

United States
Department of
Agriculture

Forest
Service

**Forest
Pest
Management**

Washington, DC

May 1987

Forest Insect and Disease Conditions in the United States 1986

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Gypsy Moth

In 1986, the gypsy moth (*Lymantria dispar*) defoliated 2.4 million acres in the generally infested area of the Eastern United States--an increase over the 1985 acreage. Defoliation is predicted to increase again in 1987.

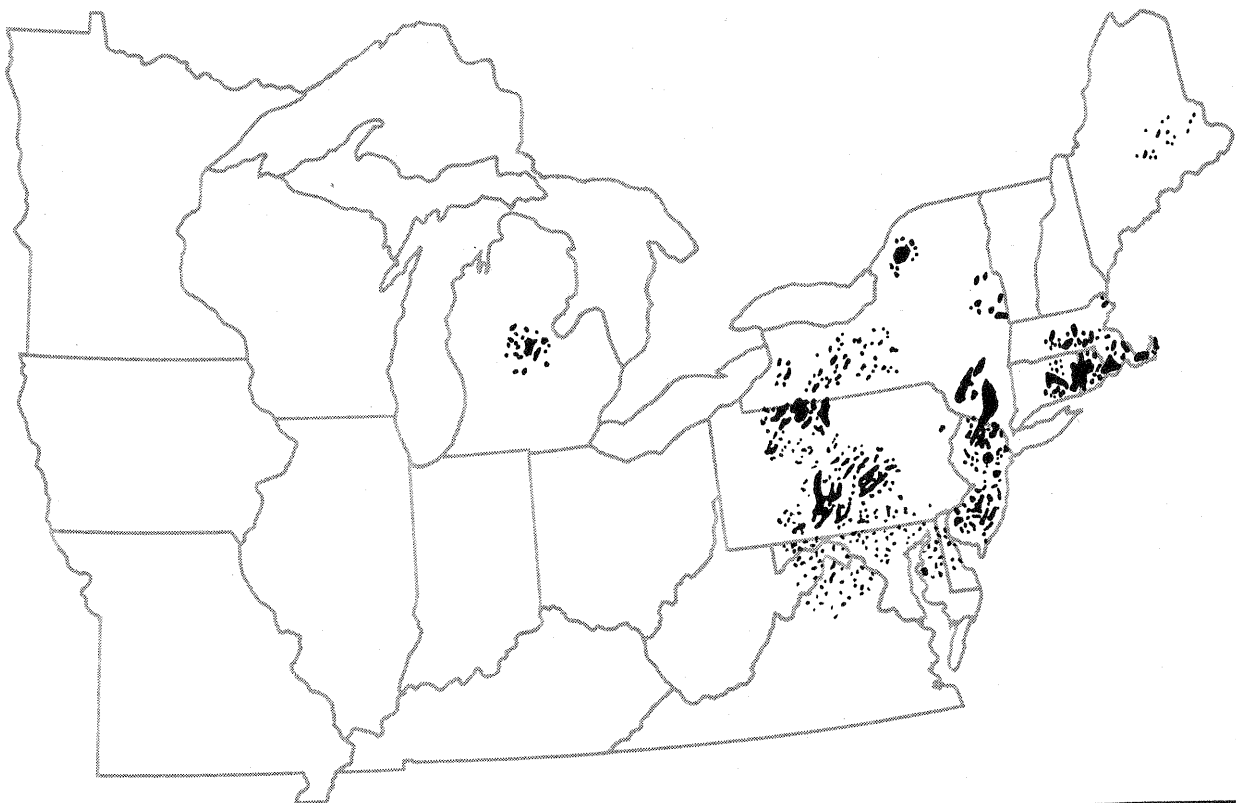
Gypsy moth populations continued their rapid southward spread. The southern edge of the generally infested area extends through the northern half of Augusta County in Virginia east to Richmond and southeast across the Chesapeake Bay to Northampton County.

