FIDS Report 95–7

Forest Insect and Disease Conditions Yukon Forest Region - 1994

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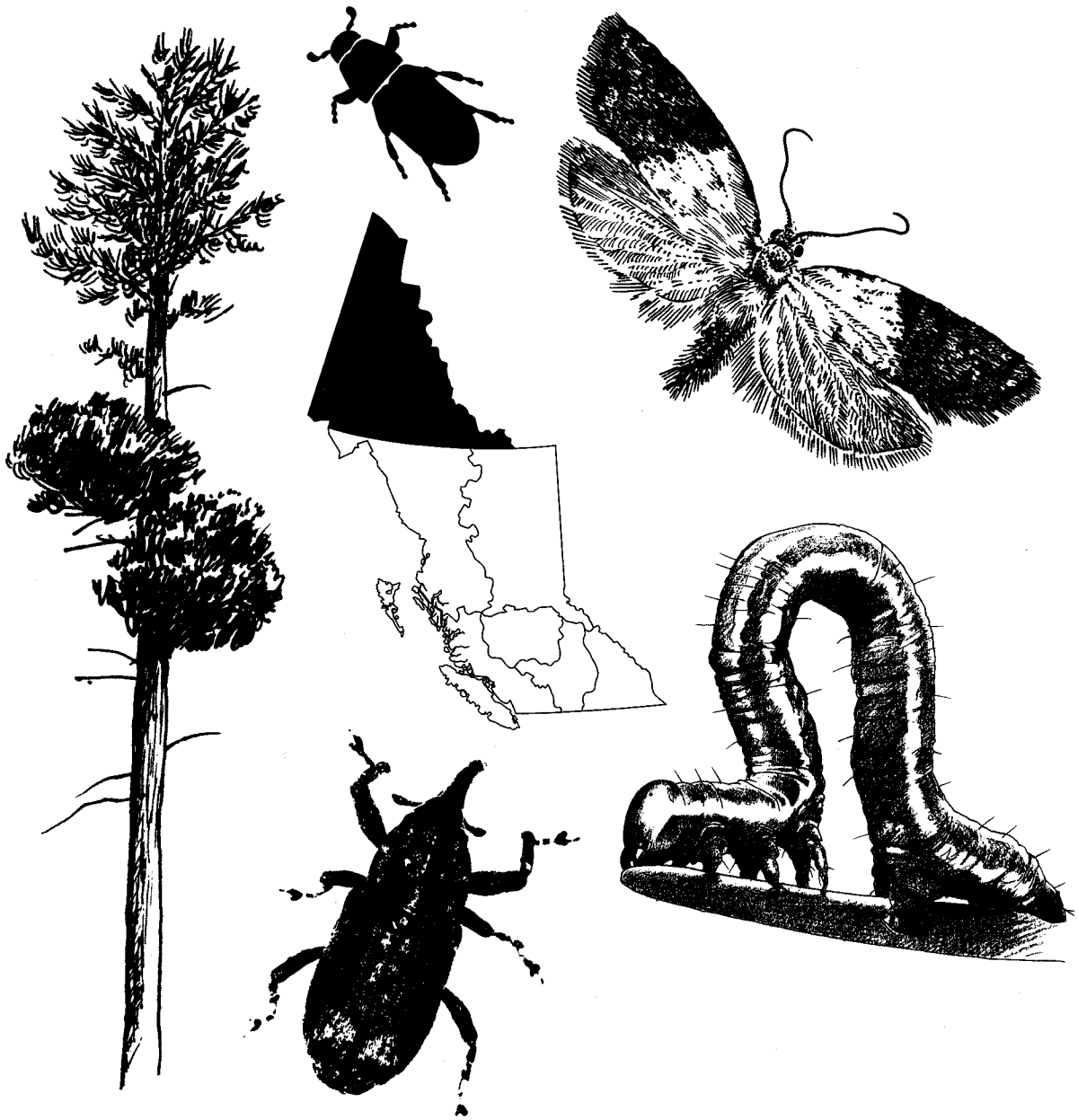
Canadian Forest Service - Pacific and Yukon Region



Natural Resources Canada
Canadian Forest Service
Pacific and Yukon Region

Ressources naturelles Canada
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Contents

Foreword

Forest Insect and Disease Survey (FIDS) is a nation-wide network within Natural Resources Canada, with the responsibility of: (1) producing an overview of forest pest conditions and their implications, including predictions where possible; (2) maintaining records and surveys to support quarantines; (3) supporting forestry research with field studies, records and Herbarium and Insectary collections; (4) providing advice and extension on forest insect and disease conditions; (5) developing and testing survey techniques; (6) and conducting related biological and impact studies.

