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FOREST FIRE WEATHER IN EASTERN OREGON

AND CENTRAL WASHINGTON IN 1960

by

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In 1960, the first analysis of fire season weather was made for forests east of the Cascade Range. Highlights were: The 1960 season was among the most severe since 1939 in eastern Oregon, was more severe than normal in central Washington, and will long be remembered for the rainless lightning storm that hit northeast Oregon with devastating effect the evening of July 19.

Severity of fire season weather on the east side was analyzed, following a procedure similar to that used for west-side forests.^{2/} Separate ratings and discussions were prepared for the three principal forest areas: northeast Oregon, south-central Oregon, and central Washington.

Abrupt weather changes marked the April-October fire season. Spring had rainy cool weather in April and May, and dry warm weather in June. July's extreme fire danger dominated the summer, while

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^{2/} Cramer, Owen P. Forest fire weather and computed fire occurrence in western Oregon and western Washington in 1960. U. S. Forest Serv. Pac. NW. Forest & Range Expt. Sta. Res. Note 193, 12 pp. 1960. (Processed.)

above-normal rainfall and below-normal temperature characterized August weather, except in south-central Oregon where it was drier than usual. In September and October, rainfall was below normal in all sections and temperatures were above normal in eastern Oregon and near normal in central Washington. Wetting rains occurred November 6-7 in south-central Oregon and in mid-November in other areas east of the Cascades.

In this report, severity of the 1960 fire season is compared with previous seasons, primarily with the aid of two indexes of weather conditions closely related to fire occurrence. These indexes are computed for the entire April-through-October fire season and separately for three portions of the season: spring (April 1-June 30), summer (July 1-September 15), and fall (September 16-October 31). The indexes are: (1) total number of days when no rain fell and (2) average number of days since a wetting rain of one-fourth inch or more. The rainfall reports used in computing the indexes are from U. S. Weather Bureau and Federal Aviation Agency stations. These provide an unbroken record for the 7-month season in both present and preceding years. Indexes have been computed beginning with 1939 for six stations, and beginning with 1949 for a seventh. These indexes are supplemented by average burning index for four Forest Service fire-danger stations. In addition, lightning storm occurrence is compared on the basis of number of days on which storms were reported over each national forest.

1960 FIRE WEATHER IN NORTHEAST OREGON

Extreme fire weather in July helped make the entire fire season one of the four most severe of the past 22 years. The season total of rainless days was fourth highest in the 22-year record. Only 1939, 1949, and 1951 had fewer rainy days. The season figure for average time since a wetting rain also was the greatest since 1951.

Spring was predominately rainy and cool to May 26. Then rainless weather prevailed, except for June 14-15, until July 28. The Weather Bureau reported that in the northeast Oregon division June temperatures averaged 2.4° above normal and July, 4.6° above normal. July fire danger was extreme until rains drenched most of northeast Oregon July 31 and August 1. August was much cooler than usual and had 200 to 400 percent of normal rainfall. September and October had slightly below-normal rainfall and slightly above-normal temperatures. Rains occurred July 29-August 2, August 21-24, September 3-5, and October 6-10. Of these, only the first was generally wetting.

Spring had a normal number of rainless days, but wetting rains were so spaced as to nearly equal the 1949 spring record for greatest average time since a wetting rain (table 1). Number of rainless days was also normal for the summer, though the June-July drought resulted in the fourth highest summer rating for time since wetting rain. Summer burning index for John Day was equal to the average of the previous nine summers, while that for Halfway Ranger Station was slightly above average. Although fall rainless days were the most numerous since 1951, the early September and October rains reduced the average time since a wetting rain to below normal.

Table 1.--1960 fire-weather indexes and comparative data
for northeast Oregon^{1/}

Item	Cur- rent year (1960)	Pre- vious year (1959)	10-year average (1950-59)	Previous record ^{2/}	
				Low	High
Spring (April 1-June 30):					
Average days since wetting rain	26.5	16.9	24.9	7.6 (1948)	26.8 (1949)
Total rainless days	72.0	75.0	70.0	49.0 (1948)	83.3 (1939)
Summer (July 1-Sept. 15):					
Average days since wetting rain	58.6	45.4	48.8	20.7 (1941)	79.6 (1951)
Total rainless days	70.0	69.3	70.0	57.0 (1941)	73.7 (1945)
Fall (Sept. 16-Oct. 31):					
Average days since wetting rain	45.9	25.7	53.9	16.8 (1940)	88.7 (1958)
Total rainless days	40.3	35.0	36.9	30.3 (1950)	45.6 (1952)
Season (April 1-Oct. 31):					
Average days since wetting rain	43.1	29.1	36.4	18.1 (1948)	53.6 (1949)
Total rainless days	182.3	179.1	176.6	153.6 (1948)	190.0 (1949)

^{1/} Indexes based on observations at Burns and Pendleton Weather Bureau stations and Redmond Federal Aviation Agency station.

