



Forest

Pest

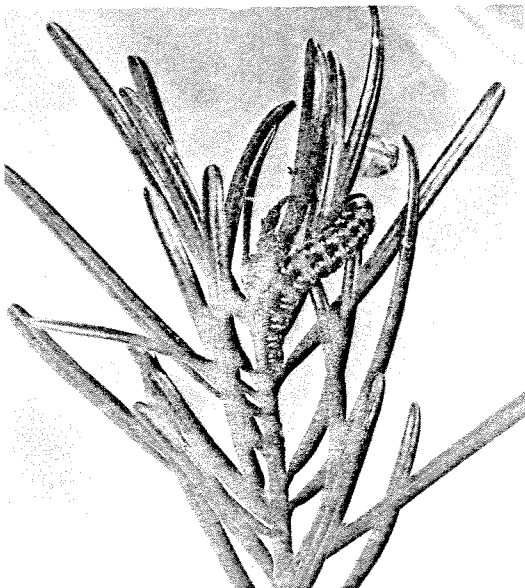
Conditions



In The Pacific

Northwest

1975



This is the 28th annual report of forest pest conditions in Oregon and Washington based on cooperative surveys sponsored by the Northwest Forest Pest Action Council. The purpose of this report is to provide public and private land managers with information concerning pest conditions and to maintain a historical record of pest trends and occurrences. This report is based on information obtained from aerial and ground surveys conducted by the Forest Service, Oregon State Department of Forestry, Washington State Department of Natural Resources, and the surveillance efforts of private, State, and Federal foresters.

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COVER PHOTO: Western spruce budworm adult male, bud-mining larvae (third instar), pre-pupal larvae (sixth instar), and defoliation of Douglas-fir in second year of outbreak.

FOREST PEST CONDITIONS
IN
THE PACIFIC NORTHWEST
1975

April 1976

Compiled by:

INSECT AND DISEASE MANAGEMENT
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U.S. DEPARTMENT OF AGRICULTURE

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INTRODUCTION

Forest insect outbreaks were detected and recorded during aerial and ground surveys made in cooperation with the Oregon State Department of Forestry and the Washington State Department of Natural Resources. Ground surveys were conducted to verify aerial survey findings, evaluate stand conditions, make biological evaluations, monitor defoliator populations, and to collect presuppression data necessary for control decisions.

Information concerning a number of insect pests of shade trees and ornamentals was obtained from Oregon State Department of Agriculture reports written by Dr. Richard Penrose. These insects include the European pine shoot moth, smaller European elm bark beetle, bronze birch borer, and gypsy moth.

The volume of timber killed by bark beetles was estimated from counts of dead trees made during the aerial survey. Volume losses resulting from defoliators, sucking insects, and diseases were not estimated.

Damage caused by the pine engraver (= Oregon pine ips) and the balsam woolly aphid is no longer being recorded unless it is exceptionally severe or represents an extension of either insect's known range.

Aerial surveys were not flown in most portions of western Oregon and western Washington in 1975 (see Map 1 in Appendix). This decision was based on the fact that very little damage caused by any insect had been observed in these areas within the past 5 years.

In lieu of the aerial survey, forest managers were requested to increase their field surveillance and promptly report any observed insect activity. If any problems are detected, special surveys will be flown upon request. No requests for special surveys were received by the two State agencies or the Forest Service in 1975.

No area has been permanently omitted from consideration for aerial detection. The decision to add or delete areas, based on known insect activity or requests by land managers, will be made each year prior to the beginning of the survey.

INSECT CONDITIONS IN BRIEF

Bark beetle activity increased in both Oregon and Washington in 1975. The mountain pine beetle continued to cause extensive tree mortality in lodgepole pine stands in eastern Oregon. The largest outbreak, encompassing approximately 920,000 acres, occurs on the Umatilla, Wallowa-Whitman, and Malheur National Forests and adjacent State and private lands in Baker, Grant, Union, Wallowa and Umatilla Counties. Losses resulting from fir engraver in true fir stands more than doubled in Washington and increased nearly five-fold in Oregon. Tree mortality caused by the Douglas-fir beetle more than doubled in the eastern portion of both States. Salvage logging of Douglas-fir beetle-infested stands on the Gifford Pinchot National Forest near Packwood, Washington was completed in early June. Western pine beetle activity more than doubled in both States. A flatheaded fir borer outbreak triggered by drought conditions in southern Oregon in 1974 increased significantly this year.

Western spruce budworm infestations in Washington have intensified. New defoliation was recorded in Douglas-fir and true fir stands on portions of the Okanogan and Wenatchee National Forests and the North Cascades National Park. In Oregon the outbreaks on the Wallowa-Whitman National Forest and the Warm Springs Indian Reservation have increased in size and intensity. Aerial survey sketch mapping indicates that approximately 532,000 acres of host type were visibly defoliated in 1975.

Larch casebearer activity remained at about the same level reported as last year in both States. However, new populations, representing an extension of this insect's range, were detected on individual trees in the vicinity of Swauk Pass in the Washington Cascades.

No Douglas-fir tussock moth defoliation was recorded in either State.

Damage caused by the balsam woolly aphid in subalpine fir stands was observed on the Mt. Baker-Snoqualmie National Forest in the vicinity of Concrete, Washington.

MAJOR BARK BEETLE PROBLEMS

The volume of timber killed by all bark beetles is determined from sketch map data recorded during the annual aerial detection survey. This is done by applying an average volume to the recorded number of infested trees in each observed outbreak. These volumes vary according to tree species, size class, and area infested. Acres infested and volume losses by major ownerships are shown in Table 1. The areas of major bark beetle activity are shown in maps in the Appendix.

DOUGLAS-FIR BEETLE, *Dendroctonus pseudotsugae* Hopk.

This insect killed an estimated 14.7 million board feet of Douglas-fir in Oregon and Washington in 1975. The largest outbreaks were observed on the Wallowa-Whitman and Umatilla National Forests in Oregon and on the Okanogan and Mt. Baker-Snoqualmie National Forests in Washington.

The severe 1974-75 infestations on the Gifford Pinchot National Forest near Packwood, Washington were significantly reduced by salvage logging. A total of 101 million board feet of timber, including an estimated 71.5 million board feet of beetle-infested trees, were removed. The additional 29.5 million board feet of non-infested trees were logged to meet silvicultural requirements. All but a very small number of the infested trees were removed before May 1, 1975 when the beetles would have emerged to attack additional green trees.

No Douglas-fir beetle activity was observed in the 1972-74 tussock moth outbreak areas in northeastern Oregon and southeastern Washington during the 1975 aerial survey. However, field surveillance indicates beetle activity is increasing in the tussock moth areas. The infested trees, which will start to fade during the winter of 1975-1976, will be easily detected during the 1976 aerial survey. Many of the infested trees are currently being logged in the process of salvaging the trees killed by the tussock moth.

FIR ENGRAVER, *Scolytus ventralis* Lec.

Fir engraver activity increased throughout Oregon and Washington this past year. Most of the damage occurred east of the Cascade Mountains. Particularly heavy losses occurred on the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests and adjacent State and private lands in Oregon; and on the Umatilla and Okanogan National Forests in Washington. This increase in fir engraver activity is believed associated with the drought conditions which occurred throughout most of eastern Oregon and Washington in 1973 and 1974. Research findings indicate a general and often significant increase in fir engraver activity in white fir stands following periods of subnormal precipitation. The greatest amount of mortality and top-killing generally occurs in overstocked pole and small sawtimber size stands occupying the poorer growing sites or in mature to overmature stands that are heavily infected with dwarf mistletoe. However, some fir engraver activity has been observed in areas defoliated by the Douglas-fir tussock moth in 1972-1974.

The trend of these outbreaks is not known. However, it has been observed that fir engraver outbreaks usually subside rapidly following a return to normal moisture conditions.