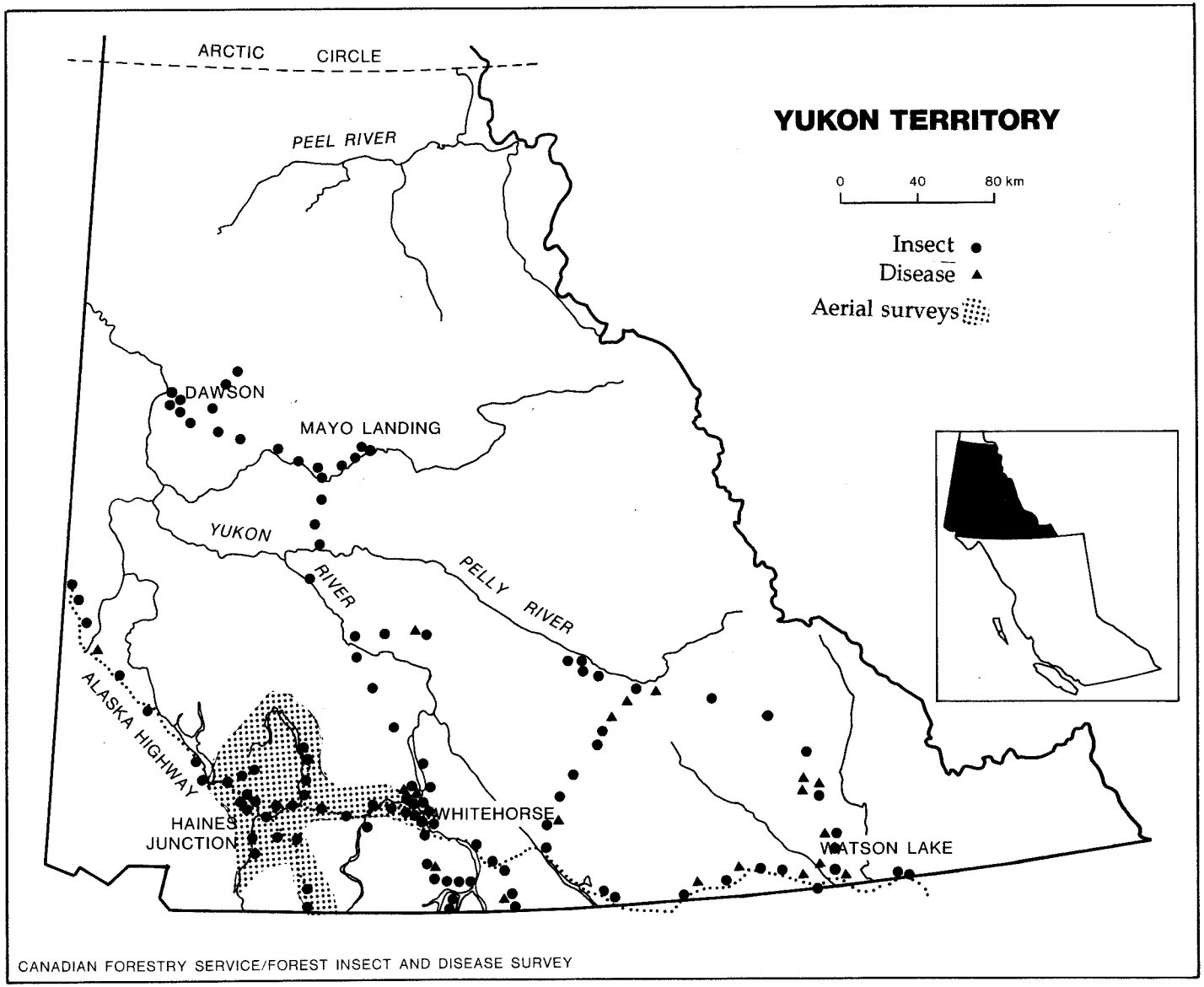
Introduction

This report summarizes forest insect and disease conditions in the Yukon Territory in 1994. Pests are listed by host with emphasis given to those capable of sudden damaging outbreaks.

During the 14-day survey in late June, and a subsequent survey in early August, over 60 insect and disease collections were made at permanent sample sites and pest-affected stands (Map 1) throughout the southern Yukon.

Yukon Forest Service staff were contacted at Whitehorse, Haines Junction, Watson Lake, Dawson City, Beaver Creek and Mayo to inform them of FIDS work plans and to exchange information about current forest pest activities. Discussions were held with Parks Canada administrative and field staff in both Whitehorse and Haines Junction with respect to pest problems within the proposed Chilkoot Pass National Park, and Kluane National Park.

