

Floods of 1950 in Southwestern Oregon Northwestern California

Prepared under the direction of C. G. PAULSEN, chief hydraulic engineer

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1137-E

A presentation of data on the floods of October-November 1950 in the southern Willamette River tributaries and the Siuslaw, Umpqua, Coos, Coquille, and Rogue River basins in southwestern Oregon, and the Smith, Klamath, Mad, and Eel River basins in northwestern California



UNITED STATES DEPARTMENT OF THE INTERIOR

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PREFACE

This report on the floods of October-November 1950 in southwestern Oregon was prepared by the U. S. Geological Survey, Water Resources Division, under the general direction of C. G. Paulsen, chief, Water Resources Division, and J. V. B. Wells, chief, Surface Water Branch.

The collection of basic records of stage and discharge in the area described in this report is a part of a continuous cooperative program with the following agencies: State of Oregon, Charles E. Stricklin, State engineer; State of California, Department of Public Works, C. H. Purcell, director, and A. D. Edmonston, State engineer; Coos Bay-North Bend Water Board; Corps of Engineers, Department of the Army; and U. S. Bureau of Reclamation.

The base data were collected and compiled in the district offices of the Surface Water Branch under the supervision of the district engineers K. N. Phillips in Oregon and R. C. Briggs, California.

The field work and computations necessary for the determination of peak discharges by indirect methods were under the technical direction of Hollister Johnson, hydraulic engineer. Other technical aspects of the report were under the immediate supervision of C. A. Young, hydraulic engineer. The report was arranged and the text prepared by J. S. Gatewood, hydraulic engineer.

Assistance in collecting records was given by Jackson and Josephine Counties, Oreg.; the city of Grants Pass, Oreg.; and The California Oregon Power Co. The American Red Cross, the U. S. Weather Bureau, the U. S. Forest Service, and many individuals supplied information or assisted otherwise in the preparation of this report.

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FLOODS OF 1950

Floods of 1950 in Southwestern Oregon and Northwestern California

Prepared under the direction of C. G. PAULSEN, chief hydraulic engineer

ABSTRACT

Continued rains through most of October 1950, culminating in heavy rains October 27-30, caused the streams of southwestern Oregon and northwestern California to rise rapidly to high peaks. Most streams reached their peaks October 29, although some peaked late on October 28 and some after October 29. The basins affected included the southern Willamette River tributaries and the Siuslaw, Umpqua, Coos, Coquille, and Rogue River basins in Oregon, and the Smith, Klamath, Mad, and Eel River basins in California. The upper Klamath River basin in Oregon east of the Cascade Mountains had no flood.

The flood was caused almost entirely by rainfall. Snow melt was a negligible factor. Little of the storm-producing precipitation fell as snow. The greatest precipitation recorded was 26.1 inches for the 6-day period October 25-30 at Gasquet ranger station, 10 miles south of the Oregon-California State line and about 13 miles inland from the coast. All the stations at which more than 15 inches were recorded for the 6-day period are in the extreme southwestern part of Oregon or northwestern part of California, except for Dunsuir, in the upper Sacramento River Valley in California, where 16.5 inches fell. The greatest unit peak discharge was 305 cfs per square mile for West Fork Illinois River near O'Brien, Oreg., which has a drainage area of 46.6 square miles. The unit discharge of 248 cfs per square mile for the Smith River near Crescent City, Calif., was even more unusual, considering its much larger drainage area, 613 square miles.

The floods of October-November 1950 were not the greatest known in the area covered by this report; peaks of the historic flood of 1861-62 were greater at every point at which records are available, except for one point on the Smith River in California where the stage of the 1950 flood equaled that of 1861-62. Also, other flood peaks since 1861-62 have been higher on many of the streams than the peaks of October 1950. However, on the lower Umpqua River the peak was the greatest since the beginning of records in October 1905, and probably the greatest since 1861. Over the entire area affected by the floods, damage was greater than any known before, largely because of the increased population and the greater economic development of recent years.

Direct and indirect flood damage approached or exceeded \$10 million, according to the best estimates. However, no comprehensive survey of damage in the entire area was made by any single organization and the total is probably low. Direct damage consisted mostly of destruction of roads and bridges, damage to houses and industrial plants, and loss of crops and cattle. Loss of income caused by disruption of transportation and business probably exceeded direct damage in money value. Almost no flood protection exists in the area except on the upper Willamette and lower Coquille and Umpqua Rivers. Three flood-control reservoirs in the upper Willamette River basin reduced flood peaks appreciably.

This report contains records of stage and discharge or contents at 46 gaging stations and 2 reservoirs during October and November, and a summary of peak discharges at 100 points within the area of the flood. The report also includes a discussion of weather associated with the flood, and other pertinent data.

INTRODUCTION

The area in which the floods of October-November 1950 occurred is shown in figure 62. It extends from the southern tributaries of the Willamette River in Oregon to the Eel River basin in California, and from the Pacific Coast inland about 120 miles. The floods were not the greatest on record, but flood damage exceeded any heretofore known because in the last decade the southwestern part of Oregon has become the principal field for the lumber industry in the State, and much of the recent industrial development has been along or near the streams.

Although a considerable part of the area studied in this report is in California, the greatest flood damage occurred in Oregon, and most of the discharge records included in the report are for Oregon streams. The floods of November-December 1950 in the Central Valley of California will be the subject of Water-Supply Paper 1137-F.

No special report on floods in the area covered by this report has been published heretofore by the Geological Survey; however, the extreme northern part of the area was included in the report "Floods of May-June 1948 in Columbia River basin," Water-Supply Paper 1080, and most of the area in California was included in the report "Floods of December 1937 in northern California," Water-Supply Paper 843.

The Geological Survey, operating through its district offices in Portland, Oreg., and San Francisco, Calif., maintains about 85 river-measurement stations within the flooded area, as a part of the regular Nation-wide stream-gaging program for the investigation of water resources. These stations are maintained by the Geological Survey largely in cooperation with the States, municipal corporations, and other Federal agencies. Many have been operated for long continuous periods, thus giving a background of systematic records of stage and discharge with which the floods of 1950 can be compared.

GENERAL DESCRIPTION OF THE FLOODS

The floods of October-November 1950 rank with the great floods of 1890 and 1927 throughout most of the area affected and rank below those of 1861-62. Only on the lower Smith River of California is it definitely known that the flood peak of October 1950 equaled the peak of 1861-62. In general, the floods were greatest near the Pacific Coast and of progressively less intensity eastward. Thus on westward-flowing streams, which include all streams affected except the Willamette River, the lower reaches had relatively higher peaks than the headwaters. In the Willamette River basin the reverse was true. Only the headwater streams in the southerly part of that basin were in the path of the flood-producing storms.

The area affected by the floods of October-November 1950 extended from the Eel River basin in California to the Siuslaw River and the southern Willamette River tributaries in Oregon. The flood was most damaging in Del Norte, Humboldt, and Siskiyou Counties in California and in Curry, Josephine, Jackson, Douglas, Coos, and Lane Counties in Oregon.

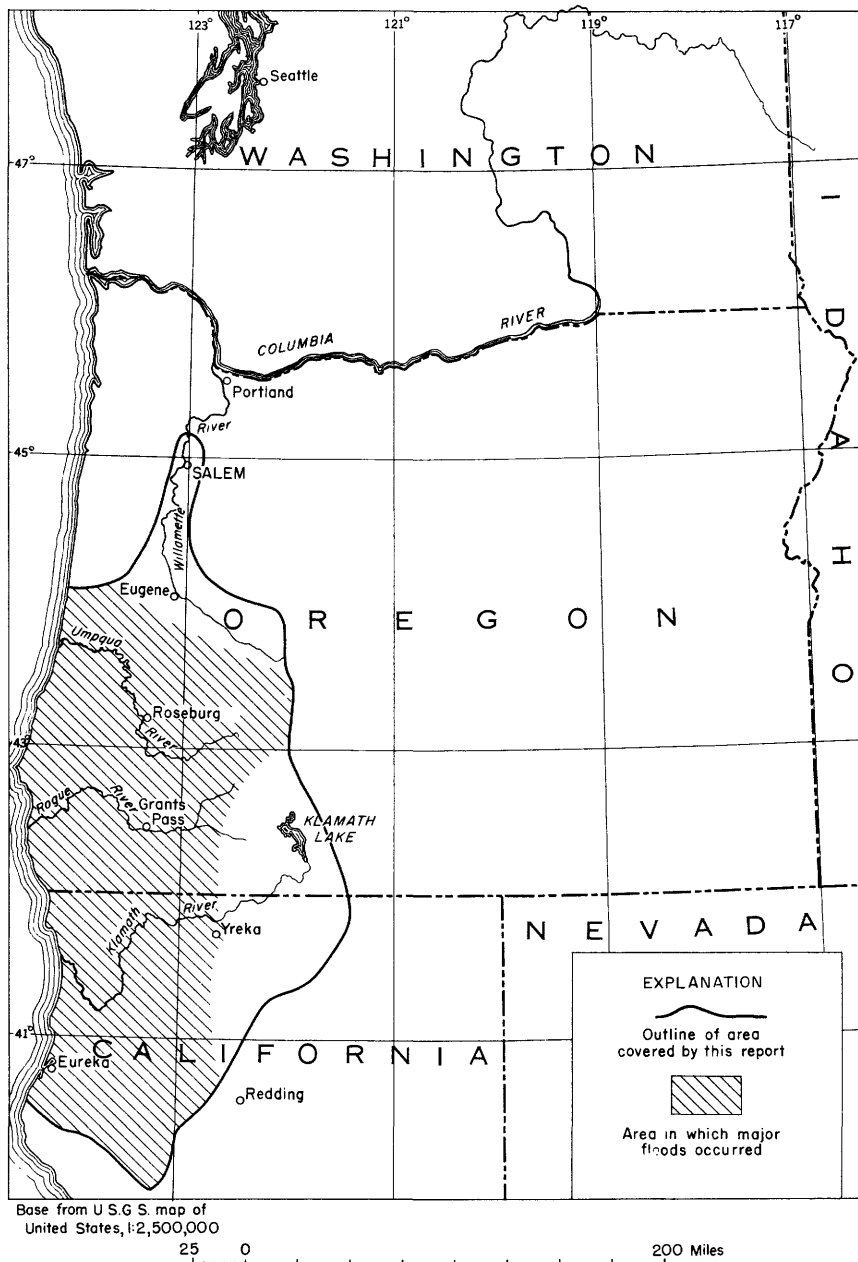


FIGURE 62.—Map showing location of area covered by this report.

An unusual feature of the flood was the off-season in which it occurred. Floods in western Oregon have usually occurred in the noncrop winter season and are normally expected from November through April. This flood, coming before the fall harvest was complete, caused a relatively large crop loss. Unharvested crops were inundated and destroyed, many cattle were trapped and drowned.

The rapid rise of the flood and its occurrence on a Saturday night and Sunday in most areas were factors contributing to its destructiveness. The rapidity of the rise is illustrated by Umpqua River, which rose 28.8 feet at Elkton in the 24 hours beginning at 6 p. m. Saturday, October 28. This quick rise was recorded, not in a steep headwaters mountain stream but near the mouth of one of the largest streams in the flood area. Peak discharge of most streams was reached on Saturday night or on Sunday morning when most persons, including maintenance and repair crews for highways, railroads, and communications, were off duty.

The flood was caused almost entirely by rain. At the beginning of the storm that produced the flood there was little or no snow below the 6,000-foot level. During most of the storm the freezing level in the mountains was about 7,000 feet. Snowmelt contributed little to the flood runoff, and but little of the precipitation that fell before and during the flood was in the form of snow.

Runoff from the storm was developed rapidly. In most of the area where rainfall was greatest, slopes are steep and soil cover is thin. Figure 63 (flood hydrographs for the six gaging stations on the main stem of Rogue River) shows how rapidly precipitation became runoff. The most upstream station, above Bybee Creek, and most downstream station, at Grants Pass, are 89 miles apart; yet the peak flows at all six stations occurred within a 7-hour period. Storm runoff apparently reached the main stream almost simultaneously throughout the 89-mile reach. It appears that the intermediate inflow between gaging stations reached maximum rates within a short period of time.

General rains of 2 or more inches, falling principally on October 5 and 17, had made the ground thoroughly wet before the 6-day rain and wind storm began on October 25. The heaviest rainfall came between the afternoon of the 27th and the morning of the 29th and resulted in rapidly rising streams and high rates of runoff. More than 9 inches of rainfall was recorded at several precipitation stations in Oregon, and 14.75 inches was recorded October 26-29 at Kerby on the Illinois River. In northwestern California, even greater amounts were recorded. Several stations reported more than 12 inches for the maximum 2-day period. At the Gasquet ranger station in the Smith River basin, 21.8 inches of rain fell in the 4-day period October 27-30, and 26.1 inches in the 6 days October 25-30. Most streams reached their crests late on October 28 or on October 29. The peaks were of short duration, and by October 31 stages were falling rapidly.

The storm preceding the flood was the first major one of the season and brought great quantities of leaves to the ground. This was an important factor in increasing the destructiveness of the flood, particularly in urban areas. Flood water, loaded with leaves and small debris, quickly clogged drains and culverts. Water normally carried harmlessly away was forced to seek an overland path. Much of the damage was caused by water on its way into the main streams rather than by the larger streams themselves. For example, a storm sewer at Grants Pass, partly plugged by debris and overloaded by flood water from Skunk Creek, hurled a geyser several feet into the air through a man-hole, caused great damage to the street pavement, and turned the street into a raging torrent for about an hour. At Roseburg much of the flooding was caused

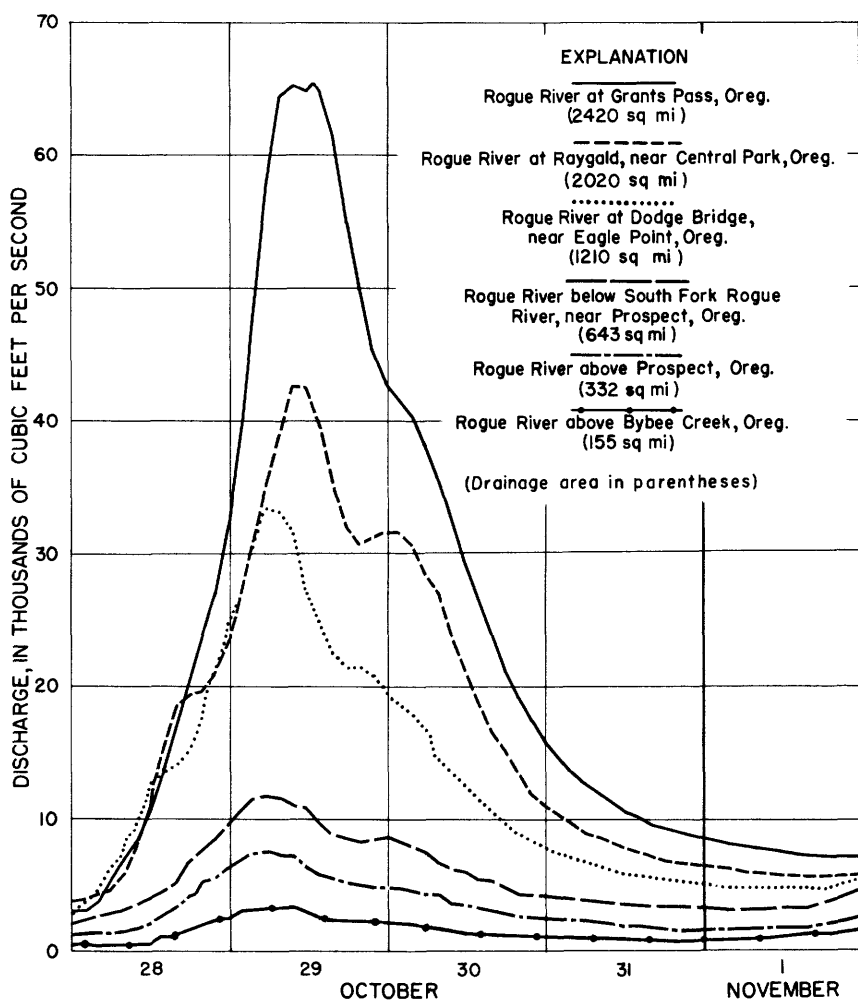


FIGURE 63.—Graphs of hourly discharge for stream-gaging stations on the Rogue River, Oreg.

by Deer Creek. This stream carried a high flow that normally would have been discharged into the South Umpqua River without serious flooding, but high waters in the river forced the creek to back up and overflow its banks. Figure 64 shows Oak Street Bridge across South Umpqua River at Roseburg, near the crest of the flood. According to H. C. Wells of The California Oregon Power Co., the water rose within 1 foot of the bottom of the lower chord of the bridge.

Damage to roads and bridges was severe. The Pacific Highway at a point 10 miles east of Grants Pass was under 3 feet of water, and all main highways were closed October 29. Figure 65 shows the Pacific Highway closed by flood water at Myrtle Creek, Oreg. Many miles of highway bordering on or near streams were damaged by erosion and caving along the edge of the roadway. Railroads were closed by landslides, as well as by washouts, and service was suspended for several days.

Lumbering, the principal industry of western Oregon, was especially hard hit by the floods. The loss of sawlogs by flooding of ponds and breakage of rafts was considerable, but of even greater loss to the economic life of the region was the resulting enforced shutdown of a great part of its principal industry.

Five persons were reported to have lost their lives as a direct consequence of the flood in Oregon, and 2,000 people were forced to leave their homes over the week end. Some sections of the towns of Myrtle Creek, Riddle, Canyonville, Eugene, Sutherlin, and Roseburg were inundated. Some business houses were flooded; and others were protected by hastily-built sandbag embankments. Schools were closed in the flood area on Monday following the flood, but most of them reopened on Tuesday when transportation facilities were restored.

A feature of the disaster emergency service, according to the Daily Courier of Grants Pass, was the radio information service of the local station KUIN, Grants Pass. Spot bulletins on flood developments were issued every half hour during the night of October 28-29. Hourly river readings, reports from the Medford weather station, and pertinent local information were broadcast. The radio station assisted State police by broadcasting requests for boats and other emergency equipment. Among other organizations participating in disaster emergency service were the Red Cross and the Oregon National Guard. The Red Cross provided emergency shelter for about 1,000 evacuees.

Flood-protection works existed only in a few areas. The lower reaches of the Coquille and Umpqua Rivers were protected by dikes. Along the lower Coquille River, water overtopped or breached the dikes generally from Myrtle Point to the mouth. Flooding in this



FIGURE 64.—Oak Street Bridge across the South Umpqua River at Roseburg, Oreg. Photo by Paul Jenkins, Roseburg, Oreg.



FIGURE 65.—U. S. Highway 99 at Myrtle Creek, Oreg., 1 hour before crest stage of Myrtle Creek. Photo by Ada's Studio, Myrtle Creek, Oreg.

area was intensive because land far back from the river is lower than land along the banks. Along the lower Umpqua River in the vicinity of Reedsport water reached the top of the dikes, but the dikes held and there was no damaging overflow. There are three flood-control reservoirs in the upper Willamette Valley--Cottage Grove Reservoir on the coast, Fork Dorena Reservoir on Row River, and Fern Ridge Reservoir on Long Tom River. These reservoirs held back large quantities of flood waters, thus reducing flood damage in the valleys below.

In the Willamette valley the peak discharge changed remarkably little as it progressed downstream. The flood peak at Harrisburg (drainage area, 3,420 square miles) was 138,000 cfs. At Albany (drainage area, 4,840 square miles) it was 140,000 cfs and at Salem (drainage area, 7,280 square miles) it was 159,000 cfs. At Wilsonville (drainage area 8,400 square miles, 2.4 times as great as the area at Harrisburg) the peak discharge was 146,000 cfs, which is less than the peak at Salem and only 8,000 cfs greater than the peak at Harrisburg. Because of the absence of flood inflow from the lower Willamette tributaries, and the effect of channel storage in the main stream, the change in the peak flow throughout the reach between Harrisburg and Wilsonville was relatively small.

FLOOD DAMAGE

Damage wrought by the flood of October-November 1950 was greater in much of the area than that caused by any previous flood, despite the fact that other floods have been higher. The reasons are: an increased population; greater economic development in recent years; the flood came in an off-season with little warning and rose swiftly to its highest stages on a Saturday and Sunday.

Most estimates of flood damage deal with items of direct loss only. For this flood, indirect losses caused by the stoppage of transportation and communications and by disruption of business with resulting loss of income to companies and individuals may have exceeded the direct losses, but no reliable estimates are available or can be made.

No comprehensive field survey of flood damage was made by any organization, and the figures given here probably are inconsistent because they reflect the different interests and points of view of the individuals who made them. Estimate of damage made by the Corps of Engineers in the Willamette River basin are the only figures available that are based on a planned and coordinated study. The Corps of Engineers over the past years has made surveys and studies from which curves were developed to show the relation of river stage to flood damage. The Corps computed

flood damage for the Willamette River basin by applying to these curves the known stages of peaks of this flood.

The Weather Bureau prepares for each year a summary of estimated flood damage in the United States. These estimates are based on questionnaires sent to many officials and residents in flood areas, and on information from other sources. The summary does not identify specific floods if more than one occurred in an area in the year. Some of the area in northwestern California discussed in this report was affected by the floods of November-December 1950 (see Water-Supply Paper 1137-F), but it is believed that a greater part of the damage in that area was caused by the October-November floods.

The Red Cross reported that in the entire flooded area emergency aid was given about 2,000 families; more than 350 homes were damaged; and \$26,680 was spent for relief of flood victims, mainly at, or in the areas near Roseburg and Eugene, Oreg.

Physical damage to structures in the national forests was estimated by the Forest Service at \$5,000 in the Willamette, \$10,000 in the Umpqua, \$7,000 in the Rogue River National Forests, and from \$125,000 to \$150,000 in the Siskiyou. Serious timber losses caused by windfall occurred in some areas but have not been evaluated.

In Oregon the State Highway Commission assessed damage to State Highways at \$133,500. Damage to State highways and county roads in Del Norte County, Calif., was estimated at \$100,000, according to H. W. Malpes, county surveyor. In Douglas County, Oregon, Judge D. N. Busenbark estimated road damage, mostly to bridges and bridge approaches, in excess of \$200,000.

Other damage reports included both highway and other losses. The county engineer of Josephine County estimated storm damage in that county, mostly in the Evans Creek district, at \$50,000. In Josephine County, Commissioner L. J. Mitchell estimated road and other damage at \$100,000; damage in Grants Pass alone was estimated at \$25,000 by the city manager. The city manager of Roseburg estimated damages within the city limits to be almost \$100,000.

Estimates of flood damage given above are scattered, overlapping, and unrelated. However, the estimates made by the Corps of Engineers and the Weather Bureau can be combined to give a total for the entire flood area.

For the Willamette River basin in Oregon the Corps of Engineers places the flood damage at \$5,354,000. Without the relief afforded by the operation of three flood-control reservoirs, damage

would have amounted to \$8,272,000, according to the Corps. Although there is no way of separating direct and indirect damages, it is believed that the indirect damages were relatively small in proportion to direct damages in the Willamette River basin.

Flood damages in southwestern Oregon and northwestern California are summarized by the Weather Bureau as follows:

Chetca, Winchuck, Pistol, and lower Rogue Rivers (Curry County, Oreg.).....	\$2,317,000
Rogue River (Jackson and Josephine Counties, Oreg.).....	175,500
Coquille and Coos Rivers (Coos County, Oreg.)	59,100
Umpqua River (Douglas County, Oreg.).....	<u>1,474,000</u>
Total for southwestern Oregon.....	<u>4,025,600</u>
Smith River (Del Norte County, Calif.).....	584,000
Scott and Shasta Rivers (Siskiyou County, Calif.)	10,500
Eel River (Humboldt County, Calif.).....	<u>30,000</u>
Total for northwestern California.....	<u>624,500</u>

These figures include direct and indirect damage. Sufficient information is not available for separate classification. It is believed, however, that the damage in Curry County, Oreg., includes a relatively high figure of indirect damage, owing to loss of income through interruption of the lumber industry. Damages include cost of emergency protection, evacuation, rehabilitation, and relief, for which \$2,000 was spent in Del Norte County, Calif., and \$22,500 in Oregon, a greater part of it in Douglas County.

The total damage reported by the Corps of Engineers for the Willamette River basin in Oregon, and by the Weather Bureau for coastal streams in southwestern Oregon and northwestern California, is \$10,004,100. According to estimates compiled by the Weather Bureau, about 22,000 acres of land in Oregon and about 25,000 acres of land in California were inundated.

METEOROLOGY AND PRECIPITATION

Meteorology

[Prepared by the staff of the United States Weather Bureau]

In the area west of the Cascade Mountains in southwestern Oregon, as in much of the west coast, the climatic regime is described as "summer-dry," for barely 5 percent of the annual precipitation occurs in summer. Almost half of the year's total precipitation normally falls in the winter season, about one-quarter in spring, and another quarter in the autumn. Most precipitation is largely due to cyclonic activity combined with orographic lifting.

With west winds predominating in southwestern Oregon, the heaviest rain falls on the western (windward) slopes of the Oregon Coast Range. The amount of rainfall decreases on the leeward side of the valley of the Willamette River, and then increases again on the western slopes of the Cascades. Precipitation totals decrease once more on the eastern slopes.

The average precipitation in Oregon for October 1950 was the highest in the 61 years of record. In the western part of the State the average was 9.28 inches above normal and 2.52 inches above the previous record set in 1947. Illahe (on the Rogue River) received the greatest precipitation total recorded in the State, 25.31 inches. The greatest reported 24-hour amount, 6.55 inches, fell at Kerby, on the Illinois River (a southern branch of the Rogue). Roseburg, on the Umpqua, reported a precipitation total of 12.53 inches for October, exceeding the previous maximum total by 2.07 inches.

Unprecedented monthly and daily precipitation totals were recorded also at stations in northwestern California in the Smith, lower Klamath, and lower Eel River basins, where records have been kept for 60, 49, and 72 years, respectively. Most notable was the rainfall at the Gasquet ranger station in the Smith River basin and at Orick Prairie Creek Park in the Klamath River basin. October precipitation at these two stations totalled 34.15 inches and 26.54 inches, respectively. At Gasquet ranger station successive calendar-day totals of 9.09 inches and 10.35 inches were recorded. At Orick Prairie Creek Park the maximum calendar-day catch was 11.50 inches. Figures 66 and 67 illustrate the great amount by which the October 1950 rainfall exceeded the average at five stations in southwestern Oregon and three in northwestern California, each station representing a drainage area.

Figure 68 shows the temperature and precipitation distribution at Medford, Oreg., on Rogue River, and at Roseburg, Oreg., on Umpqua River for October and November 1950. Figure 69 is a

similar graph for Crescent City, Calif., on the coast about 17 miles south of the State boundary. (It is interesting to note that the precipitation was associated with periods of subnormal temperature.)

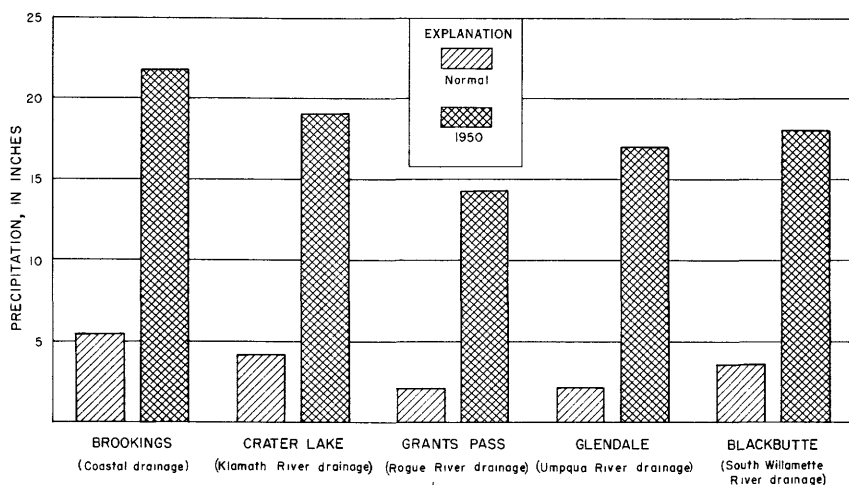


FIGURE 66.—October precipitation in southwestern Oregon.

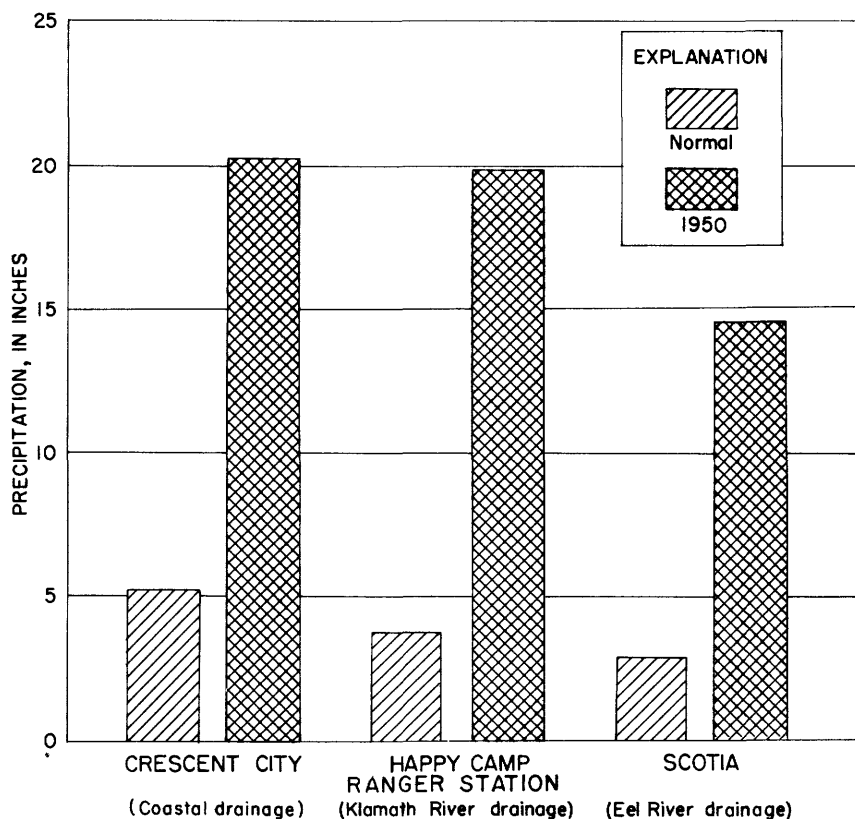


FIGURE 67.—October precipitation in northwestern California.

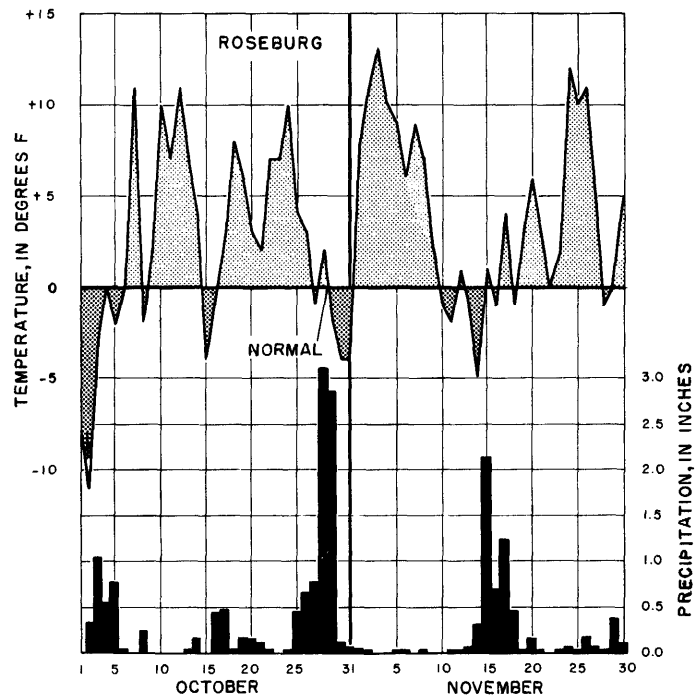
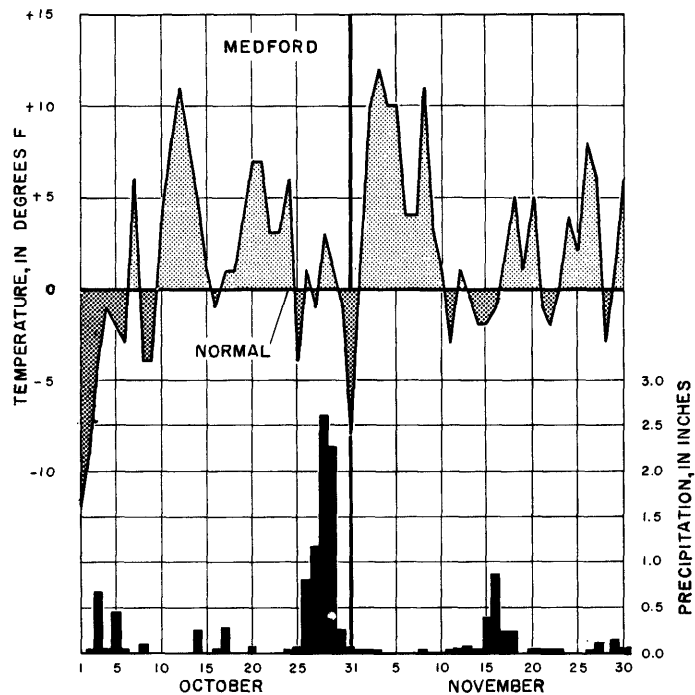


FIGURE 68.—Departure of average temperature from normal, and daily precipitation in southwestern Oregon, October and November 1950.

