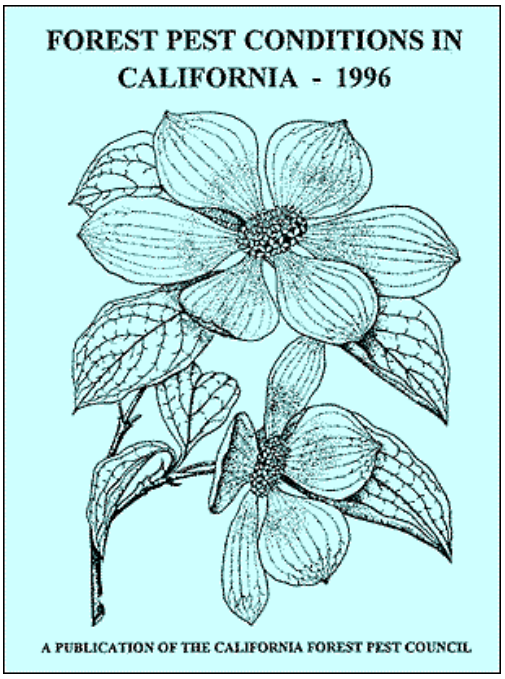

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Status and Control of Insects

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WESTERN PINE BEETLE *(Dendroctonus brevicomis)*

M261A - Klamath Mountains

Mortality associated with the western pine beetle is down considerably from previous years. This and mortality from other bark beetles is included in Table 1.

Table 1 — Tree mortality within the national forest system, California - 1996 (a)

	Pine Mortality (b)		Fir Mortality (b)		Background
Locale	**Acres**	**Volume (d)**	**Acres**	**Volume (d)**	**Mortality (c) Volume (d)**
Northern California	9,306	7.80	30,225	18.26	302.10
Cascade/ Northern Sierra	2,030	1.05	6,911	0.70	118.06
Central/ Southern Sierra	15,677	9.27	21,412	12.83	250.10
Southern California	877	0.17	0	0.0	9.83
Totals	**27,890**	**18.12**	**58,548**	**31.79**	**679.41**

(a) Mortality is seldom from bark beetles alone as other factors (e.g., drought and root disease) predispose trees to successful attack.

(b) Acres with concentrations of mortality as seen by aerial survey.

(c) Mortality of pine and fir on non-outbreak acres (total forested acres minus aerial survey acres).

(d) All volumes are in millions of board feet.

M261B - Northern California Coast Ranges

Most ridges on the eastern half of the Mendocino National Forest have scattered mortality of large ponderosa pine. The amount is less than in previous years, but still appears to be at an unsustainably high level in the older age classes. A few small group kills caused by western pine beetle have occurred in planted ponderosa pine in the Round Burn, north of Upper Lake. These trees were approximately 26 years old.

Western pine beetle caused scattered mortality of ponderosa pine in the upper Mad River drainage south of Ruth Reservoir, Trinity County. Low site and carryover effects from the drought appeared to be predisposing factors.

M261C - Northern California Interior Coast Ranges

Western pine beetle caused scattered mortality of ponderosa pine in a drainage off Backbone Ridge Road, Shasta County. Some trees exhibited symptoms of Elytroderma disease, which may have contributed to the beetle activity.

M261D - Southern Cascades

Ponderosa pine mortality was very noticeable from roads in the Burney Basin from the bottom of the Hatchet Mountain grade eastward to the intersection of Highways 299 and 89, and also northward to Lake Britton, Shasta County, and east of Coyote Flat Reservoir. There is some ponderosa pine mortality located to the south and west of the community of Tennant, Siskiyou County.

Several pockets of ponderosa pine mortality were detected in the Thousand Lakes Wilderness: just south of Eiler Butte, near Cornez Spring, by Tumble Buttes and around Magee Peak. South of the Thousand Lakes Wilderness, ponderosa and Jeffrey pines were killed near Huckleberry Mountain and to the east of North Battle Creek Reservoir, Hat Creek District, Lassen National Forest. A pocket of pine also died southeast of Blacks Mountain on the same district.

Pines were attacked and killed between Little Round Valley and Windy Hollow and one mile north of the Susan River Campground on the Eagle Lake District, Lassen National Forest. On the Almanor District, western pine beetles killed pines near Buzzard Springs and between Snow Mountain and Sunflower Flat in the southern part of the district.

M261E - Sierra Nevada
On the Plumas National Forest, Jeffrey pine and ponderosa pine were attacked and killed by bark beetles on 10-acre site along County Road 414, one mile east of Bucks Lake, Feather River District. Mortality was scattered trees or 5 to 10-tree groups.

Western pine beetle attacks resulted in ponderosa pine mortality in several isolated spots on the Downieville District, Tahoe National Forest. Areas of note include: near Clerkins Ranch, Campbell Gulch, Indian Creek drainage, and along the Downie River (section 23). Isolated spots of ponderosa pine were visible on the Nevada City District, Tahoe National Forest, between Rattlesnake Creek and Graniteville, west of Malakoff Diggins State Historic Park, and near the Omega Rest Area on State Highway 20. Western pine beetle activity increased in the Columbo area, Nevada City District, following a spring underburn in 1996. Western pine beetle also contributed to the loss of small groups of ponderosa pine near Italian Bar, and along Forest Route 44 near Mosquito Creek, Foresthill District, Tahoe National Forest.

Mortality associated with the western pine beetle remained generally low in the central and southern half of the section. Mortality occurred as scattered individuals and small groups of ponderosa pine.

M261G - Modoc Plateau
Areas of ponderosa pine mortality attributed to western pine beetle were noted in the southern portion of the Big Valley District, Modoc National Forest. Specific areas include Smith Flat, near Diaz Springs, and just north of Spring Hill. An isolated spot of western pine beetle-related mortality in ponderosa pine was detected just north of Busters Reservoir, Hat Creek District, Lassen National Forest, and scattered mortality associated with western pine beetle is visible on the Tahoe National Forest adjacent to Loyalton Pines, Sierra County.

M261F - Sierra Nevada Foothills
Scattered mortality of low elevation ponderosa pine near Auburn, Placer County, was caused by the western pine beetle.

M262A - Central California Coast Ranges
Western pine beetle may be involved in light mortality of 715 acres of ponderosa pine in the Big Pines area of the Santa Lucia Mountains, Los Padres National Forest.

M262B - Southern California Mountains and Valleys
Coulter pines which have died on Mt. Palomar (Cleveland National Forest and state lands) are now blowing down in significant numbers. Mortality of these pines was associated with western pine beetle in the late 1980s and early 1990s, at the end of a multiyear drought.

In 1996, western pine beetle was associated with pine mortality at several sites in the San Bernardino and San Jacinto Mountains.

PINE ENGRAVER BEETLES (*Ips* spp.)

M261A - Klamath Mountains
Ips mexicanus was responsible for some group kills of knobcone pine on both sides of Interstate 5 north of Lakehead, Shasta County.

M261B - Northern California Coast Ranges
Ips mexicanus was responsible for some group kills of knobcone pine to the west of Hull Mountain in southern Mendocino County.

M261E - Sierra Nevada
Ips paraconfusus populations remained highly active in the Volcano plantation following extreme amounts of snow breakage in the spring of 1995. This engraver also was active in some of the breakage material from 1995 that was shaded or under a dense overstory and in some 1996 windthrow. Some suppression activities took place in the plantation. Aerial surveys conducted during the fall of this year did not detect any top-kill or whole tree mortality as a result of the infestation. The area will continue to be monitored during 1997.

Pine engravers were not exceptionally active in the central and southern part of the section.

M262A - Central California Coast Ranges
Pine engravers may be involved in mortality of ponderosa pine in the Big Pines area in the northern Santa Lucia Mountains on the Monterey Ranger District, Los Padres National Forest.

M262B - Southern California Mountains and Valleys
Without easily identified external signs of infestation, one is limited to saying that pine engravers are probably involved in Coulter pine mortality in the vicinity of Zaca Lake and Bald Mountain, and in pine mortality on Big Pine Mountain, all on the Los Padres National Forest. Pine engravers were involved in some of the pine mortality at several sites in the San Bernardino and San Jacinto Mountains, San Bernardino National Forest.

Pinyon pines dying from black stain root disease in the eastern portion of the San Bernardino Mountains were also infested with pine engravers, which are usually the immediate cause of death, although trees have been observed to die of the disease alone. Pinyon black stain in that area is widespread and long-standing, and mortality can be expected to continue indefinitely.

Pinyon pine engravers were also involved in mortality of pinyons in the vicinity of the 12,000 acre Devil Fire which burned in July, 1994, on the north side of the San Bernardino Mountains. Trees damaged by the fire or within or near the fire perimeter continue to be killed.

FIR ENGRAVER (*Scolytus ventralis*)

M261A - Klamath Mountains
White fir mortality is much reduced from recent years. Specific locations where fir mortality was spotted by aerial survey include the Marble Mountain Wilderness, the Russian Wilderness, Salmon Mountain Wilderness, and the Taylor Creek Late Successional Reserve, Klamath National Forest.

M261B - Northern California Coast Ranges
White fir mortality rates are much lower than those sustained over the past few years. Areas which still have notable fir mortality include Snow Mountain, the east side of Anthony Peak, and the Middle Eel-Yolla Bolla Wilderness.

M261D - Southern Cascades
White fir mortality was generally lower in this section when compared to 1994 and 1995. Scattered mortality was still common, however. Patches of low to moderate mortality were seen northwest of Medicine Lake, eastern Siskiyou County, and in the Ball Mountain Late Successional Reserve, Goosenest District, Klamath National Forest. Two isolated 5 to 10 tree spots of white fir mortality associated with the fir engraver were detected near Bowman Springs, 2.5 miles south of Whitehorse Flat Reservoir, Modoc County.

On the Hat Creek District, Lassen National Forest, concentrations of white fir mortality with a small component of red fir mortality were observed in the Thousand Lakes Wilderness near Magee Peak and Tumble Buttes. White fir mortality was also detected between Snow and Clover Mountains, around Hunt Mountain, near Sugar Loaf Peak, adjacent to Devils Rock Garden, south of Ashpan Winter OHV area, immediately south and east of West Prospect Peak, and immediately south of Blacks Mountain.

On the Eagle Lake District, Lassen National Forest, white fir mortality was noted between Little Round Valley and Windy Hollow and one mile north of the Susan River Campground.

Within Lassen Volcanic National Park, true fir was attacked and killed in several areas, including the vicinity of Emigrant Lake, southeast of Snag Lake, adjacent to Painted Dunes, and near Crater Butte.

M261E - Sierra Nevada
Above normal levels of red fir mortality were again detected in 1996 in the Hamilton Mountain and Coyote Peak areas of the Eagle Lake District, Lassen National Forest. Mortality began to increase in the red fir in these areas about three years ago and continues to remain high.

White fir mortality on the Plumas National Forest has declined significantly over the past two years. Some areas of concentrated mortality detected this year on the Beckwourth District include the Diamond Mountain area south of Crystal Peak, the Rowland Creek drainage, along road 27N46 two miles south of Thompson Peak, in the Claim Creek drainage east of Plumas Eureka State Park, and along Road 10 in and adjacent to the Smith Peak State Refuge. On the Feather River District, concentrations of mortality in true fir were noted northeast of Lexington Hill, near Big Hill, and in the Woodleaf area.

Top-kill and mortality of true fir related to the fir engraver has declined to low levels in most areas in the central and southern part of the section. Some exceptions showing moderate fir engraver activity were scattered areas around Lake Tahoe and areas on the Kern Plateau in the Sequoia National Forest.

M261G - Modoc Plateau
Fir mortality associated with attacks by the fir engraver continued to decline in 1996 when compared with mortality experienced over the past three years. Small isolated pockets of white fir mortality were reported throughout the Warner Mountains. Areas to note include Cloud, Badger, and Coalpit Canyons; the Mill Creek drainage; and west of Benton Meadows in the northern part of the Warner's. Mortality was also detected near Dunsenbury Peak, Mohogany Ridge, Sunflower Knob, and just south of Red Rock Mountain in the southern Warner's.