Ongoing liaison with National Parks and Forest Resources personnel in both Whitehorse and Haines Junction has been maintained in order to survey, evaluate and plan strategies to deal with spruce beetle infestations in the Haines Junction area and Kluane Park. Yukon Forest Resources division of the Department of Northern Affairs provided resources including 4.5 hours of helicopter and over 3 hours of fixed wing aircraft time for aerial and ground surveys of infested areas. Parks Canada provided an additional 2 hours of helicopter time to evaluate infestations within Kluane Park. The participation and aid of these agencies is gratefully acknowledged.



Map 1. Locations where one or more insect and disease samples were collected and area surveyed by air. Yukon Territory 1994.

Summary

Spruce beetle-caused white spruce mortality was mapped over nearly 33 000 ha in the Shakwak Valley north of Haines Junction, adjacent to the south end of Kluane Lake and in the Alsek River drainage in Kluane National Park.

Eastern spruce budworm continued to defoliate white spruce in the Liard River drainage, most significantly in the LaBiche River area.

For the third consecutive year, **pine needle cast** caused light-to-severe discoloration of year-old needles on lodgepole pine over a broad area centered at Watson Lake. Two species of **pine needle blight** were collected for the first time in the Yukon. Attacks by the **lodgepole terminal weevil** remained low throughout the southeast Yukon, with the single exception of a stand along the Atlin Road near the Yukon-B.C. border where 10% of terminals were killed.

Populations of **larch sawfly** remained low with just scattered trace levels of early season oviposition noted.

An annual survey within a joint **Canada-Sweden co-operative growth trial** at Takhini found tree survival in lodgepole pine and Siberian larch plots to be similar to 1993, with the vigour of most trees improving steadily. **Comandra blister rust** was found on some lodgepole pine plot trees for the second consecutive year. A low incidence of tree mortality caused by the disease was recorded for the first time.

No changes were found during an annual condition assessment within the long-term study plot established in 1992 in the Takhini Forest Reserve, to monitor the effects of airborne pollutants on forest health. The study is part of the a **National Biomonitoring System** (formerly called the **Acid Rain National Early Warning System**), and is one of a growing number established nationwide.

Winter cold, in some areas in combination with **calcium salt** used for dust suppression, is suspected to be responsible for chronic dieback and foliage loss of white spruce and other coniferous and deciduous species, in many areas.

For the sixth consecutive year, **large aspen tortrix** caused widespread defoliation of trembling aspen. The damage was much more widespread but less severe than in previous years.

A summary of the incidence of **other noteworthy pests** is included in Table 4, at the end of this report.

