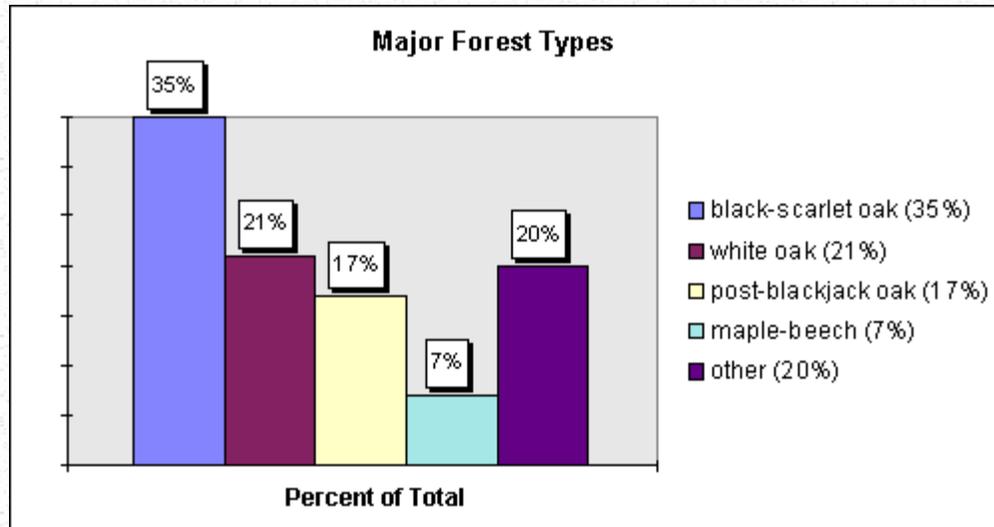


1997 Forest Health Highlights

Missouri

The Resource

Missouri is almost one-third forested. There are about 14 million acres of forest land, an increase of 10% since 1972. The eastern Ozarks have 67% of the State's forest land. In addition to recreation and wildlife benefits these forests provide, the latest statistics indicate the value of forest products produced annually exceeds \$3.3 billion. There are over 2,600 firms employing more than 33,000 people with a payroll of about \$500 million per year. In 1994, 709 million board feet were cut, 90% was oak, with a stumpage value of about \$109.5 million.



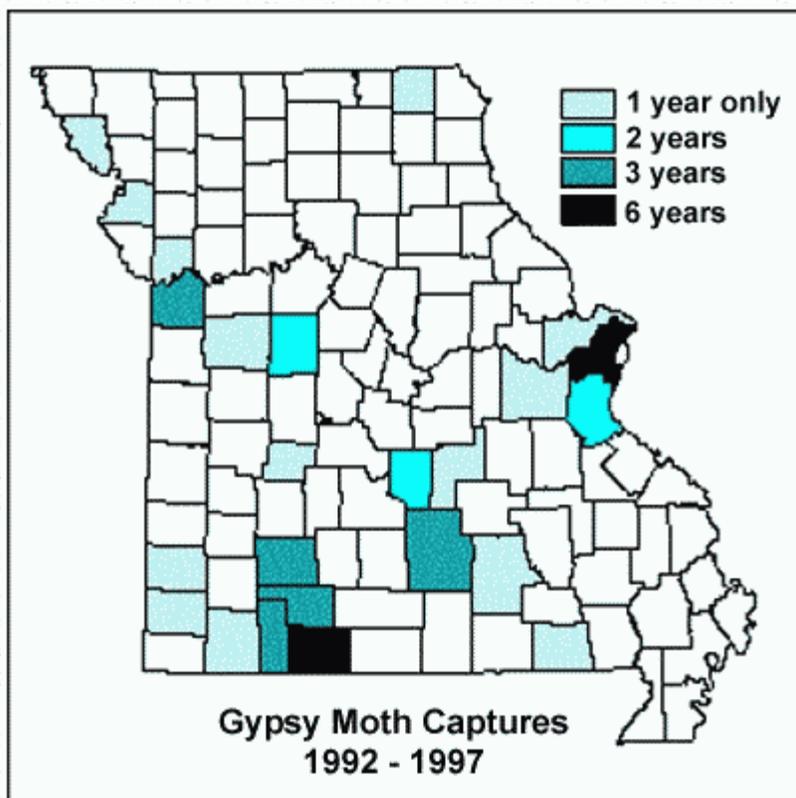
General Forest Health: Overall the forests of Missouri are in good health. The cold spring lessened insect damage and on average, disease incidence was low. The exceptions were the wilt diseases, Scotch pine needle casts and a shingle oak skeletonizer. Although severe weather patterns this year have left some species under stress, weather events this year have been of short duration allowing trees time for recovery. Species affected most by the severe weather were maple, ash, dogwood, white oak and some fruit species. Maple and ash were damaged during the series of hard frosts in April and May after an unseasonably warm March. Many produced small leaves and sparse crowns, while others leafed out normally only to die by July. The overly cold soil temperatures during May and the sudden onset of summer heat left most dogwoods scorched. Powdery mildew exaggerated the heat stress, so dogwoods were showing fall color by August. An increasing number of white oak have begun to decline over the last several years. However, no one causal agent seems to be responsible. Armillaria root rot, two-lined chestnut borer, several canker fungi plus various defoliators (both insect and fungal) seem to be involved, but none consistently. The incidence of declining white pine continues to be relatively high.

Special Issues

The Missouri Departments of Agriculture (MDA) and Conservation (MDC) and other state and federal agencies placed about 10,000 **gypsy moth** traps in 1997. This was the second year in which a gypsy moth risk system was used to determine the density of trapping throughout the entire state. The risk system uses the presence of forest cover, urban areas, trucking, tourism, and import/export facilities to assign a relative risk of gypsy moth introduction to each part of the state. Trapping density is higher in those areas considered to be at higher risk of gypsy moth introductions.