On the Shasta National Forest, increased mortality of true fir caused by the fir engraver was reported near Bowman Spring. Mortality of white fir was also noted along Blacks Ridge, Hat Creek District, Lassen National Forest.

On lands managed by the Bureau of Land Management, white fir mortality decreased sharply over the past two years. The decline can be attributed to the thinning effect of prior mortality creating more open stands, and to the increase in precipitation during 1995 and 1996. Areas of continued mortality at a much lower rate include: around Fredonyer Peak, near Widow Mountain in the Big Valley Range, near Tule Mountain, Boot Lake, and south of Blue Lake in the southern Warner Mountains — all in Modoc County.

M262A - Central California Coast Ranges
M262B - Southern California Mountains and Valleys
Fir engraver was likely involved in the mortality of white fir in approximately 800 acres of mixed conifer forest on Big Pine Mountain on the Los Padres National Forest. Fir engraver was also involved in scattered white fir mortality in the San Bernardino Mountains.

RED TURPENTINE BEETLE (*Dendroctonus valens*)

M261D - Southern Cascades
Red turpentine beetles attacked several hundred residual ponderosa and Jeffrey pine trees following a thinning project near Twin Bridges Campground and Big Pine Campground, Hat Creek District, Lassen National Forest. Attacks in excess of 100 per tree were not uncommon. Several trees are being monitored for their survival.

Red turpentine beetles attacked several Jeffrey pine and ponderosa pine trees following a controlled burn within Lassen Volcanic National Park near Butte Lake. Fresh pitch tubes caused by red turpentine beetle also were common on ponderosa pine scorched in several hundred acres of prescribed underburn on McCloud Flats, Siskiyou County

M261E - Sierra Nevada
Red turpentine beetle activity increased in the Columbo area following a 1996 spring underburn on the Nevada City District, Tahoe National Forest. In the central Sierra Nevada, red turpentine beetles were found attacking ponderosa, sugar, Jeffrey and lodgepole pines following both prescribed burns and wildfires. Specific areas include the Ackerson Complex fire in Yosemite National Park and the Stanislaus National Forest, and prescribed burns on the Placerville District, Eldorado National Forest and the Indiana Summit Research Natural Area on the Inyo National Forest. Attacks on many ponderosa and sugar pines in the Dimond-O campground on the Groveland District, Stanislaus National Forest, were apparently associated with the effects of construction activities on the trees. Very little tree mortality has been observed in conjunction with attacks of the red turpentine beetle.

M262A - Central California Coast Ranges
M262B - Southern California Mountains and Valleys
The red turpentine beetle was commonly found attacking fire scorched pines.

MOUNTAIN PINE BEETLE (*Dendroctonus ponderosae*)

M261A - Klamath Mountains
Mortality of all size classes of sugar pine still seem disproportionately high in comparison with other tree species. The lingering effects of drought, overstocking, and attacks by mountain pine beetle appear responsible for the mortality.

M261D - Southern Cascades
There is some lodgepole pine mortality at Tamarack Flat, east of the community of Tennant, Siskiyou County.

M261E - Sierra Nevada
Mortality remained at high levels in lodgepole pine on the Truckee District, Tahoe National Forest, particularly the Truckee River drainage, Squaw Valley, Alder Creek, and in the Northwoods area. Most mortality is associated with riparian areas that are over stocked with 80 to 100 year old lodgepole pine.

Mountain pine beetle continued to attack lodgepole pine in areas around Lake Tahoe, including riparian areas in the vicinity of Pioneer Trail and the North Upper Truckee River on the south shore, and around Meeks Creek on the west shore. Low levels of lodgepole mortality continued in areas on the Mammoth Ranger District, Inyo National Forest, including Deadman Creek, Inyo Craters, and in the vicinity of the town of Mammoth.

The mountain pine beetle was also associated with extensive limber pine mortality in the Dechambeau Creek drainage on the west side of Mono Lake, Inyo National Forest. There is also considerable mortality to western white and whitebark stands above Lundy Canyon and around Mono Dome. The total area involved is approximately 1,500 to 2,000 acres and the mortality has continued for about five years.

M262A - Central California Coast Ranges
Mountain pine beetle may be involved in mortality in ponderosa pine in the Santa Lucia Mountains, where 715 acres were affected.

M262B - Southern California Mountains and Valleys
Mountain pine beetle was uncommon in the San Bernardino Mountains, but may be responsible for some of the current mortality in ponderosa and sugar pine.

DOUGLAS-FIR BEETLE (*Dendroctonus pseudotsugae*)

M261A - Klamath Mountains
The number of trees killed by Douglas-fir beetle remains low: a few scattered trees similar to 1994 patterns, or may be even lower than last year. However, Douglas-fir blowdown and storm damage caused by high winds in December, 1995 became infested by Douglas-fir beetle. This could result in increased attacks during 1997.

JEFFREY PINE BEETLE (*Dendroctonus jeffreyi*)

M261D - Southern Cascades
Mortality of old growth Jeffrey pine in the Thousand Lakes Wilderness, Lassen National Forest, has declined, but several pockets of Jeffrey pine mortality remain just south of Eiler Butte, near Cornez Spring, by Tumble Buttes and around Magee Peak. South of the Thousand Lakes Wilderness, ponderosa and Jeffrey pine were killed near Huckleberry Mountain and to the east of North Battle Creek Reservoir, Hat Creek District, Lassen National Forest. Jeffrey pine mortality on the district also included an area along road 32N12 south of West Prospect Peak.

Jeffrey pine mortality remains above normal in Lassen Volcanic National Park and in adjacent Jeffrey pine stands on the Eagle Lake District, Lassen National Forest. Within the Park, areas of concentrated mortality include: the Highway 89 entrance to Lassen Park; Manzanita Lake area; Lost Springs; along Lost Creek in groups of young pole-size trees; the northeast side of Snag Lake, and west of Crater Butte.

On the Eagle Lake District, high levels of mortality are apparent near Pole Springs, along the road to Butte Lake (32N21) and near Duck Lake. Blow down in the same general area was also found to be attacked by Jeffrey pine beetle.

M261E - Sierra Nevada
Some areas of concentrated Jeffrey pine mortality detected this year on the Beckwourth District, Plumas National Forest, include the Diamond Mountain area south of Crystal Peak, the Rowland Creek drainage, and stands adjacent to the west side of Frenchman Lake along Forest Service Road 11. Also on the Plumas National Forest, a large concentration of Jeffrey and ponderosa pine were attacked and killed by bark beetles along County Road 414, one mile east of Bucks Lake, Feather River District.

Jeffrey pine beetle activity remains high in several areas of the Tahoe National Forest. On the Sierraville District, Jeffrey pine mortality was detected near Bonta Creek (southwest of Treasure Mountain), Lewis Mill, the Rock Creek drainage, and two miles directly west of Carman Valley. Scattered mortality associated with Jeffrey pine beetle is also visible on National Forest land adjacent to Loyalton Pines.

On the Truckee District, Jeffrey pine mortality has remained high over the past three years. Areas of high beetle activity include the Sagehen Creek drainage, Northwoods, Worn Mill Canyon, and in the Truckee River drainage from Squaw Valley north to Interstate 80. Mortality was observed as small group kills (<20 trees per group); however, in the Northwoods area about 80 acres are affected.

Mortality associated with the Jeffrey pine beetle continued at reduced, but above background rates, in the vicinity of Lake Tahoe, adjacent areas on the Toiyabe National Forest in Nevada, and on the Inyo National Forest. Large mortality centers can be found on the eastshore of Lake Tahoe around Spooner Summit, Glenbrook, and Round Hill. Pockets of Jeffrey pine mortality were evident on the southshore between Myers and Tahoe Valley and along the Pioneer Trail. Jeffrey pine mortality also continued on the Mammoth District in Mono County, in the vicinity of the Inyo Craters, and scattered between the Mammoth Scenic Loop and the Obsidian Flat-Deadman Campground roads. Jeffrey pine mortality was also evident on the Kern Plateau and in the Piute Mountains on the Sequoia National Forest, often in association with dwarf mistletoe infections.

M262A - Central California Coast Ranges
M262B - Southern California Mountains and Valleys
Jeffrey pine beetle populations in the San Bernardino Mountains were low in 1996, but this species was involved in some of the limited Jeffrey pine mortality.

ROUNDHEADED FIR BORER (*Tetropium abietis*)

M261A - Klamath Mountains
Attacks by the roundheaded fir borer continue to cause noticeable fading of red fir at the highest elevations. Abundant blowdown and storm damage from the previous winter are heavily infested with roundheaded borer larvae.

FLATHEADED FIR BORER (*Melanophila drummondi*)

M261A - Klamath Mountains
Douglas-fir mortality caused by flatheaded fir borer is down from previous years, but scattered trees are still fading on the poorer sites. Attacks and galleries of the flatheaded fir borer were common on dead and declining Douglas-fir in McKinzey Gulch west of Weaverville, Trinity County. The site was a dry, south-facing slope with Oregon oak and ponderosa pine intermixed with the Douglas-fir.

M261B - Northern California Coast Ranges
Flatheaded fir borer caused scattered mortality of Douglas-fir just south of Ruth Reservoir, Trinity County. Low site quality and carryover effects from the drought appeared to be predisposing factors.

DOUGLAS-FIR ENGRAVER (*Scolytus unispinosus*)

M261A - Klamath Mountains
The Douglas-fir engraver can generally be found infesting large Douglas-fir saplings dying from black stain root disease anywhere in the section. This is true of plantations and natural regeneration.

CEDAR BARK BEETLE (*Phloeosinus* sp.)

M261A - Klamath Mountains
Mortality is extremely reduced from last year. The few dying incense-cedars seen were either associated with storm damage or were on harsh sites with soils of serpentine origin.

M261D - Southern Cascades
Phloeosinus beetles, scale insects, and wood borers caused the decline and death of several incense cedar on the Eagle Lake District, Lassen National Forest. Top-kill and whole tree mortality are quite evident along Highway A12 in the Penitentiary Flat, Niles Flat, and Roney

Flat areas.

M261E - Sierra Nevada
Considerable tip dieback caused by feeding of adult Phloeosinus species was evident on incense-cedar in several areas of the Hot Springs and Greenhorn Districts, Sequoia National Forest.

CALIFORNIA FLATHEADED BORER (*Melanophila californica*)

M262A - Central CA coast ranges
M262B - Southern CA mountains and valleys

The California flatheaded borer commonly kills Jeffrey pines in the San Bernardino and San Jacinto Mountains, particularly when the tops are first killed by engraver beetles. Mortality in Jeffrey pine was scattered and generally low in 1996, but some was associated with this insect.

A FLATHEADED BORER (*Melanophila* spp.)

M262B - Southern California Mountains and Valleys
Coulter pine killed in the Bee Fire (1996) in the San Jacinto Mountains were heavily infested with one or more species of unidentified Melanophila.

PINE REPRODUCTION WEEVIL (*Cylindrocopturus eatoni*)

M261E - Sierra Nevada
Pine plantations on the Groveland District, Stanislaus National Forest, planted as part of wildfire reforestation efforts, are being damaged by the pine reproduction weevil. Approximately 1,500 to 2,000 acres are affected with 300 to 500 acres of heavy mortality to ponderosa and sugar pine stock. Most of the weevil-related problems are in plantations suffering from intense brush competition.

BRANCH AND TWIG BEETLES (*Carphoborus* spp. and *Pityophthorus* spp.)

M261E - Sierra Nevada.
Increasing mortality to Jeffrey pine in an eight-year-old, 16 acre, plantation on Breckenridge Mountain, Greenhorn District, Sequoia National Forest was observed in the spring of 1996. Associated beetles included *Carphoborus pinicolens, Pityophthorus tuberculatus, P. confertus, P. jeffreyi* and another unidentified *Pityophthorus*. Mortality appeared to have taken place over a three year period. The plantation was growing well and was not suffering from brush competition.

