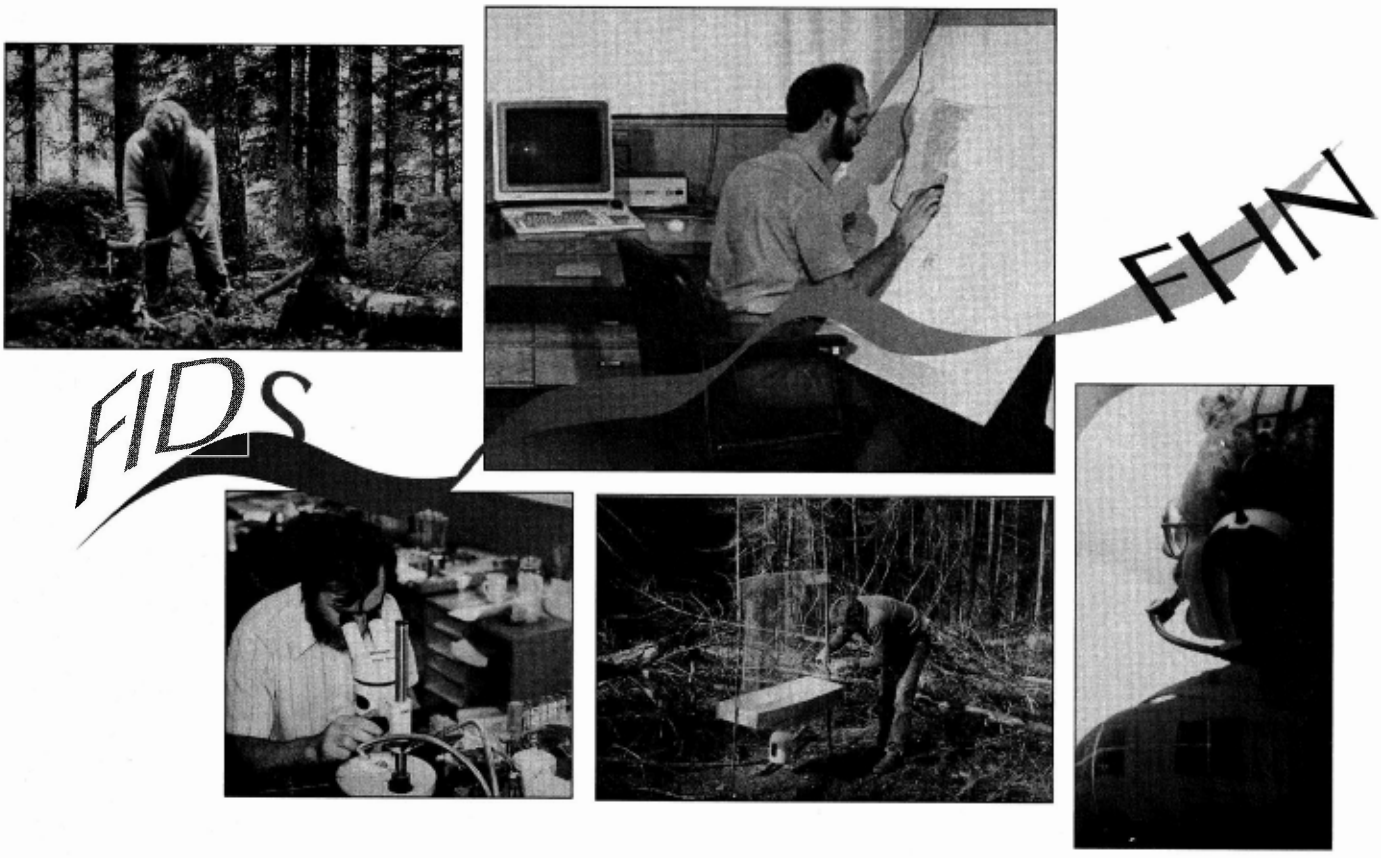
Forest Insect and Disease Conditions Yukon Forest Region – 1995

Rod Garbutt

Pacific Forestry Centre • FIDS Report 96-6



Natural Resources Canada
Canadian Forest Service

Ressources naturelles Canada
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Canada

Contents

Preface

Canadian Forest Service
Transition of FIDS to Forest Health Network

As a result of the Canadian Forest Service (CFS) program review and reorganization announced in the February 1995 federal budget, the CFS had a substantial reduction in resources (37% reduction in staff) and modified its priorities to be more in concert with federal responsibilities in the forestry sector. Overall, the Canadian Forest Service will be reduced to five establishments focusing on science and technology development. Operational forestry activities such as growth and yield, applied silviculture, and the Forest Insect and Disease Survey have been reduced; in this latter case, however, a more nationally focused Forest Health Network (FHN) is being developed.

