

FOREST INSECT AND DISEASE CONDITIONS

Vancouver Forest District

British Columbia, 1977

**E.V. Morris
C.S. Wood**

Douglas-fir stands again sustained extensive defoliation by the western spruce budworm in the southeastern part of the Vancouver Mainland District. Mountain pine beetle continued to kill large tracts of lodgepole pine in the Klinaklini River Valley. Broadleaf defoliators severely damaged urban forests on the southeast coast of Vancouver Island.

Conifer stands in a number of areas throughout the District lost a significant volume from mistletoes and root and heart rots.

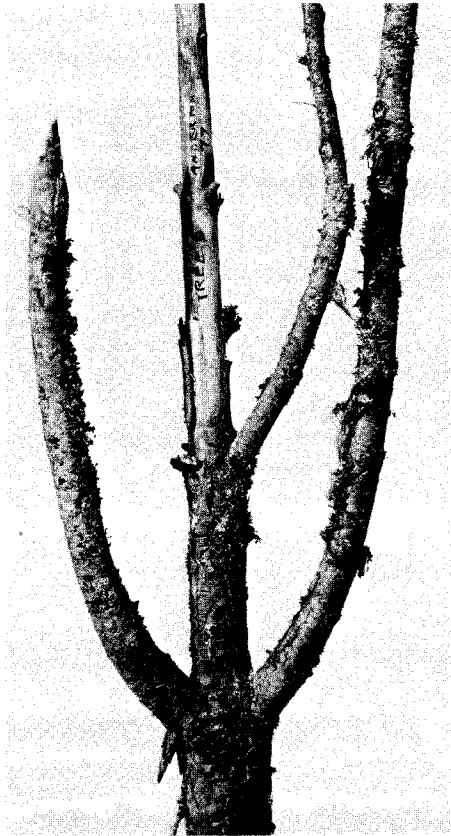
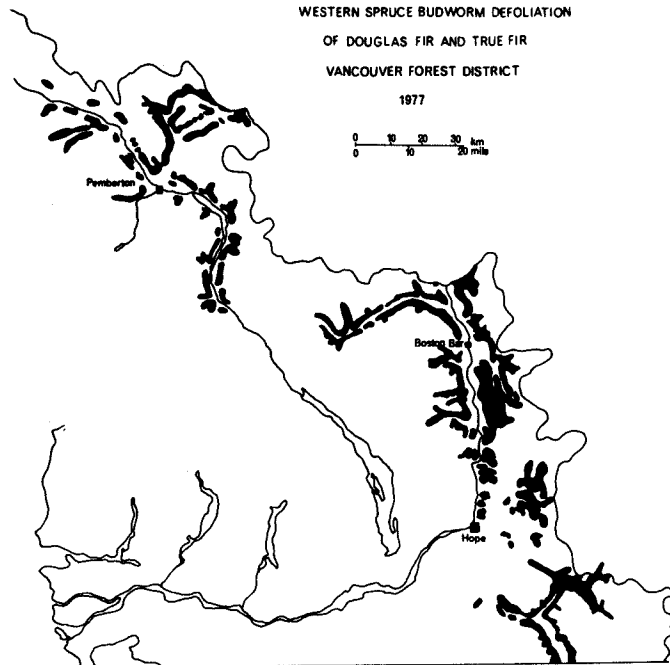


Environment
Canada

Environnement
Canada

Forestry
Service

Service
des Forêts



Dieback and multiple leaders on Douglas-fir caused by spruce budworm defoliation.

WESTERN SPRUCE BUDWORM, *Choristoneura occidentalis*, defoliation of Douglas-fir stands increased by over 18 000 ha in 1977.

Infestations continued to cause widespread defoliation of Douglas-fir stands in the Vancouver Mainland District. Defoliation expanded and intensified in the Fraser Canyon, Nahatlatch and Skagit River valleys and at Owl Creek and Birkenhead River in the Pemberton area (see map).

