# FOREST INSECT CONDITIONS IN THE PACIFIC NORTHWEST DURING 1966

by

L. F. Pettinger

and

R. E. Dolph

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Insect and Disease Control Branch
Division of Timber Management
Pacific Northwest Region Forest Service
U. S. Department of Agriculture

# FOREST INSECT CONDITIONS


L. F. Pettinger

R. E. Dolph



INSECT AND DISEASE CONTROL BRANCH

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PACIFIC NORTHWEST REGION

U.S. DEPARTMENT OF AGRICULTURE

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This report, the 19th in an annual series, is based on cooperative aerial and ground surveys sponsored by the Northwest Forest Pest Action Council. The principal cooperators were the Washington State Department of Natural Resources, Oregon State Department of Forestry, and U. S. Forest Service. Many individuals from these organizations made the survey possible.

COVER BACKGROUND: Mountain pine beetle damage in young ponderosa pine stands on Dooley Mountain, Wallowa-Whitman National Forest.

BALSAM WOOLLY APHID
Adelges piceae (Ratz.)

The loss trend varied according to host species and area (Table 6). The majority of the damage occurred in subalpine fir with lesser amounts in Pacific silver fir. In Oregon, damage decreased in subalpine fir along the Cascade Mountains but increased in lowland white fir in the southern Coast Range. Outbreaks have been detected as far south as Powers, Oregon in the Coquille River drainage. In Washington, damage occurred on the Snoqualmie and Gifford Pinchot National Forests, Yakima Indian Reservation, and Mt. Rainier National Park, with only the latter showing an increasing damage trend (Table 7).

Limited insecticide field tests were made against the aphid in a high-use recreational area on the north slope of Mt. St. Helens. Subalpine fir (10 to 40 ft. in height) were sprayed with a ground sprayer using BHC. Fall observations of the individual test trees indicate substantial control. Additional tests are planned for 1967.

PINE NEEDLE MINER
Coleotechnites sp. near milleri

Light to very heavy defoliation occurred over wide areas of lodgepole pine stands on the Deschutes, Winema, and Fremont National Forests in Oregon (Table 5). Populations of this moth have now been on the increase for the past three years. No decrease in damage is expected next year.

In ponderosa pine stands on the Winema National Forest, light defoliation occurred in nine outbreak centers and encompassed 46,640 acres.

No control measures are planned for next year. The situation will be watched very closely, however.

Table 5.--Extent of needle miner infestations on lodgepole pine in Oregon in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation | | | | All intensities |
|---|---|---|---|---|---|---|
| | | Light | Moderate | Heavy | Very heavy | |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Fremont N.F. | 1 | 240 | 0 | 0 | 0 | 240 |
| Winema N.F. | 46 | 41,260 | 19,270 | 6,360 | 6,790 | 73,680 |
| Deschutes N.F. | 33 | 67,940 | 4,760 | 1,840 | 0 | 74,540 |
| Oregon areas | 80 | 109,440 | 24,030 | 8,200 | 6,790 | 148,460 |
| Regional total | 80 | 109,440 | 24,030 | 8,200 | 6,790 | 148,460 |

1/ N.F., National Forest

## LARCH SAWFLY
## *Pristiphora erichsonii* (Htg.)

Larch sawfly populations in western larch stands increased in Washington. Outbreaks ranging in size from a few acres to those occupying several hundred acres developed along the Canadian border in northeast Washington. Subepidemic populations were found over a wide area of northeast Washington as well as on the Yakima Indian Reservation. In Oregon the outbreaks on the Mt. Hood National Forest subsided to subepidemic status but remained static on the Warm Springs Indian Reservation (Table 4).

No tree mortality has occurred as a result of defoliation, nor is any mortality expected in any of the outbreak areas in the immediate future.

Parasitism by a wasp, *Tritnepis* sp. is heavy in most outbreak areas and will probably reduce local populations. No control measures are planned.

Table 4.--Extent of larch sawfly infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area [1] | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Warm Springs I.R. | 1 | 5,600 | 0 | 0 | 0 | 5,600 |
| Oregon areas | 1 | 5,600 | 0 | 0 | 0 | 5,600 |
| Washington: | | | | | | |
| Okanogan N.F. | 2 | 0 | 280 | 0 | 0 | 280 |
| Colville N.F. | 10 | 1,800 | 3,760 | 900 | 240 | 6,700 |
| Kaniksu N.F. | 2 | 0 | 480 | 840 | 0 | 1,320 |
| Washington areas | 14 | 1,800 | 4,520 | 1,740 | 240 | 8,300 |
| Regional total | 15 | 7,400 | 4,520 | 1,740 | 240 | 13,900 |

[1] I.R., Indian Reservation; N.F., National Forest

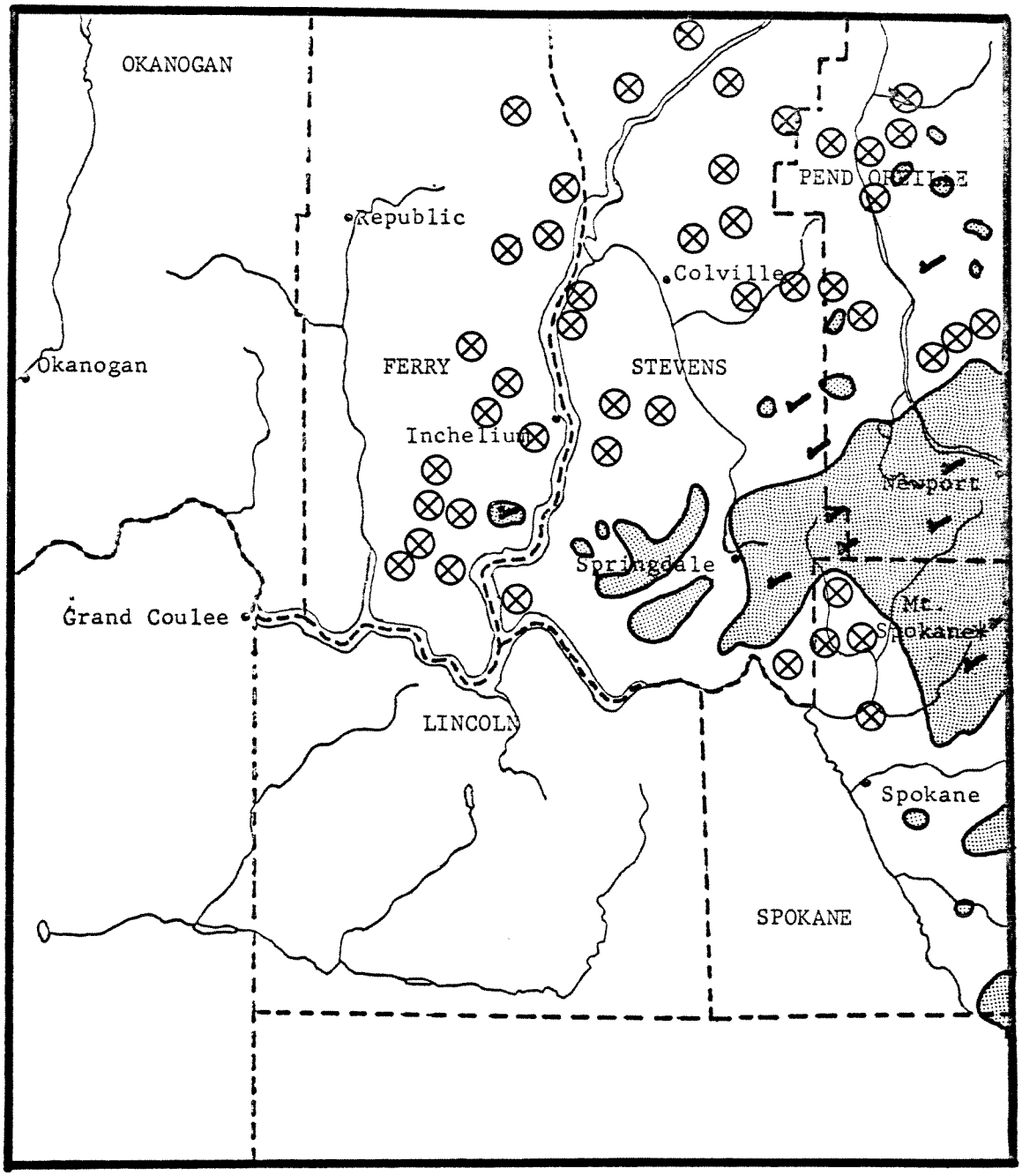


Figure 1.--Distribution of larch casebearer in northeast Washington

Epidemic populations. Damage recorded by aerial survey.

Subepidemic populations. Detected by ground surveys.

Parasite liberation plots.

Table 3.--Extent of larch casebearer infestations in Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Washington : | | | | | | |
| Colville N.F. | 23 | 43,400 | 13,880 | 3,880 | 2,680 | 63,840 |
| Colville I.R. | 4 | 400 | 0 | 0 | 2,200 | 2,600 |
| Spokane I.R. | 8 | 17,180 | 3,840 | 1,580 | 0 | 22,600 |
| Northeast Wash. Dist. | 49 | 59,720 | 42,500 | 27,320 | 7,960 | 137,500 |
| Kaniksu N.F. | 21 | 144,180 | 21,720 | 35,200 | 43,040 | 244,140 |
| Washington areas | 105 | 264,880 | 81,940 | 67,980 | 55,880 | 470,680 |
| Regional total | 105 | 264,880 | 81,940 | 67,980 | 55,880 | 470,680 |

1/ N.F., National Forest; I.R., Indian Reservation

made by U. S. Forest Service, Region 1 personnel. At the other sites the parasites were released as a cooperative project with the Washington State Department of Natural Resources. At ten of the localities the releases were "wild" releases; i.e., the parasites were not confined to the release tree. At the release site on the Colville Indian Reservation the parasites were confined to the release tree with cloth net bags in an attempt at parasite propagation for future releases in other localities. Midwinter counts revealed the increases in parasite numbers were not sufficient to use as 1967 release stock. As in 1966, the release stock for 1967 will be obtained from the U. S. Forest Service, Region 1 stock in Idaho.

Table 2.--Trend of larch casebearer infestations in Washington, 1962-66

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Kaniksu N.F. | 0 | 6,270 | 30,180 | 167,480 | 244,140 |
| Northeast Washington Dist. | 5,280 | 30,760 | 82,530 | 151,160 | 137,500 |
| Colville N.F. | 0 | 0 | 200 | 17,180 | 63,840 |
| Colville I.R. | 0 | 0 | 0 | 1,120 | 2,600 |
| Spokane I.R. | 0 | 0 | 0 | 3,440 | 22,600 |
| All areas | 5,280 | 37,030 | 112,910 | 340,380 | 470,680 |

1/ N.F., National Forest; I.R., Indian Reservation

## INTRODUCTION

Epidemic outbreaks of forest insects were detected and mapped according to intensity of damage from the air. Ground surveys were made to verify the aerial survey findings, detect subepidemic insect populations, and evaluate threat and insect population trends.

The problems of bear damage to forest trees and dying hemlock were recorded and discussed at the request of the Northwest Forest Pest Action Council.

## DEFOLIATORS OF PRIMARY IMPORTANCE

Standards used in the aerial detection survey for evaluation of forest defoliator outbreaks are as follows:

| Defoliation intensity | Appearance of damage |
|---|---|
| Light | Barely visible from air |
| Moderate | Top 1/4 of tree defoliated |
| Heavy | Top 1/2 of tree defoliated |
| Very heavy | Top 3/4 of tree defoliated |

### LARCH CASEBEARER
### *Coleophora laricella* (Hübner)

Spread of the moth within the State of Washington has been both rapid and spectacular. From the initial report in 1960 of the moth on Mica Peak, it has now spread to over 470,680 acres of epidemic outbreak (Table 2). Subepidemic populations can be found in all larch stands in Spokane, Pend Oreille, Stevens, and part of Ferry Counties (Figure 1). No casebearer has been reported in the State of Oregon.

Defoliation ranges from light to very heavy (Table 3). However, no tree mortality can be related directly to defoliation even in those trees that have been heavily defoliated since the early outbreak years.

