

# Surface Water Supply of the United States 1951

## Part 14. Pacific Slope Basins in Oregon and Lower Columbia River Basin

*Prepared under the direction of C. G. PAULSEN, Chief Hydraulic Engineer*

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GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1218

*Prepared in cooperation with the States  
of Oregon and Washington and with  
other agencies*



**UNITED STATES DEPARTMENT OF THE INTERIOR**

**Douglas McKay, *Secretary***

**GEOLOGICAL SURVEY**

**W. E. Wrather, *Director***

# **PREFACE**

This report was prepared by the Geological Survey in cooperation with the States of Oregon and Washington and with other agencies, by personnel of the Water Resources Division under the direction of:

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#### SCOPE OF WORK

This volume is one of a series of 18 reports presenting measurements of stage, discharge, and content of streams, lakes, and reservoirs in the United States during the water year ending September 30, 1951. Since 1888, when the United States Geological Survey first studied streamflow in relation to problems of irrigation, similar measurements have been made at more than 12,400 gaging stations in the 48 States and at many others in the Territories of Alaska and Hawaii. On September 30, 1951, the Geological Survey and cooperating organizations were maintaining 6,730 gaging stations, including those in Alaska and Hawaii. Miscellaneous discharge measurements were made at many other points in the 1951 water year.

#### COOPERATION

Many State, municipal, and private organizations have cooperated with the Geological Survey in this work by either furnishing or helping to collect data. Organizations that supplied data are acknowledged in station descriptions, and organizations that assisted in the collection of data through cooperative agreements with the Survey are:

Oregon: State of Oregon, C. E. Stricklin, State engineer; Fish Commission of Oregon, A. J. Suomela, Master Fish Warden; and the cities of Corvallis, Eugene, McMinnville, Portland, and Coos Bay-North Bend.

Washington: State Department of Conservation and Development, J. V. Rogers, director, succeeded by W. A. Galbraith, and C. J. Bartholet, Supervisor of Hydraulics; State Department of Fisheries, Alvin Anderson, director, succeeded by R. J. Schoettler; Walla Walla County; city of Tacoma; and Lewis, Skamania, and Wahkiakum County Public Utility Districts.

Assistance in the form of funds or services was given by the Corps of Engineers, Department of the Army, in collecting records published herein for 49 gaging stations in Oregon and 8 in Washington.

Assistance was also furnished by the Forest Service, United States Department of Agriculture and the Bureau of Reclamation, United States Department of the Interior.

The following organizations aided in collecting records:

Oregon: Counties of Crook, Deschutes, Jackson, Jefferson, Josephine, Klamath, and Umatilla; city of Grants Pass; The California Oregon Power Co., California Public Utilities, Pacific Power & Light Co., and Portland General Electric Co.

Washington: Pacific Power & Light Co.

#### DIVISION OF WORK

The stream gaging was done by the Water Resources Division of the Geological Survey, Carl G. Paulsen, chief hydraulic engineer, and Joseph V. B. Wells, chief of the Surface

Water Branch. The data for stations in the several States were collected and prepared for publication under the supervision of the district engineers at the offices listed below. The records were reviewed and the manuscript prepared for publication under the direction of B. J. Peterson, chief, Annual Reports Section.

<u>State</u>	<u>District office</u>	<u>Address</u>
Oregon a/.....	Portland.....	606 Post Office Building.
Washington.....	Tacoma.....	207 Federal Building.

a/ The work was done in collaboration with C. E. Stricklin, State engineer.

Information of a more detailed nature than that published for most of the gaging stations given in this report is on file in the district offices listed above. Provisional records of discharge prior to publication, and other unpublished data concerning the gaging station records may usually be obtained from the district office.

#### DEFINITION OF TERMS AND ABBREVIATIONS

The terms of streamflow and other hydrologic data, as used in this report, are defined as follows:

Cubic foot per second (cfs) is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Cubic feet per second per square mile (cfs/m) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Runoff in inches is the depth to which an area would be covered if all the water draining from it in a given period were uniformly distributed on its surface. The term is used for comparing runoff with rainfall, which is also usually expressed in inches.

Acre-foot is the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet. The term is commonly used in relation to storage for irrigation.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

Stage-discharge relation is the relation between gage height and the amount of water flowing in a channel, expressed as volume per unit of time.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, a long reach of the channel, or an artificial structure.

Contents is the volume of water in a reservoir. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

The drainage area of a stream at a specified location is that area, measured in a horizontal plane, which is so enclosed by a topographic divide that direct surface runoff from precipitation normally would drain by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.



## NEW DOWNSTREAM ORDER OF LISTING GAGING STATIONS

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing gaging-station records has been changed. In this report, in a downstream direction along the main stem all stations on a tributary entering above a main-stem station are listed before that station. If a tributary enters between two main-stem stations, it is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. To indicate the rank of any tributary on which a gaging station is situated and the stream to which it is immediately tributary, each indention in the listing of gaging stations in the table of contents of this report represents one rank. This new downstream order and system of indention show which gaging stations are on tributaries between any two stations on a main stem and the rank of the tributary on which each gaging station is situated.

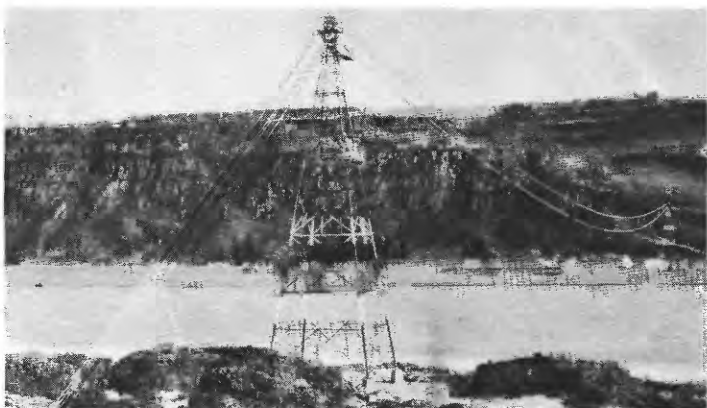
The order of listing used before the publication of the 1951 report listed first all stations on the main stem from headwaters toward mouth, then all stations on the uppermost tributary to the main stem from the tributary's source to mouth, and then all stations from source to mouth of the uppermost tributary to the tributary.

## EXPLANATION OF DATA

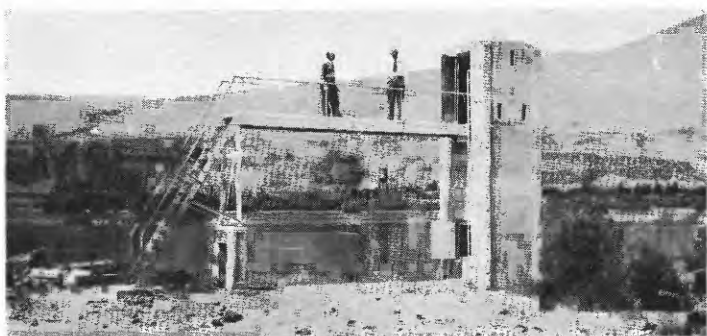
The base data collected at gaging stations consist of records of stage and measurements of discharge. In addition, observations of factors affecting the stage-discharge relation, weather records, and other information are used to supplement base data in determining the daily flow. The records of stage are obtained either from direct readings on a nonrecording gage or from a water-stage recorder that gives a continuous record of fluctuations. Measurements of discharge are made with a current meter by the general methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in Water-Supply Paper 888 and are also outlined in standard textbooks on the measurement of stream discharge. Typical structures in use at gaging stations are shown in figure 1.

Rating tables giving the discharge for any stage are prepared from stage-discharge relation curves defined by discharge measurements. If extensions to the rating curves are necessary to define the extremes of discharge, they are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, computation of flow over dams or weirs, and by other methods), velocity-area studies, and logarithmic plotting. The application of the daily mean gage height to those rating tables gives the daily mean discharge, from which the monthly and the yearly mean discharge are computed. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes by engineers and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is essentially the shifting-control method.

At some gaging stations the stage-discharge relation is affected by backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in determining



A. COLUMBIA RIVER NEAR THE DALLES, OREG.  
Measuring cable.



B. COLUMBIA RIVER NEAR THE DALLES, OREG.  
Gage shelter and stilling well.



C. WILLAMETTE RIVER AT ALBANY, OREG.

FIGURE 1.—GAGING-STATION STRUCTURES.

discharge. Information requisite for determining the slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage. If so, the rate of change of stage is used as a factor in the determination of discharge.

At most gaging stations in the northern part of the United States and at some in the mountainous regions of other parts the stage-discharge relation is affected by ice during the winter, and it becomes impossible to compute the discharge in the usual manner. Discharge for periods of ice effect is computed on the basis of the gage-height record and occasional winter discharge measurements, consideration being given to the available information on temperature and precipitation, notes by gage observers and engineers, and comparable records of discharge for other stations in the same or nearby basins. If the stage-discharge relation is affected by ice, this information is given in a note to the table. No mention is made of occasional days of ice effect if the degree of accuracy of daily records is not changed.

The data herein presented generally comprise a description of the station, a skeleton rating table, and a table showing the daily discharge and monthly and yearly discharge and runoff of the stream.

The description of the station gives the location, drainage area, records available, type and history of gages, average discharge, extremes of discharge, general remarks, and notations of revisions of the previously published record. The location of the gaging station and the drainage area are obtained from the most accurate maps available. River mileage, given under "Location" for some stations, is that determined and used by the Corps of Engineers unless otherwise noted. Under "Gage" are given the type of gage currently in use and the datum of the present gage above mean sea level, and a condensed history of the types of gages, locations, and datums of previous gages for which discharge records are generally equivalent to those at the present site. Under "Average discharge" is given the average discharge for the number of years indicated. It is not given for stations having fewer than five complete years of record or for stations where changes in water development during the period of record cause the figure to have little significance. Under "Extremes" are given the maximum discharge and gage height; the minimum discharge if there is little or no regulation; the minimum daily discharge if there is extensive regulation (also the minimum discharge if useful); and the minimum gage height (unless it is of no importance). Unless otherwise qualified, the maximum discharge corresponds to the crest-stage obtained by use of a water-stage recorder, a crest-stage indicator, or a non-recording gage read at the time of the crest. If the maximum gage height did not occur at the same time as the maximum discharge, it is given separately. Information pertaining to the accuracy of the records and conditions which affect the natural flow at the gaging station is given under "Remarks."

Previously published records of some stations have been found to be in error on the basis of data or information later obtained. Revisions of such records are usually published along with the current records in one of the annual reports. In order to make it easier to find such revised records, a paragraph headed "Revisions (water years)" has been added to the description of all stations for which revised records have been published. Listed therein are all the reports in which revisions have been published, each followed by the water years for which figures are revised in that report. In listing the report

number, "W" means water-supply paper. In listing the water years only one number is given; for instance, 1933 stands for the water year October 1, 1932, to September 30, 1933. If no daily, monthly, or annual figures of discharge are concerned in the revision, that fact is brought out by notations after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the revised figure was first published is given. It should be noted that for all stations for which cubic feet per second per square mile and runoff, in inches, are published, a revision of the drainage area necessitates corresponding revision of all figures based on the drainage area. Revised figures of cubic feet per second per square mile and runoff, in inches, resulting from a revision of the drainage area only are usually not published in the annual series of reports.

Skeleton rating tables are published for all stations except those at which the daily discharge for the greater part of the open-water period was determined by the shifting-control method, the slope method, or other special methods involving an equivalent adjustment to the gage height of more than one-tenth foot.

For stations equipped with water-stage recorders, except those on streams subject to sudden or rapid fluctuation, the daily table gives the discharge corresponding to the daily mean gage height. For stations subject to such fluctuation the daily mean gage height may not indicate the true daily mean discharge, which must be obtained by averaging the discharge for parts of the day or by using the discharge integrator, an instrument for obtaining the daily mean discharge from a continuous gage-height graph and containing, as an essential element, a curve representing the stage-discharge relation at the station. For stations equipped with nonrecording gages, the table of daily discharge gives the discharge corresponding to once-daily readings of the gage, or to the mean of twice-daily readings, or to the mean gage height determined from gage-height graphs based on gage readings. For periods of rapidly changing stage, the daily mean discharge is determined from gage-height graphs based on gage readings, the frequency of which is stated in the station description.

In the table of daily discharge, the values for the maximum day and the minimum day for each month are underlined. If the value is repeated, it is underlined only on the first day of its occurrence.

In the monthly summary below the daily table, the line headed "Total" gives the sum of the daily values; it is the total cfs-days for the month. The line headed "Mean" gives the average flow in cubic feet per second during the month. Runoff for the month may be expressed in cubic feet per second per square mile (line headed "Cfsm"), or in inches (line headed "In."), or in acre-feet (line headed "Ac-ft"). Values for cubic feet per second per square mile and runoff, in inches, are omitted if the drainage area includes large noncontributing areas, or if the average annual rainfall over the drainage basin is usually less than 20 inches.

In the yearly summary below the monthly summary, the values of maximum are the maximum daily discharges, not the momentary discharges when the water was at crest stage. Likewise, the minimums in this summary are the minimum daily discharges.

Peak discharges and the times of their occurrence and corresponding gage heights of most stations are listed below the table of daily and monthly discharge. All independent peaks above the selected base are given. The base discharge, which is given in parentheses, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for canals, ditches, drains, or for any stream for which the peaks are subject to substantial control by man.

Footnotes to the table of daily discharge indicate periods when discharge was computed or estimated by unusual or special methods during periods of no gage-height record and ice effect, or by other effects that reduce the degree of accuracy of the records. Days on which discharge measurements were made are indicated by asterisk and footnote unless they were made at frequent regular intervals, in which instance the general frequency of discharge measurements is given under "Remarks" in the station description.

For most gaging stations on lakes and reservoirs the data presented comprise a description of the station and a monthly summary table of stage and contents. For some reservoirs a table showing daily contents or stage is given. A skeleton table of capacity at given stages is usually given in the first report in which data for the reservoir are published, but it is omitted from succeeding reports.

#### ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretation of records.

The station description states the degree of accuracy of the records. "Excellent" indicates that, in general, the error in the daily records is believed to be less than 5 percent; "good," less than 10 percent; "fair," less than 15 percent; and "poor," probably more than 15 percent. The records of monthly and yearly mean discharge and runoff are, in general, more nearly accurate than the daily records.

Runoff at some stations, as indicated by the monthly mean, may vary widely from natural runoff, owing to diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, values of cubic feet per second per square mile and runoff, in inches, are not published unless storage or diversion records are included to indicate the extent of the regulation or diversion, or unless satisfactory adjustments can be made for changes in contents of reservoirs or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur when relatively large negative adjustments are made or when evaporation is large in comparison with the observed discharge.

Many gaging stations on streams in the irrigated areas of the United States are situated above most of the diversions from those streams, and therefore the discharge recorded does not actually show the water supply available at the stations for further development, because water must first be supplied to existing irrigation systems.

## PUBLICATIONS

To facilitate publication of the annual series of reports, the area of the United States is divided into 14 parts whose boundaries coincide with certain natural drainage lines. Formerly, the results of streamflow measurements were published in 14 volumes, one for each of the 14 parts. Beginning with the reports for 1951, the records are published in 18 volumes, there being 2 volumes each for Parts 1, 2, 3, and 6. The boundaries of the various parts are indicated by the following list and the map in figure 2.

- Part 1. North Atlantic slope basins, in two volumes:  
 A, North Atlantic slope basins, Maine to Connecticut.  
 B, North Atlantic slope basins, New York to New River.
2. South Atlantic slope and eastern Gulf of Mexico basins, in two volumes:  
 A, South Atlantic slope basins, James River to Savannah River.  
 B, South Atlantic slope and eastern Gulf of Mexico basins, Ogeechee River to Pearl River.
3. Ohio River basin, in two volumes:  
 A, Ohio River basin except Cumberland and Tennessee River basins.  
 B, Cumberland and Tennessee River basins.
4. St. Lawrence River basin.
5. Hudson Bay and upper Mississippi River basins.
6. Missouri River basin, in two volumes:  
 A, Missouri River basin above Sioux City, Iowa.  
 B, Missouri River basin below Sioux City, Iowa.
7. Lower Mississippi River basin.
8. Western Gulf of Mexico basins.
9. Colorado River basin.
10. The Great Basin.
11. Pacific slope basins in California.
12. Pacific slope basins in Washington and upper Columbia River basin.
13. Snake River basin.
14. Pacific slope basins in Oregon and lower Columbia River basin.

Water-supply papers and other publications of the Geological Survey containing data on the water resources of the United States may be purchased or consulted as follows:

1. Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., who will, on application, furnish lists giving prices. A list of Geological Survey publications may also be obtained by applying to the Director, Geological Survey, Washington, D. C.

2. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

3. Sets are available for consultation in the offices of the Water Resources Division of the Geological Survey. Addresses of the offices in the area covered by this report are given on page 2.

Early records of the flow of streams in the United States are published in the reports listed below. In many of these reports records for years earlier than those indicated have been included for some streams.

Streamflow data for the years 1884-1901, in reports of the Geological Survey

(A = Annual Report; B = Bulletin; W = Water-Supply Paper)

Report	Character of data	Year
10th A, pt. 2	Descriptive information only.	
11th A, pt. 2	Monthly discharge and descriptive information.....	1884 to September 1890.
12th A, pt. 2	....do.....	1884 to June 30, 1891.
13th A, pt. 3	....do.....	1884-92.
14th A, pt. 2	Monthly discharge.....	1888-93.
B 131.....	Descriptions, measurements, gage heights, and ratings.....	1893-94.
16th A, pt. 2	Descriptive information only.	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge.	1895.
W 11.....	Gage heights.....	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge..	1895-96.
W 15.....	Descriptions, measurements, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries above Kansas River.	1897.
W 16.....	Descriptions, measurements, and gage heights of stream west of the Mississippi River, except Missouri River and tributaries above Kansas River.	1897.

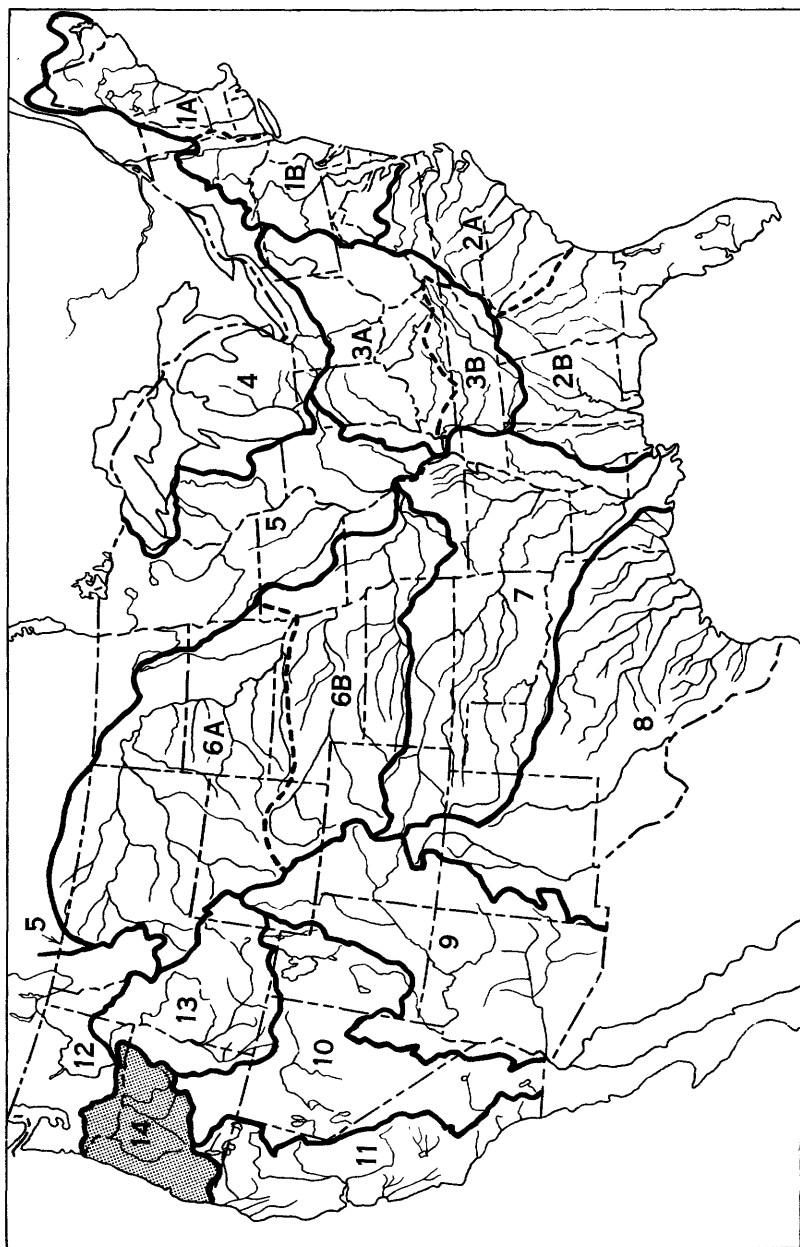


Figure 3.--Map of the United States showing areas covered by the 18 annual volumes on surface water supply. The area covered by this report is shaded.

Streamflow data for the years 1884-1901, in reports of the Geological Survey--Continued

(A = Annual Reports; B = Bulletin; W = Water-Supply Paper)

Report	Character of data	Year
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge.	1897.
W 27.....	Measurements, ratings, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries.	1898.
W 28.....	Measurements, ratings, and gage heights of streams west of the Mississippi River, except Missouri River and tributaries.	1898.
20th A, pt. 4	Monthly discharge.....	1898.
W 35 to 39...	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4	Monthly discharge.....	1899.
W 47 to 52...	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4.	Monthly discharge.....	1900.
W 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
W 75.....	Monthly discharge.....	1901.

Reports on surface-water supply containing records from 1899 to date for drainage basins in this report are listed below. The data for any particular gaging station will, in general, be found in the reports covering the years during which the station was maintained.

Numbers of water-supply papers containing results of stream measurements in Pacific slope basins in Oregon and lower Columbia River basin, 1899-1951

Year	W.S.P.	Year	W.S.P.	Year	W.S.P.	Year	W.S.P.	Year	W.S.P.
1899	38	1911	312	1922	554	1932	739	1942	964
1900	51	1912	332-C	1923	574	1933	754	1943	984
1901	66, 75	1913	362-C	1924	594	1934	769	1944	1014
1902	85	1914	394	1925	614	1935	794	1945	1044
1903	100	1915	414	1926	634	1936	814	1946	1064
1904	135	1916	444	1927	654	1937	834	1947	1094
1905	a177, 178	1917	464	1928	674	1938	864	1948	1124
1906	214	1918	484	1929	694	1939	884	1949	1154
1907-8	252	1919-20	514	1930	709	1940	904	1950	1184
1909	272	1921	534	1931	724	1941	934	1951	1218
1910	292								

a Rogue, Umpqua, and Siletz Rivers only.

The records at most of the stations discussed in these reports extend over many years. Miscellaneous measurements at many points other than regular gaging stations have been made each year and are published under "Miscellaneous discharge measurements" at the end of each report. The streams and points of measurement are listed in the same order as the streams and gaging stations in the body of the report. An index of the records obtained before 1904 has been published in Water-Supply Paper 119.