FLATHEADED FIR BORER, *Melanophila drummondi* (Kirby)

Infestations continued on low site forest lands in southwestern Oregon between Roseburg and the Oregon-California State line. Most of the tree killing, on approximately 140,000 acres, occurs on State and private lands located along the foothills of the Rogue, Umpqua and Applegate River drainages in the vicinity of Riddle, Grants Pass, Medford, and Ashland. Approximately 8,000 acres of mixed Forest Service and Bureau of Land Management lands in this area are also affected. This outbreak is attributed largely to severe drought which occurred in the area in 1973 and 1974.

The results of evaluations by Oregon State Department of Forestry entomologists indicate that populations are declining. Even so, populations of larvae are nearly the same as in 1974. However, in contrast to last year, many of the trees sampled this past year showed signs of the attacks being calloused over. An increased amount of resin in the larval galleries was also noted. This is probably due to the increased precipi-

tation that occurred during the 1975 growing season. A downward trend is expected because of increased moisture and resulting tree vigor.

MOUNTAIN PINE BEETLE, *Dendroctonus ponderosae* Hopk.

Mortality of lodgepole pine in Oregon, amounting to an estimated 181 million board feet on nearly 1.2 million acres, has more than doubled since 1974. Nearly 84 percent of this loss has occurred on National Forest and State and private ownerships in Baker, Grant, Union, Wallowa, and Umatilla Counties. The majority of this mortality is now occurring on the Umatilla, Wallowa-Whitman and Malheur National Forests in north-eastern Oregon.

Since the outbreak began in 1968, it is estimated that 595.1 MMBF of mature lodgepole pine has been killed on all ownerships.

Populations within the oldest portions of this outbreak are declining as suitable host material is depleted. However, it is anticipated that additional tree killing will occur in 1976 in the newer portions of this outbreak.

Lodgepole pine mortality in Washington, estimated at approximately 89,000 board feet, was found at many widely scattered locations.

The acres of mountain pine beetle infestations in lodgepole pine recorded between 1971 and 1975 in Oregon and Washington are summarized below:

| AREA | YEAR | | | | |
|------------|---------|---------|---------|---------|-----------|
| | 1971 | 1972 | 1973 | 1974 | 1975 |
| Oregon | 248,470 | 273,670 | 233,240 | 422,610 | 1,107,890 |
| Washington | 1,530 | 2,960 | 2,490 | 4,950 | 1,860 |
| TOTAL | 250,000 | 276,630 | 235,730 | 427,560 | 1,109,750 |

Mountain pine beetle losses in western white pine stands remained low throughout the mountainous regions of both States. In Oregon, most of the tree killing occurred on the Willamette National Forest; while those in Washington occurred on the Mt. Baker-Snoqualmie, Okanogan, and Wenatchee National Forests.

Mortality in second growth ponderosa pine stands caused by mountain pine beetle attacks in Oregon resulted in an estimated loss of 7,996 MMBF over nearly 185,000 acres. This represents an increase of nearly four-fold over the losses reported in 1974. Most of this damage occurred in the Blue Mountains of north-eastern Oregon in the Grande Ronde drainage near La Grande; Powder River drainage in the vicinity of Sumpter; Dooley Mountain south of Baker; and in the Wallowa Mountains southeast of Elgin.

In Washington mountain pine beetle losses in second growth ponderosa pine stands remained static. The largest infestations are located on State and private lands in Columbia, Garfield, and Asotin Counties in the Blue Mountains and in Pend Oreille County in the vicinity of Colville.

SPRUCE BEETLE, *Dendroctonus rufipennis* (Kby.)

Spruce beetle activity increased throughout eastern Oregon and Washington. The heaviest damage was observed on the Wallowa-Whitman and Umatilla National Forests in Oregon. The trend of these outbreaks is unknown.

WESTERN PINE BEETLE, *Dendroctonus brevicomis* Lec.

Western pine beetle infestations increased throughout Oregon and Washington. In Oregon, nearly 17 million board feet of timber has been killed on the Fremont, Ochoco, Malheur, Deschutes, Winema, and Wallowa-Whitman National Forests and adjacent State and private lands. In Washington, the heaviest losses occurred on the Yakima and Colville Indian Reservations.

Table 1.—Summary of 1975 bark beetle infestations in Oregon and Washington

| Insects ¹ | National Forest lands ² | | Forest lands other than National Forests ³ | | Dedicated Forest lands (Wild. Area & Ntl Parks) ⁴ | | All Forest lands | |
|-------------------------------|------------------------------------|-------------|---|------------|--|------------|------------------|-------------|
| | Area Acres | Volume MBF | Area Acres | Volume MBF | Area Acres | Volume MBF | Area Acres | Volume MBF |
| OREGON: | | | | | | | | |
| Douglas-fir beetle (westside) | 1,380 | 530,180 | 450 | 110,400 | 0 | 0 | 1,830 | 640,580 |
| Douglas-fir beetle (eastside) | 30,740 | 4,373,070 | 22,050 | 3,340,370 | 0 | 0 | 52,790 | 7,713,440 |
| Douglas-fir engraver | 810 | 199,950 | 120 | 10,800 | 0 | 0 | 930 | 210,750 |
| Fir engraver | 70,550 | 6,531,440 | 63,640 | 4,976,860 | 1,580 | 131,690 | 135,770 | 11,639,990 |
| Flatheaded borer (westside) | 7,970 | 414,800 | 132,140 | 12,854,000 | 0 | 0 | 140,110 | 13,268,800 |
| Flatheaded borer (eastside) | 190 | 12,000 | 0 | 0 | 0 | 0 | 190 | 12,000 |
| Mountain pine beetle (L) | 973,070 | 165,169,320 | 117,670 | 12,746,530 | 16,780 | 3,007,900 | 1,107,520 | 180,923,750 |
| Mountain pine beetle (S) | 920 | 98,530 | 280 | 19,750 | 0 | 0 | 1,200 | 118,280 |
| Mountain pine beetle (W) | 8,250 | 1,088,300 | 5,110 | 6,712,400 | 2,940 | 938,000 | 16,300 | 8,738,700 |
| Mountain pine beetle (P) | 100,960 | 4,567,610 | 94,180 | 3,762,730 | 0 | 0 | 195,140 | 8,330,340 |
| Spruce beetle | 3,200 | 153,650 | 960 | 90,000 | 1,380 | 88,750 | 5,540 | 332,400 |
| Western pine beetle | 166,470 | 13,732,670 | 50,150 | 2,698,060 | 3,970 | 215,920 | 220,590 | 16,646,650 |
| OREGON TOTAL | 1,364,510 | 196,871,520 | 486,750 | 47,321,900 | 26,650 | 4,382,260 | 1,877,910 | 248,575,680 |
| WASHINGTON: | | | | | | | | |
| Douglas-fir beetle (westside) | 1,410 | 469,610 | 470 | 183,960 | 0 | 0 | 1,880 | 653,570 |
| Douglas-fir beetle (eastside) | 8,560 | 2,956,050 | 13,120 | 2,767,240 | 50 | 9,700 | 21,730 | 5,732,990 |
| Fir engraver | 5,480 | 953,000 | 16,430 | 1,709,650 | 1,590 | 440,750 | 23,500 | 3,103,400 |
| Mountain pine beetle (L) | 1,760 | 80,190 | 100 | 8,400 | 0 | 0 | 1,860 | 88,690 |
| Mountain pine beetle (W) | 17,010 | 5,268,760 | 5,170 | 1,300,500 | 3,240 | 975,150 | 25,420 | 8,494,360 |
| Mountain pine beetle (P) | 1,120 | 126,550 | 9,550 | 246,980 | 0 | 0 | 10,670 | 373,530 |
| Spruce beetle | 840 | 103,750 | 300 | 45,000 | 0 | 0 | 1,140 | 148,150 |
| Western pine beetle | 4,300 | 260,270 | 32,650 | 2,971,940 | 0 | 0 | 36,950 | 3,232,210 |
| WASHINGTON TOTAL | 40,480 | 10,218,180 | 77,790 | 9,233,670 | 4,880 | 1,425,600 | 123,150 | 21,826,900 |
| REGIONAL TOTAL | 1,404,990 | 207,089,700 | 564,540 | 56,555,570 | 31,530 | 5,807,860 | 2,001,060 | 270,402,580 |

¹Mountain pine beetle infestations are separated by tree species: L, lodgepole pine; S, sugar pine; W, western white pine; and P, ponderosa pine.