Releases of the parasite, *Agathis pumila* (Ratz.) were made at eleven localities (Figure 1). At three of the sites, releases were

Table 1 - Summary of 1966 forest insect epidemic infestations in Oregon and Washington

| Insects [1] | Oregon | | Washington | | Regional total | |
|---|---|---|---|---|---|---|
| | Infestation centers | Area | Infestation centers | Area | Infestation centers | Area |
| | Number | Acres | Number | Acres | Number | Acres |
| Defoliators: | | | | | | |
| Black-headed budworm | 1 | 100 | 0 | 0 | 1 | 100 |
| Sawflies on true firs | 1 | 520 | 0 | 0 | 1 | 520 |
| Sawflies on larch | 1 | 5,600 | 14 | 8,300 | 15 | 13,900 |
| Western oak looper | 2 | 340 | 0 | 0 | 2 | 340 |
| Needle miners (L) | 80 | 148,460 | 0 | 0 | 80 | 148,460 |
| Needle miners (P) | 9 | 46,640 | 0 | 0 | 9 | 46,640 |
| Larch casebearer | 0 | 0 | 105 | 470,680 | 105 | 470,680 |
| All defoliators | 94 | 201,660 | 119 | 478,980 | 213 | 680,640 |
| Sucking insects: | | | | | | |
| Balsam wooly aphid | 291 | 42,320 | 44 | 11,160 | 335 | 53,480 |
| Spider mites | 7 | 6,520 | 0 | 0 | 7 | 6,520 |
| All sucking insects | 298 | 48,840 | 44 | 11,160 | 342 | 60,000 |
| Bark beetles: | | | | | | |
| Douglas-fir beetle (Westside) | 643 | 45,280 | 49 | 5,220 | 692 | 50,500 |
| Douglas-fir beetle (Eastside) | 76 | 4,590 | 119 | 22,300 | 195 | 26,890 |
| Engelmann spruce beetle | 57 | 6,170 | 27 | 4,430 | 84 | 10,600 |
| Fir engraver | 159 | 11,480 | 56 | 5,870 | 215 | 17,350 |
| Mountain pine beetle (L) | 339 | 89,390 | 1 | 80 | 340 | 89,470 |
| Mountain pine beetle (S) | 30 | 2,370 | 0 | 0 | 30 | 2,370 |
| Mountain pine beetle (W) | 657 | 71,540 | 292 | 74,410 | 949 | 145,950 |
| Mountain pine beetle (P) | 352 | 54,230 | 93 | 21,730 | 445 | 75,960 |
| Oregon pine ips | 60 | 3,870 | 5 | 640 | 65 | 4,510 |
| Western pine beetle | 239 | 37,820 | 53 | 9,610 | 292 | 47,430 |
| Silver fir beetles | 0 | 0 | 53 | 12,500 | 53 | 12,500 |
| All bark beetles | 2,612 | 326,740 | 748 | 156,790 | 3,360 | 483,530 |
| All insects | 3,004 | 577,240 | 911 | 646,930 | 3,915 | 1,224,170 |

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

3. Western pine beetle.--Losses to this bark beetle were generally lower over the Region. Most damage occurred as scattered tree killing.

4. Fir engraver beetle.--Attacks of this insect were downward in both Oregon and Washington.

5. Oregon pine ips.--Losses were greatly reduced in both States.

6. Engelmann spruce beetle.--Overall losses were generally downward, with some localized damage increasing.

7. Silver fir beetles.--Losses increased in Pacific silver fir stands of Washington. No losses were reported in Oregon.

8. Larch casebearer.--Infestations of this introduced insect continued to spread in the western larch stands of northeast Washington. Parasites were released for the first time in the State of Washington.

9. Larch sawfly.--Outbreaks decreased in Oregon and increased in Washington. An overall static trend is expected.

10. Douglas-fir tussock moth.--Epidemic outbreaks of this insect collapsed in both States.

11. Pine needle miner.--Outbreaks increased rapidly in the ponderosa and lodgepole pine stands of central Oregon.

12. Western oak looper.--Outbreaks declined with only minor damage in small localized areas in the Willamette Valley of Oregon.

13. European pine shoot moth.--The infestation continued to spread within the Containment Zone in Washington. All pines in an infested nursery in Portland, Oregon were fumigated and sprayed to eradicate the insect.

14. Blackheaded budworm.--Damage was very light in central Oregon and is is expected to continue to decline.

15. Balsam woolly aphid.--Losses decreased in both States. Infestations were found further south in the southern Coast Range of Oregon.

## SURVEY FINDINGS IN BRIEF

This year destructive forest insect outbreaks occurred on 1,224,170 acres of forest lands in Oregon and Washington (Table 1). Defoliators accounted for more than two-thirds of the effected acreage, the majority of which was caused by the larch casebearer. Defoliator outbreaks caused little or no tree mortality in 1966. Bark beetles caused the highest timber losses through tree mortality. Sucking insect damage was lower than last year and caused less damage than any other group of insects.

The infested acreage was lower than the ten-year average of 1,456,700 acres. The outbreak acreage trend for the past decade is as follows:

| Year | Acres infested | Year | Acres infested |
|---|---|---|---|
| 1957 | 2,129,440 | 1962 | 1,305,170 |
| 1958 | 2,032,720 | 1963 | 1,319,120 |
| 1959 | 1,448,360 | 1964 | 1,208,570 |
| 1960 | 1,272,960 | 1965 | 1,403,300 |
| 1961 | 1,223,230 | 1966 | 1,224,170 |

The extent and intensity of outbreaks by insect species occurring in Oregon are given in Table 37 and in Washington in Table 38. The major problem areas of insect outbreaks are shown in the generalized map in Figure 2.

Both States are divided into forest insect reporting areas as shown on the inside of back cover. These insect reporting areas are a simple convenience for reporting conditions in a geographical area. No attempt has been made to summarize insect outbreaks according to land ownership or management within an individual reporting area.

Briefly the main findings of both aerial and ground surveys in 1966 were:

1. Mountain pine beetle.--Outbreaks in western white pine stands decreased in both Oregon and Washington. Outbreaks on ponderosa pine also decreased in both States, but the potential for catastrophic outbreaks still remains. On lodgepole pine losses were lower in both States. Outbreaks on sugar pine remained at a low level.

2. Douglas-fir beetle.--The destructive outbreaks of this beetle in the westside Douglas-fir stands decreased over the past year. In eastside Douglas-fir stands the losses were slightly lower.

C O N T E N T S

Table 18.--Trend of Douglas-fir beetle infestations in eastside Douglas-fir in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Wallowa-Whitman N.F. | 12,490 | 12,510 | 52,220 | 20,710 | 1,910 |
| Umatilla N.F. | 5,630 | 1,560 | 10,640 | 1,900 | 420 |
| Malheur N.F. | 520 | 240 | 810 | 6,160 | 1,250 |
| Winema N.F. | 0 | 210 | 0 | 0 | 0 |
| Ochoco N.F. | 650 | 860 | 470 | 550 | 110 |
| Warm Springs I.R. | 60 | 20 | 0 | 50 | 0 |
| Umatilla I.R. | 80 | 80 | 0 | 0 | 70 |
| Central Oregon Dist. | 0 | 110 | 0 | 0 | 210 |
| Lookout Mt. Dist. | 0 | 0 | 0 | 0 | 620 |
| Oregon areas | 19,430 | 15,590 | 64,140 | 29,370 | 4,590 |
| Washington: | | | | | |
| Colville I.R. | 7,650 | 11,460 | 2,050 | 2,300 | 4,440 |
| Colville N.F. | 14,900 | 8,240 | 4,630 | 8,780 | 4,860 |
| Spokane I.R. | 0 | 70 | 0 | 0 | 160 |
| Yakima I.R. | 0 | 320 | 0 | 0 | 0 |
| Okanogan N.F. | 24,060 | 31,950 | 6,830 | 12,160 | 10,400 |
| Wenatchee N.F. | 4,080 | 4,280 | 760 | 1,120 | 200 |
| Glenwood Dist. | 0 | 90 | 0 | 280 | 2,160 |
| Kaniksu N.F. | 220 | 160 | 360 | 180 | 80 |
| Northeast Wash. Dist. | 80 | 60 | 0 | 120 | 0 |
| Umatilla N.F. | 330 | 500 | 2,710 | 0 | 0 |
| Washington areas | 51,320 | 57,130 | 17,340 | 24,940 | 22,300 |
| Regional total | 70,750 | 72,720 | 81,480 | 54,310 | 26,890 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 17.--Extent of Douglas-fir beetle infestations on westside Douglas-fir in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of Infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Umpqua N.F. | 41 | 1,520 | 300 | 0 | 0 | 1,820 |
| Mt. Hood N.F. | 16 | 760 | 0 | 0 | 0 | 760 |
| Rogue River N.F. | 41 | 2,120 | 0 | 120 | 0 | 2,240 |
| Siskiyou N.F. | 67 | 2,300 | 160 | 0 | 0 | 2,460 |
| Siuslaw N.F. | 188 | 7,380 | 1,980 | 0 | 0 | 9,360 |
| Willamette N.F. | 123 | 5,340 | 2,010 | 1,870 | 90 | 9,310 |
| Northwest Oregon Dist. | 1 | 20 | 0 | 0 | 0 | 20 |
| Coos-Douglas Dist. | 166 | 15,970 | 3,240 | 100 | 0 | 19,310 |
| Oregon areas | 643 | 35,410 | 7,690 | 2,090 | 90 | 45,280 |
| Washington: | | | | | | |
| Mt. Baker N.F. | 2 | 200 | 0 | 0 | 0 | 200 |
| Olympic N.F. | 1 | 80 | 0 | 0 | 0 | 80 |
| Snoqualmie N.F. | 7 | 680 | 0 | 0 | 0 | 680 |
| Southwest Wash. Dist. | 11 | 1,280 | 0 | 0 | 0 | 1,280 |
| Gifford Pinchot N.F. | 28 | 1,720 | 880 | 380 | 0 | 2,980 |
| Washington areas | 49 | 3,960 | 880 | 380 | 0 | 5,220 |
| Regional total | 692 | 39,370 | 8,570 | 2,470 | 90 | 50,500 |

1/ N.F., National Forest

Table 16.--Trend of Douglas-fir beetle infestations in westside Douglas-fir in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Coos-Douglas Dist. | 0 | 0 | 19,630 | 69,720 | 19,310 |
| Siuslaw N.F. | 1,560 | 540 | 17,890 | 54,080 | 9,360 |
| Umpqua N.F. | 740 | 4,100 | 2,360 | 30,260 | 1,820 |
| Willamette N.F. | 0 | 410 | 720 | 17,850 | 9,310 |
| Siskiyou N.F. | 1,160 | 320 | 6,760 | 15,200 | 2,460 |
| Rogue River N.F. | 3,040 | 3,560 | 240 | 2,580 | 2,240 |
| Northwest Oregon Dist. | 0 | 0 | 0 | 1,400 | 20 |
| Mt. Hood N.F. | 600 | 0 | 450 | 400 | 760 |
| Crater Lake N.P. | 0 | 30 | 0 | 0 | 0 |
| Oregon areas | 7,100 | 8,960 | 48,050 | 191,490 | 45,280 |
| Washington: | | | | | |
| Southwest Washington Dist. | 320 | 0 | 0 | 3,680 | 1,280 |
| Gifford Pinchot N.F. | 2,550 | 1,880 | 460 | 2,930 | 2,980 |
| Snoqualmie N.F. | 1,800 | 850 | 230 | 2,260 | 680 |
| Puget Sound Dist. | 0 | 0 | 0 | 440 | 0 |
| Olympic N.F. | 0 | 120 | 0 | 440 | 80 |
| Olympic N.P. | 0 | 320 | 80 | 80 | 0 |
| Northwest Washington Dist. | 0 | 0 | 0 | 40 | 0 |
| Mt. Baker N.F. | 0 | 400 | 0 | 160 | 200 |
| Washington areas | 4,670 | 3,570 | 770 | 10,030 | 5,220 |
| Regional total | 11,770 | 12,530 | 48,820 | 201,520 | 50,500 |

1/ N.F., National Forest; N.P., National Park

## DOUGLAS-FIR BEETLE
## *Dendroctonus pseudostugae* Hopk.

Douglas-fir beetle damage was significantly lower in westside Douglas-fir stands in both States (Table 16). In Oregon, where the reduction from last year's serious damage was most evident, the majority of the damage was centered on Siuslaw and Willamette National Forests and on the Coos-Douglas District. Lesser damage occurred on the Umpqua, Siskiyou, Rogue River, and Mt. Hood National Forests. In Washington, all areas showed a downward or static trend in westside Douglas-fir. Tree killing occurred on the Gifford Pinchot, Snoqualmie, Mount Baker, and Olympic National Forests and on the Southwest Washington District (Table 17).

Damage to eastside Douglas-fir stands was also lower (Table 18). Substantial reduction occurred in eastern Oregon while losses in eastern Washington were only slightly downward. Most significant damage occurred on the Wallowa-Whitman and Malheur National Forests in Oregon and on the Colville and Okanogan National Forests, Colville Indian Reservation, and the Glenwood District in Washington (Table 19). Scattered tree killing was common over much of eastern Washington.

The downward trend is expected to continue in westside Douglas-fir stands. The trend of tree killing in eastside Douglas-fir stands is uncertain. No significant changes are expected within the next year. Infested trees are being salvaged wherever possible to reduce beetle populations and utilize the timber before it deteriorates. Salvaging of fire-killed trees is in progress to prevent development of serious bark beetle outbreaks within or adjacent to the large 1966 burns.