Each of the reports on the surface-water supply for the year 1939 (Water-Supply Paper 884 for the Pacific slope basins in Oregon and lower Columbia River basin) contains, for the area included in that report, a summary of yearly discharge at gaging stations at which 10 or more complete years of record had been collected. These summaries were reprinted separately.

Reports also have been published that are compilations of records for various areas, usually a single State or drainage basin. These reports contain records previously published (some of which may have been revised), as well as some records not contained in the annual series of water-supply papers. The following table lists reports of this type for the Pacific slope basins in Oregon and lower Columbia River basin.

Reports containing compilations of records of discharge by States and drainage basins

Water-Supply Paper	Period	Report
370.....	1878-1910	Surface water supply of Oregon.
492.....	1878-1919	Summary of hydrometric data in Washington.
870.....	1919-35	Summary of records of surface waters of Washington.

Records of discharge have been published also in State reports. Some of these are not contained in the publications of the Geological Survey or are revisions of records pre-



viously published in its water-supply papers. The following table contains a list of these reports for the area covered by this report.

State reports containing compilations of records of discharge

State	Period	Report	Issued by
Oregon.....	1878-1914	Bull. 4, Water resources of the State of Oregon.	Office of the State Engineer.
Do.....	1914-24	Bull. 7, Water resources of the State of Oregon.	Do.
Do.....	1924-30	Bull. 8, Water resources of the State of Oregon.	Do.
Do.....	1930-36	Bull. 9, Water resources of the State of Oregon.	Do.
Do.....	1936-41	Bull. 10, Water resources of the State of Oregon.	Do.
Washington....	1878-1933	Bull. 5, Monthly and yearly summaries of hydrometric data.	Department of Conservation and Development.

Note.--In addition to the records contained in the reports listed above, the States of Oregon and Washington have issued annual or biennial reports in which are contained records of discharge.

The reports listed in the foregoing tables contain the customary records of discharge collected during the systematic operation of gaging stations. Detailed information on the stage and discharge of many streams during major floods has been included in special reports on these floods published by the Geological Survey. The more recent of these special reports also contain other pertinent hydrologic information and analyses and compilations of data relating to earlier notable floods. The following list gives the numbers and titles of these reports:

Water-Supply  
Paper

Title

96.....	Destructive floods in the United States in 1903.
771.....	Floods in the United States, magnitude and frequency.
1080.....	Floods of May-June 1948 in Columbia River basin.
1137-E.....	Floods of 1950 in Southwestern Oregon and Northwestern California.

## RECORDS OF DISCHARGE COLLECTED BY AGENCIES OTHER THAN THE GEOLOGICAL SURVEY

The table below contains a list of gaging stations for the area covered by this report, at which records of discharge were collected during the water year October 1950 to September 1951 by agencies other than the Geological Survey. The records of these stations are not contained in publications of the Geological Survey, nor have they been published elsewhere.

Records of discharge collected by agencies other than the Geological Survey

Stream	Location	Period	Collected by
Amazon Creek.....	At 19th Street, in Eugene, Oreg.	1950-51	Corps of Engineers.
Big Butte Creek, North Fork.	SW $\frac{1}{4}$ sec. 2, T. 35 S., R. 2 E., 1 mile north of Butte Falls, Oreg.	1928-51	Oregon State engineer.
Big Butte Springs.....	Sec. 17, T. 35 S., R. 3 E., 4 miles east of Butte Falls, Oreg.	1930-51	Do.
Big Marsh Creek.....	NE $\frac{1}{4}$ sec. 20, T. 24 S., R. 7 E., at Hoey Ranch, near Crescent, Oreg.	1924, 1928-51*	Do.
Deschutes River.....	N $\frac{1}{2}$ sec. 7, T. 20 S., R. 11 E., $\frac{1}{2}$ mile below Little Deschutes River, at Peters Ranch, near Lapine, Oreg.	1944-51	Do.
Do.....	SW $\frac{1}{4}$ sec. 31, T. 19 S., R. 11 E., $\frac{1}{2}$ mile below Spring River, near Lapine, Oreg.	1906-9 1914 1931-32 1944-51 1945-51	Do.
Do.....	SW $\frac{1}{4}$ sec. 9, T. 19 S., R. 11 E., below Benham Falls, near Bend, Oreg.	1943-51	Do.
Do.....	SW $\frac{1}{4}$ sec. 4, T. 19 S., R. 11 E., $\frac{1}{2}$ mile above Dillon Falls, at Ryan Ranch, near Bend, Oreg.	1943-51	Do.
Do.....	SW $\frac{1}{4}$ sec. 27, T. 18 S., R. 11 E., above Lava Island, near Bend, Oreg.	1943-51	Do.

\* Records for some earlier years contained in water-supply papers published by the Geological Survey.

Records of discharge collected by agencies other than the Geological Survey--Continued

Stream	Location	Period	Collected by
Deschutes River.....	Near center sec. 7, T. 18 S., R. 12 E., $\frac{1}{2}$ mile above head of millpond, near Bend, Oreg.	1943-51	Oregon State engineer.
Evans Creek.....	Sec. 20, T. 34 S., R. 2 W., $\frac{3}{4}$ miles above West Fork, $7\frac{1}{2}$ miles north of Sams Valley, Oreg.	1942-51	Do.
Do.....	SW $\frac{1}{4}$ sec. 26, T. 34 S., R. 3 W., near Bybee Springs, 7 miles northwest of Sams Valley, Oreg.	1940-51	Do.
Fish Lake Dam, tunnel at.	SW $\frac{1}{4}$ sec. 3, T. 37 S., R. 4 E., 14 miles east of Lake Creek, Oreg.	1929-51	Do.
Fivemile Creek.....	SW $\frac{1}{4}$ sec. 27, T. 4 S., R. 29 E., 14 miles west of Ukiah, Oreg.	1929-30, 1932-33, 1935-44, 1946-47, 1949-51	Do.
Fourbit Creek.....	Near northwest corner sec. 26, T. 35 S., R. 3 E., 7 miles southeast of Butte Falls, Oreg.	1949-51	Do.
Grave Creek.....	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 7, T. 34 S., R. 5 W., $1\frac{1}{2}$ miles west of Placer, Oreg.	1929-30, 1932-51*	Do.
Jumpoff Joe Creek.....	SW $\frac{1}{4}$ sec. 32, T. 34 S., R. 5 W., 7 miles northeast of Merlin, Oreg.	1929-51*	Do.
Little Butte Creek....	SE $\frac{1}{4}$ sec. 19, T. 36 S., R. 2 E., at Lake Creek, Oreg.	1922-24, 1927-47, 1949-51	Do.
Little Butte Creek, North Fork.	Sec. 21, T. 36 S., R. 2 E., above Rogue River Valley Canal intake, near Lake Creek, Oreg.	1932-51*	Do.
Little Butte Creek, South Fork.	NE $\frac{1}{4}$ sec. 21, T. 37 S., R. 4 E., 1 mile south of Big Elk ranger station, near Lake Creek, Oreg.	1932-51*	Do.
Little Walla Walla River.	George St., in Milton, Oreg.	1932-51	Do.
Ochoco Creek.....	NE $\frac{1}{4}$ sec. 6, T. 15 S., R. 17 E., below Ochoco Reservoir, 6 miles east of Prineville, Oreg.	1919-51	Do.
Ochoco Reservoir.....	NW $\frac{1}{4}$ sec. 5, T. 15 S., R. 17 E., 6 miles east of Prineville, Oreg.	1918-51	Do.
Willow Creek.....	Sec. 28, T. 35 S., R. 3 E., 6 miles southeast of Butte Falls, Oreg.	1949-51	Do.

\* Records for some earlier years contained in water-supply papers published by the Geological Survey.

Note.--Records through 1941 collected by the Oregon State engineer (some in cooperation with the Bureau of Reclamation of the U. S. Department of the Interior) are contained in bulletins published by that officer. (See table above, "State reports containing compilations of records of discharge.") The other records listed in this table have not been published.

## HYDROLOGIC CONDITIONS

Streamflow during the 1951 water year was well above normal in most of the Pacific slope basins in Oregon and lower Columbia River basin. Above normal runoff persisted for most of the year over most of the area except that streams draining low elevations were reported below normal during the months of May and June. Floods in southwestern Oregon in October and November 1950 are described in Water-Supply Paper 1137-E. For two key stations in the area covered by this report, a comparison of the monthly and yearly mean discharge during the 1951 water year with the median discharge for the 25-year period 1921-45 is shown in figure 3 on the opposite page.

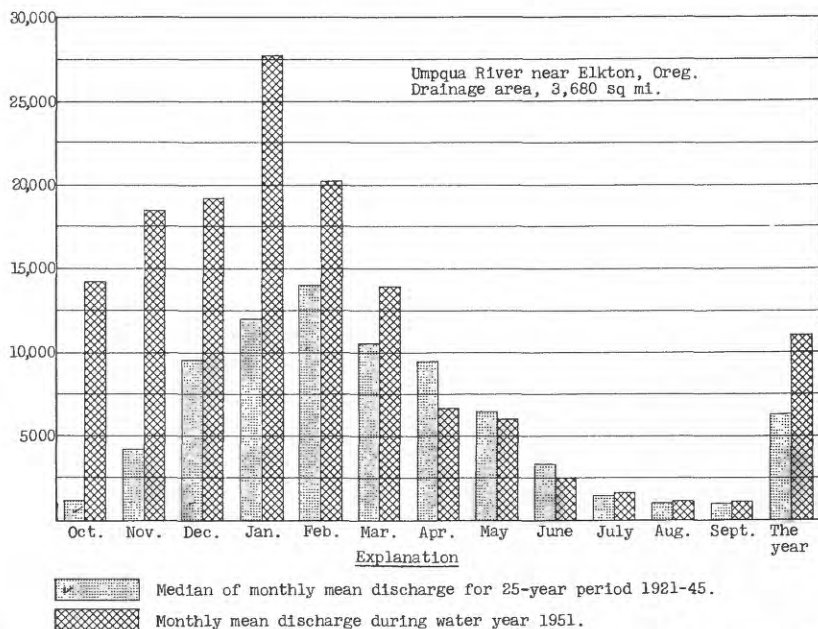
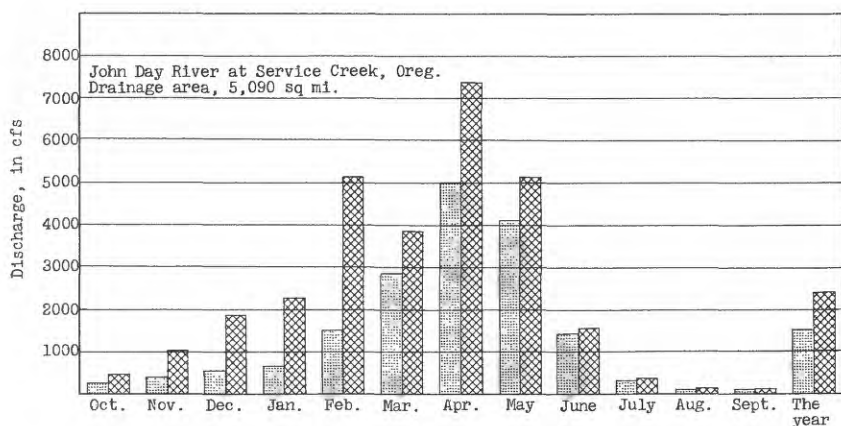


Figure 3.--Comparison of discharge at two key gaging stations during 1951 water year with median discharge for 25-year period.

## TRIBUTARIES OF COLUMBIA RIVER BELOW MOUTH OF SNAKE RIVER

## WALLA WALLA RIVER BASIN

South Fork Walla Walla River near Milton, Oreg.

Location.--Lat 45°50', long. 118°10', in NE $\frac{1}{4}$  sec. 15, T. 4 N., R. 37 E., on right bank 1 mile upstream from Pacific Power & Light Co.'s penstock intake and 13 miles south-east of Milton.

Drainage area.--63 sq mi, approximately.

Records available.--February to October 1903 (gage heights only), August 1906 to November 1917 (incomplete), May 1931 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,050 ft (from river-profile map). Prior to Oct. 18, 1931, staff gages at several sites within 1 $\frac{1}{2}$  miles of present site at various datums. Oct. 18, 1931, to Mar. 22, 1934, water-stage recorder at site three-quarters of a mile downstream at different datum.

Average discharge.--27 years (1908-15, 1931-51), 173 cfs.

Extremes.--Maximum discharge during year, 718 cfs June 7 (gage height, 2.86 ft), from rating curve extended above 450 cfs; minimum, 117 cfs Aug. 15, 16 (gage height, 1.58 ft). 1906-17, 1931-51: Maximum discharge recorded, 2,430 cfs Dec. 12, 1946 (gage height, 4.20 ft), from rating curve extended above 240 cfs; minimum, 72 cfs Feb. 14, 1932. Maximum stage known, about 6 ft Mar. 31, 1931, present site and datum.

Remarks.--Records good. No diversion or regulation above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from tree Nov. 15-30)

1.5	103
1.7	142
2.0	235
2.3	360
2.7	600

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	122	207	182	282	182	162	218	256	*200	150	127	124
2	120	263	176	290	182	162	235	242	197	150	127	122
3	120	228	176	290	179	159	270	246	194	148	127	122
4	127	204	194	265	176	164	320	278	207	162	127	120
5	133	185	191	232	176	159	355	290	298	150	127	122
6	*136	173	270	214	179	159	340	320	325	148	127	122
7	131	238	395	204	*246	153	335	370	578	145	127	122
8	135	282	315	197	340	156	330	*345	518	142	127	120
9	135	224	278	191	385	153	*315	350	395	140	127	120
10	129	191	274	185	458	148	298	375	325	136	127	120
11	129	179	266	182	512	145	290	410	298	*138	124	120
12	129	170	252	179	524	150	302	355	290	135	124	*120
13	129	164	232	176	385	*159	355	302	266	135	122	120
14	129	162	221	204	315	167	390	278	252	135	*120	118
15	131	159	210	232	278	274	355	266	242	135	120	118
16	129	156	207	238	249	315	350	282	228	135	120	118
17	131	164	204	242	238	246	365	290	218	133	120	118
18	140	176	191	224	224	224	360	282	207	133	122	118
19	131	173	188	207	207	224	320	278	197	131	122	120
20	129	188	188	194	200	252	286	278	188	131	122	122
21	129	191	*179	191	194	270	263	278	182	131	122	124
22	129	200	188	185	188	249	249	286	179	129	124	122
23	129	242	294	*182	185	244	306	252	173	129	122	122
24	127	242	266	218	179	218	246	290	179	129	122	124
25	131	249	252	263	176	238	246	298	170	129	122	129
26	142	246	235	302	170	270	252	282	*164	127	122	124
27	*133	242	218	290	170	260	256	270	159	127	122	124
28	182	214	235	242	164	246	315	249	156	127	122	124
29	224	187	302	218	-	246	310	232	153	127	124	122
30	194	192	360	200	-	235	278	221	150	127	124	131
31	173	-	315	191	-	218	-	207	-	127	122	-
Total	4,290	6,101	7,454	6,908	7,061	6,405	9,050	9,012	7,288	4,223	3,834	3,652
Mean	138	203	240	223	252	207	302	291	243	136	124	122
Cfs/m	2.19	3.22	3.81	3.54	4.00	3.29	4.79	4.62	3.86	2.16	1.97	1.94
In.	2.53	3.60	4.40	4.08	4.17	3.78	5.34	5.32	4.30	2.49	2.26	2.16
Ac-ft	8,510	12,100	14,780	13,700	14,010	12,700	17,950	17,880	14,460	8,380	7,600	7,240

Calendar year 1950: Max 694 Min 120 Mean 226 Cfs/m 3.59 In. 48.60 Ac-ft 163,400

Water year 1950-51: Max 578 Min 118 Mean 206 Cfs/m 3.27 In. 44.43 Ac-ft 149,300

Peak discharge (base, 600 cfs).--Feb. 12 (1 a.m.) 600 cfs (2.70 ft); June 7 (3 p.m.) 718 cfs (2.86 ft).

\* Discharge measurement made on this day.

North Fork Walla Walla River near Milton, Oreg.

Location.--Lat 45°54', long. 118°16', in NW $\frac{1}{4}$  sec. 23, T. 5 N., R. 36 E., on right bank  $\frac{1}{4}$  miles upstream from confluence with South Fork and 5 miles southeast of Milton.

Drainage area.--46 sq mi, approximately.

Records available.--October 1940 to September 1951, in reports of Geological Survey. December 1929 to September 1941 in reports of State engineer.

Gage.--Water-stage recorder. Altitude of gage is about 1,470 ft (from river-profile map). Prior to Oct. 15, 1948, water-stage recorders at several sites about three-quarters of a mile downstream at various datums.

Average discharge.--21 years (1930-51), 48.3 cfs.

Extremes.--Maximum discharge during year, 455 cfs June 7 (gage height, 4.90 ft); minimum, 3 cfs at times during August and September.

1929-51: Maximum discharge observed, 1,980 cfs Dec. 12, 1946 (gage height, 6.97 ft, site and datum then in use), from rating curve extended above 230 cfs; minimum, 1 cfs Aug. 8-17 (corrected), 1936, Aug. 7-11, 1940.

Remarks.--Records fair except those below 10 cfs, which are poor. Diversions above station for irrigation of about 220 acres; no regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Stage-discharge relation affected by ice Feb. 1, 2; shifting-control method used Dec. 31 to Feb. 11)

Oct. 1 to Feb. 12		Feb. 13 to June 7		June 8 to Sept. 30	
1.7	8	2.2	22	1.4	2
1.9	17	2.5	51	1.5	3
2.2	38	3.0	115	1.6	5
2.5	70	4.0	278	1.8	11
3.0	132	4.2	316	2.0	22
4.0	287				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8	51	51	133	60	44	72	91	*24	10	4	4
2	8	101	45	143	58	43	77	79	21	10	4	4
3	8	71	43	146	59	37	91	73	21	10	4	4
4	8	57	54	127	58	40	112	77	24	10	5	4
5	9	46	52	107	61	38	127	82	78	11	4	4
6	11	38	128	92	62	37	126	90	122	11	4	4
7	11	101	227	82	*100	34	121	101	316	11	4	4
8	11	149	176	75	150	33	120	*98	342	10	4	4
9	13	100	139	67	159	34	*118	93	227	11	3	4
10	10	75	124	62	192	32	111	94	165	10	4	4
11	10	61	112	59	223	30	104	115	126	*9	4	4
12	9	49	102	54	280	35	104	114	107	9	4	*4
13	9	41	92	50	205	*68	115	97	84	8	4	4
14	9	37	83	61	160	84	130	87	70	8	*4	3
15	11	35	78	81	132	147	125	77	60	7	3	3
16	10	32	74	90	111	163	122	72	51	8	3	3
17	10	36	69	96	98	120	124	70	44	8	3	3
18	12	61	64	92	88	97	122	67	38	7	4	3
19	11	61	60	82	80	90	116	60	34	6	4	3
20	10	68	56	71	*74	100	104	54	32	7	4	3
21	10	75	*49	71	69	111	90	51	29	7	3	3
22	9	75	50	66	66	98	82	50	27	6	3	4
23	8	114	102	*69	62	87	75	43	25	6	4	4
24	8	106	104	105	60	79	70	38	23	5	4	4
25	8	105	102	140	59	87	87	39	23	5	4	5
26	11	93	93	154	54	100	67	36	*21	4	4	5
27	*11	87	83	139	50	95	68	33	18	4	4	5
28	14	71	89	109	43	88	90	31	16	4	4	5
29	48	62	139	88	-	88	107	30	14	5	4	5
30	54	58	174	76	-	80	98	29	12	5	4	6
31	44	-	156	63	-	74	-	25	-	5	4	-
Total	423	2,116	2,970	2,850	2,873	2,293	3,058	2,096	2,194	237	119	119
Mean	13.6	705	95.8	91.9	103	74.0	102	67.6	73.1	7.6	3.8	4.0
Ac-ft	839	4,200	5,890	5,650	5,700	4,550	6,060	4,160	4,350	470	236	236

Calendar year 1950: Max 542 Min 3 Mean 72.9 Ac-ft 52,820  
Water year 1950-51: Max 342 Min 3 Mean 58.5 Ac-ft 42,340

Peak discharge (base, 300 cfs).--Feb. 12 (5 a.m.) 307 cfs (4.10 ft); June 7 (2 p.m.) 455 cfs (4.90 ft).

\* Discharge measurement made on this day.

## Mill Creek near Walla Walla, Wash.

Location.--Lat 46°00', long. 118°07', in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 12, T. 6 N., R. 37 E., on left bank 4 miles downstream from city of Walla Walla diversion dam,  $\frac{4}{5}$  miles upstream from Blue Creek, and 11 $\frac{1}{2}$  miles southeast of Walla Walla.

Drainage area.--53.9 sq mi (revised).

Records available.--August 1913 to September 1917, April to September 1938, October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,000 ft above mean sea level, unadjusted. Prior to Oct. 1, 1938, staff gages on left bank at about same sites at different datums. Oct. 11 to Nov. 15, 1939, staff gage at same site at datum 13.24 ft higher.

Average discharge.--16 years (1913-17, 1939-51), 97.9 cfs.

Extremes.--Maximum discharge during year, 1,330 cfs Feb. 11 (gage height, 16.72 ft); minimum, 38 cfs part of each day Aug. 21, 25, Sept. 4, 7, 14-24.  
1913-17, 1938, 1939-51: Maximum discharge, 1,920 cfs Feb. 24, 1950 (gage height, 17.10 ft), from rating curve extended above 620 cfs by logarithmic plotting; minimum observed, 16 cfs Oct. 11-15, 1939.

Remarks.--Records good except those for periods of ice effect, which are poor. City of Walla Walla diverts about 22 cfs 4 miles above station for municipal use.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

14.5	32	15.5	320
14.8	81	16.0	630
15.1	157	16.4	1,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	177	108	183	b110	90	140	113	64	54	40	40
2	45	250	86	226	b100	88	148	103	62	52	42	40
3	45	164	96	262	96	85	187	101	62	52	42	40
4	48	131	126	206	94	90	230	*106	66	57	42	39
5	59	108	128	164	94	88	250	113	113	54	42	39
6	59	92	198	142	92	83	226	123	*145	51	42	39
7	46	151	400	128	134	81	218	151	344	49	42	39
8	49	222	305	120	275	79	202	140	394	49	42	39
9	*51	167	222	110	539	77	187	131	254	48	42	39
10	48	134	206	108	662	75	172	137	180	48	42	40
11	46	113	194	103	850	72	157	154	145	46	42	40
12	45	99	187	96	930	*77	157	134	131	*46	42	40
13	43	90	164	101	497	106	180	120	116	44	42	39
14	43	85	154	164	335	128	206	110	103	43	42	39
15	48	81	128	246	258	*326	177	101	96	43	43	39
16	46	85	128	246	210	365	167	101	90	43	43	39
17	48	103	123	230	183	234	170	101	83	42	43	39
18	52	148	116	194	164	177	167	99	79	42	42	39
19	48	126	108	160	145	164	151	94	75	43	42	39
20	46	145	103	134	137	190	134	92	72	43	42	39
21	46	160	99	131	126	226	118	90	70	42	*40	39
22	45	160	123	118	118	198	110	92	68	42	40	39
23	45	187	300	110	113	160	118	94	64	42	39	39
24	45	194	270	*148	108	145	116	88	66	42	39	39
25	48	214	222	230	106	167	101	90	62	42	39	46
26	56	194	180	b320	99	214	101	85	59	42	39	43
27	49	170	154	b260	94	206	103	83	57	42	39	*39
28	83	142	*151	b200	92	*177	128	77	56	42	42	39
29	154	*126	174	b140	-	170	145	73	56	40	42	39
30	*148	116	218	b120	-	157	126	72	54	40	42	49
31	120	-	210	b110	-	142	-	70	-	40	42	-
Total	1,799	4,334	5,391	5,210	6,761	4,637	4,792	3,238	3,286	1,405	1,284	1,197
Mean	58.0	144	174	168	241	150	160	104	110	45.3	41.4	39.9
Ac-ft	3,570	8,600	10,690	10,330	13,410	9,200	9,500	6,420	6,520	2,790	2,550	2,370
Calendar year 1950: Max		1,310		Min 42		Mean 151		Ac-ft 109,100				
Water year 1950-51: Max		930		Min 39		Mean 119		Ac-ft 85,950				

Peak discharge (base, 700 cfs).--Feb. 11 (8 p.m.) 1,330 cfs (16.72 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Blue Creek near Walla Walla, Wash.

