley. Mistletoe did not yet appear to be a problem in adjacent recently regenerated areas. South of Greenville, severely infected residuals, left after logging, and infected perimeter trees pose a threat to future regeneration.

Minimizing the effect and occurrence of dwarf mistletoes through sanitation practices in juvenile spacing programs, received increased emphasis in the Region this year, and will assist in reducing the incidence of the parasite in the future.

PEST CONDITIONS IN NATURAL AND MANAGED SECOND GROWTH STANDS AND PLANTATIONS

Thirty-one plantations and managed stands were examined specifically to identify pest problems occurring naturally or influenced by stand treatment procedure. Only 10% of these were free of pests, 74% had disease problems, 35% had insect problems only and 20% had both (Pest conditions in natural and managed second growth stands and plantations, Prince Rupert Forest Region, 1980, Appendix 2).

Young lodgepole pine stands were basically free of insects, but diseases such as western gall rust, Endocronartium harknessii; stalactiform blister rust, Cronartium coleosporioides and Atropellis

canker of pine, Atropellis piniphila were a major concern in 75% of managed lodgepole pine stands examined.

The most common and injurious pest of spruces was the aphid, Pineus spp., which forms galls on branches and often severely stunts trees; found in 33% of spruce areas examined. Recognition of these problems prior to stand treatment is important, as lack of assessment could lead to understocking of crop trees in spaced stands when trees die or are devalued.

In addition to examination of specific plantations and managed stands assessments were also made at random in areas with historically chronic problems, in which the following pests were recorded:

A spruce tip moth, Zeiraphera pacifica

Tip damage to leaders and laterals of Sitka spruce regeneration was greatly reduced in a 54 ha pre-commercially thinned stand at Deena Creek on Moresby Island. Terminal damage was light this year and less than 15% of lateral buds were damaged, however alterations in form and height growth has been a problem since 1976. Based on historical data which indicates a five year damage period, spruce tip moth populations should continue to subside in 1981.

Bud necrosis, Camarosporium strobilinum

First noticed in 1976 at Division Lake, this bud fungus has again infected lateral and terminal buds on 12% of white spruce in this nine year old plantation. Prior to 1979, the disease had been restricted to damaging only leaders. At Ganokwa Creek, 9% of 300 trees examined in an eight year old plantation had bud damage to leaders and laterals; 35% of those previously attacked produced new leaders, but they formed as forked tops.

Table 7. Bud necrosis on white spruce plantations,
Prince Rupert Forest Region - 1980.

Location	Age of trees	Percent trees infected				
		1976	1977	1978	1979	1980
Division Lake	9	80	34	34	60	12
Ganokwa Creek	8	<u>1</u> /	38	16	21	9

1/ Not examined

The low incidence of infection in 1980 is probably due to the warm dry conditions during May and June which did not favor the fungus.

Spruce weevil, Pissodes strobi

Spruce weevil infested 50 (6%) of 800, 9-year-old Sitka spruce planted on .6 ha near Kseadan Camp along the Nass River.

Spruce Labrador-tea rust, Chrysomyxa ledicola

Rust infections on foliage of Sitka spruce were light between Tlell and Masset after four years of severe infection. Aside from possible increment loss, there is little evidence of permanent damage.

Severe infections occurred on white spruce at Taltapin Lake.

Snow blight, Lophophacidium hyperboreum

No snow blight was found on young white spruce at the Perow Burn and Chapman Lake after five years of moderate to severe infection.

Warren's collar weevil, Hylobius warreni

This weevil killed up to 5% of seedling size to 15 year old lodgepole pine in small scattered groups of 2 to 5 trees at the Perow Burn, Nilkitkwa Lake and in several plantations along the Nass Road near Kiteen River. In addition to tree mortality, partial girdling of the root collar may cause growth loss and provide an important avenue of infection for root-rotting and staining fungi.

Rodent damage

Numerous seedling to sapling size lodgepole pine, birch and willow were killed for about five km along Telegraph Creek Road by rodents girdling stems and lateral branches from 15 cm to 2 M above ground level. Rabbits which were very common in the area were thought to be responsible for much of the debarking damage below 50 cm.

Porcupines killed immature lodgepole pine above Canyon City and the mouth of Kinskuch River. Damage occurred in scattered patches along exposed rocky terrain, usually affecting less than 20% of trees in stand.

Stalactiform blister rust, Cronartium coleosporioides

At Byman Creek stem infections occurred on 62% of 100, 15 year-old lodgepole pine, while 19% had branch infections. Less than 10% of trees were infected at Ootsa and Goosly lakes.

Western gall rust, Endocronartium harknessii

Branch and stem galls occurred on 90% of 30 year old lodgepole pine along the Poplar Lake Park road.

A needle cast of lodgepole pine, Lophodermella concolor

Light infections were found on 30% of lodgepole pine in a 14 ha plantation at Erlandsen Creek and on 10% of shore pines at Oliver Lake Park.

DECIDUOUS TREE PESTS

Bruce spanworm, Operophtera bruceata

Defoliation of trembling aspen and willow occurred for 3 km along Kitwanga-Hazelton road east of Kitwanga. Severe defoliation, up to 100% on individual trees, occurring in 5 to 10 ha patches was caused mainly by the Bruce spanworm, but other cutworm and sawfly larvae also contributed to the defoliation. Light defoliation was confined to a few 1 to 5 ha areas near Hazelton and south of Kitwanga Lake. Poplar leaf and twig blight, Venturia macularis often occurred in the same areas. With the exception of some minor branch dieback, most trees should recover.

No defoliation was observed between Smithers and Burns Lake where small 5-20 ha patches of aspen were defoliated in 1979.

Poplar leaf and twig blight, Venturia macularis

This blight lightly discolored trembling aspen foliage in the Bulkley Valley from Burns Lake to Cedarvale, for the fourth consecutive year. Light to moderate browning of aspen occurred in small scattered patches of usually 5 ha or less near Kitwanga, from Nass Camp to Cranberry Junction, along the Kispiox and Telkwa rivers, and at Deep Creek. Most trees fully refoliated by mid-summer, but at Deep Creek foliage remained thin.

A Chrysomelid leaf beetle, Pyrrhalta punctipennis

Leaf beetles lightly skeletonized roadside willow and alder in scattered patches along Lakelse and Gainor lakes.

Striped alder sawfly, Hemichroa crocea

Roadside alders, near Skidigate Mission, were lightly defoliated for the third consecutive year, but damage was much reduced from previous years.