The Forest Health Network is one of ten Canadian Forest Service Science and Technology networks organized to integrate research among the establishments and seek partnerships with other agencies and stakeholder groups. These networks will promote sustainable forest development and responsible use of Canada's forest resources. The networks reflect the two themes of the Science and Technology program: the acquisition and aggregation of knowledge related to understanding forest ecosystems, and the development of strategies for advancing sustainable forest development. Some of the networks relevant to insects and fungi include: Forest Health, Biodiversity, Effects of Forestry Practices, Pest Management Methods, and Landscape Management.

Forest Health Network - National Priorities

1. To monitor and report on changes in national forest health using an expanded and enhanced, ecosystem-based series of plots.

2. To provide, in collaboration with provincial cooperators, national overviews of major forest disturbances due to air pollutants, insects and diseases, using nationally standardized monitoring systems with a quality assurance program. This will include national level input required by the Canadian Criteria and Indicators Process for Sustainable Forestry, such as:

   - area and severity of insect and disease attack;
   - occurrence and severity of exotic species detrimental to forests;
   - area of catastrophic forest depletion; and
   - indicators of biodiversity, climate change and forest health.

3. To maintain diagnostic expertise and working reference collections to provide the scientific foundation in support of forest biodiversity policies.

4. To maintain the national forest health database with access to all partners. Analysis of data and presentation of information in shared electronic formats will be undertaken.

5. To participate in the planning and conduct of surveys, and pest risk analysis for exotic forest pests in cooperation with Agriculture and Agri-Food Canada.

6. To maintain linkages with other client Federal departments (Environment, Heritage-Parks Canada, Agriculture and Agri-Food Canada) as well as the collaborative efforts with Provinces, universities, industry and international agencies.

7. To develop, test, and standardize monitoring techniques, indicators and predictive models of forest health.

Forest Health Network - Pacific Forestry Centre

In 1996 the Forest Health Monitoring unit at CFS-Victoria will comprise seven senior Forest Health technicians. The insect and disease diagnostic capability along with the permanent reference collections and related databases will be retained, with increased emphasis on forest biodiversity aspects. The geographic information system (GIS) developed since 1984 and the associated historical database will continue to provide support to the Forest Health unit and the national database. The long-term plan is to have a total of six forest health technicians in the Forest Health Monitoring Unit.

The planned staff of the Canadian Forest Service-Victoria, Forest Health Monitoring Unit in 1996 will include:

Forest Health Technicians
Bob Erickson
Rod Garbutt
Nick Humphreys
Peter Koot
Rod Turnquist
Leo Unger
John Vallentgoed

Forest Health Unit Leader
Allan Van Sickle

Associated staff in the Biodiversity and Landscape Management - Decision Support System networks are:

Insectary:	Lee Humble, Bob Duncan, Jane Seed
Herbarium:	Brenda Callan
GIS:	Dennis Clarke

New Partnerships

At this time of transition, we would like to again recognize the very significant support and cooperation provided by many agencies in helping the Canadian Forest Service deliver the annual forest insect and disease conditions reports in British Columbia and the Yukon Territories for several decades. Without cooperation from employees of federal and provincial parks, Agriculture and Agri-Food Canada, the forest industry, and especially the British Columbia Ministry of Forests, the more than 50 years of insect and disease records affecting the nation's forest would not be as complete.

As the Forest Health Network evolves to fulfill the national aspects of the priorities noted above, we hope that this outstanding level of cooperation and partnership continues. We look forward to continued involvement with our clients in research and planning to help develop the Forest Health Network research direction. To this end, we are pleased that there is already agreement between the Canadian Forest Service and the British Columbia Ministry of Forests to undertake a cooperative approach to forest health monitoring that will best meet the needs at both the provincial and federal levels.

We look forward to working together with our partners in 1996 and beyond.

