

FOREST INSECT CONDITIONS

*in the Pacific Northwest
during 1965*

by

P.W. Orr

L.F. Pettinger

R.E. Dolph



INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

APRIL 1966

This report, the 18th 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 surveys possible.

COVER BACKGROUND: Helicopters begin a dawn attack on the Douglas-fir tussock moth at Burns, Oregon.

FOREST INSECT CONDITIONS IN THE PACIFIC NORTHWEST
DURING 1965

By

P. W. Orr

L. F. Pettinger

R. E. Dolph

March 1966

Insect and Disease Control Branch
Division of Timber Management

Pacific Northwest Region U. S. Forest Service

U. S. Department of Agriculture

C O N T E N T S

| | <u>Page</u> |
|---|-------------|
| SURVEY FINDINGS IN BRIEF. | 1 |
| INTRODUCTION. | 4 |
| DEFOLIATORS | 4 |
| Larch casebearer | 4 |
| Figure 1. Generalized area of larch casebearer in southeast Washington | 5 |
| Larch sawfly | 7 |
| Douglas-fir tussock moth | 8 |
| Pine needle miner. | 10 |
| Blackheaded budworm. | 11 |
| Western oak looper | 11 |
| Spruce budworm | 12 |
| Western hemlock looper | 13 |
| European pine shoot moth | 14 |
| Pandora moth | 15 |
| SUCKING INSECTS | 16 |
| Balsam woolly aphid. | 16 |
| Pine needle scale. | 19 |
| Spruce aphid | 19 |
| BARK BEETLES. | 21 |
| Mountain pine beetle | 21 |
| Douglas-fir beetle | 28 |
| Western pine beetle. | 31 |
| Fir engraver | 34 |
| Oregon pine ips. | 37 |
| Engelmann spruce beetle. | 40 |
| Silver fir beetles | 41 |
| OTHER FOREST PROBLEMS | 43 |
| Dying hemlock. | 43 |
| Tree damage by bears | 45 |

| | <u>Page</u> |
|---|-------------|
| APPENDIX. | 48 |
| Aerial surveys | 48 |
| Table 39. Summary of cooperative aerial survey activities in 1965 | 48 |
| Table 40. Extent of infestations in Oregon in 1965, by forest area, insect species, and intensity of infestation. | 49 |
| Table 41. Extent of infestations in Washington in 1965, by forest area, insect species and intensity of infestation | 60 |
| Figure 2. Generalized areas of forest insect epidemics in Oregon and Washington, 1965 | |

SURVEY FINDINGS IN BRIEF

Insect outbreaks in Oregon and Washington occupied 1,403,300 acres, an increase over last year. The damage trend during the past decade is as follows:

| <u>Year</u> | <u>Acres infested</u> | <u>Year</u> | <u>Acres infested</u> |
|-------------|---------------------------|-------------|---------------------------|
| 1956 | 1,410,660 | 1961 | 1,223,230 |
| 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 |

The extent and intensity of outbreaks by insect species are given in table 40 for Oregon and in table 41 for Washington. The generalized location of the major outbreaks is shown in figure 2. Boundaries of individual forest insect survey reporting areas are shown on inside of back cover.

Main findings in 1965 were:

1. Mountain pine beetle.--Tree killing in western white pine decreased in both States. Outbreaks in ponderosa pine increased in both States. Infestations in lodgepole pine stands increased in Oregon and decreased in Washington. Infestations in knob-cone pine increased in local areas in Oregon. Sugar pine losses remained static.
2. Douglas-fir beetle.--Beetle buildup following the 1962 storm killed about 2.6 billion board feet of timber--1.9 billion board feet in 1964 and 0.7 billion board feet in 1965. The trend for 1966 is downward Regionwide.
3. Western pine beetle.--The area of infestation was about the same as last year. Losses are likely to continue in most over-mature pine stands in the Region.
4. Fir engraver.--Light, less severe losses occurred in both States.
5. Oregon pine ips.--Infestations increased slightly in immature ponderosa pine stands.
6. Engelmann spruce beetle.--Outbreaks expanded in both States.
7. Silver fir beetles.--Tree killing in Washington was more severe and extensive. No epidemic outbreaks occurred in Oregon.

8. Larch casebearer.--Infestations increased in extent and intensity in northeast Washington. The infestation is moving westward.
9. Larch sawfly.--A new outbreak developed in Washington and the ones in Oregon increased in size and intensity.
10. Douglas-fir tussock moth.--Outbreaks were brought under control by spraying and natural control factors. No defoliation is expected next year.
11. Pine needle miner.--A small outbreak on the Deschutes National Forest, Oregon intensified but no tree killing has occurred.
12. Western oak looper.--Outbreaks in the Willamette Valley of Oregon declined.
13. Spruce budworm.--No outbreaks were found this year.
14. European pine shoot moth.--Infested trees were found in a Christmas tree plantation outside the containment zone in western Washington. Three infested trees were intercepted at a new landscape planting in Portland, Oregon. Infested pines shipped to Klickitat and Sherman Creek Game Ranges in eastern Washington were found and destroyed before moth flight. No other infestations were found in communities outside the containment zone in Washington or Oregon.
15. Western hemlock looper.--The recent outbreak subsided.
16. Pandora moth.--Mature larvae pupated late in June. An "off" year adult flight also occurred in lodgepole pine near Chemult, Oregon. No serious damage is forecast.
17. Blackheaded budworm.--Light defoliation of true firs and Douglas-fir occurred on two areas of the Malheur National Forest, Oregon. An increase in defoliation is expected. No control is planned for 1966.
18. Balsam woolly aphid.--Infestations decreased in both Oregon and Washington.
19. Pine needle scale.--Infestations in lodgepole pine in eastern Oregon becomes more intensive.
20. Spruce aphid.--Damage to Sitka spruce in western Washington occurred in several areas. No control is planned for 1966.

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

| Insects ^{1/} | Oregon | | Washington | | Regional total | |
|--------------------------|-------------|---------|-------------|---------|----------------|-----------|
| | Infestation | Area | Infestation | Area | Infestation | Area |
| | centers | | centers | | centers | |
| | Number | Acres | Number | Acres | Number | Acres |
| Defoliators: | | | | | | |
| Larch casebearer | 0 | 0 | 98 | 340,380 | 98 | 340,380 |
| Larch sawfly | 8 | 16,940 | 2 | 4,640 | 10 | 21,580 |
| Douglas-fir tussock moth | 11 | 4,910 | 9 | 2,580 | 20 | 7,490 |
| Pine needle miner | 3 | 4,960 | 0 | 0 | 3 | 4,960 |
| Western oak looper | 3 | 720 | 0 | 0 | 3 | 720 |
| All defoliators | 25 | 27,530 | 109 | 347,600 | 134 | 375,130 |
| Sucking insects: | | | | | | |
| Balsam woolly aphid | 316 | 46,420 | 68 | 20,820 | 384 | 67,240 |
| Pine needle scale | 1 | 4,640 | 0 | 0 | 1 | 4,640 |
| Spruce aphid | 0 | 0 | 2 | 960 | 2 | 960 |
| All sucking insects | 317 | 51,060 | 70 | 21,780 | 387 | 72,840 |
| Bark beetles: | | | | | | |
| Mountain pine beetle (W) | 398 | 72,120 | 372 | 127,330 | 770 | 199,450 |
| Mountain pine beetle (P) | 472 | 109,620 | 81 | 31,930 | 553 | 141,550 |
| Mountain pine beetle (L) | 289 | 94,190 | 16 | 1,970 | 305 | 96,160 |
| Mountain pine beetle (S) | 50 | 6,110 | 0 | 0 | 50 | 6,110 |
| Mountain pine beetle (K) | 3 | 1,400 | 0 | 0 | 3 | 1,400 |
| Douglas-fir beetle | 2,385 | 220,860 | 211 | 34,970 | 2,596 | 255,830 |
| Western pine beetle | 663 | 104,600 | 93 | 24,920 | 756 | 129,520 |
| Fir engraver | 515 | 63,800 | 115 | 21,990 | 630 | 85,790 |
| Oregon pine ips | 196 | 16,000 | 21 | 3,100 | 217 | 19,100 |
| Engelmann spruce beetle | 58 | 7,410 | 15 | 3,770 | 73 | 11,180 |
| Silver fir beetles | 0 | 0 | 44 | 9,240 | 44 | 9,240 |
| All bark beetles | 5,029 | 696,110 | 968 | 259,220 | 5,997 | 955,330 |
| All insects | 5,371 | 774,700 | 1,147 | 628,600 | 6,518 | 1,403,300 |

^{1/} Mountain pine beetle infestations are separated by tree species attacked: W, western white pine; L, lodgepole pine; P, ponderosa pine; S, sugar pine; K, knobcone pine.

INTRODUCTION

Epidemic infestations were detected and mapped from the air. Ground surveys included intensive biological evaluations of the Douglas-fir tussock moth and spruce budworm and routine checking to verify the accuracy of aerial mapping. Individual insects are discussed below according to the extent of their outbreaks and not necessarily according to their present or future potential.

The extent and trend of damage to trees caused by bears and the extent and trend of dying hemlock are discussed at the behest of the Northwest Forest Pest Action Council.

DEFOLIATORS

Standards used for classifying forest defoliator outbreaks are as follows:

| <u>Defoliation intensity</u> | <u>Appearance of damage</u> |
|------------------------------|-----------------------------|
| 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 <u>Coleophora laricella</u> (Hübner) |
|--|

Infestations increased in size and number throughout northeast Washington (table 2). Westward and northward spread of the moth has been

rapid, with infestations being recorded as far north as the Canadian border and as far west as the west bank of the Columbia River on the Colville Indian Reservation (table 3). Centers of light to moderate defoliation were recorded over much of southwestern Stevens County, including the Spokane Indian Reservation. Sub-epidemic populations were observed over much of the Spokane Indian Reservation, but the most severe trouble spots were located in northern Spokane County and southern Pend Oreille and northeastern Stevens County (figure 1). Continued westward spread of this insect can be expected and will probably reach the Okanogan National Forest within the next year or two.

Although heavy defoliation has repeatedly occurred in some areas since 1962, no tree mortality has yet occurred.

Limited release of the larch casebearer parasite, Agathis pumila, is planned for the spring of 1966.

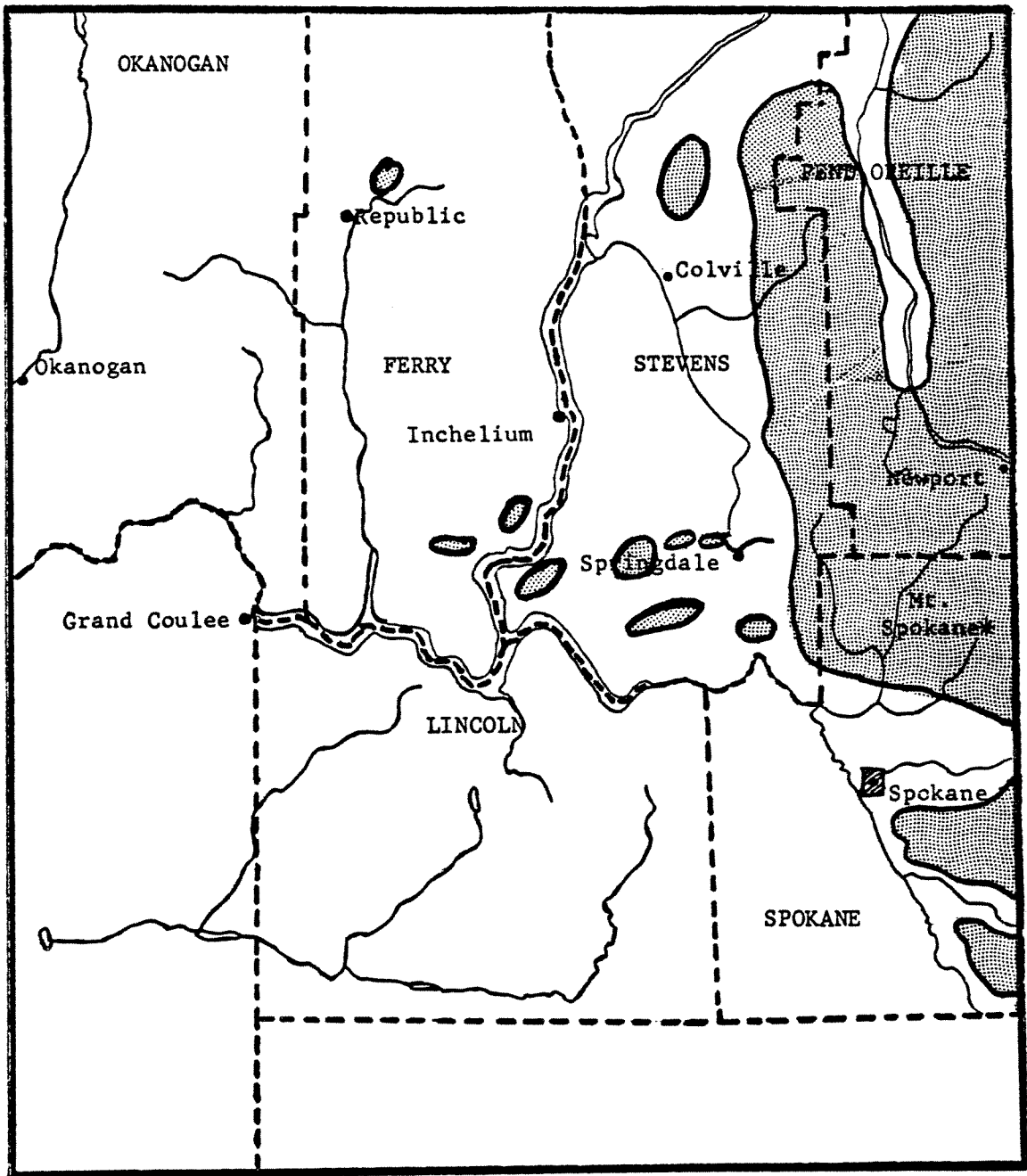


Figure 1.--Generalized area of larch casebearer in Northeast Washington.

Table 2.--Trend of larch casebearer infestations in

Washington, 1962-65

(In acres)

| Reporting area ^{1/} | Year | | | |
|------------------------------|-------|--------|---------|---------|
| | 1962 | 1963 | 1964 | 1965 |
| Kaniksu N.F. | 0 | 6,270 | 30,180 | 167,480 |
| Northeast Washington | 5,280 | 30,760 | 82,530 | 151,160 |
| Colville N.F. | 0 | 0 | 200 | 17,180 |
| Colville I.R. | 0 | 0 | 0 | 1,120 |
| Spokane I.R. | 0 | 0 | 0 | 3,440 |
| All areas | 5,280 | 37,030 | 112,910 | 340,380 |

Table 3.--Extent of larch casebearer infestation in

Washington in 1965, by reporting area and

intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|------------------------------|--------------------------|---------|----------|--------|------------|-----------------|
| | Infestation centers | Light | Moderate | Heavy | Very heavy | All intensities |
| | Number | -Acres- | | | | |
| Washington: | | | | | | |
| Kaniksu N.F. | 10 | 88,340 | 50,390 | 22,070 | 6,680 | 167,480 |
| Northeast Washington | 53 | 102,610 | 27,150 | 14,660 | 6,740 | 151,160 |
| Colville N.F. | 32 | 9,870 | 5,490 | 1,820 | 0 | 17,180 |
| Spokane I.R. | 2 | 1,360 | 2,080 | 0 | 0 | 3,440 |
| Colville I.R. | 1 | 0 | 0 | 0 | 1,120 | 1,120 |
| Washington areas | 98 | 202,180 | 85,110 | 38,550 | 14,540 | 340,380 |
| Regional total | 98 | 202,180 | 85,110 | 38,550 | 14,540 | 340,380 |

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

LARCH SAWFLY
Pristiphora erichsonni (Htg.)