Spruce Pests

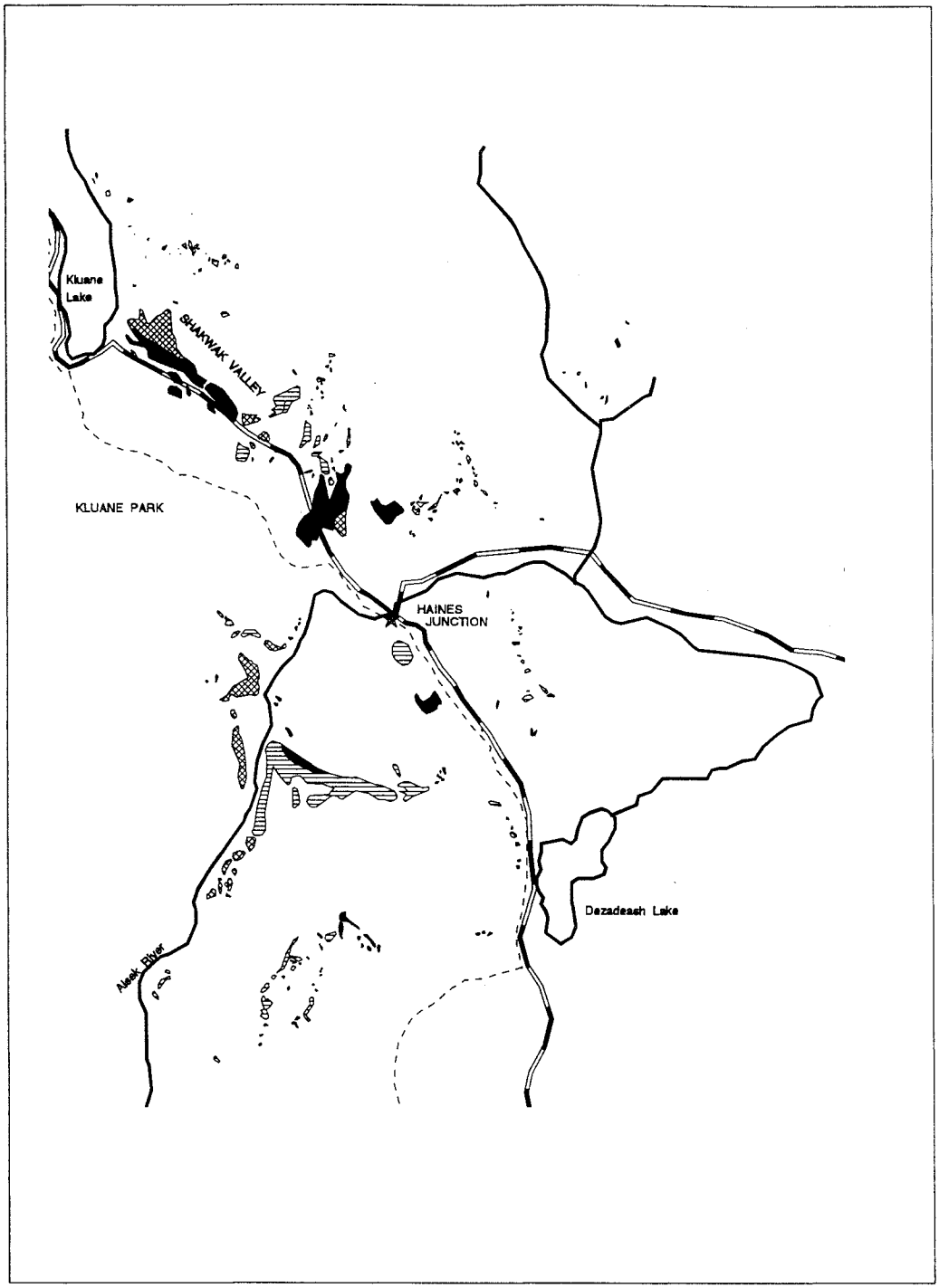
Spruce beetle
Dendroctonus rufipennis

For the first time since the late 1970s significant white spruce mortality caused by spruce beetle has been recorded in the Yukon. During aerial surveys in June and August of this year, recent white spruce mortality was mapped over an area of 33 000 ha, primarily in the Alsek River Valley and side drainages within Kluane National Park, and in the Shakwak Valley between Haines Junction and Kluane Lake (Table 1, Map 2). The current infestations are far more widespread and severe than any recorded in the last 50 years.

Table 1. Location, area and severity of spruce beetle infestations recorded during aerial surveys in the Yukon Territory 1994.

Location	Area (ha) by Severity Class[1]			
	Light	Moderate	Severe	Total
Kluane National Park				
Alsek River	4500	4000	750	9250
Kathleen Lakes	3700	-	-	3700
Mush and Bates lakes	1300	-	500	1800
Quill Creek	950	-	500	1450
Shakwak Valley and areas to the east				
Kloo Lake/Kluane Lake area	1500	3200	3900	8600
Bear Creek	700	600	4200	5500
Marl Creek - Garnet Creek	300	40	600	940
Marshall Creek	150	150	-	300
Aishihik River	100	10	60	170
Taye Lake	-	200		200
Granite Lake	450	-	-	450
Dezadeash Lake	250	90	30	370
Total	13 900	8290	10 540	32 730

[1] Light - 10% or less of trees killed in the stand
Moderate - 11-30% of trees killed in the stand
Severe - >30% of trees killed in the stand



Map 2

SPRUCE BEETLE 1994

YUKON TERRITORY

FIDS GIS

Natural Resources Canada

Canadian Forest Service

Forest Insect & Disease Survey

Scale 1: 1000000

Map Projection : Lambert

Map Produced 23 Nov 94

YUKON TERRITORY

Reference Map

Legend:

Lakes & Rivers

Roads

National Park Boundary

Tree Mortality	Number of Infestations	Area (ha)
Light	136	13726
Moderate	53	8223
Severe	53	10589
Total	242	32538

Definitions:

LIGHT	10 % or less of stand recently killed
MODERATE	11 - 29 % of stand recently killed
SEVERE	30 % + of stand recently killed

Though this was the first year the infestation was identified, ground probes have indicated that the first large scale attacks to standing timber probably occurred in 1992, particularly in the Kloo Lake area. At higher latitudes, the normal duration of the spruce beetle life cycle is two years, and this has led to high numbers of attacks to standing green trees again in 1994. However, spruce beetle populations farther south near Haines Junction appear to have benefited more from the unusually warm dry summer weather of the last two years. Brood development here has been accelerated causing a significant proportion of the population to mature in only one year. A probe 12 km north of Kluane Park headquarters of trees more than 20 cm in diameter found:

Unattacked	Current	Red	Grey
16%	37%	34%	13%

"Current" attacks by definition refer to trees attacked in the current year (June of 1994); "red" attacks resulted from attacks in June of 1993; and "greys" from 1992 attacks.

The current attack component in these stands was comprised of adults that had emerged from the grey trees, supported by a minor component from the red trees that had matured in only one year. In contrast, helicopter-accessed ground probes in June within Kluane National Park near Trout Lake, and farther south near Mush Lake found the majority of the attacks to have occurred in 1993 (5-40% of the stand trees) with current attack levels in the 5-10% range. Few grey trees were seen in these stands.

