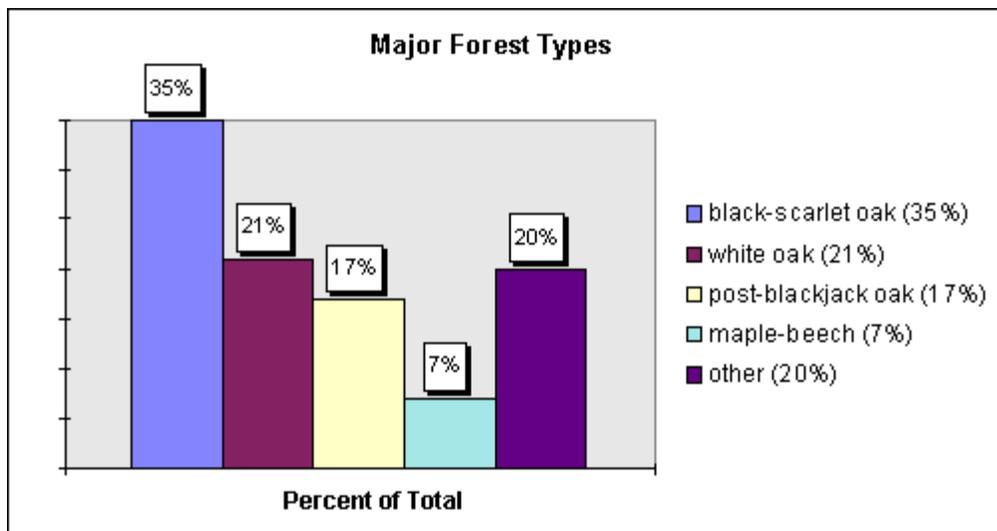


2000 Forest Health Highlights Missouri

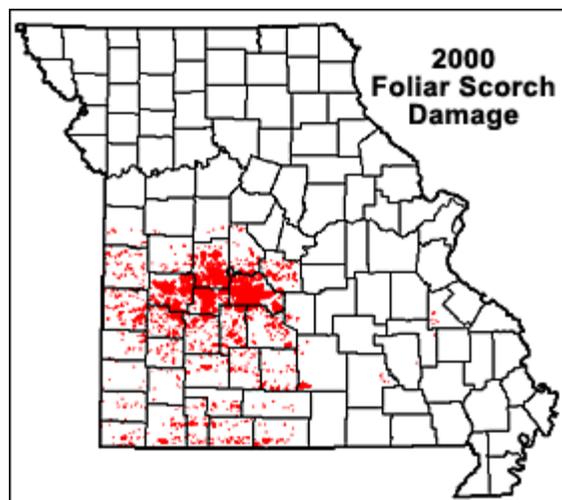
The Resource

Missouri is about one-third forested. There are over 14 million acres of forest land, an increase of 5% since 1989. Missouri is well known for its oak-hickory forests. The 1999 forest inventory estimated that almost three-fourths of the timberland in Missouri is dominated by oaks, hickories and associated species. In addition to the recreation and wildlife benefits these forests provide, the latest statistics indicate the value of forest products produced annually exceeds \$4 billion. There are over 2,500 firms employing more than 30,000 people with a payroll of over \$500 million per year. In 1997, 733 million board feet were cut, 90% was oak, with a stumpage value of over \$100 million.



Special Issues

Drought - The impacts of continuing drought conditions were the overriding forest health concern in Missouri in 2000. Dry weather patterns that began in July 1999 continued through the first half of 2000. The last half of 1999 was the 4th driest summer and fall seasons combined on record. Some parts of the state started 2000 with a 10 to 15-inch precipitation deficit. Above normal temperatures and below normal precipitation generally continued throughout the winter and spring of 2000. The winter was the 10th warmest on record. It was followed by the driest April recorded in Missouri in 106 years.



A break in the dry weather patterns came in early summer. June 2000 was one of the wettest Junes on record with statewide precipitation averaging 167% of normal for the month.

Hot, dry conditions returned in late summer to southern and western Missouri and continued through September. August 2000 was the driest ever recorded in Springfield and Joplin.

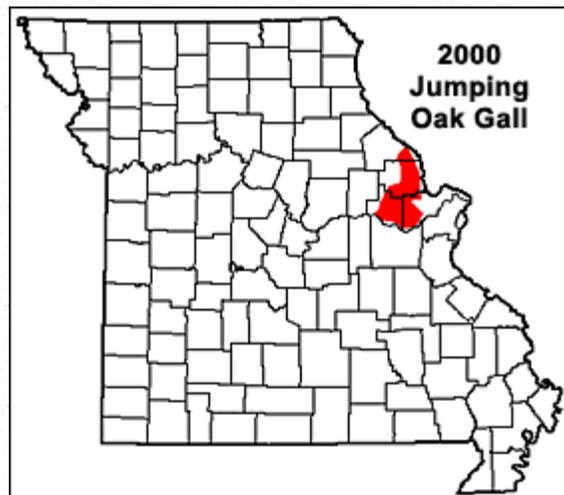
Precipitation was variable across the state during autumn. Despite high precipitation amounts in June and near normal rainfall in some areas later in the year, subsoil moisture levels remain low in many locations. By November 2000, some locations in southern Missouri had an accumulated precipitation deficit of more than 20 inches.