Epidemic outbreaks of this insect in Oregon and Washington were confirmed for the first time this year. The unidentified sawfly defoliating larch

stands on the Mt. Hood and Wallowa-Whitman National Forests in 1964 was probably this species also. The infestation recorded on the Mt. Hood National Forest has increased considerably in size, but decreased to sub-epidemic populations on the Wallowa-Whitman National Forest. Light to heavy defoliation occurred this year on the Warm Springs Indian Reservation in Oregon and on the Yakima Indian Reservation in Washington (table 4). Sub-epidemic populations were found on the Colville National Forest near Northport, Washington. This insect is expected to spread in both States.

Table 4.--Extent of larch sawfly in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|------------------------------|-----------------------------------|-------------------|----------------------|-------------------|------------------------|-----------------------------|
| | : Infes- : tation : centers | : : : Light | : : : Moderate | : : : Heavy | : : Very : heavy | : : All : intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Mt. Hood N.F. | 3 | 6,200 | 1,240 | 90 | 0 | 7,530 |
| Warm Springs I.R. | 5 | 5,710 | 2,740 | 960 | 0 | 9,410 |
| Oregon areas | 8 | 11,910 | 3,980 | 1,050 | 0 | 16,940 |
| Washington: | | | | | | |
| Yakima I.R. | 2 | 4,320 | 0 | 320 | 0 | 4,640 |
| Washington areas | 2 | 4,320 | 0 | 320 | 0 | 4,640 |
| Regional total | 10 | 16,230 | 3,980 | 1,370 | 0 | 21,580 |

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

DOUGLAS-FIR TUSSOCK MOTH
Hemerocampa pseudotsugata McD.

The trend of Douglas-fir tussock moth outbreaks was strongly downward in both Oregon and Washington (table 5). The sharp downward trend

in Oregon was due to aerial spraying of 66,000 acres with DDT on the Malheur and Ochoco National Forests in 1965. Careful application of the insecticide by helicopter prevented damage to wildlife and other natural resources and gave 98% control of the tussock moth larval populations.

Two new centers of light to moderate defoliation developed on the Fremont National Forest in Oregon while no new infestations developed in Washington (table 6). Egg mass surveys show a definite downward trend in both States. Little or no tree killing is expected in either State. No control is planned in 1966.

Table 5.--Trend of Douglas-fir tussock moth infestations
in Oregon and Washington, 1961-65

(In acres)

| Reporting area | Year | | | | |
|----------------------|------|------|-------|--------|-------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Malheur N.F. | 0 | 0 | 0 | 38,960 | 2,790 |
| Ochoco N.F. | 0 | 0 | 0 | 1,360 | 0 |
| Fremont N.F. | 0 | 0 | 0 | 0 | 2,120 |
| Oregon areas | 0 | 0 | 0 | 40,320 | 4,910 |
| Washington: | | | | | |
| Northwest Washington | 0 | 100 | 1,170 | 14,260 | 2,580 |
| Colville N.F. | 0 | 0 | 280 | 3,440 | 0 |
| Kaniksu N.F. | 0 | 0 | 65 | 0 | 0 |
| Washington areas | 0 | 100 | 1,515 | 17,700 | 2,580 |
| Regional total | 0 | 100 | 1,515 | 58,020 | 7,490 |

1/ N.F., National Forest.

Table 6.--Extent of Douglas-fir tussock moth infestations
in Oregon and Washington in 1965, by reporting
area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|--------------------------------|-------------|-------------|-------------|------------------------|------------------------|
| | Infes- :tation :centers: | : : : | : : : | : : : | : Very : heavy : | : All : intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Malheur N.F. | 9 | 2,170 | 420 | 200 | 0 | 2,790 |
| Fremont N.F. | 2 | 1,760 | 360 | 0 | 0 | 2,120 |
| Oregon areas | 11 | 3,930 | 780 | 200 | 0 | 4,910 |
| Washington: | | | | | | |
| Northeast Washington | 9 | 820 | 660 | 1,100 | 0 | 2,580 |
| Washington areas | 9 | 820 | 660 | 1,100 | 0 | 2,580 |
| Regional total | 20 | 4,750 | 1,440 | 1,300 | 0 | 7,490 |

^{1/} N.F., National Forest.

PINE NEEDLE MINER
(Probably Recurvaria sp.)

Light to moderate defoliation of lodgepole pine occurred for the second year in Oregon near Crane Prairie Reservoir on the Deschutes National Forest (table 8).

The infested area has about doubled in the past year (table 7).

Tree killing has not yet occurred but repeated defoliation may have weakened the trees so they will become attractive to bark beetles.

Needle miner infestations were not found elsewhere in the Region.

Table 7.--Trend of needle miner infestations on lodgepole pine in Oregon, 1964-65

(In acres)

| Year | Intensity of infestation | | | | All intensities |
|------|--------------------------|----------|-------|------------|-----------------|
| | Light | Moderate | Heavy | Very heavy | |
| 1964 | 0 | 2,800 | 0 | 0 | 2,800 |
| 1965 | 1,440 | 3,520 | 0 | 0 | 4,960 |

Table 8.--Extent of needle miner infestation in Oregon in 1965, 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. | 3 | 1,440 | 3,520 | 0 | 0 | 4,960 |
| Oregon areas | 3 | 1,440 | 3,520 | 0 | 0 | 4,960 |
| Regional total | 3 | 1,440 | 3,520 | 0 | 0 | 4,960 |

^{1/} N.F., National Forest.

BLACKHEADED BUDWORM
Acleris variana (Fern.)

An epidemic outbreak developed in two centers in true fir and Douglas-fir stands on the Malheur National Forest, Oregon.

| <u>Intensity</u> | <u>Approximate acreage</u> |
|-------------------|----------------------------|
| Light defoliation | 640 |
| Heavy defoliation | <u>3,200</u> |
| Total | 3,840 |

Elsewhere in eastern Oregon, larval populations were higher than normal.

Egg ratio surveys show that a much higher larval population may be available for feeding in 1966.

WESTERN OAK LOOPER
Lambdina fiscellaria somnaria (Hulst)

Outbreaks of this insect in Oregon declined sharply in 1965 (table 9). Light to moderate defoliation occurred in isolated oak stands

in the Willamette Valley near Sheridan, Oregon (table 10). Diseases and parasites apparently caused the downward population trend over western Oregon.

Table 9.--Trend of western oak looper infestation in the Willamette Valley of Oregon, 1961-65

(In acres)

| Year | Intensity of infestation | | | | All intensities |
|------|--------------------------|----------|-------|------------|-----------------|
| | Light | Moderate | Heavy | Very heavy | |
| 1961 | 0 | 5,760 | 960 | 160 | 6,880 |
| 1962 | 1,240 | 0 | 0 | 0 | 1,240 |
| 1963 | 6,120 | 3,990 | 4,760 | 1,880 | 16,750 |
| 1964 | 5,670 | 640 | 120 | 0 | 6,430 |
| 1965 | 80 | 640 | 0 | 0 | 720 |

Table 10.--Extent of western oak looper infestations in Oregon
in 1965, by reporting area and intensity of
infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|-------------------------------|-----------|-------|-----------|-----------------|----------------------|
| | Infes- :tation :centers | : | : | : | Very : heavy | All : intensities |
| | Number | - - - - - | Acres | - - - - - | - - - - - | - - - - - |
| Oregon: | | | | | | |
| Suislaw N.F. | 3 | 80 | 640 | 0 | 0 | 720 |
| Oregon areas | 3 | 80 | 640 | 0 | 0 | 720 |
| Regional total | 3 | 80 | 640 | 0 | 0 | 720 |

^{1/} N.F., National Forest.

SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)

For the first time since record keeping began in 1947, no outbreaks were detected in either State. Epidemic outbreaks of last year on the Colville and

Kaniksu National Forests in Washington have declined (table 11). Egg mass evaluation surveys in past outbreak areas indicate no population buildups for 1966.

Table 11.--Trend of spruce budworm infestations in

Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|--------|--------|--------|--------|--------|
| | : 1961 | : 1962 | : 1963 | : 1964 | : 1965 |
| Oregon: | | | | | |
| Fremont N.F. | 55,200 | 42,060 | 37,040 | 0 | 0 |
| Wallowa-Whitman N.F. | 0 | 6,310 | 12,000 | 0 | 0 |
| Oregon areas | 55,200 | 48,370 | 49,040 | 0 | 0 |
| Washington: | | | | | |
| Glenwood District | 22,400 | 0 | 0 | 0 | 0 |
| Yakima I.R. | 7,200 | 0 | 0 | 0 | 0 |
| Kaniksu N.F. | 0 | 0 | 10,200 | 2,060 | 0 |
| Colville N.F. | 0 | 0 | 0 | 740 | 0 |
| Washington areas | 29,600 | 0 | 10,200 | 2,800 | 0 |
| Regional totals | 84,800 | 48,370 | 59,240 | 2,800 | 0 |

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

WESTERN HEMLOCK LOOPER
Lambdina fiscellaria lugubrosa (Hulst)

No epidemic outbreaks of the hemlock looper were recorded in either Oregon or Washington this year (table 12). A few larvae and some sub-epidemic feeding occurred in southwestern Washington near the 1963 spray areas.

A moth flight occurred in a Clackamas River drainage in the Oregon Cascades this fall but no new eggs were found during an egg survey. Hence, no defoliation is expected in 1966.

Table 12.--Trend of western hemlock looper infestations
in Northwest Oregon and Southwest Washington,
1961-65

(In acres)

| Year | Area of epidemic infestations | | Regional total |
|------|-------------------------------|------------|----------------|
| | Oregon | Washington | |
| 1961 | 11,000 | 0 | 11,000 |
| 1962 | 1,060 | 5,990 | 7,050 |
| 1963 | 540 | 8,040 | 8,580 |
| 1964 | 0 | 650 | 650 |
| 1965 | 0 | 0 | 0 |

EUROPEAN PINE SHOOT MOTH
Rhyacionia buoliana (Schiff.)

In Washington, 88 communities were surveyed by the Washington State Department of Natural Resources outside the containment zone. Infestations

were found in two Christmas tree plantations and four residences in Tumwater. Subsequently, the quarantine zone boundary has been adjusted to include all counties west of the Cascade crest excluding all of Wahkiakum, Cowlitz, Clark and Skamania Counties. Infested pines from one of these plantations were shipped early in 1965 to Klickitat and Sherman Creek Game Ranges in eastern Washington for landscape plantings around offices. All pines in the shipments were found and destroyed before moth flight.

In Oregon, no infestations were found during eradication surveys in residential areas of Portland and Salem. Three trees in a newly planted roadside landscaping along the Minnesota Freeway in North Portland were found to be infested with European pine shoot moth. The source of infested stock was traced to a private nursery near Olympia, Washington. The entire stock of ornamental pines from which the three infested trees came was removed and burned before moth flight. This was an interception, not an established infestation.

PANDORA MOTH
Coloradia pandora Blake

Light to moderate defoliation occurred in lodgepole pine on the Winema National Forest near Chemult, Oregon.

An off-year flight of moths was reported to have occurred the last of July. The main flight is expected this year. Some feeding is predicted for next year, but the population is expected to decrease because of fairly high parasitism of mature larvae in 1965.

A pilot test using Dibrom-14 was applied on 320 acres at rates of 5 ounces of concentrate diluted in 3 ounces of propylene glycol per acre on one plot of 160 acres and 5 ounces in one gallon of ethylene glycol per acre on the other 160-acre plot. The spray was against mature larvae. Results were not encouraging, but some larval mortality occurred.

SUCKING INSECTS

BALSAM WOOLLY APHID
Adelges piceae (Ratz.)

Infested acreage decreased in Oregon and Washington (table 13). The majority of the damage occurred in the subalpine fir stands on the Gifford

Pinchot and Snoqualmie National Forests in Washington. In Oregon, infestations were centered on the Mt. Hood, Willamette, Rogue River, Umpqua and Deschutes National Forests and in Crater Lake National Park. Infestations continued in grand fir near Coquille, Oregon (table 14).

No practical control measures have been developed for use under forest conditions. Logging of infested merchantable trees and those of declining thrift is about all that can be done.

Some limited insecticide field tests may be made against the aphid in 1966 on individual trees in high-use recreational areas in Washington.