^{2/} Period of record begins with 1939.

July was outstanding as a month of extreme fire danger. It was the hottest month of record at many stations, including Pendleton, Oreg., and nearby Boise, Idaho, and was the hottest since 1906 at Walla Walla, Wash. The temperature at Meacham, at an elevation of 4,050 feet, averaged 7.2° above normal. The hottest days of the month were July 18 and 19, following about a 2-week period during which the Pendleton temperature exceeded 90° on 12 days and 100° on 4 days. On the 18th, Pendleton registered 108°; Meacham, 103°; and La Grande, 108°. On the evening of the 19th, the Umatilla and Wallowa-Whitman National Forests were swept by an intense rainless lightning storm. Only after 10 more days of extreme burning conditions and additional scattered dry lightning storms was the emergency ended by heavy rains. In those 11 days, 369 lightning fires burned 64,410 acres of forest land within the Umatilla, Malheur, and Wallowa-Whitman national-forest protection areas.

1960 FIRE WEATHER IN SOUTH-CENTRAL OREGON

The 1960 fire season was severe in south-central Oregon (table 2). The number of rainless days was the second greatest since 1951, and the average time since wetting rain was the greatest at least in the past 12 years.^{3/} Redmond recorded the greatest average time between wetting rains in 22 years of record and had no wetting rains between April 1 and October 7, a period of 189 days. Effect of this record drought was only partially offset by numerous light rains in April and May. At Lakeview, average time since a wetting rain was greatest since 1940, no wetting rain occurring between May 24 and November 6.

Rainfall was farther below normal in south-central Oregon than in any other east-side section. April rainfall was between 40 and 100 percent of normal, with slightly below normal temperature. May was the only wet month, having 100 to 150 percent of normal rainfall and below-normal temperatures. No rains occurred between the end of May and the end of July. Above-normal temperatures in June became much above normal in July. From then on, rainfall remained well below normal in most sections with light rains July 29-31

^{3/} Redmond and Lakeview indexes have been computed for each year starting with 1939. Klamath Falls indexes and, therefore, the average of the three stations begin with 1949.

and September 3, and wetting rains in the October 6-10 interval. August was cooler, but September and October were slightly warmer than normal.

Average time since wetting rains was greatest in 12 years of record in both spring and summer, and second only to 1949 in the fall. Although wetting rains were infrequent, light rains did occur so that spring and summer totals for rainless days were about normal. Rainless days in the fall were more frequent than normal. Summer burning index for Bly Ranger Station was by far the highest of the 1951-60 period.

Table 2.--1960 fire-weather indexes and comparative data
for south-central Oregon^{1/}

Item	Cur- rent year (1960)	Pre- vious year (1959)	10-year average (1950-59)	Previous record ^{2/}	
				Low	High
Spring (April 1-June 30):					
Average days since wetting rain	<u>3</u> /38.5	16.7	16.9	9.6 (1956)	23.3 (1950)
Total rainless days	71.3	77.0	71.7	63.3 (1953)	78.0 (1951)
Summer (July 1-Sept. 15):					
Average days since wetting rain	<u>3</u> /91.4	52.3	51.5	28.5 (1952)	79.3 (1951)
Total rainless days	72.7	73.0	71.3	64.3 (1958)	74.3 (1949, 1957)
Fall (Sept. 16-Oct. 31):					
Average days since wetting rain	99.4	23.9	46.1	23.9 (1959)	100.8 (1949)
Total rainless days	41.0	38.3	37.7	30.3 (1950)	44.7 (1952)
Season (April 1-Oct. 31):					
Average days since wetting rain	<u>3</u> /61.0	33.1	35.4	24.2 (1952)	49.3 (1949)
Total rainless days	185.0	188.3	180.6	174.0 (1956)	190.7 (1949)

^{1/} Indexes based on observations at Lakeview Weather Bureau station and Redmond and Klamath Falls Federal Aviation Agency stations.

^{2/} Period of record begins with 1949.

^{3/} New record high.

1960 FIRE WEATHER IN CENTRAL WASHINGTON

The fire season was more severe than usual, though April and May were comparatively damp and cool. Both the number of rainless days and the average time since a wetting rain were above normal for the season, with number of rainless days the greatest since 1954 (table 3).

