

# **Forest Insect and Disease Conditions in the United States 1990**

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# Mountain Pine Beetle

Mountain pine beetle (*Dendroctonus ponderosae*) tree killing decreased by 63 percent from 1989 to 1990. Similar to last year, the decrease was especially large in Oregon and Montana. Only Washington reported a large increase in the number of mountain pine beetle killed trees. The overall downward trend in mountain pine beetle activity was evident in the number of acres affected by this insect, which declined by 42%. The volume of timber killed by mountain pine beetle was at a high level in 1990, but decreased by about 24% over that reported in 1989. The continued high level of volume killed reflects the continuing mountain pine beetle activity in drought stressed forests of California. In fact, many areas of the west

have received below normal precipitation for up to five years in a row. The combined effects of drought and attack by bark beetles have resulted in unprecedented levels of tree mortality in these areas. An estimated 6 billion board feet of merchantable sized trees have been killed in California alone. Douglas-fir beetle, western pine beetle, *Ips* species, *Scolytus* species and Jeffrey pine beetle (in California and Nevada) have been the most important mortality agents, with the mountain pine beetle playing a comparatively minor role and sometimes acting in concert with these other insects.

State	1989 Acres Affected	1990 Acres Affected	1990 Volume† Killed	1990 Number Of Trees Killed
Arizona	900	600	53	2,000
California	NA	NA	102,389	1,265
Colorado	12,000	9,800	128	8,000
Idaho	41,600	15,200	189	12,000
Montana	421,500	195,200	12,402	620,000
New Mexico	1,000	800	80	4,000
Oregon	887,926	245,100	2,742	143,000
South Dakota	2,400	6,800	201	12,000
Utah	4,500	2,000	34	4,000
Washington	231,375	431,700	8,959	433,000
Wyoming	11,400	28,300	540	37,000
<b>Total</b>	<b>1,614,601</b>	<b>935,300</b>	<b>127,144</b>	<b>1,275,000</b>

†Volume in thousand cubic feet of timber

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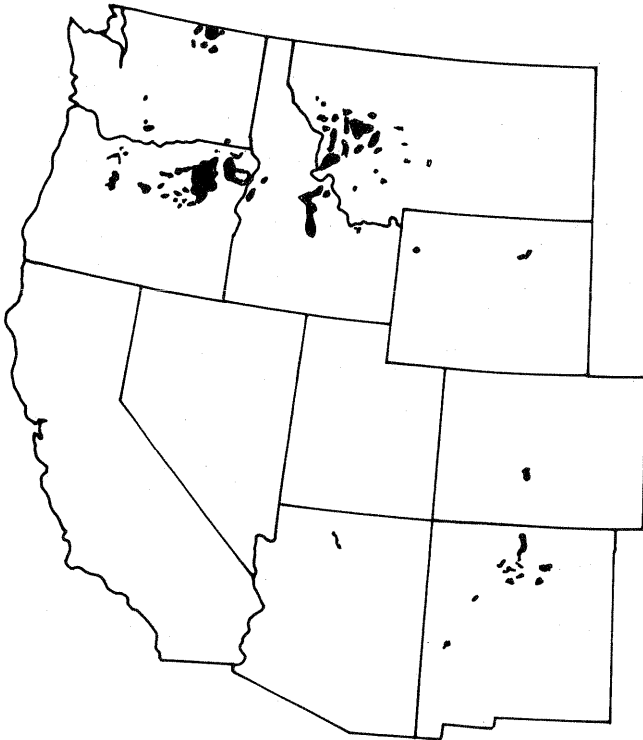
1990 Mountain Pine Beetle



# Western Spruce Budworm

Western spruce budworm (*Choristoneura occidentalis*) defoliation increased by about 1.5 million acres after declining for the previous four years. The 1990 defoliation totaled 4.6 million acres compared with 3.1 million acres reported in 1989. Despite this substantial increase in defoliation, the 1990 total is still far below the 13.2 million acres of defoliation reported in 1986. Most of the increase in defoliation took place in Oregon where 1990's defoliation was almost a million acres more than 1989's.