DOUGLAS-FIR TUSSOCK MOTH (*Orgyia pseudotsugata*)

Prior to the 1987 to 1989 outbreak on the Lassen and Plumas National Forests, increases in trap counts similar to those given in Tables 2 and 8 were detected in several areas of California in 1984 to 1987, but populations declined before reaching outbreak in the areas being monitored. Unfortunately, the outbreak happened in areas that were not being monitored at that time. Based on the uncertainty in predicting when and where populations will reach outbreak, it is prudent that field going personnel monitor for evidence of feeding and defoliation on white fir throughout the susceptible host type in the Southern Cascades, Sierra Nevada, and Modoc Plateau sections in the summer and fall of 1997. In addition, Forest Pest Management, U.S. Forest Service, and the California Department of Forestry and Fire Protection will continue to monitor other life stages and adult males in established monitoring sites. Land managers might consider establishing additional pheromone plots in areas of susceptible host type.

M261D - Southern Cascades
Plots which averaged above the threshold of >25 moths per trap were located on the Eagle Lake and Almanor Districts of the Lassen National Forest.

M261G - Modoc Plateau
Minor defoliation of scattered individual white firs was noticed west of Goose Lake, Modoc County. Douglas-fir tussock moth pheromone traps in the area had a dramatic increase in moth catches in 1995, and the Dry Rim Creek plot exceeded the threshold of 25 moths per trap in 1996.

M261E - Sierra Nevada
Male moth catches from monitoring traps indicate a general increase in the number of male moths at plots on the Mt. Hough District, Plumas National Forest, and on the Downieville, Nevada City, and Foresthill Districts on the Tahoe National Forest. Egg mass and larval surveys in 1997 will take place in conjunction with those planned for the Southern Cascades and Modoc Plateau Regions.

Pheromone trap catches continued at high numbers of moths for the second year (Table 2). Specific locations on the Eldorado National Forest include the western part of Nevada Point Ridge (Georgetown District), Iron Mountain, Baltic, and Plummer Ridges (Placerville District), and in the vicinity of Mud Springs (Amador District). On the Stanislaus National Forest, high trap catches occurred on Mattley, Bailey, and Summit Level Ridges, Thunder Hill, and Skull Peak (Calaveras District); Hull Meadow, Two Mile, and Dodge Ridge (Miwok District); and Strawberry Peak (Summit District). Three of four plots on the Mammoth District (Inyo National Forest) recorded moderate increases while most plots on the Mariposa District (Sierra National Forest) declined or showed moderate increases. No significant defoliation was observed or reported.

Table 2 — Number of Douglas-fir tussock moth pheromone detection survey plots by trap catch, 1979 to 1996*

Year	Number of plots	Percent of plots with an average moth catch per trap of:			
		<25	25-54	55-74	75+
1979	102	98%	2%		
1980	99	100			
1981	93	98	2		
1982	95	99	1		
1983	98	96	4		
1984	111	72	28		

1985	105	72	24	3	1
1986	107	78	18	4	
1987	108	92	7	1	
1988	124	95	5		
1989	130	100			
1990	138	98	2		
1991	143	98	2		
1992	164	96	2	2	
1993	143	100			
1994	151	100			
1995	158	79	21		
1996	149	50	33	14	3

* More details are found in Surveys and Evaluations (Table 8)

GYPSY MOTH (*Lymantria dispar*)

Statewide

Gypsy moths were detected in seven counties in 1996 (Table 3).

Table 3 — Summary of 1996 Gypsy Moth finds in California (a)

	Adults trapped		Date last Adult found
County	**Detection**	**Quarantine**	
Alameda	2	0	8/16
Del Norte	0	1	8/14
Los Angeles	1	0	7/15
Marin	1	0	8/15
Mariposa	1	0	8/1
Monterey	1	0	8/13
Nevada (b)	1	28	7/19

(a) Detection Advisory PD38-96, State of California, Department of Food and Agriculture, Division of Plant Industry, Sacramento California.

(b) Egg masses and pupal cases found on one property.

The California Department of Food and Agriculture and the Santa Cruz County Agricultural Commissioner's office undertook eradication of gypsy moth in Felton, Santa Cruz County, from March to May, 1996. The treatment was six weekly ground applications of *Bacillus thuringeinsis kurstaki* sp. (BT) to foliage of woody plants on seven properties surrounding the sites where life stages were found in 1995. No moths were trapped in the area during 1996.

Live egg masses and other dead life stages were found in Grass Valley, Nevada County, in 1995, after five moths were trapped in the 1994 delimitation area. A treatment of the immediate area began on April 22, 1996. Six applications of Foray 48-B (the same BT material used in Felton) were made to four properties at weekly intervals. Post-treatment monitoring has not produced

any further moth captures in the area. The captures in Nevada County in 1996 were in the Penn Valley area.

MODOC BUDWORM (*Choristoneura retiniana*)

M261G - Modoc Plateau
There was no reported defoliation by Modoc budworm in 1996 in the Warner Mountains, Modoc County.

CALIFORNIA BUDWORM (*Choristoneura carnana californica*)

M261A - Klamath Mountains
The last damage from this insect was detected in 1986, one year after the collapse of the outbreak in Trinity County. Ten years later, defoliation has reappeared. Light feeding was detected by a ground survey in an area on Bowerman Ridge stretching about two miles northward from the crest of the ridge. Light feeding was also present for several miles northward along the County Road from the site of the old Trinity Mountain Guard Station. Small pockets of moderate feeding damage were present along the Feeney Ridge Road and the Feeney Gulch Road. It is unlikely that any of the feeding would be visible from the air. These and other areas around Trinity Lake were the site of the 1981-1985 outbreak of this budworm.

PINE NEEDLE SHEATHMINER (*Zelleria haimbachi*)

M261D - Southern Cascades
Defoliation is no longer visible on ponderosa pine in the plantation now growing on the old Pondosa burn, east of Pondosa, Siskiyou County. A survey conducted this spring found an average of 1.4 larvae/shoot. This compares with 1.8 larvae/shoot last year and 9.4 in 1994 (the peak of the outbreak). It is not known if the current population is now endemic or still declining. The outbreak began in 1993.

LODGEPOLE PINE NEEDLEMINER (*Coleotechnites milleri*)

M261E - Sierra Nevada
Population surveys indicate that lodgepole pine needleminer populations increased in 20 of 28 plots in the general vicinity of Tuolumne Meadows. If this trend continues, defoliation will be evident in the high use zone around Tuolumne Meadows in 1998. Extensive areas west and north of Tuolumne Meadows are being defoliated by the third successive needleminer generation and tree mortality is expected to start in 1997 (personal communication, Tom Koerber, Entomological Service Company).

PINE NEEDLEMINER (*Coleotechnites* sp., near *milleri*)

M261E - Sierra Nevada
A needleminer similar in appearance to the lodgepole needleminer was detected in the residential area north of Truckee during the spring. Additional damage became apparent south of I-80 between Donner Lake and Truckee during late summer. A third infestation was found in South Lake Tahoe, El Dorado County. Adults of the needleminer emerged this summer, whereas the lodgepole needleminer emerges in odd-numbered years. The length of the life-cycle is unknown.

WHITE FIR NEEDLEMINER (*Epinotia meritana*)

M261G - Modoc Plateau
Defoliation by the white fir needleminer was detected on the Big Valley and Warner Mountain Districts, Modoc National Forest. On the Big Valley District, the defoliated area was located about 1 mile north of Sweagert Flat on Forest Route 22 and extended to about 1/2 mile northwest of Manzanita Mountain lookout. The defoliated area encompassed about 1,500 acres. Defoliation on the Warner Mountain District was detected about 2 miles north of Fandango Pass in the northeastern portion of the Warner Mountain range. The defoliated area did not exceed 100 acres.

SILVERSPOTTED TIGER MOTH (*Halisidota argentata*)

262A - Northern California Coast
Isolated populations of silverspotted tiger moth were noted on Sitka spruce along Highway 101 north of Fortuna, Humboldt County. Defoliation was spotty.

M261A - Klamath Mountains
Isolated populations of silverspotted tiger moth were noted on Douglas-fir near Weaverville, Trinity County. Defoliation was spotty.

CALIFORNIA OAKWORM (*Phryganidia californica*)

M261A - Klamath Mountains
Hundreds of acres of tanoak were defoliated on the ridge between Horse Linto Creek and Tish Tang a Tang Creek south of the Hoopa Indian Reservation.

263A - Northern California Coast
M261B - Northern California Coast Ranges
The oak moth caused defoliation of tanoak at scattered locations in Mendocino County. Some locally heavy defoliation was reported. Defoliation of black oak was also reported at one location.

FRUITTREE LEAFROLLER (*Archips argyrospilus*)

M262A - Central CA Coast Ranges

M262B - Southern CA Mountains and Valleys
Light defoliation of black oak was observed in the vicinity of Lake Gregory in the San Bernardino Mountains. The fruittree leafroller population in this area always seems large enough to maintain visible defoliation even in years when the populations in surrounding areas are very low.

TENT CATERPILLAR (*Malacosoma* sp.)

M261A - Klamath Mountains
Tent caterpillars were reported feeding on Ceanothus sp. on the Yolla Bolla District, Shasta-Trinity National Forests, and also in Indian Valley, west of Hayfork, Trinity County. There was some potential for conflict with cattle grazing.

M261D - Southern Cascades
Similar to 1995, tent caterpillar defoliation of bitterbrush was very apparent throughout the southern portion of the Southern Cascades section and the northern portion of the Sierra Nevada section during 1996. Individual branches were completely consumed and tent formation exceeded 2 to 3 tents per bush in some areas. A decrease in available forage was noted in several areas.

M261E - Sierra Nevada
Western tent caterpillar, Malacosoma californicum, populations declined in areas from northern Lake Tahoe to north of Truckee, including Hobart Mills (Placer County), and areas west of Burton Creek State Park in the Lake Tahoe Basin.

DOUGLAS-FIR TWIG WEEVIL (*Cylindrocopturus furnissi*)

261A - Central California Coast
Douglas-fir twig weevil was one of many factors contributing to the decline of young Douglas-fir at a Christmas tree plantation in Felton, Santa Cruz County. The plantation had not been irrigated or otherwise managed for several years.

M261B - Northern California Coast Ranges
Douglas-fir twig weevil caused heavy twig mortality on Douglas-fir reproduction south of Ruth Reservoir, Trinity County. Low site quality and competition were predisposing factors.

BLACK VINE WEEVIL (*Otiorhynchus sulcatus*)

263A - Northern California Coast
High populations of black vine weevil caused a loss of 750,000 Douglas-fir seedlings in the Humboldt Nursery in McKinleyville. The adults migrated to a bed of alder seedlings and destroyed at least 100 feet of seedlings before treatment with orthene.

GOUTY PITCH MIDGE (*Cecidomyia piniinopsis*)

M261D - Southern Cascades
The gouty pitch midge killed branch tips in an older pine plantation in the Manzanita Chute area north of Lassen Volcanic National Park.

EUCALYPTUS BORER (Phoracantha semipunctata)

Statewide
This beetle has extended its range northward to Shasta County. Research entomologists at the University of California, Riverside have found a tiny wasp from Australia that is highly efficient at parasitizing eggs. The wasp is dispersing rapidly across San Diego and Riverside counties after its release.

AFRICANIZED HONEY BEE (*Apis mellifera scutellata*)

322B - Sonoran Mojave Desert
322C - Sonoran Colorado Desert
As of September 30, 1996, 34 swarms, feral nests, and other samples (bees netted at two wildlife guzzlers in Anza-Borrego Desert State Park) have been identified as Africanized in California. The region currently considered Africanized is comprised of all of Imperial County, most of eastern Riverside County, and the northeastern portion of San Diego County, approximately 10,000 square miles. There have been two multiple stinging incidents and no human fatalities.

GRASSHOPPERS (*Acrididae*)

M261A - Klamath Mountains
The Klamath National Forest reported 10 acres of grasshopper damage (50 to 200 trees per acre) in plantations of 1 to 2-year-old ponderosa seedlings. Netting was used to control damage.