Table 14.--Trend of mountain pine beetle infestations in sugar pine in Oregon, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Rogue River N.F. | 160 | 0 | 490 | 130 | 1,200 |
| Coos-Douglas Dist. | 0 | 0 | 4,600 | 160 | 0 |
| Siskiyou N.F. | 0 | 0 | 1,030 | 4,110 | 300 |
| Deschutes N.F. | 0 | 0 | 40 | 50 | 440 |
| Fremont N.F. | 0 | 0 | 0 | 1,640 | 0 |
| Winema N.F. | 0 | 0 | 0 | 20 | 360 |
| Umpqua N.F. | 0 | 0 | 0 | 0 | 70 |
| Oregon areas | 160 | 0 | 6,160 | 6,110 | 2,370 |
| Regional total | 160 | 0 | 6,160 | 6,110 | 2,370 |

Table 15.--Extent of mountain pine beetle infestations on sugar pine in Oregon in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation | | | | All intensities |
|---|---|---|---|---|---|---|
| | | Light | Moderate | Heavy | Very heavy | |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 2 | 440 | 0 | 0 | 0 | 440 |
| Rogue River N.F. | 17 | 1,200 | 0 | 0 | 0 | 1,200 |
| Siskiyou N.F. | 8 | 300 | 0 | 0 | 0 | 300 |
| Umpqua N.F. | 1 | 70 | 0 | 0 | 0 | 70 |
| Winema N.F. | 2 | 360 | 0 | 0 | 0 | 360 |
| Oregon areas | 30 | 2,370 | 0 | 0 | 0 | 2,370 |
| Regional total | 30 | 2,370 | 0 | 0 | 0 | 2,370 |

1/ N.F., National Forest

Table 13.--Extent of mountain pine beetle infestations on lodgepole pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 46 | 5,890 | 2,240 | 1,990 | 360 | 10,480 |
| Fremont N.F. | 118 | 25,220 | 7,390 | 3,590 | 2,180 | 38,380 |
| Malheur N.F. | 22 | 2,930 | 1,520 | 90 | 0 | 4,540 |
| Rogue River N.F. | 3 | 180 | 0 | 0 | 0 | 180 |
| Siskiyou N.F. | 1 | 30 | 0 | 0 | 0 | 30 |
| Umatilla N.F. | 6 | 670 | 0 | 0 | 0 | 670 |
| Umpqua N.F. | 2 | 200 | 0 | 0 | 0 | 200 |
| Wallowa-Whitman N.F. | 22 | 2,250 | 1,020 | 720 | 240 | 4,230 |
| Winema N.F. | 104 | 22,080 | 4,390 | 2,020 | 1,160 | 29,650 |
| Crater Lake N.P. | 15 | 880 | 150 | 0 | 0 | 1,030 |
| Oregon areas | 339 | 60,330 | 16,710 | 8,410 | 3,940 | 89,390 |
| Washington: | | | | | | |
| Yakima I.R. | 1 | 80 | 0 | 0 | 0 | 80 |
| Washington areas | 1 | 80 | 0 | 0 | 0 | 80 |
| Regional total | 340 | 60,410 | 16,710 | 8,410 | 3,940 | 89,470 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 12.--Trend of mountain pine beetle infestations in lodgepole pine in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Winema N.F. | 20,390 | 17,060 | 17,100 | 21,560 | 29,650 |
| Fremont N.F. | 18,120 | 13,390 | 21,950 | 47,100 | 38,380 |
| Deschutes N.F. | 17,730 | 10,330 | 9,100 | 11,930 | 10,480 |
| Crater Lake N.P. | 5,440 | 1,180 | 2,000 | 1,800 | 1,030 |
| Malheur N.F. | 1,450 | 610 | 2,060 | 8,410 | 4,540 |
| Wallowa-Whitman N.F. | 1,160 | 2,640 | 1,440 | 3,130 | 4,230 |
| Rogue River N.F. | 640 | 360 | 1,100 | 0 | 180 |
| Umpqua N.F. | 200 | 2,190 | 160 | 0 | 200 |
| Umatilla N.F. | 60 | 2,020 | 530 | 140 | 670 |
| Ochoco N.F. | 10 | 0 | 0 | 40 | 0 |
| Willamette N.F. | 0 | 355 | 160 | 0 | 0 |
| Warm Springs I.R. | 0 | 85 | 0 | 0 | 0 |
| Siskiyou N.F. | 0 | 0 | 190 | 80 | 30 |
| Oregon areas | 65,200 | 50,220 | 55,790 | 94,190 | 89,390 |
| Washington: | | | | | |
| Colville N.F. | 1,720 | 4,360 | 3,540 | 0 | 0 |
| Wenatchee N.F. | 800 | 390 | 1,800 | 840 | 0 |
| Okanogan N.F. | 390 | 1,200 | 2,170 | 440 | 0 |
| Colville I.R. | 120 | 480 | 180 | 0 | 0 |
| Umatilla N.F. | 10 | 190 | 0 | 50 | 0 |
| Kaniksu N.F. | 10 | 600 | 0 | 0 | 0 |
| Gifford Pinchot N.F. | 0 | 8,960 | 880 | 0 | 0 |
| Yakima I.R. | 0 | 760 | 200 | 560 | 80 |
| Olympic N.F. | 0 | 680 | 0 | 80 | 0 |
| Washington areas | 3,050 | 17,620 | 8,770 | 1,970 | 80 |
| Regional total | 68,250 | 67,840 | 64,560 | 96,160 | 89,470 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 11.--Extent of mountain pine beetle infestations on ponderosa pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 13 | 790 | 210 | 0 | 0 | 1,000 |
| Fremont N.F. | 59 | 3,650 | 3,690 | 390 | 420 | 8,150 |
| Malheur N.F. | 27 | 2,360 | 1,120 | 560 | 0 | 4,040 |
| Mt. Hood N.F. | 13 | 550 | 270 | 80 | 0 | 900 |
| Ochoco N.F. | 6 | 630 | 0 | 0 | 0 | 630 |
| Rogue River N.F. | 5 | 370 | 0 | 0 | 0 | 370 |
| Siskiyou N.F. | 6 | 260 | 0 | 0 | 0 | 260 |
| Umatilla N.F. | 22 | 1,430 | 30 | 0 | 0 | 1,460 |
| Umpqua N.F. | 3 | 200 | 0 | 0 | 0 | 200 |
| Wallowa-Whitman N.F. | 141 | 12,280 | 7,710 | 4,020 | 4,470 | 28,480 |
| Winema N.F. | 39 | 3,190 | 1,560 | 600 | 240 | 5,590 |
| Umatilla I.R. | 2 | 80 | 0 | 0 | 0 | 80 |
| Warm Springs I.R. | 4 | 320 | 0 | 0 | 0 | 320 |
| Central Oregon Dist. | 9 | 1,550 | 920 | 40 | 0 | 2,510 |
| Coos-Douglas Dist. | 3 | 240 | 0 | 0 | 0 | 240 |
| Oregon areas | 352 | 27,900 | 15,510 | 5,690 | 5,130 | 54,230 |
| Washington: | | | | | | |
| Okanogan N.F. | 41 | 4,480 | 5,680 | 1,120 | 760 | 12,040 |
| Umatilla N.F. | 7 | 1,030 | 0 | 0 | 0 | 1,030 |
| Wenatchee N.F. | 5 | 440 | 100 | 80 | 240 | 860 |
| Colville N.F. | 11 | 1,120 | 200 | 0 | 760 | 2,080 |
| Colville I.R. | 20 | 1,280 | 2,280 | 200 | 240 | 4,000 |
| Spokane I.R. | 2 | 200 | 0 | 0 | 0 | 200 |
| Yakima I.R. | 3 | 600 | 120 | 0 | 0 | 720 |
| Northeast Wash. Dist. | 1 | 0 | 240 | 0 | 0 | 240 |
| Glenwood Dist. | 3 | 560 | 0 | 0 | 0 | 560 |
| Washington areas | 93 | 9,710 | 8,620 | 1,400 | 2,000 | 21,730 |
| Regional total | 445 | 37,610 | 24,130 | 7,090 | 7,130 | 75,960 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 10.--Trend of mountain pine beetle infestations in ponderosa pine in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Fremont N.F. | 1,380 | 4,970 | 2,920 | 16,740 | 8,150 |
| Rogue River N.F. | 1,200 | 940 | 1,840 | 170 | 370 |
| Wallowa-Whitman N.F. | 910 | 18,680 | 21,400 | 48,410 | 28,480 |
| Malheur N.F. | 280 | 1,760 | 6,730 | 29,170 | 4,040 |
| Umatilla N.F. | 50 | 3,080 | 4,680 | 3,140 | 1,460 |
| Umpqua N.F. | 0 | 830 | 0 | 120 | 200 |
| Ochoco N.F. | 0 | 700 | 1,340 | 2,370 | 630 |
| Deschutes N.F. | 0 | 280 | 120 | 2,550 | 1,000 |
| Warm Springs I.R. | 0 | 160 | 70 | 0 | 320 |
| Winema N.F. | 0 | 160 | 910 | 4,910 | 5,590 |
| Siskiyou N.F. | 0 | 0 | 1,600 | 1,290 | 260 |
| Central Oregon Dist. | 0 | 660 | 520 | 680 | 2,510 |
| Crater Lake N.P. | 0 | 0 | 200 | 0 | 0 |
| Umatilla I.R. | 0 | 0 | 80 | 20 | 80 |
| Mt. Hood N.F. | 0 | 0 | 30 | 50 | 900 |
| Coos-Douglas Dist. | 0 | 0 | 0 | 0 | 240 |
| Oregon areas | 3,820 | 32,220 | 42,440 | 109,620 | 54,230 |
| Washington: | | | | | |
| Yakima I.R. | 960 | 0 | 680 | 6,780 | 720 |
| Umatilla N.F. | 180 | 430 | 1,270 | 4,280 | 1,030 |
| Colville N.F. | 160 | 200 | 2,530 | 3,280 | 2,080 |
| Glenwood Dist. | 40 | 0 | 520 | 40 | 560 |
| Wenatchee N.F. | 0 | 520 | 120 | 580 | 860 |
| Okanogan N.F. | 0 | 0 | 6,480 | 15,400 | 12,040 |
| Colville I.R. | 0 | 0 | 2,070 | 1,010 | 4,000 |
| Gifford Pinchot N.F. | 0 | 0 | 160 | 0 | 0 |
| Spokane I.R. | 0 | 0 | 0 | 280 | 200 |
| Snoqualmie N.F. | 0 | 0 | 0 | 280 | 0 |
| Northeast Washington Dist. | 0 | 0 | 0 | 0 | 240 |
| Washington areas | 1,340 | 1,150 | 13,830 | 31,930 | 21,730 |
| Regional total | 5,160 | 33,370 | 56,270 | 141,550 | 75,960 |

1/ N.F., National Forest; I.R., Indian Reservation: N.P., National Park

Table 9.--Extent of mountain pine beetle infestations on western white pine in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 1 | 30 | 0 | 0 | 0 | 30 |
| Fremont N.F. | 1 | 100 | 0 | 0 | 0 | 100 |
| Mt. Hood N.F. | 56 | 5,080 | 1,660 | 980 | 0 | 7,720 |
| Rogue River N.F. | 7 | 480 | 0 | 0 | 0 | 480 |
| Siskiyou | 80 | 4,870 | 790 | 0 | 0 | 5,660 |
| Umpqua N.F. | 254 | 14,260 | 5,860 | 840 | 170 | 21,130 |
| Willamette N.F. | 244 | 19,380 | 8,540 | 4,630 | 2,200 | 34,750 |
| Coos-Douglas Dist. | 1 | 80 | 0 | 0 | 0 | 80 |
| Crater Lake N.P. | 13 | 540 | 390 | 420 | 240 | 1,590 |
| Oregon areas | 657 | 44,825 | 17,240 | 6,870 | 2,610 | 71,540 |
| Washington: | | | | | | |
| Gifford Pinchot N.F. | 16 | 2,680 | 520 | 400 | 120 | 3,720 |
| Mt. Baker N.F. | 42 | 6,640 | 1,640 | 40 | 0 | 8,320 |
| Okanogan N.F. | 7 | 1,320 | 240 | 0 | 0 | 1,560 |
| Olympic N.F. | 6 | 1,320 | 560 | 440 | 0 | 2,320 |
| Snoqualmie N.F. | 38 | 3,720 | 4,340 | 800 | 240 | 9,100 |
| Wenatchee N.F. | 74 | 8,160 | 5,960 | 4,680 | 2,840 | 21,640 |
| Colville N.F. | 14 | 1,500 | 1,600 | 680 | 1,040 | 4,820 |
| Quinault I.R. | 11 | 3,750 | 0 | 400 | 600 | 4,750 |
| Spokane I.R. | 1 | 240 | 0 | 0 | 0 | 240 |
| Yakima I.R. | 6 | 520 | 1,040 | 360 | 0 | 1,920 |
| Northeast Wash. Dist. | 1 | 40 | 0 | 0 | 0 | 40 |
| Mt. Rainier N.P. | 3 | 840 | 0 | 0 | 40 | 880 |
| Olympic N.P. | 64 | 6,720 | 3,340 | 2,040 | 880 | 12,980 |
| Kaniksu N.F. | 9 | 2,120 | 0 | 0 | 0 | 2,120 |
| Washington areas | 292 | 39,570 | 19,240 | 9,840 | 5,760 | 74,410 |
| Regional total | 949 | 84,390 | 36,480 | 16,710 | 8,370 | 145,950 |