Beyond the generally infested area, isolated infestations were treated in nine States: Illinois, Indiana, Kentucky, Minnesota, North Carolina, Ohio, Oregon, Washington, and Virginia. In all, these isolated infestations covered 205,000 acres in 38 counties and 3 independent cities.

Acres of aerially detected defoliation caused by the gypsy moth during 1985 and 1986

State	1985	1986
Connecticut	89,500	237,200
Delaware	5,100	3,100
Maine	6,700	11,600
Maryland	83,500	58,200
Massachusetts	414,100	343,100
Michigan	18,500	61,400
New Hampshire	0	0
New Jersey	239,400	280,300
New York	129,800	175,400
Pennsylvania	581,100	987,800
Rhode Island	133,900	219,200
Vermont	0	0
Virginia	5,200	27,300
West Virginia	2,500	8,300
Total	1,709,300	2,412,900

1986 Gypsy Moth Defoliation



Gypsy Moth

Counties Where Isolated Infestations Treated During 1986

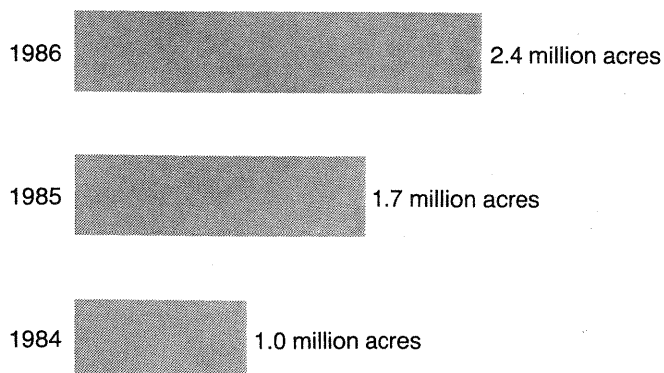


Two, large, isolated gypsy moth infestations currently exist in the United States: one in Oregon and the other in North Carolina.

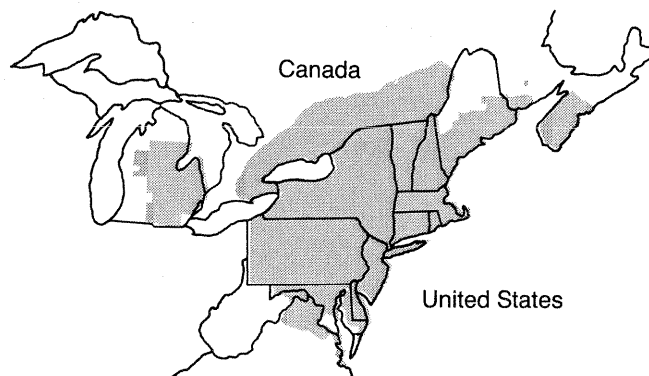
In Lane County, OR, following the second year of multiple applications of Bacillus thuringiensis, only isolated patches of the original 227,000-acre infestation remain. In 1986, only 17 moths were trapped within the treated areas out of a total of 109 moths captured within the quarantine area. Over 19,000 moths were trapped in 1984.

In Clay County, NC, a large isolated infestation was recently discovered on the Nantahala National Forest in the southwestern corner of the State. The infestation covered about 11,000 acres. An eradication program is planned for 1987.