²Excluding Wilderness areas. The volume that will be salvaged depends upon land use classification, accessibility, and other conditions.

³Includes all forested lands not within the boundaries of National Forests or National Parks.

⁴Includes only Wilderness areas of the National Forest system and National Parks.

The acres of western pine beetle infestations recorded between 1971 and 1975 in Oregon and Washington are summarized below:

| AREA | YEAR | | | | |
|------------|--------|---------|--------|---------|---------|
| | 1971 | 1972 | 1973 | 1974 | 1975 |
| Oregon | 59,200 | 124,800 | 47,060 | 106,110 | 220,590 |
| Washington | 9,840 | 240 | 1,850 | 4,545 | 36,950 |
| TOTAL | 69,040 | 125,040 | 48,910 | 110,655 | 257,540 |

DEFOLIATORS

DOUGLAS-FIR TUSSOCK MOTH, *Orgyia pseudotsugata* Mcd.

No tussock moth defoliation was observed in either Oregon or Washington. However, individual larvae were recovered from defoliator monitoring plots located in eastern Oregon and Washington. These included 8 of 358 plots located on National Forest land in eastern Oregon and Washington and 4 of 79 plots on State and private lands in southern Oregon. They are:

Oregon

| | |
|---------------------------|---|
| Deschutes NF | 1 |
| Mt. Hood NF | 1 |
| Fremont NF | 1 |
| Winema NF | 3 |
| Douglas Dist. (OSDF) | 1 |
| Klamath Lake Dist. (OSDF) | 3 |

Washington

| | |
|--------------|---|
| Colville NF | 1 |
| Wenatchee NF | 1 |

Low level populations were found for the fifth consecutive year at Mare's Egg Spring on the northwest side of upper Klamath Lake on the Winema National Forest. The trend of this infestation is not known. However, very low populations are expected in this area again in 1976.

LARCH CASEBEARER, *Coleophora laricella* (Hbn.)

The number of acres with visible defoliation caused by larch casebearer feeding in western larch stands of eastern Washington and northeast Oregon remained about the same as last year (see Map 3 in Appendix).

Aerial surveys conducted in early June revealed less than 7,000 acres of visible defoliation in northeastern Oregon and Washington. The largest single area of defoliation, totaling nearly 6,500 acres, occurred on the Umatilla National Forest between Fry Meadow and Mosier Spring, southwest of Troy, Oregon.

Several infested trees were observed along Highway 97 in the vicinity of Swauk Pass in the Washington Cascades southwest of Wenatchee. Population densities were not sufficient to cause visible defoliation detectable from the air. This find represents a southern extension of larch casebearer range in the Washington Cascades of nearly 86 air miles. Prior to this discovery, the pest had never been found south of Loup Loup Pass on the Okanogan National Forest.

In 1975 the Boise Cascade Corporation released several different parasites in northeastern Oregon. These included species of *Agathis*, *Chrysocharis*, *Elachertus*, and *Necremnus*. This release is part of a cooperative

Intermountain Forest and Range Experiment Station and Pacific Northwest Experiment Station research study on the biological control of this introduced forest pest.

MODOC BUDWORM, *Choristoneura viridis* Free.

Damage caused by this insect declined significantly in 1975. Very light defoliation, totaling approximately 28,450 acres, occurred in localized areas in the Warner and Gearhart Mountains on the Fremont National Forest in south central Oregon. The cause of population decline is not known. However, it may be partly related to cool and damp weather in the spring and early summer of 1975 and the occurrence of a severe frost in late July. The 1975 fall egg mass survey data indicate that the populations will be at a low level in 1976. No control action is being considered.

WESTERN SPRUCE BUDWORM, *Choristoneura occidentalis* Freeman

Defoliation caused by the western spruce budworm occurred on approximately 532,000 acres of Douglas-fir, grand fir, and Pacific silver fir type in Oregon and Washington in 1975. The majority of the defoliation, including the oldest and heaviest concentrations of damage, occurred on the Okanogan and Wenatchee National Forests and the North Cascades National Park in north central Washington (see Map 4 in Appendix). Light to moderate defoliation, totaling about 8,400 acres, occurred on the Wallowa-Whitman National Forest in northeastern Oregon. Light to heavy defoliation was detected on 10,560 acres on the Warm Springs Indian Reservation on the eastern slopes of the Oregon Cascades south of Mount Hood.

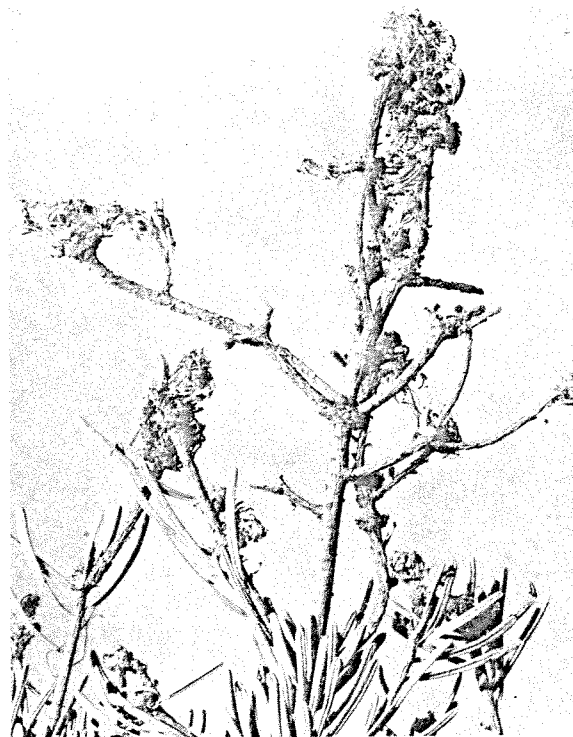


Figure #1.—The results of 2 years of defoliation on white fir.

Direct control on nearly 291,000 acres has been proposed for 1976. This includes an estimated 284,000 acres of Federal, State, and private lands located in Kittitas, Chelan, and Okanogan Counties in north central Washington and 7,000 on the Warm Springs Indian Reservation in Oregon.

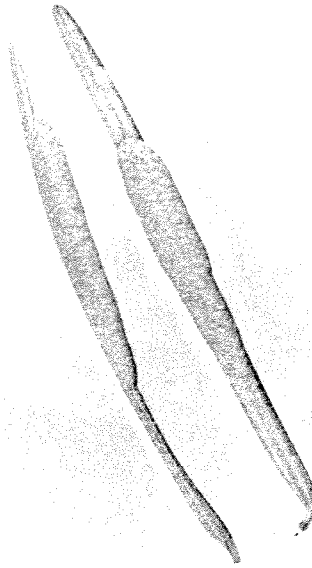


Figure #2.—Western spruce bud worm egg masses on white fir needles.

The chemicals considered for use include either carbaryl (Sevin 4 Oil), trichlorfon (Dylox 4) or malathion. Malathion is registered for use against the western spruce budworm; Sevin 4 Oil and Dylox 4 are registered for use against the eastern spruce budworm.

The per acre dosage rate includes malathion (95 percent technical) applied once at 13 fluid ounces; Sevin 4 Oil at 1 pound of carbaryl in 64 fluid ounces of oil applied once; and Dylox 4 at 1 pound of active ingredient in 32 fluid ounces of carrier applied once. Application of the selected chemical will be made in late June and early July when 50 percent of the larvae are in the fifth instar.

The principal beneficial effect of the proposed action is the protection of forests which are the source of raw materials for wood product mills within and adjacent to the infested area. Other benefits include the protection of forest watersheds, habitat for some wildlife animals, recreation, esthetics, and reduced wild-fire hazards and impacts.

Insecticide selection will be determined by public response to the Draft Environmental Statement proposed in accordance with the National Environmental Policy Act of 1969.

A pilot control project using fenitrothion (Sumithion®), was conducted on the Okanogan and Wenatchee National Forests in 1975. The results of both a single and double application rate were disappointing. The percent reduction in populations on the test plots, ranging from 66 to 77 percent, was not sufficient to save foliage.