## 1990 Western Spruce Budworm



## Acres Of Aerially Detected Defoliation

State	1989	1990
Arizona	720	25,600
California	0	0
Colorado	52,000	52,100
Idaho	26,600	48,000
Montana	1,191,300	1,482,400
New Mexico	90,080	310,500
Oregon	1,416,681	2,344,300
Utah	0	0
Washington	362,251	351,000
Wyoming	0	8,100
<b>Total</b>	<b>3,139,632</b>	<b>4,622,000</b>

# Pacific Northwest Region Insects

Prepared by Tim McConnell

Insect	Host	Location	Remarks
<b>Douglas-fir beetle</b> <i>Dendroctonus pseudotsugae</i>	Douglas-fir	Oregon, Washington	<p>Overall Douglas-fir beetle damage increased significantly to 30.6 million cubic feet.</p> <p>In Oregon, the damage occurred on 263,000 acres, down from 324,000 acres in 1989. The greatest damage occurred on the Umatilla, Wallowa-Whitman, and Malheur National Forests.</p> <p>In Washington State, Douglas-fir beetle damage almost doubled, from 12,900 trees to 23,200 trees. Acres damaged remained almost static at 29,300 acres.</p>
<b>Douglas-fir tussock moth</b> <i>Orgyia pseudotsugata</i>	True firs, Douglas-fir	Eastern Oregon	<p>Pheromone trapping and larval surveys detected widespread population increases in northeastern Oregon. Defoliation was not observed from the air because the tussock moth populations were in the same areas where heavy western spruce budworm defoliation occurred. A suppression project is being considered for 1991 for 170,000 acres on the Wallowa-Whitman National Forest.</p>
<b>Fir engraver beetle</b> <i>Scolytus ventralis</i>	True firs	Oregon, Washington	<p>Fir engraver activity decreased in Oregon and Washington. Losses of 17.9 million cubic feet occurred on 524,800 acres compared with losses of 23.6 million cubic feet on 833,700 acres in 1989.</p>
<b>Gypsy moth</b> <i>Lymantria dispar</i>	Conifers, Hardwoods	Oregon, Washington	<p>Attempts were made to eradicate this pest using pheromone traps around 2 private residences in Lake Oswego near Portland, Oregon. An eradication project was conducted on 450 acres near northeast Vancouver, Washington.</p>
<b>Modoc budworm</b> <i>Choristoneura retiniana</i>	Douglas-fir, True firs	Southern Oregon	<p>No Modoc budworm defoliation was detected from the air in 1990.</p>

Insect	Host	Location	Remarks
<b>Mountain pine beetle</b> <i>Dendroctonus ponderosae</i>	Jeffrey pine, Lodgepole pine, Ponderosa pine, Sugar pine, Western white pine	Oregon, Washington	In Washington, losses increased slightly to 6.5 million cubic feet on 186,000 acres. In south central Oregon, losses decreased significantly as the mountain pine beetle outbreak depleted the majority of its lodgepole pine host. In Oregon, losses decreased to 2.5 million cubic feet on 245,500 acres from 11.0 million cubic feet on 888,000 acres in 1989.
<b>Pine engraver beetles</b> <i>Ips</i> spp.	Ponderosa pine	Oregon, Washington	Pine engraver activity decreased from 27,450 acres to 8,971 acres in 1990.
<b>Spruce beetle</b> <i>Dendroctonus rufipennis</i>	Engelmann spruce	Oregon, Washington	The spruce beetle killed 58,900 trees on 49,400 acres compared to 115,300 trees on 68,200 acres in 1989. Losses decreased to 2.8 million cubic feet from 5.4 million cubic feet in 1989. Most damage occurred in north-east Oregon. The outbreak on the Wallowa-Whitman National Forest decreased from 62,000 acres in 1989 to 41,600 acres in 1990. Most of the susceptible host on this forest was already dead.
<b>Western pine beetle</b> <i>Dendroctonus brevicornis</i>	Ponderosa pine	Oregon, Washington	Tree mortality continued to increase in 1990 to 13.1 million cubic feet from 8.2 million cubic feet in 1989. Much of the increase was attributed to the continued drought.
<b>Western spruce budworm</b> <i>Choristoneura occidentalis</i>	Douglas-fir, Engelmann spruce, True firs, Western larch Western larch	Oregon, Washington	Regionwide visible defoliation increased.  In Oregon, budworm defoliation decreased on Mt. Hood and Willamette National Forests. Budworm activity increased on all other east-side forests and Indian Reservations, except the Winema and Fremont Reservations where defoliation did not occur.  In Washington, budworm defoliation increased on the Wenatchee and Colville National Forests and Colville Indian Reservation. Defoliation decreased on the Okanogan National Forest and Yakima Indian Reservation.