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park

Table 8.--Trend of mountain pine beetle infestations in western white pine in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Mt. Hood N.F. | 33,240 | 39,770 | 36,820 | 27,810 | 7,720 |
| Willamette N.F. | 32,560 | 22,500 | 43,440 | 38,240 | 34,750 |
| Umpqua N.F. | 7,760 | 3,350 | 6,070 | 2,920 | 21,130 |
| Warm Springs I.R. | 160 | 80 | 200 | 80 | 0 |
| Deschutes N.F. | 0 | 1,520 | 1,640 | 230 | 30 |
| Winema N.F. | 0 | 620 | 0 | 240 | 0 |
| Siskiyou N.F. | 0 | 0 | 4,340 | 1,680 | 5,660 |
| Rogue River N.F. | 0 | 0 | 190 | 920 | 480 |
| Fremont N.F. | 0 | 0 | 0 | 0 | 100 |
| Coos-Douglas Dist. | 0 | 0 | 0 | 0 | 80 |
| Crater Lake N.P. | 0 | 0 | 0 | 0 | 1,590 |
| Oregon areas | 73,720 | 67,840 | 92,700 | 72,120 | 71,540 |
| Washington: | | | | | |
| Gifford Pinchot N.F. | 140,370 | 98,330 | 31,300 | 12,870 | 3,720 |
| Olympic N.P. | 87,000 | 114,600 | 57,270 | 26,940 | 12,980 |
| Wenatchee N.F. | 34,480 | 79,280 | 20,640 | 40,520 | 21,640 |
| Snoqualmie N.F. | 32,060 | 32,060 | 22,640 | 11,960 | 9,100 |
| Mt. Baker N.F. | 25,540 | 43,060 | 4,270 | 1,440 | 8,320 |
| Olympic N.F. | 19,000 | 23,600 | 15,870 | 7,960 | 2,320 |
| Mt. Rainier N.P. | 7,250 | 9,740 | 4,240 | 1,920 | 880 |
| Quinault I.R. | 2,560 | 7,040 | 2,180 | 5,320 | 4,750 |
| Kaniksu N.F. | 940 | 1,290 | 10,440 | 3,480 | 2,120 |
| Yakima I.R. | 320 | 540 | 1,040 | 2,920 | 1,920 |
| Okanogan N.F. | 250 | 1,000 | 130 | 840 | 1,560 |
| Colville N.F. | 0 | 0 | 3,690 | 9,280 | 4,820 |
| Northwest Washington Dist. | 0 | 0 | 1,560 | 0 | 0 |
| Northeast Washington Dist. | 0 | 0 | 720 | 0 | 40 |
| Glenwood Dist. | 0 | 0 | 0 | 1,160 | 0 |
| Puget Sound Dist. | 0 | 0 | 0 | 720 | 0 |
| Spokane I.R. | 0 | 0 | 0 | 0 | 240 |
| Washington areas | 349,770 | 410,540 | 175,990 | 127,330 | 74,410 |
| Regional total | 423,490 | 478,380 | 268,690 | 199,450 | 145,950 |

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park

Table 6.--Trend of balsam woolly aphid infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Willamette N.F. | 33,920 | 44,710 | 72,760 | 19,430 | 16,780 |
| Umpqua N.F. | 4,280 | 11,830 | 17,960 | 4,320 | 3,580 |
| Mt. Hood N.F. | 5,840 | 9,870 | 17,660 | 7,530 | 6,460 |
| Deschutes N.F. | 4,000 | 19,640 | 17,320 | 5,260 | 2,370 |
| Siuslaw N.F. | 3,460 | 4,030 | 340 | 0 | 120 |
| Winema N.F. | 300 | 410 | 0 | 0 | 0 |
| Rogue River N.F. | 0 | 6,600 | 18,760 | 4,140 | 4,850 |
| Warm Springs I.R. | 0 | 3,380 | 1,380 | 1,750 | 420 |
| Crater Lake N.P. | 0 | 1,680 | 1,320 | 3,350 | 1,840 |
| Coos-Douglas Dist. | 0 | 0 | 520 | 640 | 5,060 |
| Northwest Oregon Dist. | 0 | 0 | 20 | 0 | 0 |
| Siskiyou N.F. | 0 | 0 | 0 | 0 | 840 |
| Oregon areas | 51,800 | 102,150 | 148,040 | 46,420 | 42,320 |
| Washington: | | | | | |
| Gifford Pinchot N.F. | 2,590 | 63,930 | 25,860 | 11,040 | 8,360 |
| Yakima I.R. | 360 | 6,960 | 840 | 400 | 320 |
| Southwest Washington District | 1,760 | 0 | 1,040 | 980 | 0 |
| Snoqualmie N.F. | 0 | 10,560 | 5,800 | 7,800 | 1,680 |
| Mt. Rainier N.P. | 0 | 3,260 | 1,120 | 360 | 800 |
| Wenatchee N.F. | 0 | 600 | 720 | 240 | 0 |
| Washington areas | 4,710 | 85,310 | 35,380 | 20,820 | 11,160 |
| Regional total | 56,510 | 187,460 | 183,420 | 67,240 | 53,480 |

1/ N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

Table 25.--Extent of Oregon pine ips infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon | | | | | | |
| Deschutes N.F. | 2 | 20 | 0 | 0 | 0 | 20 |
| Fremont N.F. | 2 | 70 | 0 | 0 | 0 | 70 |
| Malheur N.F. | 7 | 410 | 180 | 40 | 0 | 630 |
| Mt. Hood N.F. | 2 | 80 | 0 | 0 | 0 | 80 |
| Ochoco N.F. | 13 | 470 | 360 | 30 | 0 | 860 |
| Rogue River N.F. | 22 | 1,010 | 130 | 0 | 0 | 1,140 |
| Siskiyou N.F. | 11 | 390 | 0 | 0 | 0 | 390 |
| Central Oregon Dist. | 1 | 160 | 520 | 0 | 0 | 680 |
| Oregon areas | 60 | 2,610 | 1,190 | 70 | 0 | 3,870 |
| Washington | | | | | | |
| Okanogan N.F. | 1 | 120 | 0 | 0 | 0 | 120 |
| Wenatchee N.F. | 3 | 80 | 160 | 0 | 0 | 240 |
| Yakima I.R. | 1 | 280 | 0 | 0 | 0 | 280 |
| Washington areas | 5 | 480 | 160 | 0 | 0 | 640 |
| Regional total | 65 | 3,090 | 1,350 | 70 | 0 | 4,510 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 24.--Trend of Oregon pine ips infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area [1/] | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Malheur N.F. | 16,960 | 5,150 | 2,200 | 4,360 | 630 |
| Wallowa-Whitman N.F. | 13,580 | 3,410 | 40 | 3,820 | 0 |
| Ochoco N.F. | 3,090 | 220 | 740 | 3,730 | 860 |
| Winema N.F. | 360 | 1,790 | 1,820 | 1,780 | 0 |
| Deschutes N.F. | 0 | 330 | 150 | 950 | 20 |
| Rogue River N.F. | 2,240 | 250 | 880 | 420 | 1,140 |
| Siskiyou N.F. | 2,200 | 80 | 0 | 270 | 390 |
| Fremont N.F. | 1,740 | 1,890 | 540 | 170 | 70 |
| Central Oregon Dist. | 0 | 230 | 0 | 160 | 680 |
| Warm Springs I.R. | 0 | 190 | 0 | 130 | 0 |
| Umatilla N.F. | 3,130 | 1,470 | 0 | 30 | 0 |
| Umatilla I.R. | 110 | 0 | 0 | 110 | 0 |
| Mt. Hood N.F. | 200 | 570 | 1,000 | 70 | 80 |
| Oregon areas | 43,610 | 15,580 | 7,370 | 16,000 | 3,870 |
| Washington: | | | | | |
| Okanogan N.F. | 30 | 590 | 0 | 800 | 120 |
| Wenatchee N.F. | 0 | 0 | 160 | 740 | 240 |
| Yakima I.R. | 0 | 1,160 | 0 | 560 | 280 |
| Colville I.R. | 110 | 0 | 740 | 320 | 0 |
| Spokane I.R. | 10 | 0 | 200 | 320 | 0 |
| Northeast Washington Dist. | 400 | 0 | 0 | 160 | 0 |
| Glenwood Dist. | 20 | 130 | 520 | 60 | 0 |
| Colville N.F. | 100 | 200 | 330 | 140 | 0 |
| Kaniksu N.F. | 140 | 0 | 0 | 0 | 0 |
| Umatilla N.F. | 1,160 | 520 | 120 | 0 | 0 |
| Snoqualmie N.F. | 0 | 0 | 10 | 0 | 0 |
| Washington areas | 1,970 | 2,600 | 2,080 | 3,100 | 640 |
| Regional total | 45,580 | 18,180 | 9,450 | 19,100 | 4,510 |

[1/] N.F., National Forest; I.R., Indian Reservation

## OREGON PINE IPS
*Ips pini* Say

Outbreaks of the Oregon pine ips were generally downward over the Region (Table 24). All areas in Washington showed a downward trend with only the Okanogan and Wenatchee National Forests and the Yakima Indian Reservation receiving significant tree killing. The downward trend in Oregon occurred in all but the Mt. Hood and Rogue River National Forests and the Central Oregon District (Table 25). Late fall observations revealed an Ips build-up on the Wallowa-Whitman National Forest where damage centers occurred in fringe-type stands.

Table 23.--Extent of fir engraver infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | | | Acres | | |
| Oregon: | | | | | | |
| Fremont N.F. | 2 | 280 | 0 | 0 | 0 | 280 |
| Malheur N.F. | 8 | 330 | 120 | 0 | 0 | 450 |
| Mt. Hood N.F. | 8 | 380 | 0 | 0 | 200 | 580 |
| Ochoco N.F. | 11 | 580 | 60 | 170 | 0 | 810 |
| Rogue River N.F. | 8 | 730 | 0 | 0 | 0 | 730 |
| Umatilla N.F. | 53 | 3,310 | 790 | 0 | 0 | 4,100 |
| Umpqua N.F. | 1 | 30 | 0 | 0 | 0 | 30 |
| Wallowa-Whitman N.F. | 52 | 3,210 | 150 | 0 | 0 | 3,360 |
| Willamette N.F. | 2 | 260 | 0 | 0 | 0 | 260 |
| Winema N.F. | 10 | 390 | 160 | 0 | 0 | 550 |
| Umatilla I.R. | 1 | 60 | 0 | 0 | 0 | 60 |
| Central Oregon Dist. | 3 | 270 | 0 | 0 | 0 | 270 |
| Oregon areas | 159 | 9,830 | 1,280 | 170 | 200 | 11,480 |
| Washington: | | | | | | |
| Snoqualmie N.F. | 1 | 40 | 0 | 0 | 0 | 40 |
| Mt. Baker N.F. | 1 | 160 | 0 | 0 | 0 | 160 |
| Okanogan N.F. | 10 | 560 | 1,200 | 120 | 0 | 1,880 |
| Umatilla N.F. | 27 | 2,290 | 0 | 0 | 0 | 2,290 |
| Wenatchee N.F. | 13 | 840 | 200 | 80 | 0 | 1,120 |
| Colville N.F. | 2 | 180 | 0 | 0 | 0 | 180 |
| Colville I.R. | 1 | 0 | 80 | 0 | 0 | 80 |
| Kaniksu N.F. | 1 | 120 | 0 | 0 | 0 | 120 |
| Washington areas | 56 | 4,190 | 1,480 | 200 | 0 | 5,870 |
| Regional total | 215 | 14,020 | 2,760 | 370 | 200 | 17,350 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 22.--Trend of fir engraver infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Umatilla N.F. | 41,770 | 8,660 | 24,040 | 22,200 | 4,100 |
| Wallowa-Whitman N.F. | 11,890 | 8,370 | 36,120 | 19,310 | 3,360 |
| Ochoco N.F. | 11,320 | 1,840 | 9,930 | 8,770 | 810 |
| Malheur N.F. | 3,200 | 1,810 | 5,090 | 5,400 | 450 |
| Fremont N.F. | 18,740 | 33,110 | 39,050 | 5,260 | 280 |
| Umatilla I.R. | 700 | 0 | 180 | 530 | 60 |
| Winema N.F. | 3,120 | 1,040 | 3,400 | 1,570 | 550 |
| Mt. Hood N.F. | 920 | 620 | 120 | 270 | 580 |
| Rogue River N.F. | 10,840 | 80 | 1,170 | 270 | 730 |
| Central Oregon Dist. | 0 | 1,580 | 710 | 150 | 270 |
| Deschutes N.F. | 950 | 430 | 290 | 60 | 0 |
| Crater Lake N.P. | 80 | 30 | 40 | 10 | 0 |
| Umpqua N.F. | 760 | 0 | 0 | 0 | 30 |
| Willamette N.F. | 1,000 | 660 | 0 | 0 | 260 |
| Warm Springs I.R. | 160 | 50 | 0 | 0 | 0 |
| Lookout Mt. Dist. | 0 | 0 | 480 | 0 | 0 |
| Steens Mt. Dist. | 0 | 0 | 200 | 0 | 0 |
| Oregon areas | 105,450 | 58,280 | 120,820 | 63,800 | 11,480 |
| Washington: | | | | | |
| Umatilla N.F. | 3,990 | 3,610 | 4,000 | 11,880 | 2,290 |
| Wenatchee N.F. | 680 | 5,040 | 2,860 | 3,340 | 1,120 |
| Okanogan N.F. | 1,180 | 4,190 | 3,510 | 3,200 | 1,880 |
| Colville N.F. | 2,950 | 880 | 490 | 2,580 | 180 |
| Colville I.R. | 0 | 0 | 80 | 490 | 80 |
| Kaniksu N.F. | 2,800 | 0 | 2,840 | 280 | 120 |
| Gifford Pinchot N.F. | 3,400 | 160 | 0 | 100 | 0 |
| Northeast Washington District | 280 | 0 | 0 | 0 | 0 |
| Mt. Baker N.F. | 1,540 | 940 | 280 | 0 | 160 |
| Snoqualmie N.F. | 5,480 | 880 | 840 | 0 | 40 |
| Yakima I.R. | 400 | 160 | 320 | 120 | 0 |
| Glenwood Dist. | 120 | 0 | 0 | 0 | 0 |
| Washington areas | 22,820 | 15,860 | 15,220 | 21,990 | 5,870 |
| Regional total | 128,270 | 74,140 | 136,040 | 85,790 | 17,350 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

FIR ENGRAVER
Scolytus ventralis Lec.

Infestations of this bark beetle in true firs declined sharply in both Oregon and Washington (Table 22). Outbreaks of major importance occurred on the Umatilla and Wallowa-Whitman National Forests in Oregon and on the Wenatchee, Umatilla, and Okanogan National Forests in Washington (Table 23). Control efforts against the fir engraver have been limited to the salvage of the accessible, merchantable infested trees and those of declining thrift in the outbreak centers.