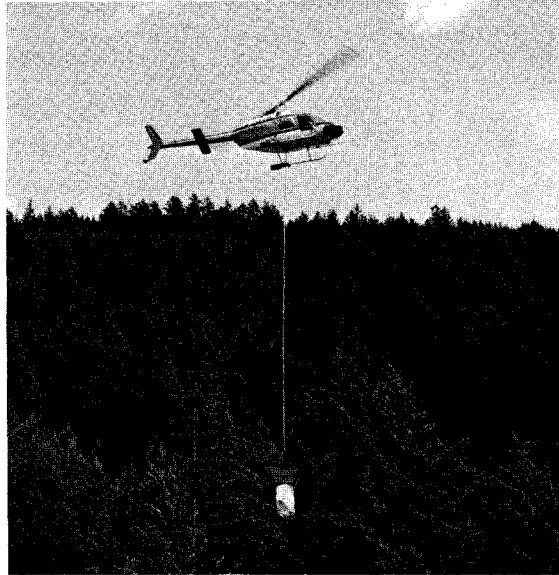
Defoliation of Douglas-fir occurred on a total of 90 200 ha in 1977. Of this total, 33 400 ha were heavy, 38 000 moderate, and 18 800 light (see graph).

Generally tree mortality was light, but some mortality has occurred on isolated 40 to 250 ha areas in the Fraser Canyon at Trafalgar and Tsileuh creeks and in the Pemberton area at Rutherford and Railroad creeks.

Parasitism resulted in less than 50 per cent mortality at the majority of sites sampled within the infestation, and did not significantly affect the degree of defoliation because of the overall high larval populations. There was no sign of disease in the larval population and parasitism in egg samples was negligible.

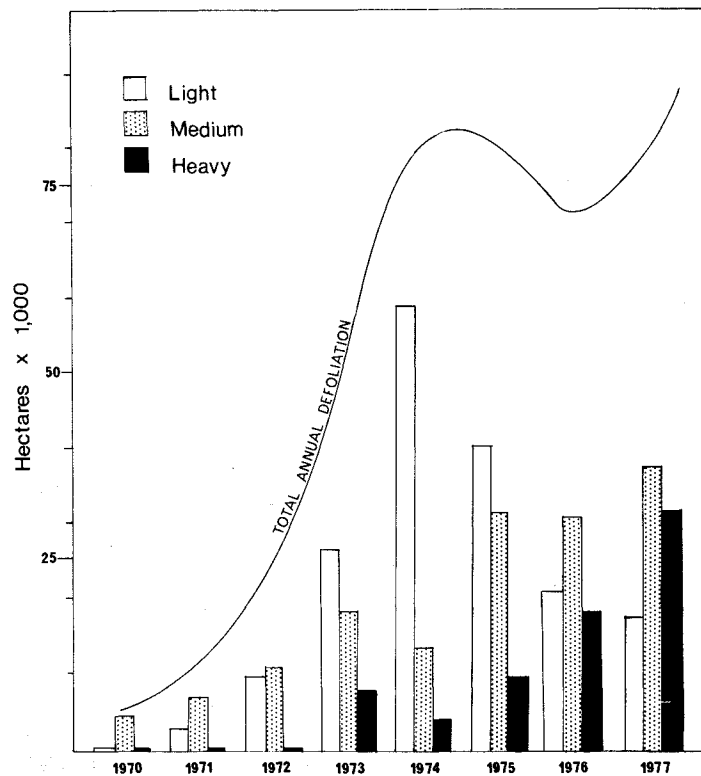
Egg populations at all 34 sample locations were lower than in 1976; however, larval populations are expected to cause moderate to severe defoliation in many areas in 1978.

Douglas-fir beetle-killed trees were found in some budworm defoliated stands in 1977, but the beetles general absence in most stands suggests no close relationship between budworm defoliation and Douglas-fir beetle attack.



Spruce budworm branch sampling (Photo, B.C.F.S.)

SPRUCE BUDWORM DEFOLIATION
VANCOUVER FOREST DISTRICT
1970-1977



RED-TOPPED TREES KILLED BY DOUGLAS-FIR BEETLE, Dendroctonus pseudotsugae, totalled 325 and were located as follows: Railroad Creek (100), Wolverine Creek (75), Anderson River (60), Uztlius Creek (40), Snass Creek (25) and Skagit River (25).

While some beetle damage was found in the Fraser and Skagit River areas and in the Pemberton region in spruce budworm defoliated stands, plot cruises in 1977 gave little evidence of an association between budworm defoliation and Douglas-fir beetle. The general infrequency of Douglas-fir beetle in the budworm defoliated stands, together with evidence of low brood productivity, suggests that factors other than budworm defoliation may be responsible for the presence of the beetle.