Over the last two years, computer technology designed to manage geographical information (GIS) and a process of quality control have been added to the gypsy moth program to improve the reliability of survey data. GIS was used to map all trap locations and catches from the 1996 survey, and to produce county maps based on risk category and history of catches for use during 1997 trapping. Standardized trapping and mapping procedures are being monitored by the addition of a quality control technician hired to work with trappers throughout the state. Trapping in 1997 produced a total of only 13 moths statewide, with 9 caught in St. Louis County and 4 caught near the resort community of Branson in Taney County. Six of the 9 moths trapped in St. Louis County were within a 1 square mile area. Further investigation revealed hatched gypsy moth egg masses on spruce stock at a nursery located within that area. The trees had been shipped this spring from an infested state. No live gypsy moths of any life stage was found.

Intensive trapping at 5 sites in Taney, Christian, Holt, and Texas Counties where gypsy moths had been found in 1996 yielded no positives in 1997. However, 2 gypsy moths were trapped at a Babler State Park campground in western St. Louis County, where gypsy moths had been found in 1996 and earlier years. Intensive trapping will be conducted in 1998 in this and all other areas having positive trap catches in 1997.



Although the relatively low number of gypsy moth catches in 1997 is encouraging, some familiar patterns emerge. As in other years, most catches were in urban or tourist areas that receive much interstate vehicular traffic. No reproducing populations of gypsy moths have been detected in Missouri, but the presence of a few positive trap catches each year indicates that the threat of introduction continues. Reports of increased catches from nearby states (Iowa, Illinois, Indiana, Wisconsin, and Minnesota) in 1997 further underscore the need to continue a diligent survey program in the future.

A thorough survey of the Trail of Tears State Park was repeated this year to verify (or refute) the presence of **dogwood anthracnose**. While we were not able to verify the presence of this disease, severe decline and **powdery mildew** was observed throughout the park. Damage consisted of significant die-back, leaf scorch, and shoot distortion. Although a large number of dogwoods had died, the cause is still in question. Weather extremes over the last several years may be compounding stress due to the mildew. Severe mildew is new to Missouri. It was first reported in isolated areas in 1995. By 1996, the damage was severe over parts of the east-central portion of the state. This year, mildew has been reported over most of the natural range of dogwood within the state. Its long term impacts are not known, nor is it known whether or not this fungus represents a new exotic introduction, but it is much more damaging than the

native species we are familiar with. While the mildew is not likely to kill trees outright, the dogwood anthracnose fungus can. It is possible that the anthracnose fungus is here within the state and that other stress symptoms combined with the mildew have masked its presence.

Other Issues

The identity of the **oak sprout canker** fungus has yet to be confirmed, but appears to be a *Botryodiplodia* spp. However, symptom development was surveyed (primarily on federal lands) and the results give a clearer picture of occurrence. The fungus was found present in all stands surveyed, with damage that ranged from 10 to 40% infected. The damage begins to appear in clear cut stands on 5 yr old black oak sprouts and begins to disappear among sprouts 20-25 yrs old. The damage consists of multiple cankers or open wounds along the stem with sunken, discolored bark that eventually falls off to reveal stained wood beneath. The fungus fruits along callus margins and on sloughed bark. Cankers on small material can girdle stems, killing them. Larger material eventually out-grows the canker walling it off with callus growth. However, the resulting defects severely devalue the stand. Butt rot is recognized to be a common problem among mature black oak that degrades the value of the timber. This fungus may be the source of many of the original defects. An understanding of conditions that favor the disease, may allow management to limit future devaluation of black oak timber.

Nursery Damage: The most notable damage found during nursery surveys was root rot among the black walnuts, *Phomopsis* tip blight among the red cedar and powdery mildew on the dogwoods. Losses among the walnuts ranged from 5 to 20%, depending on the bed. The rot is caused by a *Phytophthora* spp. which is favored by heavy rains and poorly drained soils. Control methods to date have been inadequate. Past surveys indicate that contaminated seed may be reintroducing the fungus into fumigated beds. Losses among the red cedar are still being calculated but are substantially higher than last year. Damage by *Phomopsis* tip blight increases during years of wet springs and mild summers. The cold snap in August also led to some late season infection not normally seen.

The **shingle oak skeletonizer** is a lepidopteran moth, yet to be identified. An outbreak of the small caterpillar occurred for a second year in a row, but the center of the outbreak moved west and north this time. While mid to late-season defoliation of shingle oak was seen over most of the Ozarks last year, only shingle oaks in the west-central portion of the state were defoliated this year. Damage that ranged from 30-100% defoliation occurred in an area from Jefferson City, south to Lake of the Ozark, west to the Kansas border and north to Kansas City. The most severe damage occurred in an area between Warrensburg, Clinton and Sedalia. Although, this is the second year of the outbreak, we don't expect continued damage. Outbreaks of several native insects are cyclic, with weather conditions and natural enemies controlling the normal ups and downs of the cycle. Since most of the damage occurred late in the season, no long term losses are expected.

For additional information on Missouri forests and pest management call or write: MDC, Plant Health Clinic, 2901 W. Truman Blvd, Jefferson City, MO 65102-0180, (573) 751-4115. For e-mail use either: burkss@mail.conservation.state.mo.us or lawrer@mail.conservation.state.mo.us

For more information contact:

Marvin Brown,
State Forester
Box 180
Jefferson City, MO 65102
(573) 751-4115



Forest Health Protection
Northeastern Area,
State & Private Forestry
USDA Forest Service
1992 Folwell Avenue
St. Paul, MN 55108