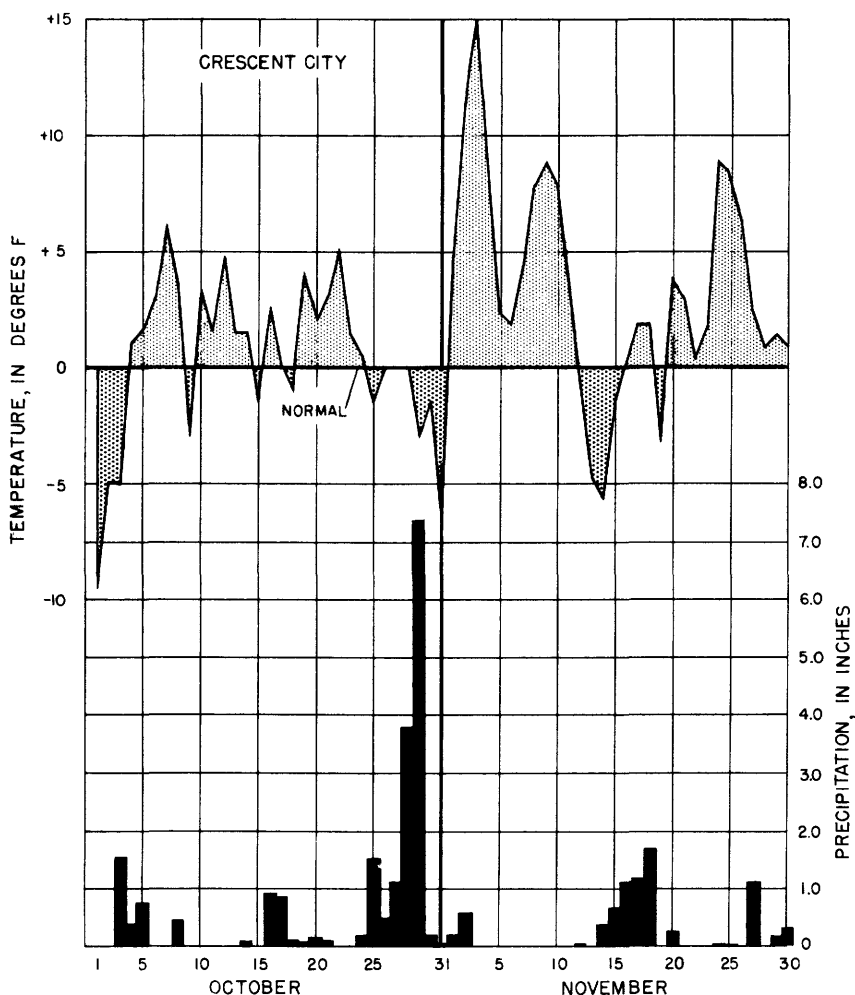


FIGURE 69.—Departure of average temperature from normal, and daily precipitation in northwestern California, October and November 1950.

The precipitation which occurred in southwestern Oregon and northwestern California during October and November 1950 resulted from the combined effects of strong frontal activity and orography. Figure 70, a surface weather map for October 4, 1950, pictures a typical situation--an occluding system about 200 miles off the Pacific Coast, a strong cyclonic circulation, the warm front of the system at the southwestern corner of Oregon and a wide area of precipitation ahead of it.

As October 1950 began, southwestern Oregon was dominated by polar air which poured down from Canada. On the morning of October 2 a frontal system in the Pacific was close enough to the Oregon coast to cause precipitation. The rain continued during the next two days as the fronts slowly approached the coast. Both

Kerby and Illahe received more than 2 inches of rain on the 3d. With the passage of the warm front, the rain slackened somewhat. It increased again on the 5th, however, with the passage of the cold front.

When the front system had passed, an extension of the Pacific high-pressure area usually associated with fair weather, moved in and dominated southwestern Oregon until a new system approached the coast on October 7. The frontal system entered the west coast farther to the north on this occasion, so that southwestern Oregon did not receive the pre-warm-front rain. Some precipitation did occur, however, when the cold front crossed the region. The Pacific high then became the dominant influence over southwestern Oregon once more.

The passage of a front on the 14th, and another on the 17th, also caused precipitation. A weak occlusion produced moderate amounts of rainfall at many stations on October 19 (1.89 inches at Port Orford), and light precipitation fell as a weak front crossed southwestern Oregon in the following 2 days.

On October 24 an occluding front approached the Washington-Oregon coast, releasing light pre-warm-front precipitation in southwestern Oregon. The low-pressure area deepened as the system's cold front passed the area on the 25th, and a wave developed on the trailing cold front off the coast. The low-pressure center deepened rapidly as it moved almost straight northward, with the result that a record low pressure (981.0 millibars) for October was recorded at Roseburg on the 26th. (The previous low, 988.2 millibars, was recorded in 1878.) Rain fell in southwestern Oregon as the system's warm front approached and again as the cold front swept eastward. By morning of the 27th the entire system lay to the east of Oregon, but another system, fully developed, was moving rapidly eastward toward the coast. A great area of precipitation spread northeastward in advance of the new warm front. By 10:30 p. m. the system had swept past southwestern Oregon, maintaining a circulation almost as strong as that of the previous day. Kerby reported 2.67 inches of rain for the 27th, and Illahe reported 2.92 inches. Five other stations in the area recorded more than 2 inches. Winds were very high during this period, causing great damage.

Early on the morning of the 28th a wave formed on the system's trailing cold front off the coast. Again, a great area of precipitation was associated with the developing system. As the wave swept rapidly inland that night, a second wave formed off the coast, this one also with a wide area of precipitation. Kerby received 6.55 inches of precipitation on the 28th; Illahe reported 5.83 inches. Seven other stations in southwestern Oregon reported more than 4 inches of precipitation. It was the second consecutive day of

continuous rain for both Kerby and Glendale. Rain continued throughout southwestern Oregon on the 29th as the second wave moved east-northeastward from a point halfway up the Oregon coast. Illahe received an additional 3.74 inches; Glendale and Sexton Summit received more than 3 inches each. Except for the hour between 8 and 9 p. m., it again rained all day at Kerby. Illahe, whose normal precipitation for the month of October is about 6.50 inches, received 16.11 inches in the 6-day period between October 25 and 30.

Rain continued for a time after the coldfront of the second wave had passed, and on the morning of October 31, a new frontal system approached the Oregon coast. Precipitation fell again and spread northward and eastward as the occlusion reached the coast that night.

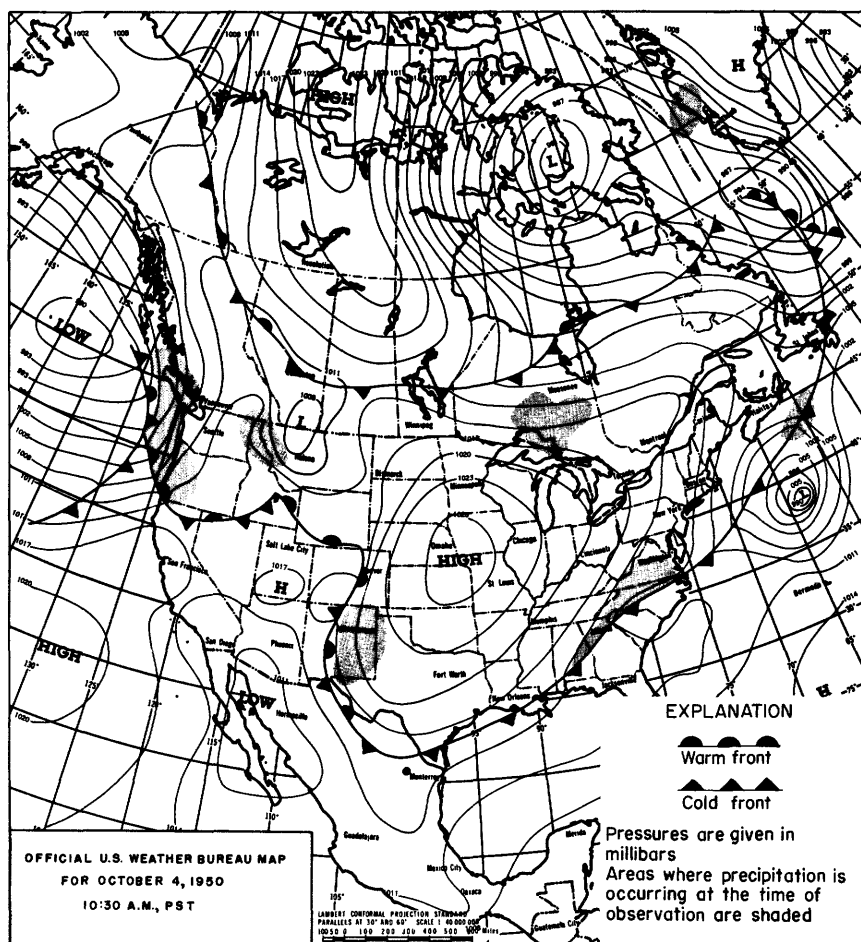


FIGURE 70.—Surface weather chart for October 4, 1950.

The storm which occurred between October 25 and 30 was the major one of the month for Oregon, with the southwestern section hardest hit. The Rogue, Umpqua, and Coquille Rivers flooded their banks, as did the southern Willamette near Eugene.

November 1950 was characterized by temperatures and precipitation totals well above the average for the 61-year period of record. There was an average of 20 days of measurable precipitation in the western part of Oregon, and Canary, near the mouth of the Siuslaw River, reported rain on 29 of November's 30 days. The highest temperature for the month, 85°, was reported at Brookings on the southernmost part of the Oregon coast on November 3. Figures 68 and 69 show the great departure of the average temperature from normal, especially during the first 10 days of November.

As November began, a front approached the Oregon coast, causing precipitation in the southwestern part of the State. The wave's center of low pressure moved northward into the Gulf of Alaska, while the fronts advanced slowly. The warm front moved inland late on the night of the 1st, and on the evening of the 2d was oriented northwest-southeast across the middle of the State. During the next two days the system's cold front approached and entered the coast. On the trailing cold front, a wave, already occluding, moved toward the coast, causing some precipitation ahead of the warm front on the 5th. The system had a very weak circulation associated with its passage. A strong polar high moved down from Canada early on the 8th and dominated southwestern Oregon through the 10th.

On the 11th a weak wave entered the Oregon coast causing some light precipitation, and another lesser polar high moved down over the area. A stationary front, lying along the Canadian west coast, began to move inland as a cold front on the morning of the 13th. Precipitation resulted in southwestern Oregon from both the approach and passage of this front.

A new frontal system approached the coast on November 14. The low associated with the system was a deep one, and the strong circulation around the low produced a great amount of precipitation along the Oregon Coast and Cascade Ranges. Gunter reported almost 5 inches on the 15th; Allegany and North Bend each more than 4 inches. Six other stations recorded more than 2 inches for the day. The intense circulation continued through the 16th, when the front finally swept past Oregon. The precipitation continued after the passage of the front, and Coquille, on the Coquille River, recorded more than 3 inches of rain on that day. Still another front appeared off the coast on the 17th, and a third on the 18th, each producing rain with its approach and passage. Many stations received more than an inch of rain on each day of the 4-day period. Gunter and Illahe each recorded a total of more than 9 inches during the period.

On the evening of November 19 and again on the night of the 20th, occluded systems crossed the Oregon region. The area was comparatively free of precipitation from the 21st through the morning of the 23d because a cell of the Pacific high dominated the northwestern United States. The approach of an occluding system on the afternoon of the 23d and its passage early the following morning resulted in rainfall, followed by the reentry of the Pacific high.

The high dominated until afternoon of the 26th when a cold front resulted in further rainfall. As the front progressed eastward, the Pacific high again moved into the area and dominated the circulation from the morning of the 27th through the 28th. On the morning of the 29th an occluding wave approached the Oregon coast, bringing rainfall in the southwestern part of the State well in advance of its movement. The center of low pressure associated with the system deepened as the frontal system moved inland and created a strong cyclonic circulation. The month ended as showers fell behind the system's cold front.

Precipitation

Distribution of precipitation within the flooded area was influenced by topography, and the precipitation of October 25-30 followed the usual pattern. In general, the higher elevations received considerably more precipitation than the lowlands; and the western front of the Oregon Coast range, where the moisture-laden winds from the ocean first strike land, received greater precipitation than the mountains farther east. The storm spent itself on the western side of the Cascade Range and its southern extension, and did not reach more than 120 miles inland.

The isohyetal map, plate 14, was prepared on the basis of about 110 records of precipitation for October 25-30 collected in or near the flood area. All but a few of these were records furnished by the Weather Bureau. In drawing the isohyetal lines consideration was given to topography as well as to the precipitation figures. Throughout the area, except for the upper Umpqua River basin, precipitation was adequately recorded.

Snow had little effect on the floods. There was little snow in the mountains at the start of the storm and probably none below the 6,000-foot level. During most of the storm the freezing level was near 7,000 feet, and although some snow fell above the 5,000-foot level during the storm, its effect on runoff was negligible. So little of the precipitation for October 25-30 fell as snow that the isohyetal lines in plate 14 may be considered to represent rainfall for all but the highest altitudes. Little of the precipitation was held from runoff in the form of snow.

MEASUREMENT OF FLOOD DISCHARGES

The operation of a stream-gaging station consists principally of the development of a relation between stage and discharge, from which the discharge can be calculated when the stage is known. The development of a stage-discharge relation is based upon current-meter measurements throughout range of stage experienced, or through a sufficient part of the range so that the discharge corresponding to the maximum stage can be obtained by a reasonable extension of the stage-discharge relation, or rating curve. Short extensions of the rating curves are usually based on logarithmic plotting or velocity-area studies.

During major floods, the maximum stage is likely to be so high above the stage of the highest measurement previously obtained that an extension of the rating curve is not feasible. Furthermore, during major floods it is often impossible to obtain current-meter measurement for several reasons: the road to a gaging station may be impassable during major floods; many streams rise and fall so rapidly that there is insufficient time to make a current-meter measurement near the crest stage; floating debris or destruction or inundation of the bridge or cableway from which the measurement would be made may prevent a current-meter measurement from being obtained. At gaging stations where the flood greatly exceeded the stage defined by current-meter measurements, and at other points where measurement of the flood discharge was desired, the maximum discharge usually was computed by indirect methods: computation of flow over dams, computation of flow through contracted openings, and computation of flow from slope-area observations. A general description of these methods can be found in Water-Supply Paper 888. More detailed description of the slope-area method, with illustrative examples, can be found in certain flood reports, particularly Water-Supply Papers 773-E, 796-G, and 816. Water-Supply Paper 816 contains illustrative examples of all three indirect methods.

STAGES AND DISCHARGES AT STREAM-GAGING STATIONS

Explanation of Data

The primary purpose of this report is the publication of useful detailed information regarding stages and discharges of streams in southwestern Oregon and northwestern California during the floods of October-November 1950 that will not be available in the summarized records of river discharge published annually in the water-supply papers of the Geological Survey. The records as usually published in the annual water-supply papers for a stream gaging station show the daily discharge and the maximum rate of discharge during a flood. This report aims to fill the need for

more detailed information by showing also the stages and discharges at frequent times throughout the flood period. The records thus presented make possible a study of the behavior of flood crests, the incidence of crests from different tributaries, and the progress of flood crests throughout a river basin, and furnish basic information for use in studies relating to flood control and watershed management.

The basic data systematically collected at stream-gaging stations consist of records of stage, measurements of discharge, and general information useful in determining the daily flow from the records of gage heights and discharge measurements. The records of stage are obtained either by periodic readings on a nonrecording gage or by a water-stage recorder which provides a continuous graph of stage. Measurements of discharge are generally made by a current-meter. Occasionally the determination of extraordinary peak flows must be made by indirect methods referred to in the preceding section of this report.

The data presented in the following tables for each stream-gaging station comprise, in general, a description of the gaging station, a table showing the daily discharges throughout the two months of October and November 1950, and a table showing the stage and discharge from October 23 to November 9 at periods sufficiently short to permit the delineation of reasonably accurate graphs of the instantaneous stage and discharge for the flood.

The description of the station gives information concerning the location, datum, and type of the gage, the area of the drainage basin, and the record of gage heights. The information regarding gage heights describes the method of determining the stage during the flood and is of technical significance because flood conditions sometimes prevent the use of the usual methods of obtaining records of stage. The statement regarding the discharge record explains briefly the methods used in the definition of the stage-discharge relation throughout the ranges of stage that occurred during the floods of October-November 1950, as well as of the previous maximum flood of record. The description also includes information about auxiliary methods used in obtaining the discharge, and describes conditions that may have affected the stage-discharge relation. All records of gage heights in this report were computed to a hundredth of a foot except those for Umpqua River near Elkton for which a special statement is included in the description. The maximum stage and discharge at each gaging station are given for the floods of October-November 1950 and for the indicated period of record before that. Also, information regarding floods antedating such period of record is given in as much detail as is available. Most of this information is also given in table 1, "Summary of flood stages and discharges." Notes on storage, regulation and diversion, and comments essential or helpful to an understanding of the record are included as remarks.

The table of daily mean discharge presents the data generally for October and November 1950, thus covering not only the period of the flood but also a time of sufficient length before and after the peak to show the relation of the flood discharges to the discharges of the preceding and following periods. The table shows the monthly mean discharge for the two months and the volume of runoff expressed in depth, in inches, over the drainage area. Figures 71 and 72 show hydrographs of daily discharge at selected gaging stations for the period October 10 to November 30.

The tables presenting stage and discharge at indicated times show the rise and recession of the flood in detail. In general, each table begins on October 23, well before the beginning of the flood, and continues through November 9, when the flood had subsided. In a few cases this table is followed by supplemental records of stage and discharge when needed to define small peaks or troughs in the hydrograph that would not be disclosed by the table.

The stages at indicated times were obtained from records of continuous water-stage recorders, so far as such records were available. For a station with an interrupted record the stage graph was usually completed on the basis of a floodmark and comparison with other records on the same stream or streams nearby. Details of the method used for a station are given in the section of the description concerning gage heights. For stations at which the records of stage consisted of one or more gage readings a day, a graph usually was drawn on the basis of the readings, the floodmark, and comparison with the stage graph for one or more stations near-by equipped with water-stage recorders.

Some figures of peak discharge for past years for seven gaging stations in Oregon have been revised on the basis of peak determinations made for the floods of October-November 1950. The seven stations are South Umpqua River near Brockway, Umpqua River near Elkton, Cow Creek near Azalea, North Umpqua River above Rock Creek near Glide (discontinued), North Umpqua River at Winchester (discontinued), South Fork Coquille River at Powers, and Illinois River at Kerby. Some revised discharges appear in table 1, but they are not qualified as such; however they will be qualified in forthcoming annual water-supply papers.

The following tables present records of stage and storage content of two reservoirs through the flood period. Their form is similar to that of data for stream-gaging stations. The figure of daily contents is based on the gage height of the reservoir at midnight of the day indicated.

The records are arranged in order of river basins from north to south. This also is the order regularly used by the Geological Survey in its annual water-supply papers for "Part 14, Pacific

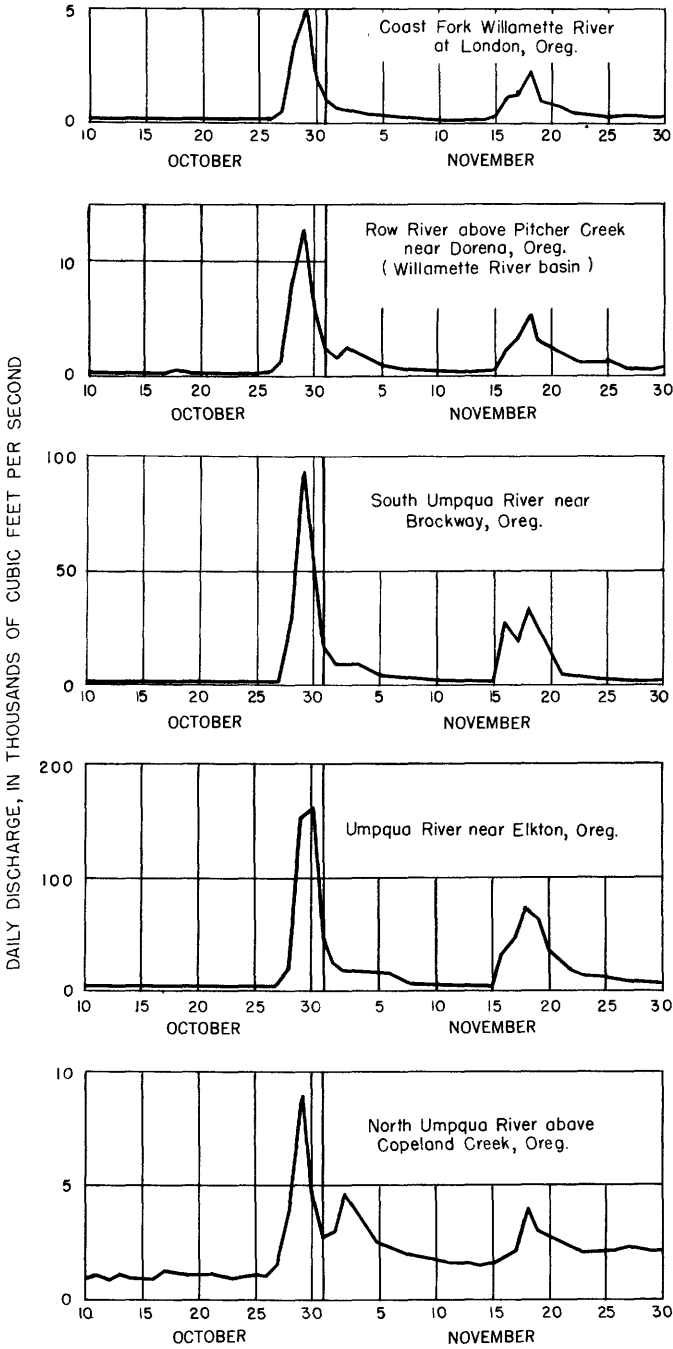


FIGURE 71.—Hydrographs of daily discharge at selected stream-gaging stations in the Willamette and Umpqua River basins.

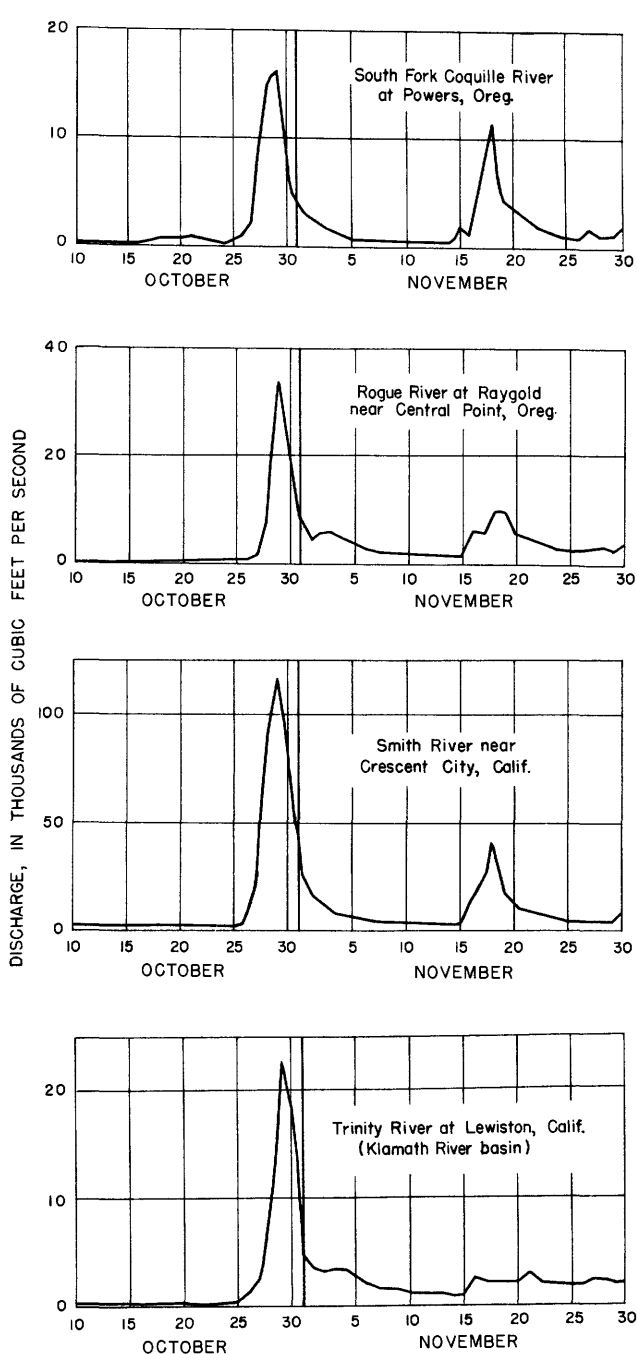


FIGURE 72.—Hydrographs of daily discharge at selected stream-gaging stations in the Coquille, Rogue, Smith, and Klamath River basins.

slope basins in California." Within each river basin, records for gaging stations on the main stream are presented first, in downstream order, followed by records for stations on the tributaries in similar order beginning with the uppermost. The table of contents lists the stations in the order in which they appear herein; the index presents them alphabetically by stream and place names.

Reference should be made to Parts 11 and 14 of the water-supply papers of the Geological Survey for additional information and for other available published records of flow of the streams discussed in this report.

Willamette River basin

Middle Fork Willamette River above Salt Creek, near Oakridge, Oreg.

Location.--Lat 43°44', long. 122°26', in SW $\frac{1}{4}$ sec. 22, T. 21 S., R. 3 E., 400 ft upstream from Salt Creek and 2 miles southwest of Oakridge. Datum of gage is 1,202.8 ft above mean sea level (from river-profile survey).

Drainage area.--392 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 13,000 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 27,400 cfs 5 a.m. Oct. 29 (gage height, 10.97 ft).
1913-14, 1935 to September 1950: Discharge, 34,000 cfs Dec. 28, 1945 (gage height, 12.06 ft), from rating curve extended above 13,000 cfs as explained above.

Remarks.--No diversion or regulation above station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	346	3,590	9	642	1,460	17	506	3,860	25	522	2,310
2	341	5,560	10	513	1,270	18	750	7,090	26	698	2,190
3	380	4,450	11	452	1,130	19	565	3,800	27	1,590	2,240
4	482	3,290	12	424	1,130	20	506	3,940	28	8,510	1,980
5	734	2,480	13	396	1,030	21	565	3,340	29	20,800	1,790
6	925	1,990	14	385	978	22	506	2,510	30	8,720	2,100
7	665	1,700	15	396	969	23	462	2,030	31	4,210	
8	600	1,580	16	390	2,310	24	433	2,130			
Monthly mean discharge, in cfs.....										1,852	2,541
Runoff, in acre-feet.....										113,900	151,200
Runoff, in inches.....										5.45	7.23

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									3.04	826	4.83	3,100
4									3.22	988	5.02	3,450
6									3.49	1,240	5.10	3,600
8	2.55	470	2.49	434	2.50	440	2.89	702	3.94	1,740	5.27	3,950
10									4.14	2,020	5.62	4,750
N									4.10	1,960	6.04	5,870
2									3.99	1,810	6.58	7,490
4	2.52	452	2.48	429	2.62	513	2.80	635	3.89	1,680	7.27	9,860
6									3.84	1,620	8.04	12,800
8									3.84	1,620	8.82	16,300
10									4.09	1,950	9.33	18,700
12	2.50	440	2.49	434	3.00	790	2.92	726	4.46	2,500	9.96	21,900
	October 29		October 30		October 31		November 1		November 2		November 3	
2	10.60	25,300										
4	10.87	26,900	7.72	11,000	5.89	4,950	5.16	3,220	6.15	5,700		
6	10.83	26,600										
8	10.71	26,000	7.30	9,420	5.71	4,480	5.12	3,140	6.16	5,720	5.79	4,680
10	10.42	24,300										
N	9.96	21,800	6.98	8,300	5.55	4,080	5.17	3,240	6.14	5,670		
2	9.41	18,900										
4	8.98	16,700	6.76	7,570	5.40	3,730	5.27	3,450	6.10	5,550	5.58	4,150
6	8.83	16,000										
8	8.69	15,300	6.47	6,660	5.30	3,510	5.60	4,200	6.07	5,460		
10	8.50	14,400										
12	8.22	13,100	6.13	5,640	5.24	3,380	5.98	5,200	6.00	5,260	5.43	3,800
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	5.26	3,430	4.82	2,550	4.53	2,050	4.31	1,720	4.20	1,580	4.13	1,500
10												
N												
2	5.11	3,120	4.72	2,370	4.45	1,920	4.27	1,670	4.20	1,580	4.06	1,420
4												
6												
8												
10												
12	4.97	2,840	4.61	2,180	4.37	1,810	4.22	1,610	4.20	1,580	4.00	1,350

Supplemental record.--Oct. 29, 5 a.m., 10.97 ft, 27,400 cfs.

Salt Creek near Oakridge, Oreg.

Location.--Lat 43°44', long. 122°25', in SW $\frac{1}{4}$ sec. 23, T. 21 S., R. 3 E., 0.7 mile upstream from mouth and 2 miles southeast of Oakridge. Datum of gage is 1,245.67 ft above mean sea level, datum of 1929.

Drainage area.--113 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,600 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 4,500 cfs 4 a.m. Oct. 29 (gage height, 8.00 ft).

1913-1914, 1933 to September 1950: Discharge, 4,320 cfs Dec. 28, 1945 (gage height, 7.70 ft), from rating curve extended above 2,600 cfs.

Remarks.--One small diversion above station used intermittently for mill pond operations. No regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	135	854	9	242	501	17	193	681	25	188	540
2	132	1,380	10	199	417	18	232	1,020	26	210	520
3	145	1,230	11	178	381	19	193	764	27	338	580
4	161	927	12	164	377	20	187	846	28	1,230	525
5	239	737	13	156	373	21	199	758	29	3,220	475
6	260	620	14	153	361	22	184	630	30	1,580	530
7	242	532	15	156	349	23	172	545	31	948	
8	239	563	16	150	515	24	165	530			
Monthly mean discharge, in cfs.....										393	635
Runoff, in acre-feet.....										24,180	37,810
Runoff, in inches.....										4.01	6.27

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Time	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2												
4									2.60	267	3.12	480
6											3.17	505
8	2.32	175	2.28	164	2.31	172	2.42	206	2.88	377	3.21	525
10											3.33	585
N									2.87	373	3.50	670
2											3.70	780
4	2.30	169	2.28	164	2.39	196	2.40	199	2.79	341	3.95	918
6											4.47	1,200
8									2.80	345	5.26	1,770
10											6.06	2,440
12	2.29	166	2.29	165	2.49	229	2.47	222	3.02	434	6.59	2,970
									7.06	3,470		
	October 29		October 30		October 31		November 1		November 2		November 3	
2	7.65	4,120	5.65	2,080	4.35	1,140	3.70	780	4.45	1,190		
4	8.00	4,500	5.51	1,970	4.26	1,090	3.68	769	4.53	1,240	4.73	1,360
6	7.77	4,250	5.35	1,840	4.18	1,040	3.68	769	4.59	1,270		
8	7.30	3,730	5.15	1,680	4.09	994	3.70	780	4.66	1,320	4.62	1,290
10	7.05	3,460	5.09	1,630	4.03	962	3.71	786	4.72	1,350		
N	6.75	3,130	4.93	1,500	3.96	923	3.78	824	4.78	1,400	4.51	1,230
2	6.40	2,780	4.85	1,440	3.90	890	3.83	846	4.90	1,480		
4	6.20	2,580	4.74	1,370	3.85	862	3.88	879	4.93	1,500	4.39	1,160
6	6.15	2,530	4.63	1,300	3.82	846	3.90	890	4.93	1,500		
8	6.02	2,410	4.55	1,250	3.78	824	3.96	923	4.93	1,500	4.27	1,090
10	5.94	2,340	4.48	1,210	3.76	813	4.16	1,030	4.91	1,490		
12	5.85	2,260	4.43	1,180	3.74	802	4.33	1,140	4.87	1,460	4.21	1,060
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	4.11	1,010	3.72	791	3.44	640	3.28	560	3.18	510		
6												
8	4.02	956	3.66	758	3.42	630	3.25	545	3.27	555	3.18	510
10												
N	3.96	923	3.62	736	3.39	615	3.22	530	3.33	585		
2												
4	3.89	884	3.57	708	3.39	615	3.18	510	3.37	605	3.12	480
6												
8	3.82	846	3.54	692	3.36	600	3.17	505	3.34	590		
10												
12	3.78	824	3.47	655	3.32	580	3.16	500	3.30	570	3.07	456

WILLAMETTE RIVER BASIN

439

Coast Fork Willamette River at London, Oreg.

Location.--Lat 43°39', long. 123°05', in SW $\frac{1}{4}$ sec. 20, T. 22 S., R. 3 W., 0.6 mile north of London and 11 miles south of Cottage Grove. Datum of gage is 852.65 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Drainage area.--69 sq mi.

Gage-height record.--Water-stage recorder graph except for period Oct. 1-4.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 4,000 cfs and extended to peak stage by logarithmic plotting. Discharge for period of no gage-height record computed on basis of records for Row River at Star. Shifting-control method used Oct. 5-27.

Maxima.--October-November 1950: Discharge, 6,790 cfs 6 p.m. Oct. 28 (gage height, 11.43 ft).
1935 to September 1950: Discharge, 8,800 cfs Dec. 28, 1945 (gage height, 13.25 ft),
from rating curve extended above 4,000 cfs.

Remarks.--No diversions above station; millpond 3 miles above station may cause slight regulation at times.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	17	663	9	113	187	17	181	1,260	25	106	318
2	17	666	10	73	167	18	189	2,230	26	144	283
3	47	541	11	57	157	19	140	960	27	642	377
4	135	425	12	50	160	20	178	875	28	3,430	314
5	258	339	13	45	152	21	133	661	29	5,080	297
6	178	281	14	51	147	22	107	494	30	1,830	353
7	88	240	15	73	271	23	87	393	31	917	
8	116	214	16	73	1,260	24	76	365			
Monthly mean discharge, in cfs.....										472	502
Runoff, in acre-feet.....										29,020	29,850
Runoff, in inches.....										7.89	8.12

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L C H	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.82	71	2.14	133	2.78	333	4.33	1,080
4									3.08	454	4.73	1,280
6									3.31	566	5.25	1,590
8	1.92	88	1.86	78	1.83	73	2.11	126	3.66	730	5.75	1,890
10									3.73	765	6.10	2,110
N					1.96	95	2.08	119	3.60	700	6.60	2,460
2									3.43	620	8.30	3,770
4	1.90	85	1.84	75	2.14	133	2.12	128	3.36	589	10.70	6,030
6									3.45	630	11.43	6,790
8					2.24	157	2.25	160	3.75	775	10.70	6,030
10									4.02	920	9.78	5,130
12	1.88	81	1.83	73	2.18	142	2.59	258	4.13	975	9.62	4,960
	October 29		October 30		October 31		November 1		November 2		November 3	
2	9.65	5,010	7.08	2,800								
4	9.74	5,100	6.83	2,480	4.27	1,060	3.51	675	3.58	710	3.31	584
6	10.12	5,460	6.23	2,200								
8	10.48	5,820	5.85	1,950	4.10	970	3.44	643	3.52	680	3.25	558
10	10.50	5,840	5.51	1,750								
N	10.26	5,600	5.31	1,630	3.94	890	3.42	634	3.49	666	3.22	544
2	10.17	5,560	5.15	1,530								
4	10.17	5,510	5.01	1,450	3.85	845	3.42	634	3.46	652	3.16	517
6	9.62	4,980	4.93	1,400								
8	8.95	4,360	4.77	1,300	3.72	780	3.50	670	3.41	630	3.12	499
10	8.20	3,680	4.63	1,240								
12	7.60	3,200	4.51	1,180	3.62	730	3.58	710	3.36	607	3.08	481
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	2.99	441	2.77	353	2.60	290	2.47	246	2.37	216	2.28	189
8												
10												
N												
2	2.91	409	2.70	325	2.55	272	2.43	234	2.36	213	2.26	184
4												
6												
8												
10												
12	2.82	373	2.65	308	2.50	255	2.40	225	2.32	201	2.23	175

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Cottage Grove Reservoir near Cottage Grove, Oreg.