A cooperative small-scale field experiment was also conducted by Region 6 and the Pacific Southwest Forest and Range Experiment Station using Orthene® and Matacil® against the budworm. The results of these tests are encouraging. The percent reduction in populations ranged from 95 to 99 percent in a late application. However, these insecticides will not be available for operational use in 1976. They will not be registered for use against the western spruce budworm until after they have been applied on a pilot control project.

Summary of western spruce budworm infestations in Oregon and Washington
1970-1975

| Land Classification | Acres of Defoliation by Year | | | | | |
|---------------------|------------------------------|--------|---------|---------|---------|----------|
| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
| Oregon: | | | | | | |
| Wallowa-Whitman NF | 13,780 | 28,200 | 23,030 | 48,210 | 1,980 | 8,430 |
| Warm Springs IR | 0 | 0 | 0 | 0 | 7,200 | 10,560 |
| TOTAL | 13,780 | 28,200 | 23,030 | 48,210 | 9,180 | 18,990 |
| Washington: | | | | | | |
| North Cascades NP | 0 | 0 | 3,990 | 14,690 | 23,900 | 35,050 |
| Okanogan NF | 240 | 15,900 | 86,310 | 66,570 | 176,480 | 168,450 |
| Wenatchee NF | 0 | 2,360 | 85,180 | 144,230 | 277,960 | 250,070 |
| Non-Federal | 0 | 0 | 26,990 | 56,640 | 86,120 | 59,460 |
| TOTAL | 240 | 18,260 | 202,470 | 282,130 | 564,460 | 513,030 |
| REGIONAL TOTAL | 14,020 | 46,460 | 225,500 | 330,340 | 573,640 | 532,020* |

*Apparent decrease in Regional Total is due to more intensive sketch mapping of infested centers.

SUCKING INSECTS

BALSAM WOOLLY APHID, *Adelges piceae* (Ratz.)

Damage caused by this insect continued to be observed in the true fir stands of western Oregon and Washington. A new center of damage in subalpine fir was recorded on the Mt. Baker-Snoqualmie National Forest in the vicinity of Concrete, Washington. This find represents a northern extension of this insect's range in the Washington Cascades. Previously, this pest had not been found north of the Snoqualmie River (see Map 5 in Appendix).

Gouting and some tree mortality has been observed on Fraser fir, *Abies fraseri* (Porsch) in a Christmas tree plantation near Vader and Tumwater in Washington State. According to the landowners, populations have been observed on these firs for the past 3 years.

No visible damage was observed in the Blue Mountains where this insect was discovered in 1974.

COOLEY SPRUCE GALL APHID, *Adelges cooleyi* (Gill)

This aphid was again active at many locations in the Willamette Valley and throughout the metropolitan Portland area. Infestations on ornamental spruce resulted in both tip galling and needle drop. Mortality which occurs only after repeated infestations, has not been observed.

OTHER INSECTS

Forest and Shade Tree

A TENT CATERPILLAR, *Malacosoma* sp.

Larval feeding caused defoliation on red alder in southwestern Washington and throughout the Puget Sound basin. Especially heavy feeding was reported in the Edmonds area north of Seattle. Control is generally not needed because parasites and diseases usually check most outbreaks before any tree killing occurs.

ALDER LEAF BEETLE, *Altica ambiens* (Lec.)

This insect caused extensive defoliation of red alder throughout much of northwest Oregon this past summer. Large numbers of adult beetles seeking hibernation sites were observed swarming on ponderosa pine near Grants Pass in the fall.

BRONZE BIRCH BORER, *Agrilus anxius*

Damage to ornamental cutleaf larch was widespread in northeastern Oregon and particularly heavy in the communities of Enterprise, Wallowa County and Elgin, Union County, both of which represent new distributional records. This buprestid beetle, also recorded for the first time from Deschutes and Wheeler Counties, was found infesting water birch, *Betula occidentalis*, a native tree which occurs along stream courses east of the Cascade Mountains.

Damage caused by this insect is usually most severe during or immediately following periods of drought such as has recently occurred in eastern and northeastern Oregon.

DOUGLAS-FIR ENGRAVER, *Scolytus unispinosus* (Lec.)

Scattered top-killing of drought-weakened Douglas-fir continued on the Mt. Hood National Forest. Additional new top-killing was observed on the Wallowa-Whitman National Forest. No damage was observed in Washington.

EUROPEAN PINE SHOOT MOTH, *Rhyacionia buoliana* (Schiff.)

Two new infestations were discovered in northwestern Oregon using pheromone traps during annual detection surveys. One infestation is located in a commercial field nursery in Clackamas County and the second is in a suburban area near Woodburn in Marion County. Larvae were recovered from the Clackamas County nursery and all pines are under embargo until the infestation is eradicated. Delimiting surveys within a 2 mile radius around the infested nursery revealed no additional infestations.

Approximately 3,000 residential pines in Hermiston, Umatilla, Hat Rock, McNary Dam and Pendleton in Umatilla County were sprayed with Sevin to suppress increasing shoot moth populations. Four applications at 7-day intervals were made with low pressure ground sprayers beginning 10 days after the first moths were observed. Post-treatment checks indicate excellent control was achieved.

GYPSY MOTH, *Porthetria dispar* (L.)

The results of cooperative State and Federal detection surveys in parks and highway rest stops in west-side Oregon and Washington using the synthetic attractant Gyplure® were negative.

LARCH SAWFLY, *Pristiphora erichsonii* (Wong and Ross)

This insect caused light defoliation on about 600 acres of western larch in the upper portion of Fifteen Mile drainage near Bulo Point on the Barlow Ranger District on the Mt. Hood National Forest. The trend of this outbreak is not known. However, experience indicates that parasites and predators cause population decline before serious tree damage occurs.

PINE NEEDLE SCALE, *Phenacaspis pinifoliae* (Fitch)

Scale damage was locally heavy on ponderosa pine in the vicinity of Burns and La Grande, Oregon. Infestations of this insect are often associated with environmental conditions harmful to the host. These may include smelter fumes, smog, smoke, and dust from roads, trails, excavations, and cement plants. Chronic infestations are also found on either mature or ornamental trees in areas adjacent to orchards where pesticides are frequently applied to control fruit pests. Presumably the insecticides reduce the number of beneficial insects which normally hold the scale in check.

SILVER SPOTTED TIGER MOTH, *Halisidota organata* Pack.

For the third year defoliation has occurred on individual Douglas-fir trees in a senior citizens mobile trailer development north of Lacey, Washington. Defoliation caused by this insect, although somewhat spec-

tacular, does not usually cause serious tree damage because of the annually heavy toll of caterpillars by natural enemies. Therefore, applied control measures are not likely to be necessary.

SPRUCE APHID, *Neomyzaphis abietina* (Wlkr.)

Defoliation by this aphid resulted in discoloration and needle drop of the previous year's growth on Sitka spruce along a 10-mile strip of coastal forest near Lincoln City, Oregon.

Needle drop of mature Sitka spruce along the central and southwestern coast of Washington State caused by this aphid was the greatest observed within the past 12 years. This is probably due to the abnormally dry summers that have occurred the past 2 years. It is speculated that the most heavily defoliated trees will not recover.

SMALLER EUROPEAN ELM BARK BEETLE, *Scolytus multistriatus*

This insect, the principal vector of Dutch elm disease, *Ceratocystis ulmi*, was found to be generally distributed throughout the north, central and eastern portions of Oregon. Use of traps containing pheromone resulted in the detection of this beetle in 12 new Counties east of the Cascade Mountains. These included: Sherman, Gilliam, Morrow, Union, Wallowa, Baker, Grant, Wheeler, Jefferson, Crook, Deschutes, and Harney. The results of trapping in Portland, Oregon suggest that *S. multistriatus* has been established for some time and may have a wide distribution in the Willamette Valley.

This insect, considered to have two generations per year and an extended flight period from mid-May through October, infests all native and introduced species of elm. The preferred host material for breeding consists of living elms severely weakened by drought, trees rapidly dying from disease or injury, trees with broken limbs, or any recently cut elm wood.