Acres Defoliated by Gypsy Moth



1986 Gypsy Moth Generally Infested Area



Mountain Pine Beetle

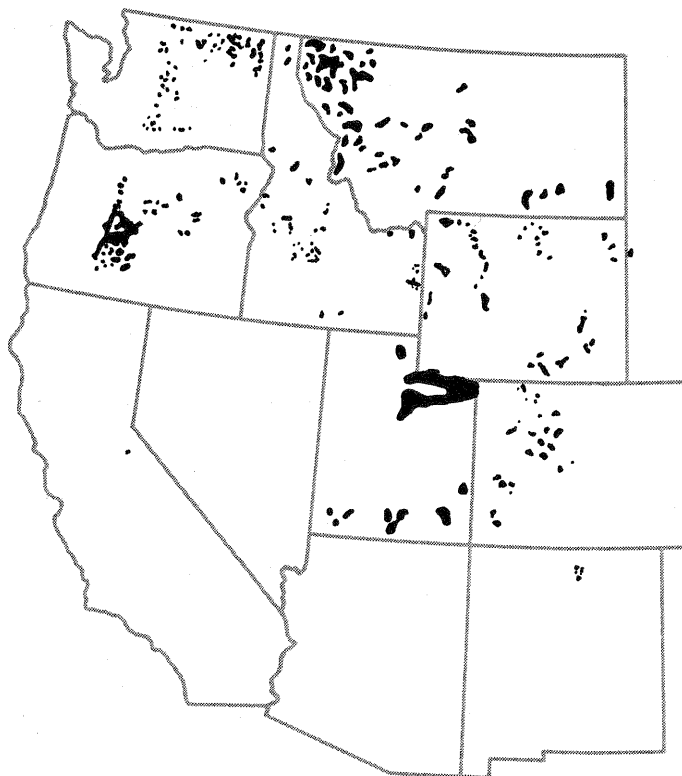
Mountain pine beetle (Dendroctonus ponderosae) activity remained high. Outbreaks covered 3.45 million acres in 1986 compared to 3.34 million acres in 1985 and 3.3 million acres in 1984.

The size of the outbreaks increased in Idaho, New Mexico, Oregon, Utah, and Washington. The largest increase occurred in lodgepole pine stands in south-central Oregon.

Acres of mountain pine beetle outbreaks during 1985 and 1986

State	1985	1986
Arizona	100	50
California	20,000	20,000
Colorado	260,000	159,500
Idaho	27,000	34,700
Montana	933,000	867,000
New Mexico	900	2,000
Oregon	1,400,000	1,600,000
South Dakota	7,000	4,640
Utah	477,000	560,400
Washington	100,000	157,000
Wyoming	115,000	44,870
Total	3,340,000	3,450,160

1986 Mountain Pine Beetle Outbreak



Western Spruce Budworm

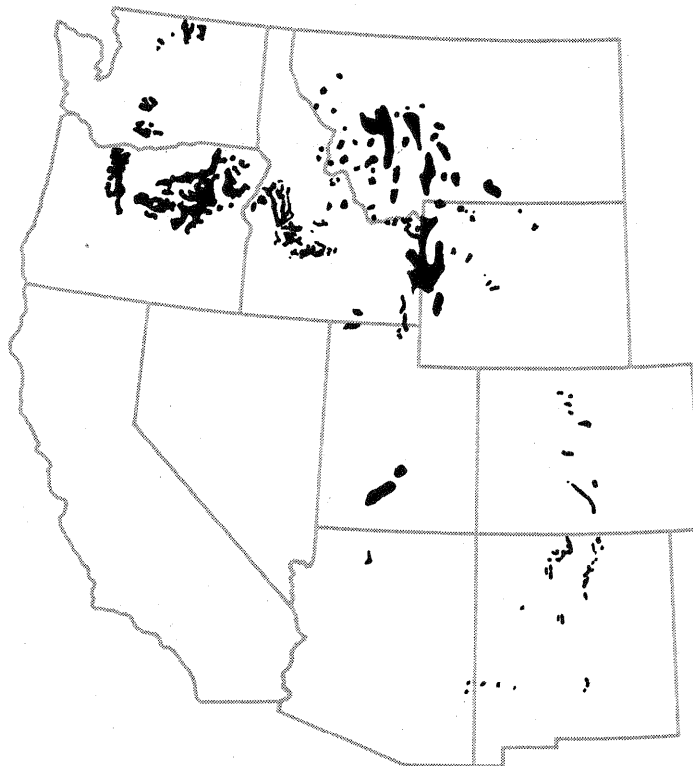
In 1986, the amount of defoliation caused by the western spruce budworm (*Choristoneura occidentalis*) exceeded 13 million acres--a record for this insect pest. The 13.2 million acres reported in 1986 broke the previous record of 12.8 million defoliated acres reported in 1985.