In the Fraser Canyon, up to 80 per cent of the Douglas-fir trees at Tsileuh Creek on 250 ha were dead and, of this, 50 per cent had evidence of old Douglas-fir bark beetle attacks. At Trafalgar Creek, 71 per cent of the trees on 40 ha were dead and, of this, 50 per cent had evidence of old and current bark beetle attacks.

Douglas-fir beetles should continue to be regarded as a potential hazard to defoliated stands.

SPRUCE BEETLE, Dendroctonus rufipennis, attacked Engelmann spruce trees at km 24 Mowhokam Creek Mainline. The infested trees were in a spruce-alpine fir stand, with spruce comprising 28 per cent of the stand in the two prism plots examined. Nine per cent of the spruce trees examined were infested. The diameter range of the trees was 35 to 70 cm. Between km 19 and 20, approximately 150 spruce trees had been killed prior to 1976.

WESTERN BALSAM BARK BEETLE, Dryocoetes confusus, in association with the fungus Ceratocystis dryocoetidis, killed alpine fir trees on 400 ha along Mowhokam Creek and 50 ha on Ainslie Creek in the Fraser Canyon. In five prism plots examined between km 19 and km 24 Mowhokam Creek Mainline, alpine fir comprised 27 per cent of the stand, of which 12 per cent were currently infested and 23 per cent were attacked prior to 1977.

MOUNTAIN PINE BEETLE, Dendroctonus ponderosae, killed an additional 4,000 lodgepole pine trees on 2 560 ha in the Klinaklini River Drainage. The heaviest damage occurred from Klinaklini Lake west and south to 13 km south of Knot Creek Junction. This is the fourth year mortality has been recorded in this area.

At Spruce Creek, near Anderson Lake, 300 lodgepole pine trees were killed by beetles, and 25-30 scattered western white pine trees at each locality were killed at Birkenhead Lake, Skagit and Nahatlatch rivers.

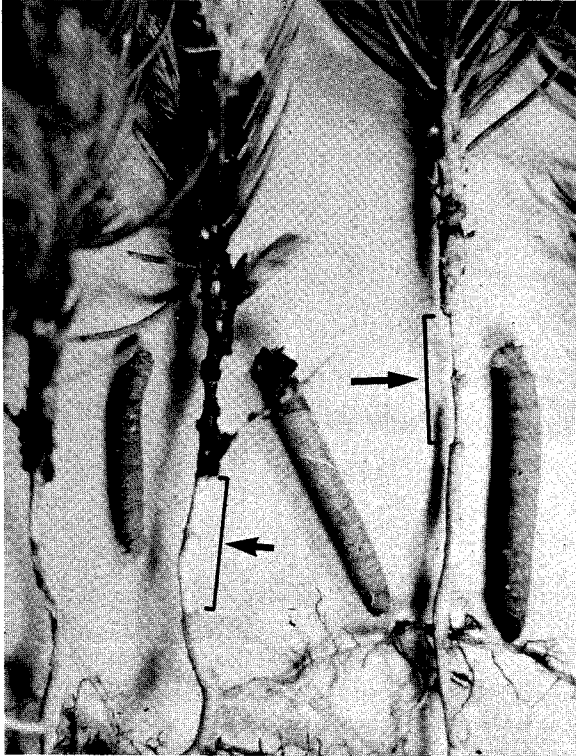
Scattered red-topped lodgepole and western white pine trees occurred over some 300 ha along Mowhokam Creek and 75 ha on Ainslie Creek in the Fraser Canyon.

WINTER MOTH, Operophtera brumata, defoliation of Garry oak, maple, willow and fruit trees was severe and widespread throughout the Greater Victoria region for the eighth successive year. Prior to 1977, defoliation was attributed solely to Bruce spanworm, Operophtera bruceata; however, in the fall of 1977, the winter moth was identified as being the major defoliator. The winter moth is an introduced pest from Europe and was previously known to occur only in the Maritimes.

In the fall of 1977, adult populations were the highest observed since the infestation was first recorded and if climatic and/or natural controls do not reduce the early 1978 larval population, widespread, severe defoliation is expected to occur in 1978 throughout the Greater Victoria region.



Banded oak tree with captured winter moth female adults.



Leatherjacket larvae and damaged seedlings (Photo, B.C. Min. Agric.)