For further information please contact Dr. Allan Van Sickle, Forest Health Unit Leader at

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Introduction

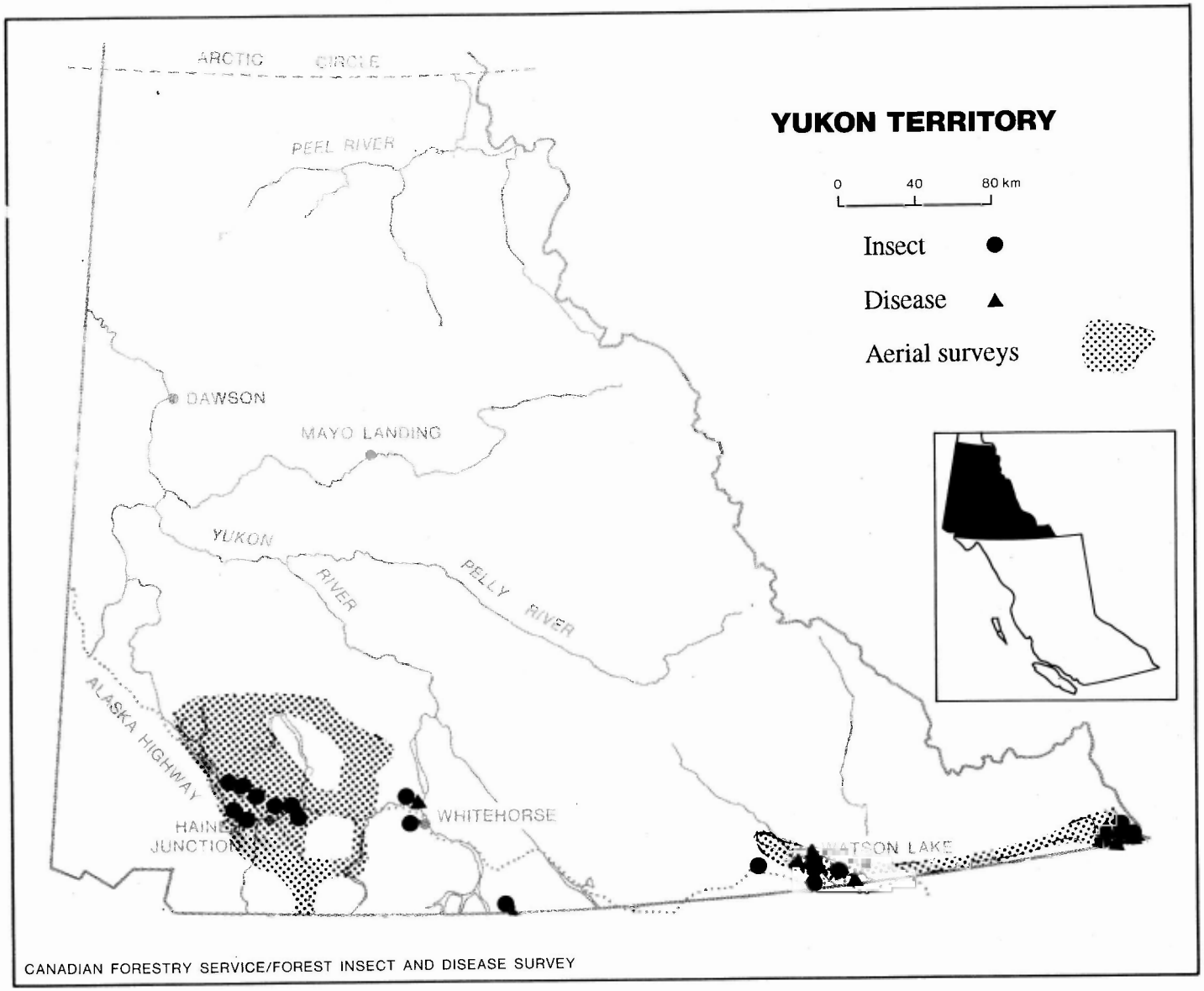
Forest Insect and Disease Survey (FIDS) is a nation-wide network within Natural Resources Canada, with the responsibility of: (1) producing an overview of forest pest conditions and their implications, including predictions where possible; (2) maintaining records and surveys to support quarantines; (3) 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.

This report summarizes forest insect and disease conditions encountered during a survey of southern areas of the Yukon Territory in 1995. Pests are listed by host with emphasis given to those capable of sudden damaging outbreaks.

This year signaled the beginning of a gradual phasing-out of FIDS and a greater national focus under the new network. This resulted in some of the normal detection and monitoring surveys being dropped in favor of a more concerted evaluation of known pest problems. During the 14-day survey in early July and a subsequent visit in late August, aerial surveys of pest damage were complemented with ground surveys and specimen collections. Ground survey coverage was limited to areas adjacent to the Alcan Highway as far west as Haines Junction, and the Haines Road as far as the B.C. border.