The variation in population development throughout the infested area emphasized the effect that local climatic variation has had on the maturation of spruce beetle broods. One-year-cycling has also recently been common in south and central Alaska where, in 1994, spruce beetle infestations covered an estimated one million hectares.

Under non-outbreak conditions spruce beetle is a secondary agent of attack, attracted to over-mature stressed or recently-killed trees. Consequently, spruce beetle infestations normally follow events such as floods, blowdown or right-of-way clearing. Fallen trees enhance the survival of beetle broods because they dry out more slowly than standing trees, and attract fewer beetle predators such as woodpeckers. Healthy trees are attacked only after beetle numbers have increased to such a degree that they far exceed the absorption capacity of available slash. Spruce beetle infestations, when confined to standing timber, normally decline after a few generations.

In the absence of recent blowdown or logging in Kluane Park and the Shakwak Valley, it is not clear just how the current beetle infestation was initiated. It is possible that a population of beetle adults was carried by prevailing winds from infested stands in Alaska, in the Chilkat River Valley, or up the Tatshenshini River Valley from Glacier Bay. High velocity, low level south-westerlies commonly occur during the beetle flight period of late May and June. Both of these areas have been subject to ongoing spruce beetle infestation, and records from the USDA Forest Service in Juneau indicate that 1992 was a major flight year in the Chilkat River infestations. Though the Tatshenshini River was not surveyed, anecdotal evidence, from a B.C. Forest Service entomologist who traveled the river in July of this year, supported the presence of beetle infestations. He reported broad bands of red-hued white spruce on hillsides downstream from Dalton Post.

Once a significant population of beetles had become established in the Alsek and Shakwak valleys, they met with a coincidence of factors which facilitated survival and a fast and near exponential increase. The first and most important condition was a vast supply of pure, even aged, mature white spruce, particularly low-lying stands in the Alsek River Valley which became established 150-200 years ago on the fertile bed of a recently-drained lake. The

second condition was successive relatively mild winters followed by unusually warm and dry summers, providing optimum conditions for beetle survival and accelerated development. The conditions in fact, have been so conducive to a beetle outbreak, it is possible that they alone facilitated a fast build-up from a local endemic population, rather than one that was introduced.

The conditions that have aided beetle development have also aided detection of the infestations. When the initial aerial survey was completed in late June, the foliage of trees attacked the year previously had already faded. Normally, (in B.C.) aerial surveys to map spruce beetle are delayed until late summer or fall (i.e. 14+ months following attack) to allow sufficient time for the color change. When follow-up aerial surveys were completed in early August, those same trees had dropped most or all of their needles, and trees attacked in June of this year were already beginning to fade. The fast color change and needle drop was likely paralleled by a rapid drying of the sapwood of the trees. This could significantly reduce brood survival, particularly in the two-year-cycle component.

In September, crews under the direction of Yukon Forest Resources staff undertook population assessments in severely infested stands, focusing particularly on the Kloo Lake area. The purpose was to determine the size and status of beetle populations in trees attacked in June of 1994 and estimate the proportion that had developed through to pupal and adult stages and were therefore theoretically committed to a one year cycle. In 6 of 14 stands where beetle-attacked trees were examined, numbers of progeny, including larvae, pupae and callow adults, averaged over 50 per 225 sq. cm. sample. As a proportion of total progeny, pupae and callow adults averaged 29%, and ranged from 10 - 71%. This is the proportion of the population which may be expected to fly following only a single year of development. For this to be the case, all pupae would have to have developed through to callow adulthood before the onset of cold weather. Winter cold causes development to cease and the insects to "harden off" in preparation for winter. Follow-up sampling by Forest Resources personnel in the same trees in early spring will provide unique information regarding beetle development in the Yukon.

Eastern spruce budworm

Choristoneura fumiferana

Eastern spruce budworm populations remained high in the southeastern corner of the Yukon, particularly in the La Biche River area. Light-to-moderate defoliation of white spruce was reported to be widespread throughout the valley and was continuous with infestations which followed the Liard River Valley into B.C. In the adjacent Prince George Forest Region in B.C., the main body of infestations covered 173 000 ha, very similar to last year. No aerial surveys were conducted to map the budworm in the Yukon and information on infestations in the LaBiche River area was gained through communication with Yukon Forest Resources personnel. These infestations continued in the Liard River drainage south, west, and then north. The westernmost fringe re-entered the Yukon along Irons Creek, a tributary of the Liard. It was in this area that the population was sampled from the Alcan Highway.