GLASSY-WINGED SHARPSHOOTER (*Homalodisca coagulata*)

262B - Southern California Coast
M262B - Southern California Mountains and Valleys
The glassy-winged sharpshooter was first collected in California in 1990. It now is considered established. Its range includes Santa Barbara, Ventura, Los Angeles, Orange, and San Bernardino Counties. In California, this leafhopper has been taken on *Citrus, Oleander, Pinus, Eucalyptus, Platanus, Ficus,* and *Prunus* species. In the eastern United States, adults and nymphs also feed on oak, ash, silktree, and crapemyrtle. Vector entomologists are concerned that this sharpshooter may be able to vector species of *Xylella*, a xylem-limited bacterium, which as yet do not occur in California.

OTHER

M262B - Southern California Mountains and Valleys
Black oak in the San Bernardino Mountains, in the vicinity of Highway 18 between Heaps Peak and Big Bear Lake, were moderately to heavily infested with twig girdling buprestids and cerambycids, presumably the oak twig girdler, *Agrilus angelicus* Horn and the roundheaded oak twig borer, *Styloxus fulleri* (Horn).

UNKNOWN

Dieback, which appears to be caused by sucking insects, is very evident on sugarbush chaparral, especially along the Angeles Crest Highway between the Angeles Crest and Clear Creek Fire Station just north of the city of LaCanada/Flintridge (Los Angeles County) between the 1,800 to 3,500 foot elevation on the Arroyo-Seco District, Angeles National Forest. This dieback is significant enough to increase the spread of wildfire throughout the chaparral plant community. Dieback and stem cankering were found on California laurel and an unknown species of willow at 2,800 ft. elevation along the Angeles Crest Highway. Some dieback was also observed in laurel sumacs along district roads, but to a lesser degree than in 1995.

Table 4 — Insects of Lesser Importance in California - 1996

Insects			Where Examined or Reported	
Scientific Name	**Common Name**	**Host***	**County**	**Remarks**
Endothenia albolineana	Spruce needleminer	CS	Siskiyou (M261A)	Ornamental tree
Pyrrhalta luteola	Elm leaf beetle	EL	Several counties in M261D & M261E	Severe defoliation of ornamentals reported in the Southern Cascades and northern Sierras
Semanotus amethystinus	Amethyst cedar borer	POC	Shasta (M261A)	20 trees stressed from drought and exposure
Synanthedon sequoiae	Sequoia pitch moth	JP	Lassen (342B)	Several landscape trees, Sierra Army Depot; continuing infestation

* Host Abbreviations: EL=Elms CS=Colorado blue spruce JP=Jeffrey pine POC=Port-Orford cedar

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Report to the Forest Pest Council from the Disease Committee

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John Pronos, Chair
John Kliejunas, Secretary

Abiotic Influences

RESIDUAL DROUGHT-RELATED EFFECTS

M261D - Southern Cascades
Incense-cedar with thin crowns are common in the vicinities of Manton, Tehama County; Whitmore, Shasta County; and Weed, Siskiyou County. This condition has persisted in these areas for many years, apparently a residual effect of California's recent drought. Wood borers are associated with scattered mortality of these trees.

HAIL

M261E - Sierra Nevada
Hail damaged several species of conifers, hardwoods and shrubs during a storm in early July, 1996 on the Truckee District, Tahoe National Forest. The area most affected was between Hoke Valley and Granite Peak along County Route 72. Some shrubs lost up to 85% of their leaves. Tops of several white fir trees were completely defoliated. Hail wounds on the topside of branches were apparent on most species (M261E).

STORM DAMAGE

M261A - Klamath Mountains
Storm damage from heavy, wet snows and high winds in January was widespread in the Klamath Mountains. Much of the damaged timber was white fir in the intermediate and codominant crown classes. Stem breakage was more common than uprooting. The most significant damage was in the New River and Horse Linto Creek watersheds, Humboldt County. Over 20,000 acres were estimated as being affected, with upwards of 4,000 acres being heavily impacted. This does not include areas within the Trinity Alps Wilderness.

M261D - Southern Cascades
Extensive pine blowdown occurred between the Curtis water hole and Tom Large Flat on the Big Valley District, Modoc National Forest. Several areas of pine and fir blowdown were noted on the Shasta National Forest. Areas include the southern portion of the Lava Rim west of Ahjumawi Lava Springs State Park and between Poison Creek and Rock Creek north of Forest Service Road 11.

Widespread blowdown occurred throughout the Lassen National Forest involving red and white fir and Jeffrey pine. The total volume of blowdown is estimated at 50 million board feet (mmbf).

Concentrated areas of volume include the area immediately west of the Thousand Lake Wilderness, Greyback Ridge, Ashpan Flat, south of Big Lake, Table Mountain, Cabin Springs and North Blue Lake Canyon, Hat Creek District.

On the Almanor District, areas affected by blowdown include: several hundred acres east of Dry Lake; from Christie Hill south along Highway 36 to Gurnsey Creek Campground; south of Almanor Campground along Highway 89 on the southwest side of Lake Almanor; along County Road 312 near Sunflower Flat; near High Bridge Campground; the area north and east of Blue Lake; the National Forest land to the south, east, and west of Feather Meadow; the remaining portion of the district from County Road 318 north to Lassen Volcanic National Park; and the Caribou Wilderness over to Highway A21.

The area to the east of the Caribou Wilderness (including Swain Mountain Experimental Forest) over to Highway A21 also had substantial amounts of blowdown. South of Highway 36 areas affected include Carter Meadow, the Bull Creek Drainage, along Scott's John Creek and the area around Little Grizzly Campground.

On the Eagle Lake District, blowdown was noted around Pole Springs, Duck Lake, near the Swain Mountain recreational area, south of McCoy Flat Reservoir, on the southwest side of Pegleg Mountain, and along Forest Service Road 30N51.

M261E - Sierra Nevada

A large concentration of true fir and pine blowdown occurred in the Humbug Creek area and an additional spot of true fir blowdown was detected just south of Green Island Lake, Almanor District, Lassen National Forest.

The Plumas National Forest estimated about 7 mmbf of blowdown across the forest. Most of the affected areas involved mature trees located on north-south ridge lines and/or past shelterwood harvests. Pine and fir blowdown on the Beckwourth District was detected in concentrations at the following locations: on the west side of Lake Davis (south to Smith Peak and west to Happy Valley); around the Cold Water Creek drainage west to Joseph Creek; in the southern portion of the district in the Eureka Ridge area; and near Kelly Cabin and along the 21N27 Road.

True fir blowdown covering several hundred acres was detected at the following locations: east of Red Rock Mountain to Wheeler Sheep Camp; around Wilcox Valley; to the north, northeast and northwest of Evans Peak; around Rush Creek Hill, Soda Creek, Tollgate Creek along County Road 403; immediately west of Grizzly Creek; in the Kettle Rock and Kesler Peak areas; in the Brady Camp area along Pine Creek; and in the Third and Fourth Water Creeks and Deans Valley area south of Meadow Valley, Mt. Hough District.

On the Feather River District, concentrations of pine and fir blowdown were noted around the northwest corner of Little Grass Valley Reservoir, near Stag Point and Fowler Creek, northeast of Big Bar Mountain, along Rock Island Ridge, between Grizzly Summit and Frenchman Hill, south of Red Mountain, south of the Haskins Valley Summer Home Tract, between Bucks Lake and Cedar Flat, and along County Road 414 east of Bucks Lake.

Blowdown concentration of true fir were reported from several areas on the Sierraville, Nevada City, and Downieville Districts, Tahoe National Forest. Total volume is estimated at 5 mmbf. General locations include: along Primary Forest Routes 54 and 70, between Long Valley Creek and Henness Pass on Primary Forest Route 12, French Meadows, Webber Peak, Lake of the Woods, Bonta Saddle, Jones Valley, and around Austin Meadow.

OZONE INJURY

M261E - Sierra Nevada
Twenty-seven ozone injury monitoring plots were visited in August and September, 1996 on the Sequoia National Forest. These sites were established in 1977 and most recently visited in 1994. Since 1994, changes in the amount of observed ozone injury to pine foliage changed very slightly. The plots were equally divided among three categories of change; 9 showed increased injury, 9 decreased injury and 9 remained unchanged. It was predicted in 1994 that a return to normal precipitation in the southern Sierra Nevada would result in more visible ozone chlorotic mottle, but this has not been the case, at least in the past two years.

WINTER FLECKING

M261D - Southern Cascades
This past spring white fir reproduction near Shingletown, Shasta County, exhibited discreet tan flecking on the upper surfaces of needles. The damage is cosmetic and believed to result from exposure to low temperatures and snow.

M261E - Sierra Nevada
Foliar discoloration in several four-year-old Jeffrey pine plantations within the 1990 Stormy Fire burn area (Tulare County) was suspected to be ozone injury. The injury, present only on the upward facing surface of needles was identified as winter injury or "fleck."

Canker Diseases

PINE PITCH CANKER (*Fusarium subglutinans* f.sp. *pini*)

261A - Central California Coast
Pine pitch canker was reported from Marin and Ventura Counties, bringing the total number of infested counties to 17. Extension of the disease within infested counties includes native Monterey pine at Point Lobos State Park, planted Monterey pine at Plaskett Creek Campground, Los Padres National Forest, and native Bishop pine near Diablo Canyon, San Luis Obispo County. The disease continues to spread and intensify within all three of California's native Monterey pine stands. A survey at Cambria found infected individual trees as well as groups of trees scattered throughout the native forest. Within these disease centers it was common to find seedlings killed by an infection at the soil line. At Ano Nuevo State Park, infected Monterey pines are closely associated with native Douglas-fir, which have not yet begun to show symptoms.

The Pine Pitch Canker Task Force, a coalition of governmental, private, and non-profit groups formed under the auspices of the California Forest Pest Council, released an Action Plan in November 1995 for dealing with the pitch canker threat. The plan, endorsed by the State Board of Forestry in 1996, outlines priority actions in the areas of management, research, and education. Some important goals are slowing disease spread, predicting future impacts, and employing natural resistance to mitigate the disease. The Task Force is continuing its educational efforts to alert forestry and landscape professionals and the public of the need to slow disease spread. Other major efforts of the Task Force

are securing funding for, and coordinating, priority actions.

TANOAK DECLINE (Unknown)

263A - Northern California Coast
Hundreds of tanoak around Mt. Tamalpais, Marin County, are dead and dying. Trees in Baltimore Canyon and West Blithedale Canyon are showing the following symptoms: shriveling and discoloration of branch tips, cankers along the bole and branches, dead branches, dead foliage, proliferation of regrowth, and eventually tree death. Trees often have black sap streaming from cankers. Trees of all ages and sizes are affected with mortality up to 100% in localized areas. Both a bacteria and Diplodia have been isolated from affected tissues. The causal agent has not been positively identified. The trees are increasing fire hazard which is already extremely high. The Marin County Fire Department is removing the dead trees to reduce the fire hazard.

DIPLODIA BLIGHT OF PINES (*Sphaeropsis sapinea* (*Diplodia pinea*))

M261F - Sierra Nevada Foothills
Shoot dieback caused by Sphaeropsis sapinea was observed on ponderosa pines in Bella Vista, Shasta County; Paradise, Butte County; and along I-80 east of Auburn, Placer County. Diseased trees were growing at elevations of 1,200 to 2,000 ft. The distribution of observations suggests the disease was common at this elevational band throughout the northern Sierra Nevada foothills. Diseased trees were scattered among numerous other symptomless trees.

Individual trees varied considerably in the number of blighted twigs, with the most severely affected showing evidence of chronic infection and reduced vigor. Wet spring weather during shoot elongation causes an increase in infection levels. Springs were wet in 1996, 1995, and 1993.

261A - Central California Coast
Diplodia pinea was isolated from dead and dying twigs on native Monterey pines at Jack's Peak County Park, Monterey County, and native Bishop pine at Pacific Gas and Electric's Diablo Canyon facility, San Luis Obispo County. Because dead twigs are resin-soaked, infection by *Diplodia pinea* can be mistaken for pine pitch canker.