Location.--Lat 46°03'40", long. 118°07'50", in SE $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 25, T. 7 N., R. 37 E., on right bank 1 mile upstream from mouth and 10 miles east of Walla Walla.

Drainage area.--17.0 sq mi.

Records available.--October 1939 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,700 ft above mean sea level, unadjusted. Prior to Oct. 1, 1950, at datum 1,700 ft lower.

Average discharge.--12 years, 16.0 cfs.

Extremes.--Maximum discharge during year, 450 cfs Feb. 11 (gage height, 42.70 ft); minimum, 0.3 cfs Aug. 6, 7, 9, 10, 11, 14, 19, 20, 21; minimum gage height, 40.27 ft Aug. 19, 20. 1939-51: Maximum discharge, 725 cfs Dec. 28, 1945 (gage height, 43.35 ft, present datum); minimum observed, 0.1 cfs Oct. 14, 1939, but may have been less during period of no gage-height record Oct. 1-11, 1939.

Remarks.--Records good except those for periods of shifting control or those below 10 cfs, which are fair, and those for period of ice effect, which are poor. No known diversion or regulation.

Revisions (water years).--W 984: 1942.

Rating table, water year 1950-51, except periods of ice effect or shifting control (gage height, in feet, and discharge, in cubic feet per second)

40.27	0.4	40.8	16.5
40.3	.7	41.0	31
40.4	1.9	41.3	67
40.5	4.2	41.7	143
40.6	7.4	42.3	303

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.0	16.5	14.5	35	b12	16.5	29	9.2	2.7	1.8	0.7	0.7
2	1.0	31	12	60	b12	15.5	29	8.8	2.7	1.6	.7	.7
3	1.0	19	13	70	b13	14.5	34	8.0	2.4	1.4	.7	.6
4	1.4	14.5	18.5	54	14.5	15	38	8.0	3.1	1.9	.7	.6
5	1.8	11	20	45	16	15	40	7.7	14.5	1.8	.5	.5
6	1.6	8.8	53	37	16.5	13.5	36	7.4	25	1.4	.5	.5
7	1.4	26	134	31	26	12.5	32	8.4	77	1.3	.5	.5
8	1.8	39	87	28	51	12.5	30	7.7	80	1.2	.5	.5
9	2.0	27	59	25	108	13	29	7.0	47	1.0	.4	.7
10	1.8	20	47	23	125	11	25	6.6	31	1.0	.4	.7
11	1.8	16	42	22	200	10	23	8.0	22	.8	.4	.8
12	1.8	13.5	*35	19.5	*303	*16	21	8.0	18.5	*.8	.5	.7
13	1.6	11.5	30	21	128	39	21	7.7	15	.8	.5	.6
14	1.8	11	27	31	89	51	22	7.4	*12	.8	.5	.7
15	3.1	10.5	25	53	67	*119	20	6.6	9.6	.7	.5	.6
16	*2.2	11	23	52	56	121	19	6.6	8.4	.6	.5	.6
17	2.0	18.5	22	57	48	87	18	6.3	6.6	.6	.5	.6
18	2.0	34	20	51	43	66	16.5	5.7	6.0	.6	.5	.6
19	1.9	27	19	43	36	56	15	5.4	5.4	.6	.4	.6
20	1.8	32	18	35	32	54	11.5	5.1	4.8	.6	.4	.6
21	1.8	34	16	36	29	59	12	4.5	4.2	.6	*.4	.6
22	1.8	30	18.5	33	27	53	10.5	4.2	3.9	.5	.4	.6
23	1.8	31	43	34	25	46	9.6	3.9	3.4	.5	.4	.7
24	1.8	30	37	*57	22	41	8.8	4.2	3.6	.5	.5	.7
25	2.2	31	33	b82	22	41	8.4	3.9	3.1	.5	.5	1.0
26	2.7	25	29	b60	20	47	8.0	3.6	2.7	.6	.4	1.0
27	2.2	22	26	b40	19	48	7.7	3.4	2.4	.6	.4	*.8
28	5.1	19	25	b25	16.5	*41	*9.2	3.1	2.0	.6	.6	.8
29	15.5	16.5	27	b20	-	39	12	3.1	1.9	.6	.8	.8
30	*14.5	15.5	35	b15	-	35	9.6	3.4	1.9	.6	1.0	1.6
31	10.5	-	37	b15	-	32	-	2.8	-	.6	.8	-
Total	94.7	651.8	1,045.5	1,209.5	1,576.5	1,240.0	604.8	185.7	422.8	27.5	16.5	21.0
Mean	3.05	21.7	33.7	39.0	56.3	40.0	20.2	5.99	14.1	0.887	0.532	0.700
Cfsm	0.179	1.28	1.98	2.29	3.31	2.35	1.19	0.352	0.829	0.052	0.031	0.041
In.	0.21	1.45	2.29	2.65	3.45	2.71	1.32	0.41	0.92	0.06	0.04	0.05
Ac-ft	188	1,290	2,070	2,400	3,130	2,460	1,200	368	839	55	33	42

Calendar year 1950: Max 410 Min 0.7 Mean 24.4 Cfsm 1.44 In. 19.51 Ac-ft 17,670  
 Water year 1950-51: Max 303 Min 0.4 Mean 19.4 Cfsm 1.14 In. 15.54 Ac-ft 14,020

Peak discharge (base, 200 cfs).--Feb. 11 (8 p.m.) 450 cfs (42.70 ft); Mar. 15 (2:15 p.m.) 213 cfs (41.98 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--Shifting-control method used Oct. 4 to Dec. 3, June 17 to Sept. 30.

## Yellowhawk Creek at Walla Walla, Wash.

Location.--Lat 46°04'20", long. 118°16'55", in NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 23, T. 7 N., R. 36 E., on right bank 1 mile downstream from point of diversion from Mill Creek and 1 mile east of Walla Walla.

Records available.--April 1941 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,140 ft (from topographic map). Prior to July 1, 1941, staff gage at site 300 ft downstream at datum 0.62 ft lower.

Average discharge.--10 years, 44.2 cfs.

Extremes.--Maximum discharge during year, 133 cfs Oct. 29 (gage height, 1.80 ft); minimum not determined, occurred sometime during period of ice effect.

1941-51: Maximum discharge not determined, occurred June 7, 1941 (gage height, 4.00 ft site and datum then in use); no flow Nov. 30, Dec. 1, 1949.

Remarks.--Records good except those for period of ice effect, which are poor. Regulation at Mill Creek diversion dam, 1 mile above station. Yellowhawk and Garrison Creeks divert water from Mill Creek for stock and irrigation. Many small diversions above station for irrigation.

Revisions (water years).--W 1094: 1946.

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.5	3.0	0.9	17
.6	4.6	1.0	24
.7	7.3	1.2	45
.8	11.5	1.6	108

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	29	68	45	49	*b1.1	30	50	*47	32	33	18	26
2	29	62	40	52	b2.0	27	52	39	30	33	18	25
3	29	32	39	55	16	27	67	38	30	31	18	24
4	32	18.5	55	49	10	30	82	40	35	38	18	23
5	38	13	57	37	12.5	27	76	41	49	36	18	20
6	43	15	61	30	18.5	26	55	45	46	35	18	20
7	35	27	68	26	27	28	51	58	64	32	18.5	19
8	34	41	51	33	47	26	49	52	54	32	18	20
9	*37	*30	*36	27	32	27	46	45	41	30	18.5	21
10	34	28	32	26	18.5	25	44	46	46	29	18	21
11	32	30	29	*25	21	24	39	*57	44	27	18.5	23
12	32	25	34	23	26	27	38	55	43	27	19	22
13	31	29	39	23	21	*33	39	47	29	*25	19	21
14	32	36	38	37	21	49	44	44	38	24	19	21
15	36	44	38	49	23	66	43	39	*45	23	18.5	20
16	34	51	39	43	22	*73	38	36	44	21	19	21
17	34	64	38	41	20	47	38	38	40	20	19	22
18	37	35	36	38	18	36	38	37	39	20	18.5	20
19	35	30	34	32	22	39	35	35	45	19	18	19
20	33	33	32	24	23	*70	32	34	39	19	*20	19
21	33	35	40	28	26	88	29	33	36	21	21	20
22	33	34	46	23	28	76	27	32	35	21	18.5	20
23	33	39	78	20	26	61	37	32	33	21	18.5	21
24	32	39	68	29	25	60	46	31	35	20	19	21
25	32	45	58	44	25	62	40	32	39	21	20	22
26	39	41	47	61	27	78	38	29	43	21	18.5	24
27	30	37	39	55	30	78	39	28	40	21	25	23
28	41	43	37	40	28	66	55	27	39	18.5	24	23
29	106	54	40	b5.0	-	*64	62	22	38	20	24	23
30	90	50	54	b1.5	-	61	55	22	35	18.5	25	31
31	67	-	55	b1.1	-	54	-	28	-	17	28	-
Total	1,212	1,128.5	1,403	1,026.6	616.6	1,463	1,384	1,189	1,204	774.0	611.0	655
Mean	39.1	37.6	45.3	33.1	22.0	47.8	46.1	38.4	40.1	25.0	19.7	21.8
Ac-ft	2,400	2,240	2,780	2,040	1,220	2,840	2,750	2,360	2,390	1,540	1,210	1,300
Calendar year 1950: Max	147			Min	1.2	Mean	40.2	Ac-ft	29,100			
Water year 1950-51: Max	106			Min	1.1	Mean	34.8	Ac-ft	25,170			

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.



## Garrison Creek at Walla Walla, Wash.

Location.--Lat 46°04'25", long. 118°17'10", in NE $\frac{1}{4}$  sec. 22, T. 7 N., R. 36 E., on left bank 30 ft downstream from highway bridge, 1 mile downstream from point of diversion from Mill Creek, and 0.9 mile east of Walla Walla.

Records available.--April 1941 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,130 ft (from topographic map). Prior to June 27, 1941, staff gage at present site and datum.

Average discharge.--10 years, 6.72 cfs.

Extremes.--Maximum discharge during year, 26 cfs Apr. 5 (gage height, 3.07 ft); maximum gage height, 3.25 ft Jan. 29 (backwater from ice); minimum discharge not determined, occurred sometime during period of ice effect.

1941-51: Maximum discharge, 60 cfs May 9, 1948; (gage height, 3.28 ft); maximum gage height, 3.29 ft Dec. 28, 1948 (backwater from ice); no flow part of May 10, 1941.

Remarks.--Records fair except those for periods of ice effect or indefinite stage-discharge relation, which are poor. Regulation at Mill Creek diversion dam, 1 mile above station. Yellowhawk and Garrison Creeks divert water from Mill Creek for stock and irrigation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7.1	17	12	10.5	*b0.7	9.6	18	*7.0	6.0	6.5	4.1	5.4
2	6.8	13.5	11	12	b1.0	9.1	19	6.0	5.5	6.7	4.1	5.1
3	6.8	8.6	10.5	7.1	b2.0	9.1	22	6.0	5.5	6.0	4.1	4.9
4	7.4	6.4	14.5	2.4	3.4	9.6	24	6.0	6.2	6.5	4.1	5.6
5	9.0	6.4	15	2.6	3.9	9.4	24	6.2	8.9	6.2	3.9	7.0
6	9.8	5.4	16	5.4	5.0	8.9	19.5	6.7	8.9	6.2	3.9	6.7
7	8.6	8.6	18.5	4.6	6.0	8.6	18.5	8.6	11.5	5.8	e4.0	6.7
8	9.0	13	15	5.7	10	8.9	18	7.9	8.9	5.5	e4.0	7.7
9	*9.0	*8.2	*8.6	4.6	8.9	9.1	17	8.4	7.0	6.5	e4.1	8.2
10	8.2	8.2	6.4	3.2	6.5	8.9	16	8.4	7.7	6.7	4.3	8.2
11	7.8	8.2	5.4	*2.2	7.9	8.9	15	*9.8	7.4	6.2	4.5	8.8
12	7.4	7.1	8.2	1.9	9.6	9.6	15	9.1	7.0	*5.8	4.5	8.5
13	7.4	8.2	10	2.0	7.2	8.4	15	8.4	5.8	6.0	4.5	7.9
14	7.8	10	9.4	3.5	7.7	*7.4	15.5	7.4	7.2	5.0	4.3	7.7
15	9.0	11.5	9.4	4.4	7.7	7.4	15	6.7	*8.4	4.6	4.3	7.9
16	8.6	9.4	9.4	3.2	7.7	5.8	14	6.7	8.2	4.6	4.3	7.9
17	8.6	9.8	9.0	2.6	7.0	3.2	13.5	6.5	7.7	3.9	4.5	7.9
18	9.0	6.0	8.6	2.2	7.0	1.9	14	6.2	7.2	3.9	4.3	7.4
19	8.2	5.7	7.8	1.9	7.7	2.3	13	6.0	7.9	4.1	4.3	7.4
20	7.8	6.0	7.8	1.5	8.2	2.1	12	5.8	7.9	3.9	*4.7	7.2
21	8.2	6.4	9.8	1.3	8.9	1.9	10.5	5.5	*7.4	4.1	4.7	7.4
22	8.2	6.0	10.5	1.9	9.4	4.5	9.4	5.3	8.2	3.9	4.3	7.4
23	7.8	7.1	18.5	5.4	9.4	13	8.2	5.5	7.4	3.9	4.1	7.4
24	7.8	7.1	16.5	13	9.1	16	7.2	5.5	7.9	4.6	*4.3	7.7
25	7.8	7.4	13.5	16.5	8.9	18	6.0	5.5	7.2	3.7	4.3	8.8
26	10	7.1	11	16.5	9.6	23	5.8	5.3	6.0	3.9	4.7	*9.3
27	7.4	6.4	9.4	14.5	9.8	24	6.0	5.3	5.5	3.9	5.1	8.8
28	7.8	7.8	9.0	b5.0	9.1	22	7.7	5.3	5.3	3.9	4.7	8.5
29	21	14	9.8	b2.0	-	*22	8.9	4.8	4.8	3.7	4.9	8.2
30	15.5	13	12	b1.0	-	21	7.7	5.0	5.5	3.7	5.4	11.5
31	12	-	12.5	b.7	-	19	-	5.3	-	3.9	5.6	-
Total	278.8	259.5	343.0	161.3	199.3	332.6	415.4	202.1	216.0	153.8	136.9	229.3
Mean	8.99	8.65	11.1	5.20	7.12	10.7	13.8	6.52	7.20	4.96	4.42	7.64
Ac-ft	553	515	680	320	395	660	824	401	428	305	272	455
Calendar year 1950: Max	24			Min 0.2	Mean 5.80		Ac-ft 4,200					
Water year 1950-51: Max	24			Min 0.7	Mean 8.02		Ac-ft 5,810					

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

e Stage-discharge relation indefinite; discharge interpolated.

## WALLA WALLA RIVER BASIN

## Mill Creek at Walla Walla, Wash.

Location.--Lat 46°04'40", long. 118°17'00", in NE $\frac{1}{4}$  sec. 22, T. 7 N., R. 36 E., on left bank at bridge, 0.9 mile downstream from diversion dam and 1.0 mile east of Walla Walla.

Drainage area.--90.5 sq mi.

Records available.--April 1941 to September 1951.

Gage.--Water-stage recorder with artificial control. Altitude of gage is 1,120 ft (from topographic map). Prior to June 12, 1941, staff gage and June 12, 1941, to Nov. 6, 1947, water-stage recorder at approximately same site at different datum.

Average discharge.--10 years, 130 cfs (adjusted for diversion).

Extremes.--Maximum discharge recorded during year, 1,810 cfs Feb. 11 (gage height, 4.26 ft); minimum daily, 1.7 cfs Sept. 10.

1941-51: Maximum discharge, 2,760 cfs Dec. 28, 1945; maximum gage height, 5.04 ft Jan. 22, 1950, from high-water mark on outside gage; minimum discharge, 0.5 cfs May 10, 1947, July 23, 24, 1949.

Remarks.--Records poor. Some regulation at diversion dam, 0.9 mile above station where water is diverted into Yellowhawk and Garrison Creeks for stock and irrigation. Possible diversions at high stages into flood-control reservoir. City of Walla Walla diverts water for municipal supply. Other small diversions above station for irrigation. Monthly discharge adjusted for Yellowhawk Creek and Garrison Creek diversions.

Revisions.--W 1014: Drainage area.

Rating table, water year 1950-51, except periods of indefinite stage--discharge relation (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Aug. 11 to Sept. 10)

1.9	1.8	2.3	20	3.1	223
2.0	3.6	2.4	30	3.4	398
2.1	7.1	2.5	45	3.7	750
2.2	12.5	2.8	110	4.1	1,490

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.8	93	71	160	158	86	122	*84	32	8.1	4.8	4.8
2	5.1	*285	62	250	143	77	124	75	30	6.7	5.1	4.5
3	5.1	166	58	230	124	77	139	75	30	5.9	5.1	3.3
4	5.1	130	58	280	119	84	162	77	33	6.7	5.5	2.9
5	5.9	105	98	240	119	79	200	79	75	6.7	5.9	2.3
6	6.7	84	133	200	103	77	210	84	139	5.5	*5.5	2.1
7	5.5	119	442	190	140	73	200	100	380	5.5	5.1	2.7
8	8.1	292	351	170	270	73	137	93	508	5.1	5.9	2.7
9	8.1	205	259	170	*620	75	178	88	302	5.1	5.5	1.9
10	5.1	147	214	170	992	71	158	88	200	4.2	6.3	1.7
11	5.1	110	187	180	1,160	68	147	98	155	4.2	6.7	2.5
12	5.1	86	170	190	1,490	77	139	93	127	4.5	8.1	*4.0
13	5.1	68	143	200	1,010	*136	151	86	116	4.2	6.5	4.0
14	5.1	45	130	240	508	170	79	79	3.3	3.3	4.3	3.9
15	5.5	36	124	300	364	434	162	75	*58	3.9	5.5	3.8
16	5.5	27	113	310	285	588	147	73	54	4.2	5.1	3.6
17	5.1	54	113	270	248	351	143	73	51	*3.9	4.5	3.4
18	5.1	160	110	210	214	269	147	68	43	3.9	4.8	3.3
19	5.5	120	108	170	182	233	133	66	32	4.2	4.8	3.2
20	5.5	100	*108	130	162	214	122	64	30	4.2	*5.1	3.1
21	5.5	98	91	120	143	238	110	60	29	4.2	3.3	3.1
22	5.1	82	91	98	127	223	103	60	27	4.5	3.1	3.6
23	4.2	240	210	100	119	174	88	80	26	4.5	3.9	3.1
24	3.6	250	230	140	116	147	84	60	26	3.9	*3.3	3.1
25	3.9	240	200	260	116	151	75	60	16	3.9	3.6	4.5
26	5.1	240	170	*407	100	192	68	58	8.1	4.1	4.5	*4.8
27	7.6	200	140	384	93	178	73	54	8.1	4.7	5.1	3.6
28	14.5	133	130	284	22	158	88	53	8.1	5.9	5.1	3.6
29	*91	98	130	200	-	*151	100	49	8.1	7.1	4.5	3.6
30	98	82	180	178	-	139	91	47	7.6	6.7	5.1	4.8
31	75	-	180	158	-	130	-	36	-	5.9	4.8	-
Total	425.6	4,100	4,802	6,549	9,307	5,183	4,021	2,215	2,636.0	156.0	156.7	101.5
Mean	13.7	137	155	211	332	167	134	71.5	87.9	5.03	5.05	3.38
Ac-ft	844	8,130	9,520	12,990	18,460	10,280	7,980	4,390	5,230	309	311	201
(†)	2,950	2,760	3,460	2,360	1,620	3,600	3,570	2,760	2,820	1,840	1,480	1,760

## Adjusted for diversions

Mean	61.6	183	211	250	362	226	194	116	135	35.0	29.1	32.9
Ac-ft	3,790	10,890	12,980	15,350	20,080	13,880	11,550	7,150	8,050	2,150	1,790	1,960

## observed

Calendar year 1950: Max	1,260	Min	1	Mean	122	Ac-ft	88,200
Water year 1950-51: Max	1,490	Min	1.7	Mean	109	Ac-ft	78,640

## Adjusted

Calendar year 1950: Mean	168	Ac-ft	121,500
Water year 1950-51: Mean	151	Ac-ft	109,600

\* Discharge measurement made on this day.

† Diversions from Yellowhawk and Garrison Creeks in acre-feet.

Dry Creek near Walla Walla, Wash.

Location.--Lat 46°07'20", long. 118°14'10", on south line SW $\frac{1}{4}$  sec. 31, T. 8 N., R. 37 E., on right bank 1 mile downstream from Spring Creek and 6 miles northwest of Walla Walla.

Drainage area.--48.4 sq mi.

Records available.--January 1949 to September 1951.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,200 ft (from topographic map).

Extremes.--Maximum discharge recorded during year, 870 cfs Jan. 21 (gage height, 5.85 ft), but may have been higher about Feb. 12 during period of doubtful gage-height record; minimum, 1.0 cfs Aug. 8, 9, 10, 11, 21 (gage height, 3.09 ft).

1949-51: Maximum discharge, 3,340 cfs Feb. 22, 1949 (gage height, 11.6 ft, from high-water mark in well) by contracted-opening method at bridge 100 ft downstream from gage; minimum, 0.2 cfs Aug. 4, 1949.

Remarks.--Records good except those for periods of partly estimated gage-height record and those below 20 cfs, which are fair, and those for periods of ice effect or doubtful gage-height record, which are poor. Several small diversions above station for irrigation. No regulation.