Table 13.--Trend of balsam woolly aphid infestations

in Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|---------------|---------------|----------------|----------------|---------------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Willamette N.F. | 68,640 | 33,920 | 44,710 | 72,760 | 19,430 |
| Umpqua N.F. | 6,880 | 4,280 | 11,830 | 17,960 | 4,320 |
| Mt. Hood N.F. | 1,760 | 5,840 | 9,870 | 17,660 | 7,530 |
| Deschutes N.F. | 800 | 4,000 | 19,640 | 17,320 | 5,260 |
| Siuslaw N.F. | 0 | 3,460 | 4,030 | 340 | 0 |
| Winema N.F. | 0 | 300 | 410 | 0 | 0 |
| Rogue River N.F. | 0 | 0 | 6,600 | 18,760 | 4,140 |
| Warm Springs I.R. | 0 | 0 | 3,380 | 1,380 | 1,750 |
| Crater Lake N.P. | 0 | 0 | 1,680 | 1,320 | 3,350 |
| Coos-Douglas | 0 | 0 | 0 | 520 | 640 |
| Northwest Oregon | 0 | 0 | 0 | 20 | 0 |
| Oregon areas | 78,080 | 51,800 | 102,150 | 148,040 | 46,420 |
| Washington: | | | | | |
| Gifford Pinchot N.F. | 2,080 | 2,590 | 63,930 | 25,860 | 11,040 |
| Yakima I.R. | 240 | 360 | 6,960 | 840 | 400 |
| Southwest Washington | 0 | 1,760 | 0 | 1,040 | 980 |
| Snoqualmie N.F. | 0 | 0 | 10,560 | 5,800 | 7,800 |
| Mt. Rainier N.P. | 0 | 0 | 3,260 | 1,120 | 360 |
| Wenatchee N.F. | 0 | 0 | 600 | 720 | 240 |
| Washington areas | 2,320 | 4,710 | 85,310 | 35,380 | 20,820 |
| Regional total | 80,400 | 56,510 | 187,460 | 183,420 | 67,240 |

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

Table 14.--Extent of balsam woolly aphid infestations in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | : Infestation : Intensity of infestation : : centers : Light : Moderate : Heavy : heavy : All intensities | | | | | |
|------------------------------|--|---------------|---------------|--------------|------------|---------------|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Willamette N.F. | 115 | 13,510 | 4,740 | 1,180 | 0 | 19,430 |
| Mt. Hood N.F. | 50 | 7,370 | 160 | 0 | 0 | 7,530 |
| Deschutes N.F. | 61 | 4,860 | 400 | 0 | 0 | 5,260 |
| Umpqua N.F. | 25 | 3,440 | 800 | 80 | 0 | 4,320 |
| Rogue River N.F. | 27 | 3,290 | 770 | 80 | 0 | 4,140 |
| Crater Lake N.P. | 17 | 1,790 | 900 | 660 | 0 | 3,350 |
| Warm Springs I.R. | 16 | 1,230 | 520 | 0 | 0 | 1,750 |
| Coos-Douglas | 5 | 0 | 360 | 280 | 0 | 640 |
| Oregon areas | 316 | 35,490 | 8,650 | 2,280 | 0 | 46,420 |
| Washington: | | | | | | |
| Gifford Pinchot N.F. | 36 | 8,910 | 1,980 | 150 | 0 | 11,040 |
| Snoqualmie N.F. | 24 | 4,480 | 1,080 | 1,280 | 960 | 7,800 |
| Southwest Washington | 3 | 980 | 0 | 0 | 0 | 980 |
| Yakima I.R. | 2 | 80 | 0 | 320 | 0 | 400 |
| Mt. Rainier N.P. | 2 | 120 | 0 | 240 | 0 | 360 |
| Wenatchee N.F. | 1 | 240 | 0 | 0 | 0 | 240 |
| Washington areas | 68 | 14,810 | 3,060 | 1,990 | 0 | 20,820 |
| Regional total | 384 | 50,300 | 11,710 | 4,270 | 960 | 67,240 |

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

PINE NEEDLE SCALE
Phenacaspis pinifoliae (Fitch)

Moderate defoliation by the pine needle scale occurred on lodgepole pine near Wickiup Reservoir on the Deschutes National Forest (table 15).

The infestation is quite widespread but below tree killing severity. No control is needed in 1966.

Table 15.--Extent of pine needle scale infestation in Oregon
in 1965, by reporting area and intensity of
infestation

| Reporting area ^{1/} | : Infestation : Intensity of infestation : : centers : Light : Moderate : Heavy : heavy : All : : : : : intensities | | | | | |
|---------------------------------|---|---|-------|---|---|-------|
| | Number | - | - | - | - | - |
| | ----- Acres ----- | | | | | |
| Oregon: | | | | | | |
| Deschutes N.F. | 1 | 0 | 4,640 | 0 | 0 | 4,640 |
| Oregon areas | 1 | 0 | 4,640 | 0 | 0 | 4,640 |
| Regional total | 1 | 0 | 4,640 | 0 | 0 | 4,640 |

^{1/} N.F., National Forest.

SPRUCE APHID
Neomyzaphis abietina (Wlkr.)

The spruce aphid reappeared on Sitka spruce on the Olympic National Forest and Olympic National park (table 16). The damage was light and no tree

mortality occurred. Outbreaks of this insect usually decline naturally within a year or two without causing any apparent damage to the stand.

Table 16.--Extent of spruce aphid infestations in Washington
in 1965, by reporting area and intensity of
infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|--------------------------------------|--------------|------------|---------|---------|----------------------|
| | : Infes- : tation : : centers: | : Light | : Moderate | : Heavy | : heavy | : All intensities |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Washington: | | | | | | |
| Olympic N.F. | 1 | 240 | 0 | 0 | 0 | 240 |
| Olympic N.P. | 1 | 720 | 0 | 0 | 0 | 720 |
| Washington areas | 2 | 960 | 0 | 0 | 0 | 960 |
| Regional total | 2 | 960 | 0 | 0 | 0 | 960 |

^{1/} N.F., National Forest; N.P., National Park.

BARK BEETLES

| |
|--|
| MOUNTAIN PINE BEETLE <u>Dendroctonus ponderosae</u> Hopk. |
|--|

Regionwide, mountain pine beetle outbreaks in young ponderosa pine stands more than doubled the 1964 losses (table 17). Tree killing in

the lodgepole pine stands increased in Oregon but decreased in Washington. Mortality in western white pine stands decreased slightly in both States. Some tree killing occurred in knobcone pine stands in Oregon. Sugar pine losses remained static. The situation by tree species is as follows:

Western white pine.--Outbreaks decreased in both Oregon and Washington. The heaviest losses occurred on the Wenatchee National Forest in Washington. Additional heavy losses were found on the Olympic National Park and the Gifford Pinchot and Snoqualmie National Forests. In Oregon, most of the mortality occurred on the Willamette and Mt. Hood National Forests (table 18).

Control is impractical in the Cascade Mountains because of the blister rust and the scattered occurrence of white pine. To reduce beetle populations and save timber values, salvaging merchantable beetle-infested trees and logging the intermingled merchantable green white pine is encouraged.

Ponderosa pine.--Tree killing in Oregon was heaviest on the Wallowa-Whitman, Malheur and Fremont National Forests. Significant losses also occurred on the Winema, Umatilla and Ochoco National Forests. In Washington, tree mortality was the heaviest on the Okanogan National Forest. Lighter losses were found on the Yakima Indian Reservation and Umatilla National Forest (table 19).

For control, stand manipulation by thinning is necessary to prevent future beetle outbreaks. Vigorous, well-spaced trees appear to be less susceptible to attack. Direct control is only a stopgap measure.

Lodgepole pine.--Tree killing in the lodgepole pine stands of Oregon increased considerably with the heaviest losses occurring on the Fremont, Winema, Deschutes and Malheur National Forests. Outbreaks in Washington decreased significantly with most of the losses occurring on the Yakima Indian Reservation and the Wenatchee and Okanogan National Forests (table 20).

Salvage logging of merchantable beetle-infested trees and adjacent green trees is recommended to reduce beetle population.

Sugar pine.--Light to moderate tree killing occurred in mature sugar pine stands of southern Oregon. Most of the losses reported occurred on the Siskiyou and Fremont National Forests (table 21).

Salvaging is recommended to reduce the beetle population and save timber values.

Knobcone pine.--Light losses occurred in a knobcone pine stand on the Umpqua National Forest (table 22). Previously, this stand had been severely defoliated for a three-year period by a sawfly Neodriprion fulviceps complex.

Table 17.--Trend of mountain pine beetle infestations in Oregon and Washington, by host species, 1961-65^{1/}

(In acres)

| Year of detection: | Area of epidemic infestations | | | | | | | | Regional tot., all species |
|--------------------------|-------------------------------|--------|---------|-------|------------|--------|--------|---------|----------------------------------|
| | Oregon | | | | Washington | | | | |
| | W | L | P | S | W | L | P | | |
| 1961 | 114,380 | 77,680 | 16,640 | 0 | 291,760 | 1,520 | 1,200 | 503,180 | |
| 1962 | 73,720 | 65,200 | 3,820 | 160 | 349,770 | 3,050 | 1,340 | 497,060 | |
| 1963 | 67,845 | 50,220 | 32,220 | 0 | 410,540 | 17,620 | 1,160 | 579,605 | |
| 1964 | 92,700 | 55,790 | 42,440 | 6,160 | 175,990 | 8,770 | 13,830 | 395,680 | |
| 1965 | 72,120 | 94,190 | 109,620 | 6,110 | 127,330 | 1,970 | 31,930 | 443,270 | |

^{1/} Host species are: W, western white pine; L, lodgepole pine; P, ponderosa pine; S, sugar pine.

Table 18.--Extent of mountain pine beetle infestations in western white pine in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|------------------------------|--------------------------|--------|----------|--------|------------|-----------------|
| | Infestation centers | Light | Moderate | Heavy | Very heavy | All intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Willamette N.F. | 148 | 18,980 | 13,620 | 5,640 | 0 | 38,240 |
| Mt. Hood N.F. | 182 | 9,330 | 8,620 | 8,360 | 1,500 | 27,810 |
| Umpqua N.F. | 30 | 2,120 | 800 | 0 | 0 | 2,920 |
| Siskiyou N.F. | 10 | 720 | 960 | 0 | 0 | 1,680 |
| Rogue River N.F. | 17 | 640 | 280 | 0 | 0 | 920 |
| Winema N.F. | 3 | 240 | 0 | 0 | 0 | 240 |
| Deschutes N.F. | 4 | 140 | 90 | 0 | 0 | 230 |
| Warm Springs I.R. | 4 | 80 | 0 | 0 | 0 | 80 |
| Oregon areas | 398 | 32,250 | 24,370 | 14,000 | 1,500 | 72,120 |
| Washington: | | | | | | |
| Wenatchee N.F. | 125 | 16,780 | 12,460 | 7,940 | 3,340 | 40,520 |
| Olympic N.P. | 71 | 16,040 | 8,540 | 1,680 | 680 | 26,940 |
| Gifford Pinchot N.F. | 31 | 10,140 | 2,550 | 100 | 80 | 12,870 |
| Snoqualmie N.F. | 56 | 5,380 | 5,260 | 1,080 | 240 | 11,960 |
| Colville N.F. | 13 | 2,920 | 620 | 5,460 | 280 | 9,280 |
| Olympic N.F. | 25 | 5,440 | 920 | 1,120 | 480 | 7,960 |
| Quinalt I.R. | 4 | 4,920 | 400 | 0 | 0 | 5,320 |
| Kaniksu N.F. | 15 | 2,200 | 1,000 | 280 | 0 | 3,480 |
| Yakima I.R. | 5 | 480 | 2,320 | 0 | 120 | 2,920 |
| Mt. Rainier N.P. | 7 | 800 | 840 | 280 | 0 | 1,920 |
| Mt. Baker N.F. | 10 | 1,440 | 0 | 0 | 0 | 1,440 |
| Glenwood District | 2 | 600 | 560 | 0 | 0 | 1,160 |
| Okanogan N.F. | 6 | 480 | 360 | 0 | 0 | 840 |
| Puget Sound District | 2 | 0 | 560 | 160 | 0 | 720 |
| Washington areas | 372 | 67,620 | 36,390 | 18,100 | 5,220 | 127,330 |
| Regional total | 770 | 99,870 | 60,760 | 32,100 | 6,720 | 199,450 |

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

Table 19.--Extent of mountain pine beetle infestations in ponderosa pine in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | :Infes- : :tation : :centers: | Intensity of infestation | | | | | All intensities |
|------------------------------|-------------------------------------|--------------------------|---------------|---------------|--------------|--|-----------------|
| | | Light | Moderate | Heavy | heavy | | |
| | Number | Acres | | | | | |
| Oregon: | | | | | | | |
| Wallowa-Whitman N.F. | 134 | 28,290 | 8,920 | 7,570 | 3,630 | | 48,410 |
| Malhuer N.F. | 106 | 21,300 | 5,610 | 2,260 | 0 | | 29,170 |
| Fremont N.F. | 104 | 8,520 | 5,600 | 2,460 | 160 | | 16,740 |
| Winema N.F. | 37 | 4,350 | 560 | 0 | 0 | | 4,910 |
| Umatilla N.F. | 23 | 2,720 | 420 | 0 | 0 | | 3,140 |
| Deschutes N.F. | 18 | 1,240 | 1,310 | 0 | 0 | | 2,550 |
| Ochoco N.F. | 19 | 2,370 | 0 | 0 | 0 | | 2,370 |
| Siskiyou N.F. | 11 | 1,290 | 0 | 0 | 0 | | 1,290 |
| Central Oregon Dist. | 9 | 680 | 0 | 0 | 0 | | 680 |
| Rogue River N.F. | 5 | 170 | 0 | 0 | 0 | | 170 |
| Umpqua N.F. | 1 | 120 | 0 | 0 | 0 | | 120 |
| Mt. Hood N.F. | 3 | 50 | 0 | 0 | 0 | | 50 |
| Umatilla I.R. | 2 | 20 | 0 | 0 | 0 | | 20 |
| Oregon areas | 472 | 71,120 | 22,420 | 12,290 | 3,790 | | 109,620 |
| Washington: | | | | | | | |
| Okanogan N.F. | 31 | 3,540 | 6,480 | 3,900 | 1,480 | | 15,400 |
| Yakima I.R. | 6 | 1,040 | 4,660 | 680 | 400 | | 6,780 |
| Umatilla N.F. | 21 | 3,940 | 340 | 0 | 0 | | 4,280 |
| Colville N.F. | 13 | 280 | 1,500 | 1,140 | 360 | | 3,280 |
| Colville I.R. | 4 | 620 | 0 | 390 | 0 | | 1,010 |
| Wenatchee N.F. | 3 | 160 | 180 | 240 | 0 | | 580 |
| Spokane I.R. | 1 | 280 | 0 | 0 | 0 | | 280 |
| Snoqualmie N.F. | 1 | 0 | 280 | 0 | 0 | | 280 |
| Glenwood Dist. | 1 | 40 | 0 | 0 | 0 | | 40 |
| Washington areas | 81 | 9,900 | 13,440 | 6,350 | 2,240 | | 31,930 |
| Regional total | 553 | 81,020 | 35,860 | 18,640 | 6,030 | | 141,550 |

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

Table 20.--Extent of mountain pine beetle infestations in lodgepole pine in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|------------------------------|--------------------------|---------------|---------------|---------------|--------------|-----------------|
| | Infestation centers | Light | Moderate | Heavy | Very heavy | All intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Fremont N.F. | 101 | 18,920 | 17,020 | 8,780 | 2,380 | 47,100 |
| Winema N.F. | 93 | 17,130 | 3,690 | 740 | 0 | 21,560 |
| Deschutes N.F. | 44 | 7,360 | 2,600 | 1,770 | 200 | 11,930 |
| Malheur N.F. | 25 | 4,780 | 2,240 | 1,390 | 0 | 8,410 |
| Wallowa-Whitman N.F. | 12 | 1,370 | 1,080 | 680 | 0 | 3,130 |
| Crater Lake N.P. | 9 | 1,000 | 800 | 0 | 0 | 1,800 |
| Umatilla N.F. | 3 | 140 | 0 | 0 | 0 | 140 |
| Siskiyou N.F. | 1 | 80 | 0 | 0 | 0 | 80 |
| Ochoco N.F. | 1 | 40 | 0 | 0 | 0 | 40 |
| Oregon areas | 289 | 50,820 | 27,430 | 13,360 | 2,580 | 94,190 |
| Washington: | | | | | | |
| Wenatchee N.F. | 7 | 640 | 100 | 100 | 0 | 840 |
| Yakima I.R. | 2 | 560 | 0 | 0 | 0 | 560 |
| Okanogan N.F. | 5 | 200 | 120 | 120 | 0 | 440 |
| Olympic N.F. | 1 | 80 | 0 | 0 | 0 | 80 |
| Umatilla N.F. | 1 | 50 | 0 | 0 | 0 | 50 |
| Washington areas | 16 | 1,530 | 220 | 220 | 0 | 1,970 |
| Regional total | 305 | 52,350 | 27,650 | 13,580 | 2,580 | 96,160 |

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

Table 21.--Extent of mountain pine beetle infestations
in sugar pine in Oregon in 1965, by area
and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|-------------------------------|--------------|------------|----------|-----------------|----------------------|
| | Infes- :tation :centers | Light | Moderate | Heavy | Very : heavy | All : intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Siskiyou N.F. | 37 | 3,750 | 360 | 0 | 0 | 4,110 |
| Fremont N.F. | 6 | 1,640 | 0 | 0 | 0 | 1,640 |
| Coos-Douglas Dist. | 2 | 160 | 0 | 0 | 0 | 160 |
| Rogue River N.F. | 3 | 130 | 0 | 0 | 0 | 130 |
| Deschutes N.F. | 1 | 50 | 0 | 0 | 0 | 50 |
| Winema N.F. | 1 | 20 | 0 | 0 | 0 | 20 |
| Oregon areas | 50 | 5,750 | 360 | 0 | 0 | 6,110 |
| Regional total | 50 | 5,750 | 360 | 0 | 0 | 6,110 |

^{1/} N.F., National Forest.

