

1997

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Subject: Annual Insect and Disease Conditions Report (Your ltr. 12/15/97)

To: Chief

Enclosed is the Pacific Northwest Region's contribution to the 1997 National Forest Insect and Disease Conditions Report. Included are the insect and disease narratives and the Forest Pest Information System (FPIS) Report. Maps showing the occurrence of mountain pine beetle and western spruce budworm defoliation in the Region will be digitally transferred by Julie Johnson in our Forest Insect and Disease group (503-808-2998).

If you have any questions, please contact Keith Sprengel at 503-668-1476 or Sally Campbell at 503-808-2904.

ROBERT W. WILLIAMS
Regional Forester

Enclosures

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I concur, S.Campbell 2/17/98
I concur, K.Snell 2/ /98

ENCLOSURE 1

Insects: indigenous

Mountain pine beetle, *Dendroctonus ponderosae*

Hosts: Jeffrey pine, Lodgepole pine, ponderosa pine, sugar pine, western white pine, whitebark pine.

{Region 6: Oregon, Washington}

Mountain pine beetles occur throughout the range of the pine type in the Pacific Northwest. Both adults and larvae feed in the phloem layer of the inner bark, producing one generation per year. Fungi introduced by the beetles clog the conductive tissues and mortality may result. Some infestations have resulted in extensive mortality over large areas.

Acres affected by mountain pine beetle decreased from 170,252 acres with an average of 3.45 trees/acre in 1996 to 157,089 acres with an average of 2.16 trees/acre in 1997. Decreased activity was detected in the whitebark, western white and lodgepole pine hosts. Increased activity was detected in ponderosa and sugar pine hosts. The aerial survey has mapped single tree mortality in sugar pine due to concern over their gradual removal from stands in southern Oregon. Approximately 420 large sugar pine trees were mapped in southern Oregon during the 1997 aerial survey. Areas most heavily affected by mountain pine beetle include federal lands within the Deschutes, Fremont, and Okanogan reporting areas. Over 7,000 acres of lodgepole pine on state lands in the Loomis block of north-central Washington were affected. Dense stand conditions continue to predispose areas to mountain pine beetle infestations.

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Hosts: Douglas-fir

{Region 6: Oregon, Washington}

Douglas-fir beetles occur throughout the range of Douglas-fir and are considered the most important bark beetles which cause mortality in Douglas-fir. Normally they breed in felled, injured, or diseased trees. The females bore into the bark and tunnel upward through the phloem. Mortality occurs when phloem continuity is disrupted by beetle larval galleries or by fungi introduced by the beetles. The resulting mortality is widely scattered when at low levels. At times, these insects reach epidemic levels and kill apparently healthy trees over extensive areas. Douglas-fir beetle activity was detected on fewer acres, but at a greater intensity. Activity was reported on 8,600 acres averaging one tree/acre in 1997 as compared to 9,700 acres with an average of 0.80 tree/acre in 1996. Increased levels of activity were detected on the Colville, Mt. Baker-Snoqualmie, and Umatilla National Forests. Predisposing tree stresses caused by repeated years of defoliation by western spruce budworm, drought, and overstocking may result in relatively high levels of Douglas-fir beetle activity in the next few years despite three years of normal precipitation. Increased Douglas-fir beetle mortality is expected in the summer of 1998 due to a windstorm on December, 12, 1995, and extensive flooding during February of 1996.

Fir engraver, *Scolytus ventralis*

Hosts: True firs

{Region 6: Oregon, Washington}

Fir engravers infest true firs in western forests. These beetles attack pole-sized and mature trees, causing significant mortality during and following periods of drought. Trees infected with annosus root disease are especially subject to attack. Trees defoliated by Douglas-fir tussock

moth or western spruce budworm also are likely to be attacked. These beetles commonly breed in logging slash and windthrown trees.

Fir engraver activity within the Region decreased from 377,600 acres in 1996 (2.15 trees/acre) to less than 26,000 acres in 1997 (0.82 trees/acre). Following three years of approximately normal precipitation, mortality levels remain highest in areas which have experienced drought, defoliation by Douglas-fir tussock moth or western spruce budworm, or are infected with root disease. Many of the most heavily infested areas are pine sites which, due to selective logging and fire exclusion, now have a large component of true fir.