Rating table, water year 1950-51, except periods of ice effect or doubtful gage-height record (gage height, in feet, and discharge, in cubic feet per second)

3.1	1.2	3.8	45
3.2	3.2	4.0	79
3.3	6.0	4.5	200
3.4	10	5.0	400
3.6	22		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.5	r18	25	89	*b45	28	45	*21	7.6	4.8	1.7	2.3
2	2.7	r44	20	r310	b48	28	44	20	7.2	*4.5	1.2	2.1
3	2.7	23	30	r114	b51	25	48	18	7.2	4.5	1.2	2.1
4	2.5	18.5	r59	r112	53	28	55	18.5	7.6	2.7	1.3	1.9
5	2.7	14	r63	*r63	55	26	58	18	24	5.4	1.2	1.9
6	3.2	12	r186	56	55	25	55	17	35	5.4	1.2	1.9
7	3.2	r36	400	48	59	23	50	21	*95	4.5	1.2	1.3
8	3.2	63	242	44	70	24	48	19	*99	4.2	1.2	1.7
9	3.4	33	163	40	92	24	44	17	61	3.9	1.2	1.7
10	3.4	23	177	37	120	22	40	16.5	42	3.6	1.2	1.5
11	2.9	19	140	36	200	23	36	20	30	3.6	1.2	1.9
12	2.9	17	112	33	400	r61	33	18.5	26	*3.4	1.2	*1.9
13	2.9	14.5	97	32	150	*f93	35	17	21	2.7	1.7	1.7
14	2.7	15	81	38	r95	83	38	16.5	17	2.7	1.7	1.7
15	3.9	14	r95	60	83	*r276	36	15	14.5	2.7	1.5	1.7
16	*3.9	15.5	79	140	72	140	31	14	13.5	2.7	1.2	1.7
17	3.9	26	72	80	68	103	30	13	11.5	2.5	1.3	1.7
18	3.6	53	66	60	58	87	30	12.5	11	2.1	1.3	1.7
19	3.6	33	59	51	51	79	27	11.5	10	2.3	1.3	1.3
20	3.2	41	53	45	48	79	25	11.5	9.2	2.3	1.3	1.5
21	3.2	41	48	250	44	81	21	10.5	*8.8	2.1	*1.2	1.7
22	3.2	40	r104	100	41	74	21	9.6	8.8	2.1	1.2	1.9
23	2.9	38	r69	87	37	66	18.5	9.2	8.0	2.1	1.3	1.9
24	2.9	47	85	150	36	63	18	9.2	7.6	2.1	1.7	1.9
25	2.9	53	83	280	37	65	17	8.8	7.2	1.9	1.7	2.5
26	4.2	44	79	150	32	70	16.5	8.8	6.4	1.9	1.5	*2.9
27	3.2	44	72	75	30	66	17	8.0	6.4	1.9	1.5	2.9
28	3.2	35	77	55	28	59	21	7.6	5.7	1.9	1.9	2.9
29	r20	*29	74	47	-	58	26	7.6	5.4	1.7	2.5	2.9
30	*r18.5	27	133	45	-	*53	24	7.6	5.1	1.7	2.9	4.2
31	12.5	-	99	44	-	50	-	8.0	-	1.9	2.7	
Total	139.7	930.5	3,162	2,771	2,158	1,982	1,008.0	430.4	618.7	94.8	46.4	60.9
Mean	4.51	31.0	102	89.4	77.1	63.9	33.6	13.9	20.6	3.06	1.50	2.03
Ac-ft	277	1,850	6,270	5,500	4,280	3,930	2,000	854	1,230	188	92	121

Calendar year 1950: Max 400 Min 0.8 Mean 37.0 Ac-ft 26,800  
 Water year 1950-51: Max 400 Min 1.2 Mean 36.7 Ac-ft 26,590

Peak discharge (base, 400 cfs).--Dec. 7 (1:30 a.m.) 642 cfs (5.47 ft); Dec. 22 (10:30 p.m.) 666 cfs (5.51 ft); Dec. 30 (11 p.m.) 455 cfs (5.11 ft); Jan. 2 (time unknown) about 700 cfs; Jan. 21 (12:30 p.m.) 870 cfs (5.85 ft); about Feb. 12 (time and discharge unknown); Mar. 15 (1 p.m.) 822 cfs (5.77 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

f Partly estimated gage-height record.

Note.--Doubtful gage-height record Jan. 15-31, Feb. 8-13; discharge estimated on basis of records for nearby stations.

## WALLA WALLA RIVER BASIN

East Fork Touchet River near Dayton, Wash.

Location.--Lat 46°16'45", long. 117°54'05", in NW¼NW¼ sec. 11, T. 9 N., R. 39 E., on right bank 250 ft upstream from city of Dayton's water-supply headworks, 1,000 ft upstream from Hatley Creek, three-quarters of a mile downstream from Wolf Creek, 3 miles upstream from confluence with South Fork, and 4 miles southeast of Dayton.

Drainage area.--102 sq mi.

Records available.--April 1941 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,868.3 ft above mean sea level (river-profile survey). Prior to May 26, 1941, staff gage at same site at datum 0.25 ft lower.

Average discharge.--10 years, 125 cfs.

Extremes.--Maximum discharge during year, 1,370 cfs Feb. 12 (gage height, 5.03 ft); minimum, 44 cfs Aug. 19, 21; minimum gage height, 1.73 ft Oct. 2.  
1941-51: Maximum discharge, 1,530 cfs about Jan. 7, 1948 (gage height, 5.28 ft, from recorded range in stage); minimum, 29 cfs Sept. 9, 12, 13, 14, 1944.

Remarks.--Records fair except those for periods of ice effect or shifting control, or doubtful gage-height record, which are poor. No regulation. Small diversions above station for irrigation during summer months.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	54	190	195	195	b110	132	195	169	120	78	54	54	
2	54	247	180	230	b110	129	201	169	116	*78	54	52	
3	54	185	185	230	b120	124	217	*164	114	77	52	52	
4	59	154	220	222	127	129	249	169	120	88	52	52	
5	66	132	209	201	124	127	280	175	175	80	52	52	
6	64	*118	322	182	116	124	280	190	167	78	52	50	
7	56	180	*530	172	d150	120	274	*236	233	75	52	50	
8	62	209	470	162	d400	118	272	225	247	73	52	50	
9	64	182	403	154	*d830	116	*263	214	214	71	52	50	
10	56	162	418	149	d780	112	244	217	193	69	52	50	
11	54	149	418	139	d840	109	228	228	*180	69	50	52	
12	*54	134	378	132	955	*116	222	212	177	68	50	50	
13	54	124	337	134	630	146	238	193	159	*66	52	50	
14	54	118	307	188	454	156	263	180	149	64	52	49	
15	59	114	283	220	364	354	252	167	136	62	50	49	
16	57	116	260	230	280	378	238	162	129	*62	49	49	
17	59	156	249	*263	244	301	236	164	120	62	49	49	
18	64	177	233	244	222	252	236	164	*116	61	47	47	
19	57	167	222	220	195	238	222	159	109	61	47	47	
20	57	209	214	195	185	244	203	154	107	61	47	47	
21	57	228	198	190	182	255	180	149	103	61	47	47	
22	57	233	217	175	172	247	167	151	103	61	*49	47	
23	56	238	260	162	164	230	*159	*156	97	59	49	49	
24	56	274	255	206	159	222	154	154	101	57	49	49	
25	59	313	255	269	154	233	151	156	97	57	49	57	
26	68	301	241	340	146	258	151	151	92	57	49	56	
27	62	283	222	334	*139	258	154	146	90	56	49	52	
28	129	247	214	274	134	241	167	141	86	56	52	*52	
29	203	214	209	b170	-	236	177	136	80	56	57	52	
30	172	206	217	b130	-	220	175	129	78	54	59	62	
31	127	-	201	b120	-	206	-	124	-	54	57	-	
Total	2,204	5,760	8,522	6,232	8,486	6,131	6,448	5,304	4,008	2,031	1,583	1,526	
Mean	71.1	192	275	201	303	198	215	171	134	65.5	51.1	50.9	
Cfs/m	0.697	1.88	2.70	1.97	2.97	1.94	2.11	1.68	1.31	0.642	0.501	0.499	
In.	0.80	2.10	3.11	2.27	3.09	2.24	2.35	1.93	1.46	0.74	0.58	0.56	
Ac-ft	4,370	11,420	16,900	12,360	16,830	12,160	12,790	10,520	7,950	4,030	3,140	3,030	
Calendar year 1950: Max			1,020	Min	40	Mean	188	Cfs/m	1.84	In.	25.01	Ac-ft	136,100
Water year 1950-51: Max			955	Min	47	Mean	160	Cfs/m	1.57	In.	21.23	Ac-ft	115,500

Peak discharge (base, 700 cfs).--Feb. 12 (9 a.m.), 1,370 cfs (5.03 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

d Doubtful gage-height record; discharge estimated on basis of 1 discharge measurement and records for nearby stations.

Note.--Shifting-control method used Oct. 1 to Jan. 28, Feb. 4-6, Feb. 12 to Mar. 16, May 25 to June 16.

## Touchet River at Bolles, Wash.

Location.--Lat 46°16'30" long. 118°13'15", on line between secs. 7 and 8, T. 9 N., R. 37 E., on right bank just downstream from bridge on State Highway 3E a quarter of a mile southeast of Bolles and 3 miles west of Waitsburg.

Drainage area.--362 sq mi.

Records available.--February 1924 to October 1929, April to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,150 ft (from topographic map). Prior to Oct. 5, 1929, water-stage recorder at site half a mile upstream at different datum. Apr. 1 to May 6, 1951, staff gage at present site and datum.

Extremes.--Maximum discharge during period, 894 cfs June 7 (gage height, 6.29 ft); minimum, 34 cfs Aug. 9, 18, 20, 21 (gage height, 4.10 ft).  
1924-29, 1951: Maximum discharge, 4,470 cfs Jan. 13, 1928 (gage height, 7.04 ft, site and datum then in use); minimum, 1.4 cfs July 30, 1926.

Remarks.--Records good except those for period prior to May 7 and those for period of shifting control, which are fair. Diurnal fluctuation and some regulation at low flow caused by operation of flour mill at Waitsburg. Numerous small diversions for municipal and domestic use and for irrigation.

Rating table, Apr. 1 to Sept. 30, 1951, except period of  
shifting control (gage height, in feet, and discharge,  
in cubic feet per second)

4.1	34
4.4	74
4.7	135
5.0	230
5.9	670

Discharge, in cubic feet per second, April to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							515	292	144	87	42	53
2							520	*279	135	85	41	52
3							555	254	130	84	41	50
4							632	262	132	98	40	47
5							620	a280	262	92	40	47
6							a580	297	328	92	41	46
7							a590	435	576	84	39	44
8							a570	405	593	79	36	44
9							a560	385	456	80	38	45
10							a570	375	370	76	39	44
11							510	410	*315	76	38	49
12							470	385	292	70	39	46
13							490	342	254	*66	41	44
14							535	310	223	80	40	42
15							545	279	209	61	38	45
16							510	258	189	59	38	45
17							480	258	177	54	38	47
18							470	262	162	52	35	47
19							460	250	147	50	36	46
20							430	238	141	50	36	44
21							375	230	132	52	35	44
22							a330	220	132	50	*35	39
23							306	226	125	49	38	45
24							279	230	130	46	40	41
25							262	223	128	45	40	e50
26							254	216	110	45	41	e56
27							254	206	106	45	42	e53
28							a280	192	98	44	44	*e57
29							a310	177	92	45	53	e54
30							328	165	88	45	60	e61
31							-	153	-	44	59	-
Total							13,590	8,494	6,370	1,865	1,263	1,427
Mean							453	274	212	63.4	40.7	47.6
Ac-ft							26,960	16,850	12,630	3,900	2,510	2,830

Calendar year : Max Min Mean Ac-ft  
Water year : Max Min Mean Ac-ft

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

e Shifting-control method used.

## WALLA WALLA RIVER BASIN

Touchet River near Touchet, Wash.

Location.--Lat 46°05'25", long. 118°39'40", in NE $\frac{1}{4}$  sec. 15, T. 7 N., R. 33 E., on right bank 100 ft downstream from highway bridge,  $3\frac{1}{2}$  miles north of Touchet, and  $4\frac{1}{2}$  miles upstream from mouth.

Drainage area.--736 sq mi.

Records available.--April 1941 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 490 ft (from topographic map). Prior to July 3, 1941, staff gage at same site and datum.

Average discharge.--10 years, 255 cfs.

Extremes.--Maximum discharge during year, 4,370 cfs Feb. 12 (gage height, 8.70 ft, from high-water mark on outside gage); minimum, 6.0 cfs Sept. 11 (gage height, 0.80 ft).  
1941-51: Maximum discharge, 13,300 cfs Feb. 10, 1949 (gage height, 14.7 ft, from high-water mark in gage house), by contracted-opening method at Johnson Bridge, 3 miles upstream; minimum, that of Sept. 11, 1951.

Remarks.--Records good except those for periods of shifting control, which are fair, and those for periods of no gage-height record or ice effect, which are poor. Many large diversions above station for irrigation. Occasional regulation from unknown source.

Revisions (water years).--W 1124: Drainage area. W 1154: 1946(M).

Rating table, water year 1950-51, except periods of ice effect or shifting control (gage height, in feet, and discharge, in cubic feet per second)

1.0	14	5.0	1,070
1.3	35	6.0	1,740
2.0	123	7.0	2,600
3.0	306	8.0	3,600
4.0	600		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	47	214	317	375	b300	285	560	296	149	81	24	48
2	50	540	285	509	b300	285	523	274	138	84	22	38
3	52	427	264	700	b350	264	506	248	130	84	23	38
4	56	317	375	600	b300	264	506	*238	130	78	17.5	41
5	64	262	375	560	*414	274	523	260	164	97	18	36
6	67	217	388	456	375	262	523	264	328	93	19.5	26
7	71	188	810	400	407	248	523	317	328	90	27	27
8	71	491	985	375	1,070	234	506	363	660	82	24	25
9	69	400	935	363	1,280	258	506	340	472	74	22	24
10	80	328	835	340	1,820	233	523	328	375	68	24	26
11	73	285	855	328	1,780	223	488	328	317	63	25	29
12	64	254	810	317	3,400	231	456	351	285	60	26	35
13	60	221	660	296	*a1,820	456	442	317	274	54	20	36
14	60	202	542	363	a1,220	*680	488	285	*242	48	21	32
15	63	190	506	506	a985	940	523	262	217	48	20	29
16	69	176	488	580	a835	1,860	472	238	197	53	21	30
17	*71	185	442	600	a740	1,340	442	231	181	*43	23	30
18	72	373	400	620	a680	910	427	233	169	36	26	*33
19	77	351	375	580	a620	785	427	231	154	30	21	29
20	77	317	*363	488	a560	720	400	217	141	31	14.5	27
21	72	414	340	492	a506	720	363	210	135	35	20	26
22	71	442	317	564	a456	720	328	202	129	37	19.5	28
23	69	427	459	427	a427	700	296	193	126	34	19.5	29
24	66	427	427	488	a388	680	274	204	118	30	*26	29
25	62	560	427	680	a363	640	262	197	129	19.5	29	31
26	74	542	414	910	a328	640	246	193	120	18	35	34
27	67	488	388	b750	317	640	248	185	102	21	32	*44
28	61	427	363	b550	296	*640	274	176	98	20	33	45
29	248	363	363	b400	-	620	317	173	91	18	36	44
30	*375	328	361	b550	-	600	317	164	86	21	32	47
31	*296	-	427	b530	-	580	-	161	-	24	37	-
Total	2,774	10,356	15,276	15,297	22,337	17,932	12,689	7,679	6,185	1,574.5	807.5	996
Mean	89.5	345	493	493	798	578	423	248	206	50.8	26.0	33.2
Ac-ft	5,500	20,540	30,300	30,340	44,300	35,570	25,170	15,230	12,270	3,120	1,600	1,980
Calendar year 1950: Max	2,310			Min 27		Mean 384		Ac-ft 270,000				
Water year 1950-51: Max	3,400			Min 14.5		Mean 312		Ac-ft 225,900				

Peak discharge (base, 2,000 cfs).--Feb. 12 (time unknown) 4,370 cfs (8.70 ft); Mar. 15 (8:30 p.m.) 2,020 cfs (6.33 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations, and weather records.

b Stage-discharge relation affected by ice.

Note.--Shifting-control method used Oct. 1-25, Sept. 11-30.

Umatilla River above Meacham Creek, near Gibbon, Oreg.

Location.--Lat 45°43', long. 118°20', in SW $\frac{1}{4}$  sec. 21, T. 3 N., R. 36 E., on right bank 0.8 mile downstream from Ryan Creek,  $2\frac{1}{4}$  miles upstream from Meacham Creek, and  $2\frac{1}{2}$  miles northeast of Gibbon.

Drainage area.--125 sq mi.

Records available.--April 1933 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,855.25 ft above mean sea level, datum of 1929. Prior to June 27, 1939, water-stage recorder at site 1 mile downstream at datum 43.94 ft lower.

Average discharge.--18 years, 222 cfs.

Extremes.--Maximum discharge during year, 1,750 cfs Feb. 12 (gage height, 5.41 ft); minimum, 42 cfs Sept. 16 (gage height, 1.99 ft).

1933-51: Maximum discharge, 6,660 cfs Dec. 12, 1946 (gage height, 8.84 ft), from rating curve extended above 2,000 cfs by logarithmic plotting; minimum, 28 cfs Sept. 27, 1935, Jan. 9, 1937.

Remarks.--Records good except those for periods of no gage-height record, which are poor.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 12		Feb. 13 to Sept. 30	
2.2	42	2.0	43
2.5	84	2.5	93
3.0	195	3.0	195
3.5	390	3.5	385
4.0	660	4.0	620
4.5	990	4.5	910

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	186	148	523	a320	a155	320	a420	165	83	50	47
2	49	358	136	528	a320	152	390	a390	155	81	50	45
3	49	228	131	550	a320	148	506	*362	150	80	49	45
4	51	182	180	445	a340	155	645	412	*160	82	49	45
5	64	150	204	358	a350	145	712	448	318	80	48	45
6	58	124	554	304	a400	139	676	488	367	79	48	44
7	53	234	885	264	a600	129	645	540	693	76	48	43
8	52	490	612	242	*843	127	645	498	808	73	48	43
9	58	*300	465	225	962	123	a600	475	585	70	47	44
10	52	213	460	216	a1,100	115	a560	493	452	*71	48	44
11	50	172	440	207	a1,250	111	a530	555	376	69	47	43
12	50	148	*386	195	a1,400	*115	*635	511	340	67	47	44
13	50	131	327	182	a900	168	660	439	288	65	47	44
14	50	124	280	392	a650	213	766	398	256	65	48	44
15	52	112	253	636	a500	568	676	372	232	65	48	43
16	51	110	239	567	a450	610	a600	372	210	64	47	43
17	52	114	232	485	a400	439	a600	372	190	63	*46	44
18	68	168	219	405	a350	376	a550	349	175	61	45	*44
19	59	178	213	358	a300	403	a500	328	165	60	45	43
20	56	195	201	284	a270	493	a450	308	150	60	45	43
21	56	210	192	268	a250	560	a400	300	*137	59	45	43
22	54	201	190	246	a230	475	a380	304	131	58	46	43
23	54	216	304	232	*210	390	a360	320	122	57	46	44
24	54	225	345	403	201	362	a340	304	118	56	46	43
25	56	242	327	562	192	448	a330	312	111	55	46	46
26	70	222	292	666	180	540	a320	284	104	54	46	48
27	64	204	253	589	168	*506	a330	264	99	53	47	46
28	73	*185	292	450	a160	444	a400	236	93	53	47	46
29	143	162	787	a400	-	439	a500	210	88	53	48	45
30	143	155	864	a350	-	394	a450	192	86	52	49	53
31	118	-	672	a300	-	340	-	178	-	30	46	-
Total	1,957	5,939	11,083	11,832	13,616	9,782	15,376	11,434	7,322	2,014	1,464	1,337
Mean	63.1	198	358	382	486	316	513	369	244	65.0	47.2	44.6
Cfs/m	0.505	1.58	2.86	3.06	3.89	2.53	4.10	2.95	1.95	0.520	0.378	0.357
In.	0.58	1.77	3.30	3.52	4.05	2.91	4.57	3.40	2.18	0.60	0.44	0.40
Ac-ft	3,880	11,780	21,980	23,470	27,010	19,400	30,500	22,680	14,520	3,990	2,900	2,650

Calendar year 1950: Max 1,900 Min 44 Mean 294 Cfs/m 2.35 In. 31.92 Ac-ft 212,600  
 Water year 1950-51: Max 1,400 Min 43 Mean 255 Cfs/m 2.04 In. 27.72 Ac-ft 184,800

Peak discharge (base, 1,400 cfs).--Feb. 12 (time unknown) 1,750 cfs (5.41 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Pendleton and at Yonkum.

## UMATILLA RIVER BASIN

## Umatilla River at Pendleton, Oreg.

Location.--Lat 45°40'20", long. 118°47'40", in NE¼ sec. 10, T. 2 N., R. 32 E., on left bank a quarter of a mile upstream from Main Street bridge at Pendleton, and 2½ miles upstream from McKay Creek.

Drainage area.--637 sq mi.

Records available.--February 1891 to July 1892, May 1903 to June 1905, May 1921 to September 1951. Published as "above McKay Creek near Pendleton" May 1921 to September 1934.

Gage.--Water-stage recorder. Datum of gage is 1,062.54 ft above mean sea level, datum of 1929. February 1891 to July 1892, type of gage and location not known. May 22, 1903, to June 11, 1905, staff gage at Main Street bridge at different datum. May 1 to Oct. 12, 1931, staff gage and Oct. 13, 1921, to Sept. 30, 1934, water-stage recorders at two sites 200 ft apart 2½ miles downstream at various datums. Supplemental water-stage recorder at site 600 ft upstream at different datum used during low-water periods since Aug. 1, 1942.

Average discharge.--28 years (1923-51), 478 cfs.

Extremes.--Maximum discharge during year, 3,560 cfs Feb. 12 (gage height, 4.28 ft); minimum, 26 cfs Aug. 24, 25.

1891-92, 1903-5, 1921-51: Maximum discharge, 15,400 cfs Feb. 22, 1949 (gage height, 9.01 ft); minimum, 7 cfs Aug. 14, 1924.

Maximum flood known, 17,000 cfs Dec. 14, 1882 (date and discharge from data furnished by Corps of Engineers). Flood of May 30-31, 1906, reached a stage of 11.0 ft, present site and datum but before channel was improved (discharge, 15,500 cfs, estimated by Corps of Engineers).

Remarks.--Records fair except those for periods of doubtful or no gage-height record, which are poor. Diversions for irrigation of about 1,100 acres above station; no regulation.

Revisions (water years).--W 934: 1931 (maximum gage height only).