Table 22.--Extent of mountain pine beetle infestations
in knobcone pine in Oregon in 1965, by area
and intensity of infestation

| Reporting area ^{1/} | : Infes- : Intensity of infestation : : tation : : : : Very : All : centers: Light : Moderate : Heavy : heavy : intensities | | | | | |
|---------------------------------|---|-------|---|---|---|-------|
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Umpqua N.F. | 3 | 1,400 | 0 | 0 | 0 | 1,400 |
| Oregon areas | 3 | 1,400 | 0 | 0 | 0 | 1,400 |
| Regional total | 3 | 1,400 | 0 | 0 | 0 | 1,400 |

1/ N.F., National Forest.

DOUGLAS-FIR BEETLE
Dendroctonus pseudotsugae Hopk.

Douglas-fir beetle damage nearly doubled that reported in 1964 (table 23). In western Oregon the most severe outbreaks occurred primarily on private and

O&C lands in Coos and Douglas Counties. Losses were also high on the Siuslaw, Umpqua, Willamette and Rogue River National Forests. Although heavy damage in eastern Oregon remained on the Wallowa-Whitman National Forest, there was a significant reduction when compared to 1964 losses. In eastern Washington, tree mortality was heaviest on the Okanogan and Colville National Forests. Lighter losses occurred in western Washington on Southwest Washington State District and the Gifford Pinchot and Snoqualmie National Forests (table 24).

A combination photo-ground survey showed that losses sustained in western Oregon alone during 1964 and 1965 totalled 2.6 billion board feet. Of this 1.9 billion board feet occurred in 1964 and 0.7 billion board feet in 1965.

Although losses will continue to be high, a general downward trend is expected in 1966. Removal of infested trees and recent blowdown is essential to reduce the beetle population and the deterioration of the timber.

Table 23.--Trend of Douglas-fir beetle infestations
in Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|---------|--------|--------|---------|---------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Coos-Douglas Dist. | 0 | 0 | 0 | 19,630 | 69,720 |
| Siuslaw N.F. | 800 | 1,560 | 540 | 17,890 | 54,080 |
| Umpqua N.F. | 320 | 740 | 4,100 | 2,360 | 30,260 |
| Willamette N.F. | 0 | 0 | 410 | 720 | 17,850 |
| Siskiyou N.F. | 1,200 | 1,160 | 320 | 6,760 | 15,200 |
| Rogue River N.F. | 9,360 | 3,040 | 3,560 | 240 | 2,580 |
| Northwest Oregon Dist. | 0 | 0 | 0 | 0 | 1,400 |
| Mt. Hood N.F. | 960 | 600 | 0 | 450 | 400 |
| Wallowa-Whitman N.F. | 32,640 | 12,490 | 12,510 | 52,220 | 20,710 |
| Umatilla N.F. | 24,480 | 5,630 | 1,560 | 10,640 | 1,900 |
| Malheur N.F. | 320 | 520 | 240 | 810 | 6,160 |
| Winema N.F. | 40 | 0 | 210 | 0 | 0 |
| Ochoco N.F. | 0 | 650 | 860 | 470 | 550 |
| Warm Springs I.R. | 0 | 60 | 20 | 0 | 50 |
| Umatilla I.R. | 0 | 80 | 80 | 0 | 0 |
| Central Oregon Dist. | 0 | 0 | 110 | 0 | 0 |
| Crater Lake N.P. | 0 | 0 | 30 | 0 | 0 |
| Oregon areas | 70,120 | 26,530 | 24,550 | 112,190 | 220,860 |
| Washington: | | | | | |
| Southwest Washington Dist. | 160 | 320 | 0 | 0 | 3,680 |
| Gifford Pinchot N.F. | 9,440 | 2,550 | 1,880 | 460 | 2,930 |
| Snoqualmie N.F. | 160 | 1,800 | 850 | 230 | 2,260 |
| Puget Sound Dist. | 0 | 0 | 0 | 0 | 440 |
| Olympic N.F. | 0 | 0 | 120 | 0 | 440 |
| Olympic N.P. | 0 | 0 | 320 | 80 | 80 |
| Northwest Washington | 960 | 0 | 0 | 0 | 40 |
| Colville I.R. | 20,600 | 7,650 | 11,460 | 2,050 | 2,300 |
| Spokane I.R. | 40 | 0 | 70 | 0 | 0 |
| Mt. Baker N.F. | 200 | 0 | 400 | 0 | 160 |
| Yakima I.R. | 0 | 0 | 320 | 0 | 0 |
| Okanogan N.F. | 49,460 | 24,060 | 31,950 | 6,830 | 12,160 |
| Colville N.F. | 11,720 | 14,900 | 8,240 | 4,630 | 8,780 |
| Wenatchee N.F. | 2,240 | 4,080 | 4,280 | 760 | 1,120 |
| Glenwood Dist. | 480 | 0 | 90 | 0 | 280 |
| Kaniksu N.F. | 1,880 | 220 | 160 | 360 | 180 |
| Northeast Washington Dist. | 0 | 80 | 60 | 0 | 120 |
| Umatilla N.F. | 1,800 | 330 | 500 | 2,710 | 0 |
| Washington areas | 99,140 | 55,990 | 60,700 | 18,110 | 34,970 |
| Regional total | 169,260 | 82,520 | 85,250 | 130,300 | 255,830 |

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

Table 24.--Extent of Douglas-fir beetle infestations in
Oregon and Washington in 1965, by reporting
area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation : | | | | | |
|----------------------------------|-------------------------------|----------------|---------------|---------------|--------------|--------------------|
| | Infes- :tation :centers | Light | Moderate | Heavy | heavy | All intensities |
| | Number | Acres | | | | |
| Oregon (Westside): | | | | | | |
| Coos-Douglas Dist. | 664 | 29,080 | 21,680 | 17,040 | 1,920 | 69,720 |
| Siuslaw N.F. | 568 | 27,210 | 15,070 | 11,400 | 400 | 54,080 |
| Umpqua N.F. | 374 | 23,180 | 5,520 | 1,560 | 0 | 30,260 |
| Willamette N.F. | 197 | 15,320 | 1,570 | 960 | 0 | 17,850 |
| Siskiyou N.F. | 208 | 10,270 | 3,890 | 1,040 | 0 | 15,200 |
| Rogue River N.F. | 55 | 2,370 | 210 | 0 | 0 | 2,580 |
| Northwest Oregon Dist. | 16 | 1,400 | 0 | 0 | 0 | 1,400 |
| Mt. Hood N.F. | 11 | 400 | 0 | 0 | 0 | 400 |
| Westside Oregon areas | 2,093 | 109,230 | 47,940 | 32,000 | 2,320 | 191,490 |
| Oregon (Eastside): | | | | | | |
| Wallowa-Whitman N.F. | 215 | 18,520 | 2,110 | 80 | 0 | 20,710 |
| Malheur N.F. | 49 | 5,760 | 400 | 0 | 0 | 6,160 |
| Umatilla N.F. | 21 | 1,900 | 0 | 0 | 0 | 1,900 |
| Ochoco N.F. | 4 | 550 | 0 | 0 | 0 | 550 |
| Warm Springs I.R. | 3 | 50 | 0 | 0 | 0 | 50 |
| Eastside Oregon areas | 292 | 26,780 | 2,510 | 80 | 0 | 29,370 |
| All Oregon areas | 2,385 | 136,010 | 50,450 | 32,080 | 2,320 | 220,860 |
| Washington (Westside): | | | | | | |
| Southwest Washington Dist. | 30 | 2,640 | 880 | 0 | 160 | 3,680 |
| Gifford-Pinchot N.F. | 9 | 2,710 | 220 | 0 | 0 | 2,930 |
| Snoqualmie N.F. | 19 | 930 | 810 | 520 | 0 | 2,260 |
| Olympic N.F. | 6 | 440 | 0 | 0 | 0 | 440 |
| Puget Sound Dist. | 3 | 440 | 0 | 0 | 0 | 440 |
| Mt. Baker N.F. | 3 | 160 | 0 | 0 | 0 | 160 |
| Olympic N.P. | 1 | 80 | 0 | 0 | 0 | 80 |
| Northwest Washington Dist. | 1 | 40 | 0 | 0 | 0 | 40 |
| Westside Washington areas | 72 | 7,440 | 1,910 | 520 | 160 | 10,030 |
| Washington (Eastside): | | | | | | |
| Okanogan N.F. | 58 | 7,720 | 3,080 | 1,360 | 0 | 12,160 |
| Colville N.F. | 52 | 5,600 | 2,520 | 420 | 240 | 8,780 |
| Colville I.R. | 12 | 2,040 | 260 | 0 | 0 | 2,300 |
| Wenatchee N.F. | 10 | 1,120 | 0 | 0 | 0 | 1,120 |
| Glenwood Dist. | 4 | 280 | 0 | 0 | 0 | 280 |
| Kaniksu N.F. | 2 | 80 | 0 | 100 | 0 | 180 |
| Northeast Washington Dist. | 1 | 120 | 0 | 0 | 0 | 120 |
| Eastside Washington areas | 139 | 16,960 | 5,860 | 1,880 | 240 | 24,940 |
| All Washington areas | 211 | 24,400 | 7,770 | 2,400 | 400 | 34,970 |
| Regional total | 2,596 | 160,410 | 58,220 | 34,480 | 2,720 | 255,830 |

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

WESTERN PINE BEETLE
Dendroctonus brevicomis Lec.

Western pine beetle outbreaks remained static (table 25). In Oregon, the majority of losses occurred on the Malheur, Fremont, Ochoco and Winema

National Forests. Lighter tree mortality occurred on the Wallowa-Whitman, Umatilla and Deschutes National Forests. Losses in Washington were found primarily on the Yakima Indian Reservation and Wenatchee National Forest (table 26). Elsewhere in the pine region of both States tree killing was fairly light.

Losses caused by this beetle can be reduced or held to a minimum by continuing aggressive sanitation-salvage logging programs in all high-risk stands. Until the high-risk elements are removed, losses are likely to continue in uncut stands.

Table 25.--Trend of western pine beetle infestations

in Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Umatilla I.R. | 0 | 0 | 50 | 0 | 0 |
| Malheur N.F. | 32,720 | 71,660 | 14,790 | 42,180 | 26,770 |
| Fremont N.F. | 41,400 | 99,010 | 43,900 | 15,990 | 30,760 |
| Ochoco N.F. | 57,280 | 119,010 | 5,040 | 16,870 | 14,760 |
| Winema N.F. | 2,800 | 14,360 | 13,160 | 9,960 | 11,710 |
| Wallowa-Whitman N.F. | 2,600 | 1,250 | 4,510 | 5,480 | 6,410 |
| Umatilla N.F. | 9,920 | 18,770 | 5,070 | 8,170 | 4,880 |
| Deschutes N.F. | 5,920 | 30,380 | 2,950 | 5,010 | 4,780 |
| Warm Springs I.R. | 5,880 | 19,240 | 480 | 440 | 1,480 |
| Siskiyou N.F. | 1,760 | 960 | 130 | 3,120 | 1,350 |
| Rogue River N.F. | 19,160 | 14,320 | 4,430 | 1,180 | 1,200 |
| Central Oregon Dist. | 0 | 0 | 730 | 0 | 440 |
| Mt. Hood N.F. | 440 | 2,640 | 1,530 | 0 | 60 |
| Umpqua N.F. | 160 | 160 | 1,260 | 740 | 0 |
| Crater Lake N.P. | 0 | 620 | 0 | 0 | 0 |
| Willamette N.F. | 0 | 0 | 360 | 0 | 0 |
| Coos-Douglas Dist. | 0 | 0 | 0 | 2,170 | 0 |
| Oregon areas | 180,040 | 392,380 | 98,390 | 111,310 | 104,600 |
| Washington: | | | | | |
| Umatilla N.F. | 0 | 110 | 80 | 510 | 0 |
| Yakima I.R. | 9,040 | 2,680 | 9,560 | 10,480 | 7,320 |
| Wenatchee N.F. | 960 | 0 | 6,890 | 1,740 | 5,160 |
| Okanogan N.F. | 480 | 340 | 7,500 | 3,810 | 3,640 |
| Colville I.R. | 280 | 940 | 320 | 2,120 | 3,360 |
| Colville N.F. | 0 | 0 | 2,160 | 920 | 1,760 |
| Spokane I.R. | 0 | 0 | 0 | 1,280 | 1,280 |
| Snoqualmie N.F. | 800 | 30 | 0 | 0 | 1,180 |
| Glenwood Dist. | 40 | 200 | 8,860 | 840 | 940 |
| Northwest Washington Dist. | 0 | 360 | 60 | 0 | 280 |
| Gifford Pinchot N.F. | 1,160 | 1,720 | 3,840 | 2,400 | 0 |
| Washington areas | 12,760 | 6,380 | 39,270 | 24,100 | 24,920 |
| Regional total | 192,800 | 398,760 | 137,660 | 135,410 | 129,520 |

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

Table 26.--Extent of western pine beetle infestations in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | | |
|------------------------------|--------------------------|----------------|---------------|--------------|------------|-----------------|--|
| | Infestation centers: | Light | Moderate | Heavy | Very heavy | All intensities | |
| | Number | Acres | | | | | |
| Oregon: | | | | | | | |
| Malheur N.F. | 183 | 23,340 | 3,310 | 120 | 0 | 26,770 | |
| Fremont N.F. | 119 | 20,000 | 7,100 | 3,660 | 0 | 30,760 | |
| Ochoco N.F. | 89 | 14,760 | 0 | 0 | 0 | 14,760 | |
| Winema N.F. | 82 | 10,850 | 480 | 380 | 0 | 11,710 | |
| Wallowa-Whitman N.F. | 57 | 6,410 | 0 | 0 | 0 | 6,410 | |
| Umatilla N.F. | 44 | 4,430 | 450 | 0 | 0 | 4,880 | |
| Deschutes N.F. | 47 | 4,510 | 270 | 0 | 0 | 4,780 | |
| Warm Springs I.R. | 9 | 1,480 | 0 | 0 | 0 | 1,480 | |
| Siskiyou N.F. | 8 | 1,350 | 0 | 0 | 0 | 1,350 | |
| Rogue River N.F. | 15 | 1,160 | 40 | 0 | 0 | 1,200 | |
| Central Oregon Dist. | 7 | 440 | 0 | 0 | 0 | 440 | |
| Mt. Hood N.F. | 3 | 60 | 0 | 0 | 0 | 60 | |
| Oregon areas | 663 | 88,790 | 11,650 | 4,160 | 0 | 104,600 | |
| Washington: | | | | | | | |
| Yakima I.R. | 21 | 6,520 | 800 | 0 | 0 | 7,320 | |
| Wenatchee N.F. | 17 | 4,200 | 960 | 0 | 0 | 5,160 | |
| Okanogan N.F. | 18 | 3,320 | 320 | 0 | 0 | 3,640 | |
| Colville I.R. | 10 | 3,080 | 280 | 0 | 0 | 3,360 | |
| Colville N.F. | 6 | 1,760 | 0 | 0 | 0 | 1,760 | |
| Spokane I.R. | 5 | 1,280 | 0 | 0 | 0 | 1,280 | |
| Snoqualmie N.F. | 6 | 580 | 600 | 0 | 0 | 1,180 | |
| Glenwood Dist. | 7 | 940 | 0 | 0 | 0 | 940 | |
| Northeast Washington Dist. | 3 | 200 | 80 | 0 | 0 | 280 | |
| Washington areas | 93 | 21,880 | 3,040 | 0 | 0 | 24,920 | |
| Regional total | 756 | 110,670 | 14,690 | 4,160 | 0 | 129,520 | |

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

FIR ENGRAVER
Scolytus ventralis Lec.