PHOMOPSIS CANKER (*Diaporthe lokoyae*)

M261A - Klamath Mountains
Phomopsis canker was commonly involved in the death of branches and entire seedling and sapling sized Douglas-fir trees in the Corral Bottom Progeny Test Site, Trinity County. It is assumed that the long-term effects of drought were part of the cause. Competition from other vegetation was not a significant factor.

Foliage Diseases

LEAF SPOTS ON PACIFIC MADRONE (*Coccomyces arbutifolius* and others)

M261A - Klamath Mountains
Foliage blight of Pacific madrone was moderate to severe along the Klamath River between Willow Creek and Orleans, Humboldt County, in the winter and spring of 1996. Several foliage pathogens were involved, but the most common and obvious was *Coccomyces arbutifolius.* This blight was affecting the 1995 foliage and was a continuation of an outbreak that has been occurring the past two years.

263A - Northern California Coast
This same foliage blight was observed on madrone along State Highway 299 from Redwood Creek toward the Pacific coast. Older foliage was seriously affected in the spring.

ELYTRODERMA DISEASE (*Elytroderma deformans*)

M261D - Southern Cascades
Elytroderma needle disease is infecting Jeffrey and ponderosa pine on the Lassen National Forest over a large area south of McCoy Flat and Hog Flat Reservoirs in Lassen County, along Forest Road 30N06 and County Road 104. Brooms are evident in numerous pole size and mature trees on more than 500 acres.

FIR NEEDLE CAST (*Lirula abietis-concoloris*)

M262B - Southern California Mountains and Valleys
Fir needle cast, caused by *Lirula abietis-concoloris*, is causing moderate defoliation on white fir throughout the San Gorgonio District, San Bernardino National Forest.

POWDERY MILDEW ON LIVE OAK (*Sphaerotheca lanestris*)

261A - Central California Coast
Coast live oak along McKay Street in Alameda, and along University Avenue and several other streets in Berkeley (Alameda County) had dieback, witches' brooming, and deformation of new tissues caused by powdery mildew.

Nursery Diseases

CHARCOAL ROOT ROT (*Macrophomina phaseolina*)

Placerville Nursery
Macrophomina phaseolina killed approximately 15% of the 2-0 red fir crop at Placerville Nursery, El Dorado County. Douglas-fir, red fir, white fir, sugar pine, pinyon pine, and giant sequoia 1-0 seedlings are also affected with between 5 and 50% mortality in various seedlots. Three years ago the nursery discontinued fumigating with methyl bromide + chloropicrin, which has allowed a build-up of the fungus's microsclerotia in the soil.

PHYTOPHTHORA ROOT ROT (*Phytophthora* spp.)

Placerville Nursery
Greenhouse *Ribes* grown in containers at the Placerville Nursery serve as the alternate host for white pine blister rust in the Sugar Pine Blister Rust Resistance Program. Many of the 3+ year-old plants had to be discarded because of infections by *Phytophthora* spp.

SMUT (*Ustilago* spp.)

Placerville Nursery
Smut caused dieback of California brome at the Placerville Nursery. The fungus was infecting approximately 25% of the grass being grown for seed for the Mendocino National Forest. The infested seed transmit the disease to its progeny increasing the problem each year. The smut also serves as a food source for a small black beetle, *Phalacrus* sp., that mines into the seed heads looking for a place to breed and feed.

FUSARIUM HYPOCOTYL ROT (*Fusarium* spp.)

Humboldt Nursery
Hundreds of one-year-old Douglas-fir at Humboldt Nursery, Humboldt County, were killed by *Fusarium* spp. Damage levels ranged from 1 to 10% in several nursery beds.

Root Diseases

ANNOSUS ROOT DISEASE (*Heterobasdion annosum*)

M261D - Southern Cascades
California red fir and white fir were most of the toppled trees on the Lassen and Plumas National Forests during the December, 1995 windstorm. Uprooted fir on Swain Mountain, along Lassen County Road A-21 and along State Highway 44 were examined for root disease. Delaminated roots, indicating annosus root disease, were found on less than half the trees and very few of the diseased roots were large structural ones supporting the trees. The conclusion is that root disease did not play a significant role in the tree failures.

M261E - Sierra Nevada
Annosus root disease killed 9-year old ponderosa pine saplings in a small plantation at 3,700 ft on the Amador District, Eldorado National Forest. Conks with fresh pore surfaces were found in several large pine stumps cut one year before plantation establishment. It is uncommon to find this root disease actively killing trees at low elevation westside pine sites in the central Sierra Nevada. Annosus root disease was not observed in any of the adjacent natural stands.

BLACK STAIN ROOT DISEASE (*Leptographium wagneri*)

M261A - Klamath Mountains
Black stain root disease was reported on Douglas-fir saplings in a plantation on the Scott River District, Klamath National Forest. A group of several dead and dying Douglas-firs were present along a road in a recently thinned part of the plantation.

Pockets of dead and dying Douglas-fir saplings and poles infected with black stain were present along Forest Highway 15, Lems Ridge, Smith River National Recreation Area (Del Norte County). These trees were in 15 to 25-year-old plantations.

Several black stain infection centers in a 30-year-old Douglas-fir plantation were identified on the Orleans District, Six Rivers National Forest. The disease was actively killing trees and damage was not abating.

PORT-ORFORD-CEDAR ROOT DISEASE (*Phytophthora lateralis*)

M261A - Klamath Mountains
A small perennial stream between Blue Lake and Fish Lake on Orleans District, Six Rivers National Forest, was found to be infested by Port-Orford-cedar root disease. The site of infection appears to be the crossing of the Bluff Creek Road at the stream. Evidence of the disease is at least 1/4 mile downstream from the crossing. It appears the fungus may have been present 4 to 5 years. This new site in the Klamath River basin exposes a considerable amount of Port-Orford-cedar to increased likelihood of spread of the disease.

The disease was also found on the east side of the Sacramento River near the old site of Conant in Shasta County. At this time, it is not known how extensive this infection is, nor how it may have been introduced.

M261B - Northern California Coast Ranges
Surveys of Potato Patch Creek and West Fork Blue Creek, Humboldt County, identified three additional pockets of Port-Orford-cedar root disease downstream from the original identification made in 1995. This was the first significant find of this fungus in the Klamath River watershed. These pockets were on small benches with slow moving water that were ideal for infection. Both the Six Rivers National Forest and private landowners are taking an aggressive approach in this particular drainage by removing all Port-Orford-cedars along these streams. It is hoped this will stop further spread along roads to adjacent drainages.

M261D - Southern Cascades
Dying Port-Orford-cedars were observed on the east side of the Sacramento River near the old site of Conant south of Dunsmuir, Shasta County. Examination of the trees revealed the cause to be Port-Orford-cedar root disease. This is the first report of this disease in the Sacramento River basin and in Shasta County. The source and time of infection is unknown. This group of Port-Orford- cedars is at the eastern and southern extent of the natural range of this species.

LAMINATED ROOT DISEASE (*Phellinus weirii*)

M261A - Klamath Mountains
A pocket of dead white fir near Baldy Mountain, Happy Camp District, Klamath National Forest, was caused by laminated root disease. Sanitation and salvage efforts had recently taken place. This

infection site provides continuity between known infections in Oregon and a southern infection on Scott River District, Klamath National Forest.

Dwarf Mistletoe

Surveys during the past couple of decades have established that about 25% of forested lands in northern California are infested with dwarf mistletoe (see California Forest Health - Past and Present. 1994. USDA Forest Service, San Francisco. 70 p.). These general figures and more specific figures, such as the infestations in the Lake Tahoe Basin, change very slowly because the parasite spreads slowly and management reduces or eliminates the parasite on only a relatively small number of acres each year. Therefore, annual reports of dwarf mistletoe are limited to particular surveys and general figures are not repeated.

WESTERN DWARF MISTLETOE (*Arceuthobium campylopodum*)

M261E - Sierra Nevada
Extensive infestations of western dwarf mistletoe were observed on the eastern half of the Piute Mountains, Sequoia National Forest. Most of the area is above 6,500 feet elevation, of low site quality and stocked almost entirely with Jeffrey pine. It was not uncommon to find stands with average Hawksworth ratings of 3 or more. Heavy logging in the 1800's without regard for mistletoe is blamed for the condition of these stands. The Piutes are not aggressively managed because of its remote location and low productivity. Future management of this area will begin with pre-suppression surveys to document dwarf mistletoe distribution and intensity.

M262B - Southern California Mountains and Valleys
Dwarf mistletoes continue to be a serious problem in recreation areas in Southern California. The following paragraphs summarize the activity towards the Five-Year Dwarf Mistletoe Suppression Program in 1996.

1. Cleveland National Forest, Descanso District - Laguna Mt. Recreation Area (San Diego County). This project included branch pruning and tree removals in developed recreation areas. The district pruned 516 trees and 91 were removed from 55 acres.
2. Los Padres National Forest, Mt. Pinos District - Organizational Camps, and Mt. Pinos Recreation Area (Kern and Ventura Counties). The Mt. Pinos District pruned 271 trees and removed 150 trees from 55 acres.
3. Los Padres National Forest, Ojai District - Pine Mt. Area (Ventura County). The district broom or branch pruned 153 trees and removed 17 trees from 58 acres.
4. The San Bernardino National Forest broom and branch pruned 376 trees and removed 24 in the 105 acre project area.

True Mistletoes

TRUE MISTLETOE (*Phoradendron* spp.)

M262B - Southern California Mountains and Valleys
Leafy mistletoes are causing decline in both hardwood and conifer species in developed recreation sites on both the Angeles and San Bernardino National Forests.

Rusts

WESTERN GALL RUST (*Peridermium harknessi*)

M261E - Sierra Nevada
Western gall rust was identified on both sides of Plumas County Road 414 and in the Bucks Summit Plantation. The rust is severely impacting the lodgepole pine on about 100 acres along a two mile stretch of the road just west of the Bucks Summit, and is occasionally infecting Jeffrey and ponderosa pine. It is found throughout the Tahoe Basin in both Jeffrey pine and lodgepole pine.

WHITE PINE BLISTER RUST (*Cronartium ribicola*)

M261E - Sierra Nevada
White pine blister rust has infested the western white pine north of Haskell Peak on the Beckwourth District of the Plumas National Forest in Plumas County. Tops and branches are dying in all ages of pine. The top dieback on some of the large western white pine might not all be from blister rust. Individual trees are being monitored to determine if another agent is involved.

Observations of recent blister rust activity in areas of the southern Sierra Nevada that have been significantly affected by this disease in the past include:

Low activity - Tree and branch mortality were minimal at Rogers Camp and Long Meadow (Tulare County) on the Sequoia National Forest.
Moderate activity - Recent branch flagging and occasional seedling/sapling mortality were visible at Weston Meadow and Whitaker Forest (Tulare County), and Rhymes Camp (Kern County).
High activity - A 16-year old plantation (70-75% sugar pine) established after the Granite Burn on the Stanislaus National Forest contained 10-15% sugar pine mortality that occurred over the last 3 years. Many other green trees had lethal cankers. Trees showed infections dating to 1983, 1988, and 1993. Much of the current year branch flagging was due to 1993 infections.

Mountain Home Demonstration State Forest
White pine blister rust was found attacking previously resistant sugar pine saplings in two separate test plantings about one-quarter mile apart at Mountain Home Demonstration State Forest (Tulare County). The area involved is approximately 100 acres in size. Infected wood dates back to 1988- 89. Infected branches are not yet flagging.

The infected saplings are in the same area where blister rust was first found in the southern Sierras in 1964. Most of the mature sugar pine in this drainage have been killed by a combination of blister rust and drought/bark beetle effects. Low branches of some remaining naturals surrounding these sites are also infected with the new strain.

The only other California site where genotypes with Major Gene Resistance (MGR) are being attacked is near Happy Camp in Siskiyou County. It is not known if the Mountain Home Strain is the same fungal strain as the one at Happy Camp.