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a60	280	335	1,340	797	395	894	849	252	101	33	39
2	a60	*578	326	1,560	784	380	970	750	231	99	33	39
3	a62	468	318	1,640	758	358	1,310	690	224	*94	31	37
4	65	375	365	1,290	758	372	1,690	708	*224	94	31	37
5	65	310	459	1,100	797	365	1,980	768	336	96	31	34
6	72	a250	771	953	810	343	1,920	795	524	96	31	34
7	72	a500	1,860	849	*1,170	329	1,770	912	665	a90	31	34
8	65	952	1,620	760	2,080	315	1,740	876	1,240	81	31	34
9	72	*722	*1,210	700	2,330	315	1,620	804	960	76	31	36
10	75	a500	1,120	660	2,720	*301	1,510	768	750	*71	*33	34
11	70	a400	1,100	620	2,860	294	1,330	858	614	64	33	37
12	65	a350	1,000	580	3,350	308	*1,250	867	540	62	33	37
13	65	a300	900	560	*2,630	462	1,350	759	485	57	33	34
14	65	285	800	620	1,900	742	1,640	682	432	a55	33	33
15	72	270	750	1,250	1,440	1,370	1,520	631	380	a53	33	36
16	62	246	700	1,330	1,160	2,160	1,320	597	336	51	31	39
17	65	242	660	1,290	970	1,500	1,270	588	308	*51	31	37
18	75	336	620	*1,160	867	1,180	1,270	572	273	50	30	*37
19	*78	411	580	1,030	750	1,110	1,180	540	252	50	29	36
20	68	454	550	914	682	*1,240	1,010	500	224	48	30	36
21	65	500	520	875	631	1,460	831	470	198	48	29	29
22	60	474	500	849	580	1,320	724	*448	180	44	29	33
23	55	461	550	823	*548	1,090	*648	455	*168	42	29	36
24	53	480	700	1,110	524	980	606	462	162	39	29	39
25	53	487	700	1,580	508	1,080	588	448	162	39	29	39
26	75	487	650	1,760	478	1,350	572	425	145	39	30	42
27	78	454	620	1,710	440	*1,420	588	388	135	37	31	46
28	78	417	640	1,340	*410	1,260	777	365	130	37	30	50
29	254	375	1,730	1,030	-	1,200	1,090	329	120	37	33	50
30	326	348	2,140	862	-	1,120	970	301	110	37	36	53
31	305	-	1,720	758	-	980	-	*280	-	34	57	-
Total	2,755	12,712	26,512	32,483	33,732	27,099	35,938	18,885	10,760	1,872	974	1,137
Mean	88.9	424	855	1,061	1,205	874	1,198	609	359	60.4	31.4	37.9
Ac-ft	5,460	25,210	52,590	65,220	66,910	53,750	71,280	37,460	21,340	3,710	1,930	2,260
Calendar year 1950: Max	4,470			Min	24			Mean	674			
Water year 1950-51: Max	3,350			Min	29			Mean	562			
Ac-ft	487,900			Ac-ft	407,100							

Peak discharge (base, 3,200 cfs).--Feb. 12 (2 p.m.) 3,560 cfs (4.28 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations above Meacham Creek near Gibbon, and at Yaokum.

Note.--Doubtful gage-height record Dec. 12-28, Jan. 6-14; discharge computed as explained in footnote "a."



## McKay Creek near Pilot Rock, Oreg.

Location.--Lat 45°33'10", long. 118°46'20", in NE $\frac{1}{4}$  sec. 23, T. 1 N., R. 32 E., on left bank 400 ft downstream from highway bridge, three-quarters of a mile upstream from maximum flow line (altitude, 1,322 ft) of McKay Reservoir, and 6 miles northeast of Pilot Rock.

Drainage area.--178 sq mi.

Records available.--May to August 1921, October 1926 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,335.85 ft above mean sea level, datum of 1929 (Pacific Power & Light Co. benchmark). May 7 to Aug. 14, 1921, staff gage near present site at different datum. Nov. 19, 1926, to Sept. 15, 1932, water-stage recorder at site 400 ft upstream at datum 1.4 ft higher. Sept. 16, 1932, to Apr. 8, 1941, at site 400 ft upstream at datum 4.4 ft higher than present datum.

Average discharge.--23 years (1926-27, 1929-51), 96.6 cfs.

Extremes.--Maximum discharge during year, 1,670 cfs Mar. 15; maximum gage height, 4.80 ft Dec. 29; minimum discharge, 0.1 cfs at times during August and September. 1921, 1926-51: Maximum discharge, 6,000 cfs Apr. 1, 1931 (gage height, 10.4 ft, site and datum then in use); no flow at times.

Remarks.--Records good except those below 1 cfs and those for periods of no gage-height record, which are poor. Diversions for irrigation of about 800 acres above station; no diversions between station and McKay Reservoir.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Mar. 3-11)

Oct. 1 to Dec. 29

Dec. 30 to Sept. 30

1.1	0.1	2.0	60	1.1	0.1	2.0	55
1.2	1.0	2.2	94	1.2	.7	2.2	92
1.3	3.0	2.5	160	1.3	2.3	2.5	170
1.4	6.5	3.0	320	1.4	5.0	3.0	355
1.5	11	3.5	555	1.5	9.0	3.5	610
1.6	16	4.0	880	1.6	14	4.0	960
1.8	34	4.5	1,350	1.8	30	4.4	1,300

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.5	a25	70	378	a120	92	249	101	18	5.0	0.9	0.3
2	.5	*34	62	540	a150	88	260	94	14	5.0	.7	.3
3	.6	27	59	525	120	82	294	86	11	5.0	.7	.3
4	.6	26	98	391	122	88	332	82	*12	5.0	.6	.3
5	.6	23	139	319	260	84	355	80	25	5.8	.6	.3
6	.6	23	282	263	290	*76	332	76	70	6.2	.6	.3
7	.6	26	560	221	598	72	302	76	153	5.8	.6	.3
8	.6	*133	392	198	*768	72	290	69	278	5.0	.6	.3
9	.6	102	292	158	733	99	274	65	185	*4.7	.5	.3
10	.6	78	*236	140	761	92	232	58	135	4.5	.5	.2
11	.6	62	200	128	754	88	194	72	106	4.2	.5	.3
12	.7	54	172	115	952	104	*185	84	86	3.9	.5	.2
13	.7	47	151	110	*664	366	191	74	76	3.6	.5	.1
14	.7	46	142	185	485	505	207	74	62	3.4	.5	.1
15	a.9	44	142	364	378	1,240	191	69	51	3.4	.4	.1
16	a1.1	44	135	*342	302	977	176	65	44	3.4	.4	.1
17	a1.3	47	128	298	270	610	164	60	38	3.1	.3	.2
18	a1.5	85	119	256	238	470	152	*55	33	2.8	.3	*.2
19	*1.6	102	109	218	204	410	138	51	*28	2.3	.2	.1
20	1.4	122	100	179	185	430	125	47	21	2.1	.2	.2
21	1.6	135	90	164	170	470	110	42	10	2.0	.1	.2
22	a2	119	81	155	158	410	99	39	*8.2	2.0	.1	.2
23	a2.5	137	83	173	146	360	*88	37	6.2	1.8	.1	.2
24	a3	126	81	728	135	342	78	37	5.8	1.7	.2	.2
25	a4	117	80	761	132	386	69	30	7.8	1.7	.2	.3
26	a5	104	76	640	118	*415	62	26	7.4	1.5	.1	.4
27	a8	92	71	510	108	405	60	26	6.2	1.3	.2	.4
28	a10	*83	148	a350	94	355	76	24	5.4	1.2	.2	.4
29	a15	76	1,280	a235	-	342	101	23	5.4	1.0	.3	.4
30	a20	73	859	a150	-	302	101	21	5.0	1.0	.3	.5
31	a50	-	515	a100	-	270	-	*20	-	.9	.3	-
Total	117.4	2,212	6,952	9,284	9,415	10,102	5,487	1,763	1,513.4	100.3	12.2	7.7
Mean	3.79	73.7	224	299	336	326	183	56.9	50.4	3.24	0.39	0.26
Ac-ft	233	4,390	13,790	18,410	18,670	20,040	10,880	3,500	3,000	199	24	15

Calendar year 1950: Max 1,480 Min 0.2 Mean 149 Ac-ft 108,100

Water year 1950-51: Max 1,280 Min 0.1 Mean 129 Ac-ft 95,150

Peak discharge (base, 700 cfs).--Dec. 29 (12 m.), 1,650 cfs (4.80 ft); Jan. 24 (8 p.m.) 912 cfs (3.94 ft); Feb. 12 (1 a.m.) 1,120 cfs (4.20 ft); Mar. 15 (6 p.m.) 1,670 cfs (4.78 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Butter Creek near Pine City, Birch Creek at Rieth and Umatilla River above Meacham Creek.

## UMATILLA RIVER BASIN

## McKay Reservoir near Pendleton, Oreg.

Location.--Lat 45°36', long. 118°48', in SE $\frac{1}{4}$  sec. 34, T. 2 N., R. 32 E., near right end of McKay dam, 4 miles south of Pendleton.

Drainage area.--186 sq mi.

Records available.--October 1930 to September 1951 in reports of Geological Survey. December 1927 to September 1941 in reports of State engineer.

Gage.--Staff gage read once daily. Datum of gage is at mean sea level, adjustment of 1924 (surveys by Bureau of Reclamation). For datum of 1929, supplementary adjustment of 1947, add 0.16 ft.

Extremes.--Maximum contents observed during year, 70,100 acre-ft June 15-18 (elevation, 1,319.0 ft); minimum observed, 13,600 acre-ft Sept. 30 (elevation, 1,245.8 ft).  
1930-51: Maximum contents, 73,840 acre-ft June 9, 1950 (elevation, 1,322.0 ft); minimum observed, 3,051 acre-ft Oct. 1, Nov. 1, Dec. 1, 1935 (elevation, 1,217.6 ft).

Remarks.--Reservoir is formed by gravel-fill dam with concrete facing completed in 1926; storage began in 1927. Usable capacity, 73,830 acre-ft between elevations 1,182 ft (floor of trash-rack structure) and 1,322 ft (top of spillway gates). Dead storage about 6 acre-ft, included in contents given herein. Water is used for irrigation of lands along Umatilla River near Echo, Stanfield, and Hermiston.

Cooperation.--Gage readings and capacity table furnished by Bureau of Reclamation.

Revisions.--W 1154: Drainage area.

Monthly elevation and contents, water year October 1950 to September 1951

Date	Elevation (feet)	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	1,262.1	22,070	-
Oct. 31.....	1,261.8	21,900	-170
Nov. 30.....	1,268.8	26,080	+4,180
Dec. 31.....	1,288.7	40,080	+14,000
Calendar year 1950.....	-	-	+23,030
Jan. 31.....	1,307.1	56,800	+16,720
Feb. 28.....	1,312.2	62,270	+5,470
Mar. 31.....	1,313.7	63,930	+1,660
Apr. 30.....	1,317.1	67,820	+3,890
May 31.....	1,318.7	69,740	+1,920
June 30.....	1,314.8	65,170	-4,570
July 31.....	1,295.2	45,500	-19,670
Aug. 31.....	1,267.7	25,400	-20,100
Sept. 30.....	1,245.8	13,600	-11,800
Water year 1950-51.....	-	-	-8,470

## McKay Creek near Pendleton, Oreg.

Location.--Lat 45°36'40", long. 118°48'00", in SE $\frac{1}{4}$  NW $\frac{1}{4}$  sec. 34, T. 2 N., R. 32 E., on right bank at irrigation diversion dam, a quarter of a mile downstream from McKay Dam, and 4 miles south of Pendleton.

Drainage area.--186 sq mi.

Records available.--November 1918 to September 1923, October 1924 to September 1951 (diversions by irrigation canal at gage not included since 1932).

Gage.--Water-stage recorder. Datum of gage is 1,163.71 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Apr. 15, 1919, staff gage at site 2 miles upstream at different datum. Apr. 3, 1919, to Sept. 30, 1923, staff gage at site about a quarter of a mile upstream at different datum. Oct. 1, 1924, to Jan. 14, 1927, staff gage and Mar. 23, 1928, to Nov. 15, 1948, water-stage recorder at site 30 ft downstream at same datum. Jan. 15, 1927, to Mar. 22, 1928, water-stage recorder at site 250 ft upstream at different datum.

Average discharge.--25 years (1919-23, 1924-27, 1928-43, 1948-51), 93.8 cfs (unadjusted).

Extremes.--Maximum discharge during year, 490 cfs Mar. 20 (gage height, 1.70 ft), flushing trash from reservoir; no flow Jan. 30 to Feb. 1.  
1918-51: Maximum discharge observed, 3,250 cfs Feb. 10, 1921 (gage height, 4.4 ft, site and datum then in use), from rating curve extended above 1,200 cfs; no flow at times.

Remarks.--Records good except those below 10 cfs, which are poor. Diversions above station for irrigation. Also one diversion around station during irrigation season which may amount to about 10 cfs. Flow completely regulated since 1927 by McKay Reservoir.

Revisions.--W 1154: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.0	0	0.7	91
.1	2	1.0	175
.2	8	1.3	280
.4	33	1.6	430

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4	2	2	2	0	12	156	8	129	273	292	266
2	3	2	2	2	118	61	113	8	129	273	292	248
3	3	2	2	2	248	126	91	8	135	273	292	234
4	3	2	2	2	242	196	146	8	*159	270	296	228
5	3	3	2	2	245	304	176	9	108	270	296	228
6	2	3	2	2	245	*325	252	8	24	270	296	*228
7	2	4	2	2	256	355	252	8	14	270	296	228
8	2	4	2	2	*330	325	248	8	30	273	308	228
9	2	4	2	2	365	256	220	9	21	276	330	228
10	2	4	2	2	382	153	200	9	16	*296	350	224
11	2	4	2	3	382	82	200	9	13	296	325	*224
12	2	4	2	3	382	67	*146	9	13	296	325	220
13	2	3	2	2	*382	82	80	9	13	300	325	220
14	2	2	2	2	382	101	60	9	12	308	320	217
15	2	2	2	2	382	203	60	8	2	316	320	217
16	2	3	2	3	320	304	60	8	9	308	320	217
17	3	4	2	3	245	382	60	8	29	300	320	217
18	3	3	2	3	248	394	60	*8	78	300	320	214
19	*2	4	2	3	245	394	60	7	*108	312	320	214
20	4	4	2	2	276	394	60	7	162	320	320	*137
21	3	3	2	2	312	394	60	7	192	320	320	96
22	4	3	2	2	228	394	80	7	*192	320	316	110
23	3	2	2	2	98	394	*36	7	203	312	316	118
24	4	2	2	2	79	35	388	26	7	224	308	316
25	2	2	2	2	238	10	394	25	7	224	308	316
26	2	2	2	2	214	12	394	16	6	206	308	330
27	2	2	2	2	192	12	394	12	6	224	308	330
28	2	2	2	2	245	12	394	12	6	*252	308	*113
29	2	2	2	2	136	-	394	12	9	*256	304	325
30	2	2	2	2	0	-	256	9	51	273	*296	308
31	2	-	2	0	-	156	-	*110	-	292	*296	-
Total	78	84	62	1,156	6,390	8,468	2,966	388	3,457	9,184	9,746	5,524
Mean	2.5	2.8	2.0	57.3	228	273	98.9	12.5	115	296	314	184
Ac-ft	155	167	123	2,290	12,670	16,800	5,680	770	6,860	18,220	19,330	10,960
Calendar year 1950: Max 1,040 Min 0 Mean 110 Ac-ft 79,890												
Water year 1950-51: Max 394 Min 0 Mean 130 Ac-ft 94,220												

\* Discharge measurement made on this day.

## Birch Creek at Rieth, Oreg.

Location.--Lat 45°39'10", long. 118°52'40", in SE $\frac{1}{4}$  sec. 13, T. 2 N., R. 31 E., on right bank 300 ft downstream from road bridge, a quarter of a mile upstream from mouth and half a mile southwest of Rieth.

Drainage area.--291 sq mi.

Records available.--May 1921 to September 1923, April 1927 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 951.82 ft above mean sea level datum of 1929, supplementary adjustment of 1947. May 1, 1921, to Sept. 30, 1923, staff gages near present site at different datums. Apr. 4, 1927, to Jan. 29, 1928, water-stage recorder and Feb. 3, 1928, to Dec. 16, 1931, staff gage at road bridge 300 ft upstream at different datum. Dec. 17, 1931, to Dec. 29, 1939, water-stage recorder at present site at datum 0.86 ft higher.

Average discharge.--22 years (1929-51), 44.5 cfs.

Extremes.--Maximum discharge during year, 468 cfs Feb. 11 (gage height, 3.36 ft); minimum, 0.1 cfs June 25, 26, 28-30, July 4 to Aug. 18.  
1921-23, 1927-51: Maximum discharge, 1,860 cfs June 17, 1950 (gage height, 7.2 ft), from rating curve extended above 400 cfs; no flow at times.

Remarks.--Records good except those below 5 cfs, which are fair. Diversions for irrigation of about 4,000 acres above station.

Revisions (water years).--W 984: 1939.

Rating tables, water year 1950-51, (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11				Feb. 12 to Sept. 30			
0.2	0.3	1.2	40	0.2	0.1	0.7	7.0
.3	.9	1.5	75	.3	.4	.8	11
.4	1.9	2.0	154	.4	1.0	1.0	24
.5	3.4	2.5	250	.5	2.2	1.2	40
.7	8.3	3.2	425	.6	4.2		
.9	18						

Note.--Same as preceding table above 1.2 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.3	25	57	178	106	76	154	89	16	0.2	0.1	0.2
2	.3	36	51	191	137	74	154	83	11	.2	.1	.2
3	.3	38	47	180	117	63	167	74	9.4	.2	.1	.2
4	.3	37	56	156	112	70	195	75		.1	.1	.2
5	.3	33	56	139	140	65	224	79	16	.1	.1	.2
6	.3	30	66	120	134	65	240	79	39	.1	.1	.2
7	.3	31	134	109	*246	60	260	78	62	.1	.1	.2
8	.6	*41	140	104	300	82	258	72	92	.1	.1	.2
9	.8	43	*128	95	310	72	242	*66	94	*.1	.1	.2
10	.6	42	115	86	355	65	238	57	83	.1	.1	.2
11	1.8	40	100	81	390	70	218	65	72	.1	.1	.2
12	1.5	39	104	76	*402	70	*208	85	52	.1	.1	.2
13	2.0	37	98	74	340	122	218	83	50	.1	.1	.2
14	1.8	36	95	79	280	159	260	86	46	.1	.1	.2
15	.7	35	100	101	236	254	224	85	41	.1	.1	.2
16	.8	34	95	*109	210	315	197	81	31	.1	.1	.2
17	2.4	43	95	114	191	234	193	70	21	.1	.1	.2
18	*6.3	49	89	104	172	200	183	66	15	.1	.1	.2
19	5.3	51	85	96	156	182	172	52	8.6	.1	.2	.2
20	5.8	51	81	86	142	176	154	48	6.7	.1	.2	.2
21	6.1	48	75	86	128	187	132	41	.9	.1	.2	.2
22	6.6	45	70	83	120	185	120	*29	.2	.1	.2	.2
23	7.5	50	85	108	170	102	29	.2	.1	.1	.2	.2
24	6.6	60	66	172	104	163	86	35	.2	.1	.2	.2
25	9.6	44	62	226	96	163	68	34	.1	.1	.2	.2
26	10	56	60	228	86	178	63	31	.1	.1	.2	.2
27	10	66	57	216	85	*189	58	32	.2	.1	.2	.2
28	12	67	83	154	*72	185	75	28	.1	.1	.2	.2
29	16	62	199	100	-	182	100	*24	.1	.1	.2	.2
30	28	58	234	92	-	176	95	22	.1	.1	.2	.3
31	30	-	204	81	-	165	-	19	-	.1	.2	-
Total	174.9	1,327	2,979	3,801	5,276	4,397	5,058	1,797	777.3	3.4	4.4	6.1
Mean	5.64	44.2	96.1	123	188	142	169	58.0	25.9	0.11	0.14	0.20
Ac-ft	347	2,630	5,910	7,540	10,460	8,720	10,030	3,560	1,540	6.7	8.7	12

Calendar year 1950: Max 432 Min 0.1 Mean 83.1 Ac-ft 60,160  
Water year 1950-51: Max 402 Min 0.1 Mean 70.1 Ac-ft 50,760

Peak discharge (base, 300 cfs).--Feb. 7 (7 p.m.) 428 cfs (3.21 ft); Feb. 11 (12 p.m.) 468 cfs (3.36 ft); Mar. 15 (10 p.m.) 388 cfs (3.05 ft); Apr. 7 (6:30 a.m.) 372 cfs (2.99 ft); Apr. 14 (7 a.m.) 370 cfs (2.98 ft).

\* Discharge measurement made on this day.

## Umatilla River at Yoakum, Oreg.

Location.--Lat 45°40'40", long. 119°02'00", in SW $\frac{1}{4}$  sec. 2, T. 2 N., R. 30 E., at left bank on downstream side of highway bridge half a mile northeast of Yoakum station and  $2\frac{1}{2}$  miles downstream from abandoned Furnish Reservoir.

Drainage area.--1,280 sq mi, approximately.

Records available.--May 1903 to September 1951. Published as "above Furnish Reservoir" August 1916 to September 1934.

Gage.--Water-stage recorder. Datum of gage is 768.21 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. May 5, 1903, to Aug. 15, 1916, staff gage at site 500 ft upstream at different datum. June 18 to Aug. 28, 1915, staff gage and July 5, 1916, to Sept. 30, 1934, water-stage recorder at site 5 miles upstream at different datum. Oct. 1, 1934, to Oct. 20, 1948, water-stage recorder at present site at datum 2.0 ft higher.

Average discharge.--48 years, 675 cfs.

Extremes.--Maximum discharge during year, 5,060 cfs Feb. 12 (gage height, 7.82 ft); minimum, 58 cfs Oct. 1 (gage height, 1.65 ft).

1903-51: Maximum discharge, 20,000 cfs May 30, 1906 (gage height, about 15.0 ft, datum then in use, from floodmarks), from rating curve extended above 6,600 cfs on basis of records for station near Umatilla; minimum, 12 cfs Aug. 10-12, 1908.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Diversions above station for irrigation. Slight regulation by Furnish Reservoir, 1910-16. Flow regulated to some extent since 1927 by McKay Reservoir.

Revisions (water years).--W 794: 1906(M).