This was the second consecutive year that high budworm populations were seen at Irons Creek, but damage was less than last year with only trace defoliation recorded. Population development was a week behind last year (though closer to normal) with larvae in the mid-to-late instar stages of development on June 15. A mass collection was sent to the PFC Insectary for rearing. Of 61 larvae reared, 13 (23%) subsequently died of disease and unknown causes, and 41 (77%) emerged as adults. No insect parasitism was detected. This was an unusually high percentage of emergence (compared with 26% in 1993), and could signal increased populations in 1995.

Pine Pests

Pine needle cast
Lophodermella concolor

Discoloration of year-old lodgepole pine foliage by pine needle cast was again widespread in the southeast, as in the past three years. Up to 90% of the 1993 needles were discolored in scattered pockets of mostly young roadside pine throughout the Watson Lake area. Less severe discoloration affecting up to 60% of 1993 needles in scattered pockets occurred in stands as far north as Km 250 along the Robert Campbell Highway and within the host range along the South Canol Road. Up to 80% of year-old needles affected an average of 10% of the pine in stands between Faro and Carmacks. Associated with *L. concolor* at some sites was the secondary needle disease, *Hendersonia pinicola*, a competing fungus which is thought to inhibit fruiting of the *L. concolor*, and as such, exercise some control over its proliferation.

Pine needle blights
Phaeoseptoria contortae, Leptomelanconium cinereum

These two needle blights found infecting needles of lodgepole pine were collected for the first time in the Yukon. *Phaeoseptoria contortae* was collected from three stands, two of which occurred at 1100 meters elevation along the South Canol Road. In both collections *P. contortae* was associated with other fungi; *L. concolor* which was common throughout the area, and *Leptomelanconium cinereum*, a blight which infects needles of all ages, and which also had never before been collected from the Yukon. The third collection of *P. contortae* came from Km 160 along the Robert Campbell Highway, and was the only pathogen in the sample.

Lodgepole terminal weevil
Pissodes terminalis

The distribution of terminal weevil was similar to 1993 with populations remaining at near endemic levels in most areas of the southern Yukon. One notable exception, as in 1993, was an infestation at Km 34 of the Atlin Road (just north of the Yukon - B.C. border), where 10% of the lodgepole pine terminals were killed by the weevil, half the rate reported last year. Examination of 10 leaders yielded only 7 living progeny (pupae). *P. terminalis* pupal chambers in three additional leaders were occupied by the cocoons of a Dipteran parasite. This relatively low reproductive success is expected to result in further population decline in 1995.

Weevils attack developing terminals, killing them down to the first branch whorl. High incidences and repeated attacks will result in growth loss and formation of forks and crooks. Damage of this type has never been reported from the Yukon.

Special Directed Surveys

Joint Canada-Sweden lodgepole pine trial

Pest conditions within a seven year-old co-operative Canada-Sweden lodgepole pine trial established on the Takhini Forest Reserve near Whitehorse were evaluated by FIDS again in 1994. An evaluation of individual tree condition in 12 randomly selected lodgepole pine

replicates found 92% of the original stock to be surviving, a slight reduction from last year (94%). Survival in four Siberian larch replicates averaged 78%, also slightly lower than last year (80%).

For the second successive year, cankers caused by Comandra blister rust, *Cronartium comandrae* occurred on some of the young pine, but this year the damage was significantly more prevalent and severe. A total of 28 (3.6%) were diseased, 8 of which had recently died. In one plot alone (provenance C61, rep 2) six trees were live-infected and an additional two were dead. Live-infected trees will probably die within the next two years. Western gall rust, *Endocronartium harknessii* found for the first time on two trees in 1993 was not seen this year (the replicates on which it was seen last year were not included in this year's survey). Levels of infection and subsequent mortality, especially from the Comandra blister rust, can be expected to increase in subsequent years.

The Takhini trial is the most northerly of five experimental plantations established in the Pacific Region in co-operation with Svenska Cellulose, a Swedish forest company. Lodgepole pine in the plots were grown from seed produced in Swedish seed orchards. The parent trees had been grown in Sweden from seed collected within various northern B.C. provenances. One of the purposes of the trials was to determine how the trees, one generation removed from their native environment, responded to native pests and environmental conditions when reintroduced.

Because of the small average tree size and the harshness of the site, *C. comandrae* infection levels are expected to steadily increase in the next few years. The plots will be re-assessed in 1995.

Biomonitoring plot #925

Two years following establishment of a permanent **Biomonitoring** plot in the Takhini Forest Reserve as part of the **Acid Rain National Early Warning System (ARNEWS)**, an annual assessment of the health and vigour of 58 plot and 10 off-plot trees was completed. In addition, biennial regeneration and ground vegetation identification was completed in the four sub-plots within the main plot. No change in the condition of the plot trees was detected this year.