Location.--Lat 43°43', long. 123°03', in NE $\frac{1}{4}$ sec. 28, T. 21 S., R. 3 W., at dam on Coast Fork Willamette River, 5 $\frac{1}{2}$ miles south of Cottage Grove. Datum of gage is mean sea level (surveys by Corps of Engineers).

Drainage area.--104 sq mi.

Gage-height record.--Water-stage recorder graph except for parts of Nov. 6, 11 and all of Nov. 12, 13, when contents were computed from records of inflow and outflow, and elevation at 12 p.m.

Maxima. --October-November 1950: Contents, 20,460 acre-feet, 12 m. to 4 p.m. Oct 30, (elevation, 778.81 ft)
1942 to September 1950: Contents observed, 34,750 acre-feet May 3, 1949 (elevation, 792.42 ft).

Remarks.--Reservoir is formed by earthfill dam with concrete spillway. Capacity is 33,090 acre-feet between elevation 719.0 ft (outlet conduit) and 791.0 ft (crest of spillway). Dead storage negligible. Water-stage recorder inspected by Corps of Engineers.

Contents, in acre-feet, at 12 p. m. of indicated day, 1950

[illegible]

Elevation, in feet, and contents, in acre-feet, at indicated time, 1950

[illegible]

WILLAMETTE RIVER BASIN

441

Coast Fork Willamette River below Cottage Grove Dam, Oreg.

Location.--Lat 43°43', long. 123°03', in NE $\frac{1}{4}$ sec. 28, T. 21 S., R. 3 W., at bridge a quarter of a mile downstream from Cottage Grove Dam and 5 $\frac{1}{4}$ miles south of Cottage Grove. Datum of gage is 711.00 ft above mean sea level (Corps of Engineers bench mark).

Drainage area.--104 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,600 cfs and extended to peak discharge.

Maxima.--October-November 1950: Discharge, 2,700 cfs 9 a.m. Oct. 29 (gage height, 8.36 ft). 1939 to September 1950: Discharge, 3,340 cfs Jan. 4, 1943 (gage height, 10.06 ft, site and datum then in use).

Remarks.--No diversions above station. Flow regulated by Cottage Grove Reservoir.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	366	2,420	9	341	57	17	362	1,500	25	564	380
2	362	2,390	10	185	662	18	564	1,720	26	438	380
3	376	2,430	11	201	447	19	614	2,350	27	654	383
4	438	2,430	12	211	230	20	800	2,290	28	1,800	474
5	372	2,310	13	106	95	21	840	1,600	29	1,440	564
6	362	1,290	14	80	55	22	815	765	30	1,610	765
7	232	117	15	79	59	23	774	369	31	2,560	
8	195	70	16	135	1,030	24	728	372			
Monthly mean discharge, in cfs.										594	1,000
Runoff, in acre-feet.										36,520	59,510
Runoff, in inches.										6.58	10.73

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					5.02	700	4.57	498	4.10	320	5.60	990
4					5.01	695	4.56	494	4.12	327	5.62	1,000
6					5.00	690	4.56	494	4.12	327	5.65	1,020
8					4.62	519	4.55	490	4.12	327	5.69	1,040
10					4.62	519	4.64	528	4.56	494	7.32	2,010
N	5.17	775	5.07	725	4.61	514	4.64	528	5.23	805	7.65	2,220
2					4.60	510	4.64	528	5.25	815	7.65	2,350
4					4.60	510	4.11	324	5.56	970	7.60	2,190
6					4.59	506	4.10	320	5.57	975	7.70	2,260
8					4.58	502	4.10	320	5.58	980	7.83	2,340
10					4.58	502	4.10	320	5.58	980	7.95	2,420
12	5.12	750	5.04	710	4.57	498	4.10	320	5.59	985	8.06	2,490
	October 29		October 30		October 31		November 1		November 2		November 3	
2	8.12	2,530	4.69	550	7.75	2,290						
4	8.20	2,590	4.70	555	7.74	2,280	7.91	2,390	7.94	2,410	7.82	2,330
6	8.28	2,650	4.70	555	7.73	2,270						
8	8.34	2,690	6.03	1,230	7.87	2,360	7.90	2,380	7.92	2,400	8.07	2,500
10	7.15	1,900	6.03	1,230	7.87	2,360						
N	5.63	990	7.78	2,310	7.85	2,350	7.90	2,380	7.91	2,390	8.04	2,480
2	4.68	546	7.78	2,310	7.84	2,350						
4	4.69	550	7.77	2,300	8.00	2,450	8.03	2,470	7.89	2,380	8.01	2,460
6	3.70	205	7.78	2,310	7.98	2,440						
8	4.69	550	7.77	2,300	7.97	2,430	8.01	2,460	7.86	2,360	7.94	2,410
10	4.69	550	7.76	2,290	7.96	2,420						
12	4.69	550	7.76	2,290	7.94	2,410	7.97	2,430	7.84	2,350	7.93	2,400
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	7.88	2,370	7.82	2,330	7.40	2,060	3.32	117	3.32	117		
6												
8	8.07	2,500	7.73	2,270	7.23	1,950	3.32	117	2.88	50	2.94	56
10												
N	8.06	2,490	7.94	2,410	6.95	1,770	3.32	117	2.94	56		
2												
4	8.01	2,460	7.83	2,340	3.47	150	3.32	117	2.94	56	2.95	58
6												
8	7.93	2,400	7.73	2,270	3.32	117	3.32	117	2.94	56		
10												
12	7.86	2,360	7.56	2,160	3.32	117	3.32	117	2.94	56	2.96	59

Supplemental record.--Oct. 29, 9 a.m., 8.36 ft, 2,700 cfs; Nov. 6, 3 a.m., 6.73 ft, 1,640 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Coast Fork Willamette River at Saginaw, Oreg.

Location.--Lat 43°50'05", long. 123°02'30", in NW¹ sec. 15, T. 20 S., R. 3 W., at Saginaw, 1 mile downstream from Row River. Datum of gage is 595.47 ft above mean sea level, datum of 1929.

Drainage area.--529 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 9,600 cfs and extended to peak stage on basis of logarithmic plotting and of previously defined rating curve.

Maxima.--October-November 1950: Discharge, 18,400 cfs 10 a.m. Oct. 29 (gage height, 6.68 ft).

1923 to September 1950: Discharge, 32,900 cfs Dec. 28, 1945 (gage height, 12.38 ft), from rating curve extended above 16,000 cfs.

Remarks.--Small diversions and regulation by log ponds upstream; regulation by Cottage Grove and Dorena Reservoirs. Gage-height record collected in cooperation with U. S. Weather Bureau.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	784	9,570	9	1,110	5,490	17	1,160	9,820	25	1,680	2,380
2	770	9,570	10	812	3,470	18	1,770	12,600	26	1,630	2,240
3	826	9,240	11	744	1,810	19	1,810	10,700	27	3,390	2,020
4	1,020	8,940	12	798	1,480	20	2,040	10,000	28	11,300	2,000
5	1,270	8,570	13	666	1,270	21	2,110	8,670	29	16,000	1,900
6	1,550	7,510	14	582	896	22	2,020	4,210	30	10,800	2,560
7	1,360	5,830	15	525	1,030	23	1,930	2,680	31	10,200	
8	1,020	5,680	16	628	7,160	24	1,820	2,360			
Monthly mean discharge, in cfs.										2,714	5,389
Runoff, in acre-feet.										166,900	320,600
Runoff, in inches.										5.91	11.36

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											3.05	5,550
4											3.19	5,980
6							1.54	1,670	1.67	1,940	3.35	6,490
8					1.58	1,750	1.53	1,650	1.82	2,270	3.55	7,140
10											4.17	9,220
N	1.67	1,940	1.61	1,810			1.54	1,670	2.39	3,660	4.66	11,000
2											5.15	12,700
4					1.50	1,590	1.56	1,710	2.65	4,410	5.72	14,700
6											6.23	16,700
8							1.43	1,460	2.75	4,660	6.45	17,500
10											6.39	17,300
12	1.64	1,870	1.60	1,790	1.52	1,630	1.50	1,590	2.92	5,160	6.25	16,800
	October 29		October 30		October 31		November 1		November 2		November 3	
2	6.16	16,400										
4	6.22	16,600	4.50	10,400								
6	6.42	17,400										
8	6.59	18,100	4.35	9,860	4.46	10,200	4.26	9,540	4.29	9,640	4.16	9,190
10	6.68	18,400										
N	6.59	17,300	4.54	10,500								
2	6.00	15,800										
4	5.87	15,300	4.78	11,400	4.40	10,000	4.24	9,470	4.26	9,540	4.19	3,300
6	5.73	14,800										
8	5.60	14,300	4.77	11,300								
10	5.39	13,500										
12	5.05	12,300	4.64	10,900	4.31	9,720	4.30	9,680	4.21	9,360	4.13	9,080
	November 4		November 5		November 6		November 7		November 8		November 9	
2					3.87	8,200						
4												
6					3.81	7,990	3.11	5,730	3.08	5,640	2.99	5,370
8	4.07	8,880	3.96	8,500	3.80	7,960						
10												
N					3.73	7,730	3.17	5,920	3.11	5,730	3.08	5,640
2	4.11	9,020	4.01	8,670	3.20	6,010						
4												
6												
8												
10												
12	4.03	8,740	3.92	8,370	3.17	5,920	3.12	5,760	3.05	5,550	2.99	5,370

WILLAMETTE RIVER BASIN

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Row River above Pitcher Creek, near Dorena, Oreg.
(Formerly published as Row River at Star)

Location.--Lat 43°44', long. 122°53', in NW¼ sec. 24, T. 21 S., R. 2 W., half a mile west of Star and 3 miles upstream from Teeter Creek. Datum of gage is 856.16 ft above mean sea level, datum of 1929.

Drainage area.--211 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 9,300 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 16,700 cfs 7 p.m. Oct. 28 (gage height, 13.41 ft).
1935 to September 1950: Discharge, 19,600 cfs Dec. 28, 1945 (gage height, 14.33 ft), from rating curve extended above 9,300 cfs.

Remarks.--No diversion above station. Possibly slight regulation at times by log ponds. Gage-height record collected in cooperation with U. S. Weather Bureau.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	30	1,980	9	351	454	17	183	3,070	25	192	1,090
2	28	2,580	10	206	386	18	482	5,480	26	317	864
3	63	1,960	11	146	345	19	285	2,670	27	1,250	858
4	177	1,290	12	110	392	20	288	2,620	28	8,320	715
5	590	903	13	93	366	21	309	1,980	29	12,900	650
6	630	695	14	87	345	22	260	1,390	30	4,660	960
7	294	544	15	132	458	23	194	1,040	31	2,400	
8	277	487	16	108	2,280	24	159	1,130			
Monthly mean discharge, in cfs.....										1,152	1,329
Runoff, in acre-feet.....										70,850	79,100
Runoff, in inches.....										6.24	7.03

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					2.64	146	3.54	357	3.52	351	7.57	3,450
4									3.77	438	7.80	3,730
6					2.69	154	3.45	330	4.28	670	7.93	3,890
8	2.96	202	2.76	165					5.12	1,160	8.17	4,200
10					2.75	164	3.37	306	5.76	1,660	8.57	4,780
N									5.72	1,630	9.06	5,660
2					2.81	174	3.31	288	5.54	1,480	10.00	7,650
4	2.86	183	2.67	150					5.39	1,360	11.62	11,700
6					3.20	257	3.30	285	5.33	1,310	13.10	15,800
8									5.40	1,370	13.32	16,500
10									6.15	1,980	12.51	14,100
12	2.81	174	2.66	149	3.56	363	3.39	312	7.12	2,930	12.25	13,400
	October 29		October 30		October 31		November 1		November 2		November 3	
2	12.61	14,400			7.04	2,840	5.88	1,750	6.94	2,740	6.42	2,230
4	12.76	14,800	9.46	6,470								
6	12.88	15,200			6.73	2,530	5.82	1,710	6.84	2,640	6.26	2,080
8	12.94	15,300	8.80	5,180								
10	12.81	15,000			6.53	2,330	5.83	1,710	6.78	2,580	6.09	1,930
N	12.34	13,700	8.27	4,330								
2	11.91	12,500			6.40	2,210	5.87	1,750	6.73	2,530	5.93	1,790
4	11.73	12,000	7.93	3,890								
6	11.60	11,700			6.17	2,000	6.28	2,100	6.69	2,490	5.83	1,710
8	11.16	10,500	7.64	3,540								
10	10.71	9,390			6.00	1,850	6.83	2,630	6.58	2,380	5.69	1,600
12	10.30	8,380	7.33	3,170								
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	5.40	1,370	4.77	942	4.38	720	4.05	558	3.88	482	3.84	466
10												
N												
2												
4	5.16	1,190	4.63	858	4.28	670	3.97	522	3.90	490	3.78	442
6												
8												
10												
12	4.94	1,040	4.49	775	4.17	615	3.90	490	3.90	490	3.72	418

Supplemental record.--Oct. 28, 7 p.m., 13.41 ft, 16,700 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Dorena Reservoir near Cottage Grove, Oreg.

Location.--Lat 43°47', long. 122°57', in SE $\frac{1}{4}$ sec. 32, T. 20 S., R. 2 W., near left end of spillway of Dorena Dam in Row River 5 miles east of Cottage Grove. Datum of gage is at mean sea level, datum of 1929 (levels by Corps of Engineers).

Drainage area.--265 sq mi.

Gage-height record.--Water-stage recorder graph.

Maxima.--October-November 1950: Contents, 75,890 acre-feet 8 to 10 p.m. Oct. 30 (elevation, 834.14 ft).
1949 to September 1950: Contents, 72,540 acre-feet May 27, 1950 (elevation, 832.34 ft).

Remarks.--Reservoir is formed by earthfill dam with concrete spillway. Usable capacity, 77,510 acre-feet between invert of outlet gates (elevation, 739.0 ft), and spillway crest (elevation 835.0 ft). Dead storage, 8 acre-feet below elevation 739.0 ft. Figures given below are total contents. Water-stage recorder inspected by Corps of Engineers.

Contents, in acre-feet, at 12 p.m. of indicated day, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	43,920	67,670	9	39,020	15,140	17	33,510	9,040	25	25,360	7,420
2	43,190	64,230	10	38,450	11,440	18	33,030	16,930	26	24,490	6,880
3	42,680	59,640	11	37,650	10,190	19	32,080	14,790	27	24,300	7,120
4	42,110	53,250	12	36,840	9,080	20	31,160	11,990	28	39,790	7,030
5	42,170	46,210	13	35,990	7,920	21	30,190	8,010	29	70,010	7,070
6	41,630	38,960	14	35,320	7,350	22	29,110	7,030	30	75,850	7,470
7	40,280	30,900	15	34,820	7,190	23	27,900	6,980	31	72,570	
8	39,500	23,010	16	34,170	8,430	24	26,580	7,250			
Change in contents, acre-feet.....										+27,870	-65,100
Change in contents, equivalent mean cfs.....										+453	-1,094

Elevation, in feet, and contents, in acre-feet, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											795.95	
4	800.52	28,920	799.30	27,710	797.89	26,340	796.72	25,240	795.82	24,410	796.34	24,890
6											796.79	
8	800.32	28,720	799.06	27,470	797.67	26,130	796.55	25,080	795.80	24,400	797.32	25,800
10											797.80	
N	800.12	28,520	798.78	27,200	797.46	25,930	796.37	24,920	795.87	24,460	798.32	26,750
2											799.00	
4	799.91	28,310	798.57	26,990	797.24	25,730	796.23	24,790	795.83	24,420	800.28	28,680
6											802.30	
8	799.70	28,100	798.35	26,780	797.03	25,530	796.05	24,620	795.72	24,320	805.15	33,790
10											808.15	
12	799.50	27,900	798.14	26,580	796.85	25,360	795.90	24,490	795.70	24,300	810.40	39,790
	October 29		October 30		October 31		November 1		November 2		November 3	
2	812.20	41,970	831.70	71,370	834.08	75,780						
4	814.25	44,540	832.36	72,570	834.01	75,650	831.93	71,790	829.36	67,190	827.31	63,690
6	816.30	47,200	832.93	73,630	833.91	75,460						
8	818.30	49,910	833.33	74,370	833.80	75,250	831.48	70,970	829.08	66,710	826.90	63,010
10	820.50	53,030	833.61	74,900	833.69	75,050						
N	822.50	56,010	833.80	75,250	833.52	74,730	831.00	70,100	828.63	65,930	826.45	62,260
2	824.40	58,950	833.94	75,520	833.35	74,410						
4	826.10	61,690	834.05	75,720	833.19	74,110	830.51	69,220	828.32	65,400	825.95	61,440
6	827.60	64,180	834.11	75,830	833.00	73,760						
8	829.20	66,920	834.14	75,890	832.80	73,390	830.01	68,330	827.97	64,800	825.40	60,550
10	830.85	68,410	834.14	75,890	832.60	73,020						
12	830.95	70,010	834.12	75,850	832.36	72,570	829.64	67,670	827.63	64,230	824.83	59,640
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	824.24	58,700	819.87	52,120	814.65	45,050	808.45	37,500	801.20	29,610	792.78	21,740
6												
8	823.60	57,700	819.00	50,880	813.71	43,850	807.35	36,240	799.90	28,300	791.26	20,470
10												
N	822.90	56,620	818.22	49,800	812.76	42,670	806.20	34,950	798.56	26,990	789.60	19,130
2												
4	822.20	55,550	817.34	48,590	811.75	41,420	804.97	33,590	797.12	25,610	787.74	17,690
6												
8	821.45	54,430	816.45	47,400	810.72	40,180	803.72	32,240	795.67	24,280	786.00	16,410
10												
12	820.65	53,250	815.55		809.70	38,960	802.45	30,900	794.29	23,010	784.20	15,140

WILLAMETTE RIVER BASIN

445

Row River near Cottage Grove, Oreg.

Location.--Lat 43°48', long. 123°00', in NE¼ sec. 36. T. 20 S., R. 3 W., 1½ miles upstream from Mosby Creek, 2 miles downstream from Dorena Dam, and 3 miles east of Cottage Grove. Datum of gage is 685.24 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Drainage-area.--270 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 18,000 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 5,200 cfs 5-11 p.m. Nov. 18 (gage height, 8.34 ft).

1939 to September 1950: Discharge, 21,400 cfs Dec. 28, 1945 (gage height, 18.20 ft).

Remarks.--No diversion above station. Flow regulated by Dorena Reservoir.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	452	5,000	9	679	4,800	17	696	3,630	25	912	1,440
2	452	5,020	10	575	2,330	18	898	4,360	26	906	1,370
3	452	5,000	11	575	1,180	19	952	5,080	27	1,620	1,060
4	550	4,960	12	575	1,140	20	956	4,950	28	3,240	1,030
5	740	4,940	13	570	1,110	21	943	4,630	29	3,130	898
6	1,070	4,920	14	475	720	22	943	2,050	30	4,330	1,130
7	1,120	4,870	15	419	668	23	930	1,450	31	5,020	
8	865	4,900	16	490	2,760	24	910	1,310			
Monthly mean discharge, in cfs.										1,176	2,957
Runoff, in acre-feet.										72,310	175,900
Runoff, in inches.										5.02	12.22

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge	
	October 23		October 24		October 25		October 26		October 27		October 28		October 29		October 30		October 31		November 1	
2									3.67	910	5.45	2,230								
4									3.67	910	5.49	2,260								
6									3.67	910	5.50	2,270								
8									3.68	917	5.52	2,290								
10									4.38	1,400	6.96	3,620								
N	3.70	930	3.67	910	3.68	917	3.66	904	5.12	1,970	7.00	3,660								
2									5.12	1,970	7.62	4,330								
4									5.43	2,210	7.70	4,430								
6									5.44	2,220	7.16	3,830								
8									5.44	2,220	7.12	3,780								
10									5.44	2,220	6.64	3,300								
12									5.44	2,220	6.72	3,380								
	October 29		October 30		October 31		November 1		November 2		November 3									
2	6.78	3,440	6.42	3,090																
4	6.84	3,500	6.42	3,090	8.17	4,990	8.15	4,970	8.15	4,970	8.17	4,990								
6	6.94	3,600	6.42	3,090																
8	6.58	3,240	7.82	4,570	8.22	5,050	8.21	5,040	8.20	5,030	8.17	4,990								
10	6.60	3,260	7.82	4,570																
N	5.94	2,660	7.82	4,570	8.22	5,050	8.20	5,030	8.21	5,040	8.20	5,030								
2	5.98	2,690	8.07	4,870																
4	6.01	2,720	8.20	5,030	8.19	5,020	8.19	5,020	8.20	5,030	8.19	5,020								
6	6.42	3,090	8.20	5,030																
8	6.42	3,090	8.20	5,030	8.17	4,990	8.17	4,990	8.19	5,020	8.15	4,970								
10	6.42	3,090	8.19	5,020																
12	6.41	3,080	8.18	5,010	8.16	4,980	8.17	4,990	8.18	5,010	8.13	4,950								
	November 4		November 5		November 6		November 7		November 8		November 9									
2	8.13	4,950	8.09	4,900	8.06	4,860	8.01	4,800	8.00	4,790	7.91	4,680								
4																				
6	8.10	4,910	8.05	4,850	8.16	4,980	7.99	4,780	8.21	5,040	8.10	4,910								
8																				
10	8.18	5,010	8.19	5,020	8.15	4,970	8.15	4,970	8.16	4,980	8.13	4,950								
2																				
4	8.15	4,970	8.15	4,970	8.13	4,950	8.13	4,950	8.13	4,950	8.04	4,840								
6																				
8	8.13	4,950	8.13	4,950	8.09	4,900	8.08	4,890	8.05	4,850	7.95	4,730								
10																				
12	8.12	4,930	8.10	4,910	8.03	4,830	8.03	4,830	7.98	4,770	7.86	4,620								

Supplemental record.--Oct. 27, 11 a.m., 4.70 ft, 1,630 cfs; Oct. 28, 1 p.m., 7.50 ft, 4,200 cfs.

Umpqua River basin

South Umpqua River at Tiller, Oreg.

Location.--Lat 42°56', long. 122°57', in NE¹/₄ sec. 33, T. 30 S., R. 2 W., 0.3 mile upstream from Elk Creek, 0.4 mile downstream from Salt Creek, and 0.4 mile east of Tiller. Datum of gage is 991.8 ft above mean sea level, datum of 1929 (from river-profile survey).

Drainage area.--454 sq mi.

Gage-height record.--Water-stage recorder graph. Gage heights affected by drawdown in well have been corrected by curve of relation to equivalent outside gage heights.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 12,000 cfs and extended to peak stage on basis of slope-area determination. Shifting-control method used Oct. 31 to Nov. 30.

Maxima.--October-November 1950: Discharge, 37,400 cfs 2:30 a.m. Oct. 29 (gage height, 22.35 ft).
1910-11, 1939 to September 1950: Discharge, 29,900 cfs Dec. 31, 1942 (gage height, 19.56 ft), from rating curve extended above 12,000 cfs on basis of slope-area determination at gage height 22.35 ft.

Remarks.--Small diversions for irrigation; no regulation. Water-stage recorder inspected by employees of U. S. Forest Service.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	59	3,130	9	252	876	17	118	3,690	25	111	1,500
2	59	5,720	10	179	743	18	298	9,040	26	239	1,340
3	75	4,160	11	138	650	19	188	5,290	27	1,380	1,420
4	162	2,750	12	115	635	20	145	3,680	28	11,700	1,250
5	356	1,940	13	102	580	21	151	2,920	29	25,200	1,190
6	400	1,460	14	95	560	22	142	2,210	30	9,050	1,830
7	274	1,160	15	95	560	23	122	1,750	31	3,890	
8	206	1,010	16		3,420	24	111	1,560			
Monthly mean discharge, in cfs.....										1,791	2,267
Runoff, in acre-feet.....										110,100	134,900
Runoff, in inches.....										4.55	5.57

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									2.30	465	6.43	3,710
4									2.61	615	7.25	4,580
6									3.20	940	7.98	5,460
8					1.23	104	1.63	213	4.13	1,590	9.02	6,850
10									4.67	2,030	10.16	8,650
N	1.31	122	1.26	111					4.69	2,050	10.76	9,680
2					1.25	108	1.77	260	4.42	1,820	11.14	10,400
4									4.14	1,600	11.97	11,900
6									3.92	1,430	13.65	15,300
8									3.80	1,340	16.09	20,900
10									3.91	1,420	17.99	25,700
12	1.29	118	1.23	104	1.37	138	2.02	348	4.86	2,200	20.57	32,600
	October 29		October 30		October 31		November 1		November 2		November 3	
2	21.90	36,200	13.10	14,200								
4	21.62	35,400	12.37	12,700	7.27	4,600	5.68	2,890	7.81	5,250	7.46	4,830
6	20.42	32,300	11.66	11,300								
8	18.99	28,300	11.01	10,100	6.86	4,120	5.55	2,760	8.40	6,000	7.14	4,450
10	18.13	26,100	10.41	9,080								
N	16.71	22,400	9.91	8,230	6.50	3,740	5.49	2,700	8.60	6,260	6.79	4,050
2	15.72	20,000	9.46	7,510								
4	15.44	19,400	9.10	6,970	6.26	3,490	5.61	2,820	8.47	6,090	6.55	3,790
6	15.34	19,100	8.76	6,480								
8	15.17	18,700	8.36	5,950	6.06	3,260	6.53	3,770	8.22	5,770	6.33	3,550
10	14.63	17,500	8.05	5,540								
12	13.98	16,000	7.76	5,190	5.85	3,050	7.32	4,660	7.82	5,260	6.10	3,300
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	5.72	2,920	4.77	2,020	4.16	1,520	3.72	1,200	3.46	1,020	3.28	904
10												
N												
2												
4	5.33	2,540	4.55	1,830	4.00	1,400	3.60	1,110	3.42	994	3.17	838
6												
8												
10												
12	5.03	2,260	4.34	1,660	3.84	1,280	3.50	1,050	3.38	970	3.11	804

Supplemental record.--Oct. 29, 2:30 a.m., 22.35 ft, 37,400 cfs.

UMPQUA RIVER BASIN

447

South Umpqua River near Brockway, Oreg.

Location.--Lat 43°08', long. 123°24', in SW $\frac{1}{4}$ sec. 15, T. 28 S., R. 6 W., at Winston Bridge on Pacific Highway, 2 $\frac{1}{2}$ miles northeast of Brockway and 4 miles downstream from Lookingglass Creek. Datum of gage is 461.84 ft above mean sea level, datum of 1929 (Oregon State Highway bench mark).

Drainage area.--1,640 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 51,000 cfs and extended above on basis of slope-area determination of peak flow.

Maxima.--October-November 1950: Discharge, 118,000 cfs 9 p.m. Oct. 29 (gage height, 32.4 ft).

1905-12, 1923-26, 1942 to September 1950: Discharge, 78,400 cfs Jan. 7, 1948 (gage height, 29.0 ft, from floodmark, present site and datum), from rating curve extended above 50,000 cfs on basis of slope-area determination at gage height 32.4 ft.

Stage known, 33.1 ft February 1890 (discharge, about 130,000 cfs). Flood of Feb. 21, 1927, reached a stage of about 31.3 ft, present site and datum (discharge, 101,000 cfs).

Remarks.--Many small diversions above station for irrigation; no regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	108	9,240	9	416	2,250	17	229	19,600	25	306	4,160
2	107	9,020	10	443	1,970	18	272	32,100	26	416	3,710
3	142	8,710	11	360	1,740	19	510	24,000	27	2,200	3,500
4	180	6,140	12	290	1,590	20	412	13,100	28	16,900	3,320
5	336	4,580	13	244	1,560	21	380	9,740	29	90,200	2,980
6	849	3,610	14	226	1,470	22	470	7,120	30	53,000	3,590
7	758	2,950	15	211	2,020	23	442	5,640	31	15,900	
8	530	2,510	16	205	26,900	24	353	4,660			
Monthly mean discharge, in cfs.....										6,045	7,449
Runoff, in acre-feet.....										371,700	443,300
Runoff, in inches.....										4.25	5.07

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							4.00	300	4.78	669	8.81	5,780
4	4.43	485	4.20	380	4.02	308	4.00	300	4.80	680	9.34	6,860
6							4.01	304	4.90	740	10.08	8,520
8	4.37	456	4.16	364	4.02	308	4.02	308	5.05	835	10.64	9,860
10							4.03	312	5.24	968	11.49	12,000
N	4.32	434	4.12	348	4.02	308	4.06	324	5.51	1,170	12.43	14,400
2							4.12	348	6.21	1,800	13.44	16,900
4	4.29	420	4.10	340	4.01	304	4.30	425	7.00	2,770	14.65	20,600
6							4.64	592	7.71	3,790	16.07	24,700
8	4.25	402	4.08	332	4.00	300	4.74	647	8.26	4,720	17.35	28,600
10							4.76	658	8.54	5,250	18.66	32,500
12	4.22	389	4.05	320	4.00	300	4.75	652	8.62	5,400	20.42	38,100
	October 29		October 30		October 31		November 1		November 2		November 3	
2	22.47	44,800	31.32	103,000	14.80	21,000	11.12	11,000				
4	24.73	52,900	30.16	89,400	14.30	19,600	10.94	10,600	9.71	7,670	10.62	9,810
6	26.92	63,800	28.28	72,900	13.84	18,300	10.73	10,100				
8	28.96	78,100	26.07	59,100	13.42	17,100	10.60	9,760	10.04	8,430	10.41	9,300
10	30.34	91,300	23.92	49,700	13.06	16,100	10.44	9,380				
N	31.28	102,400	21.89	42,900	12.76	15,300	10.30	9,040	10.34	9,140	10.17	8,730
2	31.86	110,000	20.20	37,400	12.42	14,400	10.17	8,730				
4	32.10	114,000	18.83	33,100	12.18	13,800	10.06	8,480	10.58	9,710	9.91	8,130
6	32.20	115,000	17.75	29,800	11.94	13,100	9.97	8,270				
8	32.33	117,000	16.77	26,800	11.72	12,600	9.88	8,060	10.78	10,200	9.69	7,630
10	32.32	117,000	16.00	24,500	11.51	12,000	9.79	7,860				
12	32.08	113,000	15.32	22,500	11.31	11,500	9.74	7,740	10.76	10,200	9.48	7,170
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
10	9.13	6,420	8.28	4,750	7.69	3,760	7.19	3,030	6.83	2,550	6.64	2,300
N												
2												
4	8.82	5,800	8.06	4,360	7.49	3,460	7.08	2,870	6.75	2,440	6.57	2,210
6												
8												
10												
12	8.55	5,260	7.85	4,010	7.32	3,210	6.93	2,680	6.70	2,380	6.49	2,120

Supplemental record.--Oct. 29, 9 p.m., 32.4 ft, 118,000 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Umpqua River near Elkton, Oreg.

Location.--Lat 43°35', long. 123°33', in sec. 8, T. 23 S., R. 7 W., 4 miles south of Elkton. Datum of gage is 91.33 ft above mean sea level, datum of 1929.

Drainage area.--3,680 sq mi.

Gage-height record.--Staff gage read twice daily. Graph drawn on basis of staff-gage readings for period Oct. 23 to Nov. 9.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 67,000 cfs and extended to peak stage on basis of slope-area determination. Gage heights used to half tenths between 3.4 and 6.7 ft; hundredths below and tenths above these limits.

Maxima.--October-November 1950: Discharge, 208,000 cfs about 1 a.m. October 30 (gage height, 44.2 ft, from floodmark).

1905 to September 1950: Discharge, 186,000 cfs Dec. 31, 1942 (gage height, 41.1 ft), from rating curve extended above 67,000 cfs on basis of slope-area determination at gage height 44.2 ft.

Stage known, 45.5 ft, from floodmark, sometime in 1861, probably December (discharge about 220,000 cfs).

Remarks.--Some diversions for irrigation from streams in South Umpqua River basin, but effect on flood flow negligible. Power plant at Winchester and manipulation of gates and racks at fish hatchery at Diamond Lake ordinarily do not affect flow at this station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	1,280	25,500	9	2,380	7,120	17	1,760	44,900	25	1,890	11,500
2	1,160	19,800	10	2,170	6,520	18	1,720	71,500	26	1,980	10,400
3	1,260	19,200	11	1,960	5,920	19	1,800	62,300	27	4,220	9,730
4	1,770	18,900	12	1,810	5,280	20	2,640	35,900	28	22,700	9,960
5	2,000	17,000	13	1,720	5,020	21	2,360	28,400	29	152,000	9,050
6	2,510	13,600	14	1,650	4,860	22	2,160	18,500	30	160,000	9,380
7	3,980	9,080	15	1,630	5,190	23	2,020	14,000	31	49,100	
8	2,820	7,740	16	1,670	33,000	24	1,930	12,300			
Monthly mean discharge, in cfs.....										14,200	18,380
Runoff, in acre-feet.....										872,800	1,094,000
Runoff, in inches.....										4.45	5.57

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	October 23		October 24		October 25		October 26		October 27		October 28	
	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
2											6.38	9,270
4							2.12	1,910	2.75	2,700	6.88	10,400
6											7.50	12,000
8							2.12	1,910	3.04	3,080	8.32	14,300
10											8.80	15,900
N	2.20	2,000	2.13	1,920	2.08	1,870	2.12	1,910	3.50	3,740	9.46	18,100
2											10.25	20,600
4							2.14	1,930	4.06	4,620	11.30	24,400
6											12.50	28,800
8							2.28	2,100	4.83	6,020	14.40	36,300
10											16.90	47,100
12	2.19	1,990	2.11	1,900	2.12	1,910	2.46	2,320	5.80	7,950	20.20	62,300
October 29			October 30		October 31		November 1		November 2		November 3	
2	25.60	89,200	44.10	207,000	22.00	71,000						
4	28.80	106,000	43.30	205,000	20.60	64,200	12.80	29,900	10.80	20,200	9.85	19,200
6	31.40	122,000	42.90	199,000	19.20	57,500						
8	33.40	134,000	42.00	192,000	18.20	52,900	12.15	27,700	9.98	19,800	9.84	19,200
10	35.40	147,000	40.10	179,000	17.30	48,800						
N	37.10	158,000	38.30	166,000	16.50	45,300	11.45	24,800	9.92	19,500	9.82	19,200
2	38.60	168,000	36.40	154,000	15.90	42,700						
4	40.00	178,000	34.40	141,000	15.40	40,500	10.82	22,600	9.90	19,500	9.80	19,200
6	41.30	187,000	32.30	127,000	14.90	38,400						
8	42.50	196,000	30.00	113,000	14.40	36,300	10.46	21,600	9.90	19,500	9.79	19,200
10	43.60	204,000	27.30	98,000	13.90	34,200						
12	44.10	207,000	24.40	83,000	13.50	32,600	10.25	20,600	9.88	19,500	9.78	19,200
November 4			November 5		November 6		November 7		November 8		November 9	
2												
4	9.76	19,200										
6												
8	9.76	19,200	9.32	17,500	8.36	14,600	6.36	9,160	5.74	7,840	5.44	7,220
10												
N	9.72	18,800										
2												
4	9.68	18,800	9.03	16,500	7.80	12,900	6.06	8,500	5.65	7,640	5.35	7,020
6												
8	9.61	18,500										
10												
12	9.55	18,500	8.72	15,600	7.13	11,000	5.92	8,170	5.52	7,320	5.28	6,920

Supplemental record.--Oct. 30, 1 a.m., 44.2 ft, 208,000 cfs.