The area infested by the fir engraver increased slightly in Washington and decreased considerably in Oregon resulting in an overall downward trend

(table 27). Most of the losses in Washington occurred on the Umatilla National Forest. Although there was a significant decrease in Oregon, the heaviest losses in the Pacific Northwest occurred on the Umatilla and Wallowa-Whitman National Forests. Significant losses also occurred on the Ochoco National Forest (table 28). Most of the damage reported occurred in defective overmature trees and low value stands at high elevations. Because this beetle will attack some trees and produce broods without killing the tree, control under forest conditions is impractical. These attacks, however, kill strips of cambium and often introduce decay organisms that result in a lower quality of lumber. Salvage of merchantable infested trees is recommended to recover timber values that would otherwise be lost.

Table 27.--Trend of fir engraver infestations in
Oregon and Washington, 1961-65
(In acres)

| Reporting area ^{1/} | Year | | | | |
|------------------------------|---------------|----------------|---------------|----------------|---------------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Umatilla N.F. | 7,280 | 41,770 | 8,660 | 24,040 | 22,200 |
| Wallowa-Whitman N.F. | 6,560 | 11,890 | 8,370 | 36,120 | 19,310 |
| Ochoco N.F. | 5,360 | 11,320 | 1,840 | 9,930 | 8,770 |
| Malheur N.F. | 1,760 | 3,200 | 1,810 | 5,090 | 5,400 |
| Fremont N.F. | 6,040 | 18,740 | 33,110 | 39,050 | 5,260 |
| Umatilla I.R. | 0 | 700 | 0 | 180 | 530 |
| Winema N.F. | 3,520 | 3,120 | 1,040 | 3,400 | 1,570 |
| Mt. Hood N.F. | 560 | 920 | 620 | 120 | 270 |
| Rogue River N.F. | 7,040 | 10,840 | 80 | 1,170 | 270 |
| Central Oregon Dist. | 0 | 0 | 1,580 | 710 | 150 |
| Deschutes N.F. | 480 | 950 | 430 | 290 | 60 |
| Crater Lake N.P. | 480 | 80 | 30 | 40 | 10 |
| Umpqua N.F. | 960 | 760 | 0 | 0 | 0 |
| Willamette N.F. | 3,200 | 1,000 | 660 | 0 | 0 |
| Warm Springs I.R. | 160 | 160 | 50 | 0 | 0 |
| Lookout Mt. | 320 | 0 | 0 | 480 | 0 |
| Steens Mt. | 0 | 0 | 0 | 200 | 0 |
| Oregon areas | 43,720 | 105,450 | 58,280 | 120,820 | 63,800 |
| Washington: | | | | | |
| Umatilla N.F. | 800 | 3,990 | 3,610 | 4,000 | 11,880 |
| Wenatchee N.F. | 1,600 | 680 | 5,040 | 2,860 | 3,340 |
| Okanogan N.F. | 5,360 | 1,180 | 4,190 | 3,510 | 3,200 |
| Colville N.F. | 160 | 2,950 | 880 | 490 | 2,580 |
| Colville I.R. | 0 | 0 | 0 | 80 | 490 |
| Kaniksu N.F. | 1,280 | 2,800 | 0 | 2,840 | 280 |
| Gifford Pinchot N.F. | 0 | 3,400 | 160 | 0 | 100 |
| Spokane I.R. | 0 | 0 | 0 | 0 | 0 |
| Northeast Washington Dist. | 1,440 | 280 | 0 | 0 | 0 |
| Mt. Baker N.F. | 3,040 | 1,540 | 940 | 280 | 0 |
| Olympic N.F. | 160 | 0 | 0 | 0 | 0 |
| Olympic N.P. | 1,280 | 0 | 0 | 0 | 0 |
| Snoqualmie N.F. | 480 | 5,480 | 880 | 840 | 0 |
| Yakima I.R. | 1,960 | 400 | 160 | 320 | 120 |
| Glenwood Dist. | 240 | 120 | 0 | 0 | 0 |
| Washington areas | 17,800 | 22,820 | 15,860 | 15,220 | 21,990 |
| Regional total | 61,520 | 128,270 | 74,140 | 136,040 | 85,790 |

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

Table 28.--Extent of fir engraver beetle infestations in Oregon and Washington in 1965, by reporting area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|------------------------------|--------------------------|--------|----------|-------|------------|-----------------|
| | Infestation centers | Light | Moderate | Heavy | Very heavy | All intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Umatilla N.F. | 176 | 19,290 | 2,910 | 0 | 0 | 22,200 |
| Wallowa-Whitman N.F. | 160 | 16,060 | 3,250 | 0 | 0 | 19,310 |
| Ochoco N.F. | 51 | 5,790 | 2,980 | 0 | 0 | 8,770 |
| Malheur N.F. | 57 | 5,070 | 330 | 0 | 0 | 5,400 |
| Fremont N.F. | 22 | 2,680 | 1,820 | 760 | 0 | 5,260 |
| Winema N.F. | 19 | 1,450 | 120 | 0 | 0 | 1,570 |
| Umatilla I.R. | 5 | 530 | 0 | 0 | 0 | 530 |
| Mt. Hood N.F. | 8 | 270 | 0 | 0 | 0 | 270 |
| Rogue River N.F. | 7 | 270 | 0 | 0 | 0 | 270 |
| Central Oregon Dist. | 6 | 110 | 40 | 0 | 0 | 150 |
| Deschutes N.F. | 3 | 60 | 0 | 0 | 0 | 60 |
| Crater Lake N.P. | 1 | 10 | 0 | 0 | 0 | 10 |
| | 515 | 51,590 | 11,450 | 760 | 0 | 63,800 |
| Washington: | | | | | | |
| Umatilla N.F. | 58 | 9,850 | 1,470 | 560 | 0 | 11,880 |
| Wenatchee N.F. | 21 | 2,560 | 780 | 0 | 0 | 3,340 |
| Okanogan N.F. | 14 | 1,640 | 920 | 440 | 200 | 3,200 |
| Colville N.F. | 15 | 1,840 | 740 | 0 | 0 | 2,580 |
| Colville I.R. | 3 | 210 | 280 | 0 | 0 | 490 |
| Kaniksu N.F. | 2 | 160 | 120 | 0 | 0 | 280 |
| Yakima I.R. | 1 | 120 | 0 | 0 | 0 | 120 |
| Gifford Pinchot N.F. | 1 | 0 | 0 | 100 | 0 | 100 |
| Washington areas | 115 | 16,380 | 4,310 | 1,100 | 200 | 21,990 |
| Regional total | 630 | 67,970 | 15,760 | 1,860 | 200 | 85,790 |

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

OREGON PINE IPS
Ips pini Say

Oregon pine ips outbreaks in Oregon increased substantially, while in Washington only a slight increase occurred (table 29). The heaviest losses in

Oregon were found on or near the Malheur, Wallowa-Whitman, Ochoco and Winema National Forests. Most losses in Washington were situated on the Okanogan and Wenatchee National Forests (table 30). Elsewhere, tree killing was light in the pine region.

No control is needed in 1966. Good management practices usually preclude the need for direct control measures.

Table 29.--Trend of Oregon pine ips infestations in

Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|---------------|---------------|---------------|--------------|---------------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Malheur N.F. | 2,240 | 16,960 | 5,150 | 2,200 | 4,360 |
| Wallowa-Whitman N.F. | 2,680 | 13,580 | 3,410 | 40 | 3,820 |
| Ochoco N.F. | 0 | 3,090 | 220 | 740 | 3,730 |
| Winema N.F. | 0 | 360 | 1,790 | 1,820 | 1,780 |
| Deschutes N.F. | 0 | 0 | 330 | 150 | 950 |
| Rogue River N.F. | 5,920 | 2,240 | 250 | 880 | 420 |
| Siskiyou N.F. | 3,360 | 2,200 | 80 | 0 | 270 |
| Fremont N.F. | 160 | 1,740 | 1,890 | 540 | 170 |
| Central Oregon Dist. | 0 | 0 | 230 | 0 | 160 |
| Warm Springs I.R. | 0 | 0 | 190 | 0 | 130 |
| Umatilla N.F. | 1,520 | 3,130 | 1,470 | 0 | 30 |
| Umatilla I.R. | 0 | 110 | 0 | 0 | 110 |
| Mt. Hood N.F. | 0 | 200 | 570 | 1,000 | 70 |
| Oregon areas | 15,880 | 43,610 | 15,580 | 7,370 | 16,000 |
| Washington: | | | | | |
| Okanogan N.F. | 0 | 30 | 590 | 0 | 800 |
| Wenatchee N.F. | 0 | 0 | 0 | 160 | 740 |
| Yakima I.R. | 0 | 0 | 1,160 | 0 | 560 |
| Colville I.R. | 320 | 110 | 0 | 740 | 320 |
| Spokane I.R. | 240 | 10 | 0 | 200 | 320 |
| Northeast Washington Dist. | 5,560 | 400 | 0 | 0 | 160 |
| Glenwood Dist. | 40 | 20 | 130 | 520 | 60 |
| Colville N.F. | 40 | 100 | 200 | 330 | 140 |
| Kaniksu N.F. | 360 | 140 | 0 | 0 | 0 |
| Umatilla N.F. | 1,000 | 1,160 | 520 | 120 | 0 |
| Snoqualmie N.F. | 0 | 0 | 0 | 10 | 0 |
| Washington areas | 7,560 | 1,970 | 2,600 | 2,080 | 3,100 |
| Regional total | 23,440 | 45,580 | 18,180 | 9,450 | 19,100 |

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

Table 30.--Extent of Oregon pine ips infestations in
Oregon and Washington in 1965, by reporting
area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|--------------------------------|--------|----------|-------|-----------------|----------------------|
| | Infes- :tation :centers: | Light | Moderate | Heavy | Very : heavy | All : intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Malheur N.F. | 37 | 2,240 | 1,880 | 240 | 0 | 4,360 |
| Wallowa-Whitman N.F. | 36 | 3,060 | 240 | 520 | 0 | 3,820 |
| Ochoco N.F. | 40 | 3,360 | 230 | 140 | 0 | 3,730 |
| Winema N.F. | 25 | 1,260 | 520 | 0 | 0 | 1,780 |
| Deschutes N.F. | 17 | 470 | 480 | 0 | 0 | 950 |
| Rogue River N.F. | 9 | 420 | 0 | 0 | 0 | 420 |
| Siskiyou N.F. | 5 | 270 | 0 | 0 | 0 | 270 |
| Fremont N.F. | 5 | 170 | 0 | 0 | 0 | 170 |
| Central Oregon Dist. | 4 | 160 | 0 | 0 | 0 | 160 |
| Warm Springs I.R. | 6 | 90 | 40 | 0 | 0 | 130 |
| Umatilla N.F. | 4 | 110 | 0 | 0 | 0 | 110 |
| Mt. Hood N.F. | 7 | 40 | 30 | 0 | 0 | 70 |
| Umatilla I.R. | 1 | 30 | 0 | 0 | 0 | 30 |
| Oregon areas | 196 | 11,680 | 3,420 | 900 | 0 | 16,000 |
| Washington: | | | | | | |
| Okanogan N.F. | 7 | 440 | 360 | 0 | 0 | 800 |
| Wenatchee N.F. | 2 | 0 | 340 | 0 | 400 | 740 |
| Yakima I.R. | 1 | 0 | 560 | 0 | 0 | 560 |
| Colville I.R. | 4 | 80 | 160 | 80 | 0 | 320 |
| Spokane I.R. | 1 | 320 | 0 | 0 | 0 | 320 |
| Northeast Washington Dist. | 3 | 160 | 0 | 0 | 0 | 160 |
| Colville N.F. | 2 | 40 | 100 | 0 | 0 | 140 |
| Glenwood Dist. | 1 | 60 | 0 | 0 | 0 | 60 |
| Washington areas | 21 | 1,100 | 1,520 | 80 | 400 | 3,100 |
| Regional total | 217 | 12,780 | 4,940 | 980 | 400 | 19,100 |

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

ENGELMANN SPRUCE BEETLE
Dendroctonus obesus (Mann.)

Engelmann spruce beetle outbreaks increased substantially in both States (table 31). The heaviest losses in Oregon were found on the Wallowa-Whitman

National Forest. Lighter damage occurred on the Umatilla National Forest. In Washington, the largest infestations occurred on the Wenatchee National Forest. Tree mortality also occurred on the Okanogan and Umatilla National Forests (table 32). In most cases these outbreaks are located in inaccessible areas and in small isolated patches where logging is not economical. In accessible areas, salvaging of infested merchantable trees and recent windthrown trees is recommended.