Dramatic decreases in observed mortality were reported on the Deschutes, Winema and Fremont reporting areas with less than one half of one percent of 1996 levels. The Umatilla reporting area experienced a two and half fold increase in reported fir engraver caused mortality. Other areas of significant acreage's of detected fir engraver activity include the Wallowa-Whitman and Wenatchee National Forests.

Pine engraver beetles, *Ips* spp.

Hosts: Ponderosa pine

{Region 6: Oregon, Washington}

Pine engraver beetles affect all species of pine but are most notable for their effect on ponderosa pine. Populations commonly build up in weakened trees, improperly treated logging and thinning slash, and

windthrow. High populations in warm, dry years may kill large numbers of apparently healthy saplings and pole-sized trees as well as tops of mature trees.

Pine engraver activity increased slightly over 1996 levels. The majority of activity was detected on federal and private lands in central and northeastern Oregon. Field checks in northeastern Oregon suggest that some pine engraver beetle activity is coded as mountain pine beetle during the annual region-wide aerial survey.

Western pine beetle, *Dendroctonus brevicomis*

Hosts: Ponderosa pine

{Region 6: Oregon, Washington}

Western pine beetles periodically kill large numbers of ponderosa pine in the Pacific Northwest. Normally, these beetles breed in large, old trees; in windfalls; in trees infected by root disease; or in trees weakened by drought, overstocking, or fires. Under epidemic conditions, they will attack and kill trees of all ages having bark sufficiently thick to protect the insect during development. Two generations per year of this beetle are typical in the Pacific Northwest.

Western pine beetle activity decreased substantially in both large and pole-sized ponderosa pines throughout much of the Region. Over 13,600 large trees were killed in 1996 compared to about 2,900 in 1997. Mortality in smaller, pole-sized trees decreased from 12,400 trees in 1996 to 4,300 trees killed in 1997.

The only notable increase in large-tree mortality occurred on private lands in northeastern Washington. In pole-sized ponderosa pine, an increase in mortality was reported on private lands in the Glenwood reporting area and on the Yakima Indian Reservation.

Spruce beetle, *Dendroctonus rufipennis*

Hosts: Engelmann spruce

{Region 6: Oregon, Washington}

Spruce beetles infest all species of spruce and are the most significant mortality agent of mature spruce trees. Populations build up in windthrown trees. Stand susceptibility can relate to a

variety of factors including geographic location, tree diameter, basal area, and percentage of spruce in the canopy.

All reported mortality in Oregon and Washington in 1997 was in Engelmann spruce. Reported trees killed decreased from 31,800 in 1996 to approximately 6,500 trees in 1997. Over 88 percent of all trees reported killed were on Forest Service lands. Seventy-two percent of the reported tree mortality occurred within wilderness areas on the Okanogan and Wenatchee National Forests. In other areas, spruce beetle activity was lightly scattered in the host type. Low levels of spruce beetle activity are due, in part, to the gradual removal of preferred host trees by previous infestations.

Pandora moth, *Coloradia pandora*

Hosts: Lodgepole pine, ponderosa pine

{Region 6: Oregon}

Pandora moths infrequently defoliate pines. The insect has a 2-year life cycle: The larval stage causes defoliation in even-numbered years, and adult moths appear in odd-numbered years. The current pandora moth infestation in central Oregon began in 1986 and grew with each successive generation until 1994, when pines on 369,100 acres experienced some level of defoliation. A naturally occurring virus was noted throughout the infested area in 1994. We believe that this virus brought about the collapse of the pandora moth population since only 12,300 acres were defoliated in 1996. The defoliation produced by the larvae has caused concern, but trees are only bare for a short time until the current year's growth of needles appears later in the summer. We anticipate the long-term effects of the infestation will be minimal, with very low tree mortality in some areas. Field evaluation is planned for the spring of 1998 to determine if a special aerial survey is warranted.

Douglas-fir tussock moth, *Orgyia pseudotsugata*

Hosts: Douglas-fir, true firs

{Region 6: Oregon, Washington}

The larvae of tussock moths feed on foliage of several tree species, but only four are considered primary hosts: Douglas-fir, grand fir, white fir, and subalpine fir. Early instar larvae feed on current year's foliage as the shoots elongate. Later instar larvae feed on all foliage.