Rating tables. water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 30

Dec. 31 to Sept. 30

1.6	51	3.0	430	2.1	129	5.0	1,760
1.8	80	4.0	940	2.5	235	7.0	3,930
2.0	118	5.0	1,700	3.0	425	7.7	4,880
2.5	247	6.0	2,690	4.0	975		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	202	378	1,630	a850	497	1,240	1,030	407	394	331	316
2	59	462	362	1,740	a900	484	1,250	916	384	389	331	298
3	64	480	336	1,940	975	545	1,520	827	376	376	331	281
4	70	382	414	1,520	949	585	1,980	821	407	380	334	*277
5	71	326	511	1,260	*1,120	757	2,370	897	470	384	331	277
6	71	280	746	1,050	1,110	737	2,490	942	632	384	327	274
7	76	254	2,000	910	1,620	773	2,360	1,050	714	380	323	274
8	71	727	1,880	827	2,730	743	2,300	1,050	1,450	372	327	270
9	74	735	1,390	749	3,140	708	2,160	*962	1,180	367	331	267
10	76	547	1,210	686	3,720	580	2,010	910	930	*394	355	264
11	*76	430	1,180	642	4,050	470	*1,830	388	755	389	359	264
12	72	374	1,100	595	4,800	448	1,760	1,080	637	380	359	261
13	71	322	*952	560	*3,800	626	1,780	949	580	372	359	261
14	71	298	850	722	2,860	1,060	2,010	864	510	376	355	257
15	80	280	808	1,390	2,350	1,650	1,950	797	452	a380	355	257
16	80	275	750	1,520	1,970	3,070	1,660	743	402	394	346	261
17	80	270	730	1,490	1,590	2,310	1,580	725	355	376	342	257
18	91	340	690	*1,320	1,480	1,920	1,570	703	363	367	339	254
19	96	434	650	1,140	1,320	1,790	1,490	654	367	367	338	248
20	91	475	606	968	1,210	*1,830	1,310	605	389	380	338	*208
21	85	534	565	897	1,180	2,100	1,110	570	407	384	334	134
22	85	*506	534	878	1,080	2,060	975	*530	402	384	334	134
23	85	488	601	803	858	1,810	868	530	394	376	331	147
24	84	502	750	1,280	749	1,840	755	540	398	355	327	154
25	84	511	750	2,090	676	1,670	714	520	398	351	331	152
26	91	516	700	2,220	615	1,960	686	488	376	351	351	160
27	98	498	655	2,150	a550	2,060	676	448	346	346	*355	164
28	98	475	655	1,820	*525	1,940	815	416	384	342	355	170
29	141	422	1,650	a1,200	-	1,850	1,240	*367	389	342	355	172
30	211	394	2,750	a800	-	1,730	1,160	355	405	342	342	a170
51	217	-	2,080	785	-	1,360	-	398	-	331	358	-
Total	2,775	12,737	28,863	37,672	48,777	41,761	45,609	22,675	15,659	11,505	10,583	6,883
Mean	89.6	425	931	1,215	1,742	1,347	1,520	731	522	371	341	229
Ac-ft	5,510	25,260	57,250	74,720	96,750	82,830	90,460	44,980	31,060	22,820	20,990	13,650
Calendar year 1950:	Max	4,600		Min	47	Mean	868	Ac-ft	628,400			
Water year 1950-51:	Max	4,800		Min	59	Mean	782	Ac-ft	666,300			

Peak discharge (base, 3,600 cfs).--Feb. 12 (1:30 p.m.) 5,060 cfs (7.82 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Umatilla and at Pendleton with adjustment for release of water from McKay Reservoir.

## UMATILLA RIVER BASIN

Butter Creek near Pine City, Oreg.  
(Called North Fork Butter Creek on some maps)

Location.--Lat 45°32'40", long. 119°18'40", in SW¼ sec. 22, T. 1 N., R. 28 E., on right bank half a mile below Matlock Canyon, 6 miles southeast of settlement of Pine City, and 20 miles south of Hermiston.

Drainage area.--291 sq mi.

Records available.--October 1945 to September 1951 in reports of Geological Survey. April 1928 to September 1941 in reports of State engineer and October 1941 to September 1945 in files of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 1,400 ft (by barometer). Apr. 10, 1928, to Sept. 30, 1944, at present site at datum 1.1 ft higher. Oct. 1, 1944, to Sept. 6, 1949, at present site at datum 1.0 ft higher.

Average discharge.--19 years (1929-30, 1931-32, 1933-41, 1942-51), 22.2 cfs.

Extremes.--Maximum discharge during year, 351 cfs Mar. 16 (gage height, 3.68 ft); minimum, 0.5 cfs, at times during August and September.

1928-51: Maximum gage height, 12.4 ft, present datum, Feb. 21, 1949 (discharge not determined); no flow at times.

Revisions.--The maximum discharge for water year 1950 has been revised to 358 cfs Feb. 16, 1950 (gage height, 3.90 ft), superseding figure published in Water-Supply Paper 1184.

Remarks.--Records good except those below 5 cfs, which are fair, and those for periods of ice effect or doubtful or no gage-height record, which are poor. No regulation. Discharge for irrigation of about 600 acres above station; for about 20 days each year not over 30 cfs may be diverted into headwaters of Butter Creek from Fivemile Creek, a tributary of Camas Creek in John Day River basin.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	13	20	61	b35	38	81	61	15	3.9	0.9	0.7
2	2.7	12	19	55	b55	38	82	56	14	3.9	.8	.7
3	3.3	19	18	*53	63	30	94	48	14	3.9	.8	.6
4	3.7	16	19	49	53	37	106	46	12	3.9	.7	.6
5	3.9	14	21	45	*56	32	114	50	*14	3.9	.7	.6
6	3.5	12	27	39	55	35	112	49	24	4.1	.6	.5
7	3.5	*12	56	34	130	*30	109	54	27	4.1	.6	.5
8	3.7	12	56	b32	218	34	108	56	25	3.5	.7	.5
9	3.5	14	45	b31	182	35	107	51	22	*3.1	.6	.5
10	3.3	15	40	b30	191	28	*103	48	17	2.9	.6	.5
11	3.7	14	37	b30	d200	31	97	52	15	2.7	.6	.5
12	3.7	14	35	b30	*d250	31	95	68	14	2.5	.6	.5
13	3.7	13	*32	30	184	32	96	61	15	2.4	.6	.5
14	3.9	12	31	32	152	43	104	57	15	2.0	.6	.6
15	3.9	13	42	43	128	95	103	51	13	1.9	.6	.6
16	3.9	14	40	50	108	209	97	*45	12	1.8	.5	.7
17	4.4	15	38	49	98	124	94	42	11	1.9	.5	.7
18	*4.6	17	35	45	85	98	91	36	11	2.0	.5	.6
19	4.4	20	53	41	*76	94	86	36	10	2.0	.5	*.6
20	4.4	21	31	35	72	102	82	34	10	2.0	.5	.5
21	4.4	32	30	38	66	116	72	32	9.4	1.9	.5	.5
22	4.6	*28	27	40	61	100	67	28	9.0	1.8	.5	.6
23	4.6	24	27	39	51	92	61	25	8.6	1.9	.5	.6
24	4.9	23	27	49	54	97	56	26	49.2	1.8	.5	.6
25	4.9	25	25	137	51	100	49	25	8.2	1.5	.5	.7
26	5.4	25	24	140	41	*102	47	23	7.8	1.5	.5	.8
27	5.1	24	24	122	42	101	47	22	7.2	1.4	.5	.8
28	6.6	23	25	69	35	92	59	21	6.6	1.1	.5	1.0
29	9.4	22	56	a40	-	91	74	21	4.4	1.0	.7	1.4
30	12	21	103	a35	-	90	67	19	4.4	1.0	.8	1.5
31	17	-	76	b30	-	85	-	19	-	.9	.7	-
Total	152.2	539	1,119	1,553	2,792	2,262	2,560	1,264	383.8	74.2	18.7	20.0
Mean	4.91	18.0	36.1	50.1	99.7	73.0	85.3	40.8	12.8	2.39	0.60	0.67
Ac-ft	302	1,070	2,220	3,080	5,540	4,490	5,080	2,510	761	147	37	40
Calendar year 1950: Max		268			Min 0.4		Mean 39.2		Ac-ft 28,370			
Water year 1950-51: Max		250			Min 0.5		Mean 34.9		Ac-ft 25,280			

Peak discharge (base, 200 cfs).--Feb. 8 (5 a.m.) 248 cfs (3.33 ft); Feb. 11 (time unknown) about 275 cfs; Mar. 16 (3 a.m.) 351 cfs (3.68 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Birch Creek at Rieth and Mc-Kay Creek near Pilot Rock.

b Stage-discharge relation affected by ice.

c Doubtful gage-height record; discharge computed from reconstructed gage-height graph based on records for nearby stations.

## Umatilla River near Umatilla, Oreg.

Location.--Lat 45°54', long. 119°20', in NW¼ sec. 21, T. 5 N., R. 28 E., on left bank 1½ miles downstream from West Division main canal of Umatilla project and 2 miles upstream from Umatilla and mouth of river.

Drainage area.--2,290 sq mi, approximately.

Records available.--October 1903 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 330.57 ft above mean sea level, datum of 1929.

Average discharge.--48 years, 507 cfs.

Extremes.--Maximum discharge during year, 4,820 cfs Feb. 13 (gage height, 5.84 ft); minimum, 6 cfs part of each day May 27 to June 4.

1903-51: Maximum discharge observed, 19,600 cfs May 31, 1906 (gage height, 11.0 ft), from rating curve extended above 11,000 cfs by logarithmic plotting; no flow at times.

Remarks.--Records good except those for periods of backwater from moss, which are fair. Many diversions above station for irrigation; Brownell Canal diverts below station. Flow regulated by McKay and Cold Springs (off-channel) Reservoirs.

Revisions.--W 794: Drainage area.

Rating table, water year 1950-51, except periods of backwater from moss (gage height, in feet, and discharge, in cubic feet per second)

1.9	6	2.4	48	4.0	1,170
2.0	10	2.5	70	5.0	3,010
2.1	14	2.7	135	5.7	4,510
2.2	21	3.0	270		
2.3	32	3.5	620		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	37	198	343	1,860	1,140	510	1,230	580	6	13	*35	63
2	45	193	336	1,600	1,080	510	1,140	458	7	14	25	57
3	68	444	300	2,180	1,230	564	1,250	312	6	14	21	48
4	85	362	300	1,710	1,230	588	1,670	294	10	25	26	46
5	147	306	402	1,400	*1,320	730	2,220	324	37	22	25	35
6	147	255	502	1,160	1,250	790	2,390	416	207	32	25	40
7	147	*202	1,400	880	1,620	898	2,260	409	255	37	24	40
8	147	290	1,960	854	2,720	898	2,080	510	780	40	21	32
9	143	770	*1,460	780	3,280	887	1,940	402	1,030	42	18	26
10	139	580	1,200	692	3,510	760	1,670	330	647	32	12	*28
11	147	465	1,140	647	3,920	647	1,360	350	444	37	10	37
12	151	525	1,080	604	4,380	604	1,170	510	276	28	12	37
13	143	495	980	564	4,440	620	1,050	444	198	22	13	32
14	139	437	843	580	3,240	898	1,170	343	97	24	10	28
15	155	270	780	1,100	2,560	1,180	1,310	*288	32	30	10	28
16	139	240	740	1,490	2,200	3,040	1,040	216	13	31	10	19
17	143	230	692	1,440	1,730	2,840	920	147	10	30	10	18
18	205	230	665	1,430	1,540	2,180	887	128	13	26	13	18
19	245	324	620	1,180	1,380	1,900	854	114	8	24	16	17
20	198	510	588	1,000	1,230	1,860	730	57	7	26	19	14
21	180	488	540	865	1,180	2,100	564	45	8	34	18	13
22	175	510	510	876	1,120	2,260	430	12	*10	38	20	13
23	167	430	480	790	898	2,080	324	9	11	52	15	13
24	163	437	629	968	780	1,860	225	7	11	43	12	12
25	159	451	692	1,940	692	1,780	155	7	14	38	19	12
26	163	465	674	2,360	647	*1,980	184	7	16	37	21	11
27	159	451	620	2,460	588	2,160	85	7	13	40	23	11
28	159	430	580	2,180	558	2,080	170	6	13	35	23	11
29	171	395	1,000	1,750	-	1,860	532	7	12	37	31	11
30	198	362	2,480	1,250	-	1,840	683	7	13	40	48	11
31	220	-	2,420	1,050	-	1,440	-	6	-	37	63	-
Total	4,664	11,745	26,958	39,740	51,461	44,324	31,623	6,752	4,204	980	648	781
Mean	150	392	870	1,282	1,638	1,430	1,054	216	140	31.6	20.9	26.0
Ac-ft	9,250	23,300	53,470	78,820	102,100	87,920	62,720	13,390	8,340	1,940	1,290	1,550
Calendar year 1950: Max	4,180				Min 8		Mean 671	Ac-ft 486,000				
Water year 1950-51: Max	4,440				Min 6		Mean 613	Ac-ft 444,100				

Peak discharge (base, 2,800 cfs).--Feb. 13 (5 a.m.) 4,820 cfs (5.84 ft); Mar. 16 (9 p.m.) 3,390 cfs (5.18 ft).

\* Discharge measurement made on this day.

Note.--Backwater from moss Oct. 1 to Nov. 8, May 5 to June 8.

## Principal diversions from Umatilla River between Pendleton and Umatilla, Oreg.

The following canals divert water from Umatilla River between Pendleton and Umatilla: Furnish Canal, from right bank of Umatilla River in sec. 36, T. 3 N., R. 29 E. Umatilla project feed canal, from right bank of Umatilla River in SW $\frac{1}{4}$  sec. 22, T. 3 N., R. 29 E., to feed Cold Springs Reservoir of Bureau of Reclamation. Western Land Canal, from left bank of Umatilla River in NE $\frac{1}{4}$  sec. 21, T. 3 N., R. 29 E.; gage is 1 mile downstream from intake. Allen Canal, from right bank of Western Land Canal, half a mile downstream from headgate of that canal. Maxwell Canal, from right bank of Umatilla River in SW $\frac{1}{4}$  sec. 28, T. 4 N., R. 28 E.; at times it receives water from Cold Springs Reservoir. West Division main canal, from left bank of Umatilla River in SW $\frac{1}{4}$  sec. 28, T. 5 N., R. 28 E. Brownell Canal, from right bank of Umatilla River 2 miles below West Division main canal diversion and  $\frac{1}{2}$  miles above mouth of Umatilla River (no record of monthly diversion during 1951).

Water diverted by all these canals is used for irrigation of lands on both sides of Umatilla River near and below Echo, except that diverted by West Division main canal, which is applied to land along Columbia River in vicinity of Irrigon.

Several smaller canals also divert water between Pendleton and Umatilla, but no records for them were obtained.

Records of monthly discharge of the canals, published as a group, are available from March 1926 to September 1951; records for some of the canals published separately prior to 1926.

Diversions, in acre-feet, water year October 1950 to September 1951

Month	Furnish Canal	Umatilla project feed canal	Western Land Canal	Allen Canal	Maxwell Canal	West Division main canal
October.....	0	2,860	-	1,030	1,190	4,210
November.....	0	9,960	-	-	-	0
December.....	0	11,540	-	-	-	0
January.....	0	10,290	-	-	-	0
February.....	0	6,090	-	-	-	0
March.....	0	4,720	-	-	-	2,340
April.....	6,180	8,730	11,130	-	4,120	9,720
May.....	8,600	9,390	13,150	515	4,220	11,470
June.....	7,740	3,800	11,740	843	2,740	10,780
July.....	8,170	0	12,260	812	2,090	11,920
August.....	8,140	0	10,920	638	2,160	12,700
September.....	4,320	0	8,010	599	1,840	10,470
Water year 1950-51.....	43,150	67,380	-	-	-	73,610

Note.--No gage-height record for months of little or no flow and for a few days and short periods at other times. Discharge for some periods interpolated or computed on basis of information furnished by watermaster.



## Willow Creek at Heppner, Oreg.

Location--Lat 45°21', long. 119°32', in SE $\frac{1}{4}$  sec. 35, T. 2 S., R. 26 E., on right bank, 100 ft upstream from Court Street bridge, 800 ft southeast of Morrow County courthouse, and a third of a mile downstream from Balm Fork.

Drainage area--87 sq mi, approximately.

Records available--May to September 1951.

Gage--Water-stage recorder and concrete control. Datum of gage is 1,952.73 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Extremes--Maximum discharge during period, 32 cfs May 19 (gage height, 1.79 ft); no flow Sept. 16.

Maximum discharge known, about 36,000 cfs June 14, 1903, by slope-area determination.

Remarks--Records good. Many diversions above station for irrigation of about 500 acres. Part of flow of Ditch Creek, in John Day River basin, is diverted to Willow Creek above station.

Discharge, in cubic feet per second, May to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								-	7.2	1.6	*0.6	0.2
2								-	5.8	1.2	.6	.2
3								-	5.5	1.1	.6	.2
4								-	4.3	1.6	.4	.2
5								-	7.0	1.4	.4	.2
6								-	16	1.4	.4	.2
7								-	22	2.2	.4	.1
8								-	22	2.0	.3	.2
9								-	18	*2.7	.3	.2
10								-	18	1.8	.3	.2
11								-	17	1.1	.3	*.2
12								-	16	.8	.3	.1
13								-	16	.8	.4	.1
14								-	14	.6	.3	.1
15								-	13	.6	.3	.1
16								-	10	.6	.3	0
17								-	8.4	.6	.3	.2
18								-	6.8	.6	.3	.2
19								32	7.5	.6	.3	.1
20								30	5.8	.4	.2	.1
21								*26	3.9	.4	.2	.1
22								22	*2.9	.6	.2	.2
23								20	3.7	.6	.3	.2
24								22	3.9	.6	.3	.2
25								17	3.9	.6	.3	.2
26								13	1.6	.8	.2	.3
27								10	1.2	1.0	.2	.3
28								8.7	2.0	1.0	.2	.3
29								9.0	2.7	.8	.3	.3
30								9.3	2.9	.8	.3	.3
31								8.7	-	.6	.3	-
Total								-	269.0	31.5	10.1	5.5
Mean								-	8.97	1.02	0.33	0.16
Ac-ft								-	534	62	20	11
Calendar year	: Max		Min		Mean		Ac-ft					
Water year	: Max		Min		Mean		Ac-ft					

\* Discharge measurement made on this day.

## Prairie power canal at Prairie City, Oreg.

Location--Lat 44°27', long. 118°42', in sec. 11, T. 13 S., R. 33 E., on left bank just upstream from highway bridge over canal and 1 mile south of Prairie City.

Records available--May 1925 to September 1951.

Gage--Staff gage read twice daily. Datum of gage is 3,667 ft above mean sea level (from U. S. Coast and Geodetic Survey vertical-angle benchmark).

Average discharge--26 years, 47.7 cfs.

Extremes--1925-51: Maximum daily discharge, 86 cfs May 5, 1939; no flow at times.

Remarks--Records fair. Canal diverts from John Day River in SE $\frac{1}{4}$  sec. 7, T. 13 S., R. 34 E. Water is used by powerplant at Prairie City and is returned to river below station on John Day River at Prairie City.

Cooperation--Gage read by employee of California-Pacific Utilities Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	36	45	56	61	62	62	61	57	38	22	17
2	26	36	15	56	62	64	62	61	57	38	22	16
3	26	36	0	56	59	42	62	61	54	38	17	16
4	26	36	45	55	68	67	62	61	51	38	17	16
5	27	36	63	56	65	64	*62	61	51	46	13	16
6	26	42	64	40	65	66	62	62	52	44	13	17
7	26	42	53	28	70	57	62	62	51	38	11	17
8	26	46	53	56	*44	64	62	62	51	31	11	17
9	26	46	53	55	64	61	62	62	51	33	11	14
10	26	46	53	56	64	41	62	62	51	34	11	13
11	26	46	55	58	63	44	62	61	51	33	11	13
12	26	*48	58	59	63	64	63	62	50	32	9.6	13
13	26	46	58	59	65	67	63	62	48	32	9.6	13
14	26	46	57	61	65	66	63	62	37	32	9.6	13
15	26	46	58	62	65	62	63	62	47	32	9.1	14
16	28	46	*57	61	64	44	64	62	69	19	9.1	14
17	28	46	57	61	65	62	64	62	67	19	9.1	23
18	28	46	58	61	65	63	64	62	69	19	9.1	23
19	28	46	57	58	64	63	62	62	64	*20	8.9	24
20	28	46	57	40	65	62	62	56	59	22	8.9	19
21	28	45	17	64	65	62	62	*62	58	22	8.9	19
22	28	45	21	58	65	62	62	62	53	22	8.9	19
23	12	45	57	61	63	62	62	64	52	25	*8.9	19
24	0	45	56	61	63	62	40	64	51	28	8.4	18
25	0	45	56	61	64	62	59	64	49	30	8.4	19
26	0	45	56	61	42	62	59	64	49	28	8.4	22
27	0	45	56	60	46	62	59	64	49	28	8.4	22
28	0	45	56	61	40	62	59	64	41	31	8.4	23
29	0	45	56	24	-	63	61	65	40	23	8.4	24
30	20	45	56	28	-	62	61	59	38	22	10	26
31	35	-	56	46	-	62	-	58	-	22	17	-
Total	655	1,312	1,559	1,679	1,714	1,868	1,834	1,918	1,567	919	346.1	552
Mean	21.1	43.7	50.3	54.2	61.2	60.3	61.1	61.8	52.2	29.6	11.2	18.4
Ac-ft	1,300	2,600	3,090	3,330	3,400	3,710	3,640	3,800	3,110	1,820	686	1,090

Calendar year 1950: Max 64 Min 0 Mean 34.8 Ac-ft 25,210  
 Water year 1950-51: Max 70 Min 0 Mean 43.6 Ac-ft 31,580

\* Discharge measurement made on this day.

Strawberry Creek above Slide Creek, near Prairie City, Oreg.

Location.--Lat 44°20', long. 118°39', in SW $\frac{1}{4}$  sec. 20, T. 14 S., R. 34 E., on left bank 100 ft upstream from Slide Creek and  $\frac{8}{10}$  miles south of Prairie City.

Drainage area.--7.2 sq mi, approximately.

Records available.--October 1930 to September 1951.

Gage.--Water-stage recorder and log control. Datum of gage is 4,909.57 ft above mean sea level, datum of 1929.

Average discharge.--21 years, 12.0 cfs.

Extremes.--Maximum discharge during year, 84 cfs May 28 (gage height, 2.04 ft); minimum, 2.5 cfs all or part of each day Oct. 1-26.

1930-51: Maximum discharge, 172 cfs June 8, 1948; maximum gage height, 2.44 ft June 9, 1933; minimum discharge, 1.4 cfs for several days in 1931, 1934, 1935, 1937, and on Nov. 19, 1939.