More than 80 percent of the defoliation occurred in three States: Oregon, Idaho, and Montana. Oregon again reported a large increase: up 1 million acres to 5.6 million acres in 1986. And--for the fifth year in a row--both Montana and Idaho reported defoliation on more than 2 million acres.

Acres of aerially detected defoliation caused by the western spruce budworm during 1985 and 1986

State	1985	1986
Arizona	102,640	86,480
California	0	0
Colorado	1,567,000	1,080,000
Idaho	2,631,300	2,916,900
Montana	2,675,000	2,497,000
New Mexico	529,484	382,936
Oregon	4,567,390	5,600,000
Utah	87,600	95,600
Washington	415,290	400,000
Wyoming	220,500	164,500
Total	12,796,204	13,223,416

1986 Western Spruce Budworm Defoliation



Pacific Northwest Region--Insects

Prepared by David R. Bridgwater

Pacific Northwest Region--Status of insects in Oregon and Washington

Insect	Host	Location	Remarks
Douglas-fir beetle <u>Dendroctonus</u> <u>pseudotsugae</u>	Douglas-fir	Oregon, Washington	<p>Douglas-fir beetle damage decreased east of the Cascade Range: Losses in Douglas-fir occurred on 3,700 acres (245,730 cubic feet). Current damage levels are still far below what they were in the 1970's. The greatest damage in 1986 was on the Wallowa-Whitman National Forest in Oregon.</p> <p>West of the Cascades, losses decreased significantly. Damage was reported on 3,670 acres in 1986 compared to 17,720 acres in 1985; volume loss fell from 1.2 million cubic feet in 1985 to 0.8 million cubic feet in 1986.</p>
Douglas-fir bud moth <u>Zeiraphera hesperiana</u>	Douglas-fir	Oregon	<p>Light to heavy defoliation was reported on 122,650 acres of mature Douglas-fir. Most of the defoliation was on the Siuslaw National Forest and adjoining State, private, and Bureau of Land Management lands. Smaller areas of defoliation occurred on the Willamette National Forest. This is the second year of defoliation caused by this insect since the mid-1960's.</p>
Fir engraver <u>Scolytus ventralis</u>	True firs	Oregon, Washington	<p>A substantial increase in fir engraver activity was noted in Washington but the level of activity remained the same in Oregon. Most of the fir engraver damage occurred on sites infected with either laminated root rot, armillaria root disease, or annosus root disease--diseases which weaken true firs, making them susceptible to beetle attacks. Total losses occurred on 15,920 acres (315,200 cubic feet) as compared to 11,470 acres (198,020 cubic feet) in 1985.</p>

Pacific Northwest Region --Insects

Pacific Northwest Region--Status of insects in Oregon and Washington--Continued

Insect	Host	Location	Remarks
Gypsy moth <u>Lymantria dispar</u>	Conifers, various hard- woods	Oregon, Washington	<p>In Washington, trap catches decreased from 175 adults in 1985 to 56 adults in 1986. An eradication project continued in Bellingham, WA; and a new one using the inherited sterility technique began in Manor, WA.</p> <p>In Oregon, trap catches fell from 1,537 adults in 1985 to 246 in 1986. An eradication project using <u>B.t.</u> was conducted on 194,000 acres in Lane County. A 12,000-acre project is planned for 1987.</p>
Modoc budworm <u>Choristoneura</u> <u>retiniana</u>	Douglas-fir, true firs	Southern Oregon	<p>Modoc budworm defoliation decreased in southern Oregon in true fir stands on the Fremont and Winema National Forests. Visible defoliation decreased from 503,400 acres in 1985 to 281,910 acres in 1986.</p>
Mountain pine beetle <u>Dendroctonus</u> <u>ponderosae</u>	Lodgepole pine, ponderosa pine, western white pine, other pines	Oregon, Washington	<p>In Washington, losses increased. In Oregon, losses have intensified on the Deschutes, Fremont, and Winema National Forests; however, losses continued to decline on the Wallowa-Whitman, Malheur, and Umatilla National Forests, primarily because the most suitable host trees have already been killed.</p> <p>Approximately 1.76 million acres were infested during 1986: Oregon had 1,600,000 acres infested; Washington had 157,000 acres. In 1985, 1.5 million acres were infested.</p> <p>Losses occurred on 1.42 million acres of lodgepole pine (59 million cubic feet); 288,000 acres of ponderosa pine (5.6 million cubic feet); 49,000 acres of western white pine (2.6 million cubic feet); and about 1,600 acres of various other pines (34,000 cubic feet).</p> <p>Intense losses are expected to continue in south-central Oregon and north-central Washington and to decrease elsewhere.</p>