# Pacific Northwest Region Diseases

Prepared by Ellen Michaels Goheen

Disease	Host	Location	Remarks
<b>Branch cankers</b> <i>Phomopsis</i> spp. <i>Sclerophoma</i> spp. <i>Dermea</i> spp. <i>Cytospora</i> spp.	Douglas-fir, True firs	Oregon, Washington	Top, branch, and whole tree mortality, associated primarily with drought and secondarily with complexes of canker fungi, decreased in plantations and in sapling stands. Damage was noticeable in drought-stricken southwestern Oregon. Canker fungi were associated with true fir dwarf mistletoe throughout the area.
<b>Dwarf mistletoes</b> <i>Arceuthobium</i> spp.	Various conifers	Oregon, Washington	In Washington and Oregon, reported dwarf mistletoe effects remained unchanged from 1989. Dwarf mistletoes were present on 9.5 million acres and caused an estimated loss of 131 million cubic feet of timber. Most of the damage occurred east of the Cascade crest. Douglas-fir dwarf mistletoe was the most damaging forest tree disease in stands east of the Cascades, infecting 42 percent of the host type.
<b>Stem decay</b> <i>Phellinus pini</i> <i>Echinodontium tinctorium</i> Other Basidiomycetes	Various conifers	Oregon, Washington	Stem decay fungi continued to consume enormous volumes of wood. Most losses occurred in young stands on trees with thin bark, which are susceptible to wounding during stand entries. Wounding of residue trees both activates dormant infections and creates areas where new infections can occur.
<b>White pine blister rust</b> <i>Cronartium ribicola</i>	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. Rust-resistant planting stock was available for regenerating stands. Approximately 1.2 million rust resistant western white pine and 105,000 rust resistant sugar pine, were planted in the area during 1990. Interest in pruning white pine stands to lessen disease effects continued to increase.

Disease	Host	Location	Remarks
<b>Root diseases</b>			
<b>Root disease</b>	Various conifers	Oregon, Washington	Root diseases were among the most serious pest problems in Oregon and Washington forests. They are difficult to control and treat. Reports of root disease incidence increased as use of stand examinations to detect root disease increased. Annual losses to root disease on land of all ownerships was estimated at over 185 million cubic feet. Tolerant, resistant, and immune tree species were planted on some affected sites to limit future losses.
<b>Annosus root disease</b> <i>Heterobasidion annosum</i>	True firs, Western hemlock, Ponderosa pine	Oregon, Washington	Annosus root disease was responsible for extensive loss in many partially cut white and grand fir stands in southern and eastern Oregon and eastern Washington. Mortality was high in drought-stricken areas of northeastern Oregon where annosus root disease and fir engraver beetles operated as a complex. Evidence pointed to extensive infection throughout eastern portions of the area. The severity of infection in these stands was expected to increase with time. Annosus root disease was observed with increasing frequency in ponderosa pine stands on very dry sites in eastern Washington and southeast Oregon. There was increased concern regarding the impacts of annosus root disease on mountain hemlock and Pacific silver fir in high elevation stands in the Cascades. There was increased use of borax to protect stumps from annosus root disease on susceptible conifers.
<b>Armillaria root disease</b> <i>Armillaria ostoyae</i>	Various conifers	Oregon, Washington	Serious losses occurred east of the Cascades in mixed-conifer stands. Ponderosa pine was seriously damaged in localized areas. West of the Cascades, losses were confined to stressed stands, such as off-site plantings. Control recommendations include planting or favoring tree species tolerant or resistant to this disease.