Following a 3-year low of 2,900 acres reported in 1995, we observed no Douglas-fir tussock moth activity in the Region for the second straight year.

Western spruce budworm, *Choristoneura occidentalis*

Hosts: Douglas-fir, true firs, Engelmann spruce, western larch

{Region 6: Oregon, Washington}

Western spruce budworm is a common defoliator of conifers in the Pacific Northwest.

Budworm outbreaks commonly occur in the true fir/Douglas-fir forest type. Larvae prefer new foliage but also feed on older foliage when new foliage is in short supply. On western larch, larvae not only feed on the needles but also sever new shoots. Repeatedly defoliated trees experience substantial radial growth reduction and, if defoliation is great enough, are predisposed to attack by various bark beetles. Increasingly effective fire prevention and suppression during this century have eliminated many major fires and nearly all surface fires. As a consequence, host trees have increased, resulting in an abundant and expanding source of the budworm's favorite food: shade-tolerant, late-successional species such as true fir.

Areas of visible defoliation decreased from approximately 191,000 acres in 1996 to 166,000 acres in 1997. Over 92 percent of the area reported with visible defoliation caused by western

spruce budworm occurred within the Glenwood Reporting area and on the Yakima Indian Reservation. Although there was a slight decrease in the number of reported acres affected, there was an observable intensification of cumulative defoliation in the mapped areas. A decrease in the affected acres on the Yakima Indian Reservation was accompanied by greater overall damage on the affected acres. Similarly, the Gifford-Pinchot National Forest had little change in the number of defoliated acres from 1996, but experienced more severe damage. A new center of light defoliation was detected on approximately 770 acres of the Colville Indian Reservation. The greatest increase in acreage affected occurred within the Glenwood Reporting area and slight increases in both affected acres and intensity of damage were reported on the Colville and Wenatchee National Forests.

Western Hemlock looper, *Lambdina fiscellaria lugubrosa*

Hosts: Western hemlock, Douglas-fir, Sitka spruce, Pacific silver fir

{Region 6: Oregon, Washington}

The primary host for hemlock looper is western hemlock, although it will feed on other conifer species and understory shrubs found in association with western hemlock. Intense, repeated defoliation can result in tree mortality. Outbreaks typically will last 3 years and are kept in check by natural biological controls.

Only 53 acres of hemlock looper defoliation were reported in 1997. A 39-acre pocket of activity was reported on the Mt. Baker-Snoqualmie National Forest and a 14-acre site on the Olympic National Park. The defoliation was mapped during the annual region-wide aerial survey and was not verified on the ground.

Insects: nonindigenous

Balsam woolly adelgid, *Adelges piceae*

Hosts: True firs

{Region 6: Oregon, Washington}

Balsam woolly adelgids, natives of Europe, can kill trees slowly by infesting the twigs and branches, or quickly by infesting the bole. They also cause gouting of branch tips. Balsam woolly adelgid activity was observed on 9,400 acres in 1997, a decrease of 4,300 acres from 1996 reported levels. The majority of activity was reported in the Olympic National Park, which reported a two-fold increase in the number of acres visibly affected.

Gypsy moth, *Lymantria dispar*

Hosts: Oaks, apple, sweetgum, other hardwoods

{Region 6: Oregon, Washington}

While no defoliation has been observed in either State, pheromone traps continue to catch moths. These catches represent either new introductions or populations not completely eradicated by previous treatments. In Washington, five eradication projects totaling 893 acres were conducted using ground and aerial applications of *Bacillus thuringiensis* (Bt). In one of the ground application sites, Dimilin was also used in the immediate area where egg masses were found. The gypsy moth survey in 1997 resulted in trap catches of 69 individuals. Of those, one has been identified as the Russian Far East strain of the Asian gypsy moth, one as a central Siberian strain, and the remainder were identified as the European strain. Eradication projects are planned for 1998 at the Asian and central Siberian gypsy moth sites and one site where European gypsy moths were caught.

In Oregon, an eradication project was conducted using three aerial applications of Bt on 70 acres. Thirty moths were trapped in Oregon, and all have been identified as the European strain. Two sites, one in Beaverton (22 acres) and one in Lake Oswego (13 acres) are proposed for eradication using two ground applications of Bt followed by mass trapping. New introductions are expected to continue as long as moth populations in the east persist and people move from the generally infested area to the Pacific Northwest.