Pacific Northwest Region--Insects

Pacific Northwest Region--Status of insects in Oregon and Washington--Continued

Insect	Host	Location	Remarks
Pine engraver <u>Ips</u> sp.	Ponderosa pine	Oregon, Washington	Pine engraver activity increased to 10,040 acres. Most of the activity was on the Deschutes and Ochoco National Forests in Oregon and the Wenatchee and Okanogan National Forests in Washington.
Spruce beetle <u>Dendroctonus</u> <u>rufipennis</u>	Engelmann spruce	Oregon, Washington	Losses occurred on 24,500 acres (1.8 million cubic feet). Spruce beetle activity in Engelmann spruce stands in Oregon increased: A major outbreak developed on the Wallowa-Whitman National Forest near Halfway, OR. However, losses in Washington were very low in 1986.
Sugar pine tortrix <u>Choristoneura</u> <u>lambertiana</u>	Lodgepole pine, ponderosa pine	Oregon	For the first time in many years, defoliation was observed from the ground in 1985. In 1986, defoliation was visible from the air over 136,560 acres. The defoliation occurred on the Deschutes, Fremont, and Winema National Forests.
Western pine beetle <u>Dendroctonus</u> <u>brevicomis</u>	Ponderosa pine	Oregon, Washington	Mortality caused by the beetle decreased in Oregon and Washington from 4.9 million cubic feet in 1985 to 2.6 million cubic feet in 1986. Greatest losses occurred on the Winema and Deschutes National Forests.
Western spruce budworm <u>Choristoneura</u> <u>occidentalis</u>	Douglas-fir Engelmann spruce, true firs, western larch	Oregon, Washington	Visible defoliation increased from 5.0 million acres in 1985 to 6.0 million acres in 1986: Oregon had 5.6 million acres defoliated; Washington had 0.4 million acres defoliated. In Oregon, populations continued to increase on the Wallowa-Whitman, Mt. Hood, Deschutes, and Umatilla National Forests; the Warm Springs Indian Reservation; and intermingled State and private lands. In Washington, the size of the infestation increased on the Okanogan National Forest and adjacent State and private lands but decreased on the Wenatchee National Forest.

Pacific Northwest Region--Diseases

Prepared by Donald J. Goheen

Pacific Northwest Region--Status of diseases in Oregon and Washington

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Dwarf mistletoes <u>Arceuthobium</u> spp.	Various conifers	Oregon, Washington	As stand management intensifies, losses due to this group of disease-causing plants are declining. However, dwarf mistletoes still caused an estimated loss of 132 million cubic feet of timber in Oregon and Washington in 1986. Programs for handheld programmable calculators are being used to project reductions in yield and perform economic analyses for dwarf mistletoe-infected lodgepole pine in central Oregon.
Stem decay	Various conifers	Oregon, Washington	Stem decay fungi consumed enormous volumes of wood. Most losses occurred in younger stands of thin-bark species, which are susceptible to wounding during stand entries. Wounding of residual trees both activates dormant infections and creates areas where new infections can begin. Programs for handheld calculators have been developed to estimate percentages of infection and decay in white and grand fir understories, two of the most decay-damaged species in the Region.
White pine blister rust <u>Cronartium ribicola</u>	Sugar pine, western white pine	Oregon, Washington	Annual losses of western white and sugar pines from blister rust in Oregon and Washington were estimated to be 15 million cubic feet. Additional training and followup on use of handheld programmable calculator programs for predicting infection hazard occurred during 1986.
ROOT DISEASES			
	Various conifers	Oregon, Washington	Root diseases were among the most serious pest problems in Oregon and Washington forests. The incidence of root disease is increasing, often in direct response to human activity. Annual losses to root diseases on all ownerships were estimated at over 130 million cubic feet.