Table 31.--Trend of Engelmann spruce beetle infestations
in Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|-------|-------|--------|-------|--------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Wallowa-Whitman N.F. | 2,560 | 130 | 2,690 | 2,760 | 7,220 |
| Umatilla N.F. | 0 | 860 | 1,420 | 840 | 190 |
| Willamette N.F. | 0 | 240 | 0 | 0 | 0 |
| Oregon areas | 2,560 | 1,230 | 4,110 | 3,600 | 7,410 |
| Washington: | | | | | |
| Kaniksu N.F. | 80 | 260 | 0 | 0 | 0 |
| Wenatchee N.F. | 1,360 | 120 | 600 | 0 | 3,080 |
| Okanogan N.F. | 840 | 480 | 4,890 | 280 | 380 |
| Umatilla N.F. | 0 | 4,180 | 4,040 | 320 | 310 |
| Snoqualmie N.F. | 1,280 | 400 | 1,480 | 0 | 0 |
| Colville I.R. | 640 | 80 | 0 | 0 | 0 |
| Colville N.F. | 800 | 80 | 0 | 0 | 0 |
| Yakima I.R. | 0 | 680 | 0 | 0 | 0 |
| Washington areas | 5,000 | 6,280 | 11,010 | 600 | 3,770 |
| Regional total | 7,560 | 7,510 | 15,120 | 4,200 | 11,180 |

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

Table 32.--Extent of Engelmann spruce beetle infestations
in Oregon and Washington in 1965, by reporting
area and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|------------------------------------|-------|----------|-------|-----------------|----------------------|
| | Infes- : tation : : centers: | Light | Moderate | Heavy | Very : heavy | All : intensities |
| | Number | Acres | | | | |
| Oregon: | | | | | | |
| Wallowa-Whitman N.F. | 53 | 5,860 | 1,080 | 280 | 0 | 7,220 |
| Umatilla N.F. | 5 | 190 | 0 | 0 | 0 | 190 |
| Oregon areas | 58 | 6,050 | 1,080 | 280 | 0 | 7,410 |
| Washington: | | | | | | |
| Wenatchee N.F. | 8 | 3,080 | 0 | 0 | 0 | 3,080 |
| Okanogan N.F. | 2 | 60 | 320 | 0 | 0 | 380 |
| Umatilla N.F. | 5 | 310 | 0 | 0 | 0 | 310 |
| Washington areas | 15 | 3,450 | 320 | 0 | 0 | 3,770 |
| Regional total | 73 | 9,500 | 1,400 | 280 | 0 | 11,180 |

^{1/} N.F., National Forest.

SILVER FIR BEETLES
Pseudohylesinus spp.

Losses in Washington were significantly higher with the most severe and extensive tree killing on the Mt. Baker, Olympic and Snoqualmie

National Forests (table 33). For the third consecutive year no outbreaks of silver fir beetles were found in Oregon (table 34). Scattered single trees were killed in many true fir stands in Washington.

No control other than removal of merchantable infested trees is recommended for 1966.

Table 33.--Trend of silver fir beetles infestations

in Oregon and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|-------|------|--------|-------|-------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Siuslaw N.F. | 0 | 480 | 0 | 0 | 0 |
| Northwest Oregon Dist. | 480 | 0 | 0 | 0 | 0 |
| Oregon areas | 480 | 480 | 0 | 0 | 0 |
| Washington: | | | | | |
| Mt. Baker N.F. | 0 | 0 | 51,120 | 520 | 5,660 |
| Olympic N.F. | 0 | 0 | 0 | 0 | 1,440 |
| Olympic N.P. | 0 | 0 | 0 | 150 | 920 |
| Snoqualmie N.F. | 3,040 | 0 | 3,360 | 560 | 1,260 |
| Gifford Pinchot N.F. | 0 | 0 | 200 | 0 | 0 |
| Mt. Rainier N.P. | 0 | 0 | 160 | 0 | 0 |
| Washington areas | 3,040 | 480 | 54,840 | 1,230 | 9,280 |
| Regional total | 3,520 | 480 | 54,840 | 1,230 | 9,280 |

^{1/} N.F., National Forest, N.P., National Park.

Table 34.--Extent of silver fir beetles infestations
in Washington in 1965, by reporting area
and intensity of infestation

| Reporting area ^{1/} | Intensity of infestation | | | | | |
|---------------------------------|--------------------------------------|---------|------------|---------|-------------------|------------------------|
| | : Infes- : tation : : centers: | : Light | : Moderate | : Heavy | : Very : heavy | : All : intensities |
| | Number | Acres | Acres | Acres | Acres | Acres |
| Washington: | | | | | | |
| Mt. Baker N.F. | 27 | 1,860 | 2,600 | 760 | 440 | 5,660 |
| Olympic N.F. | 7 | 1,200 | 200 | 0 | 0 | 1,400 |
| Snoqualmie N.F. | 6 | 580 | 520 | 0 | 160 | 1,260 |
| Olympic N.P. | 4 | 760 | 160 | 0 | 0 | 920 |
| Washington areas | 44 | 4,400 | 3,480 | 760 | 600 | 9,240 |
| Regional total | 44, | 4,400 | 3,480 | 760 | 600 | 9,240 |

^{1/} N.F., National Forest; N.P., National Park.

OTHER FOREST PROBLEMS

DYING HEMLOCK

No dying hemlock was recorded in Oregon this year and the extent and intensity of damage in Washington was substantially reduced (table 35). Continuing

damage centers occurred on the Mt. Baker and Olympic National Forests and Olympic National Park in Washington (table 36). Lighter scattered damage occurred on or near the Snoqualmie National Forest and Northwest and Southwest Washington.

Prompt salvage of the merchantable dead and dying hemlock is continuing in an attempt to save timber values that might otherwise be lost to decays.

Table 35.--Trend of dying hemlock in Oregon and

Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|---------|---------|---------|---------|--------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Northwest Oregon Dist. | 480 | 0 | 3,820 | 0 | 0 |
| Siuslaw N.F. | 0 | 1,280 | 0 | 0 | 0 |
| Oregon areas | 480 | 1,280 | 3,820 | 0 | 0 |
| Washington: | | | | | |
| Mt. Baker N.F. | 143,320 | 79,340 | 42,760 | 115,340 | 57,690 |
| Olympic N.F. | 122,240 | 60,800 | 80,720 | 60,830 | 16,040 |
| Olympic N.P. | 66,400 | 69,600 | 32,480 | 21,450 | 5,200 |
| Snoqualmie N.F. | 5,120 | 10,100 | 2,560 | 0 | 2,480 |
| Southwest Washington Dist. | 13,760 | 3,840 | 0 | 0 | 2,080 |
| Northwest Washington Dist. | 0 | 0 | 0 | 5,840 | 2,000 |
| Gifford Pinchot N.F. | 1,880 | 0 | 0 | 0 | 0 |
| Quinalt I.R. | 320 | 0 | 1,800 | 0 | 0 |
| Washington areas | 353,040 | 223,680 | 160,320 | 203,460 | 85,490 |
| Regional total | 353,520 | 224,960 | 164,140 | 203,460 | 85,490 |

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

Table 36.--Extent of dying hemlock in Washington in 1965,
by reporting area and intensity of damage

| Reporting area ^{1/} | Intensity of damage | | | | | | All intensities |
|---------------------------------|---------------------|--------|----------|--------|---------------|--------|--------------------|
| | Damage centers | Light | Moderate | Heavy | Very heavy | | |
| | Number | Acres | | | | | |
| Washington: | | | | | | | |
| Mt. Baker N.F. | 38 | 19,560 | 22,410 | 13,160 | 2,560 | 57,690 | |
| Olympic N.F. | 15 | 10,600 | 4,760 | 680 | 0 | 16,040 | |
| Olympic N.P. | 6 | 920 | 4,280 | 0 | 0 | 5,200 | |
| Snoqualmie N.F. | 3 | 2,480 | 0 | 0 | 0 | 2,480 | |
| Southwest Washington Dist. | 3 | 2,080 | 0 | 0 | 0 | 2,080 | |
| Northwest Washington Dist. | 3 | 2,000 | 0 | 0 | 0 | 2,000 | |
| Washington area | 68 | 37,640 | 31,450 | 13,840 | 2,560 | 85,490 | |
| Regional total | 68 | 37,640 | 31,450 | 13,840 | 2,560 | 85,490 | |

^{1/} N.F., National Forest; N.P., National Park.

TREE DAMAGE BY BEARS

Tree damage and killing caused by bears increased slightly in Washington and decreased significantly in Oregon Forests (table 37). The heaviest and

most severe damage centers in Washington were on or near the Olympic and Gifford Pinchot National Forests (table 38). Lighter, but significant damage was recorded in the Southwestern Washington area and on or near the Snoqualmie National Forest. Oregon losses or damage were centered on the Northwest Oregon reporting area (table 38). Minor losses also occurred on or near the Siuslaw and Willamette National Forests.

From 1961 to 1965 bears have killed about 30 percent of the total growing stock on sample plots on the Gifford Pinchot National Forest in Washington. These losses further reduce the stocking and yield on already understocked areas.

Table 37.--Trend of bear damage in Oregon and
and Washington, 1961-65

(In acres)

| Reporting area ^{1/} | Year | | | | |
|---------------------------------|----------------|----------------|----------------|----------------|---------------|
| | 1961 | 1962 | 1963 | 1964 | 1965 |
| Oregon: | | | | | |
| Northwest Oregon Dist. | 51,200 | 42,920 | 32,610 | 37,770 | 10,330 |
| Siuslaw N.F. | 19,440 | 28,300 | 27,810 | 7,100 | 3,410 |
| Willamette N.F. | 44,800 | 26,200 | 2,250 | 7,200 | 2,100 |
| Mt. Hood N.F. | 10,480 | 12,280 | 2,720 | 960 | 1,510 |
| Umpqua N.F. | 0 | 0 | 150 | 180 | 0 |
| Siskiyou N.F. | 3,520 | 0 | 0 | 80 | 0 |
| Rogue River N.F. | 480 | 0 | 0 | 0 | 0 |
| Oregon areas | 129,920 | 109,700 | 65,540 | 53,290 | 17,350 |
| Washington: | | | | | |
| Olympic N.F. | 80,700 | 21,760 | 59,800 | 32,390 | 30,320 |
| Gifford Pinchot N.F. | 9,580 | 960 | 36,620 | 19,220 | 26,440 |
| Southwest Washington | 13,280 | 800 | 34,560 | 12,390 | 12,200 |
| Snoqualmie N.F. | 7,920 | 520 | 18,730 | 6,760 | 10,420 |
| Quinault I.R. | 1,920 | 3,360 | 360 | 2,280 | 560 |
| Olympic N.P. | 0 | 0 | 0 | 0 | 380 |
| Puget Sound Dist. | 0 | 0 | 0 | 0 | 260 |
| Yakima I.R. | 0 | 0 | 0 | 240 | 0 |
| Washington areas | 113,400 | 27,400 | 150,070 | 73,280 | 80,580 |
| Regional total | 243,320 | 137,100 | 215,610 | 126,570 | 97,930 |

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

Table 38.--Extent of tree damage caused by bears in Oregon and Washington in 1965, by reporting area and intensity of damage

| Reporting area ^{1/} | Intensity of damage | | | | | | |
|------------------------------|---------------------|--------|----------|--------|------------|-----------------|--|
| | Damage centers | Light | Moderate | Heavy | Very heavy | All intensities | |
| | Number | Acres | | | | | |
| Oregon: | | | | | | | |
| Northwest Oregon Dist. | 44 | 5,770 | 4,560 | 0 | 0 | 10,330 | |
| Siuslaw N.F. | 30 | 2,170 | 640 | 600 | 0 | 3,410 | |
| Willamette N.F. | 17 | 1,840 | 260 | 0 | 0 | 2,100 | |
| Mt. Hood N.F. | 21 | 1,330 | 180 | 0 | 0 | 1,510 | |
| Oregon areas | 112 | 11,110 | 5,640 | 600 | 0 | 17,350 | |
| Washington: | | | | | | | |
| Olympic N.F. | 71 | 18,000 | 8,360 | 3,960 | 0 | 30,320 | |
| Gifford Pinchot N.F. | 28 | 16,940 | 8,200 | 1,300 | 0 | 26,440 | |
| Southwest Washington Dist. | 35 | 6,000 | 3,280 | 2,360 | 560 | 12,200 | |
| Snoqualmie N.F. | 28 | 5,460 | 2,120 | 2,080 | 760 | 10,420 | |
| Quinalt I.R. | 1 | 560 | 0 | 0 | 0 | 560 | |
| Olympic N.P. | 3 | 260 | 120 | 0 | 0 | 380 | |
| Puget Sound Dist. | 3 | 80 | 180 | 0 | 0 | 260 | |
| Washington areas | 169 | 47,300 | 22,260 | 9,700 | 1,320 | 80,580 | |
| Regional total | 281 | 58,410 | 27,900 | 10,300 | 1,320 | 97,930 | |

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

APPENDIX

Aerial Surveys

Aerial surveys were coordinated by the U. S. Forest Service in cooperation with Oregon State Department of Forestry and Washington State Department of Natural Resources. Larch casebearer surveys in northeastern Washington were made in early June. Regular detection surveys were made between July and September. Douglas-fir beetle evaluation surveys were flown in September. Flying time for surveys this year totaled 321.1 hours (table 39).

Managing foresters accompanied the regular survey crews on the flights over their respective areas to gain a better understanding of their forest pest problems.