Contents Top of this Document Animals

Report to the Forest Pest Council from the Animal Damage Committee

Status and Control of Animal Pests

Prepared By: *John Borrecco*

INTRODUCTION

This report summarizes the Animal Damage Committee's annual survey of vertebrate damage to forest trees. The survey is accomplished by mailing a simple form to private timber companies, federal and state agencies, and other organizations who manage forested lands in California. The survey form requests summary information by pest species regarding species of trees injured, age class of trees, acres over which damage occurs, number of trees per acre damaged, whether damage occurs in plantations or other areas, the general trend in damage relative to past conditions, and control methods used. Results of this survey are reported as part of the California Forest Pest Council's annual overview of forest pest conditions in California.

In August, 1996, 128 survey forms were mailed to federal and state agencies, private timber companies, and other private organizations managing forested lands in California. A total of 40 (31% return) responses were received.

RESPONDENTS AND LOCATION OF REPORTS

Survey forms were returned by representatives of the USDA Forest Service (17 forms), California Dept. of Forestry and Fire Protection (4), private timber companies (9), and various other organizations (10 total) including Los Angeles County (1), the National Park Service (4), Bureau of Land Management (4), and Blodgett Forest Research Station (1).

Incidence of damage to trees was reported from 35 counties representing over 2% of the land area of California. Counties represented: Alpine, Amador, Butte, Del Norte, El Dorado, Fresno, Humboldt, Imperial, Inyo, Kern, Lake, Lassen, Los Angeles, Madera, Marin, Mariposa, Mendocino, Modoc, Mono, Nevada, Orange, Placer, Plumas, Riverside, San Bernardino, San Diego, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, Tuolumne, and Yuba.

SPECIES CAUSING DAMAGE

A variety of animal species are causing damage to forest trees and the damage varies by region of the state and by land ownership (Table 5). Species most commonly identified in this survey (as well as in previous years) as causing problems are deer (52% of respondents); pocket gopher (40%); domestic stock (38%); rabbits and hares (32%); black bear (28%); and porcu pine (22%). Deer, pocket gophers, rabbits and hares, and livestock feeding injuries on trees occur throughout the State. Damage by other species tends to be more limited geographically.

Table 5 — Number of damage reports - reported by species

SPECIES	USFS	CDF	PRIVATE	OTHER	TOTAL
Beaver	3	0	0	0	3

Birds	0	1	0	0	1
Black Bear	2	3	4	2	11
Deer	14	2	4	1	21
Woodrat	1	0	2	1	4
Elk	1	1	1	0	3
Mountain Beaver	0	0	1	0	1
Pocket Gopher	13	1	2	0	16
Porcupine	6	0	3	0	9
Rabbit and Hare	10	2	1	0	13
Tree Squirrel	2	2	1	0	5
Domestic Stock	13	0	2	0	15
Ground Squirrel	1	0	1	1	3
Wild Burro	0	0	0	1	1
Total	**66**	**12**	**22**	**6**	**106**
# of Reports	17	4	9	10	40

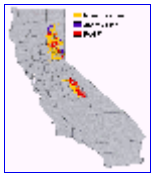
SCOPE OF DAMAGE

Damage from all species was reported on about 158,880 acres (Table 6). All of California's major timber producing regions and timber types have reported damage by vertebrate species. Based on the acres of damage, the species ranking changes somewhat from the above ranking: black bear (33% of the acres), deer (29%), pocket gopher (19%), domestic stock (12%), porcupine (5%), rabbits and hares (1%), and all others (1%). The ranking of the black bear is primarily based on one respondent. Rankings are similar as in previous years.

Table 6 — Number of acres reported to be receiving some level of damage

Species	USFS	CDF	PRIVATE	OTHER	TOTAL
Beaver	10	0	0	0	10
Birds	0	0	0	*	*
Black Bear	1,020	600	50,600	3	52,223
Deer	35,325	0	11,330	36	46,691
Woodrat	400	0	*	*	400
Elk	300	0	*	0	300
Mountain Beaver	0	0	*	0	*
Pocket Gopher	29,296	0	110	20	29,426
Porcupine	7,671	0	440	0	8,111
Rabbit & Hare	1,945	3	*	15	1,963
Tree Squirrel	5	0	*	150	155
Domestic Stock	19,361	0	60	0	19,421
Ground Squirrel	20	0	10	150	180
Wild Burro	0	0	0	*	*
Totals	**95,353**	**603**	**62,550**	**374**	**158,880**

% distribution of damaged acres	60	<1	39	<1	100
* Incidence of damage was reported, but no information as to how many acres were affected					

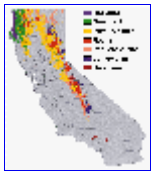


Species Accounts **Beaver**

Species Damaged: Aspen, Ash, and other miscellaneous hardwoods within riparian areas in indicated conifer types.
Damage Trend: Static.
Control Methods: None.
Damage Location: Fresno, Lassen, Madera, Mariposa, Nevada, Placer, Plumas, Sierra, and Yuba counties.
Comments: Damage reported to 1 to 50 year-old trees in Stream Side Management Zones and around wet meadows in the Southern Cascades (M261D) and Sierra Nevada (M261E) Ecological Sections.

Birds
Species Damaged: Mixed Conifer.
Damage Trend: Static.
Control Methods: Screening.
Damage Location: Los Angeles county.
Comments: Minor problem in nursery seed beds.

Bear
Species Damaged: Douglas-fir, Redwood, White fir, Red fir, Ponderosa pine, Jeffrey pine, Sugar pine, Coulter pine, Knobcone pine, and Apple.
Damage Trend: Increasing.
Control Methods: Sport hunting, none.
Damage Location: Del Norte, Humboldt, Los Angeles, Madera, Shasta, and Trinity counties.
Comments: Damage was reported in both plantations and natural stands to poles and small saw timber from 10 to 90 years old. Levels of damage vary from 1 to 60 trees/acre. Black bears are primarily a problem on private timber lands on the north coast of California in the Redwood and Douglas-fir forest types (263A and M261A & B Ecological Sections). As reported last year, a few incidences of bear damage were reported on the Six-Rivers National Forest and Sierra National Forest (M261E). Whisketown National Recreation Area reported bears damaging mature apple trees in a historic orchard. Injuries to campground trees were also reported in the San Gabriel Mountains (M262B).

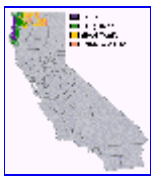


Deer
Species Damaged: Douglas-fir, Redwood, Ponderosa pine, Jeffrey pine, Sugar pine, Western white pine, White fir, Red fir, Incense cedar, Apple, California black oak, California live oak, Canyon live oak, & Engelmann oak.
Damage Trend: Static to increasing.
Control Methods: Seedling protectors, repellents, Sport hunting, & none.
Damage Location: Alpine, Amador, Butte, Del Norte, El Dorado, Fresno, Humboldt, Kern, Lake, Lassen, Los Angeles, Madera, Mariposa, Mendocino, Modoc, Mono, Nevada, Placer, Plumas, Riverside, San Bernardino, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tulare, Tuolumne, & Yuba counties.
Comments: Most damage occurs to seedlings 1 to 10 yr. old in plantations. Levels of damage reported varied from 5 to 350 trees/acre. Repellents include Bgr & Plant Pro-tec (Garlic Units). Injuries occur in all major timber types in M261A-G, M262B, and 263A Ecological Sections.

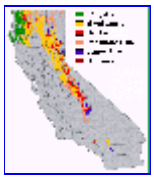
Woodrat
Species Damaged: Douglas-fir, Redwood, Ponderosa pine, Sugar pine, and Ironwood.
Damage Trend: Static.

Control Methods: None.

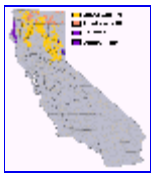
Damage Location: Humboldt, Lake, Mendocino, and Eastern San Diego and Imperial counties.
Comments: Damage occurred to sapling and pole sized trees from 5 to 20 years old at levels up to 35 trees/acre. Injuries were also observed on Ironwood trees in the Sonoran Colorado Desert (322C) of eastern San Diego and Imperial counties. Woodrat damage is primarily reported from private industry lands on the Northern California Coast and Coast Ranges (263A and M261A & B).



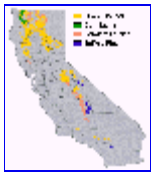
Elk
Species Damaged: Douglas-fir, White fir, Ponderosa pine.
Damage Trend: Static.
Control Methods: None.
Damage Location: Del Norte, Humboldt and Siskiyou counties.
Comments: Damage occurs to seedlings and saplings 3 to 5 years of age at levels of 1 to 300 trees/acre. Damage most often reported from the Klamath Mountains and Northern California Coast Ranges (M261A & B) and Northern California Coast (263A).



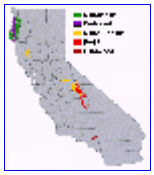
Pocket Gopher
Species Damaged: Douglas-fir, White fir, Red fir, Ponderosa pine, Jeffrey pine, Sugar pine, Western white pine, and Canyon live oak, and Engelmann oak.
Damage Trend: Static to increasing.
Control Methods: Baiting, trapping, habitat control, seedling protectors, none.
Damage Location: Alpine, Amador, Butte, Del Norte, El Dorado, Fresno, Humboldt, Kern, Lassen, Los Angeles, Madera, Mariposa, Modoc, Mono, Nevada, Placer, Plumas, Riverside, San Bernardino, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tulare, Tuolumne, and Yuba counties.
Comments: Most damage to seedlings occurs in plantations 1 to 10 years old. Levels of damage reported range from 1 to 500 trees/acre. Damage occurs throughout all sections of the Sierran Steppe, Mixed and Coniferous Forest and Meadow Ecological Province (M261A-G) and Southern California Mountains (M262B) and Northern California Coast (263A).



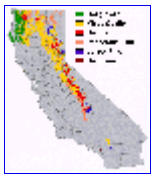
Porcupine
Species Damaged: Redwood, Ponderosa pine, Coulter pine, and Jeffrey pine.
Damage Trend: Static.
Control Methods: None.
Damage Location: Butte, Del Norte, Humboldt, Lassen, Modoc, Nevada, Placer, Plumas, and Yuba counties.
Comments: Injuries occur to seedlings through mature trees in plantations and natural stands at levels of damage ranging from 5 to 150 trees/acre. Injuries were reported throughout the Sierran Steppe, Mixed and Coniferous Forest and Alpine Meadow Ecological Province (M261A-G) and Northern California Coast (263A).



Rabbit & Hare
Species Damaged: Douglas-fir, Ponderosa pine, Jeffrey pine, Sugar pine, and White fir.
Damage Trend: Static to decreasing.
Control Methods: Seedling protectors, repellents, and none.
Damage Location: Butte, Fresno, Humboldt, Kern, Lake, Los Angeles, Mariposa, Mendocino, Mono, Plumas, Riverside, San Bernardino, Shasta, Siskiyou, Tehama, Trinity, Tulare, and Tuolumne counties.
Comments: Damage reported to seedlings 1 to 10 years old in plantations at levels of 1 to 100 trees/acre. one respondent reported bark stripping by rabbits. Injuries occurred throughout northern California Coast Ranges, Klamath Mountains, Southern Cascades (M261A), and Sierra Nevada (M261A-G) ecological sections, and the Central California Coast Ranges and Southern California Mountains (M262A-B).



Tree Squirrel
Species Damaged: Douglas-fir, Redwood, Sugar pine, White fir, and Red fir.
Damage Trend: Stable.
Control Methods: Metal Bands, hunting, bagging cones, and none.
Damage Location: Fresno, Humboldt, Kern, Lake, Los Angeles, Madera, Mariposa, and Tulare counties.
Comments: Reports from private forest lands concerned bark stripping and top kill, especially of redwood poles to mature trees on the Northern California Coast (263A) and Coast Ranges (M261B). Reports from the Klamath Mountains (M261A), Southern California Mountains (M262b), and Sierra Nevada (M261E & F) Ecological Sections concern cone cutting.