UMPQUA RIVER BASIN

449

Cow Creek near Azalea, Oreg.

Location.--Lat 42°50', long. 123°11', in sec. 4, T. 32 S., R. 4 W., 4 miles northeast of Azalea.

Drainage area.--76 sq mi.

Gage-height record.--Water-stage recorder record.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,000 cfs and extended to peak stage on basis of slope-area determination. Shifting-control method used Oct. 9-27.

Maxima.--October-November 1950: Discharge, 5,920 cfs 5 a.m. Oct. 29 (gage height, 14.37 ft).
1926 to September 1950: Discharge, 4,550 cfs Jan. 6, 1948 (gage height, 11.50 ft).

Remarks.--Small diversions above station for irrigation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	12	327	9	22	80	17	18	868	25	19	194
2	13	254	10	17	74	18	23	1,480	26	32	176
3	16	183	11	15	69	19	16	776	27	208	168
4	29	146	12	14	69	20	15	649	28	2,140	146
5	49	121	13	14	67	21	20	367	29	4,400	144
6	42	102	14	13	67	22	18	286	30	1,360	173
7	23	89	15	13	96	23	16	241	31	495	
8	20	84	16	14	972	24	14	211			
Monthly mean discharge, in cfs.....										294	289
Runoff, in acre-feet.....										18,090	17,180
Runoff, in inches.....										4.46	4.24

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L C H	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							2.45	92	5.02	944		
4							2.68	139	5.65	1,240		
6							2.84	175	5.75	1,280		
8	1.92	16	1.90	14	1.91	15	2.05	27	3.00	212	5.89	1,360
10							3.05	224	6.42	1,650		
N							2.07	30	3.15	244	6.57	1,740
2							3.04	232	6.87	1,920		
4	1.91	15	1.90	14	1.99	22	2.11	35	2.94	208	7.40	2,240
6							2.88	193	8.35	2,810		
8							2.12	36	2.93	295	9.60	3,560
10							3.20	270	10.92	4,260		
12	1.91	15	1.90	14	2.02	24	2.22	52	4.02	528	11.98	4,790
	October 29		October 30		October 31		November 1		November 2		November 3	
2	13.40	5,480	7.46	2,420								
4	14.20	5,840	6.82	2,050	3.88	583						
6	14.15	5,820	6.30	1,720								
8	12.50	4,950	5.87	1,480	3.71	527	3.14	345	2.80	238	2.62	186
10	11.11	4,360	5.50	1,290								
N	10.77	4,180	5.20	1,140	3.55	476						
2	10.50	3,950	4.96	1,020								
4	9.76	3,680	4.76	930	3.42	435	3.01	305	2.75	224	2.58	176
6	9.75	3,680	4.61	866								
8	9.58	3,590	4.45	799	3.35	414						
10	9.08	3,340	4.29	734								
12	8.28	2,900	4.15	679	3.28	392	2.90	271	2.70	211	2.52	161
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	2.48	151	2.37	124	2.28	103	2.21	89	2.18	84	2.16	80
8												
10												
N												
2	2.46	146	2.34	117	2.27	101	2.20	88	2.18	84	2.16	80
4												
6												
8												
10												
12	2.41	135	2.31	111	2.24	95	2.19	86	2.17	82	2.14	76

Supplemental record.--Oct. 27, 11 a.m., 3.18 ft, 256 cfs; Oct. 29, 5 a.m., 14.37 ft, 5,920 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

North Umpqua River below Lake Creek, Oreg.

Location.--Lat 43°19', long. 122°11', in NW¼ sec. 13, T. 26 S., R. 5 E., 600 ft down-stream from Lake Creek and 30 miles southwest of Crescent. Altitude of gage is 4,090 ft (from river-profile map).

Drainage area.--175 sq mi.

Gage-height record.--Water-stage recorder graph except Nov. 7, 8, which was computed on basis of graph for North Umpqua River above Clearwater River.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--October-November 1950: Discharge, 702 cfs 2 to 4 a.m. Oct. 29 (gage height, 1.75 ft).
1927 to September 1950: Discharge, 1,190 cfs June 9, 1933 (gage height, 2.34 ft), from rating curve extended above 700 cfs.

Remarks.--No diversions above station. Flow slightly regulated by Diamond Lake.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	370	563	9	382	522	17	470	502	25	445	488
2	367	610	10	462	515	18	462	525	26	446	488
3	378	587	11	462	506	19	450	510	27	468	502
4	382	564	12	458	502	20	446	520	28	545	488
5	418	548	13	450	502	21	442	502	29	649	492
6	398	528	14	450	497	22	442	497	30	569	502
7	390	522	15	450	492	23	438	492	31	527	
8	386	525	16	450	497	24	438	492			
Monthly mean discharge, in cfs.....										448	516
Runoff, in acre-feet.....										27,550	30,700
Runoff, in inches.....										2.95	3.29

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									1.33	484	1.32	479
4											1.33	484
6											1.35	492
8	1.22	438	1.22	438	1.23	442	1.23	442	1.30	470	1.36	497
10											1.37	502
N									1.27	458	1.38	506
2											1.41	520
4	1.22	438	1.22	438	1.25	450	1.24	446	1.27	458	1.47	550
6											1.58	605
8									1.30	470	1.67	653
10											1.70	670
12	1.22	438	1.22	438	1.25	450	1.25	450	1.32	479	1.73	690
	October 29		October 30		October 31		November 1		November 2		November 3	
2	1.75	702										
4	1.75	702	1.55	590	1.43	530	1.42	525	1.58	605		
6	1.73	690										
8	1.70	670	1.53	580	1.42	525	1.45	540	1.58	605	1.55	590
10	1.67	653										
N	1.64	637	1.50	565	1.42	525	1.49	560	1.59	610		
2	1.62	626										
4	1.61	620	1.48	555	1.42	525	1.53	580	1.60	615	1.53	580
6	1.61	620										
8	1.60	615	1.47	550	1.42	525	1.58	605	1.60	615		
10	1.59	610										
12	1.58	605	1.46	545	1.42	525	1.59	610	1.58	605	1.52	575
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	1.50	565	1.47	550	1.43	530	1.41	520	1.42	525	1.41	520
10												
N												
2												
4	1.49	560	1.46	545	1.42	525	1.42	525	1.42	525	1.41	520
6												
8												
10												
12	1.48	555	1.45	540	1.41	520	1.42	525	1.42	525	1.42	525

UMPQUA RIVER BASIN

451

North Umpqua River above Clearwater River, Oreg.

Location.--Lat 43°17', long. 122°24', in NE¼ sec. 25, T. 26 S., R. 3 E., 2 miles upstream from Clearwater River. Datum of gage is 2,457.5 ft above mean sea level (levels by The California Oregon Power Co.).

Drainage area.--258 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,400 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 2,210 cfs 4 a.m. Oct. 29 (gage height, 4.18 ft).

1948 to September 1950: Discharge, 2,380 cfs May 2, 1949 (gage height, 4.36 ft), from rating curve extended above 1,400 cfs as explained above.

Remarks.--No diversion above station. Flow slightly regulated by Diamond Lake.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	494	1,200	9	522	897	17	650	913	25	598	922
2	494	1,700	10	599	854	18	635	1,300	26	609	913
3	515	1,460	11	606	828	19	599	1,110	27	707	966
4	529	1,260	12	599	820	20	592	1,090	28	1,090	930
5	613	1,130	13	592	802	21	592	1,030	29	1,890	922
6	585	1,020	14	592	794	22	578	948	30	1,300	984
7	550	957	15	592	786	23	571	904	31	1,030	
8	536	948	16	585	828	24	566	904			
Monthly mean discharge, in cfs.....										678	1,004
Runoff, in acre-feet.....										41,670	59,740
Runoff, in inches.....										3.03	4.34

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									2.54	650	2.68	755
4									2.65	732	2.67	748
6									2.69	762	2.68	755
8	2.43	571	2.42	564	2.44	578	2.47	599	2.68	755	2.72	785
10									2.64	725	2.77	822
N									2.61	702	2.87	898
2									2.58	680	2.97	972
4	2.43	571	2.42	564	2.50	620	2.47	599	2.56	665	3.13	1,090
6									2.57	672	3.42	1,320
8									2.60	695	3.73	1,560
10									2.68	755	3.94	1,980
12	2.43	571	2.43	571	2.50	620	2.52	635	2.68	755	4.08	2,110
	October 29		October 30		October 31		November 1		November 2		November 3	
2	4.16	2,190										
4	4.18	2,210	3.58	1,450	2.98	1,090	2.82	948	3.72	1,770	3.48	1,540
6	4.13	2,160										
8	4.04	2,070	3.28	1,360	2.93	1,050	2.89	1,010	3.68	1,730	3.42	1,490
10	3.97	2,010										
N	3.83	1,870	3.18	1,270	2.88	1,000	2.98	1,090	3.65	1,700	3.37	1,440
2	3.71	1,760										
4	3.65	1,700	3.13	1,230	2.87	993	3.15	1,240	3.63	1,680	3.33	1,410
6	3.63	1,680										
8	3.61	1,660	3.08	1,180	2.87	993	3.48	1,540	3.59	1,650	3.30	1,380
10	3.54	1,600										
12	3.48	1,540	3.02	1,130	2.84	966	3.72	1,770	3.53	1,590	3.27	1,350
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	3.20	1,290	3.03	1,140	2.92	1,040	2.83	957	2.82	948	2.77	904
10												
N												
2												
4	3.13	1,230	3.00	1,110	2.88	1,000	2.82	948	2.83	957	2.75	888
6												
8												
10												
12	3.08	1,180	2.97	1,090	2.86	984	2.82	948	2.80	930	2.73	870

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

North Umpqua River above Copeland Creek, Oreg.

Location.--Lat 43°18', long. 122°32', in NE $\frac{1}{4}$ sec. 23, T. 26 S., R. 2 E., half a mile upstream from Copeland Creek and 40 miles east of Roseburg. Altitude of gage is 1,580 ft (from river-profile map).

Drainage area.--471 sq.mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 3,200 cfs and extended to peak stage on basis of slope-area determination.

Maxima.--October-November 1950: Discharge, 12,200 cfs 3 a.m. Oct. 29 (gage height, 11.30 ft).
1949 to September 1950: Discharge, 4,670 cfs Feb. 25, 1950 (gage height, 6.82 ft), and extended to peak stage on basis of slope-area determination at gage height, 11.3 ft.

Remarks.--Regulation by power plant upstream; slightly regulated by Diamond Lake. Water-stage recorder inspected by employees of The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	876	3,030	9	974	1,860	17	1,200	2,130	25	1,060	2,090
2	804	4,580	10	942	1,710	18	1,190	3,910	26	1,050	2,030
3	948	3,640	11	1,040	1,640	19	1,060	2,900	27	1,720	2,220
4	936	2,880	12	954	1,620	20	1,020	2,750	28	4,370	2,060
5	1,250	2,440	13	1,010	1,560	21	1,040	2,500	29	9,000	2,020
6	1,140	2,220	14	981	1,500	22	1,000	2,240	30	4,410	2,120
7	1,040	2,000	15	995	1,510	23	963	2,020	31	2,770	
8	974	1,970	16	988	1,730	24	909	2,060			
Monthly mean discharge, in cfs.										1,568	2,298
Runoff, in acre-feet.										96,420	136,700
Runoff, in inches.										5.84	5.44

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									3.65	1,370	4.06	1,710
4	2.87	822	2.77	762	2.67	702	3.00	900	3.90	1,570	4.03	1,690
6									4.13	1,780	4.20	1,840
8	3.21	1,040	3.09	954	3.04	924	3.25	1,060	4.26	1,890	4.33	1,960
10									4.52	2,130	5.00	2,570
N	3.34	1,130	3.08	948	3.59	1,320	3.41	1,180	4.43	2,050	5.62	3,210
2									4.33	1,960	6.34	4,060
4	3.08	948	3.11	967	3.35	1,140	3.31	1,110	4.28	1,910	6.89	4,760
6									3.97	1,630	7.83	6,130
8	3.22	1,040	3.23	1,050	3.62	1,350	3.22	1,040	3.83	1,510	9.18	8,310
10									3.92	1,590	10.15	9,970
12	2.78	768	2.79	774	3.22	1,040	3.10	980	3.99	1,650	10.65	10,900
	October 29		October 30		October 31		November 1		November 2		November 3	
2	11.07	11,700	7.52	5,650								
4	11.04	11,700	7.29	5,310	5.73	3,330	4.75	2,340	6.91	4,780	6.29	4,000
6	10.88	11,400	7.04	4,960								
8	10.52	10,600	6.88	4,740	5.36	2,930	4.88	2,450	6.84	4,690	6.12	3,790
10	9.88	9,500	6.73	4,550								
N	9.36	8,610	6.47	4,210	5.14	2,710	5.10	2,670	6.75	4,580	5.90	3,530
2	8.93	7,890	6.34	4,080								
4	8.46	7,140	6.24	3,940	4.84	2,420	5.81	3,420	6.74	4,560	5.84	3,460
6	8.46	7,140	6.14	3,820								
8	8.39	7,020	6.03	3,690	5.00	2,570	6.12	3,790	6.65	4,440	5.73	3,330
10	8.04	6,460	5.84	3,460								
12	7.89	6,220	5.34	2,910	4.84	2,420	6.81	4,650	6.48	4,230	5.63	3,220
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	5.47	3,050	4.88	2,450			4.36	2,010	4.15	1,840	4.05	1,760
6												
8	5.20	2,770	5.07	2,640	4.66	2,250	4.16	1,850	4.24	1,910	4.14	1,830
10												
N	5.11	2,680	4.70	2,290			4.47	2,100	4.47	2,100	4.39	2,030
2												
4	5.28	2,850	4.65	2,240	4.60	2,200	4.44	2,070	4.40	2,040	4.25	1,920
6												
8	5.36	2,930	4.89	2,460			4.27	1,940	4.47	2,100	4.25	1,920
10												
12	5.23	2,800	4.70	2,290	4.53	2,140	4.20	1,880	4.13	1,820	3.73	1,530

Supplemental record.--Oct. 29, 3 a.m., 11.50 ft, 12,200 cfs.

UMPQUA RIVER BASIN

453

Clearwater River above Trap Creek, Oreg.

Location.--Lat 43°15', long. 122°17', in SE $\frac{1}{4}$ sec. 1, T. 27 S., R. 4 E., 450 ft upstream from Trap Creek and 40 miles east of Glide. Altitude of gage is 3,760 ft (from river-profile map).

Drainage area.--41.6 sq mi.

Gage-height record.--Water-stage recorder graph except Nov. 9, 10.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 290 cfs and extended to peak stage. Discharge for Nov. 9, 10 computed on basis of record for Clearwater River at mouth.

Maxima.--October-November 1950: Discharge, 487 cfs 6 a.m. Oct. 29 (gage height, 2.28 ft).

1927 to September 1950: Discharge, 451 cfs Jan. 1, 1943, from rating curve extended above 290 cfs; gage height, 2.40 ft Jan. 7, 1948 (backwater from log).

Remarks.--No diversion or regulation above station. Water-stage recorder inspected by employees of The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	149	238	9	156	205	17	163	196	25	154	204
2	149	272	10	153	200	18	156	215	26	156	207
3	154	255	11	153	194	19	151	202	27	170	224
4	153	240	12	151	192	20	151	213	28	251	213
5	171	226	13	149	190	21	151	207	29	412	213
6	162	214	14	149	188	22	149	200	30	278	222
7	156	206	15	149	188	23	149	200	31	232	
8	158	211	16	149	194	24	149	200			
Monthly mean discharge, in cfs.....										172	211
Runoff, in acre-feet.....										10,580	12,550
Runoff, in inches.....										4.77	5.66

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											1.09	165
4					1.00	149	1.02	153	1.21	189	1.10	167
6											1.11	169
8	1.00	149	1.00	149	1.00	149	1.02	153	1.11	169	1.17	181
10											1.25	198
N					1.03	154	1.01	151	1.08	163	1.34	219
2											1.44	243
4	1.00	149	1.00	149	1.06	160	1.03	154	1.07	162	1.58	279
6											1.74	322
8					1.05	158	1.07	162	1.11	169	1.88	362
10											2.02	404
12	1.00	149	1.01	151	1.03	154	1.12	171	1.09	165	2.12	435
October 29			October 30		October 31		November 1		November 2		November 3	
2	2.17	451	1.74	325								
4	2.24	474	1.67	308	1.36	235	1.32	226				
6	2.28	487	1.62	295								
8	2.14	442	1.57	283	1.34	231	1.35	233	1.53	274	1.45	256
10	2.06	417	1.54	276								
N	1.97	389	1.52	272	1.32	226	1.37	237				
2	1.95	383	1.50	267								
4	1.97	389	1.48	262	1.31	224	1.39	242	1.56	281	1.43	251
6	1.97	389	1.46	258								
8	1.94	380	1.43	251	1.31	224	1.43	251				
10	1.87	360	1.41	246								
12	1.80	340	1.39	242	1.29	220	1.45	256	1.51	269	1.41	246
November 4			November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	1.39	242	1.33	229	1.27	215	1.23	207	1.25	211		
10												
N												
2												
4	1.37	237	1.31	224	1.26	213	1.22	204	1.26	213		
6												
8												
10												
12	1.35	233	1.29	220	1.24	209	1.23	207	1.25	211		

Clearwater River at mouth, Oreg.

Location.--Lat 43°15'50", long. 122°25'00", in SE $\frac{1}{4}$ sec. 35, T. 26 S., R. 3 E., a quarter of a mile upstream from mouth and 3 miles northeast of Big Camas ranger station. Datum of gage is 2,437.5 ft above mean sea level (levels by The California Oregon Power Co.)

Drainage area.--75 sq mi.

Gage-height record.--Water-stage recorder graph except for period Oct. 1-11, when clock was stopped.

Discharge record.--Stage-discharge relation defined by current-meter measurements to 1,340 cfs. Discharge Oct. 1-11 computed on basis of record for Clearwater River above Trap Creek.

Maxima.--October-November 1950: Discharge, 1,250 cfs 8 a.m. Oct. 29 (gage height, 4.82 ft).

1947 to September 1950: Discharge, 1,340 cfs Jan. 7, 1948 (gage height, 4.96 ft, observed at peak).

Remarks.--No diversions or regulation above station except natural regulation by large springs with steady flow.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	245	506	9	255	391	17	278	403	25	266	436
2	245	672	10	250	373	18	270	555	26	273	436
3	260	629	11	250	367	19	258	510	27	311	471
4	255	547	12	246	370	20	258	516	28	504	450
5	290	489	13	246	361	21	255	492	29	1,080	443
6	260	446	14	246	355	22	252	464	30	716	454
7	265	415	15	248	349	23	252	443	31	511	
8	260	408	16	250	370	24	252	432			
Monthly mean discharge, in cfs.										316	452
Runoff, in acre-feet.										19,450	26,880
Runoff, in inches.										4.86	6.72

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L o c a t i o n	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					2.52	255	2.59	272	2.71	302	2.78	320
4									2.75	312	2.79	322
6					2.53	258	2.57	268	2.82	331	2.81	328
8									2.85	340	2.82	331
10	2.51	252	2.51	252	2.55	262	2.56	265	2.79	322	2.89	352
N									2.74	310	3.02	391
2									2.71	302	3.19	446
4					2.59	272	2.58	270	2.69	298	3.40	520
6									2.68	295	3.75	658
8					2.62	280	2.62	280	2.69	298	4.06	810
10									2.75	312	4.25	910
12	2.51	252	2.52	255	2.61	278	2.66	290	2.78	320	4.40	1,000
October 29			October 30		October 31		November 1		November 2		November 3	
2	4.55	1,090			3.46	541	3.26	471	3.64	611	3.77	666
4	4.68	1,170	4.12	840								
6	4.79	1,230			3.40	520	3.31	488	3.77	666	3.71	640
8	4.82	1,250	3.95	755								
10	4.71	1,190			3.35	502	3.34	499	3.84	700	3.67	623
N	4.56	1,100	3.82	690								
2	4.42	1,010			3.32	492	3.39	516	3.87	715	3.63	607
4	4.38	988	3.72	644								
6	4.42	1,010			3.30	485	3.45	538	3.86	710	3.61	599
8	4.41	1,010	3.65	615								
10	4.37	982			3.28	478	3.53	567	3.82	690	3.57	583
12	4.29	934	3.54	571								
November 4			November 5		November 6		November 7		November 8		November 9	
2												
4												
6	3.50	555	3.33	496	3.20	450	3.11	418	3.08	409	3.03	394
8												
10												
N												
2	3.44	534	3.28	478	3.17	440	3.08	409	3.08	409	3.01	388
4												
6												
8												
10												
12	3.40	520	3.24	464	3.14	429	3.08	409	3.06	403	2.99	382

UMPQUA RIVER BASIN

455

Fish Creek at Big Camas ranger station, Oreg.

Location.--Lat 43°14', long. 122°26', in SE¼ sec. 10, T. 27 S., R. 3 E., half a mile upstream from Camas Creek and three-quarters of a mile east of Big Camas ranger station. Datum of gage is 2,872.24 ft above mean sea level, datum of 1929 (levels by The California Oregon Power Co.).

Drainage area.--67 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 900 cfs and extended above on basis of contracted-opening determination at gage height, 7.24 ft. Shifting-control method used 8 a.m. Oct. 29 to Nov. 30.

Maxima.--October-November 1950: Discharge, 3,750 cfs 4 a.m. Oct. 29 (gage height, 7.24 ft).
1947 to September 1950: Discharge, 4,270 cfs Jan. 7, 1948 (gage height, 7.62 ft), from rating curve extended above 900 cfs as explained above.

Remarks.--No diversion or regulation above station. Water-stage recorder inspected by employees of The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	53	958	9		99	17	150	390	25	110	442
2	53	1,280	10		78	18	120	932	26	140	448
3	72	925	11		71	19	90	688	27	321	563
4	90	729	12		66	20	81	682	28	1,480	458
5	177	584	13		61	21	83	580	29	2,860	448
6	139	475	14		61	22	72	480	30	1,350	486
7	101	397	15		66	23	68	410	31	779	
8	101	372	16		66	24	68	420			
Monthly mean discharge, in cfs.....										294	503
Runoff, in acre-feet.....										18,100	29,950
Runoff, in inches.....										5.07	8.38

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					2.66	79	2.87	120	3.80	475	3.45	298
4											3.45	298
6					2.68	83	2.83	112	3.62	380	3.56	350
8											3.80	475
10											4.20	700
N	2.60	69	2.58	66	2.72	90	2.79	103	3.41	280	4.77	1,100
2											5.15	1,440
4					2.98	146	2.83	112	3.31	241	5.67	1,920
6											6.46	2,770
8					3.03	159	3.16	194	3.38	267	6.64	2,990
10											7.01	3,450
12	2.58	66	2.61	71	2.94	137	3.38	267	3.45	298	7.14	3,620
	October 29		October 30		October 31		November 1		November 2		November 3	
2	7.19	3,690	5.50	1,810								
4	7.24	3,750	5.36	1,680	4.41	869	4.15	706	5.06	1,410		
6	7.09	3,560	5.25	1,580								
8	6.84	3,240	5.13	1,470	4.31	802	4.28	784	5.00	1,350	4.52	946
10	6.47	2,810	5.03	1,380								
N	6.23	2,540	4.92	1,280	4.23	754	4.33	814	4.91	1,270		
2	6.15	2,460	4.86	1,230								
4	6.27	2,600	4.79	1,160	4.18	724	4.66	1,060	4.86	1,230	4.43	883
6	6.23	2,570	4.72	1,100								
8	5.96	2,270	4.64	1,040	4.16	712	4.99	1,340	4.81	1,180		
10	5.76	2,070	4.58	992								
12	5.62	1,930	4.51	939	4.12	688	5.05	1,400	4.69	1,080	4.33	814
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	4.22	748	3.96	596	3.77	492	3.60	400	3.55	375	3.44	320
8												
10												
N	4.14	700	3.90	563	3.71	459	3.57	385	3.55	375	3.40	302
2												
4												
6												
8												
10												
12	4.08	664	3.83	524	3.65	426	3.57	385	3.50	350	3.36	284

Coos River basin

Daniels Creek near Eastside, Oreg.

Location.--Lat 43°21', long. 124°05', near center of sec. 2, T. 26 S., R 12 W., at county highway bridge 0.1 mile downstream from Morgan Creek, about 2 miles upstream from mouth, and 5½ miles southeast of Eastside. Datum of gage is 6.32 ft above mean sea level, datum of 1929.

Drainage area.--14.5 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--October-November 1950: Discharge, 1,170 cfs 4 p.m. Oct. 28 (gage height, 9.96 ft).

Remarks.--Some diversion above station for irrigation. No regulation. Station established July 1, 1950.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	3.9	177	9	19	51	17	56	337	25	48	112
2	3.7	176	10	12	45	18	46	446	26	63	102
3	20	152	11	9.2	40	19	92	243	27	194	170
4	27	119	12	7.6	38	20	94	187	28	582	130
5	51	95	13	6.7	36	21	47	144	29	713	111
6	22	75	14	6.3	39	22	31	115	30	433	120
7	15	62	15	6.4	168	23	23	96	31	273	
8	26	57	16	7.9	590	24	19	122			
Monthly mean discharge, in cfs.....										95.3	145
Runoff, in acre-feet.....										5,860	8,640
Runoff, in inches.....										7.58	11.17

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 22		October 24		October 25		October 26		October 27		October 28	
2					3.31	20	4.42	54	7.08	164	8.29	254
4									7.40	180	8.23	247
6									7.47	184	8.21	244
8	3.43	24	3.29	20	3.55	28	4.27	49	7.38	179	8.35	262
10									7.20	170	8.64	315
N					4.63	60	4.16	46	7.10	165	9.03	488
2									7.15	168	9.52	806
4	3.37	22	3.23	18	4.98	73	4.33	51	7.41	181	9.96	1,170
6									7.80	205	9.84	1,070
8					4.83	67	5.20	82	8.32	258	9.62	886
10									8.44	275	9.45	755
12	3.32	21	3.29	20	4.62	60	6.48	134	8.39	268	9.38	706
	October 29		October 30		October 31		November 1		November 2		November 3	
2	9.38	706										
4	9.42	734	9.01	476	8.66	320	7.65	195	7.02	161	7.06	163
6	9.48	776										
8	9.44	748	8.89	406	8.53	291	7.44	182	7.31	176	6.96	158
10	9.37	699										
N	9.35	685	8.93	428	8.40	269	7.28	174	7.55	189	6.83	152
2	9.44	748										
4	9.49	783	8.93	428	8.25	249	7.15	168	7.51	187	6.73	148
6	9.43	741										
8	9.34	678	8.87	396	8.06	228	7.01	160	7.36	178	6.62	141
10	9.25	620										
12	9.16	566	8.78	358	7.85	209	6.95	158	7.22	171	6.48	134
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	6.25	124	5.63	99	5.10	78	4.72	63	4.58	58	4.36	52
8												
10												
N												
2	6.00	114	5.43	91	4.94	72	4.62	60	4.51	56	4.28	49
4												
6												
8												
10												
12	5.80	106	5.25	84	4.81	66	4.65	60	4.41	53	4.21	47

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

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Coquille River basin

South Fork Coquille River at Powers, Oreg.

Location.--Lat 42°54', long. 124°04', in SE $\frac{1}{4}$ sec. 12, T. 31 S., R. 12 W., half a mile northeast of bridge at Powers and three-quarters of a mile upstream from Woodward Creek. Datum of gage is 197.42 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Drainage area.--169 sq mi.

Gage-height record.--Water-stage recorder graph except Nov. 6-11, which was computed on basis of range in stage, general pattern of falling stage, and records for Daniels Creek near Eastside.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 14,000 cfs and extended above on basis of contracted-opening determination at gage height 18.14 ft. Shifting-control method used Nov. 2-5, 12-15, 22-30.

Maxima.--October-November 1950: Discharge, 24,400 cfs 4:30 p.m. Oct. 28 (gage height, 18.14 ft).
1916-26, 1928 to September 1950: Discharge, 30,500 cfs Dec. 28, 1945 (gage height, 20.57 ft), from rating curve extended above 14,000 cfs as explained above.

Remarks.--Small diversions above station for irrigation. No regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	26	2,510	9	266	366	17	548	6,620	25	866	783
2	24	1,940	10	206	342	18	807	11,200	26	1,430	694
3	67	1,390	11	155	321	19	783	4,420	27	6,720	1,190
4	320	1,040	12	109	304	20	956	3,420	28	15,000	890
5	708	776	13	94	281	21	1,060	2,490	29	16,100	765
6	717	621	14	86	285	22	717	1,720	30	7,160	1,200
7	307	513	15	90	1,910	23	486	1,280	31	3,800	
8	249	421	16	104	1,110	24	362	994			
Monthly mean discharge, in cfs.....										1,945	1,727
Runoff, in acre-feet.....										119,600	102,700
Runoff, in inches.....										13.27	11.40

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							3.66	1,140	6.78	4,150	10.24	8,930
4					2.27	343	3.57	1,070	7.76	5,410	10.22	8,900
6							3.50	1,020	8.25	6,050	10.63	9,570
8	2.63	510	2.33	368	2.42	409	3.43	974	8.04	5,770	11.40	10,900
10							3.36	929	7.69	5,320	12.13	12,100
N					3.47	1,000	3.35	922	7.57	5,160	13.17	14,000
2							3.45	988	7.97	5,680	15.60	18,800
4	2.52	455	2.27	343	4.09	1,460	4.10	1,470	8.84	6,880	18.00	24,000
6							4.45	1,750	10.42	9,220	17.65	23,200
8					3.94	1,340	4.87	2,120	11.23	10,600	16.15	19,900
10							5.37	2,610	10.93	10,100	14.74	17,000
12	2.42	409	2.26	339	3.73	1,190	6.02	3,260	10.52	9,380	14.16	15,800
	October 29		October 30		October 31		November 1		November 2		November 3	
2	13.88	15,300										
4	13.83	15,200	10.23	8,920	7.10	4,550						
6	14.18	15,900										
8	14.77	17,000	9.32	7,550	6.73	4,090	5.33	2,570	4.79	2,050	4.19	1,460
10	15.00	17,500										
N	15.07	17,600	8.72	6,710	6.40	3,690						
2	15.92	19,400										
4	15.64	18,800	8.28	6,090	6.11	3,360	5.15	2,390	4.58	1,820	3.98	1,310
6	14.45	16,400										
8	13.40	14,400	7.93	5,630	5.86	3,100						
10	12.34	12,500										
12	11.45	11,000	7.51	5,080	5.66	2,900	5.02	2,260	4.36	1,640	3.87	1,180
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	3.75	1,090	3.37	807	3.09	644	2.87	530	2.67	432	2.53	368
10												
N												
2												
4	3.61	994	3.25	735	3.00	595	2.81	500	2.62	409	2.51	360
6												
8												
10												
12	3.49	884	3.17	688	2.93	560	2.72	455	2.57	386	2.50	355

Supplemental record.--Oct. 28, 4:30 p.m., 18.14 ft. 24 400 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Rogue River basin

Rogue River above Bybee Creek, Oreg.

Location.--Lat 42°56', long. 122°26', in NE¹/₄ sec. 26, T. 30 S., R. 3 E., 700 ft upstream from Bybee Creek and 2 miles northeast of Union Creek. Altitude of gage is 3,465 ft (from river-profile map).

Drainage area.--155 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,600 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 3,330 cfs 8 a.m. Oct. 29 (gage height, 6.53 ft).

1930 to September 1950: Discharge, 4,430 cfs Nov. 29, 1942, Dec. 28, 1945 (gage height, 7.84 ft), from rating curve extended above 1,600 cfs.