SPRUCE NEEDLE MINER, *Taniva albolineana*

This insect caused moderate damage on older needles of ornamental Colorado blue spruce in Wenatchee, Washington

WESTERN OAK LOOPER, *Lambdina fiscellaria somniaria* (Hulst.)

Defoliation of native white oak was observed in the City Park at Chehalis, Washington. Feeding by this insect results in nearly complete defoliation of host trees early in the season. However, refoilation usually occurs when larval feeding is finished. Historically, outbreaks are spectacular, of short duration, and usually subside without causing permanent tree damage.

Nursery and Regeneration

A GALL MIDGE, *Contarinia* sp.

Heavy damage resulting in needle discoloration of Douglas-fir was observed in several Christmas tree plantations in the Willamette Valley.

A PYRALID, *Crambus* sp.

Larval feeding caused 3 to 27 percent damage to the tap roots of Douglas-fir and true fir 2-0 stock in several forest nurseries in western Oregon and Washington.



Figure #3.—Damage to 2-0 Douglas-fir seedling by *Crambus* sp.

DOUGLAS-FIR TWIG WEEVIL, *Cylindrocopturus furnissi* (Buch.)

Scattered infestations were found in advanced reproduction and plantations of Douglas-fir throughout southwestern Oregon and scattered locations in the Willamette Valley. These outbreaks were observed primarily in areas with compacted soils, on old burns, and on dry sites, particularly gravel soils. These outbreaks, considered to be a result of the 1973-1974 drought which occurred in this area, are expected to subside with a return to normal moisture conditions.

EURYTOMID WASP, *Eurytoma* sp.

An unidentified species of this genus was found infesting boles and branches of a number of ponderosa pine trees in a 12-year-old plantation near Butte Falls, Oregon, on the Rogue River National Forest. The trend of the infestation is unknown.

GOUTY PITCH MIDGE, *Retinodiplosis inopsis* (O.S.)

A new center, totaling 1,190 acres and consisting of very heavy damage, was observed in the vicinity of Howard Bay (upper Klamath Lake), 9 miles northwest of Klamath Falls. The damage, consisting of bud and needle mortality on 1975 shoots, occurs in stands of second-growth ponderosa pine less than 30-feet tall. The trend of this outbreak is not known.

PINE NEEDLE SHEATH MINER, *Zelleria haimbachi* Busck.

A 500-acre ponderosa pine plantation near Keno, Oregon continued to be heavily infested for the third year. Survey results indicate that an average of four larvae per shoot caused damage to 46 percent of the new needles. Repeated defoliation has resulted in mortality of numerous lateral and terminal buds. Populations will be monitored in the spring of 1976 to determine the necessity for control. Growth impact study plans are now being developed.

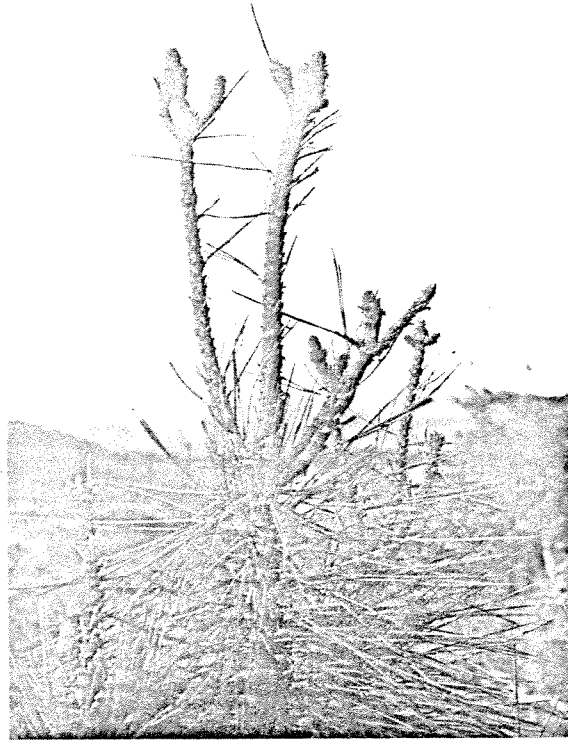


Figure #4.—Ponderosa pine damaged by the pine needle sheath miner.

VARIEGATED CUTWORM, *Peridroma saucia*

This insect is reported to have caused significant damage to Douglas-fir seedlings in the Wind River Nursery on the Gifford Pinchot National Forest.

Range

CALIFORNIA TORTOISE-SHELL BUTTERFLY, *Nymphalis californica* (Bdv.)

Caterpillar feeding caused defoliation of 600 acres of *Ceanothus* in a ponderosa pine plantation near Klamath Falls, Oregon. Numerous larvae were observed on the pine foliage, but no damage occurred.

Seed and Cone

WESTERN SEEDBUG, *Leptoglossus occidentalis*

This insect was observed feeding on western white pine seed at Dorena Seed Orchard, Willamette National Forest. An impact study to determine the amount of damage caused by this bug is now in progress.

UNKNOWN SPIDER MITES PROBABLY SPRUCE MITE, *Oligonychus ununguis* (Jacob.)

Light defoliation caused by this mite occurred on Douglas-fir in portions of northeastern Oregon and Washington. This includes 640 acres on the Malheur National Forest and 2,490 acres on the Wallowa-Whitman National Forest in Oregon; and 250 acres on the Colville Indian Reservation in Washington.

The damage on the Colville Reservation and a small portion of the acreage on the Wallowa-Whitman National Forest occurred in areas that had been treated with DDT for control of the Douglas-fir tussock moth in 1974. However, the majority of the damage occurred in areas that had not been treated in 1974.

The cause of mite activity in areas that had not been treated with DDT is not known. However, it may be partly related to the occurrence of an unusually hot, dry summer such as occurred in 1974.



Figure #5.—Western seedbug feeding on western white pine cone.

The spruce spider mite frequently develops epidemic populations on ornamental evergreens during unusually hot, dry summers. However, it is not known whether such weather contributes to outbreaks under forest conditions.

These outbreaks are expected to collapse by 1976 as the biological balance with natural predators reaches an equilibrium. No serious damage is expected.

DISEASE CONDITIONS IN BRIEF

The incidence of foliage diseases and weather injuries continued to cause damage in both forest nurseries and forest stands in 1975. Mortality of seedlings caused by *Phytophthora* fungi was observed in several forest nurseries in Oregon and Washington. Several rust fungi which infect foliage were commonly observed on true firs, hemlock and Sitka spruce. Damage caused by *Rhabdocline* needle cast affected Douglas-fir in several Christmas tree plantations in western Oregon.

The most important forest diseases in Oregon and Washington are the decays, root rots, and dwarf mistletoes. These diseases, while taking a large yearly toll, are not subject to yearly fluctuations. They are the quiet thieves and killers of the forest who frequently go unnoticed because of their ever present nature.

NURSERY DISEASES

Four species of *Phytophthora* fungi have been isolated from root rotted and dead Douglas-fir seedlings in several forest nurseries in Oregon and Washington. The four species have been tentatively identified as *P. cinnamomi*, *P. dreschleri*, *P. cryptogea*, and an unidentified species. With the exception of *P. cinnamomi*, the *Phytophthoras* had not previously been reported on Douglas-fir or other northwest conifers. All of these fungi have been demonstrated to be pathogenic to Douglas-fir seedlings in small-scale plot tests.

Mortality of seedlings in the infested nurseries has occurred in very wet portions of beds or sections where water tends to remain on the surface. Disease incidence is absent or very limited in well-drained portions of the infested nurseries.

Survival of stock outplanted from an area known to be infested in one nursery was poor.

Evaluations of the biology of the fungi, particularly their survival and spread in nurseries, are planned. Tests of control methods are also planned.

FOLIAGE DISEASES

Douglas-fir needle blight caused by *Rhabdocline pseudotsugae* damaged Christmas tree plantations in Clackamas County this spring. No increase in infection was evident in forest stands. A Washington State Department of Natural Resources investigation of a Christmas tree progeny study showed that families of Douglas-fir brought from Oregon to the Olympia area were more susceptible to infection by *Rhabdocline* than local Washington sources.