Table 39.--Summary of cooperative aerial survey activities in 1965

| Area covered | : Timber area surveyed | : <u>Survey flight time</u> | : Mapping | : Ferry | : Total |
|--------------------|------------------------|----------------------------------|-----------|---------|---------|
| | <u>M acres</u> | - - - - - <u>Hours</u> - - - - - | | | |
| Western Oregon | 15,858 | 68.3 | 12.2 | | 80.5 |
| Eastern Oregon | 14,881 | 67.8 | 19.7 | | 87.5 |
| Western Washington | 13,061 | 45.5 | 23.7 | | 69.2 |
| Eastern Washington | 9,989 | 72.2 | 11.7 | | 83.9 |
| All areas | 53,789 | 253.8 | 67.3 | | 321.1 |

Table 40.--Extent of infestations in Oregon in 1965, by forest area,
insect species, and intensity of infestation

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: Intensity of infestation : | | | | | All : centers : Light : Moderate : Heavy : Very heavy : intensities |
|--|--|----------------------------------|--------|--------|-------|--|
| | <u>Number</u> | - - - - - <u>Acres</u> - - - - - | | | | |
| Central Oregon District and adjacent forest lands: | | | | | | |
| Mountain pine beetle (P) | 9 | 680 | 0 | 0 | 0 | 680 |
| Western pine beetle | 7 | 440 | 0 | 0 | 0 | 440 |
| Oregon pine ips | 4 | 160 | 0 | 0 | 0 | 160 |
| Fir engraver | 6 | 110 | 40 | 0 | 0 | 150 |
| All insects | 26 | 1,390 | 40 | 0 | 0 | 1,430 |
| Coos District and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 664 | 29,080 | 21,680 | 17,040 | 1,920 | 69,720 |
| Balsam woolly aphid | 5 | 0 | 360 | 280 | 0 | 640 |
| Mountain pine beetle (S) | 2 | 160 | 0 | 0 | 0 | 160 |
| All insects | 671 | 29,240 | 22,040 | 17,320 | 1,920 | 70,520 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: | | Intensity of infestation | | | All intensities |
|--|---------------|--------------|--------------------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Crater Lake N.P.: | | | | | | |
| Balsam woolly aphid | 17 | 1,790 | 900 | 660 | 0 | 3,350 |
| Mountain pine beetle (W) | 9 | 1,000 | 800 | 0 | 0 | 1,800 |
| Fir engraver | 1 | 10 | 0 | 0 | 0 | 10 |
| All insects | 27 | 2,800 | 1,700 | 660 | 0 | 5,160 |
| Deschutes N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (L) | 44 | 7,360 | 2,600 | 1,770 | 200 | 11,930 |
| Balsam woolly aphid | 61 | 4,860 | 400 | 0 | 0 | 5,260 |
| Needle miner, lodgepole pine | 3 | 1,440 | 3,520 | 0 | 0 | 4,960 |
| Western pine beetle | 47 | 4,510 | 270 | 0 | 0 | 4,780 |
| Pine needle scale | 1 | 0 | 4,640 | 0 | 0 | 4,640 |
| Mountain pine beetle (P) | 18 | 1,240 | 1,310 | 0 | 0 | 2,550 |
| Oregon pine ips | 17 | 470 | 480 | 0 | 0 | 950 |
| Mountain pine beetle (W) | 4 | 140 | 90 | 0 | 0 | 230 |
| Fir engraver | 3 | 60 | 0 | 0 | 0 | 60 |
| Mountain pine beetle (S) | 1 | 50 | 0 | 0 | 0 | 50 |
| All insects | 199 | 20,130 | 13,310 | 1,770 | 200 | 35,410 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: : centers | Intensity of infestation | | | | : All : intensities |
|--|-----------------------------|--------------------------|--------|----------|-------|------------------------|
| | | Number | Acres | | | |
| | | | Light | Moderate | Heavy | Very heavy |
| Fremont N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (L) | 101 | 18,920 | 17,020 | 8,780 | 2,380 | 47,100 |
| Western pine beetle | 119 | 20,000 | 7,100 | 3,660 | 0 | 30,760 |
| Mountain pine beetle (P) | 104 | 8,520 | 5,600 | 2,460 | 160 | 16,740 |
| Fir engraver | 22 | 2,680 | 1,820 | 760 | 0 | 5,260 |
| Douglas-fir tussock moth | 2 | 1,760 | 360 | 0 | 0 | 2,120 |
| Mountain pine beetle (S) | 6 | 1,640 | 0 | 0 | 0 | 1,640 |
| Oregon pine ips | 5 | 170 | 0 | 0 | 0 | 170 |
| All insects | 359 | 53,690 | 31,900 | 15,660 | 2,540 | 103,790 |
| Malheur N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (P) | 106 | 21,300 | 5,610 | 2,260 | 0 | 29,170 |
| Western pine beetle | 183 | 23,340 | 3,310 | 120 | 0 | 26,770 |
| Mountain pine beetle (L) | 25 | 4,780 | 2,240 | 1,390 | 0 | 8,410 |
| Douglas-fir beetle | 49 | 5,760 | 400 | 0 | 0 | 6,160 |
| Fir engraver | 57 | 5,070 | 330 | 0 | 0 | 5,400 |
| Oregon pine ips | 37 | 2,240 | 1,880 | 240 | 0 | 4,360 |
| Douglas-fir tussock moth | 9 | 2,170 | 420 | 200 | 0 | 2,790 |
| All insects | 466 | 64,660 | 14,190 | 4,210 | 0 | 83,060 |

-51-

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965...(Continued)

| Reporting area and insects involved ^{1/} _{2/} | : Infestation: Intensity of infestation : | | | | | All : intensities |
|--|---|---------------|---------------|--------------|--------------|----------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Mt. Hood N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (W) | 182 | 9,330 | 8,620 | 8,360 | 1,500 | 27,810 |
| Balsam woolly aphid | 50 | 7,370 | 160 | 0 | 0 | 7,530 |
| Larch sawfly | 3 | 6,200 | 1,240 | 90 | 0 | 7,530 |
| Douglas-fir beetle | 11 | 400 | 0 | 0 | 0 | 400 |
| Fir engraver | 8 | 270 | 0 | 0 | 0 | 270 |
| Oregon pine ips | 7 | 40 | 30 | 0 | 0 | 70 |
| Western pine beetle | 3 | 60 | 0 | 0 | 0 | 60 |
| Mountain pine beetle (P) | 3 | 50 | 0 | 0 | 0 | 50 |
| All insects | 267 | 23,720 | 10,050 | 8,450 | 1,500 | 43,720 |
| Bear damage | 21 | 1,330 | 180 | 0 | 0 | 1,510 |
| All damage | 288 | 25,050 | 10,230 | 8,450 | 1,500 | 45,230 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: Intensity of infestation : | | | | | All intensities |
|--|--|--------------|------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Northwest Oregon Dist. and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 16 | 1,400 | 0 | 0 | 0 | 1,400 |
| All insects | 16 | 1,400 | 0 | 0 | 0 | 1,400 |
| Bear damage | 44 | 5,770 | 4,560 | 0 | 0 | 10,330 |
| All damage | 60 | 7,170 | 4,560 | 0 | 0 | 11,730 |
| Ochoco N.F. and adjacent forest lands: | | | | | | |
| Western pine beetle | 89 | 14,760 | 0 | 0 | 0 | 14,760 |
| Fir engraver | 51 | 5,790 | 2,980 | 0 | 0 | 8,770 |
| Oregon pine ips | 40 | 3,360 | 230 | 140 | 0 | 3,730 |
| Mountain pine beetle (P) | 19 | 2,370 | 0 | 0 | 0 | 2,370 |
| Douglas-fir beetle | 4 | 550 | 0 | 0 | 0 | 550 |
| Mountain pine beetle (L) | 1 | 40 | 0 | 0 | 0 | 40 |
| All insects | 204 | 26,870 | 3,210 | 140 | 0 | 30,220 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965... (Continued)

-54-

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: : centers | Intensity of infestation | | | | : All intensities |
|--|-----------------------------|--------------------------|------------|---------|--------------|----------------------|
| | | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Rogue River N.F. and adjacent forest lands: | | | | | | |
| Balsam woolly aphid | 27 | 3,290 | 770 | 80 | 0 | 4,140 |
| Douglas-fir beetle | 55 | 2,370 | 210 | 0 | 0 | 2,580 |
| Western pine beetle | 15 | 1,160 | 40 | 0 | 0 | 1,200 |
| Mountain pine beetle (W) | 17 | 640 | 280 | 0 | 0 | 920 |
| Oregon pine ips | 9 | 420 | 0 | 0 | 0 | 420 |
| Fir engraver | 7 | 270 | 0 | 0 | 0 | 270 |
| Mountain pine beetle (P) | 5 | 170 | 0 | 0 | 0 | 170 |
| Mountain pine beetle (S) | 3 | 130 | 0 | 0 | 0 | 130 |
| All insects | 138 | 8,450 | 1,300 | 80 | 0 | 9,830 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved ^{1/} ^{2/} | : Infestation: Intensity of infestation : | | | | | All intensities |
|--|---|--------------|------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Siskiyou N.F. and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 208 | 10,270 | 3,890 | 1,040 | 0 | 15,200 |
| Mountain pine beetle (S) | 37 | 3,750 | 360 | 0 | 0 | 4,110 |
| Mountain pine beetle (W) | 10 | 720 | 960 | 0 | 0 | 1,680 |
| Western pine beetle | 8 | 1,350 | 0 | 0 | 0 | 1,350 |
| Mountain pine beetle (P) | 11 | 1,290 | 0 | 0 | 0 | 1,290 |
| Oregon pine ips | 5 | 270 | 0 | 0 | 0 | 270 |
| Mountain pine beetle (L) | 1 | 80 | 0 | 0 | 0 | 80 |
| All insects | 280 | 17,730 | 5,210 | 1,040 | 0 | 23,980 |
| Siuslaw N.F. and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 568 | 27,210 | 15,070 | 11,400 | 400 | 54,080 |
| Western oak looper | 3 | 80 | 640 | 0 | 0 | 720 |
| All insects | 571 | 27,290 | 15,710 | 11,400 | 400 | 54,800 |
| Bear damage | 30 | 2,170 | 640 | 600 | 0 | 3,410 |
| All damage | 601 | 29,460 | 16,350 | 12,000 | 400 | 58,210 |

-55-

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: <u>Intensity of infestation</u> : | | | | | All intensities |
|--|---|--------------|------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Umatilla I.R.: | | | | | | |
| Fir engraver | 5 | 530 | 0 | 0 | 0 | 530 |
| Oregon pine ips | 1 | 30 | 0 | 0 | 0 | 30 |
| Mountain pine beetle (P) | 2 | 20 | 0 | 0 | 0 | 20 |
| All insects | 8 | 580 | 0 | 0 | 0 | 580 |
| Umatilla N.F. and adjacent forest lands: | | | | | | |
| Fir engraver | 176 | 19,290 | 2,910 | 0 | 0 | 22,200 |
| Western pine beetle | 44 | 4,430 | 450 | 0 | 0 | 4,880 |
| Mountain pine beetle (P) | 23 | 2,720 | 420 | 0 | 0 | 3,140 |
| Douglas-fir beetle | 21 | 1,900 | 0 | 0 | 0 | 1,900 |
| Engelmann spruce beetle | 5 | 190 | 0 | 0 | 0 | 190 |
| Mountain pine beetle (L) | 3 | 140 | 0 | 0 | 0 | 140 |
| Oregon pine ips | 4 | 110 | 0 | 0 | 0 | 110 |
| All insects | 276 | 28,780 | 3,780 | 0 | 0 | 32,560 |

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: Intensity of infestation : : centers : Light : Moderate : Heavy : Very heavy : All | | | | | intensities |
|--|--|---------------------------|--------|-------|-------|-------------|
| | Number | - - - - - Acres - - - - - | | | | |
| Umpqua N.F. and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 374 | 23,180 | 5,520 | 1,560 | 0 | 30,260 |
| Balsam woolly aphid | 25 | 3,440 | 800 | 80 | 0 | 4,320 |
| Mountain pine beetle (W) | 30 | 2,120 | 800 | 0 | 0 | 2,920 |
| Mountain pine beetle (K) | 3 | 1,400 | 0 | 0 | 0 | 1,400 |
| Mountain pine beetle (P) | 1 | 120 | 0 | 0 | 0 | 120 |
| All insects | 433 | 30,260 | 7,120 | 1,640 | 0 | 39,020 |
| Wallowa-Whitman N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (P) | 134 | 28,290 | 8,920 | 7,570 | 3,630 | 48,410 |
| Douglas-fir beetle | 215 | 18,520 | 2,110 | 80 | 0 | 20,710 |
| Fir engraver | 160 | 16,060 | 3,250 | 0 | 0 | 19,310 |
| Engelmann spruce beetle | 53 | 5,860 | 1,080 | 280 | 0 | 7,220 |
| Western pine beetle | 57 | 6,410 | 0 | 0 | 0 | 6,410 |
| Oregon pine ips | 36 | 3,060 | 240 | 520 | 0 | 3,820 |
| Mountain pine beetle (L) | 12 | 1,370 | 1,080 | 680 | 0 | 3,130 |
| All insects | 667 | 79,570 | 16,680 | 9,130 | 3,630 | 109,010 |

-57-

See footnotes at end of table.

Table 40.--Extent of infestations in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: <u>Intensity of infestation</u> : | | | | | All intensities |
|--|---|---------------|---------------|--------------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Warm Springs I.R.: | | | | | | |
| Larch sawfly | 5 | 5,710 | 2,740 | 960 | 0 | 9,410 |
| Balsam woolly aphid | 16 | 1,230 | 520 | 0 | 0 | 1,750 |
| Western pine beetle | 9 | 1,480 | 0 | 0 | 0 | 1,480 |
| Oregon pine ips | 6 | 90 | 40 | 0 | 0 | 130 |
| Mountain pine beetle (W) | 4 | 80 | 0 | 0 | 0 | 80 |
| Douglas-fir beetle | 3 | 50 | 0 | 0 | 0 | 50 |
| All insects | 43 | 8,640 | 3,300 | 960 | 0 | 12,900 |
| Willamette N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (W) | 148 | 18,980 | 13,620 | 5,640 | 0 | 38,240 |
| Balsam woolly aphid | 115 | 13,510 | 4,740 | 1,180 | 0 | 19,430 |
| Douglas-fir beetle | 197 | 15,320 | 1,570 | 960 | 0 | 17,850 |
| All insects | 460 | 47,810 | 19,930 | 7,780 | 0 | 75,520 |
| Bear damage | 17 | 1,840 | 260 | 0 | 0 | 2,100 |
| All damage | 477 | 49,650 | 20,190 | 7,780 | 0 | 77,620 |

-58-

See footnotes at end of table.

Table 40.--Extent of infestation in Oregon in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | :Infestation: Intensity of infestation : | | | | | All intensities |
|--|--|----------------------------------|------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very Heavy | |
| | <u>Number</u> | - - - - - <u>Acres</u> - - - - - | | | | |
| Winema N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (L) | 93 | 17,130 | 3,690 | 740 | 0 | 21,560 |
| Western pine beetle | 82 | 10,850 | 480 | 380 | 0 | 11,710 |
| Mountain pine beetle (P) | 37 | 4,350 | 560 | 0 | 0 | 4,910 |
| Oregon pine ips | 25 | 1,260 | 520 | 0 | 0 | 1,780 |
| Fir engraver | 19 | 1,450 | 120 | 0 | 0 | 1,570 |
| Mountain pine beetle (W) | 3 | 240 | 0 | 0 | 0 | 240 |
| Mountain pine beetle (S) | 1 | 20 | 0 | 0 | 0 | 20 |
| All insects | 260 | 35,300 | 5,370 | 1,120 | 0 | 41,790 |

-59-

1/ Mountain pine beetle 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/ Administrative areas are abbreviated as follows: N.F., National Forest; I.R., Indian Reservation; N.P., National Park.