Remarks.--No diversion or regulation above station. Water-stage recorder inspected by employees of The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	341	1,100	9	408	700	17	446	579	25	426	700
2	341	1,830	10	377	642	18	426	955	26	444	705
3	374	1,380	11	356	602	19	384	850	27	675	845
4	418	1,110	12	359	592	20	374	800	28	1,230	764
5	550	950	13	356	570	21	380	759	29	2,760	750
6	490	832	14	356	554	22	365	696	30	1,570	870
7	446	761	15	368	538	23	360	660	31	962	
8	418	764	16	365	562	24	360	669			
Monthly mean discharge, in cfs.....										564	803
Runoff, in acre-feet.....										34,680	47,780
Runoff, in inches.....										4.20	5.78

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2						380	1.83	462	2.11	574	2.37	692
4					1.60				2.29	656	2.30	660
6						401	1.76	436	2.49	746	2.27	647
8	1.53	359	1.52	356	1.66				2.63	808	2.29	656
10						415	1.71	418	2.59	791	2.41	710
N					1.70				2.45	728	2.64	813
2						429	1.70	415	2.29	656	3.10	1,040
4	1.53	359	1.52	356	1.74				2.21	620	3.69	1,360
6						494	1.75	432	2.17	602	4.39	1,780
8					1.91				2.22	624	5.00	2,180
10						494	1.96	514	2.34	678	5.40	2,460
12	1.53	359	1.58	374	1.91				2.42	714	5.82	2,770
October 29			October 30		October 31		November 1		November 2		November 3	
2	6.15	3,030	5.02	2,190	3.18	1,070	2.74	860	4.37	1,770		
4	6.35	3,190	4.76	2,010	3.12	1,050	2.74	860	4.49	1,840	3.97	1,530
6	6.45	3,270	4.47	1,830	3.05	1,020	2.75	865	4.60	1,910		
8	6.53	3,330	4.22	1,680	3.00	990	2.82	900	4.65	1,940	3.79	1,420
10	6.37	3,210	4.02	1,560	2.94	960	2.91	945	4.65	1,940		
N	6.05	2,950	3.86	1,470	2.89	935	2.97	975	4.58	1,900	3.66	1,350
2	5.58	2,590	3.71	1,380	2.86	920	3.04	1,010	4.51	1,860		
4	5.21	2,330	3.61	1,320	2.84	910	3.20	1,090	4.45	1,820	3.56	1,290
6	5.05	2,220	3.57	1,290	2.83	905	3.54	1,280	4.40	1,790		
8	5.07	2,230	3.48	1,240	2.81	895	3.82	1,480	4.36	1,770	3.51	1,260
10	5.15	2,280	3.38	1,190	2.78	880	4.16	1,650	4.28	1,720		
12	5.18	2,310	3.30	1,140	2.76	870	4.28	1,720	4.18	1,660	3.45	1,230
November 4			November 5		November 6		November 7		November 8		November 9	
2	3.36	1,180	3.02	1,000	2.76	870	2.55	772	2.56	777	2.46	732
4												
6	3.28	1,130	2.96	970	2.71	845	2.52	759	2.53	764	2.41	710
8												
10	3.21	1,100	2.90	940	2.67	826	2.49	746	2.52	759	2.37	692
2												
4	3.14	1,060	2.86	920	2.64	813	2.48	741	2.51	754	2.35	682
6												
8	3.13	1,060	2.84	910	2.61	800	2.53	764	2.52	759	2.33	674
10												
12	3.08	1,030	2.80	890	2.59	790	2.57	782	2.51	754	2.31	664

Supplemental record.--Oct. 29, 8: a.m., 6.53 ft, 3,330 cfs.

Rogue River above Prospect, Oreg.

Location.--Lat 42°47', long. 122°30', in NE $\frac{1}{4}$ sec. 19, T. 32 S., R. 3 E., $1\frac{1}{2}$ miles upstream from intake of diversion of The California Oregon Power Co., 2 miles northwest of Prospect, and 3 miles upstream from Mill Creek. Altitude of gage is 2,620 ft (from river-profile map).

Drainage area.--332 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 4,900 cfs and extended to peak stage by logarithmic plotting. Shifting-control method used Oct. 27-28.

Maxima.--October-November 1950: Discharge, 7,620 cfs 6 a.m. Oct. 29 (gage height, 6.74 ft).

1907-12, 1923 to September 1950: Discharge, 11,900 cfs Dec. 28, 1945 (gage height, 8.4 ft, from floodmark), from rating curve extended above 4,900 cfs.

Remarks.--No diversion or regulation above station. Water-stage recorder graph furnished by The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	452	1,860	9	568	1,140	17	584	1,000	25	536	1,200
2	452	3,300	10	512	1,000	18	607	2,360	26	599	1,210
3	480	2,810	11	496	934	19	518	1,970	27	971	1,360
4	562	2,110	12	480	918	20	496	1,620	28	2,940	1,260
5	748	1,720	13	474	886	21	502	1,490	29	6,290	1,190
6	694	1,440	14	474	862	22	480	1,290	30	3,660	1,460
7	607	1,270	15	485	822	23	470	1,190	31	2,030	
8	556	1,210	16	480	910	24	466	1,150			
Monthly mean discharge, in cfs.....										957	1,431
Runoff, in acre-feet.....										58,850	85,190
Runoff, in inches.....										3.32	4.81

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.68	474	1.99	649	2.05	674	3.08	1,510
4									2.18	748	3.12	1,550
6									2.43	926	3.09	1,520
8					1.73	502	1.92	607	2.65	1,100	3.15	1,590
10									2.72	1,170	3.35	1,810
N 2	1.67	468	1.66	463	1.79	534	1.86	573	2.70	1,150	3.70	2,260
4									2.60	1,060	4.05	2,750
6					1.82	551	1.84	562	2.54	1,000	4.45	3,340
8									2.46	950	5.00	4,210
10					1.89	590	1.85	568	2.45	942	5.55	5,120
12	1.67	468	1.67	468	2.01	662	1.92	607	2.55	1,010	5.92	5,780
									2.80	1,240	6.23	6,380
	October 29		October 30		October 31		November 1		November 2		November 3	
2	6.55	7,120	5.34	4,900								
4	6.70	7,530	5.26	4,760	3.68	2,340	3.14	1,660	4.17	3,040	4.26	3,180
6	6.74	7,620	5.08	4,470								
8	6.62	7,350	4.90	4,180	3.53	2,140	3.14	1,660	4.29	3,220	4.12	2,970
10	6.47	7,040	4.66	3,800								
N 2	6.23	6,540	4.49	3,520	3.40	1,970	3.18	1,710	4.46	3,480	3.98	2,760
4	5.95	5,980	4.33	3,280								
6	5.69	5,500	4.20	3,090	3.28	1,830	3.28	1,830	4.51	3,560	3.87	2,610
8	5.55	5,260	4.07	2,900								
10	5.40	5,000	3.97	2,750	3.23	1,770	3.50	2,100	4.47	3,500	3.77	2,470
12	5.34	4,900	3.87	2,610								
	5.34	4,900	3.82	2,540	3.18	1,710	3.92	2,680	4.39	3,380	3.70	2,370
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	3.64	2,280	3.28	1,830	3.01	1,520	2.81	1,320	2.69	1,210	2.66	1,180
6												
8	3.57	2,190	3.23	1,770	2.97	1,480	2.78	1,290	2.69	1,210	2.64	1,170
10												
N 2	3.51	2,110	3.17	1,700	2.93	1,440	2.75	1,260	2.69	1,210	2.62	1,150
4												
6	3.43	2,010	3.13	1,650	2.89	1,400	2.72	1,240	2.69	1,210	2.58	1,110
8												
10	3.37	1,930	3.08	1,600	2.86	1,370	2.70	1,220	2.68	1,200	2.56	1,090
12	3.32	1,870	3.04	1,550	2.84	1,350	2.69	1,210	2.67	1,190	2.54	1,060

ROGUE RIVER BASIN

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Rogue River at Dodge Bridge, near Eagle Point, Oreg.

Location.--Lat 42°32', long. 122°50', in SE $\frac{1}{4}$ sec. 17, T. 35 S., R. 1 W., at Dodge Bridge, 0.6 mile downstream from Reese Creek and $\frac{1}{2}$ miles northwest of Eagle Point. Datum of gage is 1,273.66 ft above mean sea level, datum of 1929.

Drainage area.--1,210 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 30,000 cfs and extended to peak stage.

Maxima.--October-November 1950: Discharge, 33,800 cfs 6:30 a.m. Oct. 29 (gage height, 10.3 ft).

1938 to September 1950: Discharge, 41,900 cfs Dec. 28, 1945 (gage height, 11.52 ft), from rating curve extended above 30,000 cfs.

Remarks.--Many small diversions above station for irrigation; most of the flow of Big Butte Creek is diverted near Butte Falls. Some diurnal fluctuation caused by power plant 30 miles upstream.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	1,230	4,900	9	1,510	2,660	17	1,410	4,870	25	1,370	3,140
2	1,210	6,660	10	1,440	2,370	18	1,610	9,810	26	1,560	2,990
3	1,300	6,040	11	1,350	2,230	19	1,430	8,240	27	2,210	3,280
4	1,480	4,640	12	1,310	2,190	20	1,380	5,570	28	11,700	3,200
5	1,660	3,770	13	1,280	2,140	21	1,360	4,700	29	26,400	2,950
6	1,910	3,290	14	1,270	2,090	22	1,320	3,960	30	13,000	3,540
7	1,580	2,880	15	1,310	2,040	23	1,280	3,480	31	6,130	
8	1,500	2,770	16	1,310	4,390	24	1,260	3,200			
Monthly mean discharge, in cfs.....										3,098	3,931
Runoff, in acre-feet.....										190,600	233,900
Runoff, in inches.....										2.95	3.62

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											2.78	3,500
4	1.57	1,400	1.56	1,390	1.53	1,350	1.66	1,520	1.78	1,700	3.30	4,630
6											3.92	6,200
8	1.41	1,190	1.39	1,170	1.42	1,210	1.67	1,540	1.86	1,820	4.41	7,600
10											5.12	9,850
N	1.41	1,190	1.39	1,170	1.43	1,220	1.73	1,620	2.00	2,040	5.94	12,600
2											6.31	13,900
4	1.65	1,510	1.55	1,380	1.69	1,570	1.74	1,640	2.35	2,660	6.33	14,000
6											6.61	15,000
8	1.34	1,110	1.40	1,180	1.65	1,510	1.63	1,480	2.39	2,740	7.33	18,200
10											8.02	21,300
12	1.42	1,210	1.51	1,320	1.60	1,440	1.78	1,700	2.47	2,890	8.66	24,500
	October 29		October 30		October 31		November 1		November 2		November 3	
2	9.23	27,500	7.49	18,900								
4	9.87	31,200	7.30	18,000	4.25	7,120	3.40	4,870	3.87	6,070	4.13	6,780
6	10.23	33,400	6.97	16,600								
8	10.19	33,100	6.48	14,500	4.01	6,450	3.36	4,770	4.01	6,450	3.99	6,390
10	9.88	31,300	6.19	13,500								
N	9.18	27,200	5.85	12,300	3.81	5,910	3.34	4,730	4.10	6,700	3.82	5,930
2	8.63	24,400	5.58	11,400								
4	8.23	22,400	5.28	10,400	3.65	5,490	3.37	4,800	4.29	7,240	3.70	5,620
6	8.09	21,600	5.05	9,610								
8	8.03	21,400	4.83	8,910	3.56	5,260	3.43	4,940	4.30	7,270	3.61	5,390
10	7.93	20,900	4.69	8,460								
12	7.66	19,700	4.50	7,870	3.53	5,180	3.61	5,390	4.23	7,070	3.52	5,160
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	3.37	4,800	2.98	3,920	2.71	3,360	2.50	2,950	2.41	2,780	2.36	2,680
10												
N												
2												
4	3.22	4,450	2.81	3,560	2.64	3,220	2.41	2,780	2.42	2,800	2.28	2,530
6												
8												
10												
12	3.10	4,180	2.78	3,500	2.57	3,080	2.39	2,740	2.39	2,740	2.24	2,460

Supplemental record.--Oct. 29, 6:30 a.m., 10.3 ft, 33,800 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Rogue River at Raygold, near Central Point, Oreg.

Location.--Lat 42°26', long. 122°59', in sec. 18, T. 36 S., R. 2 W., at Raygold, just downstream from dam and powerhouse of The California Oregon Power Co., half a mile downstream from Bear Creek, and 6 miles northwest of Central Point. Datum of gage is 1,121.78 ft above mean sea level, datum of 1929.

Drainage area.--2,020 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 36,000 cfs and extended to peak stage.

Maxima.--October-November 1950: Discharge, 43,100 cfs 11 a.m. Oct. 29 (gage height, 14.91 ft).

1905 to September 1950: Discharge, 91,500 cfs Feb. 21, 1927 (gage height, 24.8 ft, from floodmark), from rating curve extended above 36,000 cfs.

Flood of 1861-62 reached a stage of 32.0 ft (discharge, about 140,000 cfs) and that of February 1890, 27.5 ft (discharge, about 110,000 cfs).

Remarks.--Many diversions above station for irrigation. Diurnal fluctuation caused by power plant just above station. Water-stage recorder inspected by employees of The California Oregon Power Co.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	1,270	5,870	9	1,660	2,960	17	1,460	6,320	25	1,440	3,800
2	1,330	6,940	10	1,550	2,700	18	1,720	10,300	26	1,640	3,640
3	1,410	6,880	11	1,450	2,550	19	1,540	10,500	27	2,290	3,970
4	1,600	5,280	12	1,420	2,510	20	1,460	6,800	28	12,300	4,000
5	1,700	4,340	13	1,360	2,490	21	1,430	5,880	29	34,200	3,580
6	2,130	3,720	14	1,370	2,460	22	1,420	4,860	30	21,500	4,210
7	1,760	3,270	15	1,410	2,380	23	1,410	4,280	31	8,100	
8	1,650	3,080	16	1,410	6,640	24	1,370	3,920			
Monthly mean discharge, in cfs.....										3,799	4,671
Runoff, in acre-feet.....										233,600	277,900
Runoff, in inches.....										2.17	2.58

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											2.51	3,190
4	1.09	1,420	1.00	1,330	1.10	1,430	1.20	1,530	1.52	1,870	2.95	3,920
6											3.80	5,490
8	1.17	1,500	1.17	1,500	1.17	1,500	1.27	1,600	1.60	1,960	4.58	7,130
10											5.36	8,890
N	1.01	1,340	1.02	1,350	1.04	1,370	1.29	1,620	1.82	2,230	6.45	11,700
2											7.71	15,500
4	1.00	1,330	.96	1,290	1.00	1,330	1.38	1,720	1.99	2,450	8.57	18,400
6											8.87	19,400
8	1.16	1,490	1.07	1,400	1.20	1,530	1.41	1,750	2.32	2,900	8.97	19,800
10											9.36	21,200
12	1.02	1,350	1.03	1,360	1.23	1,560	1.35	1,680	2.40	3,020	10.1	23,500
October 29			October 30		October 31		November 1		November 2		November 3	
2	10.97	27,100	12.14	31,700	5.90	10,200						
4	12.05	31,300	11.85	30,500	5.68	9,670	4.14	6,190	4.12	6,150	4.80	7,610
6	13.14	35,700	11.31	28,400	5.40	8,990						
8	14.01	39,200	10.67	26,000	5.28	8,700	4.02	5,940	4.39	6,720	4.65	7,280
10	14.82	42,700	10.00	23,500	5.08	8,240						
N	14.80	42,600	9.33	21,100	4.90	7,830	3.92	5,730	4.52	6,990	4.48	6,910
2	14.12	39,700	8.62	18,600	4.73	7,460						
4	13.11	35,600	8.00	16,500	4.61	7,190	3.88	5,650	4.66	7,300	4.30	6,530
6	12.22	32,000	7.60	15,200	4.49	6,830						
8	11.93	30,800	7.13	13,700	4.39	6,720	3.88	5,650	4.86	7,740	4.11	6,130
10	12.04	31,300	6.52	11,900	4.31	6,550						
12	12.17	31,800	6.16	10,900	4.25	6,420	3.92	5,730	4.87	7,760	3.98	5,860
November 4			November 5		November 6		November 7		November 8		November 9	
2												
4	3.88	5,650	3.32	4,570	2.93	3,880						
6												
8	3.78	5,450	3.25	4,440	2.88	3,800	2.60	3,330	2.42	3,050	2.39	3,000
10												
N	3.69	5,270	3.20	4,350	2.83	3,710						
2												
4	3.60	5,090	3.12	4,210	2.80	3,660	2.52	3,200	2.45	3,100	2.35	2,940
6												
8	3.50	4,900	3.05	4,080	2.73	3,540						
10												
12	3.41	4,730	3.00	4,000	2.69	3,470	2.45	3,100	2.42	3,050	2.25	2,800

Supplemental record.--Oct. 29, 11 a.m., 14.91 ft, 43,100 cfs.

Rogue River at Grants Pass, Oreg.

Location.--Lat 42°26', long. 123°19', in NW¹/₄ sec. 20, T. 36 S., R. 5 W., at filter plant 0.6 mile east of Pacific Highway bridge at Grants Pass. Datum of gage is 888.28 ft above mean sea level, datum of 1929.

Drainage area.--2,420 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 27,000 cfs and extended above on basis of slope-area determination at gage height 21.25 ft.

Maxima.--October-November 1950: Discharge, 65,400 cfs 1 p.m. Oct. 29 (gage height, 21.25 ft).

1939 to September 1950: Discharge, 70,000 cfs Dec. 29, 1945 (gage height, 23.16 ft), from rating curve extended above 23,000 cfs.

Stages known, about 40 ft in 1861-62, about 32 ft in February 1890, and about 28 ft Feb. 22, 1927, from floodmarks.

Remarks.--Many diversions from Rogue River and tributaries above station, the largest being at Savage Rapids Dam of Grants Pass Irrigation District, 5 miles above station. Flow regulated by dams at Savage Rapids and Raygold and slightly by Fish Lake and Emigrant Gap Reservoirs. Water-stage recorder inspected by employees of Grants Pass Water Department.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	1,240	7,640	9	1,670	3,620	17	1,520	9,240	25	1,470	4,630
2	1,180	7,960	10	1,670	3,210	18	1,840	14,200	26	1,680	4,440
3	1,350	8,380	11	1,550	2,960	19	1,720	14,300	27	2,420	4,610
4	1,870	6,480	12	1,460	2,880	20	1,450	9,130	28	13,300	4,860
5	2,050	5,370	13	1,460	2,840	21	1,500	7,570	29	54,700	4,270
6	2,240	4,660	14	1,430	2,760	22	1,520	6,180	30	29,600	4,860
7	2,280	4,040	15	1,450	2,740	23	1,470	5,420	31	11,200	
8	1,730	3,640	16	1,470	8,360	24	1,460	4,910			
Monthly mean discharge, in cfs.										4,934	5,872
Runoff, in acre-feet.										303,400	349,400
Runoff, in inches.										2.35	2.71

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									1.51	2,050	2.86	4,260
4	1.02	1,410	1.06	1,460	1.00	1,390	1.13	1,550	1.48	2,010	3.03	4,550
6									1.50	2,040	3.25	4,920
8	1.06	1,460	1.08	1,490	1.06	1,460	1.20	1,630	1.49	2,030	3.99	6,230
10									1.56	2,120	5.26	8,750
N 2	1.18	1,610	1.03	1,430	1.10	1,510	1.20	1,630	1.66	2,270	6.38	11,100
4									1.71	2,340	7.59	14,000
6	1.16	1,580	1.11	1,520	1.15	1,570	1.28	1,730	1.78	2,450	8.80	17,100
8									1.98	2,770	10.00	20,300
10	1.00	1,390	1.06	1,460	1.10	1,510	1.34	1,820	2.14	3,040	11.14	23,600
12									2.34	3,380	12.14	26,800
	1.00	1,390	.99	1,380	1.03	1,430	1.48	2,010	2.68	3,960	13.70	32,300
	October 29		October 30		October 31		November 1		November 2		November 3	
2	15.58	39,600	15.46	41,400	7.30	14,600						
4	17.84	49,400	15.22	40,500	6.90	13,500	4.64	8,240	4.11	7,130	5.04	9,110
6	19.74	58,400	14.64	38,200	6.56	12,700						
8	20.98	64,500	13.98	35,700	6.28	12,000	4.45	7,840	4.26	7,450	4.92	8,840
10	21.14	65,300	13.14	32,700	6.04	11,400						
N 2	21.06	64,900	12.22	29,500	5.80	10,800	4.30	7,530	4.55	8,060	4.75	8,480
4	21.15	65,000	11.39	26,800	5.55	10,300						
6	20.44	61,900	10.49	23,900	5.34	9,780	4.18	7,280	4.69	8,350	4.54	8,030
8	18.90	55,400	9.52	21,000	5.18	9,420						
10	17.54	49,700	8.82	18,900	5.00	9,020	4.10	7,110	4.83	8,650	4.34	7,610
12	16.39	45,100	8.26	17,300	4.89	8,780						
	15.76	42,600	7.75	15,800	4.78	8,540	4.09	7,090	5.05	9,130	4.17	7,260
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	4.01	6,920	3.40	5,710	2.93	4,820	2.61	4,210	2.36	3,750	2.30	3,640
6												
8	3.86	6,620	3.30	5,520	2.86	4,680	2.55	4,100	2.33	3,690	2.27	3,590
10												
N 2	3.76	6,420	3.21	5,350	3.00	4,950	2.51	4,020	2.30	3,640	2.50	4,000
4												
6	3.68	6,260	3.12	5,180	2.75	4,480	2.46	3,930	2.11	3,300	2.22	3,500
8												
10	3.59	6,080	3.05	5,040	2.70	4,380	2.45	3,910	2.32	3,680	2.20	3,460
12												
	3.50	5,900	3.00	4,950	2.68	4,340	2.40	3,820	2.33	3,690	2.17	3,410

Supplemental record.--Oct. 29, 1 p.m., 21.25 ft, 65,400 cfs.

Big Butte Creek near McLeod, Oreg.

Location.--Lat 42°39', long. 122°41', in NW¼ sec. 3, T. 34 S., R. 1 E., at bridge on county road, 1 mile upstream from mouth and 1 mile south of McLeod. Datum of gage is 1,526.48 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Drainage area.--249 sq mi.

Gage-height record.--Graph for period Oct. 24 to Nov. 9 drawn on basis of two staff-gage readings daily, floodmark, and shape of recorder graph for South Fork Big Butte Creek near Butte Falls. Average of twice-daily readings Oct. 1-23, Nov. 10-30 except Oct. 2, 8, 12, 21, 23, Nov. 11, 23, 27, when read once daily.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,700 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 3,380 cfs 6 a.m. Oct. 29 (gage height, 8.0 ft, from floodmark).

1945 to September 1950: Discharge, 4,680 cfs Jan. 7, 1948 (gage height, 9.4 ft, from floodmark), from rating curve extended above 2,700 cfs as explained above.

Remarks.--Slight regulation by fish hatchery 600 ft above station. Several diversions in vicinity of Butte Falls, the two largest being the city of Medford diversion and the Eagle Point Irrigation District canal.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	111	466	9	166	213	17	146	508	25	158	312
2	111	388	10	154	201	18	141	868	26	197	292
3	137	344	11	148	195	19	141	729	27	428	393
4	164	299	12	151	198	20	141	575	28	2,100	302
5	198	270	13	125	198	21	141	488	29	2,160	288
6	171	249	14	123	213	22	139	432	30	1,120	351
7	156	227	15	132	201	23	137	393	31	602	
8	151	202	16	132	596	24	138	337			
Monthly mean discharge, in cfs.....										330	358
Runoff, in acre-feet.....										20,270	21,280
Runoff, in inches.....										1.53	1.60

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L O G	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2									2.18	254	5.50	1,660
4									2.26	281	6.15	2,060
6									2.33	306	6.80	2,480
8					1.84	156	1.88	166	2.39	326	7.20	2,760
10									2.35	312	7.10	2,690
N	1.76	137	1.76	137					2.28	288	6.70	2,420
2									2.25	278	6.30	2,160
4					1.88	166	2.08	222	2.28	288	5.95	1,930
6									2.85	488	5.65	1,750
8									3.45	698	5.85	1,870
10									4.00	900	5.85	1,870
12	1.76	137	1.77	139	1.88	166	2.13	238	4.65	1,200	5.75	1,810
	October 29		October 30		October 31		November 1		November 2		November 3	
2	6.35	2,190										
4	7.35	2,860	5.15	1,460	3.36	666						
6	8.00	3,380										
8	7.30	2,850	4.80	1,270	3.26	631	2.83	480	2.58	393	2.46	351
10	6.70	2,420										
N	6.05	1,990	4.43	1,080	3.15	592						
2	5.45	1,630										
4	5.55	1,690	4.05	920	3.07	564	2.74	449	2.54	379	2.42	337
6	5.65	1,750										
8	5.65	1,750	3.70	785	3.00	540						
10	5.60	1,720										
12	5.45	1,630	3.52	722	2.95	522	2.65	418	2.50	365	2.39	326
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	2.35	312	2.25	278	2.18	254	2.12	234	1.90	171	2.05	213
10												
N												
2	2.28	288	2.22	267	2.15	244	2.10	228	2.08	222	2.04	210
4												
6												
8												
10												
12	2.23	270	2.20	260	2.13	238	2.00	198	2.10	228	2.03	207

465

Location.--Lat 42°40', long. 122°45', in SE $\frac{1}{4}$ sec. 30, T. 33 S., R. 1 E., 0.7 mile upstream from mouth and 3 $\frac{1}{2}$ miles northeast of Trail. Datum of gage is 1,468.70 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Gage-height record.--Water-stage recorder graph.

Maxima.--October-November 1950: Discharge, 8,080 cfs 4 a.m. Oct. 29 (gage height, 11.80 ft).
1945 to September 1950: Discharge, 9,880 cfs Dec. 28, 1945 (gage height, 13.2 ft, from floodmark), from rating curve extended above 6,800 cfs.

Remarks.--Several small diversions above station for irrigation. No regulation.

Mean discharge, in cubic feet per second, 1950

[illegible]

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28		October 29	
2														
4														
6									1.24	53			4.14	992
8	0.77	14	0.75	12	0.77	14	1.05	34	1.58	98			4.71	1,330
10													5.18	1,660
N													5.81	2,110
2									2.13	207			6.68	2,800
4	.76	13	.75	12	.83	17	1.07	36	2.07	193			7.52	3,500
6													7.70	3,660
8													7.85	3,800
10									2.04	186			8.63	4,530
12	.75	12	.75	12	.97	28	1.10	39	2.88	423			9.73	5,720
													10.23	6,270
													10.81	6,910
2	11.48	7,700												
4	11.80	8,080	6.98	3,080	3.97	1,050	3.16	622	3.12	604				
6	11.73	8,000												
8	10.95	7,060	6.28	2,560	3.75	922	3.10	595	3.13	608	3.45		760	
10	9.85	5,860												
N	8.93	4,840	5.63	2,090	3.56	818	3.04	571	3.27	672				
2	8.25	4,160												
4	7.83	3,780	5.09	1,730	3.42	745	3.01	559	3.47	770	3.28		676	
6	7.65	3,620												
8	7.90	3,840	4.63	1,450	3.35	710	3.09	591	3.57	824				
10	7.74	3,700												
12	7.58	3,560	4.26	1,230	3.23	654	3.14	613	3.57	824	3.10		595	
2														
4														
6														
8	2.93	527	2.48	369	2.18	278	1.93	211	1.80	179	1.70		156	
10														
N														
2														
4	2.78	473	2.38	337	2.10	256	1.88	198	1.78	174	1.66		147	
6														
8														
10														
12	2.63	420	2.28	307	2.02	234	1.83	186	1.76	170	1.62		138	

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Bear Creek at Medford, Oreg.

Location.--Lat 42°19', long. 122°52', in NW¼ sec. 30, T. 3 S., R. 1 W., just upstream from Main Street Bridge in Medford. Datum of gage is 1,343.47 ft above mean sea level, datum of 1929.

Drainage area.--279 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 5,600 cfs.

Maxima.--October-November 1950: Discharge, 2,480 cfs 11 p.m. Oct. 29 (gage height, 4.14 ft).

1915 to September 1950: Discharge, 10,200 cfs Feb. 20, 1927 (gage height, 10.57 ft, site then in use), from rating curve extended above 1,600 cfs.

Remarks.--Diversions above station for irrigation. Flow partly regulated by Emigrant Gap Reservoir.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	13	233	9	41	82	17	46	361	25	31	249
2	13	187	10	42	72	18	39	380	26	42	238
3	16	162	11	42	72	19	41	375	27	100	238
4	25	137	12	42	70	20	41	321	28	659	220
5	41	120	13	44	70	21	42	305	29	1,360	210
6	41	109	14	44	79	22	37	281	30	1,100	220
7	34	99	15	37	72	23	34	265	31	360	
8	34	92	16	39	626	24	34	253			
Monthly mean discharge, in cfs.....										146	207
Runoff, in acre-feet.....										9,210	12,290
Runoff, in inches.....										0.60	0.83

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							0.48	31	0.81	94	1.13	186
4											1.26	231
6											1.45	305
8	0.50	34	0.50	34	0.48	31	.48	31	.87	110	1.82	486
10											2.40	840
N							.48	31	.86	107	2.64	1,020
2											2.83	1,180
4	.50	34	.50	34	.47	30	.60	51	.82	97	2.75	1,110
6											2.37	819
8							.60	51	.78	88	2.08	638
10											2.08	638
12	.50	34	.48	31	.47	30	.78	88	.93	125	2.33	791
	October 29		October 30		October 31		November 1		November 2		November 3	
2	2.52	926	3.62	2,130			1.33	257				
4	2.64	1,020	3.47	1,780	1.73	436						
6	2.72	1,090	3.13	1,450								
8	2.92	1,260	2.84	1,190	1.62	380	1.30	245	1.14	190	1.07	167
10	2.99	1,320	2.62	1,010								
N	2.78	1,130	2.46	882	1.54	343	1.26	231				
2	2.73	1,090	2.32	784								
4	2.83	1,180	2.18	698	1.48	317	1.22	217	1.12	183	1.04	157
6	3.09	1,410	2.08	638								
8	3.57	1,880	1.98	578	1.43	297	1.20	210				
10	4.08	2,420	1.92	542								
12	4.13	2,470	1.84	497	1.38	277	1.17	200	1.10	176	1.01	148
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	0.98	139	0.92	123	0.87	110	0.84	102	0.81	94	0.76	83
8												
10												
N												
2												
4	.96	134	.90	117	.86	107	.82	97	.80	92	.75	81
6												
8												
10												
12	.94	128	.89	114	.85	104	.81	94	.78	88	.72	74

Supplemental record.--Oct. 29, 11 p.m., 4.14 ft, 2,480 cfs.

ROGUE RIVER BASIN

467

Evans Creek above West Fork, at Meadows Bridge, Oreg.

Location.--Lat 42°36', long. 122°58', in sec. 20, T. 34 S. R. 2 W., 3 miles upstream from West Fork Evans Creek, 15 miles northeast of Rogue River.

Drainage area.--33.7 sq mi.

Gage-height record.--Staff gage read twice daily. Gage heights Oct. 23 to Nov. 9, Nov. 16, 18, from graph based on staff gage readings and records for Grave Creek at Pease Bridge and Applegate River near Ruch.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 600 cfs and extended above on basis of slope-area determination of peak flow. Shifting-control method used Oct. 1-27.

Maxima.--October-November 1950: Discharge, 2,490 cfs about 4 a.m. Oct. 29 (gage height, 6.40 ft).
1943 to September 1950: Discharge observed, 2,630 cfs Dec. 28, 1945 (gage height, 6.60 ft).

Remarks.--Small diversion above station for irrigation. Station maintained by Oregon State Engineer.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	3.3	99	9	5.2	19	17	9.2	298	25	7.5	54
2	4.1	59	10	4.4	15	18	6.6	660	26	11	43
3	9.2	49	11	4.4	7.0	19	5.8	260	27	62	35
4	8.1	46	12	4.4	7.0	20	4.4	150	28	826	31
5	5.5	46	13	4.4	7.0	21	4.4	130	29	1,350	35
6	3.9	40	14	4.4	7.0	22	4.4	118	30	396	51
7	3.9	35	15	5.2	9.5	23	4.4	80	31	215	
8	4.4	26	16	8.1	170	24	4.4	58			
Monthly mean discharge, in cfs.....										96.6	88.2
Runoff, in acre-feet.....										5,940	5,250
Runoff, in inches.....										3.30	2.92

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L O O M	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											1.63	400
4											1.85	478
6	-0.20	4.4	-0.20	4.4	-0.18	5.2	-0.05	11	0.00	14	2.35	655
8											3.08	947
10											4.00	1,360
N												
2	-20	4.4	-20	4.4	-0.8	9.2	-1.0	8.1	.00	14		
4												
6												
8												
10												
12	-20	4.4	-20	4.4	-0.2	12	+0.05	18	1.30	295	5.30	1,940
October 29		October 30		October 31		November 1		November 2		November 3		
2	6.30	2,420										
4	6.40	2,490	2.30	490	1.50	260						
6	5.50	1,940										
8	4.70	1,500	2.04	412	1.40	236	0.80	106	0.52	61	0.44	51
10	4.27	1,280										
N	3.95	1,130	1.92	376	1.30	214						
2	3.67	1,010										
4	3.44	916	1.80	340	1.20	192	.67	83	.48	56	.41	47
6	3.25	840										
8	3.05	760	1.70	310	1.10	170						
10	2.85	680										
12	2.65	608	1.60	285	1.00	148	.58	69	.45	52	.40	46
November 4		November 5		November 6		November 7		November 8		November 9		
2												
4												
6	0.40	46	0.40	46	0.34	39	0.30	35	0.21	26	0.11	19
8												
10												
N												
2												
4	.40	46	.40	46	.34	39	.30	35	.20	25	.08	17
6												
8												
10												
12	.40	46	.37	43	.33	38	.28	33	.18	24	.12	19

Applegate River near Copper, Oreg.

Location.--Lat 42°03', long. 123°07', in SE $\frac{1}{4}$ sec. 25, T. 40 S., R. 4 W., a quarter of a mile downstream from French Gulch, $1\frac{1}{2}$ miles downstream from Squaw Creek, and 3 miles northeast of Copper store. Datum of gage is 1,759.66 ft above mean sea level, datum of 1929.

Drainage area.--220 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 6,300 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 11,800 cfs 6 a.m. Oct. 29 (gage height, 16.50 ft).

1938 to September 1950: Discharge, 13,400 cfs Jan. 6, 1948 (gage height, 17.84 ft), from rating curve extended above 6,300 cfs as explained above.