Yukon Forest Resources staff were contacted at Whitehorse, Haines Junction and Watson Lake, to exchange information about current forest pest problems. Discussions were held with Parks Canada administrative and field staff at Haines Junction with respect to pest problems within Kluane National Park.

Frequent liaison with National Parks and/or Forest Resources personnel in Whitehorse, Watson Lake and Haines Junction facilitated co-operative surveys to evaluate, and strategies to respond to spruce beetle infestations and other pest problems in the Haines Junction area, Kluane National Park and the LaBiche River area. The Yukon Forest Resources division of the Department of Indian Affairs and Northern Development provided 11 hours of helicopter, and over 4 hours of fixed-wing aircraft time for aerial and ground surveys of infested areas in the Shakwak Valley, and areas of spruce mortality along the LaBiche River. Parks Canada provided an additional 2 hours of helicopter and 1.5 hours of fixed-wing time to evaluate infestations within Kluane Park. Aerial survey coverage is shown on Map 1. The participation and aid of these agencies is gratefully acknowledged.



Map 1. Locations where one or more insect or disease samples were collected or surveys completed and area covered by aerial surveys in 1995.

Summary

Spruce beetle-caused white spruce mortality increased by 43% to cover 47 000 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. Spruce beetle is also suspected to have caused significant white spruce mortality in the LaBiche River corridor in the southeast.

Eastern spruce budworm caused trace levels of defoliation to white spruce in the Liard River drainage, most significantly in the LaBiche River area.

A single standing white spruce with stain characteristic of that caused by **tomentosus root disease** fungus was found adjacent to the LaBiche River, but examination of blowdown in the same area found no signs of the disease.

For the fourth 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. An unidentified **lodgepole needleminer** killed up to 30% of the current year's needles in young stands west of Watson Lake. 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 up to 10% of terminals were killed.

Patches of recent alpine fir mortality, possibly the result of attacks by the **western balsam bark beetle complex** were mapped during an aerial survey in the extreme southeast.

With the exception of a small infestation in Whitehorse, **larch sawfly** populations remained low.

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 **National Biomonitoring System** (formerly called the **Acid Rain National Early Warning System**), and is one of a growing number of such plots established nationwide.

Winter cold, in some areas, possibly 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.

A single 200-ha trembling aspen stand just east of Jakes Corner was severely defoliated by the **large aspen tortrix**.