Elytroderma needle blight, caused by *Elytroderma deformans*, became quite noticeable throughout much of eastern Oregon in 1975. Ponderosa pine stands in the Ochoco Mountains and portions of the Blue Mountains displayed the most damage. These are the same areas that were severely damaged by an outbreak in the late 1940's. Damage is not severe enough to cause tree killing. The amount of visible damage is expected to increase significantly in 1976 because of good infection conditions which existed in 1975.

Lophodermium needlecast caused by *Lophodermium pinastri* has damaged several Scotch pine Christmas tree plantations in western Washington. Effective controls have been developed. Young seedlings must be sprayed from nursery age on with formulations of maneb fungicide.

The cool, moist spring, summer, and fall weather contributed to an increase in infection by several rust fungi which infect foliage. Although these fungi normally cause very little impact in forest stands, their appearance can often times be striking. *Pucciniastrum geoppertianum*, *Chrysomya ledicola*, and *Melampsora abietis-canadensis* were common on true firs, hemlocks and Sitka spruce this year.

ROOT DISEASES

ARMILLARIA ROOT ROT, *Armillaria mellea* Vahl. ex Fr.

Armillaria root rot was found killing 7-year old noble fir Christmas trees in a plantation south of Olympia. The root rot was associated with stumps of the previous noble fir Christmas tree crop. The new crop was interplanted between the old stumps. This instance of tree killing suggests that managers consider removing stumps to avoid future root rot.

LAMINATED ROOT ROT, *Phellinus (Poria) weirii* (Murr.) Murr.

The number of forest stands known to be infected by laminated root rot caused by *Phellinus (Poria) weirii* continues to increase largely as a result of increased awareness of the disease by many foresters. Several infection centers were detected in stands in eastern Oregon and Washington and in southern Oregon in 1975.

PORT-ORFORD-CEDAR ROOT ROT, *Phytophthora lateralis* Tucker and J. Milb.

Unusually common reports of Port-Orford-cedar root rot caused by *Phytophthora lateralis* were noted in western Washington this year. One large group planting of old trees near Hoquiam was wiped out. Several other ornamental plantings, all along roads or near traffic concentrations were killed. Up until now tree killing from this virulent root rot of native cedar has been sporadic in Washington.

Management systems for root rot-infested stands are now under development and will be released during early 1976. Particular emphasis will be placed on the *Armillaria mellea* root rot problem in the Glenwood,

Washington vicinity. The disease involves some 10,000 acres in that area and has been chronic there for years.

Similarly, a management system will also be made available for west slope stands infected with *Phellinus (Poria) weirii*.

Decays continue to cause large losses in northwest forests. This serious problem is not going to disappear as the old-growth stands are removed, because wounds on young-growth trees provide ideal infection courts for decay causing organisms. This problem is especially acute in western hemlock trees which have been wounded by logging or bears.

VASCULAR WILT DISEASE

DUTCH ELM DISEASE, *Ceratocystis ulmi* (Buisman) C. Moreau

This disease was not reported from any new locations in 1975. The disease has previously been detected in Ontario, Nyssa, and Union, Oregon.

DEFECTS AND DECAY

The Shigometer, an electric meter used to detect decay in wood, was tested in several locations in Oregon and Washington this fall. The tests showed the meter has great potential for accurately detecting and measuring many of the decays in northwest trees.

WEATHER INJURY

The prolonged dry fall of 1974, which extended well into November before measurable precipitation occurred, contributed to widespread tree killing, top-killing, and branch flagging on Douglas-fir in southern Oregon and scattered locations throughout Oregon and Washington. In a few cases damage became apparent in November and December 1974, but symptom expression on most trees was delayed until the spring of 1975. The damage was particularly noticeable in the Illinois Valley around Cave Junction. The moist conditions of 1975 have helped relieve much of the drought stress.

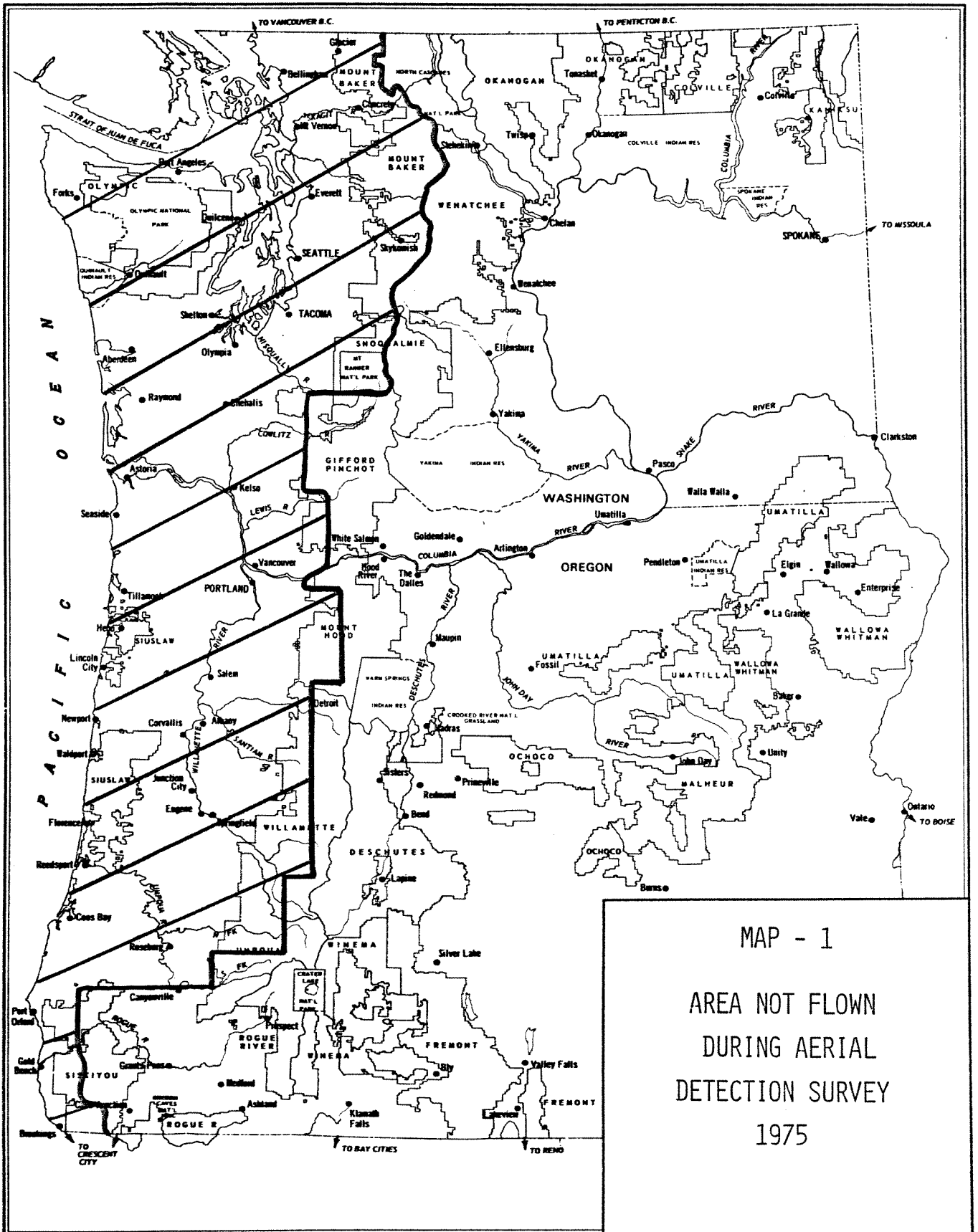
A Christmas tree plantation near Winlock, Washington that was partially harvested in November 1974 suffered needle injury to the residual trees. Cold southeasterly winds and sunny weather in early 1975 desiccated the newly exposed foliage on unprotected trees. Prior to harvesting, injury was rare because the thick, bushy trees protected each other. Injured trees must be held an additional year before being harvested.