Domestic Stock
Species Damaged: Douglas-fir, White fir, Red fir, Ponderosa pine, Jeffrey pine, Sugar pine, Giant sequoia, Incense cedar, Engelmann oak, and California black oak.
Damage Trend: Static.
Control Methods: Placement of salt blocks, seedling protectors, herding, fences, none.
Damage Location: Alpine, Amador, Butte, Del Norte, El Dorado, Fresno, Humboldt, Kern, Lassen, Madera, Mariposa, Modoc, Nevada, Orange, Placer, Plumas, Riverside, San Bernardino, San Diego, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tulare, Tuolumne, and Yuba counties.
Comments: Most respondents reported damage to seedings 1 to 10 years old in plantations. Levels of damage varied from 1 to 200 trees/acre. One report indicated that cows primarily cause injury by trampling seedlings. Another respondent reported that damage was reduced where heifers were mixed with steers. Cows also damaged native plants in meadows and riparian areas. Injuries occurred throughout the state in the 263A, M261A-G, and M262B Ecological Sections.

Ground Squirrel
Species damaged: Coulter pine, Ponderosa pine, Jeffrey pine, and hardwoods.
Damage Trend: Static.
Control Methods: Seedling protectors, grain baits, smoke bombs and shooting, none.
Damage Location: Fresno, Los Angeles, Riverside, and San Bernardino counties.
Comments: Damage is occurring to seedlings 1 to 5 years old in plantations and natural stands at levels of 85 to 400 seedlings/acre. Problems reported in the Southern California Mountains (M262B) and Sierra Nevada (M261E & F) Ecological Sections.

Wild Burro (no map available)
Species Damaged: Ironwood, Paloverde, and Mesquite.
Damage Trend: New report.
Control Methods: None.
Damage Location: Imperial and eastern San Diego counties.
Comments: Damage is occurring to almost all trees located near water sources in the Sonoran Colorado Desert (322C) Ecological Section.

Contents Top of this page Weeds

Report to the Forest Pest Council from the Weed Committee

Status and Control of Weeds

Ken Fleming, Chair
Paul Violett, Secretary

No report was submitted by the Weed Committee this year.

Contents Surveys and Evaluations

Report to the Forest Pest Council from the Insect and Disease Committees

Surveys and Evaluations

DEMONSTRATION THINNING PLOTS IN THE EASTSIDE PINE TYPE ON THE LASSEN NATIONAL FOREST

In 1978-1979, the Forest Service established plots in the eastside pine type to show the effects of thinning on pest-caused losses in areas of high tree mortality. The stands chosen were mostly pole-size ponderosa pine mixed with some white fir and incense-cedar, growing on medium to low sites, and ranging in age from 70 to 90 years. Within the demonstration plots, four levels of stocking density — 40, 55, 70, and 100 percent of normal basal area — were established to demonstrate the biological and economic alternatives available for management planning (Normal basal area is the basal area that a stand should have reached when fully stocked with trees, which in the demonstration areas, ranges from 185 to 215 sq ft/ac, depending on site quality). Seventeen years after thinning, the treatments had reduced mortality from 90 to 100 percent of the level in unthinned stands (Table 7).

Table 7 - Commercial tree mortality by stocking level, 17 years after thinning (a)

	Residual stocking after thinning (b) trees per acre			
Year	***40%***	***55%***	***70%***	***100%***
1980	*0.0*	*0.2*	*0.2*	*2.4*
1981	*0.0*	*0.0*	*0.7*	*2.4*
1982	*0.0*	*0.5*	*0.3*	*3.6*
1983	*0.0*	*0.1*	*0.8*	*4.1*
1984	*0.0*	*0.0*	*0.0*	*1.0*
1985	*0.0*	*0.2*	*0.0*	*0.6*
1986	*0.0*	*0.0*	*0.0*	*1.3*
1987	*0.0*	*0.0*	*0.0*	*1.4*
1988	*0.0*	*0.0*	*0.0*	*0.0*
1989	*0.0*	*0.4*	*0.0*	*2.6*
1990	*0.0*	*0.0*	*0.0*	*2.6*
1991	*0.0*	*0.0*	*0.0*	*1.8*
1992	*0.0*	*0.2*	*0.0*	*3.0*
1993	*0.0*	*0.2*	*0.3*	*5.2*
1994	*0.0*	*0.0*	*0.0*	*4.8*
1995	*0.0*	*0.0*	*0.3*	*0.4*
1996	*0.0*	*0.2*	*0.0*	*1.3*
Mean	*0.0*	*0.1*	*0.2*	*2.3*
Range	*0*	*0 - 0.5*	*0 - 0.8*	*0 - 5.2*
% M.R. (c)	*100*	*95.7*	*91.3*	*—*

(a) Commercial trees are 8 inches dbh and larger, with straight boles, yielding at least one 10-foot log with a 6-inch top. Trees were killed by the mountain pine beetle.

(b) Percent of normal basal area.

(c) Percent Mortality Reduction compared with normal basal area.

OZONE

M262B - Southern California Mountains and Valleys Section

Based on the results of the broad preliminary survey for ozone damage in 1993, the Los Padres National Forest has installed two permanent plots on the Mt. Pinos District in 1996. Plans are to evaluate ozone damage each year on these plots and possibly to install a portable ozone monitoring station in the same vicinity.

WHITE PINE BLISTER RUST RESISTANCE SCREENING PROGRAM

Because sugar pine with MGR were found to be infected on Mountain Home State Forest, seven plantations of rust-resistant sugar pine were evaluated for rust infection and slow-rusting reactions. The plantations are located on the Plumas, Tahoe and Eldorado National Forests, and are from 13 to 30 years old. No breakdown of resistance was found; the major gene resistance was holding and segregation ratios of different genotypes were within expected Mendellian ratios.

Four new MGR parents were identified of the 172 candidates scored. Progeny of 941 trees (56,460 seedlings) were grown, inoculated, and evaluated for major gene resistance in greenhouses at the Placerville Nursery (El Dorado County). The USDA Forest Service, Pacific Southwest Region has now identified 1,041 rust resistance sugar pine trees.

Table 8 - Number of male Douglas-fir tussock moths caught per trap at pheromone survey plots in California, 1979 - 1996

Year	No. of Plots	Average Moth Catch per Trap (5 traps per plot)													
		Percent of Total Catch													
		<10	<20	<25	<30	<35	<40	<45	<50	<55	<60	<65	<70	<75	75+
1979	102	97	2	1	1	0	1	0	0	0	0	0	0	0	0
%		95	2	2	2	0	2	—	—	—	—	—	—	—	—
1980	99	99	0	0	0	0	0	0	0	0	0	0	0	0	0
%		100	—	—	—	—	—	—	—	—	—	—	—	—	—
1981	93	78	10	4	1	0	0	0	0	0	0	0	0	0	0
%		84	10	4	2	—	—	—	—	—	—	—	—	—	—
1982	95	93	1	0	1	0	0	0	0	0	0	0	0	0	0
%		98	1	0	1	—	—	—	—	—	—	—	—	—	—
1983	98	87	6	1	1	3	0	0	0	0	0	0	0	0	0
%		89	6	1	1	3	—	—	—	—	—	—	—	—	—
1984	111	51	18	11	5	7	8	4	3	4	0	0	0	0	0
%		46	16	10	4	6	7	4	3	4	—	—	—	—	—
1985	105	58	14	4	7	6	5	1	2	4	1	2	0	1	0
%		55	13	4	7	6	5	1	2	4	1	2	0	1	—

1986	107	64	16	4	8	6	1	3	0	1	0	1	1	1	1
%		60	15	4	7	6	1	3	0	1	0	1	1	1	1
1987	108	80	15	4	2	1	1	3	0	1	0	0	1	0	0
%		74	14	4	2	1	1	3	0	1	0	0	1	—	—
1988	124	105	9	3	3	0	2	1	0	0	0	0	0	0	0
%		86	9	2	2	0	2	1	—	—	—	—	—	—	—
1989	130	129	1	0	0	0	0	0	0	0	0	0	0	0	0
%		99	1	—	—	—	—	—	—	—	—	—	—	—	—
1990	138	135	1	0	1	1	0	0	0	0	0	0	0	0	0
%		97	1	0	1	1	—	—	—	—	—	—	—	—	—
1991	143	135	4	1	0	0	2	1	0	0	0	0	0	0	0
%		94	3	1	0	0	1	1	—	—	—	—	—	—	—
1992	164	156	3	0	2	1	0	0	0	0	1	0	1	0	0
%		95	1	0	1	1	0	0	0	0	1	0	1	—	—
1993	143	135	8	0	0	0	0	0	0	0	0	0	0	0	0
%		94	6	—	—	—	—	—	—	—	—	—	—	—	—
1994	151	139	11	1	0	0	0	0	0	0	0	0	0	0	0
%		92	7	1	—	—	—	—	—	—	—	—	—	—	—
1995	158	77	35	13	16	7	7	3	0	0	0	0	0	0	0
%		49	22	8	10	5	4	2	—	—	—	—	—	—	—
1996	149	33	26	16	8	7	12	9	5	8	6	8	5	1	5
%		22	17	11	6	4	8	6	3	6	4	6	3	1	3

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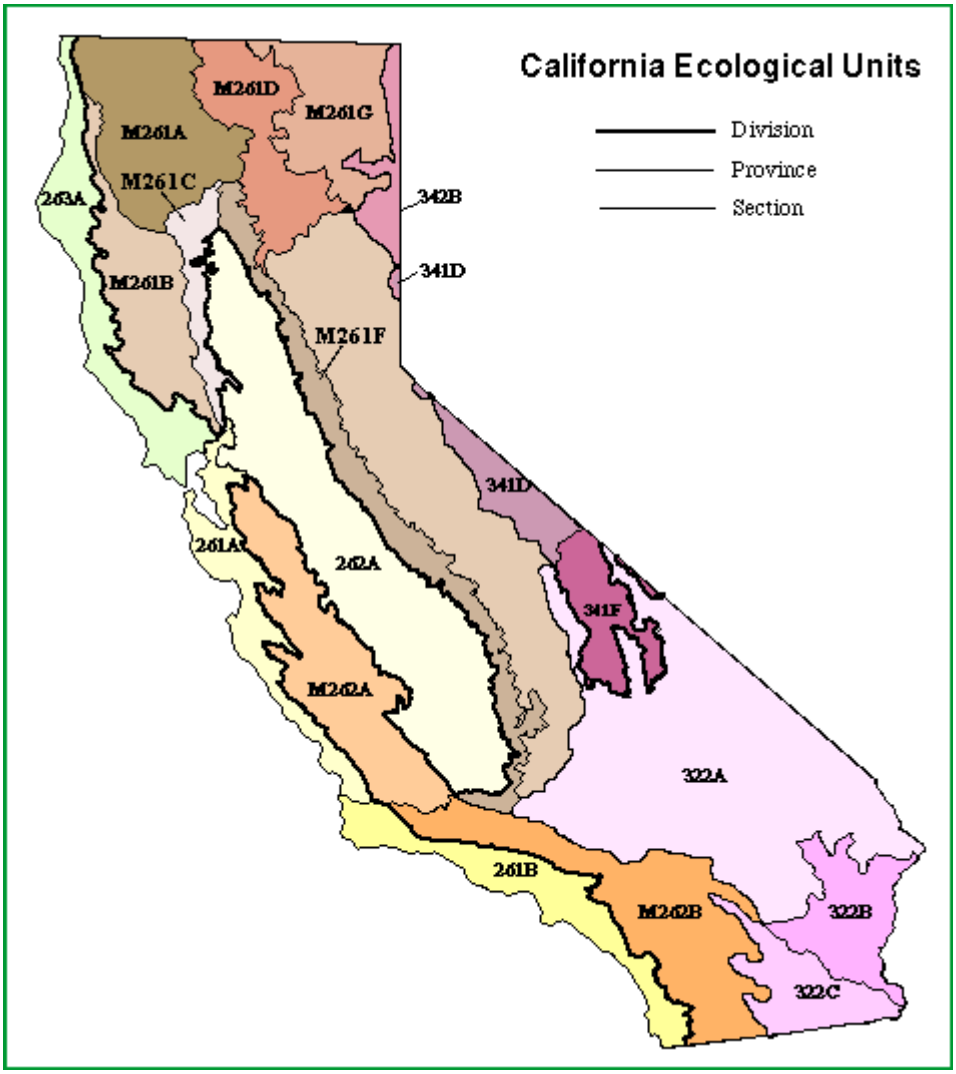
- Appendix A -
Hierarchy of Ecological Units in California

Humid Temperate Domain

Division	Province	Section
260-Mediterranean	261-CA coastal chaparral	261A-Central CA coast Forest and Shrub
		261B-Southern CA coast
	262-CA dry steppe	262A-Great Valley
	263-CA coastal steppe, mixed and redwood forest	263A-Northern CA coast
M260-Mediterranean regime mountains	M261-Sierran steppe, mixed and coniferous forest and alpine meadow	M261A-Klamath mountains
		M261B-Northern CA coast ranges
		M261C-Northern CA interior coast ranges
		M261D-Southern Cascades
		M261E-Sierra Nevada
		M261F-Sierra Nevada foothills
		M261G-Modoc plateau
	M262-CA coastal range open woodland, shrub, continuous forest, meadow	M262A-Central CA coast range
		M262B-Southern CA mountains and valleys

Dry Domain

Division	Province	Section
320-Tropical/subtropical desert	322-American semi-desert and desert	322A-Mojave desert
		322B-Sonoran Mojave desert
		322C-Sonoran Colorado desert
340-Temperate desert	341-Intermountain semi-desert and desert	341D-Mono
	342-Intermountain semi-desert	342B-Northwestern basin and range



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- Appendix B -
Index of Scientific and Commom Names

Note: Common and Scientific names mentioned in this report are listed in alphabetic order by common name.