Spruce Pests

Spruce beetle
Dendroctonus rufipennis

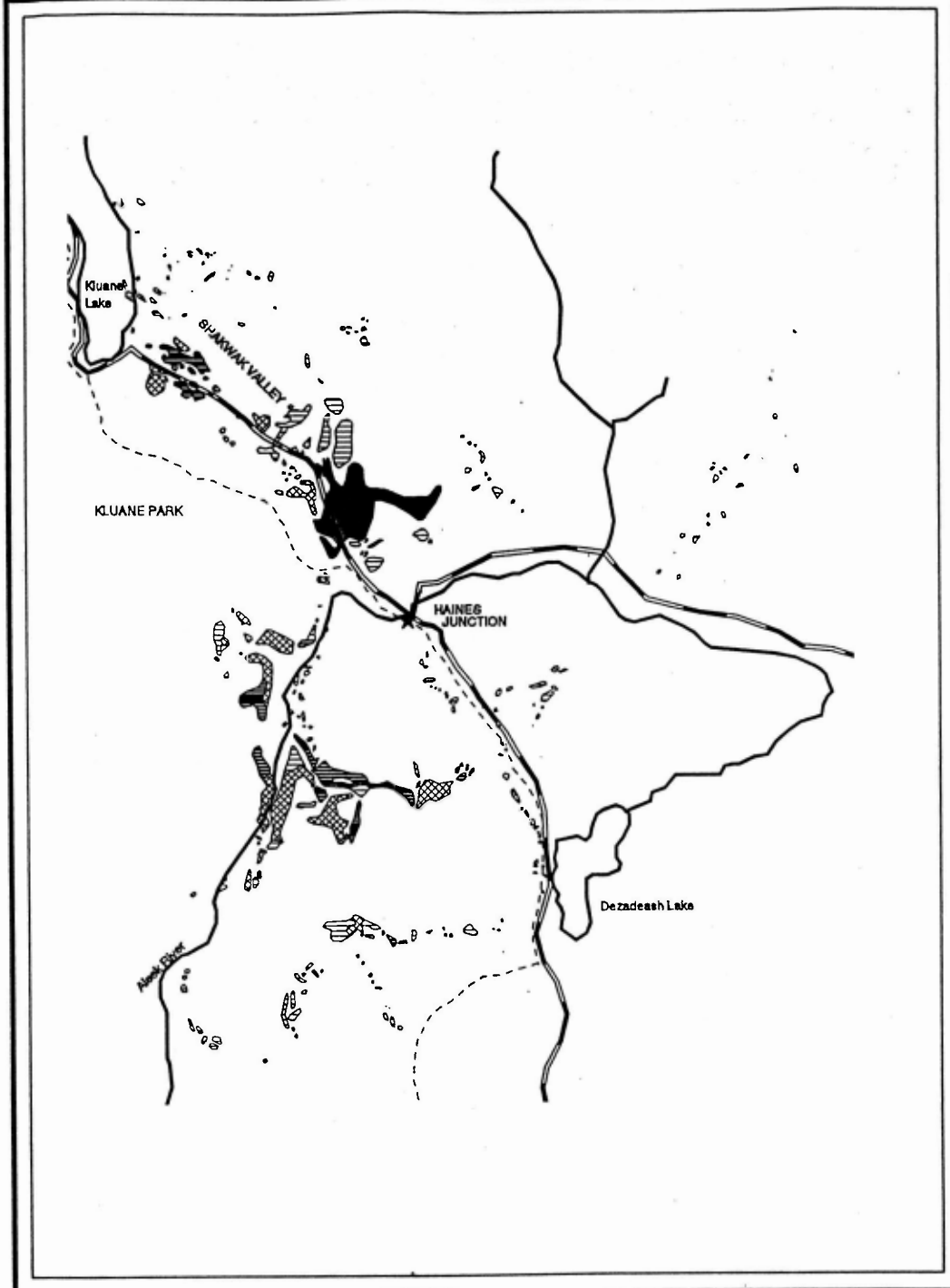
Aerial surveys in July of 1995 determined that increased attacks of white spruce by spruce beetle, *Dendroctonus rufipennis*, had resulted in a 43% expansion of the infested area to 47 100 ha (Map 2, Table 1). Based upon a conservative estimated average of 150 m^3 of total timber volume per ha, over 1.4 million m^3 of spruce was killed in a single year. The portion within Kluane National Park climbed 77% to 28 600 ha, over 60% of the total infested area.

Table 1. Location, area and severity of spruce beetle infestations recorded during aerial surveys in the Yukon. FIDS, Yukon Territory, 1995

Location	Area (ha) by Severity Class[1]				Mortality (m^3)[2]
	Light	Moderate	Severe	Total	
Kluane National Park					
Alsek River	2500	6450	2450	11 400	311 000
Kathleen Lakes	600	3000	2700	6 300	234 000
Shakwak Valley north	550	2150	2210	4 910	184 500
Mush and Bates lakes	2900	560	180	3 640	45 200
Tatshenshini/Bridge rivers	1550	--	--	1 550	11 600
Quill Creek	120	100	110	330	9 900
Dezadeash Lake	250	150	70	470	9 500
Subtotals: area	8470	12 410	7720	28 600	
volume					805 700
Shakwak Valley and areas east					
Bear Creek	960	50	9750	10 760	596 000
Kloo Lake/Kluane Hills	3700	--	600	4 300	63 700
Kluane Lake	700	--	--	700	5 250
Granite Creek	800	--	--	800	6 000
McKinley/Lake creeks	675	--	--	675	5 100
Marshall Creek	475	15	10	500	5 700
Moraine Lake	380	--	--	380	2 850
Subtotals: area	7690	65	10 360	18 115	
volume					684 600
Grand totals: area	16 160	12 475	18 080	**46 715**	
volume					**1 490 300**

[1] Light - 10% or less of trees killed in the stand
Moderate - 11-29% of trees killed in the stand
Severe - 30%+ of trees killed in the stand

[2] Based on an estimated average volume of 150m^3 per ha



Map 2

SPRUCE BEETLE 1995

YUKON TERRITORY

FIDS GIS

Natural Resources Canada

Canadian Forest Service

Forest Insect & Disease Survey

Scale 1: 1000000

Map Projection : Lambert

Map Produced 18 Jan 96

YUKON TERRITORY

Reference Map

Legend:

- Lakes & Rivers
- Roads
- National Park Boundary

Tree Mortality	Number of Infestations	Area (ha)
Light	223	16993
Moderate	29	12319
Severe	103	17769
Total	355	47081

Definitions:

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

Severe white spruce mortality were mapped over 4000 ha during a first-time aerial survey within the LaBiche River corridor in the extreme southeastern corner of the Territory. Spruce beetle is at least partly implicated as a primary cause of the damage, though only a single current (strip) attack was seen during one of only two ground calls. A more detailed discussion of the findings from this survey is included in the spruce budworm section, later in this report.