EUROPEAN CRANE FLY, Tipula paludosa, larvae, commonly called leather-jackets, damaged or killed approximately 50,000 (2-0) spruce and Douglas-fir seedlings at the B.C. Forest Service Nursery at Surrey. Most damage occurred in localized patches, but was dispersed over 7 ha. Control measures were undertaken in early May by applying the insecticide Diazinon. No leatherjacket larvae were found in the infested area on May 16, after spraying.

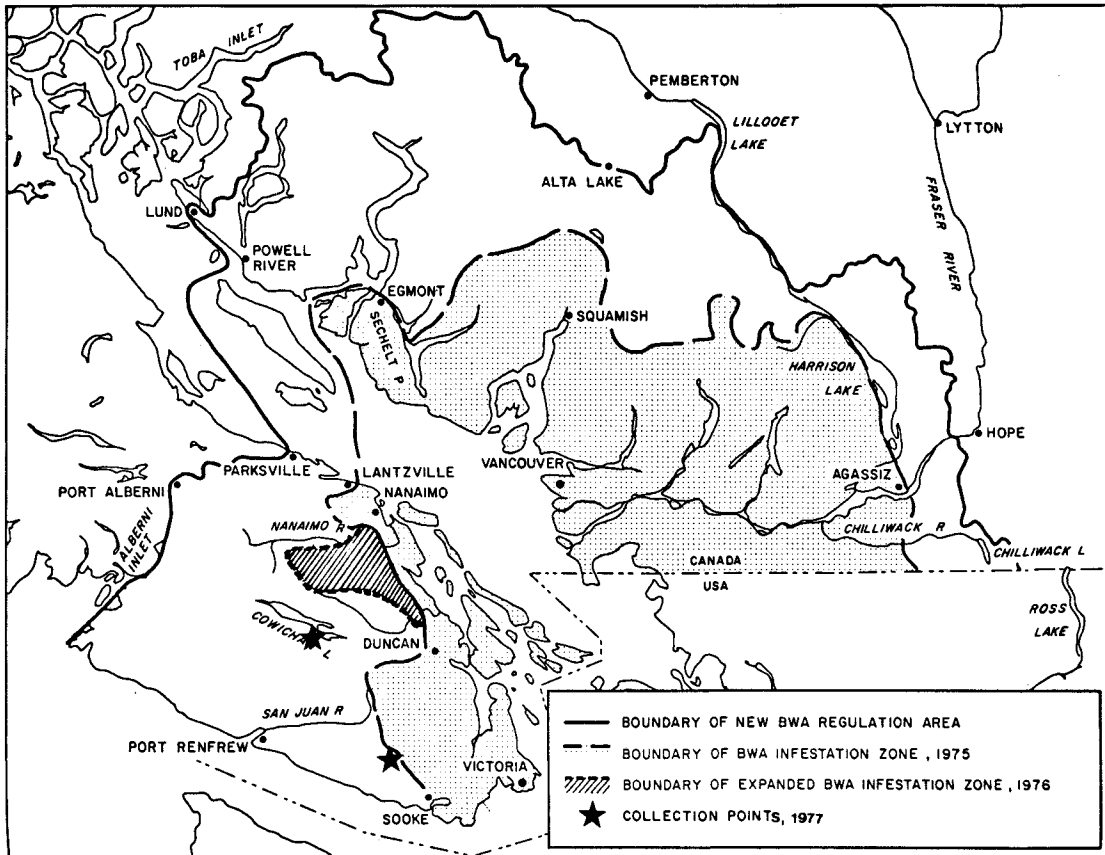
WESTERN BLACKHEADED BUDWORM, Acleris gloverana, larval populations continued at low levels throughout the former infestation areas on Vancouver Island. No defoliation was observed in the District, and no damage is expected in 1978.

BALSAM WOOLLY APHID, Adelges piceae, infestation boundaries on Vancouver Island were expanded for the second consecutive year in 1977 (see map). Collections of aphid-infested amabilis fir were taken near Bear Creek Reservoir near Jordan River and at Honeymoon Bay on Cowichan Lake. A special survey is planned for 1978 on Vancouver Island to further define the infestation boundaries.

STRIPED ALDER SAWFLY, Hemichroa crocea, larvae defoliated alder trees in stands within 8 km of the coastline from Mill Bay north to Nanoose on Vancouver Island, and on Saltspring and Gabriola islands. Up to 100 per cent defoliation occurred in localized areas on southern Saltspring Island, moderate defoliation in the Cherry Point area on Vancouver Island and light defoliation elsewhere in the coastal regions of Vancouver Island and Gabriola Island.

