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Southern  
Forestry

U. S. DEPT. OF AGRICULTURE  
P. R. Y.  
JUN 9 - 1962  
SERIAL RECORDS



FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

*Southern Forest Experiment Station, New Orleans, La.*

No. 138

March 1962

### LOW HUMIDITY WARNS OF BAD FIRE SITUATIONS

In the South relative humidity is not used for calculating fire danger, but it is a good thing to be aware of. Analysis of Texas state reports on 2,207 fires that burned during the winters of 1958, 1959, and 1960 shows that low humidities give warning of big fires and high occurrence rate.

Included were man-caused fires that were larger than a spot in size, were discovered between 10 a.m. and 6 p.m., and were attacked within 4 hours after discovery. Non-incendiary fires were divided into those that occurred on grass land and those that burned in timber. Incendiary fires were analyzed separately as a single group.

Relative humidity was one of four variables found to affect size of non-incendiary fires significantly. Even more important, it showed the likelihood of big fires. At least 77 percent of all fires over 100 acres in size occurred when relative humidity was below 40 percent. Fires burning at humidities below 40 percent averaged almost three times as large as those at higher humidities.

As anticipated, fire size also depended heavily on wind speed and attack time (elapsed time between discovery and first attack). Winds below about 8 miles an hour had less effect on the size of fires

in timber than in grass; above 8 miles an hour, increasing wind caused timber fires to increase in size more than grass fires. Delayed attack obviously permitted fires to get larger--no news to firefighters.

The fourth significant factor was hour of discovery. The earlier in the day that fires were discovered, the larger they tended to become. This paradox, also observed in other places, has never been explained satisfactorily.

Predicting number of fires on any given day is not possible, but the likelihood of high-occurrence days can be forecast from relative humidity and Burning Index (an integration of fuel moisture, wind, cumulative drying effect, and condition of lesser vegetation). At least 60 percent and possibly up to 92 percent of all days with 5 or more fires on a protection district came when relative humidity was less than 40 percent. Ninety-six percent of the high-occurrence days had Burning Indexes higher than 5.

Incendiary fires were far less predictable. Only wind and hour of discovery affected their size, and nothing helped in predicting the number that would occur. This indication that incendiary fires belong in a class by themselves adds strength to a conviction fire control men have held for a long time.

Relative ease of prediction makes relative humidity attractive in comparison with more complicated criteria of fire weather. Even if available weather forecasts do not include humidity itself, they give temperature predictions from which approximate minimum humidities can be estimated by means of psychrometric tables. Answers should be close enough to warn when potentially bad days are in prospect.--G.R. Fahnestock.

## TENNESSEE WOOD-USING PLANTS

A survey of Tennessee forest industries found 1,286 primary wood-using plants operating in 1960. Sawmills alone made up 1,135 of the total. In 1946, when the last complete census was made, 2,789 sawmills were active. The losses were entirely among small, generally portable mills; those cutting at least 3 million board feet annually increased in number from 19 to 20. Average annual output per mill, however, almost doubled between 1946 and 1960.

Establishment of two new pulpmills during the 1950's increased daily pulping capacity in the State from 715 tons in 1950 to 2,357 in 1960. Of Tennessee's five pulpmills, two primarily process pine; three, hardwood.

During the 1950's the veneer industry shrank from 14 to 9 plants.

Tennessee's forests are also supplying 37 cooperage operations, 4 pressure-treating plants, 87 dimension mills, and 9 miscellaneous factories making charcoal, excelsior, golf club heads, barrel faucets, and chemical stoppers.--*Joe F. Christopher.*

### SITE PREPARATION BENEFITS PINE SEEDING AND PLANTING IN TEXAS

In east Texas, site preparation improved first-year survival of loblolly and shortleaf pine planted and sown in both fields and woods.

Sites were prepared either by furrowing with a fire plow or disking with a bush and bog harrow. Seed that had been stratified and coated with bird and rodent repellents was sown in January 1960, and year-old seedlings were bar-planted in the same month.

Survival of planted trees was 93 percent in furrows and 89 percent on disked plots, as compared to 81 percent on unprepared sites. Tree percentages from seed were better in disked rows (18) and furrows (15) than on unprepared sites (8). Furrowing or disking improved the height growth of planted but not of seeded trees.

Planted shortleaf survived better (91) than loblolly (84), but tree percent of sown shortleaf (13) did not differ greatly from that of loblolly (15). Survival of planted and sown

trees was better in the woods than in the field; height growth was better in the field.--E.R. Ferguson and J.J. Stransky.

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\*Copies are available at the Southern Station.