Table 21.--Extent of western pine beetle infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 15 | 3,110 | 360 | 0 | 0 | 3,470 |
| Fremont N.F. | 19 | 5,880 | 770 | 0 | 0 | 6,650 |
| Malheur N.F. | 76 | 13,610 | 1,120 | 0 | 0 | 14,730 |
| Mt. Hood N.F. | 3 | 260 | 0 | 0 | 0 | 260 |
| Ochoco N.F. | 39 | 6,070 | 0 | 0 | 0 | 6,070 |
| Rogue River N.F. | 13 | 520 | 120 | 0 | 0 | 640 |
| Siskiyou N.F. | 3 | 210 | 0 | 0 | 0 | 210 |
| Umatilla N.F. | 24 | 1,760 | 0 | 0 | 0 | 1,760 |
| Wallowa-Whitman N.F. | 15 | 740 | 0 | 0 | 0 | 740 |
| Winema N.F. | 17 | 2,260 | 0 | 0 | 0 | 2,260 |
| Warm Springs I.R. | 14 | 880 | 0 | 0 | 0 | 880 |
| Central Oregon Dist. | 1 | 150 | 0 | 0 | 0 | 150 |
| Oregon areas | 239 | 35,450 | 2,370 | 0 | 0 | 37,820 |
| Washington: | | | | | | |
| Okanogan N.F. | 12 | 840 | 540 | 0 | 0 | 1,380 |
| Umatilla N.F. | 3 | 110 | 0 | 0 | 0 | 110 |
| Wenatchee N.F. | 21 | 3,640 | 520 | 0 | 0 | 4,160 |
| Colville I.R. | 9 | 680 | 440 | 0 | 0 | 1,120 |
| Spokane I.R. | 1 | 120 | 0 | 0 | 0 | 120 |
| Yakima I.R. | 6 | 1,880 | 320 | 0 | 0 | 2,200 |
| Glenwood Dist. | 1 | 0 | 520 | 0 | 0 | 520 |
| Washington areas | 53 | 7,270 | 2,340 | 0 | 0 | 9,610 |
| Regional total | 292 | 42,720 | 4,710 | 0 | 0 | 47,430 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 20.--Trend of western pine beetle infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area[1/] | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Umatilla I.R. | 0 | 50 | 0 | 0 | 0 |
| Malheur N.F. | 71,660 | 14,790 | 42,180 | 26,770 | 14,730 |
| Fremont N.F. | 99,010 | 43,900 | 15,990 | 30,760 | 6,650 |
| Ochoco N.F. | 119,010 | 5,040 | 16,870 | 14,760 | 6,070 |
| Winema N.F. | 14,360 | 13,160 | 9,960 | 11,710 | 2,260 |
| Wallowa-Whitman N.F. | 1,250 | 4,510 | 5,480 | 6,410 | 740 |
| Umatilla N.F. | 18,770 | 5,070 | 8,170 | 4,880 | 1,760 |
| Deschutes N.F. | 30,380 | 2,950 | 5,010 | 4,780 | 3,470 |
| Warm Springs I.R. | 19,240 | 480 | 440 | 1,480 | 880 |
| Siskiyou N.F. | 960 | 130 | 3,120 | 1,350 | 210 |
| Rogue River N.F. | 14,320 | 4,430 | 1,180 | 1,200 | 640 |
| Central Oregon Dist. | 0 | 730 | 0 | 440 | 150 |
| Mt. Hood N.F. | 2,640 | 1,530 | 0 | 60 | 260 |
| Umpqua N.F. | 160 | 1,260 | 740 | 0 | 0 |
| Crater Lake N.P. | 620 | 0 | 0 | 0 | 0 |
| Willamette N.F. | 0 | 360 | 0 | 0 | 0 |
| Coos-Douglas Dist. | 0 | 0 | 2,170 | 0 | 0 |
| Oregon areas | 392,380 | 98,390 | 111,310 | 104,600 | 37,820 |
| Washington: | | | | | |
| Umatilla N.F. | 110 | 80 | 510 | 0 | 110 |
| Yakima I.R. | 2,680 | 9,560 | 10,480 | 7,320 | 2,200 |
| Wenatchee N.F. | 0 | 6,890 | 1,740 | 5,160 | 4,160 |
| Okanogan N.F. | 340 | 7,500 | 3,810 | 3,640 | 1,380 |
| Colville I.R. | 940 | 320 | 2,120 | 3,360 | 1,120 |
| Colville N.F. | 0 | 2,160 | 920 | 1,760 | 0 |
| Spokane I.R. | 0 | 0 | 1,280 | 1,280 | 120 |
| Snoqualmie N.F. | 30 | 0 | 0 | 1,180 | 0 |
| Glenwood Dist. | 200 | 8,860 | 840 | 940 | 520 |
| Northeast Washington Dist. | 360 | 60 | 0 | 280 | 0 |
| Gifford Pinchot N.F. | 1,720 | 3,840 | 2,400 | 0 | 0 |
| Washington areas | 6,380 | 39,270 | 24,100 | 24,920 | 9,610 |
| Regional total | 398,760 | 137,660 | 135,410 | 129,520 | 47,430 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation.

## WESTERN PINE BEETLE
## *Dendroctonus brevicomis* Lec.

Infestations of the western pine beetle were sharply downward in both States (Table 20). The most serious outbreak areas in Oregon occurred on the Malheur, Fremont, Ochoco, and Deschutes National Forests. Losses in Washington were centered on the Wenatchee and Okanogan National Forests and the Colville and Yakima Indian Reservations (Table 21). Scattered tree killing occurred throughout most stands in eastern Washington and Oregon.

Table 19.--Extent of Douglas-fir beetle infestations on eastside Douglas-fir in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Malheur N.F. | 17 | 1,030 | 220 | 0 | 0 | 1,250 |
| Ochoco N.F. | 3 | 110 | 0 | 0 | 0 | 110 |
| Umatilla N.F. | 13 | 350 | 0 | 70 | 0 | 420 |
| Wallowa-Whitman N.F. | 35 | 1,530 | 380 | 0 | 0 | 1,910 |
| Umatilla I.R. | 1 | 70 | 0 | 0 | 0 | 70 |
| Central Oregon Dist. | 1 | 30 | 180 | 0 | 0 | 210 |
| Lookout Mt. Dist. | 6 | 260 | 360 | 0 | 0 | 620 |
| Oregon areas | 76 | 3,380 | 1,140 | 70 | 0 | 4,590 |
| Washington: | | | | | | |
| Okanogan N.F. | 57 | 5,800 | 3,440 | 1,160 | 0 | 10,400 |
| Wenatchee N.F. | 2 | 200 | 0 | 0 | 0 | 200 |
| Colville N.F. | 34 | 3,040 | 1,640 | 180 | 0 | 4,860 |
| Colville I.R. | 22 | 3,280 | 400 | 760 | 0 | 4,440 |
| Spokane I.R. | 1 | 160 | 0 | 0 | 0 | 160 |
| Glenwood Dist. | 2 | 2,160 | 0 | 0 | 0 | 2,160 |
| Kaniksu N.F. | 1 | 80 | 0 | 0 | 0 | 80 |
| Washington areas | 119 | 14,720 | 5,480 | 2,100 | 0 | 22,300 |
| Regional total | 195 | 18,100 | 6,620 | 2,170 | 0 | 26,890 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 29.--Extent of Engelmann spruce beetle infestations in Oregon and Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Malheur N.F. | 4 | 150 | 160 | 0 | 0 | 310 |
| Umatilla N.F. | 11 | 520 | 0 | 0 | 0 | 520 |
| Wallowa-Whitman N.F. | 42 | 3,900 | 860 | 320 | 260 | 5,340 |
| Oregon areas | 57 | 4,570 | 1,020 | 320 | 260 | 6,170 |
| Washington: | | | | | | |
| Okanogan N.F. | 11 | 840 | 320 | 840 | 0 | 2,000 |
| Umatilla N.F. | 1 | 30 | 0 | 0 | 0 | 30 |
| Wenatchee N.F. | 10 | 1,280 | 560 | 0 | 0 | 1,840 |
| Colville N.F. | 2 | 160 | 0 | 0 | 0 | 160 |
| Colville I.R. | 1 | 0 | 160 | 0 | 0 | 160 |
| Yakima I.R. | 2 | 240 | 0 | 0 | 0 | 240 |
| Washington areas | 27 | 2,550 | 1,040 | 840 | 0 | 4,430 |
| Regional total | 84 | 7,120 | 2,060 | 1,160 | 260 | 10,600 |

1/ N.F., National Forest; I.R., Indian Reservation

Table 28.--Trend of Engelmann spruce beetle infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Malheur N.F. | 0 | 0 | 0 | 0 | 310 |
| Wallowa-Whitman N.F. | 130 | 2,690 | 2,760 | 7,220 | 5,340 |
| Umatilla N.F. | 860 | 1,420 | 840 | 190 | 520 |
| Willamette N.F. | 240 | 0 | 0 | 0 | 0 |
| Oregon areas | 1,230 | 4,110 | 3,600 | 7,410 | 6,170 |
| Washington: | | | | | |
| Kaniksu N.F. | 260 | 0 | 0 | 0 | 0 |
| Wenatchee N.F. | 120 | 600 | 0 | 3,080 | 1,840 |
| Okanogan N.F. | 480 | 4,890 | 280 | 380 | 2,000 |
| Umatilla N.F. | 4,180 | 4,040 | 320 | 310 | 30 |
| Snoqualmie N.F. | 400 | 1,480 | 0 | 0 | 0 |
| Colville I.R. | 80 | 0 | 0 | 0 | 160 |
| Colville N.F. | 80 | 0 | 0 | 0 | 160 |
| Yakima I.R. | 680 | 0 | 0 | 0 | 240 |
| Washington areas | 6,280 | 11,010 | 600 | 3,770 | 4,430 |
| Regional total | 7,510 | 15,120 | 4,200 | 11,180 | 10,600 |

1/ N.F., National Forest; I.R., Indian Reservation

ENGELMANN SPRUCE BEETLE
Dendroctonus obesus (Mann.)

Infestations of this beetle were slightly reduced in Oregon and slightly increased in Washington (Table 28). In Oregon, tree killing occurred on the Malheur, Wallowa-Whitman, and Umatilla National Forests. Tree killing continued at a reduced rate on the Wenatchee National Forest and increased substantially on the Okanogan National Forest in Washington. Elsewhere in Washington losses remained low (Table 29). Most of the infested acreage over the Region is in the high elevations and inaccessible areas, making beetle control by removal of infested trees impractical.

Table 27.--Extent of silver fir beetle infestations in Washington in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Washington: | | | | | | |
| Gifford Pinchot N.F. | 3 | 120 | 0 | 0 | 0 | 120 |
| Mt. Baker N.F. | 35 | 5,020 | 4,600 | 120 | 0 | 9,740 |
| Olympic N.F. | 4 | 240 | 160 | 0 | 0 | 400 |
| Snoqualmie N.F. | 6 | 440 | 120 | 440 | 0 | 1,000 |
| Southwest Washington District | 1 | 120 | 0 | 0 | 0 | 120 |
| Olympic N.P. | 4 | 240 | 40 | 840 | 0 | 1,120 |
| Washington areas | 53 | 6,180 | 4,920 | 1,400 | 0 | 12,500 |
| Regional total | 53 | 6,180 | 4,920 | 1,400 | 0 | 12,500 |

1/ N.F., National Forest; N.P., National Park

Table 26.--Trend of silver fir beetles infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Siuslaw N.F. | 480 | 0 | 0 | 0 | 0 |
| Oregon areas | 480 | 0 | 0 | 0 | 0 |
| Washington: | | | | | |
| Southwest Wash. Dist. | 0 | 0 | 0 | 0 | 120 |
| Mt. Baker N.F. | 0 | 51,120 | 520 | 5,660 | 9,740 |
| Olympic N.F. | 0 | 0 | 0 | 1,440 | 400 |
| Olympic N.P. | 0 | 0 | 150 | 920 | 1,120 |
| Snoqualmie N.F. | 0 | 3,360 | 560 | 1,260 | 1,000 |
| Gifford Pinchot N.F. | 0 | 200 | 0 | 0 | 120 |
| Mt. Rainier N.P. | 0 | 160 | 0 | 0 | 0 |
| Washington areas | 0 | 54,840 | 1,230 | 9,280 | 12,500 |
| Regional total | 480 | 54,840 | 1,230 | 9,280 | 12,500 |

1/ N.F., National Forest; N.P., National Park.

## SILVER FIR BEETLES
## *Pseudohylesinus* spp.

Outbreaks of these beetles in Washington are continuing the upward trend of last year (Table 26). Serious tree killing in the overmature Pacific silver fir stands on the Mt. Baker and Snoqualmie National Forests and the Olympic National Park accounted for the upward trend. Less serious tree killing occurred on the Gifford Pinchot and Olympic National Forests and the Southwest Washington District (Table 27). The outlook for next year is for additional tree killing in the overmature stands. Timber harvesting in the outbreak and potential outbreak areas is the only control being applied in these highly susceptible overmature stands. No outbreaks of the silver fir beetles have been recorded in Oregon for the past four years.

## EUROPEAN PINE SHOOT MOTH
Rhyacionia bouliana (Schiff.)

Seventy-eight communities outside the Containment Zone were surveyed in Washington by the Washington State Department of Natural Resources. The shoot moth was found at Port Angeles, Longview, and Prosser. All of these are single residence finds with one to seven trees infested. In each case the infestation was traced to the movement of infested nursery stock.