Remarks.--Many diversions above station for irrigation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	39	1,590	9	66	530	17	92	1,200	25	140	1,140
2	39	1,510	10	60	481	18	94	2,260	26	228	1,070
3	61	1,280	11	56	445	19	73	1,220	27	671	1,300
4	102	1,070	12	53	418	20	67	1,580	28	5,860	1,040
5	144	887	13	52	400	21	65	1,390	29	10,200	922
6	110	735	14	50	383	22	59	1,140	30	4,270	1,050
7	78	642	15	53	408	23	56	1,000	31	1,880	
8	66	592	16	54	1,030	24	55	1,120			
Monthly mean discharge, cfs.....										803	1,011
Runoff, in acre-feet.....										49,380	60,160
Runoff, in inches.....										4.21	5.13

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

L C H	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge	Gage height	Dis- charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											5.25	1,680
4					1.32	63	2.12	199	3.81	795	6.04	2,280
6											6.95	3,010
8	1.26	57	1.24	54	1.36	68	1.96	166	3.66	727	8.75	4,450
10											10.85	6,200
N					1.53	90	1.86	146	3.27	568	12.41	7,580
2											12.14	7,340
4	1.24	54	1.24	54	2.00	174	1.98	170	3.09	496	12.04	7,250
6											12.27	7,450
8					2.49	292	2.50	295	3.35	600	12.86	7,980
10											14.04	9,140
12	1.24	54	1.29	60	2.31	243	3.19	536	4.43	1,140	15.52	10,700
	October 29		October 30		October 31		November 1		November 2		November 3	
2	16.22	11,500										
4	16.10	11,300	10.05	5,780	5.57	2,150	4.84	1,580	4.85	1,590	4.53	1,370
6	16.50	11,800										
8	16.22	11,500	8.84	4,760	5.27	1,910	4.86	1,600	4.78	1,540	4.45	1,310
10	14.87	10,100										
N	13.38	8,670	7.80	3,930	5.12	1,790	4.83	1,580	4.70	1,480	4.38	1,270
2	13.20	8,510										
4	14.75	9,950	7.05	3,330	5.00	1,700	4.83	1,580	4.68	1,470	4.33	1,230
6	15.47	10,700										
8	14.82	10,000	6.38	2,790	4.96	1,670	4.86	1,600	4.63	1,440	4.31	1,220
10	13.42	8,710										
12	12.18	7,590	5.92	2,430	4.92	1,640	4.88	1,610	4.62	1,430	4.24	1,180
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	4.12	1,100	3.83	910	3.59	754	3.41	650	3.32	605	3.18	541
10												
N												
2												
4	4.02	1,030	3.75	858	3.52	712	3.37	630	3.27	582	3.13	518
6												
8												
10												
12	3.93	984	3.66	799	3.46	678	3.34	615	3.23	564	3.09	501

ROGUE RIVER BASIN

469

Applegate River near Ruch, Oreg.

Location.--Lat 42°11', long. 123°03', in sec. 15, T. 39 S., R. 3 W., at Cameron Bridge, 1½ miles upstream from Little Applegate River and 4½ miles south of Ruch. Datum of gage is 1,475.09 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Drainage area.--297 sq mi.

Gage-height record.--Water-stage recorder record.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Oct. 18-25.

Maxima.--October-November 1950: Discharge, 12,000 cfs 7 to 8 a.m. Oct. 29 (gage height, 11.4 ft).
1911-14, 1925 to September 1950: Discharge, 20,000 cfs Feb. 20, 1927 (gage height, 16.0 ft), from rating curve extended above 8,000 cfs.

Remarks.--Diversions above station for irrigation. Records compiled in cooperation with the Oregon State Engineer.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	46	1,700	9	70	518	17	86	1,180	25	106	986
2	45	1,560	10	66	465	18	98	2,410	26	234	914
3	52	1,230	11	61	435	19	74	1,780	27	724	1,150
4	116	878	12	58	411	20	64	1,550	28	5,880	914
5	129	810	13	56	388	21	62	1,330	29	10,800	800
6	137	695	14	55	379	22	55	1,010	30	4,850	886
7	92	612	15	56	392	23	54	879	31	2,020	
8	75	563	16	56	1,110	24	54	963			
Monthly mean discharge, in cfs.....										849	967
Runoff, in acre-feet.....										52,230	57,520
Runoff, in inches.....										3.30	3.63

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					-0.03	58	0.62	237	1.45	602	2.70	1,450
4									1.73	768	3.45	2,100
6									2.02	954	4.25	2,900
8	-0.05	55	-0.07	52	.00	62	.52	198	2.04	968	5.25	4,070
10									1.86	849	6.55	5,630
N					+0.04	68	.41	166	1.67	732	8.00	7,460
2									1.50	630	8.45	6,050
4	-0.06	54	-0.06	54	+1.13	84	.49	192	1.39	570	8.35	7,920
6									1.36	555	8.30	7,860
8					.56	198	.51	198	1.42	586	8.60	8,250
10									1.62	702	9.22	9,070
12	-0.06	54	-0.05	55	.76	271	1.35	550	2.07	989	10.25	10,500
	October 29		October 30		October 31		November 1		November 2		November 3	
2	11.05	11,600	8.20	7,760								
4	11.10	11,600	7.45	6,840	3.65	2,380	3.00	1,700				
6	11.20	11,800	6.80	6,060								
8	11.35	12,000	6.25	5,400	3.40	2,100	3.00	1,700	2.92	1,620	2.55	1,260
10	10.90	11,300	5.80	4,860								
N	9.90	9,990	5.45	4,440	3.22	1,920	2.97	1,670				
2	9.15	8,980	5.10	4,020								
4	9.70	9,720	4.80	3,660	3.08	1,780	2.99	1,690	2.80	1,500	2.45	1,180
6	10.70	11,100	4.55	3,360								
8	10.75	11,100	4.35	3,140	3.05	1,750	3.00	1,700				
10	9.95	10,100	4.15	2,920								
12	9.00	8,780	3.95	2,700	3.00	1,700	3.03	1,730	2.72	1,420	2.35	1,090
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	2.25	1,010	2.00	875	1.80	710	1.65	620	1.57	575	1.48	545
10												
N												
2												
4	2.15	935	1.92	782	1.74	674	1.62	602	1.53	555	1.44	510
6												
8												
10												
12	2.08	886	1.87	752	1.70	650	1.58	580	1.50	540	1.39	485

Supplemental record.--Oct. 29, 7 a.m., 11.4 ft 12,000 cfs.

Applegate River near Applegate, Oreg.

Location.--Lat 42°14', long. 123°08', in NE $\frac{1}{4}$ sec. 26, T. 36 S., R. 4 W., 0.9 mile downstream from Keeler Creek and 2 miles southeast of Applegate. Datum of gage is 1,285.33 ft above mean sea level, datum of 1929.

Drainage area.--480 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 6,000 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 18,600 cfs 9 a.m. Oct. 29 (gage height, 13.20 ft).

1938 to September 1950: Discharge, 21,200 cfs Jan. 6, 1948 (gage height, 14.20 ft), from rating curve extended above 5,100 cfs by logarithmic plotting.

Remarks.--Many diversions above station for irrigation and mining.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	31	2,030	9	75	612	17	69	1,490	25	74	1,270
2	33	1,880	10	67	533	18	111	2,660	26	212	1,190
3	36	1,530	11	63	491	19	84	2,180	27	750	1,420
4	103	1,260	12	60	455	20	71	1,830	28	6,490	1,180
5	119	1,050	13	56	431	21	67	1,650	29	16,100	1,030
6	153	879	14	53	414	22	61	1,320	30	6,740	1,130
7	99	757	15	54	408	23	57	1,150	31	2,580	
8	82	689	16	57	1,550	24	54	1,230			
Monthly mean discharge, in cfs.....										1,118	1,190
Runoff, in acre-feet.....										68,750	70,810
Runoff, in inches.....										2.69	2.77

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge		Gage height		Dis-charge	
	October 23		October 24		October 25		October 26		October 27		October 28		October 29		October 30		October 31		November 1		November 2		November 3	
2					1.29	53			2.73	532	3.57	1,100												
4					1.29	53	2.13	250	2.98	678	4.30	1,780												
6					1.29	53			3.14	781	5.15	2,780												
8	1.33	58	1.30	54	1.29	53	2.02	216	3.52	1,060	5.93	3,800												
10					1.50	86			3.52	1,060	7.06	5,390												
N					1.40	69	1.91	188	3.37	939	8.16	7,130												
2					1.42	72			3.16	794	9.22	9,190												
4	1.32	57	1.29	53	1.42	72	1.89	182	3.01	696	9.52	9,840												
6					1.44	75			2.93	648	9.46	9,710												
8					1.47	82	1.88	180	2.89	624	9.53	9,860												
10					1.56	101			2.93	648	9.84	10,500												
12	1.31	56	1.28	52	1.94	192	2.30	315	3.12	768	10.85	12,800												
	October 29		October 30		October 31		November 1		November 2		November 3													
2	11.90	15,400	10.46	11,900																				
4	12.77	17,500	9.63	10,100	5.36	3,050	4.50	2,060	4.45	2,000														
6	12.91	17,900	8.91	8,540																				
8	13.06	18,300	8.29	7,360	5.10	2,720	4.49	2,040	4.39	1,940	4.01	1,570												
10	13.10	18,400	7.72	6,400																				
N	12.26	16,200	7.29	5,740	4.87	2,460	4.47	2,020	4.33	1,880														
2	11.25	13,800	6.89	5,150																				
4	10.95	13,100	6.60	4,740	4.71	2,280	4.43	1,980	4.25	1,800	3.89	1,460												
6	11.82	15,200	6.32	4,350																				
8	12.56	17,000	6.09	4,030	4.60	2,160	4.46	2,010	4.23	1,780														
10	12.35	16,500	5.87	3,720																				
12	11.43	14,200	5.68	3,460	4.56	2,120	4.49	2,040	4.19	1,740	3.82	1,400												
	November 4		November 5		November 6		November 7		November 8		November 9													
2																								
4																								
6	3.70	1,300	3.43	1,070	3.20	900	3.03	772																
10																								
N									2.92	694	2.81	617												
2																								
4	3.60	1,210	3.36	1,020	3.14	855	2.98	736																
6																								
8																								
10																								
12	3.53	1,150	3.27	952	3.08	810	2.95	715	2.86	652	2.73	564												

Supplemental record.--Oct. 29, 9 a.m., 13.20 ft, 18,600 cfs.

ROGUE RIVER BASIN

471

Applegate River near Wilderville, Oreg.

Location.--Lat 42°21', long. 123°24', in W $\frac{1}{2}$ sec. 15, T. 37 S., R. 6 W., 900 ft downstream from Jackson Creek and 4 miles southeast of Wilderville. Datum of gage is 949.54 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Drainage area.--694 sq mi.

Gage-height record.--Staff gage read once daily Oct. 1-28; twice daily Oct. 29 to Nov. 30. Graph for period Oct. 23 to Nov. 9 was drawn on basis of gage readings and compared with recorder graph for Applegate River near Applegate.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 9,500 cfs and extended to peak stage by logarithmic plotting.

Maxima.--October-November 1950: Discharge, 25,800 cfs 2 p.m. Oct. 29 (gage height, 17.5 ft, from floodmark).
1938 to September 1950: Discharge observed, 23,100 cfs Jan. 6, 1948 (gage height, 16.44 ft), from rating curve extended above 9,500 cfs as explained above.

Remarks.--Many diversions above station for irrigation and mining.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	45	3,180	9	136	906	17	120	3,660	25	121	1,640
2	47	2,700	10	132	776	18	158	6,250	26	330	1,560
3	70	2,260	11	122	712	19	140	4,110	27	1,110	1,710
4	92	1,870	12	116	664	20	120	2,980	28	7,680	1,490
5	215	1,500	13	109	634	21	116	2,610	29	21,500	1,290
6	241	1,280	14	102	610	22	113	2,000	30	10,700	1,390
7	182	1,100	15	99	594	23	110	1,650	31	4,430	
8	158	998	16	109	3,910	24	107	1,580			
Monthly mean discharge, in cfs.....										1,575	1,920
Runoff, in acre-feet.....										96,850	114,500
Runoff, in inches.....										2.62	3.09

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							2.85	340	3.60	730	4.82	1,710
4							5.68				5.68	2,700
6							6.52				6.52	3,780
8	2.05	111	2.03	107	2.04	109	3.08	441	4.10	1,070	7.40	4,960
10											8.26	6,190
N							2.80	320	4.64	1,530	9.10	7,520
2											10.04	9,180
4	2.04	109	2.02	106	2.06	113	2.65	264	4.40	1,310	10.90	10,800
6											11.72	12,400
8							2.75	301	4.18	1,130	12.08	13,200
10											11.70	12,400
12	2.04	109	2.03	107	2.35	174	3.10	450	4.42	1,330	12.14	13,300
	October 29		October 30		October 31		November 1		November 2		November 3	
2	13.15	15,400										
4	14.18	17,700	13.08	15,300	7.60	5,240						
6	15.26	20,200										
8	16.25	22,600	11.05	11,100	7.15	4,610	6.14	3,280	5.77	2,800	5.39	2,350
10	17.00	24,500										
N	17.28	25,200	10.08	9,250	6.88	4,240						
2	17.50	25,800										
4	16.90	24,200	9.40	8,030	6.68	3,980	5.95	3,040	5.62	2,620	5.23	2,160
6	16.24	22,600										
8	15.58	21,000	8.72	6,900	6.50	3,750						
10	15.83	21,600										
12	15.80	21,500	8.12	5,980	6.35	3,560	5.85	2,900	5.49	2,470	5.15	2,060
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	5.05	1,960	4.66	1,550	4.40	1,310	4.18	1,130	4.02	1,010	3.89	923
10												
N												
2												
4	4.90	1,790	4.55	1,440	4.31	1,240	4.11	1,080	3.98	986	3.84	888
6												
8												
10												
12	4.78	1,670	4.48	1,380	4.23	1,170	4.08	1,040	3.94	958	3.79	854

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Powell Creek near Williams, Oreg.

Location.--Lat 42°16', long. 123°18', near center of sec. 16, T. 38 S., R. 5 W., 0.1 mile upstream from Blodgett ditch intake and 2 miles northwest of Williams.

Drainage area.--8.6 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 550 cfs and extended to peak stage on basis of slope-area determination at gage height 4.92 ft. Shifting-control method used Oct. 1-27, Nov. 1-16.

Maxima.--October-November 1950: Discharge, 938 cfs 11:30 p.m. Oct. 28 (gage height, 5.14 ft).

1946 to September 1950: Discharge, 780 cfs Jan. 6, 1948 (gage height, 4.92 ft), by slope-area method.

Remarks.--No diversion above station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	1.6	51	9	2.1	9.6	17	3.1	125	25	3.3	24
2	1.5	36	10	2.0	8.4	18	2.5	213	26	4.8	21
3	3.4	28	11	2.0	7.6	19	2.2	114	27	26	19
4	2.9	23	12	2.0	7.1	20	2.0	71	28	354	16
5	5.4	18	13	1.9	6.7	21	2.0	51	29	535	15
6	3.1	15	14	1.8	6.6	22	2.0	40	30	162	16
7	2.4	13	15	2.0	7.8	23	2.0	33	31	79	
8	2.0	11	16	2.0	61	24	2.0	28			
Monthly mean discharge, in cfs.....										39.4	36.5
Runoff, in acre-feet.....										2,420	2,170
Runoff, in inches.....										5.28	4.74

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.02	2.0	1.18	3.5	1.76	15	3.20	137
4									1.87	20	3.37	166
6					1.06	2.3	1.14	3.1	1.83	18	3.68	230
8	1.02	2.0	1.02	2.0					1.77	16	4.13	368
10					1.15	3.2	1.12	2.9	1.69	13	4.13	368
N									1.63	11	4.02	329
2									1.61	11	3.97	313
4	1.02	2.0	1.02	2.0	1.28	4.7	1.30	5.0	1.59	10	4.00	322
6									1.73	14	4.24	413
8					1.27	4.6	1.43	7.1	2.20	36	4.32	450
10									2.83	68	4.60	595
12	1.02	2.0	1.02	2.0	1.22	4.0	1.61	11	2.99	107	5.00	840
	October 29		October 30		October 31		November 1		November 2		November 3	
2	4.98	826	3.65	223								
4	4.92	784	3.59	209	2.88	94	2.50	53	2.23	39		
6	5.05	875	3.51	192								
8	4.82	722	3.43	177	2.79	84	2.46	55	2.21	38	2.06	29
10	4.44	510	3.37	166								
N	4.32	450	3.31	155	2.70	75	2.41	51	2.17	35		
2	4.24	413	3.24	143								
4	4.18	387	3.18	134	2.63	69	2.37	48	2.14	34	2.01	26
6	4.07	346	3.17	132								
8	3.96	310	3.12	125	2.60	66	2.32	44	2.12	32		
10	3.79	259	3.07	118								
12	3.72	240	2.98	106	2.55	62	2.28	41	2.10	31	1.99	26
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	1.96	24	1.85	19	1.76	16	1.68	13	1.62	11	1.57	10
10												
N												
2												
4	1.92	22	1.82	18	1.72	14	1.65	12	1.61	11	1.55	9.5
6												
8												
10												
12	1.88	20	1.78	16	1.70	14	1.63	12	1.58	10	1.52	8.9

Supplemental record.--Oct. 28, 11:30 p.m., 5.14 ft, 938 cfs.

ROGUE RIVER BASIN

473

Slate Creek at Wonder, Oreg.

Location.--Lat 42°22', long. 123°31', in SW $\frac{1}{4}$ sec. 10, T. 37 S., R. 7 W., half a mile upstream from Elliot Creek and 0.4 mile east of Wonder. Datum of gage is 1,035.1 ft above mean sea level (Bureau of Reclamation bench mark).

Drainage area.--30.0 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,100 cfs and extended to peak stage on basis of two slope-area determinations. Shifting-control method used Oct. 1 to 12 m. Oct. 3.

Maxima.--October-November 1950: Discharge, 4,020 cfs 11 a.m. Oct. 29 (gage height, 9.72 ft).
1913, 1942 to September 1950: Gage height, 9.0 ft Dec. 28, 1945, from floodmark, former site and datum (discharge not determined).

Remarks.--Several small diversions above station for irrigation. No regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	2.5	240	9	8.0	44	17	12	869	25	28	90
2	2.5	171	10	6.7	39	18	12	1,150	26	52	82
3	16	127	11	6.1	35	19	10	570	27	370	77
4	12	100	12	5.8	33	20	8.3	301	28	1,520	67
5	39	84	13	5.0	31	21	9.1	190	29	3,160	66
6	21	69	14	5.0	29	22	8.3	145	30	863	71
7	13	58	15	5.0	65	23	7.8	120	31	366	
8	10	51	16	6.1	734	24	7.3	101			
Monthly mean discharge, in cfs.....										213	194
Runoff, in acre-feet.....										13,090	11,520
Runoff, in inches.....										7.94	6.99

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.20	7.2	1.73	41	2.50	133	5.20	1,090
4									2.76	182	5.18	1,080
6					1.23	8.3	1.70	38	2.92	218	5.33	1,160
8	1.22	8.0	1.20	7.2					2.90	213	5.47	1,220
10					1.48	21	1.68	36	2.87	206	5.73	1,360
N									2.88	208	5.75	1,360
2					1.87	55	1.80	48	3.00	238	5.82	1,400
4	1.21	7.6	1.20	7.2					3.22	301	6.13	1,570
6					1.83	51	2.01	70	3.62	427	6.55	1,800
8									4.38	722	6.93	2,010
10									4.98	981	7.28	2,230
12	1.21	7.6	1.20	7.2	1.78	46	2.32	106	5.25	1,110	8.20	2,870
	October 29		October 30		October 31		November 1		November 2		November 3	
2	8.55	3,130			3.65	438	3.11	268				
4	8.77	3,300	5.40	1,190								
6	9.28	3,680			3.49	382	3.05	252	2.75	180	2.49	131
8	9.44	3,800	4.87	932								
10	9.62	3,940			3.38	349	3.00	238				
N	9.38	3,760	4.49	766								
2	8.98	3,460			3.29	322	2.94	223	2.65	160	2.42	120
4	8.78	3,300	4.23	662								
6	8.32	2,960			3.24	307	2.90	213				
8	7.56	2,420	4.04	586								
10	6.76	1,910										
12	6.14	1,580	3.83	502	3.19	292	2.85	202	2.58	147	2.37	113
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	2.30	103	2.15	86	2.02	71	1.91	59	1.84	52	1.78	46
10												
N												
2	2.24	96	2.11	81	1.97	66	1.88	56	1.82	50	1.75	43
4												
6												
8												
10												
12	2.19	90	2.07	77	1.93	61	1.86	54	1.80	48	1.73	41

Supplemental record.--Oct. 29, 11 a.m., 9.72 ft, 4,020 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Grave Creek at Pease Bridge, near Placer, Oreg.

Location.--Lat 42°39', long. 123°12', in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 5, T. 34 S., R. 4 W., at bridge 5 $\frac{1}{2}$ miles northeast of Placer. Datum of gage is 2,384.1 ft above mean sea level, datum of 1929.

Drainage area.--22 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 850 cfs and extended to peak stage on basis of slope-area determination at gage height 5.73 ft. Shifting-control method used Oct. 1 to 8 a.m. Oct. 28, 12 m. Oct. 31 to Nov. 16.

Maxima.--October-November 1950: Discharge, 3,550 cfs 2:30 a.m. Oct. 29 (gage height, 6.95 ft).

1940 to September 1950: Discharge, 2,400 cfs Jan. 6, 1948 (gage height, 5.73 ft), by slope-area method.

Remarks.--Columbia upper ditch diverts water about 2 miles above station. No regulation

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	4.2	277	9	6.6	35	17	6.6	673	25	10	128
2	4.2	214	10	5.3	31	18	7.7	1,050	26	18	107
3	9.1	163	11	4.2	28	19	5.9	510	27	145	99
4	13	117	12	3.6	26	20	5.3	380	28	1,070	79
5	22	80	13	3.0	25	21	6.3	284	29	2,420	75
6	13	59	14	3.0	23	22	5.6	207	30	835	90
7	7.7	47	15	3.0	63	23	4.6	155	31	396	
8	6.3	41	16	3.3	370	24	4.2	140			
Monthly mean discharge, in cfs.....										163	186
Runoff, in acre-feet.....										10,020	11,060
Runoff, in inches.....										8.54	9.43

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											2.94	505
4					0.73	4.4	1.04	17	1.79	100	3.00	532
6											3.16	620
8	0.74	4.7	0.72	4.2	.78	5.9	1.02	16	1.93	128	3.38	733
10											3.49	804
N					.85	8.4	.99	14	1.80	105	3.70	920
2											3.79	974
4	.73	4.4	.72	4.2	.99	14	1.00	15	1.77	100	4.16	1,200
6											4.68	1,560
8					1.04	17	1.08	19	2.15	185	5.14	1,890
10											4.79	1,630
12	.72	4.2	.72	4.2	1.05	18	1.25	32	2.89	474	5.83	2,490
	October 29		October 30		October 31		November 1		November 2		November 3	
2	6.68	3,280										
4	6.76	3,360	4.16	1,100	3.22	466						
6	6.53	3,130										
8	6.15	2,780	3.91	917	3.14	425	2.90	284	2.75	218	2.64	167
10	5.90	2,550										
N	5.62	2,300	3.70	770	3.08	385						
2	5.48	2,170										
4	5.41	2,110	3.56	874	3.03	350	2.86	267	2.74	207	2.60	155
6	5.24	1,960										
8	5.03	1,790	3.44	596	2.97	324						
10	4.73	1,550										
12	4.50	1,370	3.34	834	2.95	314	2.80	244	2.69	190	2.56	143
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	2.51	120	2.38	81	2.28	59	2.21	48	2.17	42	2.12	36
8												
10												
N												
2	2.47	109	2.35	75	2.26	56	2.19	45	2.12	40	2.10	33
4												
6												
8												
10												
12	2.43	99	2.32	70	2.23	51	2.18	43	2.14	38	2.09	32

Supplemental record.--Oct. 29, 2:30 a.m., 6.95 ft, 3,550 cfs.

ROGUE RIVER BASIN

475

Grave Creek near Placer, Oreg.

Location.--Lat 42°38', long. 123°20', NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 7, T. 34 S., R. 5 W., about a quarter of a mile upstream from Burgess Gulch and 12 miles north of Grants Pass.

Drainage area.--48 sq mi.

Gage-height record.--Staff gage read once daily. No record Nov. 1-7.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,200 cfs and extended above on basis of slope-area determination of peak stage. Discharge for Oct. 23 to Nov. 9, Nov. 15-19 computed from graph based on staff gage readings (when available) and record for station at Pease Bridge.

Maxima.--October-November 1950: Discharge, 8,000 cfs about 10 a.m. Oct. 29 (gage height, 8.30 ft).
1913, 1929-30 1932 to September 1950: Discharge, 6,690 cfs probably Jan. 7, 1948 (gage height, 8.0 ft).

Remarks.--Several diversions for irrigation and mining. Records collected by Oregon State Engineer.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	3.7	524	9	14	62	17	10	775	25	25	148
2	4.2	388	10	11	51	18	17	1,200	26	47	129
3	7.8	294	11	8.9	46	19	14	775	27	509	118
4	18	225	12	7.8	44	20	11	464	28	1,170	102
5	24	166	13	7.1	48	21	10	315	29	4,510	90
6	30	122	14	6.5	51	22	11	233	30	1,470	100
7	25	87	15	7.5	64	23	10	187	31	757	
8	17	72	16	8.2	830	24	10	159			
Monthly mean discharge, in cfs.										283	262
Runoff, in acre-feet.										17,420	15,600
Runoff, in inches.										6.80	6.10

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2							1.90	43	3.07	269	4.37	805
4												
6												
8	1.45	10	1.44	10	1.60	18	1.90	43	3.72	500	4.58	914
10												
N							1.91	44	4.13	686	4.82	1,050
2	1.45	10	1.44	10	1.78	51	1.92	45	4.05	648	5.12	1,230
4												
6												
8							1.97	51	3.88	570	5.55	1,600
10												
12	1.45	10	1.50	12	1.85	38	2.12	69	4.14	691	6.05	2,170
	October 29		October 30		October 31		November 1		November 2		November 3	
2	6.32	2,640										
4	6.70	3,230	5.71	1,910	4.38	874						
6	7.50	5,090										
8	8.22	7,560	5.40	1,600	4.25	802	3.74	550	3.39	405	3.10	307
10	8.30	8,000										
N	8.00	6,690	5.14	1,380	4.14	742						
2	7.60	5,390										
4	7.18	4,210	4.90	1,200	4.04	690	3.61	493	3.28	366	3.01	280
6	6.83	3,470										
8	6.53	2,950	4.71	1,070	3.96	651						
10	6.28	2,580										
12	6.08	2,320	4.53	958	3.88	613	3.50	448	3.19	336	2.93	257
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	2.84	233	2.60	173	2.40	129	2.18	90	2.06	72	2.00	64
10												
N												
2												
4	2.78	217	2.53	157	2.32	114	2.13	82	2.04	70	1.96	59
6												
8												
10												
12	2.68	192	2.47	144	2.24	100	2.10	78	2.02	67	1.94	56

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

East Fork Illinois River near Takilma, Oreg.

Location.--Lat 42°01', long. 123°38', in SE $\frac{1}{4}$ sec. 10, T. 41 S., R. 8 W., 500 ft up-stream from county road bridge, a quarter of a mile upstream from Long Gulch, and 3 miles south of Takilma. Datum of gage is 1,746.6 ft above mean sea level (surveys by Bureau of Reclamation).

Drainage area.--42.6 sq mi.

Gage-height record.--Water-stage recorder graph except for period 12:30 a.m. to 2 p.m. Oct. 29, for which graph was drawn on basis of floodmark.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 5,000 cfs and extended above on basis of slope-area determination of peak flow. Shifting-control method used Oct. 1 to 12 m. Oct. 3, Nov. 18-30.

Maxima.--October-November 1950: Discharge, 7,610 cfs 5 a.m. Oct. 29 (gage height, 9.56 ft, from floodmark).

1926-32, 1940 to September 1950: Gage height, 9.4 ft Dec. 28, 1945, from floodmark, site and datum then in use (discharge not determined, but was less than that of Oct. 29, 1950, based on comparison of peak discharge of nearby streams).

Remarks.--No diversions or regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	9.6	700	9	26	106	17	34	975	25	69	227
2	9.5	541	10	21	94	18	36	1,990	26	183	207
3	30	376	11	19	85	19	28	898	27	1,120	266
4	35	273	12	17	80	20	24	628	28	4,630	201
5	100	209	13	16	75	21	22	447	29	5,410	174
6	59	168	14	15	75	22	20	304	30	1,680	236
7	32	140	15	15	108	23	19	234	31	801	
8	26	123	16	17	760	24	19	231			
Monthly mean discharge, in cfs.....										469	364
Runoff, in acre-feet.....										28,840	21,680
Runoff, in inches.....										12.70	9.54

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27	
2					1.00	20	1.98	105	4.80	1,090
4					1.02	21	1.92	98	5.22	1,370
6					1.03	22	1.87	91	4.87	1,140
8	0.98	19	0.95	18	1.05	22	1.83	87	4.53	932
10					1.12	26	1.78	81	4.28	800
N					1.29	36	1.76	79	4.08	700
2					1.73	76	1.81	84	4.03	675
4	.97	19	.97	19	2.22	140	2.02	111	4.10	710
6					2.23	142	2.82	254	4.47	898
8					2.17	132	3.12	332	5.12	1,300
10					2.12	125	3.48	451	5.97	2,030
12	.97	19	.99	20	2.05	115	4.12	720	6.82	2,980
	October 29		October 30		October 31		November 1		November 2	
2	8.90	6,300	6.43	2,520						
4	9.48	7,450	6.22	2,290	4.52	926	4.17	745		
6	9.50	7,490	6.02	2,080						
8	9.15	6,790	5.80	1,860	4.34	830	4.13	725	3.80	572
10	8.77	6,050	5.62	1,700						
N	8.45	5,440	5.43	1,530	4.17	745	4.08	700		
2	8.10	4,820	5.28	1,420						
4	7.87	4,440	5.15	1,320	4.07	695	4.03	675	3.63	506
6	7.57	3,980	5.05	1,260						
8	7.28	3,560	4.92	1,170	4.14	730	4.00	660		
10	6.97	3,160	4.80	1,090						
12	6.68	2,820	4.68	1,020	4.17	745	3.96	642	3.47	447
	November 4		November 5		November 6		November 7		November 8	
2										
4										
6	2.95	286	2.65	217	2.42	174	2.24	143	2.12	125
8										
10										
N										
2	2.83	256	2.57	201	2.36	163	2.19	136	2.08	119
4										
6										
8										
10										
12	2.73	234	2.48	184	2.29	151	2.16	131	2.05	115

Supplemental record.--Oct. 29, 5 a.m., 9.56 ft, 7,610 cfs.

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Location.--Lat 42°13', long. 123°39', in NW $\frac{1}{4}$ sec. 4, T. 39 S., R. 8 W., 1 mile northwest of Kerby. Datum of gage is 1,215.24 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Gage-height record.--Gaging station structure destroyed by flood of Oct. 29, 1950, with graph lost from Sept. 19, 1950.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 17,000 cfs and extended to peak stage on basis of slope-area determination. Discharge for period based on combined flow of 4 upstream stations, East Fork Illinois River near Takilma, West Fork Illinois River near O'Brien, Althouse Creek near Holland, and Sucker Creek near Holland (which constitute 51 percent of the drainage area), floodmarks, 1 discharge measurement, and slope-area determination of flood of Oct. 29, 1950.

Maxima.--October-November 1950: Discharge, 49,000 cfs about 10 a.m. Oct. 29 (gage height, 24.6 ft, from floodmarks).
1926 to September 1950: Discharge, 52,000 cfs Feb. 20, 1927 (gage height, 19.6 ft, site and datum then in use, from floodmark), from rating curve extended above 26,000 cfs on basis of slope-area determination at gage height 19.2 ft.
Remarks.--Diversion above station for irrigation.

[illegible][illegible]

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Althouse Creek near Holland, Oreg.

Location.--Lat 42°06', long. 123°32', in SE $\frac{1}{4}$ sec. 9, T. 40 S., R. 7 W., half a mile upstream from Carter Gulch and 2 miles southeast of Holland.

Drainage area.--23.8 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 500 cfs and extended to peak stage on basis of slope-area determinations at gage heights 5.14 and 5.96 ft. Shifting-control method used 8 p.m. Oct. 30 to Nov. 30.

Maxima.--October-November 1950: Discharge, 2,160 cfs 9 a.m. Oct. 29 (gage height, 5.96 ft).

1945 to September 1950: Discharge, 1,520 cfs Jan. 7, 1948 (gage height, 5.14 ft), by slope-area method.

Remarks.--Slight regulation by mining operations above station. Water used for placer mining is returned to creek above station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	6.6	230	9	11	48	17	18	487	25	30	75
2	6.6	184	10	9.3	43	18	14	550	26	54	75
3	22	146	11	8.9	38	19	11	288	27	197	88
4	15	118	12	8.4	36	20	9.8	180	28	885	65
5	39	95	13	8.0	34	21	9.8	132	29	1,620	61
6	18	78	14	8.4	33	22	8.9	92	30	698	75
7	12	68	15	10	69	23	8.9	78	31	326	
8	12	56	16	18	280	24	8.9	78			
Monthly mean discharge, in cfs.....										132	129
Runoff, in acre-feet.....										8,140	7,690
Runoff, in inches.....										6.41	6.06

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.60	9.8	1.85	30	2.50	162	3.64	630
4					1.61	10	1.83	27	2.61	198	3.78	700
6					1.62	11	1.81	25	2.56	182	4.12	886
8			1.57	8.4	1.63	12	1.79	23	2.43	142	4.44	1,070
10					1.71	17	1.78	22	2.36	124	4.40	1,050
N	1.58	8.9			1.88	33	1.76	21	2.31	112	4.25	960
2					2.10	65	1.84	28	2.31	112	4.38	864
4			1.58	8.9	2.05	57	2.17	80	2.35	122	3.92	776
6					1.99	47	2.27	102	2.49	159	3.83	728
8					1.93	41	2.27	102	2.69	226	4.10	875
10					1.90	35	2.30	109	3.06	364	4.47	1,090
12	1.58	8.9	1.60	9.8	1.87	32	2.34	119	3.96	798	4.63	1,190
	October 29		October 30		October 31		November 1		November 2		November 3	
2	4.63	1,190										
4	5.08	1,470	4.23	891								
6	5.48	1,760										
8	5.88	2,080	4.07	779	3.32	336	3.08	235	2.96	191	2.84	151
10	5.92	2,130										
N	5.53	1,800	3.92	682								
2	5.58	1,850										
4	5.38	1,700	3.75	580	3.21	288	3.04	219	2.92	177	2.80	140
6	5.23	1,590										
8	5.00	1,430	3.64	510								
10	4.74	1,250										
12	4.46	1,050	3.52	440	3.16	267	3.00	205	2.88	164	2.77	132
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	2.73	121	2.65	100	2.57	80	2.51	67	2.46	57	2.42	50
10												
N												
2												
4	2.69	110	2.62	92	2.55	75	2.49	73	2.45	55	2.40	46
6												
8												
10												
12	2.67	105	2.59	85	2.52	69	2.47	59	2.43	52	2.39	45

Supplemental record.--Oct. 29, 9 a.m., 5.96 ft, 2,160 cfs.

Sucker Creek near Holland, Oreg.

Location.--Lat 42°09', long. 123°28', in NE¹/₄ sec. 25, T. 39 S., R. 7 W., 1 mile downstream from Grayback Creek and 4.3 miles northwest of Holland. Datum of gage is 1,777.84 ft above mean sea level, datum of 1929 (surveys by Bureau of Reclamation).

Drainage area.--76 sq mi.

