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SUMMER MOISTURE OF FOREST FIRE FUELS IN OREGON AND WASHINGTON IN 1948 AND PREVIOUS YEARS

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The forest fire season of 1948 in Oregon and Washington was regarded by fire suppression agencies as the most favorable for many years. The number of fires started and area burned were, in general, less than for many years. On the national forests the number of fires was the least since 1912 and the acreage burned was the least ever recorded. Was this primarily due to favorable fire weather conditions or to better fire prevention and suppression? Experienced fire fighters recognized at the time that periods of unusually dry weather which usually bring with them numerous accidental fires were not occurring. Some fires did start and it was difficult to judge without measurements how the fire weather compared with that of previous years. The following comparison of forest fuel moisture measurements shows that in a great part of Oregon and Washington the weather was the most favorable since 1941.

If the kindling fuels in the forest become drier fires start more easily and spread faster; in contrast, if the fuels become moist, fires start less easily and spread slower. Day-to-day or week-to-week changes in kindling-fuel dryness thus cause corresponding changes in fire danger if other factors remain unchanged. A record of kindling-fuel moisture content for each day of the fire season would show the principal yearly variation in effect of weather on forest fire danger.

It is impracticable to measure each day in numerous localities dryness of the actual kindling fuels in the forest. The moisture content of standardized fuel moisture indicator sticks that show the trends of changes in kindling-fuel dryness is, however, easily measured.

The fuel moisture indicator sticks used in Oregon and Washington are ponderosa pine sapwood cylinders $\frac{1}{2}$ inch in diameter and about 20 inches long. Four such sticks are held parallel and $\frac{1}{4}$ inch apart by two small wooden dowels. The wood is carefully selected to insure that all sets of sticks are alike in their moisture absorption and drying characteristics. The sticks are exposed to rain, dew, sun, moist air, dry air, and wind in the same manner as forest fuels. Tests have shown that their moisture content changes consistently and quickly with changes in these weather elements. The sticks are weighed on scales reading directly in moisture content percent.[1/]

A representative network of 55 out of approximately 400 stations that record daily fuel moisture indicator stick readings on the national forests was selected for a comparison of the 1948 records with those of previous years back to 1941. In selecting the stations the objective was to obtain the average weather condition in forested areas throughout the two states. Since most of the national forest land is within the mountain ranges and most of the private forest land extends from the foothills to the lowlands, the stations were selected as nearly as possible along the boundary of the two. Mountain peak and valley stations were both chosen to obtain a sample of weather conditions at both high and low elevations within the mountains.

The period of record selected for study in each year was July 16 to August 31. It was desired to compare fuel moisture values for the principal part of the fire season each year. In some years and localities there is little fire danger after September 1 or before July 1. Daily fuel moisture indicator stick records are not available for seasonal guard stations before and after the period of fire danger requires continuous occupancy. The length of period to be averaged should be the same for all years and stations compared. As a result of those considerations the period July 16 to August 31 was selected.

Yearly summer average fuel moisture indicator stick readings were listed for each station and the stations were arranged according to geographic location with the high mountain stations in one group and the low valley stations in another. Similar studies in the past have shown that year-to-year trends are not the same at both high and low elevations. For example, fuel moistures may increase over those of the previous year at high elevations but may decrease at low elevations.

At stations in Washington and the northern part of the Blue Mountains in Oregon the 1948 fuel moisture indicator stick average summer values at both high and low elevations were greater than for any other year in the period 1941-48. In southwestern Oregon the 1947 moisture values were the highest of the period. East of the Cascades in Oregon, except in the Wallowas and northern Blue Mountains in the northeast part of the state, the 1941 values were the highest recorded in the period. In contrast to these years of high fuel moisture, the driest fuels in the 8-year period occurred in 1946 at one-third of the stations, while 1945 and 1942 each produced lowest moisture readings at about one-fifth of the stations in the region.

1/ Morris, William G. Gaging fire weather in the woods. West Coast Lumberman 68 (6): 20. June 1942.