Foliar scorch damage became evident throughout much of southern and western Missouri in September. Scorch damage is caused primarily by drought stress due to the hot, dry conditions of late summer, particularly in forests growing on the thin-soiled ridges typical of southern Missouri. Aerial surveys in 2000 revealed a total of more than 2.08 million acres affected by foliar scorch. Damage was severe on approximately 340,000 acres of that total area. Foliar scorch damage was also widespread in 1999, although it occurred primarily in eastern and southeastern Missouri. Damage was observed in both years in areas near the Lake of the Ozarks in central Missouri and several isolated locations in south central and southeastern Missouri. Looking at the two years combined, it is apparent that much of the southern half of the state has been recently affected by significant drought conditions.

Many cases of mortality of single or small groups of trees have been reported during 2000. Often no immediate cause has been determined, but drought effects are suspected of having played a role. Several reports were received of various evergreens (e.g., pines, yews) dying in the spring. Diseases are likely to be involved in some cases. But also, the relatively warm temperatures of the past fall and winter could be expected to cause increased moisture loss from evergreen foliage, thus increasing the already high drought stress.

The impacts of the 1999-2000 drought are expected to be seen over the next several years. Oak decline has been a common problem across southern Missouri in the past, and is expected to increase during the next few years. Decline of red oak and other species is due in part to ongoing drought stress, particularly on ridge tops and south-facing slopes with thin soils. Common indicators of decline include *Armillaria*, *Hypoxylon*, two-lined chestnut borer and red oak borer. Increased activity of red oak borers has been reported in some locations in southern Missouri. This raises serious concerns, particularly in light of events recently reported in the Ozark National Forest in Arkansas, where drought followed by extremely high numbers of red oak borer attacks resulted in very high red oak mortality.

Jumping Oak Gall - Foliar damage from the jumping oak gall wasp (*Neuroterus saltatorius*) was visible in eastern Missouri for the third consecutive year in 2000. The wasp induces pinhead-size galls to form on white oak leaves in the spring. Leaves on heavily infested trees turn brown and drop by mid- to late summer. In 2000, foliar damage was present on a total of 592,440 acres in Lincoln, Pike, St. Charles and Warren counties, immediately northwest of St. Louis. In most cases, damage was not severe. The counties affected in 2000 are located immediately north of the area affected in 1999, and represent a greatly reduced area compared to 1999.

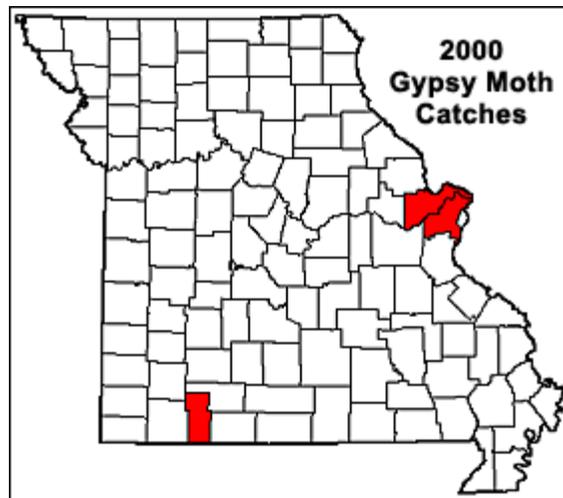


Variable Oakleaf Caterpillar - Heavy defoliation by the variable oak leaf caterpillar (*Lochmaeus manteo*) became obvious in south central Missouri in September. Damage was



contained in pockets in Dent and Texas counties and covered a total of 39,400 acres. Damage was severe in most stands, with many trees being completely defoliated. Small numbers of other late-season defoliators (*e.g.*, *Datana spp.*) were also present in the damaged stands. Variable oakleaf caterpillars feed on a wide range of deciduous trees, but prefer oaks and particularly white oak. In 1970-1972, variable oakleaf caterpillar populations reached outbreak levels across much of southern Missouri. Current populations will be monitored closely to detect any significant increases in numbers.

Gypsy Moth - The Missouri Cooperative Gypsy Moth Survey continued its annual effort to detect the presence of gypsy moths by placing and monitoring more than 12,000 traps throughout the state in 2000. A total of 12 moths were captured statewide, including 10 moths from the St. Louis metropolitan area (St. Louis and St. Charles Counties) and 2 moths from Stone County near the popular recreation areas of Branson and Table Rock Lake in southwestern Missouri.



Moths captured this year were found in the same general areas where moths have been caught for the past several years. Large volumes of interstate traffic traveling to those areas provide opportunity for gypsy moths to repeatedly hitchhike into the state. In spite of the repeated moth captures, there are no known populations of gypsy moths in Missouri at this time. However, the risk of gypsy moths establishing in Missouri continues to increase as infested areas in nearby states expand. Statewide gypsy moth monitoring efforts will continue annually in Missouri. Those sites where gypsy moths have been detected in one year, will be trapped at an increased intensity in the following year.

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