Needle damage to grand fir Christmas trees was widespread throughout western Washington during the summer. Current year foliage was apparently damaged by high summer temperatures while still succulent. New foliage quality was reduced and trees must be held an additional year to improve salability.

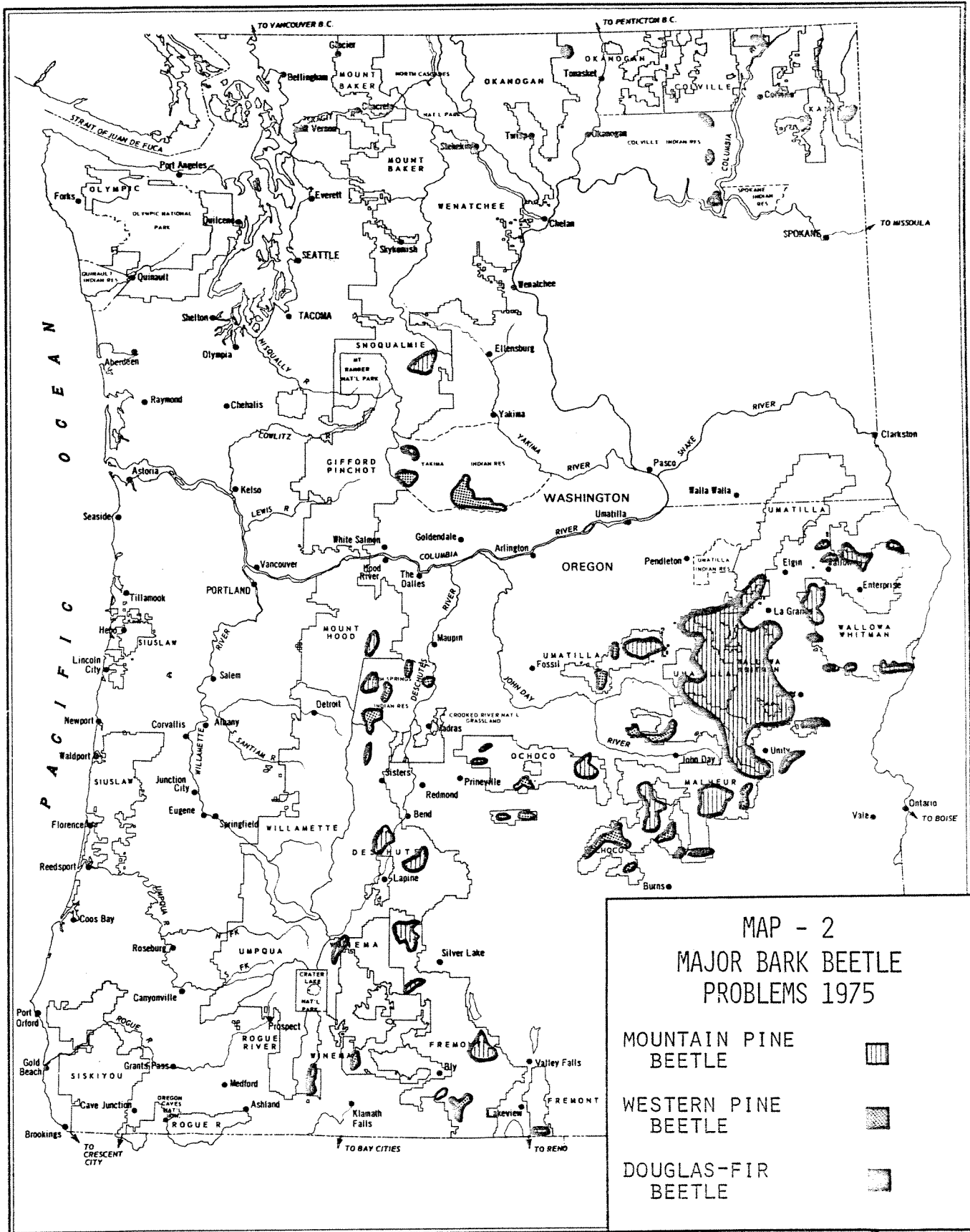
APPENDIX

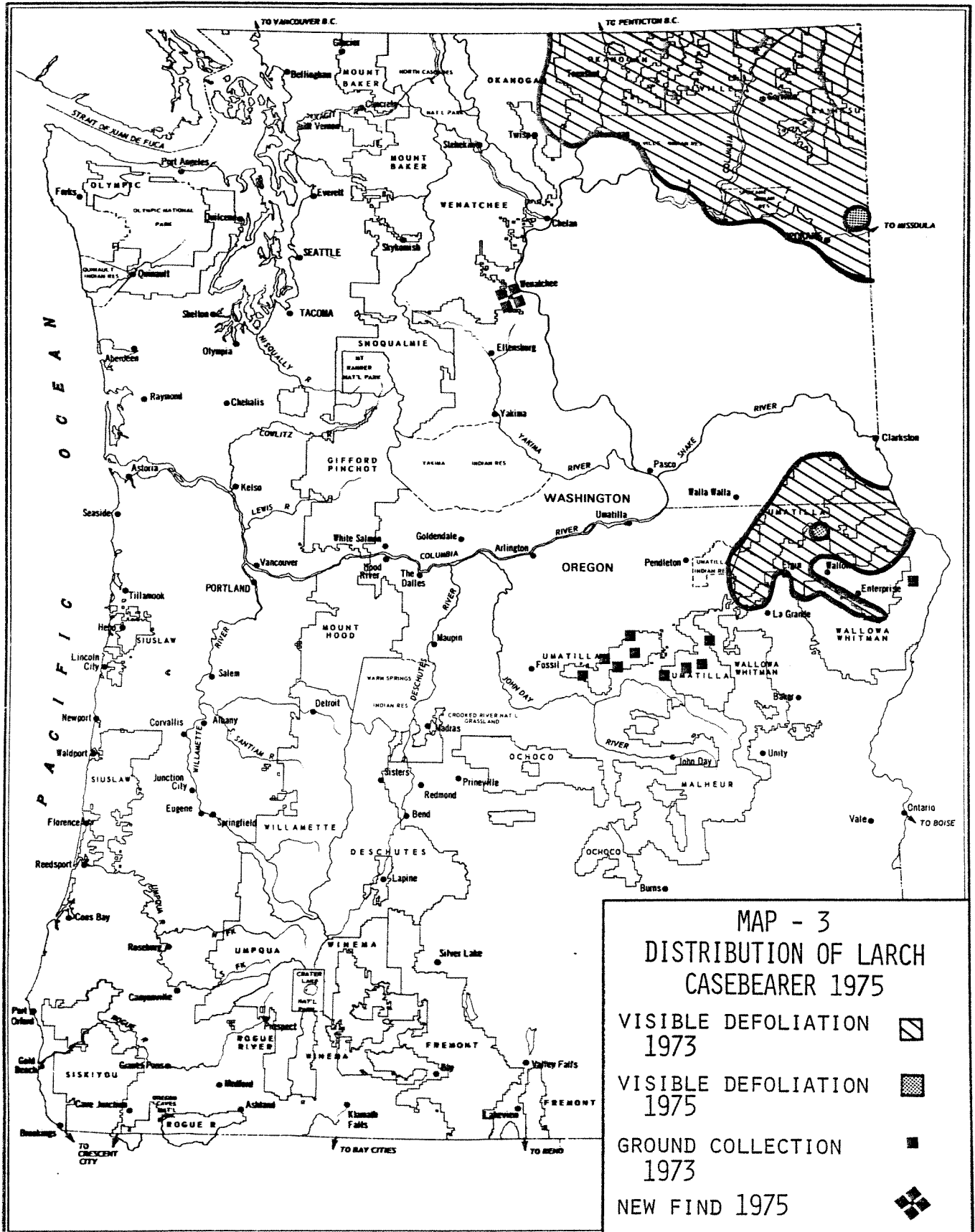
MAPS

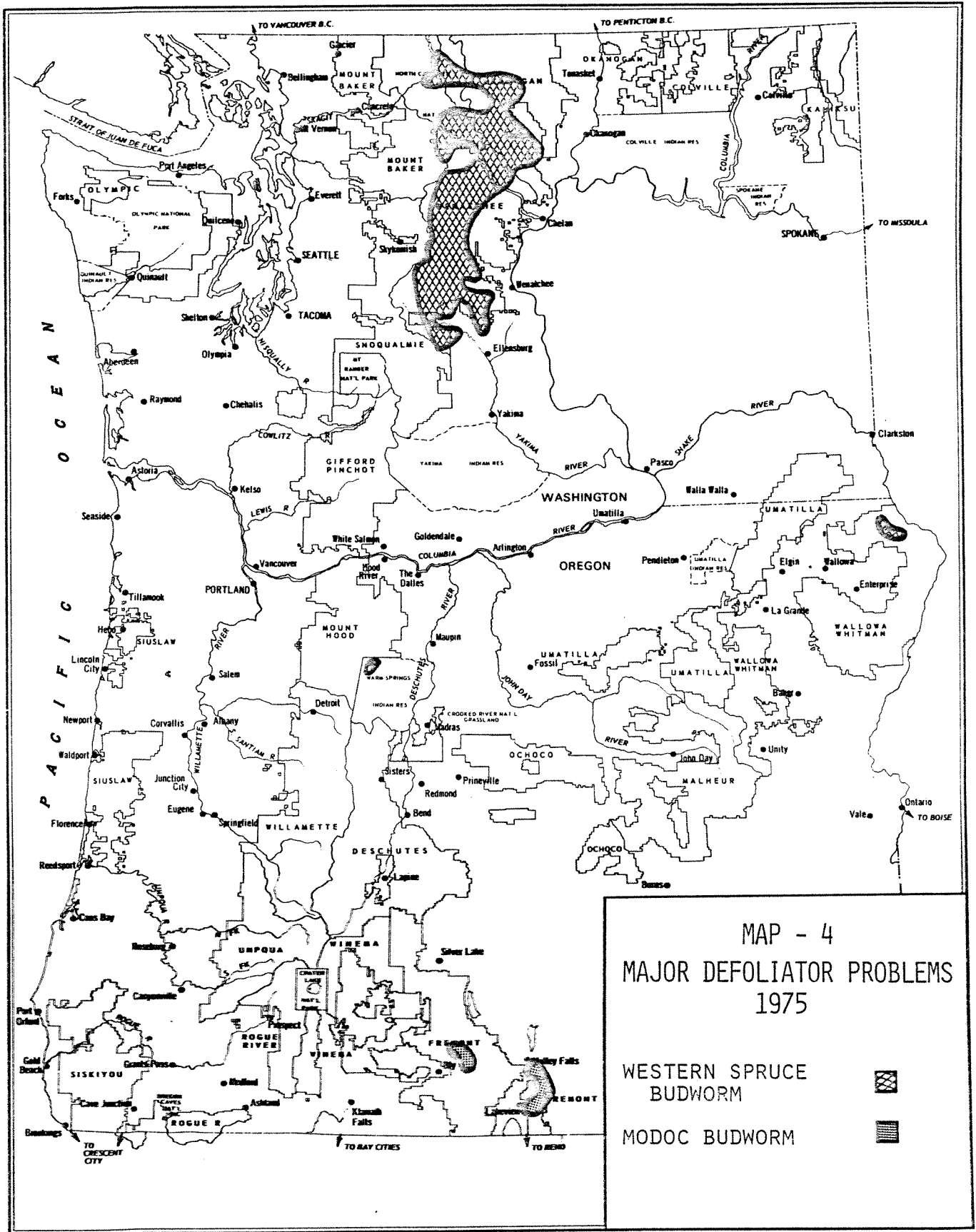
1. Area flown during 1975 aerial detection survey.
2. Distribution of mountain pine beetle, western pine beetle, and Douglas-fir beetle in the Pacific Northwest.