Gage-height record.--Staff gage read once daily, oftener during floods. Graph for period Oct. 23 to Nov. 9 based on staff-gage readings, floodmark, and shape of recorder graph for Grayback Creek near Holland. No readings Oct. 9, 15.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,900 cfs and extended to peak stage on basis of slope-area determination at gage height 8.3 ft. Shifting-control method used Oct. 1 to 2 a. m. Oct. 28, Oct. 31 to Nov. 30.

Maxima.--October-November 1950: Discharge, 5,720 cfs 6 a.m. Oct. 29 (gage height, 8.75 ft, from floodmarks).

1940 to September 1950: Discharge, 5,090 cfs Jan. 7, 1948 (gage height, 8.3 ft, from floodmark), by slope-area method.

Remarks.--Grayback Canal diverts water from Grayback Creek above station for domestic use and irrigation; most of return flow enters creek above station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	31	568	9	40	188	17	77	670	25	82	386
2	31	489	10	36	172	18	49	1,220	26	168	356
3	91	425	11	36	157	19	40	880	27	349	410
4	49	351	12	34	148	20	38	638	28	1,780	321
5	134	294	13	33	105	21	38	474	29	4,010	314
6	57	265	14	33	148	22	36	394	30	1,430	386
7	57	233	15	35	182	23	34	356	31	713	
8	47	210	16	38	575	24	35	394			
Monthly mean discharge, in cfs.....										312	390
Runoff, in acre-feet.....										19,160	23,220
Runoff, in inches.....										4.73	5.73

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2											3.94	808
4					1.31	39	1.83	119	2.80	410	4.55	1,270
6											4.78	1,430
8	1.26	34	1.26	34	1.36	45	1.78	109	2.70	370	5.10	1,660
10											5.65	2,120
N					1.50	62	1.80	113	2.43	279	5.65	2,120
2											5.60	2,080
4	1.26	34	1.27	35	1.83	119	1.96	148	2.30	240	5.53	2,020
6											5.50	1,990
8					1.94	143	2.50	300	2.48	294	5.47	1,960
10											5.70	2,170
12	1.26	34	1.28	36	1.87	128	2.53	310	3.50	690	6.22	2,670
	October 29		October 30		October 31		November 1		November 2		November 3	
2	7.20	3,740										
4	8.08	4,800	5.37	1,800	3.75	804						
6	8.75	5,720										
8	8.14	4,880	4.97	1,560	3.63	740	3.26	584	3.06	498	2.90	434
10	7.53	4,140										
N	7.25	3,800	4.63	1,320	3.51	690						
2	7.43	4,020										
4	7.62	4,240	4.34	1,130	3.43	652	3.18	548	3.01	478	2.86	418
6	7.40	3,980										
8	6.88	3,370	4.12	1,000	3.38	638						
10	6.43	2,880										
12	6.04	2,490	3.93	892	3.34	620	3.13	526	2.96	458	2.79	390
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4	2.73	366	2.53	297	2.44	270	2.33	237	2.25	213	2.17	190
6												
8												
10												
N												
2	2.64	335	2.50	288	2.41	261	2.30	228	2.23	207	2.15	185
4												
6												
8												
10												
12	2.58	314	2.47	279	2.37	249	2.27	219	2.20	199	2.13	180

Grayback Creek near Holland, Oreg.

Location.--Lat 42°08', long. 123°27', in NW $\frac{1}{4}$ sec. 31, T. 39 S., R. 6 W., 600 ft upstream from mouth and $4\frac{1}{2}$ miles northeast of Holland. Datum of gage is 1,836.92 ft above mean sea level (surveys by Bureau of Reclamation).

Drainage area.--24.1 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 580 cfs and extended to peak stage on basis of logarithmic plotting and slope-area determination at gage height 5.92 ft. Shifting-control method used Oct. 1-3.

Maxima (not adjusted for diversion).--October-November 1950: Discharge, 2,080 cfs 6 a.m. Oct. 29 (gage height, 6.80 ft).
1946 to September 1950: Discharge, 1,500 cfs Jan. 7, 1948 (gage height, 5.92 ft), by slope-area method.

Remarks.--Diversion three-quarters of a mile above station for irrigation by Grayback Canal during flood period: Maximum, 17 cfs 6:30 a.m. Oct. 29; maximum daily, 14 cfs Oct. 29.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	7.7	148	9	16	44	17	22	203	25	23	98
2	7.4	122	10	13	40	18	16	428	26	43	91
3	18	102	11	13	37	19	14	266	27	114	109
4	18	86	12	13	36	20	13	185	28	581	84
5	35	72	13	12	34	21	14	146	29	1,350	78
6	20	60	14	12	33	22	13	118	30	426	91
7	16	52	15	13	45	23	13	103	31	189	
8	16	48	16	14	164	24	13	105			
Monthly mean discharge, in cfs.....										99.6	108
Runoff, in acre-feet.....										6,130	6,400
Runoff, in inches.....										4.77	4.98

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Time	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.68	14	1.86	23	2.79	142	3.77	414
4											3.90	460
6											4.13	552
8	1.65	13	1.64	13	1.68	14	1.82	21	2.62	109	4.29	616
10											4.25	600
N					1.79	20	1.79	20	2.39	72	4.28	612
2											4.13	552
4	1.65	13	1.64	13	2.06	36	2.09	38	2.28	58	4.14	556
6											4.15	560
8					2.01	32	2.56	98	2.52	91	4.25	600
10											4.63	775
12	1.64	13	1.66	13	1.92	26	2.53	93	3.51	333	5.12	1,020
October 29		October 30		October 31		November 1		November 2		November 3		
2	5.51	1,250										
4	6.24	1,690	4.22	588	3.11	219						
6	6.80	2,080										
8	6.35	1,760	3.95	480	3.04	200	2.84	153	2.70	124	2.60	105
10	5.96	1,520										
N	5.26	1,100	3.69	387	2.94	176						
2	5.60	1,300										
4	5.82	1,430	3.49	327	2.90	166	2.80	144	2.68	120	2.57	100
6	5.67	1,340										
8	5.16	1,040	3.35	286	2.90	166						
10	4.79	855										
12	4.52	720	3.23	252	2.89	164	2.74	132	2.63	111	2.53	93
November 4		November 5		November 6		November 7		November 8		November 9		
2												
4												
6												
8	2.50	89	2.40	73	2.32	63	2.23	52	2.20	49	2.16	45
10												
N												
2												
4	2.47	84	2.38	70	2.27	57	2.22	51	2.18	47	2.14	43
6												
8												
10												
12	2.43	78	2.35	66	2.25	54	2.21	50	2.17	46	2.13	42

ROGUE RIVER BASIN

481

West Fork Illinois River near O'Brien, Oreg.

Location.--Lat 42°04', long. 123°43', in NW $\frac{1}{4}$ sec. 25, T. 40 S., R. 9 W., 800 ft upstream from bridge on U. S. Highway 199 and half a mile southwest of O'Brien. Datum of gage is 1,404.37 ft above mean sea level, datum of 1929.

Drainage area.--46.6 sq mi.

Gage-height record.--Staff gage read twice daily except for Oct. 1, 2, 10-17, 21-24 when read once daily; additional readings during floods. Graph drawn on basis of staff gage readings and shape of recorder graphs for East Fork Illinois River near Takilma and Althouse Creek near Holland for period Oct. 23 to Nov. 9.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 7,200 cfs and extended above on basis of slope-area determination at peak flow.

Maxima.--October-November 1950: Discharge, 14,200 cfs about 12 p.m. Oct. 28 (gage height, 12.96 ft, from floodmark).
1930, 1943 to September 1950: Discharge, 13,400 cfs Dec. 28, 1945 (gage height, 12.63 ft, present site and datum, from floodmark), from rating curve extended above 7,200 cfs on basis of slope-area determination at gage height 12.96 ft.

Remarks.--One small diversion above station.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	6.8	851	9	43	133	17	31	2,520	25	202	245
2	6.8	894	10	38	116	18	67	3,160	26	369	206
3	47	510	11	31	111	19	53	1,260	27	2,650	255
4	60	371	12	27	97	20	43	780	28	9,680	216
5	192	288	13	25	89	21	43	558	29	8,670	203
6	134	228	14	21	91	22	38	427	30	2,150	479
7	69	188	15	21	170	23	36	348	31	1,050	
8	51	158	16	21	1,520	24	36	286			
Monthly mean discharge, in cfs.....										836	552
Runoff, in acre-feet.....										51,390	32,840
Runoff, in inches.....										20.68	13.21

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					1.02	46	2.14	329	4.16	1,360	9.35	7,060
4									5.00	1,960	10.25	8,650
6									5.30	2,200	11.17	10,300
8					1.07	53	2.02	287	4.87	1,860	11.18	10,300
10									4.53	1,620	10.95	9,910
N	0.94	36	0.92	33	1.33	100	1.92	255	4.36	1,500	10.72	9,500
2									4.43	1,550	10.54	9,170
4					2.33	396	1.80	219	5.20	2,120	10.40	8,920
6									6.65	3,480	10.28	8,700
8					2.37	410	2.60	500	7.88	4,910	11.35	10,630
10									8.45	5,680	12.45	12,900
12	.93	35	1.00	43	2.27	374	3.38	874	8.78	6,170	12.98	14,200
October 29			October 30		October 31		November 1		November 2		November 3	
2	12.90	14,000										
4	12.64	13,400	5.76	3,030								
6	12.05	12,100										
8	11.50	11,000	5.08	2,420	3.20	1,090	2.80	875	2.58	765	2.10	540
10	10.66	9,420										
N	9.86	8,120	4.48	1,920								
2	9.08	6,910										
4	8.44	6,050	4.06	1,620	2.96	958	2.70	825	2.30	630	1.98	487
6	7.82	5,280										
8	7.30	4,640	3.75	1,420								
10	6.85	4,140										
12	6.48	3,740	3.52	1,270	2.87	910	2.64	795	2.18	576	1.84	431
November 4			November 5		November 6		November 7		November 8		November 9	
2												
4												
6												
8	1.73	387	1.50	300	1.32	239	1.17	191	1.07	162	.98	138
10												
N												
2	1.63	348	1.43	276	1.25	216	1.14	182	1.03	151	.94	128
4												
6												
8												
10												
12	1.56	322	1.37	255	1.22	206	1.12	176	1.01	146	.91	120

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Deer Creek near Dryden, Oreg.

Location.--Lat 42°16', long. 123°27', near center of sec. 18, T. 38 S., R. 6 W., 500 ft downstream from confluence of North and South Forks and 5 miles east of Dryden.
 Datum of gage is 1,650.10 ft above mean sea level (surveys by Bureau of Reclamation).

Drainage area.--23 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,300 cfs and extended to peak stage on basis of slope-area determination. Shifting-control method used Oct. 1-3, 10 p.m. Oct. 27 to 4 a.m. Oct. 29.

Maxima.--October-November 1950: Discharge, 4,370 cfs 6 a.m. Oct. 29 (gage height, 7.92 ft).

1941 to September 1950: Discharge, 2,750 cfs Dec. 28, 1945 (gage height, 8.1 ft, present datum, from graph based on gage readings), from rating curve extended above 850 cfs by logarithmic plotting.

Remarks.--One small diversion above station for irrigation. No regulation.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	3.7	259	9	16	44	17	18	718	25	54	131
2	3.7	199	10	12	38	18	24	1,300	26	87	116
3	19	150	11	9.2	34	19	19	532	27	381	121
4	21	116	12	7.3	31	20	16	342	28	2,100	102
5	69	89	13	6.6	28	21	15	260	29	2,830	92
6	43	72	14	6.0	28	22	13	197	30	806	101
7	20	58	15	6.3	42	23	11	161	31	346	
8	15	51	16	6.3	302	24	11	142			
Monthly mean discharge, in cfs.										226	195
Runoff, in acre-feet.										13,870	11,620
Runoff, in inches.										11.31	9.47

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 21		October 24		October 25		October 26		October 27		October 28	
2									3.28	201	5.95	1,400
4					1.88	16	2.58	79	3.75	319	6.00	1,450
6									3.77	325	6.25	1,700
8	1.80	11	1.78	10	1.98	22	2.53	73	3.62	283	6.80	2,360
10									3.50	253	6.78	2,320
N					2.13	32	2.47	65	3.43	236	6.50	2,000
2									3.43	236	6.27	1,720
4	1.79	11	1.79	11	2.74	102	2.53	73	3.52	258	6.08	1,520
6									3.92	369	6.28	1,730
8					2.73	100	2.80	111	4.47	535	7.08	2,750
10									5.25	890	7.50	3,500
12	1.79	11	1.84	13	2.67	92	3.02	148	5.69	1,190	7.64	3,370
	October 29		October 30		October 31		November 1		November 2		November 3	
2	7.65	3,880										
4	7.74	4,040	5.08	1,100	3.62	412						
6	7.92	4,370										
8	7.75	4,060	4.73	902	3.48	363	3.18	269	2.97	210	2.75	157
10	7.26	3,260										
N	6.69	2,480	4.43	750	3.37	326						
2	6.48	2,240										
4	6.32	2,070	4.18	636	3.27	296	3.12	251	2.89	190	2.68	142
6	6.08	1,850										
8	5.87	1,670	3.97	548	3.27	296						
10	5.62	1,470										
12	5.43	1,330	3.78	472	3.25	290	3.03	225	2.82	173	2.63	131
	November 4		November 5		November 6		November 7		November 8		November 9	
2												
4												
6	2.58	121	2.42	92	2.31	74	2.21	60	2.14	52	2.08	45
8												
10												
N												
2	2.52	110	2.38	85	2.27	69	2.18	57	2.12	49	2.05	42
4												
6												
8												
10	2.47	101	2.35	80	2.23	63	2.16	54	2.10	47	2.03	40

Supplemental record.--Oct. 28, 9 a.m., 7.11 ft, 2,800 cfs.

Smith River basin

Smith River near Crescent City, Calif.

Location.--Lat 41°47', long. 124°04', in SW $\frac{1}{4}$ sec. 10, T. 16 N., R. 1 E., 0.5 mile downstream from South Fork and 9 miles east of Crescent City.

Drainage area.--613 sq mi.

Gage-height record.--Water-stage recorder graph except for periods Oct. 1-6, 10 a.m. Oct. 28 to 9 a.m. Nov. 2, for which graph was drawn on basis of graph for Mad River near Arcata.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 25,000 cfs and extended to peak stage on basis of slope-area determination.

Maxima.--October-November 1950: Discharge, 152,000 cfs about 3 a.m. Oct. 29 (gage height, 39.5 ft, from floodmark).

1931 to September 1950: Discharge, 123,000 cfs Dec. 28, 1945 (gage height, 35.6 ft), and extended above 25,000 cfs by logarithmic plotting.

A stage of 41.4 ft was reached in February 1927.

Remarks.--No storage or diversion.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	225	17,900	9	634	2,930	17	810	20,900	25	2,060	4,340
2	249	12,500	10	541	2,630	18	1,300	41,900	26	3,190	3,850
3	592	8,970	11	468	2,400	19	940	18,800	27	21,600	4,710
4	650	6,830	12	414	2,230	20	840	11,900	28	91,500	4,070
5	1,880	5,380	13	380	2,090	21	774	9,140	29	117,000	3,690
6	3,530	4,440	14	359	2,030	22	670	7,090	30	78,900	6,960
7	940	3,760	15	350	2,430	23	589	5,790	31	32,000	
8	646	3,310	16	377	13,600	24	543	5,010			
Monthly mean discharge, in cfs.....										11,790	8,053
Runoff, in acre-feet.....										724,800	479,200
Runoff, in inches.....										22.17	14.66

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					4.77	581	8.70	3,590	15.85	17,400	25.05	55,800
4					4.88	622	8.48	3,330	18.13	24,200	26.30	63,300
6	4.84	607	4.67	544	5.02	678	8.26	3,090	16.75	19,900	28.40	75,900
8					5.26	774	8.07	2,880	15.45	16,400	31.40	94,600
10					5.70	990	7.90	2,700	14.55	14,100	33.70	110,000
N	4.78	585	4.64	533	6.42	1,440	7.77	2,570	14.20	13,300	33.7	110,000
2					6.86	1,770	7.77	2,570	14.40	13,800	32.9	104,000
4					7.96	2,760	7.75	2,550	15.15	15,600	31.9	97,800
6	4.75	574	4.64	533	9.22	4,240	7.90	2,700	16.75	19,900	31.0	92,000
8					9.40	4,470	8.25	3,080	19.90	30,600	31.3	94,000
10					9.20	4,210	9.06	4,030	22.95	44,800	33.7	110,000
12	4.71	559	4.73	566	8.96	3,900	10.75	6,420	24.34	50,800	36.5	130,000
	October 29		October 30		October 31		November 1		November 2		November 3	
2	39.1	149,000	33.0	105,000	22.8	44,000	17.5	20,500	15.6	14,700	13.62	10,100
4	39.5	152,000	32.3	100,000	22.2	41,000	17.1	19,100	15.3	13,800	13.47	9,850
6	38.2	142,000	31.5	95,200	21.6	38,000	17.0	18,800	15.1	13,300	13.32	9,610
8	36.2	127,000	30.7	90,000	21.2	36,000	16.8	18,200	15.0	13,000	13.18	9,390
10	33.4	108,000	29.9	84,900	20.7	33,500	16.7	17,900	14.97	12,900	13.03	9,150
N	31.1	92,600	29.1	80,100	20.1	30,600	16.5	17,300	14.84	12,600	12.90	8,940
2	29.6	83,100	28.1	74,100	19.7	28,800	16.5	17,300	14.62	12,100	12.75	8,700
4	30.1	86,200	27.0	67,500	19.1	26,400	16.5	17,300	14.46	11,700	12.63	8,510
6	33.7	110,000	26.2	62,700	18.8	25,200	16.4	17,000	14.30	11,400	12.50	8,300
8	34.6	116,000	25.1	56,100	18.4	23,600	16.3	16,700	14.12	11,000	12.38	8,110
10	34.1	113,000	24.5	52,800	18.0	22,200	16.1	16,100	13.95	10,700	12.27	7,930
12	33.6	109,000	23.6	48,000	17.7	21,200	15.8	15,200	13.78	10,400	12.15	7,740
	November 4		November 5		November 6		November 7		November 8		November 9	
2	12.04	7,560	10.30	5,860	10.19	4,900	9.46	3,970	9.00	3,460	8.65	3,080
4	11.94	7,410	10.81	5,730	10.05	4,720	9.42	3,920	8.96	3,420	8.62	3,050
6	11.84	7,260	10.74	5,640	10.00	4,650	9.38	3,880	8.93	3,380	8.60	3,030
8	11.75	7,120	10.68	5,550	9.94	4,570	9.34	3,830	8.90	3,350	8.57	3,000
10	11.65	6,980	10.61	5,450	9.88	4,490	9.31	3,800	8.89	3,340	8.54	2,970
N	11.55	6,820	10.55	5,370	9.82	4,420	9.29	3,780	8.88	3,330	8.51	2,940
2	11.45	6,680	10.48	5,270	9.76	4,340	9.25	3,740	8.86	3,310	8.47	2,900
4	11.35	6,520	10.42	5,200	9.70	4,260	9.20	3,690	8.83	3,270	8.44	2,870
6	11.26	6,390	10.35	5,100	9.65	4,200	9.15	3,620	8.79	3,230	8.40	2,830
8	11.15	6,220	10.29	5,030	9.60	4,140	9.10	3,570	8.76	3,200	8.36	2,790
10	11.08	6,120	10.22	4,940	9.55	4,080	9.07	3,540	8.72	3,150	8.33	2,760
12	11.00	6,000	10.18	4,860	9.50	4,020	9.04	3,500	8.69	3,120	8.30	2,730

Supplemental record.--Oct. 29, about 3 a.m., 39.5 ft, 152,000 cfs.

FLOODS OF 1950 IN WESTERN OREGON-CALIFORNIA

Klamath River basin

Trinity River at Lewiston, Calif.

Location.--Lat 40°42', long. 122°48', in NE $\frac{1}{4}$ sec. 19, T. 33 N., R. 8 W., at highway bridge at Lewiston, 0.8 mile downstream from Deadwood Creek. Datum of gage is 1,794.10 ft above mean sea level, datum of 1929.

Drainage area.--724 sq mi.

Gage-height record.--Water-stage recorder graph except for period 5 p.m. Nov. 4 to 4 p.m. Nov. 6 for which graph was drawn based on one gage reading and graph for station near Douglas City.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--October-November 1950: Discharge, 39,300 cfs 12:30 a.m. Oct. 30 (gage height, 21.00 ft).
1911 to September 1950: Discharge, 40,300 cfs Feb. 28, 1940 (gage height, 20.8 ft), from rating curve extended above 13,000 cfs.

Remarks.--Diversions above station for irrigation, power, and placer mining.

Mean discharge, in cubic feet per second, 1950

Day	October	November	Day	October	November	Day	October	November	Day	October	November
1	140	3,560	9	263	1,710	17	308	2,340	25	384	2,110
2	141	3,240	10	245	1,490	18	469	2,520	26	1,340	2,070
3	147	3,540	11	230	1,320	19	359	2,420	27	2,950	2,840
4	383	3,320	12	217	1,190	20	295	2,400	28	10,200	2,760
5	489	2,790	13	209	1,110	21	267	3,020	29	22,700	2,250
6	487	2,330	14	202	1,050	22	251	2,470	30	17,700	2,170
7	354	1,990	15	195	1,020	23	239	2,150	31	5,490	-
8	295	1,850	16	198	2,730	24	235	2,070			
Monthly mean discharge, in cfs.....										2,174	2,261
Runoff, in acre-feet.....										133,700	134,500
Runoff, in inches.....										3.46	3.49

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1950

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	October 23		October 24		October 25		October 26		October 27		October 28	
2					5.07	241	7.09	973	9.92	4,250	9.12	3,080
4					5.09	245	7.25	1,090	9.63	3,800	9.68	3,870
6	5.07	241	5.03	234	5.14	255	7.24	1,080	9.39	3,450	10.29	4,870
8					5.25	277	7.16	1,020	9.21	3,190	10.97	6,140
10					5.47	322	7.08	966	9.03	2,960	11.80	7,940
N	5.05	238	5.02	232	5.70	372	6.99	904	8.83	2,700	12.55	9,720
2					5.77	388	6.98	898	8.65	2,470	13.35	11,700
4					5.84	405	6.92	862	8.50	2,290	14.01	13,400
6	5.04	236	5.04	236	5.96	435	6.94	874	8.41	2,190	14.55	15,003
8					6.22	512	7.58	1,370	8.38	2,160	15.06	16,503
10					6.53	645	9.25	3,250	8.44	2,220	15.66	18,400
12	5.05	238	5.06	239	6.80	790	9.28	4,860	8.69	2,520	16.17	20,100
	October 29		October 30		October 31		November 1		November 2		November 3	
2	16.45	21,100	20.43	36,900	11.44	7,130	9.88	4,190	9.12	3,080	9.59	3,740
4	16.74	22,200	18.80	30,200	11.24	6,690	9.80	4,060	9.12	3,080	9.61	3,760
6	16.84	22,500	16.95	22,900	11.04	6,280	9.69	3,880	9.12	3,080	9.58	3,720
8	16.67	21,900	15.74	18,703	10.84	5,890	9.60	3,750	9.14	3,103	9.52	3,650
10	16.26	20,400	14.71	15,500	10.65	5,520	9.47	3,560	9.17	3,140	9.48	3,570
N	15.72	18,600	13.98	13,300	10.48	5,210	9.40	3,460	9.22	3,210	9.44	3,520
2	15.15	16,800	13.52	12,200	10.34	4,960	9.32	3,350	9.27	3,280	9.39	3,450
4	15.29	17,200	13.11	11,100	10.20	4,720	9.26	3,260	9.30	3,320	9.35	3,390
6	15.43	21,100	12.70	10,100	10.10	4,550	9.22	3,210	9.33	3,360	9.34	3,380
8	16.07	27,300	12.40	9,360	10.04	4,450	9.18	3,150	9.37	3,420	9.34	3,380
10	19.60	33,500	12.10	8,640	9.99	4,360	9.15	3,120	9.43	3,500	9.37	3,420
12	20.95	39,100	11.76	7,850	9.94	4,280	9.13	3,090	9.52	3,630	9.42	3,490
	November 4		November 5		November 6		November 7		November 8		November 9	
2	9.46	3,540	9.05	2,980	8.68	2,510	8.33	2,100	8.12	1,880	8.02	1,780
4	9.46	3,540	9.03	2,960	8.65	2,470	8.31	2,080	8.13	1,890	8.02	1,780
6	9.44	3,520	9.00	2,920	8.62	2,430	8.29	2,060	8.13	1,890	8.02	1,780
8	9.40	3,460	8.98	2,890	8.60	2,410	8.27	2,040	8.13	1,890	8.01	1,770
10	9.36	3,400	8.95	2,860	8.57	2,370	8.24	2,000	8.12	1,880	7.99	1,750
N	9.30	3,320	8.91	2,800	8.53	2,330	8.22	1,980	8.10	1,860	7.97	1,730
2	9.26	3,260	8.87	2,750	8.50	2,290	8.20	1,960	8.08	1,840	7.93	1,690
4	9.23	3,220	8.83	2,700	8.47	2,260	8.18	1,940	8.07	1,830	7.90	1,660
6	9.19	2,170	8.80	2,660	8.43	2,210	8.16	1,920	8.06	1,820	7.88	1,640
8	9.15	3,150	8.76	2,610	8.40	2,180	8.13	1,890	8.05	1,810	7.86	1,620
10	9.12	3,080	8.73	2,570	8.37	2,150	8.12	1,880	8.04	1,800	7.84	1,610
12	9.07	3,010	8.70	2,530	8.35	2,120	8.12	1,880	8.02	1,780	7.82	1,590

Supplemental record.--Oct. 30, 12:30 a.m., 21.00 ft, 39,000 cfs.

SUMMARY OF FLOOD STAGES AND DISCHARGES

The results of the determinations of maximum flood flows at existing stream-gaging stations and other places on streams in the area described in this report are summarized and presented in table 1. The map reference numbers in this table are applicable to plate 14 and will aid in identifying places where the discharge was determined.

The peak discharge figures for the flood of October-November 1950 as presented in table 1 were computed either by the special methods discussed in the section "Measurement of flood discharges," in which case the discharge figure is followed by a symbol explained in the headnote to the table, or by means of an established stage-discharge relation, in which case no special reference is made in the table.

Pertinent information is available at many stations regarding stages antedating the period of record. This information is included in table 2, except in a few instances it is incorporated in footnotes. Explanatory footnotes on other features of the table are also included.

Figure 73 shows the flood discharges, in cubic feet per second per square mile, which are listed in table 1, plotted against the corresponding drainage areas. It should be understood that the discharges are given as observed and some are affected by artificial storage, release of water at dams, and other similar factors. Discharge in cubic feet per second per square mile for some stations was less than 1.0, and could not be plotted on figure 73.

The basic data and computations for the determinations of discharge are filed in the district offices of the Geological Survey and may be examined in those offices. Data for determinations in Oregon and for Fall Creek at Copco, Calif., and Middle Fork Smith River near Idlewild, Calif., are filed at the district office in Portland, Oreg.; data for determinations in California, except for the two just mentioned, are filed at the district office in San Francisco, Calif.

Table 1. --Summary of flood stages and discharges in southwestern Oregon and northwestern California, October-November 1950

[Maximum discharges for the floods of October-November 1950 were obtained from gaging-station records, except as otherwise indicated by the following symbols:
S, slope-area determination; C, contracted-opening determination; D, computed flow over dam]

No. on pl. 14 and fig. 73	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	WILLAMETTE RIVER BASIN										
1	Middle Fork Willamette River above Salt Creek, near Oakridge, Oreg.	392	1913-14, 1935-	Dec. 28, 1945	12.06	34,000	86.7	Oct. 29, 5 a. m.	10.97	27,400	69.9
2	Middle Fork Willamette River at Eula, Oreg.	941	1923-	Dec. 28, 1945	18.8	65,200	69.3	Oct. 29, 6:30 a. m.	16.04	59,700	63.4
3	Middle Fork Willamette River at Lowell, Oreg.	994	1946-	Dec. 28, 1945 Jan. 7, 1948	13.9 12.75	- 43,100	- 43.4	Oct. 29, 9:30- 10:45 a. m.	13.00	62,000	62.4
4	Willamette River at Springfield, Oreg. a/	2,030	1911-13, 1919-	Dec. 29, 1945	20.9	140,000	69.0	October 29	17.41	92,500	45.6
5	Willamette River at Eugene, Oreg. b/	2,030	1878-	Jan. 25, 1903	c22.0	-	-	Oct. 29, 4-5 p. m.	15.9	-	-
6	Willamette River at Harrisburg, Oreg.	3,420	1944-	1861 Dec. 29, 1945	d21 19.69	- 210,000	- 61.4	Oct. 30, 1 a. m.	18.02	138,000	40.4
7	Willamette River at Corvallis, Oreg. b/	4,400	1939-	Dec. 30, 1945	28.2	-	-	Oct. 30, 7 p. m.	25.15	-	-
8	Willamette River at Albany, Oreg.	4,840	1878-82, 1892-	Dec. 4, 1861 Feb. 4, 1890 Jan. 14, 1881	36.0 33.9 32.8	340,000 291,000 266,000	- - 55.0	Oct. 31, 5:30 a. m.	26.01	140,000	28.9
9	Willamette River at Salem, Oreg.	7,280	1909-16, 1927-	Dec. 4, 1861 Feb. 5, 1890 Nov. 25, 1909	e39 37.1 30.5	e500,000 e450,000 315,000	- - 43.3	Nov. 1, 1-2 a. m.	21.1	159,000	21.8
10	Willamette River near Wilsonville, Oreg.	8,400	1949-	Feb. 20, 1949	85.2	196,000	23.3	Nov. 2, 8:45 a. m.	78.8	146,000	17.4
11	Salt Creek near Oakridge, Oreg.	113	1913-14, 1933-	Dec. 28, 1945	77.70	4,320	38.2	Oct. 29, 4 a. m.	8.00	4,500	39.8
12	Salmon Creek near Oakridge, Oreg.	117	1913-19, 1933-	Dec. 28, 1945	8.40	8,040	68.7	Oct. 29, 7:30 a. m.	6.65	4,870	41.6
13	North Fork of Middle Fork Willamette near Oakridge, Oreg.	246	1909-16, 1935-	Nov. 22, 1909 Dec. 28, 1945	f12.4 16.6	(g) 17,000	- 69.1	Oct. 29, 7:30 a. m.	12.72	10,200	41.5

14	Fall Creek below Winberry Creek, near Fall Creek, Oreg.	190	1935-	Dec. 28, 1945	h18.0	22,500	118	Oct. 29, 9 a. m.	13.79	12,900	67.9
15	Coast Fork Willamette R. at London, Oreg.	69	1935-	Dec. 28, 1945	13.25	8,800	128	Oct. 28, 6 p. m.	11.43	6,790	98.4
16	Coast Fork Willamette River below Cottage Grove Dam, Oreg.	104	1939-	Jan. 4, 1943	f10.06	j3,340	32.1	Oct. 29, 9 a. m.	8.36	j2,700	26.0
17	Coast Fork Willamette River at Saginaw, Oreg.	529	1923-	Dec. 28, 1945	12.38	j32,900	62.2	Oct. 29, 10 a. m.	6.68	j18,400	34.8
18	Row River above Pitcher Creek near Dorena, Oreg.	211	1935-	Dec. 28, 1945	14.33	19,600	92.9	Oct. 28, 7 p. m.	13.41	16,700	79.1
19	Row River near Cottage Grove, Oreg.	270	1939-	Dec. 28, 1945	18.20	21,400	79.3	Oct. 31, 8 a. m. to 12 m.	8.22	j5,200	19.3
20	Long Tom River near Noti, Oreg.	88	1935-	Feb. 18, 1949	18.62	4,930	56.0	Oct. 29, 10 a. m.	12.63	1,530	17.4
21	Coyote Creek near Crow, Oreg.	94	1940-	Dec. 28, 1945	14.13	9,260	98.5	Oct. 29, 10 p. m.	12.96	5,380	57.3
SIUSLAW RIVER BASIN											
22	Lake Creek at Triangle Lake, Oreg.	50	1931-	Feb. 18, 1949	k8.68	4,180	83.6	Oct. 30, 6 a. m.	4.14	1,030	20.4
UMPUQUA RIVER BASIN											
23	South Umpqua River at Tiller, Oreg.	454	1910-11, 1939-	Dec. 31, 1942	m19.56	29,900	65.9	Oct. 29, 2:30 a. m.	m22.35	37,400S	82.4
24	South Umpqua River near Brockway, Oreg.	1,640	1905-12 1923-26, 1942-	February 1890 Feb. 21, 1927	33.1 h31.2	e130,000 101,000	- 61.6	Oct. 29, 9 p. m.	32.4	118,000S	72.0
25	Umpqua River near Elkton, Oreg.	3,680	1905-	n1861 Dec. 31, 1942	h45.5 41.1	e220,000 186,000	- 50.5	Oct. 30, 1 a. m.	44.2	208,000S	56.5
26	Elk Creek at Tiller, Oreg.	84.5	-	-	-	-	-	Oct. 29	-	11,400C	135
27	Canyon Creek above Mexia Pie Shop, near Canyonville, Oreg.	10.4	-	-	-	-	-	Oct. 29	-	715D	68.8

a Published 1919-28 as at Eugene.

b U. S. Weather Bureau station.

c Floods of December 1861 and February 1890 reached about the same stage.

d About, according to local residents; flood of Jan. 1, 1943 reached a stage of 19.1 ft (from records of U. S. Weather Bureau).

e About.

f Site and datum then in use.

g Not determined.

h From floodmark.

i Record 1939-44 at site 0.8 mile downstream, published as near Cottage Grove.

j Affected by regulation.

k Affected by backwater from debris.

m Corrected to outside gage.

n Probably in December.