Table 3.--1960 fire-weather indexes and comparative data

for central Washington^{1/}

Item	:	:	:	:	Previous record ^{2/}	
	:	Cur-	Pre-	:		
	:	rent	vious	10-year		
	:	year	year	average	:	:
	:	(1960)	(1959)	(1950-59)	Low	High
	:	:	:	:	:	:
Spring (April 1-June 30):						
Average days since wetting rain		18.5	46.0	23.8	6.9 (1948)	46.0 (1959)
Total rainless days		74.0	74.5	73.2	60.5 (1948)	85.0 (1949)
Summer (July 1-Sept. 15):						
Average days since wetting rain		84.0	124.3	62.2	21.0 (1948)	124.3 (1959)
Total rainless days		69.5	67.5	69.2	64.5 (1941, 1955)	74.5 (1945)
Fall (Sept. 16-Oct. 31):						
Average days since wetting rain		112.8	11.2	49.5	11.2 (1959)	127.7 (1945)
Total rainless days		41.0	28.5	35.4	23.0 (1947)	44.5 (1942, 1952)
Season (April 1-Oct. 31):						
Average days since wetting rain		62.3	66.6	42.8	14.7 (1948)	88.5 (1939)
Total rainless days		184.5	170.5	177.8	164.5 (1948)	197.0 (1949)

^{1/} Indexes based on observations at Omak and Yakima Weather Bureau stations.

^{2/} Period of record begins with 1939.

The April-May wet and cool combination was reversed in June when rainfall averaged only a quarter of normal and temperatures were above normal. July, with only traces of rain until the last 3 days and temperatures averaging a scorching 3° to 6° above normal, had the most severe fire danger of any month in recent years. Temperature at Nespelem in the northeast part averaged an amazing 9° above normal. August brought a welcome change for central Washington with below-normal temperature, while rainfall ranged from half normal in the south to twice normal in the north. Average minimum humidities remained below normal from June 21 to August 10. September had normal temperature and below-normal rainfall. October rainfall was also below normal and temperature was slightly above normal. At the end of October, Yakima was awaiting its first wetting rain after 178 days. This drought established the highest average number of days since a wetting rain in 22 years of record for both the fall period and the entire season at Yakima. Farther north, Omak received a wetting rain during the October 7-10 rainy period after 136 days.

In the spring, number of rainless days was near normal, while the average time since wetting rain was the least since 1957. Summer also had a normal number of rainless days, though the greatest number since 1956. Time between summer wetting rains was above average, but was considerably less than in 1959 when no general wetting rains occurred here during either spring or summer. Summer burning index for Cashmere Ranger Station was slightly above the average of the previous nine summers. In the fall, both rainfall indexes were the highest since 1954, average time since wetting rain being third greatest in the 22-year record.

LIGHTNING STORM FREQUENCIES

In northeast Oregon, lightning storms occurred on more days during the summer than in any of the previous 10 years (table 4). Elsewhere east of the Cascades, summer lightning occurrence was near normal, though in central Washington there were considerably more storms than in 1959.

Table 4.--Number of days with lightning storms between
July 1 and September 15 in 1960 compared with
previous years^{1/}

Section and national forest	Cur- rent year :(1960):	Pre- vious year :(1959):	10-year average :(1950-59):	Previous record			
				Low		High	
Northeast Oregon:							
Malheur	27	12	17.3	12	(1950, 1951, 1959)	33	(1956)
Ochoco	<u>2/26</u>	6	12.4	6	(1959)	20	(1956)
Umatilla	<u>2/27</u>	4	14.9	4	(1959)	23	(1956)
Wallowa-Whitman	<u>2/35</u>	9	20.9	9	(1959)	32	(1956)
Section average	<u>2/28.8</u>	7.8	16.4	7.8	(1959)	27.0	(1956)
South-central Oregon: ^{3/}							
Deschutes	13	9	10.6	7	(1955, 1958)	19	(1952)
Fremont	13	15	15.3	5	(1954)	27	(1956)
Section average	<u>13.0</u>	12.0	12.9	6.5	(1954)	22.5	(1956)
Central Washington:							
Okanogan	13	2	14.9	2	(1959)	28	(1956)
Wenatchee	9	2	8.3	2	(1959)	23	(1956)
Section average	11.0	2.0	11.7	2.0	(1959)	25.5	(1956)

^{1/} Based on daily reports to U.S. Weather Bureau and on ranger district field records (R6-5120-49).

^{2/} New record.

^{3/} 1957 data not available.