Within Kluane National Park, infestations were again concentrated in the Alsek River Valley, and Bates, Mush and Kathleen lakes areas. Increases resulted from expansion of existing infestations on the west side of the Alsek River near the mouths of the Kaskawulsh and Dusty rivers, on Profile Mountain and farther south between Lava and Marble creeks. In the Kathleen Lakes area, large new infestations were mapped south of Sockeye Lake, along Cottonwood Creek, and westward to Campsite Lake. In the Bates and Mush lakes area, infestations at the northwest end of Mush Lake more than doubled in size and expanded to the south along Mush Creek, and to the east along Alder Creek. A large new infestation straddled The B.C.-Yukon border along the west side of the Bridge River, in the Tatshenshini River drainage.

In the Shakwak Valley/Kluane Lake areas outside Kluane Park, expansion was more modest at 12%. The major areas of new infestation included areas along the east side of Kluane Lake, as far north as Ostberg Creek, along the lower slopes of Mt. Archibald and Mt. Decoeli on the west side of the Valley and on the east side of Kloo Lake. Additional small new infestations were mapped in the Cracker Creek-Moraine Lake area. Farther east in the Taye Lake area, white spruce mortality ascribed to spruce beetle in 1994, did not recur. Ground probes by Yukon Forest Resources personnel found evidence only of *Ips* spp. engraver beetles in this area.

Up to 30% of the 1994-attacked trees in some stands were still green when the aerial assessment was done, so the actual damage may be even more severe than recorded. These green trees were likely attacked in late July and early August of last year by a second flight of parent adult beetles.

Aerial survey coverage was greatly expanded this year to ensure detection of infestations that may have begun concurrently in the vast stands of mature white spruce within the Aishihik and West Aishihik river valleys and west as far as Braeburn. The flight also covered the Nisling River drainage to north of Kluane Lake and the northern lakeshore. No evidence of current or prior infestation was seen in any of these areas.

Four ground assessments were made to monitor the health and stage of development of beetle populations within infested trees, and to determine current attack levels (Table 2).

The milder than average winter of 1994/95 exerted little stress on overwintering populations, and no evidence of winter mortality was seen in any brood-bearing tree. This was also borne out by the high levels of current attack and the abundant late instar larvae in trees attacked last year. The beetle flight was delayed until mid-June by some cool, wet weather in late spring. This was a more than aweek later than last year's attack. When assessments were made in early July, adult galleries averaged only about 10 cm in length, and none of the eggs had hatched. This delay will likely reduce the amount of one year cycling, which last year averaged between 10 and 20%, and significantly contributed to the very high current attack levels this year.

Table 2. Status of mature white spruce (>20 cm in diameter) in spruce beetle-attacked stands examined in July. FIDS, Yukon Territory, 1995

Location	% Healthy[1]	% Current	% Red	% Grey
Christmas Creek	0	43	25	32
20 km -N- of Haines Junction	12	54	20	14
Mush Lake (Kluane Park)	38	36	17	9
Trout Lake (Kluane Park)	22	28	27	23
Average	18	40	22	19

[1] Healthy - unattacked
Current - attacked in 1995
Red - attacked in 1994
Grey - attacked prior to 1994

Strong southwest winds during the beetle flight period played a major role in determining the distribution patterns of beetle attack in the previous two years. This year there was little or no wind during the flight period. Consequently, beetle flight distances and directions were determined more by the normal semiochemical (pheromone) signals of attraction and repulsion. It also meant that the beetle flight patterns were less predictable, for beetles were now able to disperse in any direction, not just along the path of the wind. The first evidence of this was the discovery of fresh attacks in stands around Haines Junction and east as far as Pine Lake. Both areas were south of the primary wind-borne beetle catchment zone within the Shakwak Valley, adjacent to and opposite the mouth of the Alsek River.

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. A previous infestation in the Dezadeash Lake area in the mid 1940s, followed the hurried construction of the Haines Road. Beetle populations had quickly built up in the abundant slash left from clearing the right-of-way. A lesser infestation south of Aishihik Lake in the late 1970s resulted from flooding following the construction of the Aishihik Dam.