No alder sawfly defoliation was recorded on the Vancouver Mainland.

A LEAF BLOTCH MINER, Lyonetia salicella, mined western white birch leaves along both sides of the Fraser River from Agassiz to Yale, with the heaviest damage concentrated along the Haig Highway and in the Hope area. Up to 100 per cent of the leaves were damaged in these areas, giving the foliage a brown, scorched appearance by mid-summer. Blotch miner damage was also evident along Highway 99 in the Municipality of Richmond.



PHOMOPSIS CANKER OF DOUGLAS-FIR, *Diaporthe lokoyae*, was evident in a 50 ha second-growth Douglas-fir stand near Redonda Bay on West Redonda Island. Up to 25 per cent of the trees from 4 to 7 m in height in localized areas within the stand had multiple leaders. Western hemlock trees in the same stand are heavily infected by hemlock dwarf mistletoe.

DROUGHT DAMAGE caused by below normal rainfall and above normal temperatures during the summer of 1977 resulted in mortality and dieback of young Douglas-fir trees on roadsides and rocky sites in the east coastal region of Vancouver Island. The largest single group of trees killed were those growing at the south end of Cassidy Airport.



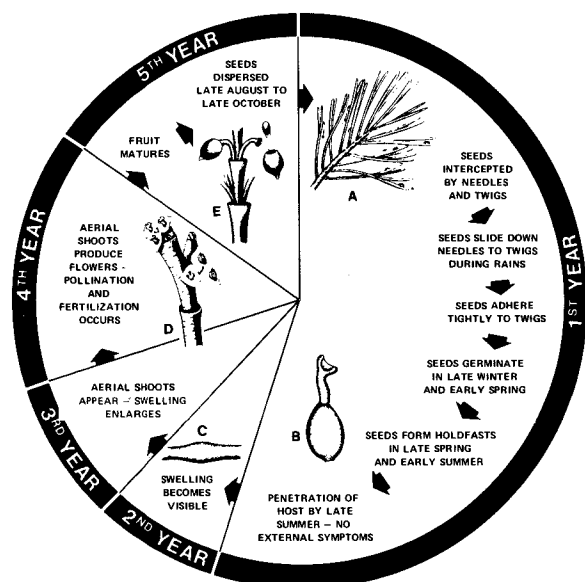
Multiple leaders on Douglas-fir subsequent to cankering by *Phomopsis*.

HEMLOCK DWARF MISTLETOE, *Arceuthobium tsugense*, surveys were done to assist in clarification of some points in the "ten foot clause" in timber sale contracts. Several areas were examined in Seymour and Kingcome inlets for dwarf mistletoe infections on residual western hemlock trees, over 3 m in height, left standing after recent logging.

In three hemlock-cedar-balsam logged areas in Seymour Inlet at Warner Bay, scattered individual hemlock trees, 3 to 10 m in height, remained throughout the areas, often on the higher ground or ridges. About half the trees had branch swellings or brooms typical of long-standing mistletoe infections, but aerial shoots were found only on 10 per cent of the trees examined.

At another operation in Seymour Inlet, brooms and swellings were evident on old-growth hemlock, but no current aerial shoots were found. In Kingcome Inlet, brooming was evident on old-growth hemlock at Satsalla and Atlatzi rivers, but not in the Clear River area.

Observations in a 1976 spaced stand indicate that increased light and reduced competition stimulate the mistletoe plants and may increase their seed production.



Dwarf mistletoe life cycle.

The first record of hemlock dwarf mistletoe on Douglas-fir was found on West Redonda Island. One tree was infected in a second-growth hemlock-Douglas-fir stand. The hemlock trees were heavily infected. One western white pine tree was also infected in the same stand.

DISCOLORATION OF BROADLEAF MAPLE FOLIAGE was widespread on Vancouver Island and the mainland portion of the Vancouver Forest District. The condition has persisted for 3 years, but was more noticeable in 1977. Initial discoloration appears as a marginal chlorosis, gradually intensifying to browning of the leaves, often affecting 100 per cent of the foliage. The cause is unknown; however, mineral and moisture deficiencies are possible causes. The presence of numerous leaf hoppers and aphids may be coincidental, or they may be attracted by the condition of the leaves.