Larch Casebearer, *Coleophora laricella*

Hosts: Western Larch

{Region 6: Eastern Oregon, Washington}

After years of negligible damage, larch casebearer-caused defoliation of western larch was observed in portions of the Blue Mountains in 1996. Despite the untimely survey, the region-wide aerial survey mapped 166 acres on private lands within the Wallowa-Whitman Reporting Area in 1997. Introduced parasites released in the Pacific Northwest in the early 1960's and established years ago, along with a couple of needle diseases on larch, helped maintain low levels of casebearer for many years. As casebearer populations declined, so did the introduced parasite. Parasites are expected to respond to the increasing casebearer population, although there may be several more years of defoliation before they increase to effective levels. Accurate assessment of the casebearer situation would require extensive aerial surveys in early June (rather than later in the summer when region-wide survey is done).

Diseases: indigenous

Annosus Root Disease, *Heterobasidion annosum*

Hosts: True firs, ponderosa pine, western hemlock

{Region 6: Oregon, Washington}

Annosus root disease causes losses in many partially-cut white and grand fir stands in southern and eastern Oregon and eastern Washington. Mortality is high where annosus root disease and fir engraver beetles operate as a complex. The new regional vegetation inventory (Current Vegetation Survey) requires examination of cut stumps. This has led to increased reporting and awareness of annosus root disease on many national forests. In eastern portions of the Region, where many stands were cut 10-20 years ago, trees surrounding cut stumps are dying. Disease severity is expected to increase with time. Annosus root disease was observed with increasing frequency in stands which are predominantly ponderosa pine on drier sites in eastern Washington and Oregon. Reports of the disease in mountain hemlock and Pacific silver fir in high-elevation stands in the Cascade Range are also increasing. Annosus root disease in low-elevation western hemlock stands primarily causes butt rot. Impacts are considered low unless stands are managed at rotations greater than 120 years.

Armillaria Root Disease, *Armillaria ostoyae*

Hosts: Conifers

{Region 6: Oregon, Washington}

The most serious losses from this disease have occurred east of the Cascade Range in mixed conifer stands. Mortality continues in both disturbed and undisturbed stands, indicating one or more especially virulent strains of the fungus. True firs and Douglas-fir sustain the most losses. However, in localized areas, ponderosa pine mortality is significant. In the Blue Mountains of Oregon, there is a several thousand-acre Armillaria-infected area. In mid- to high-elevation stands in the Cascades of

southwestern Oregon, *Armillaria* root disease causes mortality of several conifer species. Mortality on lower slopes west of the Cascades and in the Coast Range is usually confined to younger, stressed trees. Assessing species resistance on a site-by-site basis and discriminating for the more resistant species during stand management activities are considered the most effective means of controlling spread and mortality.

Black Stain Root Disease, *Ophiostoma wagneri*

Hosts: Douglas-fir, ponderosa pine

{Region 6: Oregon, Washington}

In southwestern Oregon, black stain root disease is the most commonly encountered disease in Douglas-fir plantations. High-risk areas are those where disturbances, such as road building or soil compaction, have occurred or where road maintenance equipment injured roadside Douglas-firs. Infected larger individuals are found scattered in previously entered forest stands. Black stain root disease continues to be observed on ponderosa pine east of the Cascades, especially in the southern part of the region. In 1997, 824 acres of black stain root disease were mapped in the Coos-Douglas reporting area, almost entirely on private lands.

Laminated Root Rot, *Phellinus weirii*

Hosts: Conifers

{Region 6: Oregon, Washington}

Laminated root rot is the most serious forest tree disease west of the Cascade Mountains in Washington and Oregon. Overall, an estimated 8 percent of the area with susceptible host species is affected in this portion of the Region. Locally, 15 to 20 percent of an area may be affected. East of the Cascades, laminated root rot affects mixed conifer stands north of the Crooked River in central and northeastern Oregon and throughout eastern Washington. Effects of the disease include significant changes in species composition, size, and structure. Regeneration of susceptible species in root disease centers may not grow beyond sapling and pole size. Hardwood trees and shrubs, which are immune to the fungus, often increase their site occupancy.

Dwarf Mistletoes, *Arceuthobium* spp.