In Oregon, 67 communities outside the Portland metropolitan area were surveyed with negative results by the Oregon State Board of Forestry. In the Portland metropolitan area, Oregon State Department of Agriculture surveyed all nurseries and the Oregon State Board of Forestry surveyed all other areas, including residences, etc. One nursery in northeast Portland was found infested with the moth. Case history is dim, but the infestation probably was introduced on infested nursery stock from the Seattle, Washington area in violation of quarantine regulations. All pines in the nursery were fumigated before moth flight and sprayed several times later in the season. In all probability there are no established shoot moth infestations in Oregon.

## SPIDER MITE

Light defoliation of true firs and Douglas-fir occurred on 6,520 acres on the Malheur National Forest in areas where DDT was used to control the Douglas-fir tussock moth in 1965. These outbreaks usually develop during hot, dry summers following the use of DDT. This population of spider mites is expected to collapse before 1967 as the biological balance with natural predators reaches an equilibrium. Major tree damage is not expected.

## PINE BUD MITE
Phytoptus pini Nal.

This eriophyid mite has been found infesting pine plantations on the Siskiyou, Umpqua, and Rogue River National Forests. Damage has been most severe on ponderosa pine, but Jeffrey, knobcone, and lodgepole pine have also received damage. In several plantations more than 50 percent of the trees had damage on several to many terminals; in others damage was light. In a few cases the suspected cause of death in some weaker trees has been this mite.

DOUGLAS-FIR TUSSOCK MOTH
Hemerocampa pseudotsugata McD.

Populations of the Douglas-fir tussock moth dropped to a very low level in both Oregon and Washington (Table 30). No new egg masses could be found with extensive ground surveys over wide areas of both States. This rapid and almost complete population collapse is due, in part, to the presence of a virus disease.

Table 30.--Trend of Douglas-fir tussock moth infestations in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Malheur N.F. | 0 | 0 | 38,960 | 2,790 | 0 |
| Ochoco N.F. | 0 | 0 | 1,360 | 0 | 0 |
| Fremont N.F. | 0 | 0 | 0 | 2,120 | 0 |
| Oregon areas | 0 | 0 | 40,320 | 4,910 | 0 |
| Washington: | | | | | |
| Northeast Washington District | 100 | 1,170 | 14,260 | 2,580 | 0 |
| Colville N.F. | 0 | 280 | 3,440 | 0 | 0 |
| Kaniksu N.F. | 0 | 65 | 0 | 0 | 0 |
| Washington areas | 100 | 1,515 | 17,700 | 2,580 | 0 |
| Regional total | 100 | 1,515 | 58,020 | 7,490 | 0 |

1/ N.F., National Forest.

BLACK-HEADED BUDWORM
Acleres variana (Fern.)

The outbreaks recorded last year on the Malheur National Forest continued but at a much reduced rate. Light defoliation occurred on 100 acres in the Buck Cabin Creek drainage. Elsewhere in the Region subepidemic populations were found on the Kaniksu National Forest in Washington. No large scale outbreaks are expected next year.

WESTERN OAK LOOPER
Lambdina fiscellaria somniaria (Hulst.)

Outbreaks of this moth on Oregon white oak in the Willamette Valley of Oregon have declined for the third consecutive year. Defoliation was light, widely scattered, and limited to 340 acres. This downward trend is expected to continue.

CYPRESS TIP MOTH
Argyresthia sp.

Moderate defoliation of western redcedar occurred in the Ozette Lake area of the Olympic National Park in Washington. Parasitism by a hymenopterous parasite was high in the outbreak area. Populations are expected to be lower next year with little defoliation resulting.

HEMLOCK SAWFLY
Neodiprion tsugae Midd.

Light defoliation of western hemlock occurred in localized areas on the Mt. Hood National Forest in Oregon and around Spirit Lake on the Gifford Pinchot National Forest in Washington. The population is expected to decline due to a high rate of parasitism.

PANDORA MOTH
Coloradia pandora Blake

Regular flights of the moth occurred this year in the lodgepole pine stands on the Winema National Forest near Chemult, and in ponderosa pine stands near Sisters, Oregon. Defoliation next year is expected to be light.

SAWFLY ON WHITE FIR
Neodiprion sp.

Moderate defoliation occurred at a very limited distribution on the Winema National Forest in Oregon. No major defoliation is expected in 1967.

Table 31.--Extent of sawfly infestations on true firs in Oregon in 1966, by reporting area and intensity of infestation

| Reporting area 1/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Winema N.F. | 1 | 0 | 520 | 0 | 0 | 520 |
| Oregon areas | 1 | 0 | 520 | 0 | 0 | 520 |
| Regional total | 1 | 0 | 520 | 0 | 0 | 520 |

1/ N.F., National Forest

## STRAWBERRY ROOT WEEVIL
## *Brachyrhinus ovatus* (L.)

Adults of this soil inhabiting weevil caused severe damage to Douglas-fir seedlings in a new seed orchard on Siuslaw National Forest. This planting of Douglas-fir seedlings was in an old Oregon bent grass seed field where about 90 percent of the trees had been killed or severely injured at the time of control. The infestation was brought under control by tilling the soil and applying granular Aldrin.

## DYING HEMLOCK

The problem of dying trees in the mature and overmature western hemlock stands of the Region was less extensive than last year (Table 32). In Oregon, one small center of the problem was noted on the Northwest Oregon District. Dying hemlock was common on the Mt. Baker, Olympic, and Snoqualmie National Forests and the Olympic National Park (Table 33).

The continuing program of accelerated harvesting of these overmature stands has accounted for much of the reduction in problem acreage.

Table 32.--Trend of dying hemlock in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Northwest Oregon Dist. | 0 | 3,820 | 0 | 0 | 80 |
| Siuslaw N.F. | 1,280 | 0 | 0 | 0 | 0 |
| Oregon areas | 1,280 | 3,820 | 0 | 0 | 80 |
| Washington: | | | | | |
| Mt. Baker N.F. | 79,340 | 42,760 | 115,340 | 57,690 | 41,160 |
| Olympic N.F. | 60,800 | 80,720 | 60,830 | 16,040 | 6,680 |
| Olympic N.P. | 69,600 | 32,480 | 21,450 | 5,200 | 5,480 |
| Snoqualmie N.F. | 10,100 | 2,560 | 0 | 2,480 | 2,200 |
| Southwest Washington District | 3,840 | 0 | 0 | 2,080 | 240 |
| Northwest Washington District | 0 | 0 | 5,840 | 2,000 | 0 |
| Quinault I.R. | 0 | 1,800 | 0 | 0 | 0 |
| Washington areas | 223,680 | 160,320 | 203,460 | 85,490 | 55,840 |
| Regional total | 224,960 | 164,140 | 203,460 | 85,490 | 55,840 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 33.--Extent of dying hemlock in Oregon and Washington in 1966, by reporting area and intensity of damage

| Reporting area 1/ | Damage centers | Intensity of damage: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Northwest Oregon District | 1 | 80 | 0 | 0 | 0 | 80 |
| Oregon areas | 1 | 80 | 0 | 0 | 0 | 80 |
| Washington: | | | | | | |
| Mt. Baker N.F. | 56 | 25,160 | 10,120 | 4,320 | 1,560 | 41,160 |
| Olympic N.F. | 10 | 4,600 | 2,080 | 0 | 0 | 6,680 |
| Snoqualmie N.F. | 7 | 1,440 | 760 | 0 | 0 | 2,200 |
| Southwest Washington District | 4 | 0 | 0 | 160 | 80 | 240 |
| Olympic N.P. | 6 | 680 | 4,800 | 0 | 0 | 5,480 |
| Washington areas | 83 | 31,880 | 17,760 | 4,480 | 1,640 | 55,760 |
| Regional total | 84 | 31,960 | 17,760 | 4,480 | 1,640 | 55,840 |

1/ N.F., National Forest; N.P., National Park

## TREE DAMAGE BY BEARS

Tree damage and killing by bears in young Douglas-fir and western hemlock stands increased in Oregon and decreased in Washington (Table 34). The seriousness of this problem is compounded by bears habitually working in areas already understocked. Serious damage occurred on the Siuslaw, Willamette, and Mt. Hood National Forests and on the Northwest Oregon District. In Washington the most seriously damaged areas were on the Gifford Pinchot, Olympic, and Snoqualmie National Forests and the Southwest Washington District (Table 35). The outlook for next year is for little overall change with local areas increasing or decreasing in damage received.

Table 34.--Trend of Tree damage by bears in Oregon and Washington, 1962-66

(In acres)

| Reporting area 1/ | Year | | | | |
|---|---|---|---|---|---|
| | 1962 | 1963 | 1964 | 1965 | 1966 |
| Oregon: | | | | | |
| Northwest Oregon Dist. | 42,920 | 32,610 | 37,770 | 10,330 | 20,560 |
| Siuslaw N.F. | 28,300 | 27,810 | 7,100 | 3,410 | 8,130 |
| Willamette N.F. | 26,200 | 2,250 | 7,200 | 2,100 | 5,270 |
| Mt. Hood N.F. | 12,280 | 2,720 | 960 | 1,510 | 2,000 |
| Umpqua N.F. | 0 | 150 | 180 | 0 | 0 |
| Siskiyou N.F. | 0 | 0 | 80 | 0 | 0 |
| Oregon areas | 109,700 | 65,540 | 53,290 | 17,350 | 35,960 |
| Washington: | | | | | |
| Glenwood Dist. | 0 | 0 | 0 | 0 | 760 |
| Olympic N.F. | 21,760 | 59,800 | 32,390 | 30,320 | 5,200 |
| Gifford Pinchot N.F. | 960 | 36,620 | 19,220 | 26,440 | 10,280 |
| Southwest Washington Dist. | 800 | 34,560 | 12,390 | 12,200 | 18,160 |
| Snoqualmie N.F. | 520 | 18,730 | 6,760 | 10,420 | 1,960 |
| Quinault I.R. | 3,360 | 360 | 2,280 | 560 | 160 |
| Olympic N.P. | 0 | 0 | 0 | 380 | 0 |
| Puget Sound Dist. | 0 | 0 | 0 | 260 | 0 |
| Yakima I.R. | 0 | 0 | 240 | 0 | 280 |
| Washington areas | 27,400 | 150,070 | 73,280 | 80,580 | 36,800 |
| Regional total | 137,100 | 215,610 | 126,570 | 97,930 | 72,760 |

1/ N.F., National Forest; N.P., National Park; I.R., Indian Reservation

Table 35.--Extent of tree damage caused by bears in Oregon and Washington in 1966, by reporting area and intensity of damage

| Reporting area [1] | Damage centers | Intensity of damage | | | | All intensities |
|---|---|---|---|---|---|---|
| | | Light | Moderate | Heavy | Very heavy | |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Mt. Hood N.F. | 18 | 2,000 | 0 | 0 | 0 | 2,000 |
| Siuslaw N.F. | 53 | 4,940 | 2,660 | 450 | 80 | 8,130 |
| Willamette N.F. | 44 | 4,250 | 1,020 | 0 | 0 | 5,270 |
| Northwest Oregon District | 40 | 17,960 | 2,200 | 400 | 0 | 20,560 |
| Oregon areas | 155 | 29,150 | 5,880 | 850 | 80 | 35,960 |
| Washington: | | | | | | |
| Gifford Pinchot N.F. | 34 | 5,680 | 2,280 | 1,840 | 480 | 10,280 |
| Olympic N.F. | 21 | 2,280 | 2,560 | 360 | 0 | 5,200 |
| Snoqualmie N.F. | 12 | 1,720 | 0 | 120 | 120 | 1,960 |
| Quinault I.R. | 1 | 160 | 0 | 0 | 0 | 160 |
| Yakima I.R. | 1 | 280 | 0 | 0 | 0 | 280 |
| Southwest Washington District | 39 | 8,920 | 6,000 | 1,760 | 1,480 | 18,160 |
| Glenwood Dist. | 1 | 760 | 0 | 0 | 0 | 760 |
| Washington areas | 109 | 19,800 | 10,840 | 4,080 | 2,080 | 36,800 |
| Regional total | 264 | 48,950 | 16,720 | 4,930 | 2,160 | 72,760 |

[1] N.F., National Forest; I.R., Indian Reservation

## APPENDIX

### Aerial Surveys

The general aerial detection surveys were made in July and August with fixed-wing aircraft. The surveys were coordinated by the U.S. Forest Service in cooperation with the Oregon State Department of Forestry and the Washington State Department of Natural Resources. Larch casebearer surveys in northeastern Washington were made in early June also with a fixed-wing aircraft. Limited use was made of a helicopter to increase the accuracy of aerial mapping in preparation of logging plans to salvage mountain pine beetle mortality in lodgepole pine on the Fremont National Forest. Flying time for aerial surveys totaled 226.8 hours (Table 36).

Table 36.--Summary of cooperative aerial survey activities in 1966

| Area covered | Timber area surveyed | Survey flight time | | |
|---|---|---|---|---|
| | | Mapping | Ferry | Total |
| | M acres | Hours | | |
| Western Oregon | 15,858 | 49.2 | 1.3 | 50.5 |
| Eastern Oregon | 14,881 | 56.5 | 2.6 | 59.1 |
| All Oregon | 30,739 | 105.7 | 3.9 | 109.6 |
| Western Washington | 13,061 | 46.9 | 8.2 | 55.1 |
| Eastern Washington | 9,989 | 49.7 | 12.4 | 62.1 |
| All Washington | 23,050 | 96.6 | 20.6 | 117.2 |
| All Areas | 53,789 | 202.3 | 24.5 | 226.8 |

## Ground Surveys

Ground surveys included detection surveys for larch casebearer, Douglas-fir tussock moth, western hemlock looper, and European pine shoot moth, and biological evaluations of bark beetle outbreaks.