FUME DAMAGE CAUSED BY SULPHUR DIOXIDE was evident on non-forest shrubs on 250 ha northwest of the Port Alice Pulpmill. Up to 80 per cent of the foliage showed interveinal browning. Coniferous trees and alder did not exhibit symptoms.

On August 30, a sulphur train derailed near Hope at Hunter Creek. The subsequent fire and fumes caused some damage to the foliage of deciduous trees in the immediate area and for about 1 km east from the Hunter Creek bridge. No coniferous trees appeared to be affected at the time of examination in early September.

A PINE NEEDLE BLIGHT, *Lophodermium pinastri*, was common on shore pine in the Pacific Rim National Park area and at other locations on Vancouver Island. In the Ucluelet-Tofino area, 80 per cent of the 1975 and 1976 needles were infected on up to 50 per cent of the trees.

BRANCH FLAGGING OF DOUGLAS-FIR trees was very noticeable in the Hope-Laidlaw area. Damage affected immature and mature trees and was restricted to foliage on the northern exposure, suggesting climatic injury.

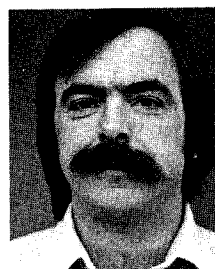
STATUS OF FOREST PESTS IN PACIFIC REGION 1977

| PEST | DISTRICTS | | | | | | |
|---|---|--|--|---|---|--|----------------------------------|
| | PRINCE RUPERT | PRINCE GEORGE | VANCOUVER | CARIBOO | KAMLOOPS | NELSON | YUKON |
| MOUNTAIN PINE BEETLE | Epidemic declining excepting Kitwanga to Dorreen | Infestations around McNaughton L | Widespread infestation Klinaklini R | Widespread infestation throughout District | Widespread infestation throughout District | Infestations throughout District | Not found |
| SPRUCE BEETLE | Epidemic - Smithers Landing area | Outbreaks at Carp and Inzana lakes | Localized attacks Mowhokam Cr | Light, localized attacks Bowron L | Epidemic in Lambly Cr, Bouleau L. area. Increasing elsewhere | Low populations | Low populations Haines Jct. |
| DOUGLAS-FIR BEETLE | Not found | Populations very low | Light attacks Fraser Canyon, Pemberton, Vancouver I | Light population in trap trees Joes L Road | Infestations near Kamloops and Cache Cr. Increasing elsewhere | Low populations | No host |
| WESTERN SPRUCE BUDWORM (1-YEAR-CYCLE) | Low populations | Low populations | Extensive infestations Fraser Canyon - Pemberton areas | Moderate population south of Clinton | Heavy defoliation Fraser R - Carpenter L. Decreasing in Shuswap L | Small outbreak near Revelstoke | Low population |
| SPRUCE BUDWORM (2-YEAR-CYCLE) | Low populations | Moderate population along Holmes R | Not found | Bowron Lakes, MacKay R - Hendrix L moderate | No defoliation noted in off-year | Populations increasing, some defoliation | Not found |
| WESTERN BLACKHEADED BUDWORM | Minor defoliation Oweegee Cr and Babine L | Low populations | Low populations | Low populations | Blue R infestation near collapse | Generally low. One light outbreak near Kimberley | Low populations |
| FOREST TENT CATERPILLAR | Not found | Severe defoliation near McBride | Not found | Not found | Infestation near Vavenby and Gosnell | Decrease from 1976 | Not found |
| CONIFER SAWFLIES <u>Neodiprion</u> spp. | Shore pine defoliation Porcher I. Tree mortality Pitt I | High populations east of Prince George | Low populations | Moderate populations | Heavy defoliation Vavenby and near Clearwater L | Generally low | Low population |
| CONE RUSTS | Poor cone crop - spruces | Not found | Not found | Not found | Not found | Not found | Low incidence southwestern Yukon |

VANCOUVER DISTRICT RANGERS - 1978



Ernie Morris
Vancouver - Mainland



Colin Wood
Vancouver Island

CANADIAN FORESTRY SERVICE
PACIFIC FOREST RESEARCH CENTRE, 506 W. BURNSIDE RD., VICTORIA, B.C., V8Z 1M5
BC-X-170 FEBRUARY, 1978