Remarks.--Records good. No diversion above station; some natural regulation by Strawberry Lake.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

1.1	0.6	1.6	24
1.2	3.0	1.8	45
1.3	7.0	2.1	95
1.4	12		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.5	3.7	5.3	5.3	b3.5	4.1	4.9	23	51	26	9.8	4.1
2	2.5	6.5	5.3	5.3	3.7	4.1	4.9	22	45	28	9.3	3.7
3	2.5	7.4	5.3	5.3	3.7	4.1	5.3	21	41	27	8.8	3.7
4	2.7	7.4	5.3	5.3	3.7	4.1	6.1	23	40	25	8.8	3.7
5	2.7	7.4	5.3	4.9	3.7	4.1	*7.4	23	39	24	8.8	3.7
6	2.7	7.0	6.5	4.9	4.1	4.1	8.8	24	37	23	8.3	3.7
7	2.7	6.5	7.0	4.9	5.3	4.1	9.3	27	34	21	7.8	3.7
8	2.7	7.0	7.0	4.5	5.3	4.1	9.3	28	31	21	7.4	3.7
9	2.7	6.1	7.0	4.5	*5.7	4.1	9.8	28	29	20	7.4	3.7
10	2.5	6.5	7.0	4.5	6.5	4.1	10	29	29	19	7.4	3.7
11	2.5	6.5	7.4	4.5	7.4	3.7	10	35	30	18	7.0	3.7
12	2.5	*6.5	7.4	4.5	7.4	3.7	13	45	32	18	7.0	3.7
13	2.5	6.1	7.4	4.5	7.4	3.7	15	48	37	17	7.0	3.7
14	2.5	6.1	7.4	4.5	7.4	3.7	17	49	43	16	6.5	3.7
15	2.5	6.1	7.4	4.5	7.0	4.1	17	46	55	16	6.5	3.4
16	2.5	6.1	7.4	4.5	7.0	4.1	20	44	64	15	6.1	3.4
17	2.7	6.1	*7.4	4.5	6.5	4.1	21	44	64	15	6.1	3.4
18	2.7	6.1	7.0	4.5	6.1	4.1	21	46	61	15	5.7	3.4
19	2.5	5.7	7.0	4.5	6.1	4.1	22	48	55	15	5.7	3.4
20	2.5	5.7	7.0	4.5	5.7	4.1	22	*51	53	*14	5.3	3.0
21	2.5	5.3	6.5	4.5	5.7	4.1	21	52	51	14	5.3	3.0
22	2.5	5.3	6.5	4.1	5.3	4.1	21	55	48	14	5.3	3.0
23	2.5	5.3	6.1	4.1	4.9	4.1	21	62	44	14	4.9	3.0
24	2.5	5.3	6.1	4.1	4.9	4.1	21	69	41	13	4.9	3.0
25	2.5	5.7	6.1	4.1	4.9	4.1	21	71	41	12	4.5	3.0
26	2.7	6.1	5.7	4.1	4.5	4.5	21	73	38	12	4.5	2.7
27	2.7	6.1	5.7	4.1	4.5	4.5	21	76	34	11	4.1	2.7
28	4.1	5.7	5.7	b4	b4.5	4.9	23	82	31	11	4.1	2.7
29	3.7	5.7	5.7	b3.5	-	4.9	24	73	31	11	4.1	2.7
30	4.1	5.7	5.7	b3.5	-	4.9	23	64	29	10	4.1	3.0
31	3.4	-	5.3	b3.5	-	4.9	-	59	-	10	4.1	-
Total	84.8	182.7	198.9	138.0	152.4	129.5	470.8	1,440	1,258	527	196.6	101.0
Mean	2.74	6.09	6.42	4.45	5.44	4.18	15.7	46.5	41.9	17.0	6.34	3.37
Ac-ft	168	362	395	274	302	257	934	2,860	2,500	1,050	390	200

Calendar year 1950: Max 80 Min 1.9 Mean 11.8 Ac-ft 8,550  
 Water year 1950-51: Max 82 Min 2.5 Mean 13.4 Ac-ft 9,690

Peak discharge (base, 50 cfs).--May 28 (5 a.m.) 84 cfs (2.04 ft); June 16 (7 p.m.) 68 cfs (1.95 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## JOHN DAY RIVER BASIN

## John Day River at Prairie City, Oreg.

Location.--Lat 44°27', long. 118°43', in NE $\frac{1}{4}$  sec. 10, T. 13 S., R. 33 E., on right bank 600 ft upstream from powerplant and outlet of Prairie power canal, a third of a mile below Dixie Creek, and three-quarters of a mile southwest of Prairie City.

Drainage area.--231 sq mi.

Records available.--October 1916 to September 1917 (gage heights only), March 1925 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3,496.99 ft above mean sea level, datum of 1929. Prior to Mar. 30, 1926, staff gage at site just below outlet of Prairie power canal at different datum. Mar. 30, 1936, to Aug. 23, 1943, staff gages at various sites and datums about 600 ft below present site, but just above the outlet of Prairie power canal.

Average discharge.--26 years (1925-51), 111 cfs, including flow of Prairie power canal.

Extremes.--Maximum discharge during year, 846 cfs Mar. 15 (gage height, 4.41 ft); minimum, 6.0 cfs Aug. 15.

1925-51: Maximum discharge observed, 1,550 cfs Mar. 19, 1932 (gage height, 4.7 ft, site and datum then in use), from rating curve extended above 500 cfs; minimum, 2 cfs Dec. 8, 21, 22, 1932, Aug. 10, 1934.

Remarks.--Records excellent except those for periods of ice effect, which are fair. Diversions above station for irrigation and for power. (See p. 36 for records for Prairie power canal at Prairie City.)

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 15				Mar. 16 to Sept. 30			
1.4	10	1.9	66	1.2	5.0	1.6	33
1.5	17	2.5	200	1.3	9.0	1.8	59
1.7	37	3.0	338	1.4	15	2.0	94

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	47	55	46	40	33	b40	134	148	124	21	11	23
2	45	85	66	42	55	40	134	121	103	20	12	23
3	45	72	79	45	50	b38	153	98	96	17	13	21
4	47	63	52	42	56	41	194	112	88	17	13	21
5	66	68	42	37	126	38	*236	112	137	25	12	20
6	61	53	55	b23	119	38	254	119	164	32	13	19
7	53	50	96	b30	301	b32	260	170	137	26	13	18
8	47	60	64	42	*261	b35	260	173	112	21	12	17
9	45	50	56	36	248	b35	254	162	98	20	10	19
10	44	45	56	33	253	b30	245	137	88	18	8.5	19
11	42	45	56	29	234	b30	230	239	94	18	7.6	17
12	40	*46	55	25	190	36	227	314	88	17	7.2	20
13	40	45	50	23	149	64	242	287	84	16	7.2	22
14	40	45	52	29	124	113	275	254	79	17	6.4	26
15	40	42	55	50	113	335	290	215	66	18	6.4	27
16	40	47	*50	42	100	230	275	194	39	18	7.2	27
17	44	46	50	40	91	164	266	188	40	18	8.5	24
18	50	55	46	41	85	137	266	179	43	17	11	17
19	42	52	45	34	74	159	251	182	43	17	12	13
20	41	53	42	b22	74	197	227	185	38	*19	12	13
21	42	52	72	46	66	206	197	*170	33	18	12	14
22	42	47	70	53	83	179	179	170	33	19	12	16
23	55	46	41	45	58	156	159	170	32	19	*12	16
24	63	46	37	76	55	159	156	179	30	20	11	14
25	64	47	37	74	56	173	107	173	31	19	11	15
26	68	47	34	85	b45	179	94	179	28	17	11	16
27	76	49	33	72	b40	170	92	185	27	16	12	18
28	87	47	37	b30	b37	159	153	194	22	15	12	20
29	83	46	45	b20	-	164	185	185	21	10	12	23
30	66	47	49	b14	-	159	164	162	21	10	18	21
31	52	-	41	b16	-	145	-	145	-	10	12	-
Total	1,617	1,551	1,609	1,236	3,154	3,681	6,159	5,501	2,039	565	345.0	589
Mean	52.2	51.7	51.9	39.9	113	119	205	177	68.0	18.2	11.1	19.6
Ac-ft	3,210	3,080	3,190	2,450	6,260	7,300	12,220	10,910	4,040	1,120	684	1,170

Adjusted for diversion by Prairie power canal

Mean	73.3	95.4	102	94.0	174	179	266	239	120	47.9	22.3	38.0
Cfsm	-	-	-	-	-	-	-	-	-	-	-	-
In.	-	-	-	-	-	-	-	-	-	-	-	-
Ac-ft	4,510	5,680	6,280	5,780	9,660	11,010	15,850	14,710	7,150	2,940	1,370	2,260

Observed

Calendar year 1950: Max	287	Min	7.3	Mean	78.7	Ac-ft	56,950
Water year 1950-51: Max	335	Min	6.4	Mean	76.8	Ac-ft	55,630

Adjusted

Calendar year 1950: Mean	113	Cfsm	-	In.	-	Ac-ft	82,170
Water year 1950-51: Mean	120	Cfsm	-	In.	-	Ac-ft	87,200

Peak discharge (base, 240 cfs).--Feb. 7 (8 p.m.) 478 cfs (3.44 ft); Mar. 15 (6 p.m.) 846 cfs (4.41 ft); Apr. 15 (2 to 7 a.m.) 296 cfs (2.72 ft); May 12 (10:30 a.m.) 338 cfs (2.86 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

John Day River at Picture Gorge, near Dayville, Oreg.

Location.--Lat 44°31'20", long. 119°37'30", in sec. 20, T. 12 S., R. 26 E., on right bank on John Day Highway, 0.7 mile upstream from Rock Creek bridge and 7 miles northwest of Dayville.

Drainage area.--1,640 sq mi, approximately.

Records available.--April 1926 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gate is 2,232.10 ft above mean sea level, water of 1929. Apr. 5 to Oct. 10, 1926, staff gage and Oct. 11, 1926, to July 25, 1930, water-stage recorder at same site at datum 0.80 ft higher.

Average discharge.--25 years, 424 cfs.

Extremes.--Maximum discharge during year, 2,840 cfs Feb. 11 (gage height, 9.42 ft); minimum, 14 cfs Aug. 14.

1926-51: Maximum discharge, 6,520 cfs May 22, 1948 (gage height, 13.72 ft); maximum gage height, 14.0 ft Mar. 19, 1932; minimum discharge, 1 cfs for several days in August and September 1930, Aug. 8, 9, 1936.

Remarks.--Records excellent. Many diversions above station for irrigation.

Revisions (water years).--W 794: 1932(M). Revised figures of discharge for period in the water year 1950, superseding those published in Water-Supply Paper 1184, are given herewith.

Day (water year)	Discharge (cubic feet per second)	Day (water year)	Discharge (cubic feet per second)	Day (water year)	Discharge (cubic feet per second)
1949-50		July 8.....	194	July 20.....	76
June 27.....	526	9.....	178	21.....	89
28.....	465	10.....	164	22.....	92
29.....	410	11.....	150	23.....	87
30.....	360	12.....	140	24.....	86
July 1.....	312	13.....	128	25.....	79
2.....	288	14.....	112	26.....	109
3.....	254	15.....	98	27.....	112
4.....	234	16.....	87	28.....	99
5.....	232	17.....	81	29.....	91
6.....	230	18.....	74	30.....	86
7.....	207	19.....	71	31.....	81

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
June 1950.....	22,810	1,010	360	760	45,240
July.....	4,321	312	71	139	8,570
Water year 1949-50....	166,220	1,690	25	455	329,700

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	106	262	290	438	514	716	1,450	1,250	701	124	27	26
2	125	318	286	445	610	701	1,470	1,160	644	109	26	28
3	143	395	280	508	622	626	1,660	1,080	593	96	23	33
4	168	372	306	485	651	674	1,960	1,050	575	98	18	30
5	169	348	332	455	1,030	683	2,290	1,100	584	109	18	30
6	216	324	427	390	1,160	662	*2,450	1,080	668	112	20	29
7	219	308	952	332	1,960	635	2,460	1,090	689	121	30	30
8	210	300	715	378	2,410	635	2,430	1,130	644	121	26	28
9	202	302	595	402	*2,290	647	2,350	1,090	593	114	23	28
10	196	292	580	400	2,640	584	2,270	1,060	548	113	22	28
11	190	282	526	398	2,700	545	2,130	1,230	539	112	23	28
12	184	*284	523	390	2,500	605	2,040	1,780	521	105	24	30
13	178	284	505	380	2,020	638	2,050	1,910	518	96	25	30
14	180	282	595	392	1,750	854	2,190	1,740	494	83	23	30
15	176	278	724	556	1,580	1,260	2,230	1,560	446	76	22	30
16	172	280	649	568	1,380	1,930	2,120	*1,400	395	73	22	29
17	176	286	*565	616	1,300	1,340	1,990	1,320	382	72	21	31
18	196	298	585	628	1,210	1,140	1,900	1,280	378	67	20	30
19	190	312	508	529	1,090	1,130	1,810	1,220	355	*59	21	30
20	186	306	482	440	1,070	1,360	1,690	1,160	310	54	22	30
21	183	306	462	458	1,020	1,700	1,540	1,100	286	53	20	29
22	182	300	442	574	958	1,640	1,380	1,030	263	49	*20	28
23	178	292	432	568	886	1,440	1,270	974	232	47	20	29
24	177	286	422	1,150	858	1,440	1,160	966	211	47	20	29
25	177	284	410	1,300	830	1,610	1,060	922	211	43	20	30
26	183	284	408	1,140	746	1,680	978	890	199	45	21	29
27	190	282	380	1,120	746	1,680	914	862	185	41	22	31
28	234	280	390	760	680	1,600	1,140	858	160	37	23	33
29	278	280	462	490	-	1,630	1,500	830	152	35	22	39
30	292	282	488	400	-	1,680	1,570	788	143	31	25	42
31	276	-	475	455	-	1,580	-	743	-	28	-	-
Total	5,946	8,991	15,116	17,545	37,191	35,025	53,252	35,653	12,619	2,370	694	906
Mean	192	300	468	568	1,328	1,130	1,775	1,150	421	76.5	22.4	30.2
Ac-ft	11,790	17,830	29,980	34,800	73,770	69,470	105,600	70,720	25,030	4,700	1,380	1,800

Calendar year 1950: Max 1,630 Min 25 Mean 495 Ac-ft 358,500  
 Water year 1950-51: Max 2,700 Min 18 Mean 617 Ac-ft 446,900

Peak discharge (base, 1,000 cfs).--Dec. 7 (9 a.m.) 1,150 cfs (6.27 ft); Jan. 25 (12:30 a.m.) 1,560 cfs (7.12 ft); Feb. 11 (6:30 a.m.) 2,840 cfs (9.42 ft); Mar. 16 (8:30 a.m.) 2,230 cfs (8.30 ft); Apr. 6 (8 a.m.) 2,500 cfs (8.72 ft); Apr. 29 (11 a.m.) 1,570 cfs (7.04 ft); May 13 (3:30 a.m.) 1,980 cfs (7.87 ft).

\* Discharge measurement made on this day.

## Desolation Creek near Dale, Oreg.

Location.--Lat 44°59', long. 118°55', in SE $\frac{1}{4}$  sec. 1, T. 7 S., R. 31 E., on right bank 1 mile upstream from mouth and 2 miles east of Dale.

Drainage area.--108 sq mi.

Records available.--July 1915 to September 1917 (fragmentary), gage heights and discharge measurements only, September 1949 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,905.24 ft above mean sea level, datum of 1929. July to September 1917, at site three-quarters of a mile downstream at different datum.

Extremes.--Maximum discharge during year, 780 cfs May 11 (gage height, 2.96 ft); maximum gage height, 3.64 ft Feb. 2 (ice jam); minimum discharge, 7.3 cfs Sept. 19-24 (gage height, 0.62 ft).

1949-51: Maximum discharge, that of May 11, 1951; maximum gage height, that of Feb. 2, 1951; minimum discharge, 4.8 cfs Oct. 20, 1949.

Remarks.--Records good except those for periods of ice effect, which are fair. Slight fluctuation at low flows caused by log ponds above station.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 1

Feb. 2 to Sept. 30

0.7	8.4	0.6	6.8	1.7	104
.8	12	.8	13	2.0	173
1.0	20	1.0	22	2.4	330
1.2	36	1.2	38	2.8	630
1.6	91	1.4	61		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.7	26	24	41	b32	45	106	264	168	45	14	9.5
2	9.7	52	22	51	b50	46	121	236	157	41	13	9.2
3	11	47	27	47	77	40	139	236	146	39	13	8.9
4	14	35	32	44	64	48	168	276	141	39	13	8.6
5	18	29	33	41	61	44	202	295	168	37	12	8.4
6	22	27	48	b20	64	42	219	325	173	39	12	8.4
7	15	26	88	b40	126	41	*240	411	173	34	12	8.1
8	15	40	67	b50	160	41	256	384	151	31	11	8.1
9	17	25	54	b44	192	38	264	390	137	29	11	8.1
10	15	22	54	53	208	b36	264	411	137	28	12	8.1
11	13	26	57	43	*208	b34	264	630	146	27	11	8.1
12	12	25	60	36	179	37	295	558	151	26	11	8.1
13	11	*19	52	32	128	44	354	444	149	25	11	8.1
14	11	22	56	46	117	48	439	390	154	24	10	8.1
15	11	18	57	57	106	99	384	360	160	24	10	8.1
16	10	22	52	44	91	108	390	360	151	24	10	7.8
17	12	21	47	47	87	82	460	384	134	*22	9.5	7.8
18	17	25	43	41	77	71	425	390	121	22	9.2	7.6
19	16	20	*42	37	69	77	397	366	110	20	8.9	7.6
20	13	26	42	32	73	102	354	354	101	20	8.9	7.3
21	12	26	38	42	66	115	310	354	93	20	*8.9	7.3
22	12	23	38	36	59	98	268	378	85	20	9.2	7.3
23	11	22	43	34	47	88	248	*411	78	18	9.2	7.6
24	11	23	42	80	59	99	230	411	74	18	9.2	7.6
25	11	30	41	b50	56	117	216	372	70	17	8.9	7.8
26	15	32	34	b55	35	125	212	360	64	16	8.6	8.1
27	18	32	37	57	b40	115	222	354	59	16	8.6	8.4
28	25	32	37	31	b36	108	425	315	55	15	8.6	8.1
29	40	28	53	b25	-	123	384	256	51	15	8.6	8.1
30	46	28	61	b30	-	115	315	219	48	15	9.2	9.2
31	31	-	46	b36	-	104	-	189	-	15	10	-
Total	504.4	829	1,427	1,302	2,567	2,330	8,571	10,083	3,605	781	321.5	243.5
Mean	16.3	27.6	46.0	42.0	91.7	75.2	266	358	120	25.2	10.4	8.12
Ac-ft	1,000	1,640	2,830	2,580	5,090	4,620	17,000	21,980	7,150	1,550	638	483

Calendar year 1950: Max 521 Min 7.6 Mean 93.5 Ac-ft 67,680

Water year 1950-51: Max 630 Min 7.3 Mean 92.0 Ac-ft 66,560

Peak discharge (base, 200 cfs).--Feb. 10 (5:30 p.m.) 230 cfs (2.17 ft); Apr. 17 (9 p.m.) 516 cfs (2.67 ft); Apr. 28 (2 p.m.) 500 cfs (2.65 ft); May 11 (9 a.m.) 780 cfs (2.96 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## North Fork John Day River near Dale, Oreg.

Location.--Lat 45°00', long. 118°57', in SE $\frac{1}{4}$  sec. 35, T. 6 S., R. 31 E., on right bank three-eighths of a mile downstream from Desolation Creek and  $\frac{1}{2}$  miles northeast of Dale.

Drainage area.--525 sq mi.

Records available.--October 1929 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,775.85 ft above mean sea level, datum of 1929.

Average discharge.--22 years, 375 cfs.

Extremes.--Maximum discharge during year, 3,330 cfs May 11 (gage height, 7.18 ft); minimum, 44 cfs Sept. 17, 18.  
1929-51: Maximum discharge, 8,170 cfs May 26, 1948 (gage height, 10.48 ft); minimum, 6 cfs Nov. 3, 1936 (gage height, 1.40 ft).

Remarks.--Records excellent except those below 100 cfs, which are good, and those for periods of ice effect, which are fair. Log ponds and several small diversions above station for irrigation and mining cause fluctuations at low flow.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

2.1	40	3.5	387
2.4	79	4.0	620
2.8	159	5.0	1,230
3.0	212	6.9	3,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	164	148	174	b110	204	475	1,410	852	268	84	63
2	67	239	121	209	b120	209	511	1,270	780	258	79	60
3	73	255	128	209	b200	184	610	1,240	738	248	78	60
4	86	221	169	206	b240	204	828	1,420	710	242	76	58
5	98	182	182	198	245	195	1,060	1,520	816	236	74	56
6	132	162	198	115	245	192	1,200	1,750	810	258	74	56
7	106	152	245	b20	375	182	*1,270	2,250	852	233	74	55
8	98	195	215	b150	484	179	1,560	2,190	774	209	73	55
9	107	169	192	b160	560	174	1,410	2,130	705	198	73	51
10	102	106	201	b170	650	162	1,430	2,250	685	187	72	51
11	88	141	218	190	*732	159	1,410	3,000	726	182	72	51
12	82	141	233	184	715	174	1,520	2,960	732	172	70	51
13	81	*126	215	172	585	187	1,870	2,480	715	162	67	51
14	76	126	221	198	535	198	2,410	2,140	710	154	64	51
15	74	109	218	224	493	329	2,380	1,900	744	150	66	50
16	73	123	204	198	444	404	2,280	1,910	720	143	63	49
17	79	126	195	201	400	375	2,390	2,050	670	136	61	46
18	102	145	187	187	367	332	2,490	2,040	615	*130	60	46
19	115	130	187	179	324	336	2,360	1,890	565	123	59	47
20	93	128	184	148	324	408	2,010	1,790	525	115	58	48
21	86	143	174	172	306	493	1,650	1,730	488	115	*59	48
22	81	130	172	176	284	488	1,470	1,750	452	111	61	48
23	73	128	182	174	236	434	1,350	*1,890	426	109	63	48
24	80	126	187	227	261	457	1,260	1,840	408	106	63	48
25	80	148	182	255	264	516	1,220	1,690	405	102	59	50
26	91	162	154	264	182	565	1,230	1,600	367	96	59	52
27	111	169	148	239	227	580	1,340	1,520	343	93	55	54
28	148	169	182	148	195	555	1,800	1,410	324	89	58	52
29	239	154	198	93	-	580	1,840	1,200	298	88	55	51
30	271	157	236	b110	-	545	1,590	1,060	284	88	66	54
31	209	-	201	b120	-	502	-	942	-	86	70	-
Total	5,273	4,626	5,877	5,540	10,103	10,502	46,024	56,202	18,239	4,887	2,065	1,560
Mean	106	154	190	179	361	339	1,534	1,813	608	158	66.6	52.0
Ac-ft	6,490	9,180	11,660	10,990	20,040	20,830	91,290	111,500	36,180	9,690	4,100	3,090
Calendar year 1950: Max	3,060			Min	40	Mean	450	Ac-ft	326,000			
Water year 1950-51: Max	3,000			Min	46	Mean	463	Ac-ft	335,000			

Peak discharge (base, 1,200 cfs).--Apr. 18 (2 a.m.) 2,620 cfs (8.55 ft); Apr. 28 (10 p.m.) 2,000 cfs (5.93 ft); May 11 (9:30 p.m.) 3,330 cfs (7.18 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## JOHN DAY RIVER BASIN

Camas Creek near Lehman, Oreg.

Location.--Lat 45°10', long. 118°44', in SW $\frac{1}{4}$  sec. 33, T. 4 S., R. 33 E., on left bank 2 miles downstream from Bowman Creek and  $3\frac{1}{2}$  miles northwest of Lehman.

Drainage area.--61 sq mi, approximately.

Records available --October 1950 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3,969.53 ft above mean sea level (levels by Oregon State Highway Department).

Extremes.--Maximum discharge during year, 544 cfs Feb. 11 (gage height, 2.52 ft); maximum gage height, 3.70 ft about Feb. 1 (ice jam); minimum discharge, 0.7 cfs Sept. 20, 21.