INSECTS

Bark Beetles

Common Name	Scientific Name
California fivespined ips	*Ips paraconfusus*
Cedar bark beetles	*Phloeosinus* sp.
Douglas-fir beetle	*Dendroctonus pseudotsugae*
Douglas-fir engraver	*Scolytus unispinosus*
Fir engraver	*Scolytus ventralis*
Jeffrey pine beetle	*Dendroctonus jeffreyi*
Monterey pine ips	*Ips mexicanus*
Mountain pine beetle	*Dendroctonus ponderosae*
Pine engravers	*Ips* spp.
Red turpentine beetle	*Dendroctonus valens*
Western pine beetle	*Dendroctonus brevicomis*

Defoliators

Common Name	Scientific Name
California oakworm	*Phryganidia californica*
California budworm	*Choristoneura carnana californica*
Douglas-fir tussock moth	*Orgyia pseudotsugata*
Elm leaf beetle	*Xanthogaleruca luteola*
Fruittree leafroller	*Archips argyrospilus*
Gypsy moth	*Lymantria dispar*
Lodgepole pine needleminer	*Coleotechnites milleri*
Modoc budworm	*Choristoneura retiniana*
Pine needleminer	*Coleotechnites* sp., near *milleri*
Silverspotted tiger moth	*Halisidota argentata*
Tent caterpillar	*Malacosoma* sp.
Western tent caterpillar	*Malacosoma californicum*
White fir needleminer	*Epinotia meritana*

Tree regeneration insects

Common Name	Scientific Name
Black vine weevil	*Otiorhynchus sulcatus*
Branch and twig beetles	*Carphoborus pinicolens*
	Pityophthorus tuberculatus
	Pityophthorus conifertus
	Pityophthorus jeffreyi

	Pityophthorus sp.
Douglas-fir reproduction weevil	*Cylindrocopturus furnissi*
Gouty pitch midge	*Cecidomyia piniinopsis*
Pine needle sheathminer	*Zelleria haimbachi*
Pine reproduction weevil	*Cylindrocopturus eatoni*
Flatheaded fir borer	*Melanophila drummondi*
Roundheaded fir borer	*Tetropium abietis*

Other

Common Name	Scientific Name
Africanized honey bee	*Apis mellifera scutellata*
Asia longhorned borer	*Anaplophora glabripennis*
	Phalacrus sp.

PATHOGENS

Cankers

Common Name	Scientific Name
Diplodia blight of pines	*Diplodia pinea (Sphaeropsis sapinea)*
Pine pitch canker	*Fusarium subglutinans* f. sp. *pini*
Phomopsis canker	*Diaporthe lokoyae*

Dwarf mistletoes

Common Name	Scientific Name
Western dwarf mistletoe	*Arceuthobium campylopodum*

Foliage diseases

Common Name	Scientific Name
Elytroderma needle disease	*Elytroderma deformans*
Fir needle cast	*Lirula abietis-concoloris*
Fusarium hypocotyl rot	*Fusarium* spp.
Leaf spot of arbutus	*Coccomyces arbutifolius*
Powdery mildew on live oaks	*Sphaerotheca lanestris*

Root diseases

Common Name	Scientific Name
Annosus root disease	*Heterobasidion annosum*
Black stain root disease	*Leptographium wagneri*
Charcoal root rot	*Macrophomina phaseolina*
Laminated root disease	*Phellinus weirii*
Phytophthora root rot	*Phytophthora* spp.
Port-Orford-cedar root disease	*Phytophthora lateralis*

Rusts

Common Name	Scientific Name
Western gall rust	*Peridermium harknessi*
White pine blister rust	*Cronartium ribicola*

True mistletoes

Common Name	Scientific Name
Leafy mistletoe	*Phoradendron* spp.

TREES

Conifers

Common Name	Scientific Name
Pines	*Pinus* spp.
Bishop pine	*Pinus muricata*
Jeffrey pine	*Pinus jeffreyi*
Knobcone pine	*Pinus attenuata*
Limber pine	*Pinus flexilis*
Lodgepole pine	*Pinus contorta* var. *murrayana*
Monterey pine	*Pinus radiata*
Ponderosa pine	*Pinus ponderosa*
Singleleaf pinyon pine	*Pinus monophylla*
Sugar pine	*Pinus lambertiana*

True firs

Common Name	Scientific Name
Red fir	*Abies magnifica*
White fir	*Abies concolor*

Others

Common Name	Scientific Name
Douglas-fir	*Pseudotsuga menziesii*
Giant sequoia	*Sequoiadendron giganteum*
Incense-cedar	*Libocedrus decurrens*
Port-Orford-cedar	*Chamaecyparis lawsoniana*
Sitka spruce	*Picea sitchensis*

Hardwoods, Oaks

Common Name	Scientific Name
California black oak	*Quercus kelloggii*
Coast live oak	*Quercus agrifolia*

Other, California natives

Common Name	Scientific Name
California laurel	*Umbellularia californica*
Elm	*Ulmus* spp.
Pacific madrone	*Arbutus menziesii*
Tanoak	*Lithocarpus densiflorus*
Willow	*Salix* spp.

SHRUBS

Common Name	Scientific Name
Antelope bitterbrush	*Purshia tridentata*
Ceanothus	*Ceanothus* sp.
Current, gooseberry	*Ribes* spp.
Laurel sumac	*Rhus laurina*
Sugarbush chaparral	*Rhus ovata*

GRASSES

Common Name	Scientific Name
California brome	*Bromus carinatus*

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Forest Pest Conditions in California - 1996: Appendix C (Preamble)

If you wish to submit a pest injury report and samples, a printable form is available to you from this web document. **Please note!** Depending on the way your computer is set up, the form may appear distorted, but it should print correctly. The form has been tested with Netscape and Internet Explorer versions 3 and 4. It prints properly with inkjet and laser printers. The form has not been tested with Macintosh computers or dot-matrix printers. To ensure the form would print on one page, it contains no navigation links to other parts of the document. To return to this page, please use the "Back" button (usually in the upper left of the screen).

"Forest Pest Detection Report" form

The COOPERATIVE FOREST PEST DETECTION SURVEY is sponsored by the California Forest Pest Control Action Council. The Pest Action Council encourages Federal, State, and private land managers and individuals to contribute to the survey by submitting pest injury reports and samples in the following manner.:

Federal Personnel. Send all detection reports to appropriate Service Areas, and mail injury samples with a copy of the report to:

Forest Pest Management
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

Forest Pest Management
Stanislaus National Forest
19777 Greenley Road
Sonora, CA 95370

Forest Pest Management
Lassen National Forest
55 South Sacramento Street
Susanville, CA 96130

Forest Pest Management
San Bernardino National Forest
1824 South Commercenter Circle
San Bernardino, CA 92408

State Personnel. Send all detection reports through channels, and mail injury samples with a copy of the report to:

California Department of Forestry
P.O. Box 1590
Davis, CA 95617

California Department of Forestry
6105 Airport Road
Redding, CA 96002

Private Land Managers and Individuals. Send all detection reports and samples to:

California Department of Forestry
1416 9th Street
Sacramento, CA 95814

Completing the detection report form

Heading (Blocks 1 - 7) — Enter all information requested. In Block 6, Location, note distinguishing landmarks and place names so that the injury center can be relocated. If possible, attach a location map to

the form.

Injury Description (Blocks 8 - 15) — Check as many boxes as are applicable, and fill in the requested information as completely as possible.

Stand Description (Blocks 16 - 20) — This information will aid the examiner in determining how the stand conditions contributed to the pest problem. In block 17, indicate the major tree species in the overstory and understory. In block 18, indicate the stand age in years, and/or the size class (seedling-sapling; pole; young sawtimber; mature sawtimber; overmature or decadent).

Pest Names (Block 21) — Write a detailed description of the pest or pests, the injury symptoms, and any contributing factors.

Action Requested (Block 23) — Mark "Field Evaluation" only if you consider the injury serious enough to warrant a professional evaluation. Mark "Your Information Only" if you are reporting a condition that does not require further attention. All reports will be acknowledged and questions answered on the lower part of the form.

Reply (Section II) — Make no entries in this block; it is for examining personnel only. A copy of the report will be returned to you with the information requested.

Handling Samples — Please submit injury samples with each detection report. If possible, send several specimens illustrating the stages of injury and decline. Keep samples cool and ship them immediately after collection. Send them in a screw-top mailing tube or other sturdy container, and enclose a completed copy of the detection report.

Your participation in the COOPERATIVE FOREST PEST DETECTION SURVEY is greatly needed and appreciated. Additional copies of the form are available from the Forest Service, Forest Pest Management and from the California Department of Forestry (ask for form number R5-3400-1).

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Forest Pest Conditions in California - 1996: Appendix C

I. Field Information (see instructions) Forest Pest Detection Report

1. County _____ 2. Forest (FS only) _____ 3. District (FS only)_____

4. Legal Description: T _____ 5. Date _____ 6. Location: _____

R _____ Sec. _____ 7. Land Ownership (circle one): USFS Other Federal State Private

8. Suspected cause(s) of injury (circle one): Insect Disease Animal Weather Chemical Mechanical Weed Unknown
9. Size(s) of Tree(s) affected (circle one): Seedling Sapling Pole Sawtimber Overmature
10. Part(s) of Tree(s) affected (circle one): Root Branch Leader Bole Twig Foliage Bud Cone

11. Species affected: _____ 12. Number affected _____ 13. Acres affected _____
14. Injury Distribution (circle one): Scattered Grouped 15. Status of Injury (circle one): Decreasing Static Increasing

16. Plantation? Yes No 17. Stand Composition (species): _____

18. Stand age and size class: _____ 19. Stand density (basal area): _____

20. Site quality: _____

21. Pest Names (if known), and Remarks (symptoms and contributing factors): _____

_____

_____

22. Sample forwarded? Yes No 23. Action requested: Your information only Lab identification Field Evaluation

24. Reporter's name: _____ 25. Reporter's agency _____

26. Reporter's address, zip code and phone number: _____

_____

II. Reply

27. Response _____

_____

_____

_____

_____

28. Report Number: _____ 29. Date _____

30. Examiner's Signature: _____

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COUNCIL AND COMMITTEE OFFICERS — 1996

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COUNCIL VICE - CHAIR: *Nelson Money* - Pacific Gas & Electric Company, Grass Valley
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