Ground surveys revealed small numbers of the green striped forest looper, Melanolophia imitata Wlk. in western Washington and larch looper, Semiothisa sexmacolata (Pack.) in northeast Washington. Only the larch looper has been recorded in outbreak conditions in Washington.

Table 37.--Extent of infestations in Oregon in 1966, by reporting area, insect species, and intensity of infestation

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Central Oregon District: | | | | | | |
| Douglas-fir beetle | 1 | 30 | 180 | 0 | 0 | 210 |
| Fir engraver | 3 | 270 | 0 | 0 | 0 | 270 |
| Mountain pine beetle (P) | 9 | 1,550 | 920 | 40 | 0 | 2,510 |
| Oregon pine ips | 1 | 160 | 520 | 0 | 0 | 680 |
| Western pine beetle | 1 | 150 | 0 | 0 | 0 | 150 |
| All insects | 15 | 2,160 | 1,620 | 40 | 0 | 3,820 |
| Coos-Douglas District: | | | | | | |
| Douglas-fir beetle | 166 | 15,970 | 3,240 | 100 | 0 | 19,310 |
| Mountain pine beetle (W) | 1 | 80 | 0 | 0 | 0 | 80 |
| Mountain pine beetle (P) | 3 | 240 | 0 | 0 | 0 | 240 |
| Balsam woolly aphid | 28 | 3,700 | 660 | 700 | 0 | 5,060 |
| All insects | 198 | 19,990 | 3,900 | 800 | 0 | 24,690 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Crater Lake N.P.: | | | | | | |
| Mountain pine beetle (L) | 15 | 880 | 150 | 0 | 0 | 1,030 |
| Mountain pine beetle (W) | 13 | 540 | 390 | 420 | 240 | 1,590 |
| Balsam woolly aphid | 7 | 1,380 | 240 | 0 | 220 | 1,840 |
| All insects | 35 | 2,800 | 780 | 420 | 460 | 4,460 |
| Deschutes N.F.: | | | | | | |
| Mountain pine beetle (L) | 46 | 5,890 | 2,240 | 1,990 | 360 | 10,480 |
| Mountain pine beetle (S) | 2 | 440 | 0 | 0 | 0 | 440 |
| Mountain pine beetle (W) | 1 | 30 | 0 | 0 | 0 | 30 |
| Mountain pine beetle (P) | 13 | 790 | 210 | 0 | 0 | 1,000 |
| Oregon pine ips | 2 | 20 | 0 | 0 | 0 | 20 |
| Western pine beetle | 15 | 3,110 | 360 | 0 | 0 | 3,470 |
| Balsam woolly aphid | 25 | 1,680 | 610 | 80 | 0 | 2,370 |
| Needle miners (L) | 33 | 67,940 | 4,760 | 1,840 | 0 | 74,540 |
| All insects | 137 | 79,900 | 8,180 | 3,910 | 360 | 92,350 |



See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Fremont N.F.: | | | | | | |
| Fir engraver | 2 | 280 | 0 | 0 | 0 | 280 |
| Mountain pine beetle (L) | 118 | 25,220 | 7,390 | 3,590 | 2,180 | 38,380 |
| Mountain pine beetle (W) | 1 | 100 | 0 | 0 | 0 | 100 |
| Mountain pine beetle (P) | 59 | 3,650 | 3,690 | 390 | 420 | 8,150 |
| Oregon pine ips | 2 | 70 | 0 | 0 | 0 | 70 |
| Western pine beetle | 19 | 5,880 | 770 | 0 | 0 | 6,650 |
| Needle miners (L) | 1 | 240 | 0 | 0 | 0 | 240 |
| All insects | 202 | 35,440 | 11,850 | 3,980 | 2,600 | 53,870 |
| Lookout Mt. District: | | | | | | |
| Douglas-fir beetle | 6 | 260 | 360 | 0 | 0 | 620 |
| All insects | 6 | 260 | 360 | 0 | 0 | 620 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Malheur N.F.: | | | | | | |
| Douglas-fir beetle | 17 | 1,030 | 220 | 0 | 0 | 1,250 |
| Engelmann spruce beetle | 4 | 150 | 160 | 0 | 0 | 310 |
| Fir engraver | 8 | 330 | 120 | 0 | 0 | 450 |
| Mountain pine beetle (L) | 22 | 2,930 | 1,520 | 90 | 0 | 4,540 |
| Mountain pine beetle (P) | 27 | 2,360 | 1,120 | 560 | 0 | 4,040 |
| Oregon pine ips | 7 | 410 | 180 | 40 | 0 | 630 |
| Western pine beetle | 76 | 13,610 | 1,120 | 0 | 0 | 14,730 |
| Spider mite | 7 | 6,520 | 0 | 0 | 0 | 6,520 |
| Black-headed budworm | 1 | 100 | 0 | 0 | 0 | 100 |
| All insects | 169 | 27,440 | 4,440 | 690 | 0 | 32,570 |
| Mt. Hood N.F.: | | | | | | |
| Douglas-fir beetle | 16 | 760 | 0 | 0 | 0 | 760 |
| Fir engraver | 8 | 380 | 0 | 0 | 200 | 580 |
| Mountain pine beetle (W) | 56 | 5,080 | 1,660 | 980 | 0 | 7,720 |
| Mountain pine beetle (P) | 13 | 550 | 270 | 80 | 0 | 900 |
| Oregon pine ips | 2 | 80 | 0 | 0 | 0 | 80 |
| Western pine beetle | 3 | 260 | 0 | 0 | 0 | 260 |
| Balsam woolly aphid | 48 | 5,870 | 490 | 100 | 0 | 6,460 |
| All insects | 146 | 12,980 | 2,420 | 1,160 | 200 | 16,760 |
| Bear damage | 18 | 2,000 | 0 | 0 | 0 | 2,000 |
| All damage | 164 | 14,980 | 2,420 | 1,160 | 200 | 18,760 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Northwest Oregon District: | | | | | | |
| Douglas-fir beetle | 1 | 20 | 0 | 0 | 0 | 20 |
| All insects | 1 | 20 | 0 | 0 | 0 | 20 |
| Bear damage | 40 | 17,960 | 2,200 | 400 | 0 | 20,560 |
| Dying hemlock | 1 | 80 | 0 | 0 | 0 | 80 |
| All damage | 42 | 18,060 | 2,200 | 400 | 0 | 20,660 |
| Ochoco N.F.: | | | | | | |
| Douglas-fir beetle | 3 | 110 | 0 | 0 | 0 | 110 |
| Fir engraver | 11 | 580 | 60 | 170 | 0 | 810 |
| Mountain pine beetle (P) | 6 | 630 | 0 | 0 | 0 | 630 |
| Oregon pine ips | 13 | 470 | 360 | 30 | 0 | 860 |
| Western pine beetle | 39 | 6,070 | 0 | 0 | 0 | 6,070 |
| All insects | 72 | 7,860 | 420 | 200 | 0 | 8,480 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Rogue River N.F.: | | | | | | |
| Douglas-fir beetle | 41 | 2,120 | 0 | 120 | 0 | 2,240 |
| Fir engraver | 8 | 730 | 0 | 0 | 0 | 730 |
| Mountain pine beetle (L) | 3 | 180 | 0 | 0 | 0 | 180 |
| Mountain pine beetle (S) | 17 | 1,200 | 0 | 0 | 0 | 1,200 |
| Mountain pine beetle (W) | 7 | 480 | 0 | 0 | 0 | 480 |
| Mountain pine beetle (P) | 5 | 370 | 0 | 0 | 0 | 370 |
| Oregon pine ips | 22 | 1,010 | 130 | 0 | 0 | 1,140 |
| Western pine beetle | 13 | 520 | 120 | 0 | 0 | 640 |
| Balsam woolly aphid | 26 | 1,850 | 740 | 1,320 | 940 | 4,850 |
| All insects | 142 | 8,460 | 990 | 1,440 | 940 | 11,830 |
| Siskiyou N.F.: | | | | | | |
| Douglas-fir beetle | 67 | 2,300 | 160 | 0 | 0 | 2,460 |
| Mountain pine beetle (L) | 1 | 30 | 0 | 0 | 0 | 30 |
| Mountain pine beetle (W) | 80 | 4,870 | 790 | 0 | 0 | 5,660 |
| Mountain pine beetle (P) | 6 | 260 | 0 | 0 | 0 | 260 |
| Mountain pine beetle (S) | 8 | 300 | 0 | 0 | 0 | 300 |
| Oregon pine ips | 11 | 390 | 0 | 0 | 0 | 390 |
| Western pine beetle | 3 | 210 | 0 | 0 | 0 | 210 |
| Balsam woolly aphid | 1 | 840 | 0 | 0 | 0 | 840 |
| All insects | 177 | 9,200 | 950 | 0 | 0 | 10,150 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Siuslaw N.F.: | | | | | | |
| Douglas-fir beetle | 188 | 7,380 | 1,980 | 0 | 0 | 9,360 |
| Balsam woolly aphid | 2 | 120 | 0 | 0 | 0 | 120 |
| Western oak looper | 2 | 340 | 0 | 0 | 0 | 340 |
| All insects | 192 | 7,840 | 1,980 | 0 | 0 | 9,820 |
| Bear damage | 53 | 4,940 | 2,660 | 450 | 80 | 8,130 |
| All damage | 245 | 12,780 | 4,640 | 450 | 80 | 17,950 |
| Umatilla I.R.: | | | | | | |
| Douglas-fir beetle | 1 | 70 | 0 | 0 | 0 | 70 |
| Fir engraver | 1 | 60 | 0 | 0 | 0 | 60 |
| Mountain pine beetle (P) | 2 | 80 | 0 | 0 | 0 | 80 |
| All insects | 4 | 210 | 0 | 0 | 0 | 210 |

See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Umatilla N.F.: | | | | | | |
| Douglas-fir beetle | 13 | 350 | 0 | 70 | 0 | 420 |
| Engelmann spruce beetle | 11 | 520 | 0 | 0 | 0 | 520 |
| Fir engraver | 53 | 3,310 | 790 | 0 | 0 | 4,100 |
| Mountain pine beetle (L) | 6 | 670 | 0 | 0 | 0 | 670 |
| Mountain pine beetle (P) | 22 | 1,430 | 30 | 0 | 0 | 1,460 |
| Western pine beetle | 24 | 1,760 | 0 | 0 | 0 | 1,760 |
| All insects | 129 | 8,040 | 820 | 70 | 0 | 8,930 |
| Umpqua N.F.: | | | | | | |
| Douglas-fir beetle | 41 | 1,520 | 300 | 0 | 0 | 1,820 |
| Fir engraver | 1 | 30 | 0 | 0 | 0 | 30 |
| Mountain pine beetle (L) | 2 | 200 | 0 | 0 | 0 | 200 |
| Mountain pine beetle (W) | 254 | 14,260 | 5,860 | 840 | 170 | 21,130 |
| Mountain pine beetle (P) | 3 | 200 | 0 | 0 | 0 | 200 |
| Mountain pine beetle (S) | 1 | 70 | 0 | 0 | 0 | 70 |
| Balsam woolly aphid | 21 | 2,790 | 790 | 0 | 0 | 3,580 |
| All insects | 323 | 19,070 | 6,950 | 840 | 170 | 27,030 |



See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Wallowa-Whitman N.F.: | | | | | | |
| Douglas-fir beetle | 35 | 1,530 | 380 | 0 | 0 | 1,910 |
| Engelmann spruce beetle | 42 | 3,900 | 860 | 320 | 260 | 5,340 |
| Fir engraver | 52 | 3,210 | 150 | 0 | 0 | 3,360 |
| Mountain pine beetle (L) | 22 | 2,250 | 1,020 | 720 | 240 | 4,230 |
| Mountain pine beetle (P) | 141 | 12,280 | 7,710 | 4,020 | 4,470 | 28,480 |
| Western pine beetle | 15 | 740 | 0 | 0 | 0 | 740 |
| All insects | 307 | 23,910 | 10,120 | 5,060 | 4,970 | 44,060 |
| Warm Springs I.R.: | | | | | | |
| Mountain pine beetle (P) | 4 | 320 | 0 | 0 | 0 | 320 |
| Western pine beetle | 14 | 880 | 0 | 0 | 0 | 880 |
| Balsam woolly aphid | 5 | 420 | 0 | 0 | 0 | 420 |
| Larch sawfly | 1 | 5,600 | 0 | 0 | 0 | 5,600 |
| All insects | 24 | 7,220 | 0 | 0 | 0 | 7,220 |



See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Willamette N.F. : | | | | | | |
| Douglas-fir beetle | 123 | 5,340 | 2,010 | 1,870 | 90 | 9,310 |
| Fir engraver | 2 | 260 | 0 | 0 | 0 | 260 |
| Mountain pine beetle (W) | 244 | 19,380 | 8,540 | 4,630 | 2,200 | 34,750 |
| Balsam woolly aphid | 128 | 13,050 | 3,700 | 30 | 0 | 16,780 |
| All insects | 497 | 38,030 | 14,250 | 6,530 | 2,290 | 61,100 |
| Bear damage | 44 | 4,250 | 1,020 | 0 | 0 | 5,270 |
| All damage | 541 | 42,280 | 15,270 | 6,530 | 2,290 | 66,370 |



See footnotes at end of table.