Disease	Host	Location	Remarks
<b>Laminated root rot</b> <i>Phellinus weirii</i>	Douglas-fir, Grand fir, White fir	Oregon, Washington	Laminated root rot was the most serious forest tree disease west of the Cascades in Washington and Oregon. Douglas-fir and true fir productivity was reduced 50 percent. West of the Cascade Mountains, an estimated 8 percent of the Douglas-fir and true firs were taken out of production. East of the Cascades, grand and white fir stands experienced severe damage. Tolerant, resistant, and immune species were favored or planted in an effort to suppress this disease.
<b>Port-Orford-cedar root</b> <i>Phytophthora lateralis</i>	Port-Orford cedar	Southwestern Oregon	Port-Orford-cedar root disease continued to caused widespread mortality of Port-Orford-cedar in southwestern Oregon.

### Vascular Wilts and Declines

<b>Black stain root disease</b> <i>Ophiostoma wageneri</i> (= <i>Ceratocystis wageneri</i> )	Douglas-fir	Oregon, Washington	In southwestern Oregon, black stain root disease was the most commonly encountered disease in Douglas-fir plantations. It was particularly damaging where disturbances, such as road building or soil compaction, had occurred or where roadside Douglas-fir was cut by mechanical choppers. Losses were greater on tractor-logged sites, which have greater soil compaction, than on cable-logged sites.
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### Foliage Diseases

<b>Dothistroma needle blight</b> <i>Mycosphaerella pini</i> [ <i>Dothistroma septospora</i> (= <i>Dothistroma pini</i> )]	Douglas-fir, Lodgepole pine, Ponderosa pine	Oregon, Washington	The incidence of several foliage diseases increased during 1990 due to favorable microclimatic conditions. Larch needle cast was prevalent throughout northeastern Washington. Swiss needle cast was common in Douglas-fir plantations in northwestern Oregon.
<b>Douglas-fir needle cast</b> <i>Rhabdocline pseudotsugae</i>			
<b>Elytroderma disease</b> <i>Elytroderma deformans</i>			
<b>Larch needle cast</b> <i>Meria laricis</i>			
<b>Swiss needle cast</b> <i>Phaeocryptopus gaeumannii</i>			

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

Disease	Host	Location	Remarks
<b>Nursery Diseases</b>			
<b>Damping-off</b>	Most conifers	Oregon, Washington	Loss of seedlings before and shortly after emergence accounted for the majority of mortality in Pacific Northwest bareroot nurseries. Losses ranged from less than 1 percent to over 20 percent in various lots. Fumigation provided the best control of damping-off.
<b>Douglas-fir canker diseases</b> <i>Phoma eupyrena</i> <i>Fusarium roseum</i> <i>Botrytis cinerea</i> <i>Phomopsis</i> spp.	Douglas-fir	Oregon, Washington	Damage was scattered, with less than 1 percent of the crop affected in most nurseries. Fungicide applications were helpful when cankers were above ground and not covered with soil collars.
<b>Gray mold</b> <i>Botrytis cinerea</i>	Douglas-fir	Oregon, Washington	Damage by gray mold was low (less than 1 percent of the crop was affected) due to applications of preventative fungicide and regulation of seedbed densities.
<b>Fusarium root and hypocotyl rots</b> <i>Fusarium oxysporum</i>	Various conifers	Oregon, Washington	Losses were scattered for most species; mortality was heavy in sugar pine.
<b>Larch needle cast</b> <i>Meria laricis</i>	Western larch	Washington	Little infection or defoliation occurred in the nurseries.
<b>Phytophthora root rot</b> <i>Phytophthora</i> spp.	Douglas-fir, Other conifers	Oregon, Washington	Seedbed seedling damage was confined primarily to nursery beds with poor drainage or compaction layers in the rooting zone.