Pacific Northwest Region--Diseases

Pacific Northwest Region--Status of diseases in Oregon and Washington--Continued

Disease	Host	Location	Remarks
Annosus root disease <u>Heterobasidion</u> <u>annosum</u>	Western hemlock, white fir	Oregon, Washington	Annosus root disease was responsible for extensive losses in many partially cut white fir stands in southern and eastern Oregon. Most losses were due to outright tree mortality. Evidence pointed to extensive infection throughout eastern Oregon and Washington. Losses in western hemlock stands can be minimized by short (100-year) rotations and wound prevention.
Armillaria root disease <u>Armillaria</u> spp.	Various conifers	Oregon, Washington	The most serious losses to this disease occurred east of the Cascades. Losses west of the Cascades were usually confined to stressed stands, such as off-site plantings. Direct control through stump and root removal is being practiced in severely infected stands in eastern Washington.
Black stain root disease <u>Ceratocystis wagneri</u> [<u>Verticicladiella</u> <u>wagneri</u>]	Douglas-fir	Oregon, Washington	In southwestern Oregon, this was by far the most commonly encountered disease in Douglas-fir plantations. It appeared to be especially damaging where disturbances have occurred, especially in roadside Douglas-firs cut back by mechanical choppers. Losses were also greater on tractor-logged sites, which have greater soil compaction, than on cable-logged sites.
Laminated root rot <u>Phellinus weirii</u>	Douglas-fir, grand fir, white fir	Oregon, Washington	Laminated root rot is estimated to have removed about 5 percent of the Douglas-fir type west of the Cascades from full production. The total acreage infested may be closer to 10 percent of the Douglas-fir. Damage was also severe in some East Side grand and white fir stands.
Port-Orford-cedar root disease <u>Phytophthora lateralis</u>	Port-Orford-cedar	Southwestern Oregon	Port-Orford-cedar root disease continued to cause widespread mortality of Port-Orford-cedar in southwestern Oregon.

Pacific Northwest Region--Diseases

Pacific Northwest Region--Status of diseases in Oregon and Washington--Continued

Disease	Host	Location	Remarks
FOLIAGE DISEASES			
Dothistroma needle blight <u>Mycosphaerella pini</u> [<u>Dothistroma septospora</u> (= <u>Dothistroma pini</u>)]	Douglas-fir, lodgepole pine, ponderosa pine	Oregon, Washington	Because of dry weather in spring and early summer, the incidence of several foliage diseases was low relative to incidence in past years.
Douglas-fir needle cast <u>Rhabdocline pseudotsugae</u>			
Elytroderma disease <u>Elytroderma deformans</u>			
NURSERY DISEASES			
Douglas-fir canker diseases <u>Botrytis cinerea</u> <u>Fusarium roseum</u> <u>Phoma cupyrena</u> <u>Phomopsis</u> spp.	Douglas-fir	Oregon, Washington	Damage was scattered, with less than 1 percent of crop affected in most nurseries. Fungicide applications were helpful when cankers were above ground and not covered with soil collars.
Fusarium root and hypocotyl rots <u>Fusarium oxysporum</u>	Various conifers	Oregon, Washington	Scattered losses for most species; continued heavy mortality in sugar pine.
Larch needle cast <u>Meria laricis</u>	Western larch	Washington	Dry weather and fungicide treatments resulted in little infection or defoliation during 1986.
Phytophthora root rot <u>Phytophthora</u> spp.	Douglas-fir, other conifers	Oregon, Washington	Damage was confined primarily to low, poorly drained areas of nursery beds.