3. Distribution of larch casebearer in the Pacific Northwest.
4. Distribution of western spruce budworm and Modoc budworm in the Pacific Northwest.
5. Distribution of balsam woolly aphid in the Pacific Northwest.





MAP - 1
 AREA NOT FLOWN
 DURING AERIAL
 DETECTION SURVEY
 1975

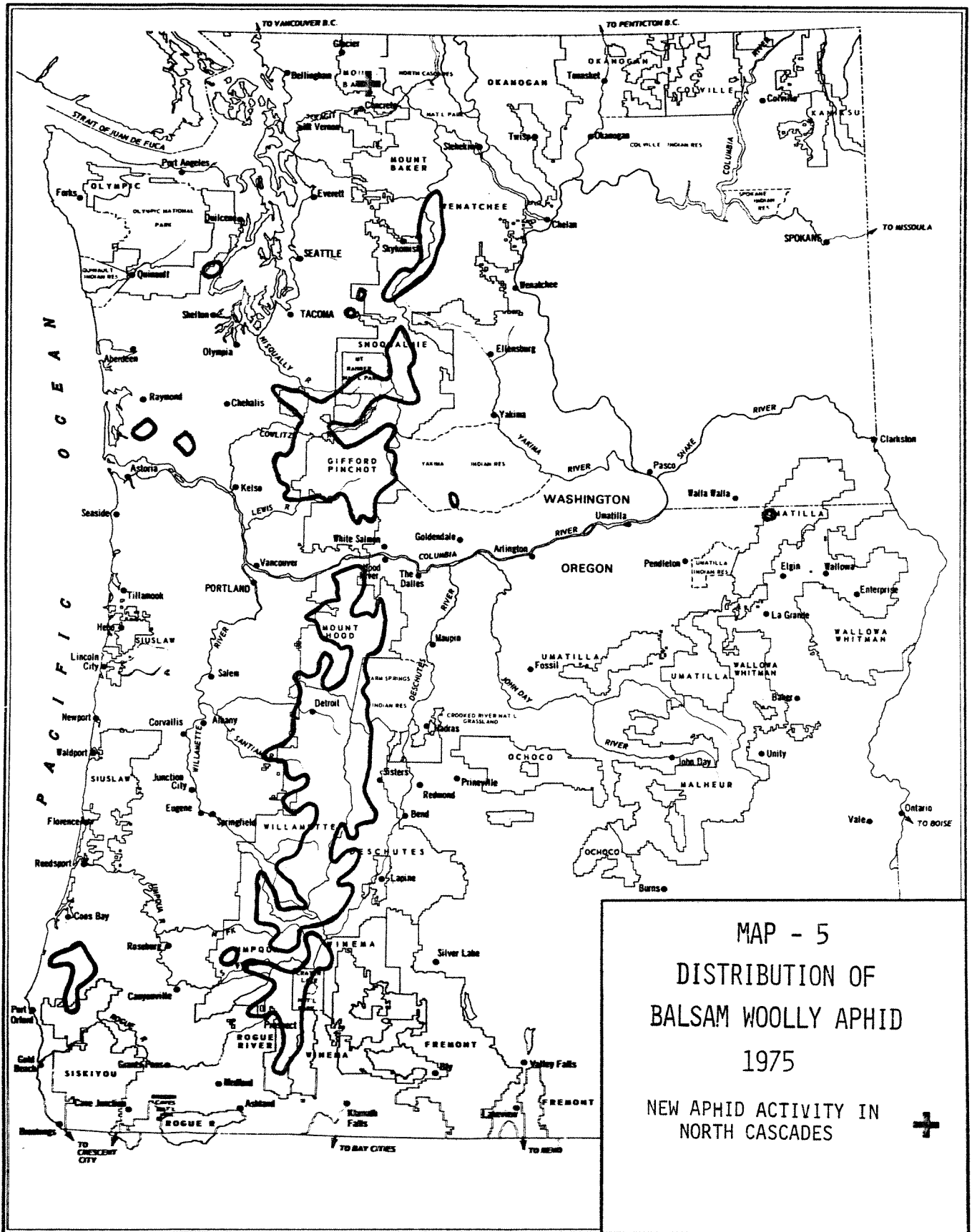






MAP - 4
 MAJOR DEFOLIATOR PROBLEMS
 1975

WESTERN SPRUCE
 BUDWORM 
 MODOC BUDWORM 



The FOREST SERVICE of the U. S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.