Five semi-mature lodgepole pine were blown over in stands adjacent to the Biomonitoring plot. All of these trees had recently been attacked to varying degrees by the engraver beetle *Ips pini*. Root samples from two of the trees were collected but proved negative for the presence of root disease. The engraver beetles are not expected to pose a threat to plot trees or other standing timber in the area.

This Biomonitoring plot is one of 12 established in 1992 to supplement the existing 15 ARNEWS plots established in the mid 1980's, to monitor the effects of airborne pollutants on forest health. The scope of the program has since been broadened beyond the effects of acid rain to include aspects related to biodiversity and general forest condition.

Plot trees will be assessed again in 1995.

Environmental Damage

Chronic dieback

This year, as in every year, various types of environmental damage were seen in Yukon forests. The cause of the most serious damage has not yet been identified, but the effect, progressive dieback and mortality of mainly white spruce, has been documented with some consistency over many years. The most significant damage continued to occur in stands between Burwash Landing and Beaver Creek, along the Mayo Road, along the Klondike Highway between Stewart Crossing and Carmacks and again in the Spirit Lake area south of Whitehorse, and along Little Atlin Lake. Though white spruce is most commonly affected by the dieback, similar appearing damage has occurred to lodgepole pine and trembling aspen.

The widespread distribution and varying symptoms suggest a range of causes, including the direct effects of cold desiccating winds funneling down road corridors, and the added seasonal stresses to exposed trees brought about by alternate freezing and thawing. Other suggested causes for damage limited to transportation corridors, include the lingering effects of calcium chloride, a salt used to inhibit dust before the highways were paved, and the toxic effects of ore dust from the "B-trains" which hauled concentrate for years between Faro and Skagway.

Blowdown

Scattered 1-2 ha patches of white spruce blowdown were reported from the LaBiche River area, prompting action to salvage remaining timber values. Fallen trees reportedly supported large root pads rather than compact root balls that would have indicated the presence of root rot. Though Tomentosus root rot, caused by *Inonotus tomentosus*, is suspected to occur in the area, its presence has never been confirmed by collection. The only Yukon-based collection of the disease was made in Kluane Park in 1983. Close monitoring will be necessary to detect signs of spruce beetle population build-up in the recently downed material.

Red belt

More immediate damage occurred once again above the Alcan Highway in the pass just west of Rancheria. Mature and immature lodgepole pine were discolored over an area of about 500 ha on south-facing slopes near 1000 meters in elevation. Year-old foliage had been desiccated and died as a result of a condition known as red belt. Though the mechanisms causing red belt are not fully understood, the desiccation is thought to result when early spring warm weather activates the needles. Water is lost from the needles through normal transpiration but cannot be replaced because the groundwater remains frozen.

Deciduous Tree Pests

Large aspen tortrix,
Choristoneura conflictana

Large aspen tortrix infestations occurred in roughly the same areas as in 1993, but infested area increased threefold to 11 400 ha. Infestations just west of Mayo, which covered an estimated 1250 ha in 1993, expanded greatly within the same areas and caused mostly light

and moderate defoliation in a number of stands north of Stewart Crossing to within 60 km of Dawson City. Conversely, infestations in central and southern areas, though still active, decreased in both area and intensity (Table 2).

Table 2. Location, number and size of infestations of large aspen tortrix in the Yukon Territory, 1994.

Location	# of infestations	Total area (approximate ha)
North		
Strickland Lake	1	4000
Barrow Creek	3	3600
Moose Creek	3	700
Mayo Road	10	2400
Central		
Braeburn	1	200
South		
Jakes Corner	1	240
Brooks Brook	1	100
Teslin	1	1 80
Total	21	11 420

No aerial surveys were conducted to map tortrix infestations, and recorded infestations were only those that could be seen from the road. It is likely, particularly in the northern areas, that far more defoliation occurred in unseen areas well removed from the highway. Vast stands of trembling aspen are found in these areas, particularly adjacent to the navigable rivers, where coniferous trees were harvested to provide fuel for the paddle steamers.

In contrast to last year, when most of the defoliation was mapped as severe, this year's defoliation was mostly in the light and moderate[1] category with some severe mixed in. When populations are so high that stands are completely defoliated, tortrix populations normally decline, and sometimes actually collapse due to starvation. This year's condition therefore may serve to prolong infestations, because in most areas the larvae completed development without exhausting the food source.

Mass collections of larvae and pupae were reared at the PFC Insectary to monitor the incidence of parasites and other causes of mortality within large aspen tortrix populations (Table 3).

[1] Light - less than 25% defoliation
Moderate - 25-65% defoliation
Severe - more than 65% defoliation

Table 3. Rearing results from mass collections of large aspen tortrix from infestations. Yukon Territory, 1994.