Hosts: Conifers

{Region 6: Oregon, Washington}

Dwarf mistletoes are present on approximately 9.5 million acres of forested lands in the Pacific Northwest Region. Their status changes little from year to year. However, long-term impacts, including reduced growth, mortality, deformity, and top-kill, are significant, particularly in unmanaged stands. All conifer species are affected to some degree. Douglas-fir dwarf mistletoe is abundant east of the Cascades and in southwestern Oregon. Western larch dwarf mistletoe causes significant effects in northeastern Oregon and central and eastern Washington. The intensity of dwarf mistletoes in eastern Oregon and Washington and in southwest Oregon is closely related to fire ecology. Lack of frequent, periodic fire in the last century has allowed infection levels to increase on many sites, especially those where mistletoe was not culturally controlled.

Swiss Needle Cast, *Phaeocryptopus gaumannii*

Hosts: Douglas-fir

{Region 6: Western Oregon, Washington}

Swiss needle cast, a fungus disease of Douglas-fir foliage, is endemic in Douglas-fir west of the Cascade Mountains. Over the last 15 years, distinctive yellowing, needle loss, and growth reduction have been observed in coastal Douglas-fir plantations. A combination of favorable climate, plantation age, and genetics may be the cause of severe disease symptoms seen in recent years. In 1996, 130,000 acres of discolored Douglas-fir along the Oregon coast were mapped by a late spring, special aerial survey. In 1997, 395,000 acres were mapped, more than a 3-fold increase. Much of the increase may be due to warm, dry weather prior to and during the survey which enhanced foliage discoloration and allowed for good survey visibility. Estimates of affected acreage for all years, however, are conservative since mapped acres represent only those areas with obvious symptoms; ground surveys indicated that Swiss needle cast occurred in all Douglas-fir stands throughout the survey area. The 1997 survey showed more discoloration in mature trees than was seen in previous surveys.

Larch Needle Cast and Larch Needle Blight, *Meria laricis* and *Hypodermella laricis*

Hosts: Western larch

{Region 6: Eastern Washington, Oregon}

In 1996, larch needle cast and needle blight were higher than normal on the Wenatchee and Okanogan National Forests and adjacent Forests in Washington and the Blue Mountains in Oregon and southeastern Washington. These foliage diseases were most severe in stands of western larch growing in moist grand fir and moist subalpine fir plant associations as well as in riparian areas. Over 393,000 acres of larch needle cast were detected by aerial survey in 1997. Acres affected by larch needle cast in 1996 were higher than in 1997 but accurate mapping was not conducted in 1996 because the entire host acreage was affected.

Lodgepole Pine Needle Cast, *Lophodermella concolor*

Hosts: Lodgepole pine

{Region 6: Eastern Oregon, Washington}

Appearance of this needle disease on lodgepole pine is sporadic and strongly influenced by weather conditions. Infected trees will shed foliage prematurely, and vigor and growth may be reduced with successive years of infection. In 1996 on the Umpqua National Forest in southwestern Oregon, stands of lodgepole pine growing on moist, high-elevation sites experienced higher than normal infection levels of *Lophodermella*. In 1997, approximately 500 acres of lodgepole with needle cast were mapped by aerial survey primarily in eastern Washington on the Colville National Forest and the Spokane Indian Reservation.

Diseases: nonindigenous

Port-Orford-cedar Root Disease, *Phytophthora lateralis*

Hosts: Port-Orford-cedar

{Region 6: Oregon}

Port-Orford-cedar root disease causes mortality of Port-Orford-cedar in southwestern Oregon. Where it has been introduced, the disease causes extensive mortality on sites favorable for infection and spread of its waterborne spores, especially along creeks, in low-lying areas, and below roads where water is channeled.

Evidence of the disease was reported over a total of 21,000 acres in 1994. Within these areas, mortality was distributed in scattered pockets or individual trees. On National Forest System lands, slightly less than 10 percent of all Port-Orford-cedar is infected. Over 4,000 killed Port-Orford-cedar on about 3,800 acres were mapped by the 1997 aerial survey.