Fallen trees enhance the survival of beetle broods because they dry out more slowly than standing trees, and provide fewer opportunities for 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. Beetles are then attracted to the largest and healthiest stands of trees in river bottoms and lower mountain slopes. When confined to standing timber, beetle populations 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. Strong 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. This year for the first time the newly formed Tatshenshini Provincial Park

corridor in B.C. was flown, to verify suspected infestations. Over 8000 ha of infested timber was seen between Detour Creek and the confluence of the Tatshenshini with the Alsek River. An additional 5000 ha was mapped along B.C. tributaries of the Chilkat River.

Once a significant population of beetles had become established in the Alsek and Shakwak valleys, a coincidence of factors facilitated survival and a near exponential increase. The first and most important condition was host availability, which was admirably met in the abundant stands of pure, even aged, mature white spruce, particularly the 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. Climatic and host conditions, in fact, have been so conducive to beetle survival that it is quite possible they alone fostered the outbreak, beginning from a local endemic population, rather than a large population swept in from the coast.

The conditions that have aided beetle development have also aided detection of the infestations. When the initial aerial survey was completed in early July, the foliage of most of the 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 caused by a rapid drying of the sapwood which could also significantly reduce survival of two-year cycle brood in smaller trees.

Forecast

The relatively high number of current attacks (almost 2:1 when compared to red (1994) attacks), indicates that the infestation is still intensifying. When coupled with the evident spread of populations into previously unattacked stands, the result will be continued high levels of recent mortality recorded in 1996. However, there are many stands both inside and outside Kluane Park where repeated beetle attacks have severely depleted the host. The remaining living trees are either immature or mature trees with diameters of less than 20 cm. These trees lose moisture quickly, and their thin bark provides little insulation against the elements. Brood survival is expected to be low in these stands. The net result of these combined factors is expected to be an overall increase in infested area in 1996, but a slight lessening of average attack severity, and, hopefully, the beginning of a decline in spruce beetle populations.

So far the winter of 1995-96 has proven to be the coldest since 1990. If average temperatures of between -30 and -40C have been sustained for a week or more within infested stands, there will be high levels of mortality in the above snowline portions of the trees. However, larvae and pupae below the snowline, as well as young adults which have migrated to the base of the trees to overwinter, will survive. Therefore, even given an unusually severe winter, current attack levels in 1996 should not be significantly lower than projected. However, significant mortality within the larval population could reduce attacks in 1997 to below the threshold levels required to sustain the infestation.

Eastern spruce budworm
Choristoneura fumiferana

During a first-time aerial survey in the extreme southeast part of the Territory in early July, a total of 7200 ha of light budworm defoliation on white spruce and alpine fir was mapped along the Beaver and LaBiche rivers, major tributaries of the Liard River. Budworm infestations have been ongoing in this area for many years and have been continuous with infestations to the east and south within the main Liard River drainage in Northwest Territories and B.C. This year, mostly light defoliation was mapped over an area of 27 000 ha, (B.C. only) compared with 170 000 in 1994. In addition, high levels of white spruce mortality (from 20 to 50%) were mapped over nearly 4000 ha along the LaBiche River. Most of the trees were grey but appeared to have died within the last five years. None contained progeny of any bark beetles, though galleries consistent with spruce beetle and *Ips* spp. engraver beetles were seen in some trees, and a single spruce beetle current attack (strip attack) was seen.

Prolonged budworm infestations are at least partially implicated in the damage as ample evidence of prior budworm feeding damage was seen in the form of branch tip dieback on the living trees. In budworm infestations the most severe damage almost always occurs in the understory, where the feeding impact is magnified on young and suppressed trees by mass larval descent from the overstory. In these stands the complete absence of an understory suggested that it had either been entirely killed by feeding or had been prevented from being established.

However, it also appeared unlikely from the limited damage to the living trees that the budworm could have been primarily responsible for the mortality in the overstory (see spruce beetle section).

In the Irons Creek area, where trace to light budworm activity has been recorded in the past few years, populations continued to decline, and only traces of branch tip feeding were seen.

Tomentosus root disease
Inonotus tomentosus

A single living white spruce growing adjacent to the LaBiche River, was suspected of being infected by *Inonotus tomentosus*. Though no symptoms were detected in the tree's growth or vigour, a pink stain characteristic of the incipient (early) stage was found in one of the roots. A sample of tree root, however, was too dry by the time it was cultured, so the identification remains unverified.

Inonotus tomentosus was thought responsible for numerous scattered instances of white spruce blowdown in the same area. Close examination of stumps of 10 windfallen trees, however, revealed no signs or symptoms of root disease. The areas where the blowdown occurred were mostly low-lying, and subject to seasonal flooding and long periods of soil saturation. During such times the anchoring capacity of the soil is greatly diminished and trees are more easily blown over.