Location	% Larvae/Pupae			% Adult Emergence
	Dead Unknown	Diseased	Insect Parasites	
Strickland Lake	40	0	46	14
Mayo	25	6	55	14
Jakes Corner	29	19	38	14

Coincidentally, in all three collections 14% of the sample emerged as adults. A similar collection from Deadman Creek along Teslin Lake in 1993, yielded a 2% successful emergence with a high incidence (71%) of insect parasitism. That particular infestation did not recur this year. An average of nearly half of the reared insects from the three areas were parasitized with Dipteran and Hymenopteran parasites, and the successful emergence, at 14%, was uniformly low. However the relatively high percentage that died of unknown causes render the results inconclusive. If these insects died due to the stresses of shipping, survival in the field would have been substantially higher.

Severe defoliation over two or more successive years can cause dieback and some mortality, especially of understory and suppressed trees. The current defoliation, however, is expected to cause little more than a loss of current growth potential.

Historical fluctuation patterns in the Yukon suggest that, following two successive years of infestation in the same area, tortrix populations normally collapse. For this reason, no damage is expected near Teslin Lake, Braeburn or Mayo in 1995. North of Stewart Crossing where defoliation was noted for the first time this year, recurrent damage may be expected in 1995.

Aspen serpentine leafminer, *Phyllocnistis populiella*

Trembling aspen between Dawson City and Carmacks were infested by the aspen serpentine leafminer for the third consecutive year. In the most northerly observation, 5% of aspen and black cottonwood leaves were mined in townsite areas of Dawson City. Farther south along the Klondike Highway, levels of infestation increased steadily until at McQueston, up to 100% of aspen leaves were infested and trees took on a grey-blue hue from the prevalence of larval mines in the leaves. Similar levels of damage were also seen between Stewart Crossing and Mayo. As in prior years south of Stewart Crossing, infestation levels declined steadily until evidence of the insect disappeared south of Carmacks.

Though the leafmining activity is very visible in areas of high population, the damage is negligible as even severely infested trees retain much of their photosynthetic capacity.

Other Noteworthy Pests

Table 4. Other noteworthy pests, Yukon Territory 1994.

Host/pest	Location	Remarks
	Conifers	
Lodgepole Pine		
Pine adelgid *Pineus coloradensis*	Takhini Forest Res., Km 509 Klondike Hwy	trace incidences
Pine engraver *Ips pini*	Takhini Forest Res. Whitehorse	-attacks in recent blowdown -right-of-way fallen trees attacked on residential property
A Sawfly *Xyela* sp.	Whitehorse	mass feeding in staminate cones on residential property
White Spruce		
Engraver beetle *Ips tridens*	Judas Creek	in stump and bole of recent blowdown
Greenheaded spruce sawfly *Pikonema dimmockii*	Klondike Hwy.	common at low numbers in standard beating samples
Redstriped needleworm *Dioryctria reniculelloides*	Whitehorse	5% buds infested in suburban area
Spruce gall adelgid *Adelges lariciatus*	km 56 Robert Campbell Hwy.	5% tips infested on all trees
Yellowheaded spruce sawfly *Pikonema alaskensis*	throughout Yukon	common at low numbers in standard beating samples
Eastern larch		
Larch sawfly *Pristiphora erichsonii*	Robert Campbell Hwy	trace levels of early-season oviposition

(Cont'd)

Table 4. (Cont'd)

Host/pest	Location	Remarks
	Deciduous	
Trembling aspen		
American aspen beetle *Gonioctena americana*	Jakes Corner	Light damage - associated with *C. conflictana* infestation
White birch		
Birch leafroller *Epinotia* sp	Dawson City	avg. 10% leaves rolled on townsite trees
Boxelder leafroller *Caloptilia* sp	Km 506 Klondike Hwy	10% leaves rolled
Willow		
Obliquebanded leafroller *Choristoneura rosaceana*	Dawson City	light feeding damage throughout area

Appendix

The following related reports are available on request from FIDS

I. History of Important Forest Pests in the Yukon Territory 1952 - 1990.
II. Summary of Svenska Cellulose lodgepole pine trials in B.C. and the Yukon.
III. Summary of data from ARNEWS plot established in the Takhini Forest Reserve
1V. Pest Report No. 94-10. Spruce Beetle in the Yukon Territory

Detailed copies of maps, pest reports, leaflets, monographs and other reports in addition to those listed above are available from the Pacific Forestry Centre upon request. Correspondence and inquiries with respect to forest pest problems in the Yukon can be directed to FIDS headquarters at:

Pacific Forestry Centre
Canadian Forest Service
506 West Burnside Road
Victoria, B.C.
V8Z 1M5 Ph. 363-0600

and from June to October at:

Forest Insect and Disease Survey
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V0J 2N0 Ph. 847-3174