Table 37.--Extent of infestations in Oregon in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Winema N.F.: | | | | | | |
| Fir engraver | 10 | 390 | 160 | 0 | 0 | 550 |
| Mountain pine beetle (L) | 104 | 22,080 | 4,390 | 2,020 | 1,160 | 29,650 |
| Mountain pine beetle (S) | 2 | 360 | 0 | 0 | 0 | 360 |
| Mountain pine beetle (P) | 39 | 3,190 | 1,560 | 600 | 240 | 5,590 |
| Western pine beetle | 17 | 2,260 | 0 | 0 | 0 | 2,260 |
| Sawfly (true fir) | 1 | 0 | 520 | 0 | 0 | 520 |
| Needle miner (L) | 46 | 41,260 | 19,270 | 6,360 | 6,790 | 73,680 |
| Needle miner (P) | 9 | 46,640 | 0 | 0 | 0 | 46,640 |
| All insects | 228 | 116,180 | 25,900 | 8,980 | 8,190 | 159,250 |

1/ Mountain pine beetle and needle miner damage has been separated by tree species attacked: L, lodgepole pine; P, ponderosa pine; W, western white pine: K, knobcone pine; S, sugar pine.

2/ Reporting areas are abbreviated as follows: N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

Table 38.--Extent of infestations in Washington in 1966, by reporting area, insect species, and intensity of infestation

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Colville N.F.: | | | | | | |
| Douglas-fir beetle | 34 | 3,040 | 1,640 | 180 | 0 | 4,860 |
| Engelmann spruce beetle | 2 | 160 | 0 | 0 | 0 | 160 |
| Fir engraver | 2 | 180 | 0 | 0 | 0 | 180 |
| Mountain pine beetle (W) | 14 | 1,500 | 1,600 | 680 | 1,040 | 4,820 |
| Mountain pine beetle (P) | 11 | 1,120 | 200 | 0 | 760 | 2,080 |
| Larch casebearer | 25 | 43,400 | 13,880 | 3,880 | 2,680 | 63,840 |
| Larch sawfly | 10 | 1,800 | 3,760 | 900 | 240 | 6,700 |
| All insects | 98 | 51,200 | 21,080 | 5,640 | 4,720 | 82,640 |
| Colville I.R.: | | | | | | |
| Douglas-fir beetle | 22 | 3,280 | 400 | 760 | 0 | 4,440 |
| Engelmann spruce beetle | 1 | 0 | 160 | 0 | 0 | 160 |
| Fir engraver | 1 | 0 | 80 | 0 | 0 | 80 |
| Mountain pine beetle (P) | 20 | 1,280 | 2,280 | 200 | 240 | 4,000 |
| Western pine beetle | 9 | 680 | 440 | 0 | 0 | 1,120 |
| Larch casebearer | 4 | 400 | 0 | 0 | 2,200 | 2,600 |
| All insects | 57 | 5,640 | 3,360 | 960 | 2,440 | 12,400 |

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Gifford Pinchot N.F.: | | | | | | |
| Douglas-fir beetle | 28 | 1,720 | 880 | 380 | 0 | 2,980 |
| Mountain pine beetle (W) | 16 | 2,680 | 520 | 400 | 120 | 3,720 |
| Silver fir beetles | 3 | 120 | 0 | 0 | 0 | 120 |
| Balsam wooly aphid | 29 | 3,960 | 1,360 | 2,640 | 400 | 8,360 |
| All insects | 76 | 8,480 | 2,760 | 3,420 | 520 | 15,180 |
| Bear damage | 34 | 5,680 | 2,280 | 1,840 | 480 | 10,280 |
| All damage | 110 | 14,160 | 5,040 | 5,260 | 1,000 | 25,460 |
| Glenwood District: | | | | | | |
| Douglas-fir beetle | 2 | 2,160 | 0 | 0 | 0 | 2,160 |
| Mountain pine beetle (P) | 3 | 560 | 0 | 0 | 0 | 560 |
| Western pine beetle | 1 | 0 | 520 | 0 | 0 | 520 |
| All insects | 6 | 2,720 | 520 | 0 | 0 | 3,240 |
| Bear damage | 1 | 760 | 0 | 0 | 0 | 760 |
| All damage | 7 | 3,480 | 520 | 0 | 0 | 4,000 |

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Kaniksu N.F.: | | | | | | |
| Douglas-fir beetle | 1 | 80 | 0 | 0 | 0 | 80 |
| Fir engraver | 1 | 120 | 0 | 0 | 0 | 120 |
| Mountain pine beetle (W) | 9 | 2,120 | 0 | 0 | 0 | 2,120 |
| Larch sawfly | 2 | 0 | 480 | 840 | 0 | 1,320 |
| Larch casebearer | 21 | 144,180 | 21,720 | 35,200 | 43,040 | 244,140 |
| All insects | 34 | 146,500 | 22,200 | 36,040 | 43,040 | 247,780 |
| Mt. Baker N.F.: | | | | | | |
| Douglas-fir beetle | 2 | 200 | 0 | 0 | 0 | 200 |
| Fir engraver | 1 | 160 | 0 | 0 | 0 | 160 |
| Mountain pine beetle (W) | 42 | 6,640 | 1,640 | 40 | 0 | 8,320 |
| Silver fir beetles | 35 | 5,020 | 4,600 | 120 | 0 | 9,740 |
| All insects | 80 | 12,020 | 6,240 | 160 | 0 | 18,420 |
| Dying hemlock | 56 | 25,160 | 10,120 | 4,320 | 1,560 | 41,160 |
| All damage | 136 | 37,180 | 16,360 | 4,480 | 1,560 | 59,580 |



See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Mt. Rainier N.P.: | | | | | | |
| Mountain pine beetle (W) | 3 | 840 | 0 | 0 | 40 | 880 |
| Balsam woolly aphid | 2 | 360 | 0 | 0 | 440 | 800 |
| All insects | 5 | 1,200 | 0 | 0 | 480 | 1,680 |
| Northeast Washington District: | | | | | | |
| Mountain pine beetle (W) | 1 | 40 | 0 | 0 | 0 | 40 |
| Mountain pine beetle (P) | 1 | 0 | 240 | 0 | 0 | 240 |
| Larch casebearer | 49 | 59,720 | 42,500 | 27,320 | 7,960 | 137,500 |
| All insects | 51 | 59,760 | 42,740 | 27,320 | 7,960 | 137,780 |



See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Okanogan N.F.: | | | | | | |
| Douglas-fir beetle | 57 | 5,800 | 3,440 | 1,160 | 0 | 10,400 |
| Engelmann spruce beetle | 11 | 840 | 320 | 840 | 0 | 2,000 |
| Fir engraver | 10 | 560 | 1,200 | 120 | 0 | 1,880 |
| Mountain pine beetle (W) | 7 | 1,320 | 240 | 0 | 0 | 1,560 |
| Mountain pine beetle (P) | 41 | 4,480 | 5,680 | 1,120 | 760 | 12,040 |
| Oregon pine ips | 1 | 120 | 0 | 0 | 0 | 120 |
| Western pine beetle | 12 | 840 | 540 | 0 | 0 | 1,380 |
| Larch sawfly | 2 | 0 | 280 | 0 | 0 | 280 |
| All insects | 141 | 13,960 | 11,700 | 3,240 | 760 | 29,660 |
| Olympic N.F.: | | | | | | |
| Douglas-fir beetle | 1 | 80 | 0 | 0 | 0 | 80 |
| Mountain pine beetle (W) | 6 | 1,320 | 560 | 440 | 0 | 2,320 |
| Silver fir beetles | 4 | 240 | 160 | 0 | 0 | 400 |
| All insects | 11 | 1,640 | 720 | 440 | 0 | 2,800 |
| Bear damage | 21 | 2,280 | 2,560 | 360 | 0 | 5,200 |
| Dying hemlock | 10 | 4,600 | 2,080 | 0 | 0 | 6,680 |
| All damage | 42 | 8,520 | 5,360 | 800 | 0 | 14,680 |

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Olympic N.P.: | | | | | | |
| Mountain pine beetle | 64 | 6,720 | 3,340 | 2,040 | 880 | 12,980 |
| Silver fir beetles | 4 | 240 | 40 | 840 | 0 | 1,120 |
| All insects | 68 | 6,960 | 3,380 | 2,880 | 880 | 14,100 |
| Dying hemlock | 6 | 680 | 4,800 | 0 | 0 | 5,480 |
| All damage | 74 | 7,640 | 8,180 | 2,880 | 880 | 19,580 |
| Quinault I.R.: | | | | | | |
| Mountain pine beetle (W) | 11 | 3,750 | 0 | 400 | 600 | 4,750 |
| All insects | 11 | 3,750 | 0 | 400 | 600 | 4,750 |
| Bear damage | 1 | 160 | 0 | 0 | 0 | 160 |
| All damage | 12 | 3,910 | 0 | 400 | 600 | 4,910 |

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Snoqualmie N.F.: | | | | | | |
| Douglas-fir beetle | 7 | 680 | 0 | 0 | 0 | 680 |
| Mountain pine beetle (W) | 38 | 3,720 | 4,340 | 800 | 240 | 9,100 |
| Silver fir beetles | 6 | 440 | 120 | 440 | 0 | 1,000 |
| Balsam woolly aphid | 11 | 1,040 | 400 | 40 | 200 | 1,680 |
| Fir engraver | 1 | 40 | 0 | 0 | 0 | 40 |
| All insects | 63 | 5,920 | 4,860 | 1,280 | 440 | 12,500 |
| Bear damage | 12 | 1,720 | 0 | 120 | 120 | 1,960 |
| Dying hemlock | 7 | 1,440 | 760 | 0 | 0 | 2,200 |
| All damage | 82 | 9,080 | 5,620 | 1,400 | 560 | 16,660 |



See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Southwest Washington District: | | | | | | |
| Douglas-fir beetle | 11 | 1,280 | 0 | 0 | 0 | 1,280 |
| Silver fir beetles | 1 | 120 | 0 | 0 | 0 | 120 |
| All insects | 12 | 1,400 | 0 | 0 | 0 | 1,400 |
| Bear damage | 39 | 8,920 | 6,000 | 1,760 | 1,480 | 18,160 |
| Dying hemlock | 4 | 0 | 0 | 160 | 80 | 240 |
| All damage | 55 | 10,320 | 6,000 | 1,920 | 1,560 | 19,800 |
| Spokane I.R.: | | | | | | |
| Douglas-fir beetle | 1 | 160 | 0 | 0 | 0 | 160 |
| Mountain pine beetle (W) | 1 | 240 | 0 | 0 | 0 | 240 |
| Mountain pine beetle (P) | 2 | 200 | 0 | 0 | 0 | 200 |
| Western pine beetle | 1 | 120 | 0 | 0 | 0 | 120 |
| Larch casebearer | 8 | 17,180 | 3,840 | 1,580 | 0 | 22,600 |
| All insects | 13 | 17,900 | 3,840 | 1,580 | 0 | 23,320 |

See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Umatilla N.F.: | | | | | | |
| Engelmann spruce beetle | 1 | 30 | 0 | 0 | 0 | 30 |
| Fir engraver | 27 | 2,290 | 0 | 0 | 0 | 2,290 |
| Mountain pine beetle (P) | 7 | 1,030 | 0 | 0 | 0 | 1,030 |
| Western pine beetle | 3 | 110 | 0 | 0 | 0 | 110 |
| All insects | 38 | 3,460 | 0 | 0 | 0 | 3,460 |
| Wenatchee N.F.: | | | | | | |
| Douglas-fir beetle | 2 | 200 | 0 | 0 | 0 | 200 |
| Engelmann spruce beetle | 10 | 1,280 | 560 | 0 | 0 | 1,840 |
| Fir engraver | 13 | 840 | 200 | 80 | 0 | 1,120 |
| Mountain pine beetle (W) | 74 | 8,160 | 5,960 | 4,680 | 2,840 | 21,640 |
| Mountain pine beetle (P) | 5 | 440 | 100 | 80 | 240 | 860 |
| Oregon pine ips | 3 | 80 | 160 | 0 | 0 | 240 |
| Western pine beetle | 21 | 3,640 | 520 | 0 | 0 | 4,160 |
| All insects | 128 | 14,640 | 7,500 | 4,840 | 3,080 | 30,060 |



See footnotes at end of table.

Table 38.--Extent of infestations in Washington in 1966 ... (Continued)

| Reporting area and insects involved 1/ 2/ | Infestation centers | Intensity of infestation: Light | Moderate | Heavy | Very heavy | All intensities |
|---|---|---|---|---|---|---|
| | Number | Acres | | | | |
| Yakima I.R.: | | | | | | |
| Engelmann spruce beetle | 2 | 240 | 0 | 0 | 0 | 240 |
| Mountain pine beetle (L) | 1 | 80 | 0 | 0 | 0 | 80 |
| Mountain pine beetle (W) | 6 | 520 | 1,040 | 360 | 0 | 1,920 |
| Mountain pine beetle (P) | 3 | 600 | 120 | 0 | 0 | 720 |
| Western pine beetle | 6 | 1,880 | 320 | 0 | 0 | 2,200 |
| Balsam woolly aphid | 2 | 80 | 0 | 240 | 0 | 320 |
| Oregon pine ips | 1 | 280 | 0 | 0 | 0 | 280 |
| All insects | 21 | 3,680 | 1,480 | 600 | 0 | 5,760 |
| Bear damage | 1 | 280 | 0 | 0 | 0 | 280 |
| All damage | 22 | 3,960 | 1,480 | 600 | 0 | 6,040 |

1/ Mountain pine beetle damage has been separated by tree species attacked: L, lodgepole pine; P, ponderosa pine; W, western white pine.

2/ Reporting areas are abbreviated as follows: N.F., National Forest; I.R., Indian Reservation; N.P., National Park.