Table 1. --Summary of flood stages and discharges in southwestern Oregon and northwestern California, October-November 1950--Continued

No. on pl. 14 and fig. 73	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	UMPQUA RIVER BASIN--Continued										
28	Canyon Creek near Canyonville, Oreg.	35.4	-	-	-	-	-	Oct. 29	-	3,700D	105
29	Cow Creek near Azalea, Oreg.	76	1926-	Jan. 6, 1948	11.50	4,550	59.9	Oct. 29, 5 a. m.	14.37	5,920S	77.9
30	Cow Creek near Riddle, Oreg.	p453	q1911-12, 1926-30	Dec. 14, 1929	11.33	10,600	23.4	Oct. 29, 10 a. m.	h20.4	41,100S	90.7
31	Lookingglass Creek near Tenmile, Oreg. r/	119	-	-	-	-	-	Oct. 29	-	13,700C	115
32	Deer Creek at Roseburg, Oreg.	54.2	-	-	-	-	-	Oct. 29, 2:30 a. m.	-	6,040S	111
33	North Umpqua R. below Lake Creek, Oreg.	175	1927-	June 9, 1933	2.34	1,190	6.80	Oct. 29, 2-4 a. m.	1.75	702	4.01
34	North Umpqua River above Clearwater River, Oreg.	258	1948-	May 2, 1949	4.36	2,380	9.22	Oct. 29, 4 a. m.	4.18	2,210	8.57
35	North Umpqua River above Copeland Creek, Oreg.	471	1949-	Feb. 25, 1950	6.82	4,670	9.92	Oct. 29, 3 a. m.	11.30	12,200S	25.9
36	North Umpqua River above Rock Creek, near Glide, Oreg.	886	1924-43	Feb. 20, 1927	20.18	53,000	59.8	Oct. 29, 4:40 a. m.	h20.5	55,000	62.1
37	North Umpqua River near Glide, Oreg.	1,210	1915-20, 1921-22, 1927-38	Nov. 22, 1909 Mar. 19, 1932	22.6 17.3	94,000 59,500	77.7 49.2	Oct. 29, 4 a. m.	20.40	80,000	66.1
38	North Umpqua River at Winchester, Oreg.	1,290	1908-13, 1923-29	Nov. 23, 1909	27.4	100,000	77.5	Oct. 29, 7-8 a. m.	h23.2	81,000	62.8
39	Lake Creek at Diamond Lake, near Fork Klamath, Oreg.	57	1922-25, 1926-	Jan. 1, 1943	2.8	j336	5.89	Oct. 29, 30	1.72	141	2.47
40	Clearwater River above Trap Creek, Oreg.	41.6	1927-	Jan. 1, 1943	2.17	541	10.8	Oct. 29, 6 a. m.	2.28	487	11.7
41	Clearwater River at mouth, Oreg.	75	1947-	Jan. 7, 1948	4.96	1,340	17.9	Oct. 29, 8 a. m.	4.82	1,250	16.7
42	Fish Creek at Big Camas ranger station, Oreg.	67	1947-	Jan. 7, 1948	7.62	4,270	63.7	Oct. 29, 4 a. m.	7.24	3,750C	56.0

43	Calapooya Creek near Nonpareil, Oreg.	83	-	-	-	-	-	Oct. 29	-	7,000D	84.3
44	Elk Creek below Pass Creek, at Drain, Oreg.	161	-	-	-	-	-	Oct. 29	-	9,200S	57.1
45	Yoncalla Creek near Yoncalla, Oreg.	6	-	-	-	-	-	Oct. 29	-	1,250C	208
COOS RIVER BASIN											
46	Daniels Creek near Eastside, Oreg.	14.5	1950-	-	-	-	-	Oct. 28, 4 p. m.	9.96	1,170	80.7
COQUILLE RIVER BASIN											
47	South Fork Coquille River at Powers, Oreg.	169	1916-26, 1928-	Dec. 28, 1945	20.57	30,500	180	Oct. 29, 4:30 p. m.	18.14	24,400C	144
48	Middle Fork Coquille River near Myrtle Point, Oreg.	305	1930-46	(s) Dec. 28, 1945	25.8 23.0	- 23,400	- 76.7	Oct. 28, 5 p. m.	h25.6	31,100	102
49	North Fork Coquille River near Myrtle Point, Oreg.	276	1928-46	(t) Dec. 28, 1945	41.2 39.3	- 10,900	- 39.5	Oct. 28	h35.8	9,330	33.8
ROGUE RIVER BASIN											
50	Rogue River above Bybee Creek, Oreg.	155	1930-	Nov. 29, 1942, Dec. 28, 1945	7.84	4,430	28.6	Oct. 29, 8 a. m.	6.53	3,330	21.5
51	Rogue River above Prospect, Oreg.	332	1907-12, 1923-	Dec. 28, 1945	h8.4	11,900	35.8	Oct. 29, 6 a. m.	6.74	7,620	23.0
52	Rogue River below South Fork Rogue River, near Prospect, Oreg.	643	1929-	Dec. 28, 1945	12.2	19,800	30.8	Oct. 29, 6 a. m.	8.6	11,900S	18.5
53	Rogue River at Dodge Bridge, near Eagle Point, Oreg.	1,210	1938-	Dec. 28, 1945	m11.52	41,900	34.6	Oct. 29, 6:30 a. m.	m10.3	33,800	27.9
54	Rogue River at Raygold, near Central Point, Oreg.	2,020	1905-	1861-62 February 1890 Feb. 21, 1927	e32 e27.5 24.8	- - 91,500	- - 45.3	Oct. 29, 11 a. m.	14.91	43,100	21.3
55	Rogue River at Grants Pass, Oreg.	2,420	1939-	1861-62 Dec. 29, 1945	e39 23.16	- 70,000	- 28.9	Oct. 29, 1 p. m.	21.25	65,400S	27.0

e About, from information furnished by Corps of Engineers.

h From floodmark.

j Affected by regulation.

m Corrected to outside gage.

p Drainage area at site of slope-area determination, 5 miles southwest of Riddle.

q Station operated by State Engineer of Oregon; records not available in publications of Geological Survey.

r Sometimes known locally as Olalla Creek.

s Probably occurred Oct. 31, 1924.

t Occurred sometime during winter of 1909-10.

Table 1.--Summary of flood stages and discharges in southwestern Oregon and northwestern California, October-November 1950--Continued

No. on pl. 14 and fig. 73	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	ROGUE RIVER BASIN--CONTINUED										
56	South Fork Rogue River near Prospect, Ore.	79	1924-31, 1950-	Dec. 19, 1929	f4.58	1,980	25.1	Oct. 29, 9 a. m.	3.39	u506	6.41
57	Middle Fork Rogue River near Prospect, Ore.	57	1925-	Nov. 29, 1942	f5.2	2,760	48.4	Oct. 29, 7:30 a. m.	3.45	u895	15.7
58	Red Blanket Creek near Prospect, Ore.	40	1925-	Nov. 29, 1942	f,h5.1	1,880	47.0	Oct. 29, 7:30 a. m.	4.70	835	20.9
59	South Fork Big Butte Creek near Butte Falls, Ore.	135	1910-11, 1915, 1917-	Feb. 20, 1927	4.05	2,470	18.3	Oct. 28, 10-11 a. m.	1.69	499	3.70
60	Big Butte Creek near McLeod, Ore.	249	1945-	Jan. 7, 1948	h9.4	4,680	18.8	Oct. 29, 6 a. m.	8.0	3,380	13.6
61	Elk Creek near Trail, Ore.	133	1945-	Dec. 28, 1945	h13.2	9,880	74.3	Oct. 29, 4 a. m.	11.80	8,080	60.8
62	South Fork Little Butte Creek near Lake Creek, Ore.	136	1910-13, 1921-	Jan. 7, 1948	6.48	3,920	28.8	Oct. 29, 7 p. m.	3.94	1,370	10.1
63	North Fork Little Butte Creek at Fish Lake, near Lake Creek, Ore.	18	1917-	July 10, 1930	-	j158	8.78	Oct. 29	.63	j12	.67
64	North Fork Little Butte Creek near Lake Creek, Ore.	37	1911-13, 1922-28, 1931-	Dec. 30, 1924	3.30	680	18.4	Oct. 29, 10-12 p. m.	2.16	j92	2.49
65	Little Butte Creek below Eagle Point, Ore.	293	1907-16, 1924-26, 1945-	Jan. 7, 1948	h11.4	10,000	34.1	Oct. 29	6.7	j3,670	12.5
66	Emigrant Creek below Walker Creek, near Ashland, Ore.	109	1943-	Jan. 7, 1948	8.87	j3,750	34.4	Oct. 29, 4 p. m.	2.88	j152	1.39
67	Bear Creek at Medford, Ore.	279	1915-	Feb. 20, 1927	f10.57	10,200	36.6	Oct. 29, 11 p. m.	4.14	j2,480	8.89
68	Evans Creek above West Fork, at Meadows Bridge, Ore.	33.7	q1943-	Dec. 28, 1945	6.60	2,630	78.0	Oct. 29, 4 a. m.	6.40	2,490S	73.9
69	Evans Creek at Bybee Springs, Ore.	118	q1913, 1925-27, 1928, 1940-	Feb. 20, 1927	h12.5	11,100	94.1	Oct. 29	h11.5	8,250S	69.9

70	Applegate River near Copper, Oreg.	220	1938-	Jan. 6, 1948	17.84	13,400	60.9	Oct. 29, 6 a. m.	16.5	11,800	53.6
71	Applegate River near Ruch, Oreg.	297	1911-14, 1925-	Feb. 20, 1927	16.0	20,000	67.3	Oct. 29, 7 a. m.	11.4	12,000	40.4
72	Applegate River near Applegate, Oreg.	480	1938-	Jan. 6, 1948	14.20	21,200	44.2	Oct. 29, 9 a. m.	13.20	18,600	38.8
73	Applegate River near Wilderville, Oreg.	694	1938-	Jan. 6, 1948	16.44	23,100	33.3	Oct. 29, 2 p. m.	h17.5	28,800	37.2
74	Powell Creek near Williams, Oreg.	8.6	1946-	Jan. 6, 1948	4.92	780	90.7	Oct. 29, 11:30 p. m.	5.14	938	109
75	Slate Creek at Wonder, Oreg.	30.9	1943-	Dec. 28, 1945	f, h9.0	-	-	Oct. 29, 11 a. m.	9.72	4,020S	130
76	Jump-off-Joe Creek near Merlin, Oreg.	28.0	q1921-22, 1929, 1932-	Jan. 6, 1948	h7.5	2,000	71.4	Oct. 29	h9.8	3,300C	118
77	Grave Creek at Pease Bridge, near Placer, Oreg.	22	1940-	Jan. 6, 1948	5.73	2,400	109	Oct. 29, 2:30 a. m.	6.95	3,550	161
78	Grave Creek near Placer, Oreg.	48	q1913, 1929-30, 1932-	Jan. 7, 1948	8.0	6,690	139	Oct. 29, 10 a. m.	8.30	u8,000S	167
79	East Fork Illinois River near Takilma, Oreg.	42.6	1926-32, 1940-	Dec. 28, 1945	f9.4	-	-	Oct. 29, 3 a. m.	h9.56	7,610S	179
80	Illinois River at Kerby, Oreg.	367	1926-	Feb. 20, 1927	f, h19.6	52,000	142	Oct. 29 about 10 a. m.	h24.6	49,000S	134
81	Althouse Creek near Holland, Oreg.	23.8	1945-	Jan. 7, 1948	5.14	1,520	63.9	Oct. 29, 9 a. m.	5.96	2,160S	90.8
82	Sucker Creek near Holland, Oreg.	76	1940-	Jan. 7, 1948	h8.3	5,090	67.0	Oct. 29, 6 a. m.	h8.75	5,720	75.3
83	Grayback Creek near Holland, Oreg.	24.1	1946-	Jan. 7, 1948	5.92	1,500	62.2	Oct. 29, 6 a. m.	6.80	2,080	86.3
84	West Fork Illinois River near O'Brien, Oreg.	46.6	1930, 1943-	Dec. 28, 1945	12.63	13,400	288	Oct. 28, about 12 p. m.	h12.96	14,200S	305
85	Deer Creek near Dryden, Oreg.	23	1941-	Dec. 28, 1945	w8.1	2,750	120	Oct. 29, 6 a. m.	7.92	4,370S	190
SMITH RIVER BASIN											
86	Smith River near Crescent City, Calif.	613	1931-	February 1927 Dec. 28, 1945	41.4 35.6	- 123,000	- 201	Oct. 29, 3 a. m.	h39.51	152,000S	248

f Site and datum then in use.

h From floodmark.

j Affected by regulation.

q Station operated by State Engineer of Oregon; records not available in publications of Geological Survey.

u Includes flow of power canal.

v Based on slope-area determination made 2 miles upstream, drainage area 39.3 sq mi, 7,360 cfs; 8,000 cfs at station computed from ratio of square root of drainage areas.

w From graph based on gage readings.

Table 1. --Summary of flood stages and discharges in southwestern Oregon and northwestern California, October-November 1950--Continued

No. on pl. 14 and fig. 73	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	SMITH RIVER BASIN--CONTINUED										
87	Middle Fork Smith River near Idlewild, Calif.	37.2	-	-	-	-	-	Oct. 29, 4 a. m.	-	7,550S	203
	KLAMATH RIVER BASIN										
88	Williamson River below Sprague River, near Chiloquin, Calif.	3,000	1917-	Apr. 1, 1943	7.29	7,660	2.55	Nov. 3, 2-3 a. m.	2.74	863	.29
89	Klamath River at Somesbar, Calif.	8,480	1927-	Feb. 21, 1927 xDec. 28, 1945	50.8 40.0	- j97,000	- 11.4	Oct. 29, 8 a. m.	32.45	j74,400	8.77
90	Sprague River near Chiloquin, Calif.	1,580	1920-	Apr. 1, 1943	7.47	6,650	4.21	Nov. 3, 3-5 a. m.	2.15	510	.32
91	Fall Creek at Copco, Calif.	20	1928-	Jan. 7, 1948	3.22	y350	17.5	Oct. 29, 9 p. m.	2.39	176	8.80
92	Beaver Creek near Lilyglen, Calif.	30.3	1916-19, 1930-31, 1948-	Mar. 24 or 25, 1919	f2.53	525	17.3	Oct. 29, 8 p. m.	3.29	276	9.11
93	Keene Creek at Hyatt Prairie, near Ashland, Oreg.	12.4	1917-22, 1948-	Apr. 21, 1922	f, z4.72	315	25.4	Oct. 29, 8:30 p. m.	2.14	j1.5	.12
94	Shasta River near Yreka, Calif.	804	1933-41, 1944-	Feb. 29, 1940	6.72	j2,440	3.03	Oct. 30, 11 a. m.	4.69	j784	.98
95	Scott River near Fort Jones, Calif.	656	1941-	Jan. 22, 1943	aa11.65	7,340	11.2	Oct. 30, 3 p. m.	11.22	6,860	10.5
96	Salmon River at Somesbar, Calif.	737	1927-	Dec. 28, 1945	15.82	29,900	40.6	Oct. 29, 11:30 p. m.	12.75	21,200	28.8
97	Trinity River at Lewiston, Calif.	724	1911-	Feb. 28, 1940	20.8	40,300	55.7	Oct. 30, 12:30 a. m.	21.00	39,300	54.3
98	Trinity River near Douglas City, Calif.	1,017	1944-	Jan. 7, 1948	30.00	41,800	41.1	Oct. 30, 3 a. m.	28.57	41,200	40.5
99	Trinity River near Hoopa, Calif.	2,840	1911-14, 1916-18, 1931-	Feb. 28, 1940	31.2	124,000	43.7	Oct. 30, 9:30 a. m.	22.08	62,700	22.1
	EEL RIVER BASIN										
100	Eel River at Scotia, Calif.	3,070	1910-15, 1916-	Feb. 2, 1915 Dec. 11, 1937	y55.5 55.1	- 345,000	- 112	Oct. 29, 5 a. m.	33.33	121,000	39.4

f Site and datum then in use.

j Affected by regulation.

x Probably.

y Observed.

z Affected by backwater from ice.

aa Flood of unknown date reached a stage of about 14 ft. from floodmarks.

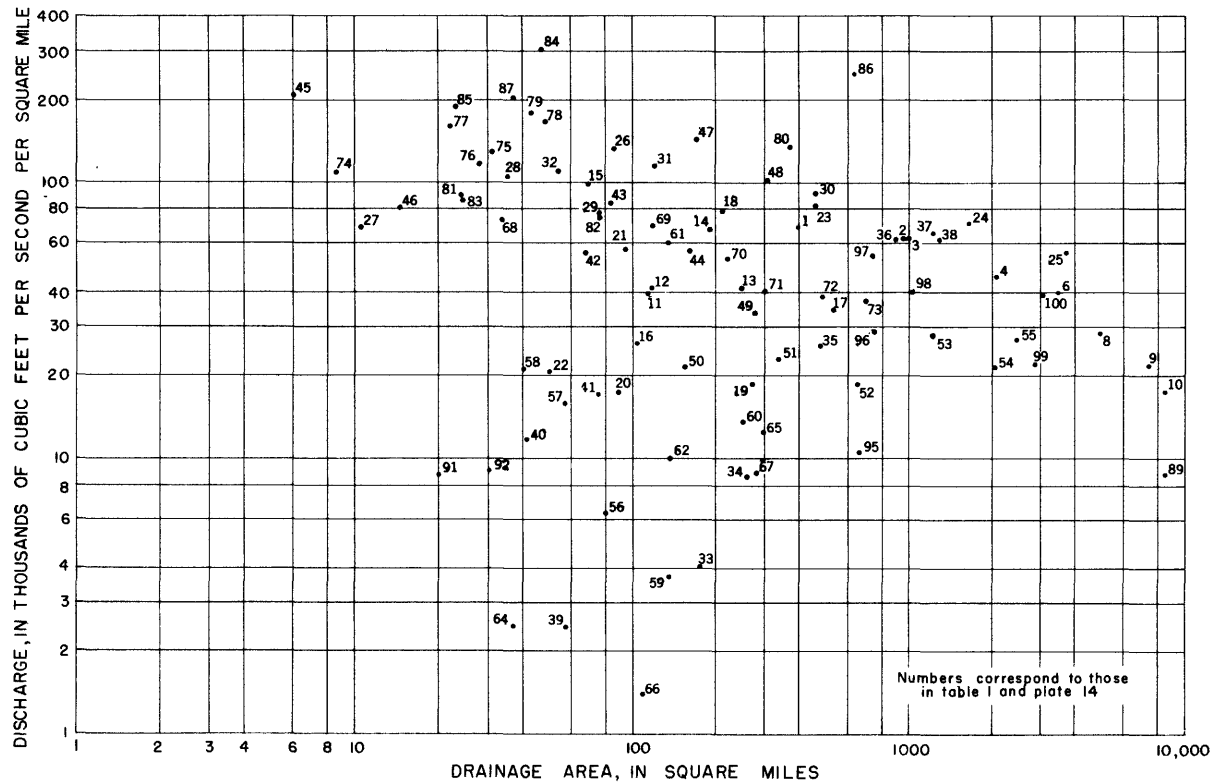


FIGURE 73.—Relation of unit discharge to size of drainage area.

RECORDS OF PREVIOUS FLOODS

The greatest flood of record throughout the area studied in this report was that of 1861-62. So far as available records show the stages reached at that time have not since been equaled or exceeded except on the lower Klamath River and Smith River in California. Records of the floods of 1861-62 are confined mostly to the main stems of the larger streams, and factual data are lacking for almost all small and tributary streams. Nevertheless, the floods of 1861-62 were so outstanding where records are available that they are considered the greatest known throughout the entire area discussed in this report. Heavy rain, with snow in the higher elevations in late November 1861, provided favorable conditions for the floods, which came in December and January as the result of continued heavy rains. Stream stages were high throughout December and January, and several peaks occurred. On most streams the highest peak was in December 1861, but on some streams the peak of January 1862 may have been greater.

Other notable floods occurred in 1881, 1890, 1909, and 1927. These are described in more detail below. The storms causing these floods were not so widespread as those of 1861-62. Hence, the size of the resulting floods varied considerably in the different river basins.

Willamette River Basin

Historic floods in this basin are discussed in detail in Water-Supply Paper 968-A, pages 10-17. The best evidence available indicates that stages for the outstanding floods of the Willamette River at the gage at Salem were as follows:

1813	About 37 feet.	Dec. 4, 1861	39 feet.
1843	About 31 feet.	Jan. 16, 1881	36.3 feet.
1844	About 34 feet.	Feb. 4, 1890	37.1 feet.
1849	About 31 feet.	Nov. 25, 1909	50.5 feet (daily mean gage height).
1853	About 30 feet.	Jan. 8, 1923	31.0 feet.

Discharge has been estimated as 500,000 cfs for the flood of 1861, and as 450,000 cfs for the flood of 1890. This list probably includes all floods higher than 31 feet since 1813. No stage greater than 31 feet has been recorded since 1923. The flood of Oct. 29, 1950, reached a stage of only 21.1 feet (159,000 cfs) at Salem. Since 1941, flood stages in the Willamette Valley have been reduced by the operation of flood-control reservoirs in the headwaters.

Considerable fragmentary information regarding stages that antedate the period of record for points on the Willamette River other than Salem is published in Water-Supply Paper 968-A.

Umpqua River Basin

The floodmark of the peak of 1861, probably in December, near the gage on Umpqua River near Elkton as pointed out by a local resident in 1935, was at gage height 45.5 feet, present datum. This represents a discharge of about 220,000 cfs, based on a short extension of the rating curve above 208,000 cfs, the peak of the flood of Oct. 30, 1950, as computed from a slope-area determination. There is no record of any flood higher than that of December 1861.

No evidence of the flood of 1861 has been found at the gaging station on South Umpqua River near Brockway, but floodmarks of what are believed to be the three highest floods since 1861, those of 1890, 1927, and 1950, have been interpreted as follows:

February 1890, gage height 33.1 feet, discharge about 130,000 cfs.
Oct. 29, 1950, gage height 32.4 feet, discharge, 118,000 cfs.
Feb. 21, 1927, gage height 31.2 feet, discharge, 100,000 cfs.

The greatest flood known on North Umpqua River was that of Nov. 22, 1909, at Glide, for which the stage at the gaging station was 22.6 feet; discharge was estimated as 94,000 cfs. This flood is believed to have exceeded that of 1927. No evidence regarding the floods of 1861 or 1890 is available.

Coquille River Basin

According to a report by the Corps of Engineers (House Document no. 78, 1931), the highest flood known on Coquille River was caused by a heavy rainstorm melting about 22 inches of snow in the mountains. On Coquille River about a mile above Coquille (at mile 25½ above mouth) the flood of February 1891 reached an altitude of 29.5 feet above mean sea level, Geological Survey datum, and about 6 miles below Coquille (at mile 19 above mouth) the same flood reached an altitude of 26.0 feet, same datum.

Other floods of note between 1900 and 1919 occurred on the Coquille River Jan. 14, 1901, Jan. 24, 1903, Feb. 2 and Dec. 26, 1907, Nov. 24, 1909, and Feb. 8, 1916. The altitude of the flood of Nov. 24, 1909, was 19 feet, and that of the others 18 feet above mean sea level, Geological Survey datum, at mile 16 above the mouth.

Information on the forks of the Coquille River is less full. At the gaging station on North Fork near Myrtle Point a flood during the winter of 1909-10 reached gage height 41.2 feet. At the station on Middle Fork near Myrtle Point the highest stage of record was 25.8 feet, probably on Oct. 31, 1924; the flood of Oct. 28, 1950, reached a stage of 25.6 feet, discharge, 31,100 cfs. On South Fork at Powers the flood of Oct. 31, 1924 reached a discharge of 25,300 cfs (gage height, 17.5 feet, site and datum then in use), and was the greatest flood in the period 1916-26, 1928-44. This flood was exceeded by that of Dec. 28, 1945, when the peak was 30,500 cfs, (gage height, 20.57 feet, present datum). The flood of Oct. 29, 1950, crested at 18.14 feet, discharge, 24,400 cfs.

Rogue River Basin

The relative heights of the flood peaks of December 1861, February 1890, and February 1927, which are the three greatest known, have been established at several points in the Rogue River basin by the Corps of Engineers. On Rogue River about 3 miles below Trail the peak of the 1890 flood was a foot lower than that of the 1861 flood, and the peak of the 1927 flood was 9 feet lower than the 1861 peak. At the road junction north of Bybee Bridge the flood peaks of 1861 and 1890 were equal, and were 6 feet above the 1927 flood peak. At Raygold the flood of December 1861, or perhaps of January 1862, reached a stage of about 32.0 feet; that of 1890, about 27.5 feet; and that of 1927, 24.8 feet. There is considerable uncertainty as to the dates and stages of the floods of 1861 (or 1862) and 1927; however, the indicated order of magnitude of the three floods is believed to be correct. The 1927 peak discharge at Raygold has been computed as 91,500 cfs. The Rogue River at Grants Pass reached a stage of about 39 feet in 1861 (from unpublished report by Corps of Engineers), about 32 feet in 1890, and about 28 feet Feb. 21, 1927. The greatest flood on Rogue River at Grants Pass since the establishment of the gaging station in 1939 was that of Dec. 29, 1945--gage height, 23.16 feet, discharge, 70,000 cfs. The flood of Oct. 29, 1950, crested at gage height 21.25 feet, discharge, 65,400 cfs.

The Illinois River near Kerby at the site of the present gage reached a stage of Feb. 20, 1927, about 2 feet higher than the stage of 24.6 feet reached on Oct. 29, 1950. This 1927 peak represented a discharge of 52,000 cfs. The flood of 1890 in the same vicinity is reported to have reached a stage about 3.5 feet higher than the 1927 peak.

At the Applegate River station near Wilderville, floodmarks believed to represent the 1927 flood peak were found at gage height 22 feet, $5\frac{1}{2}$ feet higher than the 1950 peak stage. The flood of 1890 is reported by local residents to have been a "little higher" than the 1927 peak but no exact figure has been computed.

Smith River Basin

Historic floods in the Smith River basin have been previously reported in Water-Supply Paper 843. The flood of 1861-62 on Smith River reached a stage at Tryons Corners of about 21.5 feet above the normal low water of 1937-38. The flood of Oct. 29, 1950, reached the same stage; this is the only point where the flood of 1861-62 is known to have been equaled by the flood of 1950. Data on known floods are summarized below:

Date	Tryons Corners at highway bridge	At gaging station near Crescent City (about 8 miles upstream from Tryons Corners)	
	Stage <u>a/</u> (feet)	Gage height (feet)	Discharge (cubic feet per second)
1861-62	21.5	-	-
1890	20.5	-	-
1927	20.5	41.4	-
1937, Dec. 11	15.9	29.4	78,900
1942, Dec. 31	-	30.9	91,400
1945, Dec. 28	20.0	35.6	123,000
1950, Oct. 29	21.5	39.5	152,000

a/ Stage above normal low water of 1937-38.

At the gaging station on Smith River near Crescent City, Calif., the flood of February 1927 reached a stage of 41.4 feet (discharge not determined). This was 1.9 feet higher than the flood of Oct. 29, 1950 (discharge, 152,000 cfs), and 5.8 feet higher than the flood of Dec. 28, 1945 (discharge, 123,000 cfs).

Klamath River Basin

A detailed account of floods before 1938 is given in Water-Supply Paper 843. At the gage on Klamath River at Somesbar the peak of the flood of Feb. 21, 1927, was at gage height 50.8 feet. Since 1927, the flood most nearly approaching this was that which occurred on or about Dec. 28, 1945, gage height 40.0 feet, discharge, 97,000 cfs. The flood of Oct. 29, 1950, crested at a stage of 32.45 feet, discharge, 74,400 cfs.

On the Klamath River at Weitchpec, at the mouth of Trinity River, the flood of 1861-62 reached a stage of 100.5 feet above the normal low water of 1937-38, and the flood of 1890 reached a stage of 96.5

feet above. The crest stage in October 1950 was considerably lower than either of these peaks, being 58.0 feet above the aforementioned datum. At Martins Ferry, 4 miles downstream from Weitchpec, the 1861-62 flood was 102.4 feet above normal low water of 1937-38, and the 1890 flood, 97.6 feet. Nearer the mouth of Klamath River the flood of 1890 was the greater. At the former gaging station at Requa, the flood of 1890 reached a gage height 63.0 feet, and that of 1861-62, 60.0 feet. This reach in the lower Klamath River is the only reach in which the flood peak of 1861-62 is known to have been exceeded by the later flood.

On Trinity River at the gaging station at Lewiston the flood of 1861-62, gage height 21.6 feet, has never been equaled for stage, although the flood of Feb. 28, 1940, gage height 20.8 feet, discharge, 40,300 cfs, and the flood of Oct. 30, 1950, gage height 21.00 feet, discharge, 39,300 cfs, came close. Other floods at Lewiston worth noting are those of 1881, gage height 20.4 feet, and of 1937, gage height, 19.90 feet.

The highest floodmark found on Trinity River at the bridge at Hoopa Indian Reservation was 49.4 feet above normal low water of 1937-38. This is believed to represent the flood of 1890 but may represent that of 1886. No marks were found by which the height of the flood of 1861-62 could be established, but from other evidence, that flood probably was not as high as the flood of 1890 or 1886. Another floodmark 47 feet above the normal low water of 1937-38 is believed to have made by the flood of 1907, but may represent that of 1909. The flood of Oct. 30, 1950, crested at a stage of about 19 feet above the aforementioned datum; the discharge was 62,700 cfs.

STORAGE

Southwestern Oregon

In the river basins affected by the flood, surface storage was not an appreciable factor except in the Willamette River basin. The considerable storage available in the Klamath River basin is in the upper part, upstream from the area affected by this flood. In the other basins in the flood area, including those in which the floods were most severe, either artificial or natural surface storage is almost nonexistent. A little surface storage is provided by Waldo Lake, in the upper basin of North Fork of Middle Fork Willamette River.

Ground-water storage, however, may have reduced appreciably the flood peaks in the Rogue and North Umpqua River basins. The soil of the upper part of these basins in the vicinity of Crater Lake

is composed of a very porous volcanic material that absorbs an immense quantity of rain and snow water, which is released gradually during the ensuing weeks and months. This natural ground storage has considerable effect in sustaining the low-water flow, and the effect on flood flow may be appreciable.

Another natural storage factor is channel storage, which is particularly effective in the lower reaches of the larger rivers where slopes are relatively low. The reduction of the Willamette River peak from 159,000 cfs at Salem on November 1 to 146,000 cfs at Wilsonville on November 2 was due to channel storage.

Flood flow in the upper Willamette River basin was partly controlled by Cottage Grove Reservoir on Coast Fork Willamette River, Dorena Reservoir on Row River, and Fern Ridge Reservoir on Long Tom River. The three reservoirs are operated by the Corps of Engineers principally for flood control, and they stored a total of about 102,000 acre-feet during the flood period October 27-31. The net effect was to reduce the peak flow of the Willamette River at Salem on November 1 from 180,000 cfs to 159,000 cfs, according to estimates by the Corps of Engineers.

The contents of Fern Ridge Reservoir increased 31,360 acre-feet in 88 hours from 6 a. m. on October 28 to 10 p. m. on October 31. The contents of Cottage Grove Reservoir increased 19,060 acre-feet in 64 hours from 8 p. m. on October 27 to noon October 30. Without Cottage Grove Reservoir, the flood crest would have passed the gaging station on Coast Fork Willamette River below Cottage Grove Reservoir about 7 p. m. on October 28, and the crest would have been about 8,500 cfs, computed on the basis of released flow and rate of increase in the contents of the reservoir. The actual released flow at 7 p. m. on October 28 was 2,340 cfs. Cottage Grove Reservoir, therefore, was responsible for a reduction of about 6,000 cfs in the peak discharge of Coast Fork above Row River.

The contents of Dorena Reservoir increased 51,360 acre-feet in 66 hours from 2 a. m. on October 28 to 8 p. m. on October 30. Without Dorena Reservoir, the flood crest would have passed the gaging station on Row River near Cottage Grove about 8 p. m., October 28, and the crest would have been about 23,500 cfs, computed on the basis of released flow and rate of increase in the contents of the reservoir. The actual released flow at 8 p. m. on October 28 was 3,780 cfs. Dorena Reservoir, therefore, was responsible for a reduction of about 19,700 cfs in the peak discharge of Row River.

In the Rogue River basin a small amount of storage is provided in the headwaters by two irrigation reservoirs. The contents of Fish Lake Reservoir on South Fork Little Butte Creek increased 302 acre-feet, from 2,453 acre-feet on October 26 to 2,775 acre-

feet on October 31. The contents of Emigrant Gap Reservoir on Emigrant Creek increased 4,553 acre-feet, from 275 acre-feet on October 26 to 4,828 acre-feet on October 31. Water for irrigation is also supplied to the upper Rogue River basin by diversion from two reservoirs in the upper Klamath River basin--Fourmile Lake and Hyatt Prairie Reservoir. Water stored in Fourmile Lake on Fourmile Creek is diverted by ditch across the divide to Fish Lake Reservoir. The contents of Fourmile Reservoir increased 647 acre-feet, from 5,828 acre-feet on October 18 to 6,475 acre-feet on November 3. Water stored in Hyatt Prairie Reservoir on Keene Creek in the Klamath River basin is diverted to upper Emigrant Creek in the Rogue River basin. The contents of Hyatt Prairie Reservoir increased 624 acre-feet, from 586 acre-feet on October 26 to 1,210 acre-feet on November 7.

Small amounts of storage exist on other streams. In the Umpqua River basin some storage is provided by Diamond Lake at the head of Lake Creek. In the Klamath River basin the larger storage available in the upper part of the basin was ineffective because the flood flow originated downstream from the storage facilities. In addition to the reservoirs already mentioned, most of the streams have small storage units in the form of fish pools, log ponds, or power-plant pondage, which provide temporary detention. The total of such storage is very small when compared to the size of the floods.

Northwestern California

Only fragmentary information on storage in northwestern California is available, but storage is believed to have been a negligible factor in reducing the flood peaks.

The capacity of Lake Pillsbury on the upper Eel River is 72,040 acre-feet from the sill of the outlet gate to the crest of the spillway, and 93,700 acre-feet to the top of the spillway gates, but the reservoir gained only 19,600 acre-feet during the period October 27-29. The peak flow of 121,000 cfs at Scotia on October 29 was probably only a little less than unregulated flow.

Lake Dwinell on a tributary of Shasta River has a usable capacity of 72,000 acre-feet. No figures on change in contents are available. The maximum discharge of Shasta River near Yreka was only 784 cfs, compared to the record maximum of 2,440 cfs; so, it is possible that the peak on Shasta River was reduced by storage in Lake Dwinell.

Sweasy Reservoir on Mad River, the water supply for the town of Eureka, has a usable capacity of 18,000 acre-feet. The change in contents of that reservoir during the flood period is not known,

According to the only record obtainable, the water surface of the reservoir rose from elevation 201.9 feet to 207.9 feet from 3 p. m. on October 27 to 8 p. m. on October 29, and by 7 a. m. on October 30 had dropped to 206.6 feet. It is believed that the storage had little effect on the peak discharge of Mad River.

Storage in the Trinity River basin is negligible. Water-Supply Paper 843 gives a figure of 1,200 acre-feet as storage available in 1938; the storage available now is probably about the same.

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