Table 41.--Extent of infestations in Washington in 1965, by forest area,
insect species, and intensity of infestation

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: Intensity of infestation : | | | | | All intensities |
|--|---|---------------|---------------|--------------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Colville I.R.: | | | | | | |
| Western pine beetle | 10 | 3,080 | 280 | 0 | 0 | 3,360 |
| Douglas-fir beetle | 12 | 2,040 | 260 | 0 | 0 | 2,300 |
| Larch casebearer | 1 | 0 | 0 | 0 | 1,120 | 1,120 |
| Mountain pine beetle (P) | 4 | 620 | 0 | 390 | 0 | 1,010 |
| Fir engraver | 3 | 210 | 280 | 0 | 0 | 490 |
| Oregon pine ips | 4 | 80 | 160 | 80 | 0 | 320 |
| All insects | 34 | 6,030 | 980 | 470 | 1,120 | 8,600 |
| Colville N.F. and adjacent forest lands: | | | | | | |
| Larch casebearer | 32 | 9,870 | 5,490 | 1,820 | 0 | 17,180 |
| Mountain pine beetle (W) | 13 | 2,920 | 620 | 5,460 | 280 | 9,280 |
| Douglas-fir beetle | 52 | 5,600 | 2,520 | 420 | 240 | 8,780 |
| Mountain pine beetle (P) | 13 | 280 | 1,500 | 1,140 | 360 | 3,280 |
| Fir engraver | 15 | 1,840 | 740 | 0 | 0 | 2,580 |
| Western pine beetle | 6 | 1,760 | 0 | 0 | 0 | 1,760 |
| Oregon pine ips | 2 | 40 | 100 | 0 | 0 | 140 |
| All insects | 133 | 22,310 | 10,970 | 8,840 | 880 | 43,000 |

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: <u>Intensity of infestation</u> : | | | | | All intensities |
|--|--|--------------|------------|---------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Gifford Pinchot N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (W) | 31 | 10,140 | 2,550 | 100 | 80 | 12,870 |
| Balsam woolly aphid | 36 | 8,910 | 1,980 | 150 | 0 | 11,040 |
| Douglas-fir beetle | 9 | 2,710 | 220 | 0 | 0 | 2,930 |
| Fir engraver | 1 | 0 | 0 | 100 | 0 | 100 |
| All insects | 77 | 21,760 | 4,750 | 350 | 80 | 26,940 |
| Bear damage | 28 | 16,940 | 8,200 | 1,300 | 0 | 26,440 |
| All damage | 105 | 38,700 | 12,950 | 1,650 | 80 | 53,380 |
| Glenwood District and adjacent forest lands: | | | | | | |
| Mountain pine beetle (W) | 2 | 600 | 560 | 0 | 0 | 1,160 |
| Western pine beetle | 7 | 940 | 0 | 0 | 0 | 940 |
| Douglas-fir beetle | 4 | 280 | 0 | 0 | 0 | 280 |
| Oregon pine ips | 1 | 60 | 0 | 0 | 0 | 60 |
| Mountain pine beetle (P) | 1 | 40 | 0 | 0 | 0 | 40 |
| All insects | 15 | 1,920 | 560 | 0 | 0 | 2,480 |

-61-

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved ^{1/} _{2/} | : Infestation: Intensity of infestation : | | | | | All : intensities |
|--|---|---------------|---------------|---------------|--------------|----------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Kaniksu N.F. and adjacent forest lands: | | | | | | |
| Larch casebearer | 10 | 88,340 | 50,390 | 22,070 | 6,680 | 167,480 |
| Mountain pine beetle (W) | 15 | 2,200 | 1,000 | 280 | 0 | 3,480 |
| Fir engraver | 2 | 160 | 120 | 0 | 0 | 280 |
| Douglas-fir beetle | 2 | 80 | 0 | 100 | 0 | 180 |
| All insects | 29 | 90,780 | 51,510 | 22,450 | 6,680 | 171,420 |
| Mt. Baker N.F. and adjacent forest lands: | | | | | | |
| Silver fir beetles | 27 | 1,860 | 2,600 | 760 | 440 | 5,660 |
| Mountain pine beetle (W) | 10 | 1,440 | 0 | 0 | 0 | 1,440 |
| Douglas-fir beetle | 3 | 160 | 0 | 0 | 0 | 160 |
| All insects | 40 | 3,460 | 2,600 | 760 | 440 | 7,260 |
| Dying hemlock | 38 | 19,560 | 22,410 | 13,160 | 2,560 | 57,690 |
| All damage | 78 | 23,020 | 25,010 | 13,920 | 3,000 | 64,950 |

-62-

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: | | Intensity of infestation | | | | All |
|---|----------------|---------|--------------------------|----------|-------|------------|---------------|
| | : centers | : | Light | Moderate | Heavy | Very heavy | : intensities |
| | <u>Number</u> | | <u>Acres</u> | | | | |
| Mt. Rainier N.P.: | | | | | | | |
| Mountain pine beetle (W) | 7 | 800 | 840 | 280 | 0 | | 1,920 |
| Balsam woolly aphid | 2 | 120 | 0 | 240 | 0 | | 360 |
| All insects | 9 | 920 | 840 | 520 | 0 | | 2,280 |
| Northeast Washington District and adjacent forest lands: | | | | | | | |
| Larch casebearer | 53 | 102,610 | 27,150 | 14,660 | 6,740 | | 151,160 |
| Douglas-fir tussock moth | 9 | 820 | 660 | 1,100 | 0 | | 2,580 |
| Western pine beetle | 3 | 200 | 80 | 0 | 0 | | 280 |
| Oregon pine ips | 3 | 160 | 0 | 0 | 0 | | 160 |
| Douglas-fir beetle | 1 | 120 | 0 | 0 | 0 | | 120 |
| All insects | 69 | 103,910 | 27,890 | 15,760 | 6,740 | | 154,300 |

-63-

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

-79-

| Reporting area and insects involved ^{1/} _{2/} | : Infestation centers : | Intensity of infestation : | | | | All intensities |
|---|-------------------------|----------------------------|----------|-------|------------|-----------------|
| | | Light | Moderate | Heavy | Very heavy | |
| | Number | Acres | | | | |
| Northwest Washington District and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 1 | 40 | 0 | 0 | 0 | 40 |
| All insects | 1 | 40 | 0 | 0 | 0 | 40 |
| Dying hemlock | 3 | 2,000 | 0 | 0 | 0 | 2,000 |
| All damage | 4 | 2,040 | 0 | 0 | 0 | 2,040 |
| Okanogan N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (P) | 31 | 3,540 | 6,480 | 3,900 | 1,480 | 15,400 |
| Douglas-fir beetle | 58 | 7,720 | 3,080 | 1,360 | 0 | 12,160 |
| Western pine beetle | 18 | 3,320 | 320 | 0 | 0 | 3,640 |
| Fir engraver | 14 | 1,640 | 920 | 440 | 200 | 3,200 |
| Mountain pine beetle (W) | 6 | 480 | 360 | 0 | 0 | 840 |
| Oregon pine ips | 7 | 440 | 360 | 0 | 0 | 800 |
| Mountain pine beetle (L) | 5 | 200 | 120 | 120 | 0 | 440 |
| Engelmann spruce beetle | 2 | 60 | 320 | 0 | 0 | 380 |
| All insects | 141 | 17,400 | 11,960 | 5,820 | 1,680 | 36,860 |

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: | | Intensity of infestation | | | | All intensities |
|--|----------------|--------------|--------------------------|---------|--------------|--------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | | |
| | <u>Number</u> | <u>Acres</u> | | | | | |
| Olympic N.F. and adjacent forest lands: | | | | | | | |
| Mountain pine beetle (W) | 25 | 5,440 | 920 | 1,120 | 480 | 7,960 | |
| Silver fir beetles | 7 | 1,200 | 200 | 0 | 0 | 1,400 | |
| Douglas-fir beetle | 6 | 440 | 0 | 0 | 0 | 440 | |
| Green spruce aphid | 1 | 240 | 0 | 0 | 0 | 240 | |
| Mountain pine beetle (L) | 1 | 80 | 0 | 0 | 0 | 80 | |
| All insects | 40 | 7,400 | 1,120 | 1,120 | 480 | 10,120 | |
| Bear damage | 71 | 18,000 | 8,360 | 3,960 | 0 | 30,320 | |
| Dying hemlock | 15 | 10,600 | 4,760 | 680 | 0 | 16,040 | |
| All damage | 126 | 36,000 | 14,240 | 5,760 | 480 | 56,480 | |
| Olympic N.P.: | | | | | | | |
| Mountain pine beetle (W) | 71 | 16,040 | 8,540 | 1,680 | 680 | 26,940 | |
| Silver fir beetles | 4 | 760 | 160 | 0 | 0 | 920 | |
| Green spruce aphid | 1 | 720 | 0 | 0 | 0 | 720 | |
| Douglas-fir beetle | 1 | 80 | 0 | 0 | 0 | 80 | |
| All insects | 77 | 17,600 | 8,700 | 1,680 | 680 | 28,660 | |
| Dying hemlock | 6 | 920 | 4,280 | 0 | 0 | 5,200 | |
| Bear damage | 3 | 260 | 120 | 0 | 0 | 380 | |
| All damage | 86 | 18,780 | 13,100 | 1,680 | 680 | 34,240 | |

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: | | Intensity of infestation | | | | All intensities |
|--|----------------|--------------|--------------------------|---------|--------------|-------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | | |
| | <u>Number</u> | <u>Acres</u> | | | | | |
| Puget Sound District and adjacent forest lands: | | | | | | | |
| Mountain pine beetle (W) | 2 | 0 | 560 | 160 | 0 | 720 | |
| Douglas-fir beetle | 3 | 440 | 0 | 0 | 0 | 440 | |
| All insects | 5 | 440 | 560 | 160 | 0 | 1,160 | |
| Bear damage | 3 | 80 | 180 | 0 | 0 | 260 | |
| All damage | 8 | 520 | 740 | 160 | 0 | 1,420 | |
| Quinault I.R.: | | | | | | | |
| Mountain pine beetle (W) | 4 | 4,920 | 400 | 0 | 0 | 5,320 | |
| All insects | 4 | 4,920 | 400 | 0 | 0 | 5,320 | |
| Bear damage | 1 | 560 | 0 | 0 | 0 | 560 | |
| All damage | 5 | 5,480 | 400 | 0 | 0 | 5,880 | |

See footnotes at end of table.

Table 41.--Extent of infestations in Washington ... (Continued)

| Reporting area and insects involved ^{1/} ^{2/} | : Infestation: : centers | Intensity of infestation | | | | : All : intensities |
|--|-----------------------------|--------------------------|---------------|--------------|--------------|------------------------|
| | | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Snoqualmie N.F. and adjacent forest lands: | | | | | | |
| Mountain pine beetle (W) | 56 | 5,380 | 5,260 | 1,080 | 240 | 11,960 |
| Balsam woolly aphid | 24 | 4,480 | 1,080 | 1,280 | 960 | 7,800 |
| Douglas-fir beetle | 19 | 930 | 810 | 520 | 0 | 2,260 |
| Silver fir beetles | 6 | 580 | 520 | 0 | 160 | 1,260 |
| Western pine beetle | 6 | 580 | 600 | 0 | 0 | 1,180 |
| Mountain pine beetle (P) | 1 | 0 | 280 | 0 | 0 | 280 |
| All insects | 112 | 11,950 | 8,550 | 2,880 | 1,360 | 24,740 |
| Bear damage | 28 | 5,460 | 2,120 | 2,080 | 760 | 10,420 |
| Dying hemlock | 3 | 2,480 | 0 | 0 | 0 | 2,480 |
| All damage | 143 | 19,890 | 10,670 | 4,960 | 2,120 | 37,640 |

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: : centers | Intensity of infestation | | | | : All : intensities |
|---|-----------------------------|--------------------------|----------|-------|------------|------------------------|
| | | Light | Moderate | Heavy | Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Southwest Washington District and adjacent forest lands: | | | | | | |
| Douglas-fir beetle | 30 | 2,640 | 880 | 0 | 160 | 3,680 |
| Balsam woolly aphid | 3 | 980 | 0 | 0 | 0 | 980 |
| All insects | 33 | 3,620 | 880 | 0 | 160 | 4,660 |
| Bear damage | | | | | | |
| Dying hemlock | 35 | 6,000 | 3,280 | 2,360 | 560 | 12,200 |
| | 3 | 2,080 | 0 | 0 | 0 | 2,080 |
| All damage | 71 | 11,700 | 4,160 | 2,360 | 720 | 18,940 |
| Spokane I.R.: | | | | | | |
| Larch casebearer | 2 | 0 | 2,080 | 1,360 | 0 | 3,440 |
| Western pine beetle | 5 | 1,280 | 0 | 0 | 0 | 1,280 |
| Oregon pine ips | 1 | 320 | 0 | 0 | 0 | 320 |
| Mountain pine beetle (P) | 1 | 280 | 0 | 0 | 0 | 280 |
| All insects | 9 | 1,880 | 2,080 | 1,360 | 0 | 5,320 |

-68-

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved <u>1/</u> <u>2/</u> | : Infestation: | | Intensity of infestation | | | | : All intensities |
|--|----------------|----------------------------------|--------------------------|------------|---------|--------------|----------------------|
| | : centers | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | - - - - - <u>Acres</u> - - - - - | | | | | |
| Umatilla N.F. and adjacent forest lands: | | | | | | | |
| Fir engraver | 58 | 9,850 | 1,470 | 560 | 0 | 11,880 | |
| Mountain pine beetle (P) | 21 | 3,940 | 340 | 0 | 0 | 4,280 | |
| Engelmann spruce beetle | 5 | 310 | 0 | 0 | 0 | 310 | |
| Mountain pine beetle (L) | 1 | 50 | 0 | 0 | 0 | 50 | |
| All insects | 85 | 14,150 | 1,810 | 560 | 0 | 16,520 | |
| Wenatchee N.F. and adjacent forest lands: | | | | | | | |
| Mountain pine beetle (W) | 125 | 16,780 | 12,460 | 7,940 | 3,340 | 40,520 | |
| Western pine beetle | 17 | 4,200 | 960 | 0 | 0 | 5,160 | |
| Fir engraver | 21 | 2,560 | 780 | 0 | 0 | 3,340 | |
| Engelmann spruce beetle | 8 | 3,080 | 0 | 0 | 0 | 3,080 | |
| Douglas-fir beetle | 10 | 1,120 | 0 | 0 | 0 | 1,120 | |
| Mountain pine beetle (L) | 7 | 640 | 100 | 100 | 0 | 840 | |
| Oregon pine ips | 2 | 0 | 340 | 0 | 400 | 740 | |
| Mountain pine beetle (P) | 3 | 160 | 180 | 240 | 0 | 580 | |
| Balsam woolly aphid | 1 | 240 | 0 | 0 | 0 | 240 | |
| All insects | 194 | 28,780 | 14,820 | 8,280 | 3,740 | 55,620 | |

-69-

See footnotes at end of table.

Table 41.--Extent of infestations in Washington in 1965 ... (Continued)

| Reporting area and insects involved ^{1/} _{2/} | : Infestation: Intensity of infestation : | | | | | All intensities |
|--|---|---------------|--------------|--------------|--------------|--------------------|
| | : centers | : Light | : Moderate | : Heavy | : Very heavy | |
| | <u>Number</u> | <u>Acres</u> | | | | |
| Yakima I.R.: | | | | | | |
| Western pine beetle | 21 | 6,520 | 800 | 0 | 0 | 7,320 |
| Mountain pine beetle (P) | 6 | 1,040 | 4,660 | 680 | 400 | 6,780 |
| Larch sawfly | 2 | 4,320 | 0 | 320 | 0 | 4,640 |
| Mountain pine beetle (W) | 5 | 480 | 2,320 | 0 | 120 | 2,920 |
| Mountain pine beetle (L) | 2 | 560 | 0 | 0 | 0 | 560 |
| Oregon pine ips | 1 | 0 | 560 | 0 | 0 | 560 |
| Balsam woolly aphid | 2 | 80 | 0 | 320 | 0 | 400 |
| Fir engraver | 1 | 120 | 0 | 0 | 0 | 120 |
| All insects | 40 | 13,120 | 8,340 | 1,320 | 520 | 23,300 |

^{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.