In the early stages the disease characteristically elicits no perceptible growth effects in the trees. In similar stands in the Prince George region, the disease is prevalent as an incipient infection and seems to remain in a more or less dormant state for long periods. A more rigorous survey would be required to verify the presence of the disease, and determine its frequency and impact on stands in the area.

Pine Pests

Pine needle cast
Lophodermella concolor

Discoloration of year-old lodgepole pine foliage as a result of infection by this needle cast disease was again widespread in the southeast Yukon, as in the past four years. Up to 80% of the 1994 needles were discolored in scattered pockets of mostly young roadside pine throughout the Watson Lake area. The accumulated affect of successive years of defoliation were evident in some young stands where only the current year's growth remained. This is known as "lions tailing" and results in a limited photosynthetic capacity in the affected trees, and significantly limits growth.

A lodgepole needleminer

Damage consistent with that caused by the northern lodgepole needleminer, *Coleotechnites starki*, affected the current growth needles of lodgepole pine between Km 1070 and Km 1080 of the Alcan Hwy., west of Watson Lake. Though the insect had completed its life cycle and departed, the effects of larval mining were evident in the clusters of straw-colored needles, with needle loss ranging as high as 30% of the current growth.

Lodgepole terminal weevil
Pissodes terminalis

The distribution of terminal weevil was similar to 1994 with populations remaining at near endemic levels in most areas of the southern Yukon. One notable exception, as in the two previous years, 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, similar to that reported last year.

Weevil attack was first recorded in Yukon from a single tree north of Watson Lake in 1990. In the following year numerous attacks were seen in young stands from Watson Lake as far west as Whitehorse. Since then attacks have remained low everywhere with the single exception of the Atlin Road stand.

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 Yukon.

True Fir Pest

Western balsam bark beetle complex
Dryocoetes confusus, Ceratocystis dryocoetidis

During a first-time aerial survey in the southeastern corner of the Yukon, 13 patches of alpine fir mortality were mapped totalling 1400 ha. Most of the mortality was in four patches on the slopes of Mt. Martin, and the remainder were in stands adjacent to the LaBiche River. Though none of the stands could be accessed from the ground for confirmation, the damage patterns closely resembled those which commonly result from attacks by the bark beetle-fungus complex in stands to the south.

Larch Pest

Larch sawfly
Pristiphora erichsonii

A localized population of larch sawfly moderately defoliated a single tree at the Forest Resources office in Whitehorse. Elsewhere in the region populations remained low.

Special Directed Surveys

Biomonitoring plot #925

Three 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. No change in the condition of the trees was detected this year.

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 1996.

Multiple Host Pest

Environmentally caused damage

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. This year survey coverage was limited to the Alcan Highway, the southern portion of the Klondike Highway and the Atlin Road. Chronic dieback has been reported from the south Klondike Highway, particularly in the Spirit Lake area, and along Little Atlin Lake. Damage had progressed, especially in the former area, where a number of roadside white spruce and lodgepole pine have recently died as a result of progressive needle loss.

Significant damage has been reported in prior years from stands between Burwash Landing and Beaver Creek, along the Mayo Road and along the Klondike Highway between Stewart Crossing and Carmacks. Though white spruce is most commonly affected by the dieback, similar damage has occurred on 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.

The observed incidence of frost damage was limited to a provenance trial near the confluence of the Meister and Liard Rivers, northwest of Watson Lake. An average of 10% of the newly-flushed white spruce tips had been killed by a late spring frost.

Deciduous Tree Pest

Large aspen tortrix,
Choristoneura conflictana

The area of trembling aspen defoliated by the large aspen tortrix totalled 200 ha in a single infestation with moderate-to-severe defoliation, 8km east of Jakes Corner. This is the third successive year that feeding damage has occurred in this stand. No damage was detected in stands along the north shore of Teslin Lake where patches of severe defoliation were recorded in the previous two years. Infestations active last year between Dawson City and Mayo were not visited this year.

It is unusual for a tortrix population to remain high enough to cause moderate and severe defoliation for three successive years in the same stand. The Jakes Corner stand will be revisited next year to determine whether any trees died as a result.

Appendix

The following related reports are available on request from FIDS

I. History of Important Forest Pests in the Yukon Territory 1952 - 1995.
II. Summary of data from ARNEWS plot established in the Takhini Forest Reserve
III. Pest Report No. 95-15. 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 can be directed to:

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