White Pine Blister Rust *Cronartium ribicola*

Hosts: Western white pine, sugar pine, whitebark pine

{Region 6: Oregon, Washington}

Cronartium ribicola was introduced to the west coast in 1910. Its impacts include top-kill, branch flagging, and tree mortality. While much of the mortality associated with this disease occurred earlier in the century, its impacts are still great in wild populations of five-needled pines throughout their range. Locally, this disease, in combination with mountain pine beetle, still kills many host trees. Of particular concern are the effects of blister rust in whitebark pine at high elevations in the Cascades and in the Blue and Wallowa Mountains and in sugar pine in southwest Oregon where survey and impact data are not available.

An attempt was made to aerially identify areas symptomatic of blister rust beginning in 1994. Although blister rust is known to occur extensively throughout the range of susceptible host type, observers mapped only 4,700 acres in Washington in 1996. Blister rust symptoms are difficult to distinguish from the more easily observed effects of mountain pine beetle. The bulk of the reported acreage fell within the Yakima Indian Reservation and the Gifford Pinchot, Okanogan, and Wenatchee National Forests.

In 1997, 2,924 acres with blister rust were mapped. With the exception of blister rust in whitebark pine (which grows at higher elevations and in more open conditions), blister rust is very difficult to detect from the air. The majority of the detected blister rust was on the Okanogan, Deschutes, Wenatchee National Forests and the Yakima Indian Reservations.

Diseases: Nursery

Damping-off, *Fusarium* spp., *Pythium* spp.

Hosts: Conifers

{Region 6: Oregon}

The nurseries experienced approximately 5-percent mortality to damping-off. Fumigation, deep watering, and delayed fertilization helped control damping-off. High air temperatures (80 degrees) exacerbated by dark-colored grit in containers, along with a high incidence of *Fusarium* spp on stratified seed, combined to cause unusually high losses in one greenhouse.

Fusarium Root and Hypocotyl Rot, *Fusarium* spp.

Hosts: Conifers

{Region 6: Oregon}

The nurseries experienced 4-6 percent mortality due to root and shoot *Fusarium* infections during the 1-0 year. Cooling by irrigation helped to limit losses.

Storage Molds

Hosts: Conifers

{Region 6: Oregon}

One-one Douglas-fir transplants from lots lifted during warm weather in January had 4% mortality due to storage molds. Seedlings were lifted when plant moisture stress was high and then were refrigerated for an extended period of time.

ENCLOSURE 2

Table for Submitting Data for Part 1 of Calendar Year 1997 Conditions Report
 Region: 06 Date: 2 /10/98 Name of preparer: Sprengel/Campbell/Bridgewater

Pest	State	Land Ownership Class	Acres Affected (thousands)	Volume Killed (MCF)	Number of Trees Killed (thousands)	Number of SPB Spots
		1	66.7	2,146.1	140.3	
MPB	OR	2	4.4	401.9	24.5	
		3	11.2	188.8	13.6	
		1	57.6	2,187.6	128.2	
MPB	WA	2	4.7	117.1	4.8	
		3	12.4	401.3	28.2	
		1	0.0	0.0	0.0	
WSB	OR	2	0.0	0.0	0.0	
		3	0.0	0.0	0.0	
		1	6.9	0.0	0.0	
WSB	WA	2	123.1	0.0	0.0	
		3	35.9	0.0	0.0	
		1	1.9	321.9	2.4	
DFB	OR	2	0.1	24.9	0.1	
		3	0.5	88.1	0.7	
		1	3.0	359.7	2.9	
DFB	WA	2	0.7	75.9	0.5	
		3	2.2	301.1	1.8	
		1	10.9	523.6	9.4	
FIR	OR	2	1.1	82.0	1.0	
ENGRAVER		3	3.5	136.4	2.1	
		1	5.2	261.5	4.7	
FIR	WA	2	1.2	46.0	0.9	
ENGRAVER		3	4.0	184.2	3.4	
		1	0.9	76.3	0.5	
WPB	OR	2	0.1	13.1	0.1	
		3	0.2	27.0	0.3	
		1	2.7	100.5	1.7	
WPB	WA	2	2.7	131.3	2.1	
		3	3.1	160.3	2.6	
		1	372	31,324		

RDS	OR	2	13	9,218		
		3	894	44,808		
		1	819	58,222		
RDS	WA	2	156	10,466		
		3	752	32,921		
		1	1137.0	10,124		
DM	OR	2	43.0	2,979		
		3	2760.0	14,482		
		1	2703.3	21,831		
DM	WA	2	505.0	3,924		
		3	4270.0	12,344		