Remarks.--Records good except those for periods of ice effect, which are fair, and those for periods of no gage-height record, which are poor. Slightly regulated at low flows by operation of irrigation ditches.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from moss June 22 to Sept. 30)

0.3	0.6	0.7	4.7	1.4	74
.4	1.0	.8	8.0	1.7	148
.5	1.7	.9	13	2.0	255
.6	2.8	1.1	31	2.4	465

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a1.5	a30	31	b40	a50	50	154	74	15	4.0	1.2	1.1
2	a2	a60	28	49	a65	41	215	67	12	4.0	1.2	1.1
3	a2.5	a50	27	47	a60	b56	315	60	12	3.6	1.2	1.1
4	a4	a36	*49	44	a65	b55	372	60	12	3.8	1.2	1.1
5	a5.5	a32	60	39	a65	b48	361	60	19	3.8	1.2	1.0
6	a7.5	a30	100	b30	a80	49	345	66	24	3.8	1.2	1.0
7	a4.5	a28	151	b24	a110	35	345	74	23	3.6	1.1	.9
8	a3.5	*39	105	*b40	a200	25	*356	67	19	3.4	1.0	1.0
9	a5	31	80	b34	a300	b22	330	60	15	3.4	1.0	.9
10	a4	26	69	43	a390	b16	266	54	13	2.6	1.1	1.0
11	a3	22	69	36	441	b19	251	80	12	2.7	1.1	*1.0
12	a2.5	20	64	33	*378	20	247	87	12	2.5	1.1	.8
13	a2.5	18	57	31	255	b24	268	89	12	2.2	1.2	.9
14	a2.5	17	59	42	194	b34	268	89	10	2.0	1.0	.9
15	2.4	15	59	47	154	83	235	80	9.5	1.8	.9	.9
16	*2.4	15	54	47	134	158	204	71	9.0	1.8	.9	.9
17	a3.5	19	51	46	115	123	190	66	8.0	*1.6	.9	.8
18	a7	36	47	46	93	98	177	57	8.0	1.5	.9	.8
19	a6	33	44	b40	78	105	158	50	6.8	1.5	.9	.8
20	a5.5	50	*41	b36	72	140	131	43	6.4	1.5	*1.1	.8
21	a5	51	36	b40	64	174	108	38	6.1	1.5	1.0	.8
22	a4.5	46	36	41	57	151	89	35	5.8	1.5	.9	.8
23	a4	42	38	b36	b48	131	80	*32	*5.5	1.5	.9	.9
24	a3.5	46	35	b55	b48	151	71	29	5.5	1.4	1.0	.9
25	a4.5	57	33	b50	42	204	66	26	5.8	1.4	1.1	1.2
26	a6	56	31	b55	b34	239	62	23	5.0	1.4	1.1	1.1
27	a10	53	28	b40	b38	235	62	19	4.7	1.2	1.2	1.1
28	a20	43	28	b50	b56	208	89	19	4.4	1.1	1.1	1.1
29	a40	36	39	a24	-	208	93	17	4.2	1.2	1.1	1.2
30	a50	37	46	a28	-	177	80	15	4.0	1.2	1.2	1.5
31	a40	-	42	a34	-	151	-	15	-	1.2	1.2	-
Total	264.8	1,078	1,637	1,227	3,656	3,212	6,008	1,622	308.7	69.9	33.2	29.4
Mean	8.54	35.9	52.8	39.6	131	104	200	52.3	10.3	2.25	1.07	0.98
Ac-ft	525	2,140	3,250	2,430	7,250	6,370	11,920	3,220	612	139	66	58

Calendar year 1950: Max - Min - Mean - Ac-ft -  
Water year 1950-51: Max 441 Min 0.8 Mean 52.5 Ac-ft 37,980

Peak discharge (base, 250 cfs).--Feb. 11 (8:30 p.m.) 544 cfs (2.52 ft); Mar. 26 (8 p.m.) 291 cfs (2.08 ft); Apr. 4 (9 p.m.) 478 cfs (2.42 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage when available, weather records, records for station downstream at Ukiah, and records for other stations in John Day River basin.

b Stage-discharge relation affected by ice.



## Camas Creek near Ukiah, Oreg.

Location.--Lat 45°09', long. 118°49', 1n SE $\frac{1}{4}$  sec. 3, T. 5 S., R. 32 E., on right bank 1.2 miles upstream from Cable Creek and 6 miles east of Ukiah.

Drainage area.--121 sq mi.

Records available.--May 1914 to September 1917, November 1919 to June 1924 and October 1945 to September 1951 in reports of Geological Survey. May 1914 to September 1917, November 1919 to June 1924, and March 1932 to September 1941 (incomplete) in reports of State engineer; October 1941 to September 1945 (incomplete) in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 3,588.61 ft above mean sea level (levels by Oregon State Highway Department). May 1, 1914, to June 30, 1924, staff gage and Mar. 1, 1932, to Nov. 7, 1940, water-stage recorder at site 1.2 miles downstream at different datum.

Average discharge.--17 years (1914-17, 1919-23, 1940-44, 1945-51), 111 cfs.

Extremes.--Maximum discharge during year, 1,030 cfs Feb. 11 (gage height, 3.62 ft); minimum, 2.0 cfs Aug. 19, 31.  
1914-17, 1919-24, 1932-51: Maximum discharge, 2,350 cfs Dec. 12, 1946 (gage height, 4.58 ft), from rating curve extended above 810 cfs by logarithmic plotting; minimum observed, 1 cfs Aug. 1-9, 1932, June 24 to July 2, 1940.

Remarks.--Records good except those for periods of ice effect or doubtful gage-height record, which are fair, and those for periods of no gage-height record, which are poor. Slightly regulated at low flows by operation of irrigation ditches.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.6	60	40	b75	b90	b100	276	d180	d46	12	3.4	2.2
2	7	120	36	b80	b110	b90	374	d160	d42	12	3.4	2.3
3	9	95	50	b40	b120	b80	559	d150	d40	11	3.2	2.4
4	11	75	*61	78	111	b100	702	d150	d40	11	3.2	2.4
5	16	65	89	73	109	b90	702	d160	54	12	3.2	2.6
6	20	60	127	b50	125	91	644	d180	d80	12	3.2	2.7
7	15	55	216	b65	333	b85	665	d190	d70	11	3.4	2.6
8	13	*76	154	*b100	467	b80	*629	d180	63	10	3.2	2.9
9	18	65	132	b75	607	75	559	d160	55	10	3.0	3.2
10	12	50	118	b80	803	b60	d500	d200	d46	9.5	3.0	3.2
11	9	42	114	b85	903	b65	d460	d240	d42	9.0	3.0	2.7
12	8	36	114	76	*771	68	d460	d260	d40	8.5	3.0	2.7
13	8	34	103	66	492	68	d500	d270	d40	8.5	2.9	3.2
14	8	32	103	85	364	73	512	d260	d36	7.0	2.9	3.0
15	7	30	105	109	294	158	d420	d230	d32	7.0	2.7	3.0
16	7	34	95	103	247	308	d400	d220	d29	7.0	2.4	2.9
17	13	44	91	103	216	231	d360	d200	d27	*6.6	2.3	*2.9
18	20	55	82	99	185	188	d320	d190	d26	5.8	2.1	2.7
19	18	44	78	93	161	202	d300	d180	d24	5.2	2.1	2.7
20	17	60	*73	b80	150	290	d280	d160	d22	5.5	*2.1	2.7
21	16	65	66	b90	135	369	d240	d150	20	5.2	2.2	2.4
22	15	60	63	91	123	313	d220	d140	d19	5.2	2.2	2.3
23	13	55	68	85	105	263	d180	*d130	*18	5.2	2.2	2.4
24	11	60	63	b140	109	304	d170	d120	18	4.9	2.2	2.6
25	15	75	61	b110	101	402	d160	99	18	4.9	2.2	3.2
26	20	70	55	b120	66	455	d150	89	16	4.6	2.2	3.4
27	50	65	51	b80	b70	437	d150	82	15	4.6	2.2	3.0
28	50	55	45	b65	b65	380	d200	75	15	4.4	2.2	3.0
29	80	50	68	b50	-	374	d220	66	13	4.4	2.2	3.0
30	100	46	87	b46	-	328	d190	55	12	4.4	2.1	3.6
31	75	-	82	b65	-	286	-	48	-	4.1	2.1	-
Total	663.6	1,733	2,700	2,601	7,432	6,413	11,502	4,974	1,018	232.5	81.7	83.9
Mean	21.4	57.8	87.1	83.9	265	207	383	160	33.9	7.50	2.64	2.80
Ac-ft	1,320	3,440	5,360	5,160	14,740	12,720	22,610	9,970	2,020	461	162	166
Calendar year 1950: Max	680				Min 3.6	Mean 113		Ac-ft 81,500				
Water year 1950-51: Max	903				Min 2.1	Mean 108		Ac-ft 78,230				

Peak discharge (base, 550 cfs).--Feb. 11 (10:30 p.m.) 1,030 cfs (3.62 ft); Apr. 4 (11 p.m.) 869 cfs (3.44 ft); Apr. 13 (10:30 p.m.) about 600 cfs.

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

d Doubtful gage-height record; discharge computed on basis of appearance of recorder graph, 1 discharge measurement, weather records, and records for station near Lehman.

Note.--No gage-height record Oct. 2 to Nov. 7, Nov. 9 to Dec. 3; discharge estimated on basis of recorded range in stage, weather records, and records for station near Lehman and North Fork John Day River near Dale.

## Middle Fork John Day River at Ritter, Oreg.

Location.--Lat 44°53', long. 119°08', in NW¼ sec. 8, T. 8 S., R. 30 E., on left bank 35 ft downstream from bridge and half a mile south of Ritter.

Drainage area.--526 sq mi.

Records available.--October 1929 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,544.56 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Average discharge.--22 years, 225 cfs.

Extremes.--Maximum discharge during year, 1,630 cfs Mar. 15 (gage height, 5.47 ft); minimum, 13 cfs Aug. 19, 23 (gage height, 1.81 ft).

1929-51: Maximum discharge, 4,000 cfs Mar. 19, 1932 (gage height, 7.78 ft), from rating curve extended above 2,200 cfs; maximum gage height, 8.50 ft Feb. 18, 1949 (ice jam); minimum discharge, 1.0 cfs Dec. 10, 1932.

Revisions.--Minimum discharge for the water year 1950 has been revised to 13 cfs Sept. 19, 1950 (gage height, 1.81 ft), superseding figure published in Water-Supply Paper 1184.

Remarks.--Records excellent except those for periods of no gage-height record, which are fair. Several small diversions above station for irrigation.

Revisions (water years).--W 739: 1931. Revised figures of discharge for water year 1950, superseding those published in Water-Supply Paper 1184, are given herein.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.8	12	3.5	330
2.0	26	4.0	530
2.5	56	4.5	790
2.7	121	5.3	1,460
3.0	186		

Discharge, in cubic feet per second, water year October 1949 to September 1950

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	47	41	86	b42	b80	360	513	615	620	222	43	21
2	39	41	73	b35	b100	323	896	640	635	204	41	20
3	36	40	63	b30	b130	482	756	590	610	188	41	20
4	36	40	41	b25	b180	570	620	565	615	170	41	19
5	38	40	b50	b20	b210	575	605	565	615	163	51	20
6	42	40	64	b30	b250	545	706	526	600	150	*59	*19
7	48	40	58	b60	b230	424	701	482	600	139	56	18
8	52	43	55	b70	b210	387	734	459	580	127	50	18
9	51	49	50	b65	b180	337	723	454	*495	125	44	19
10	52	58	b40	b65	b150	*323	701	477	464	125	41	21
11	60	55	b31	b60	b120	277	712	526	526	117	39	20
12	52	56	b32	b60	b108	264	860	625	635	103	37	20
13	49	54	b40	b60	b100	249	1,050	767	625	96	35	16
14	46	50	b50	b60	b115	274	872	878	580	89	35	16
15	43	48	b60	b60	b200	277	812	908	560	83	34	15
16	48	47	b65	b65	b320	323	794	878	540	81	32	17
17	49	47	b65	b60	b240	495	854	890	536	78	30	18
18	49	47	*b58	b60	274	670	878	800	522	75	28	15
19	48	48	b50	b70	284	805	872	718	486	73	27	14
20	42	43	b43	b120	252	540	934	685	472	70	26	16
21	44	b40	b50	b250	217	472	1,020	718	560	66	25	16
22	42	b40	b65	341	206	531	1,020	789	490	83	24	16
23	43	55	b65	240	252	450	902	836	424	59	24	17
24	42	93	b60	158	433	411	778	778	379	55	27	18
25	42	84	b50	112	605	375	712	728	348	51	27	25
26	43	73	b55	105	595	367	670	712	306	48	26	29
27	42	84	b58	114	575	334	670	728	283	46	25	34
28	*43	126	b56	103	424	330	*645	701	264	46	25	34
29	46	96	b50	b85	-	286	580	665	246	46	25	32
30	47	84	b48	b80	-	310	550	645	231	48	23	32
31	43	-	46	b65	-	313	-	615	-	46	22	-
Total	1,404	1,700	1,677	2,770	7,017	12,479	23,140	20,963	14,847	3,052	1,063	615
Mean	45.3	56.7	54.1	89.4	251	403	771	676	495	98.5	34.3	20.5
Ac-ft	2,780	3,370	3,350	5,490	13,920	24,750	45,900	41,580	29,450	6,050	2,110	1,220

Calendar year 1949: Max 1,340 Min 17 Mean 265 Ac-ft 192,000  
 Water year 1949-50: Max 1,050 Min 14 Mean 249 Ac-ft 180,000

Peak discharge (base, 760 cfs).--Apr. 2 (9 a.m.) 948 cfs (4.74 ft); Apr. 13 (12 m.) 1,140 cfs (5.00 ft); May 15 (5 a.m.) 934 cfs (4.72 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Middle Fork John Day River at Ritter, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	32	a95	96	183	185	196	680	650	327	75	26	28
2	32	a110	81	a180	179	194	790	595	296	87	25	25
3	35	a140	88	a190	194	183	952	580	282	64	24	22
4	43	a120	103	a170	211	179	1,170	595	273	63	22	23
5	49	103	131	a140	379	184	1,390	625	308	70	22	22
6	70	a90	168	a120	459	172	1,430	640	320	78	22	22
7	57	a80	267	a95	790	165	*1,350	724	308	76	20	20
8	49	a90	227	131	920	161	1,310	713	288	66	20	19
9	50	a100	191	135	1,000	161	1,250	713	261	62	20	19
10	46	a80	184	139	1,170	135	1,200	724	258	62	21	19
11	42	a70	184	139	*1,130	143	1,100	906	230	57	20	19
12	40	75	a190	145	1,020	154	1,060	968	224	54	20	19
13	43	*70	a180	133	784	184	1,120	871	227	48	20	20
14	38	70	a200	191	665	255	1,290	784	219	46	20	20
15	37	66	a190	376	565	687	1,290	713	214	44	20	20
16	36	72	a180	235	485	595	1,170	691	204	44	20	19
17	39	75	a180	211	436	444	1,120	708	191	41	19	19
18	52	84	a170	198	400	393	1,100	696	177	*37	18	19
19	56	94	*156	184	334	420	1,020	660	163	37	16	19
20	45	89	152	152	344	585	913	635	152	37	15	20
21	42	100	145	161	311	752	808	615	141	36	*16	20
22	41	95	137	194	276	740	730	*605	133	35	16	20
23	40	89	135	186	255	635	670	625	123	35	16	22
24	40	86	131	362	252	670	630	615	117	34	19	22
25	40	94	125	416	258	789	620	580	112	32	19	22
26	45	98	a120	382	188	866	575	555	101	32	17	23
27	54	101	a110	330	216	878	575	530	94	31	17	24
28	54	100	a120	201	184	806	680	498	91	29	18	21
29	a110	91	a160	148	-	824	784	436	84	28	20	22
30	125	91	a230	161	-	784	708	390	78	28	22	26
31	a110	-	a190	170	-	712	-	354	-	27	29	-
Total	1,592	2,716	4,921	6,138	13,570	14,026	29,485	19,974	5,976	1,475	619	637
Mean	51.4	90.5	159	198	485	452	983	644	199	47.6	20.0	21.2
Ac-ft	3,160	5,390	9,760	12,170	26,920	27,820	58,480	39,620	11,850	2,930	1,230	1,260
Calendar year 1950: Max			1,050		Min 14		Mean 261		Ac-ft 188,800			
Water year 1950-51: Max			1,430		Min 15		Mean 277		Ac-ft 200,600			

Peak discharge (base, 760 cfs)--Feb. 10 (9:30 p.m.) 1,380 cfs (5.22 ft); Mar. 15 (7 p.m.) 1,630 cfs (5.47 ft); Mar. 27 (5 a.m.) 928 cfs (4.71 ft); Apr. 6 (8 a.m.) 1,490 cfs (5.33 ft); Apr. 29 (5 to 6 a.m.) 832 cfs (4.57 ft); May 11 (10:30 p.m.) 1,038 cfs (4.84 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for other station in John Day River basin.

Fox Creek at gorge, near Fox, Oreg.  
(The lower part of this stream is named Cottonwood Creek)

Location.--Lat 44°37'10", long. 119°15'45", in NW¼ sec. 17, T. 11 S., R. 29 E., on left bank, at head of gorge, 6 miles southwest of Fox.

Drainage area.--90.2 sq mi.

Records available.--October 1930 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 4,230 ft (from topographic map).

Average discharge.--21 years, 22.8 cfs.

Extremes.--Maximum discharge during year, 507 cfs Mar. 15 (gage height, 3.37 ft); maximum gage height, 4.26 ft Feb. 7 (ice jam); no flow Oct. 1-17, July 17-26, July 29 to Sept. 30.

1930-51: Maximum discharge, 1,850 cfs May 22, 1948 (gage height, 5.84 ft), by slope-area determination; no flow at times.

Remarks.--Records good except those below 1 cfs or above 150 cfs, which are fair, and those for periods of ice effect, which are poor. Several diversions above station for irrigation of about 4,800 acres.

Revisions (water years).--W 754: 1932(M). W 1184: Drainage area.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.4	0	0.9	1.8	95
.5	.1	1.0	2.4	212
.6	.6	1.1	3.0	383
.7	1.3	1.2	20	
.8	2.7	1.4	41	

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0	2.4	2.0	b6	b10	22	80	66	9.9	0.4		
2	0	4.2	2.1	b7	b15	18	80	58	8.6	.3		
3	0	2.4	2.4	b8	b30	b13	84	52	8.2	.2		
4	0	2.0	4.9	b6	47	14	100	57	7.9	.1		
5	0	1.7	5.3	b5	67	14	113	63	9.9	.2		
6	0	1.7	8.6	b4	b60	b16	120	60	14	.3		
7	0	1.6	14	b4	b70	b15	*121	62	15	.2		
8	0	2.0	16	b7	b100	b16	123	60	13	.3		
9	0	1.7	11	b6	b200	b25	121	53	9.9	.2		
10	0	1.6	9.0	8.2	*305	b14	118	46	7.9	.2		
11	0	1.7	8.6	9.0	228	b15	109	74	6.8	.3		
12	0	2.0	8.6	9.9	173	16	108	105	6.0	.3		
13	0	*2.0	9.5	11	108	39	113	105	6.8	.3		
14	0	2.0	16	15	86	77	126	89	5.3	.2		
15	0	2.0	34	b20	76	237	123	73	4.2	.2		
16	0	2.4	28	b14	60	252	114	63	3.4	.1		
17	0	3.1	17	b13	62	152	108	56	2.7	0		
18	.3	4.5	14	b11	51	116	103	51	2.3	*0		
19	.4	3.1	*13	b9	46	146	95	45	2.0	0		
20	.5	3.8	12	b8	52	188	80	40	2.0	0		
21	.5	3.1	9.9	8.6	49	170	72	*34	1.6	0		
22	.5	3.1	9.9	9.0	42	111	63	28	1.6	0		
23	.4	2.9	9.9	10	39	90	57	24	1.3	0		
24	.4	2.9	9.0	21	34	90	53	24	1.1	0		
25	.6	2.7	8.6	b12	36	100	48	20	1.2	0		
26	.8	2.7	b6	b13	24	98	45	16	1.1	0		
27	1.1	2.7	b6	b10	31	90	46	14	1.0	.1		
28	2.1	2.7	6.4	b6	32	82	69	12	.6	.1		
29	2.6	2.9	b10	b7	-	90	92	11	.5	0		
30	2.6	3.1	b8	b6	-	95	80	11	.4	0		
31	1.6	-	b7	b8	-	100	-	11	.4	0		
Total	14.4	76.7	326.7	293.7	2,135	2,521	2,764	1,483	156.2	4.0	0	0
Mean	0.46	2.56	10.5	9.47	76.2	81.3	92.1	47.8	5.21	0.13	0	0
Ac-ft	29	152	648	583	4,230	5,000	5,480	2,940	310	7.9	0	0

Calendar year 1950: Max 152 Min 0 Mean 22.4 Ac-ft 16,230

Water year 1950-51: Max 305 Min 0 Mean 26.8 Ac-ft 19,380

Peak discharge (base, 150 cfs).--Feb. 10 (8:30 p.m.) 328 cfs (2.82 ft); Feb. 13 (3 p.m.) 152 cfs (2.13 ft); Mar. 15 (4:30 p.m.) 507 cfs (3.37 ft); Mar. 20 (9 p.m.) 212 cfs (2.40 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## North Fork John Day River at Monument, Oreg.

Location.--Lat 44°49', long. 119°26', in E $\frac{1}{2}$  sec. 1, T. 9 S., R. 27 E., on right bank just downstream from entrance to canyon, a quarter of a mile downstream from Cottonwood Creek and three-quarters of a mile west of Monument.

Drainage area.--2,520 sq mi, approximately.

Records available.--March 1925 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,959.64 ft above mean sea level, datum of 1929. Prior to Nov. 24, 1925, staff gage at same site at different datums. Nov. 25, 1925, to Sept. 30, 1930, water-stage recorders at same site at various datums.

Average discharge.--25 years (1925-27, 1928-51), 1,122 cfs.

Extremes.--Maximum discharge during year, 8,950 cfs Feb. 11 (gage height, 9.18 ft); minimum, 75 cfs Sept. 20.

1925-51: Maximum discharge, 22,000 cfs Mar. 18, 1932 (gage height, 14.8 ft), from rating curve extended above 12,000 cfs by logarithmic plotting; minimum, 6 cfs sometime during period Nov. 2-13, 1936, when recorder was not operating.

Remarks.--Records good. Many small diversions above station for irrigation.

Revisions (water years).--W 754: 1932(M).

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Feb. 8-13, Apr. 4-13, May 11-13)

2.6	68	5.0	1,760
3.0	170	7.0	4,650
3.5	395	9.1	8,240
4.0	745		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	124	500	598	1,190	b1,200	1,060	3,060	3,490	1,520	419	137	117
2	127	760	514	1,270	b1,250	1,060	3,610	3,140	1,390	390	137	112
3	127	956	481	1,420	1,300	920	4,460	2,890	1,290	368	132	102
4	143	737	590	1,330	1,280	974	5,610	3,070	1,230	362	124	97
5	167	598	956	1,220	1,760	956	6,580	3,400	1,340	362	122	97
6	188	494	1,300	956	2,180	911	*6,550	3,480	1,580	378	119	92
7	229	449	2,390	631	4,250	875	6,460	4,030	1,550	384	117	90
8	194	494	1,950	866	6,280	866	6,450	4,110	1,460	346	117	88
9	184	665	1,490	956	*6,740	884	6,170	3,880	1,310	325	114	86
10	191	468	1,280	929	7,770	754	5,820	3,840	1,210	300	114	86
11	180	390	1,220	902	3,200	770	5,210	5,100	1,180	286	107	86
12	161	425	1,220	884	7,320	930	5,190	6,260	1,190	272	107	83
13	152	401	1,140	839	5,080	1,060	5,800	5,240	1,200	258	107	83
14	149	*368	1,170	1,090	3,990	1,630	6,920	4,510	1,140	245	104	86
15	143	356	1,640	1,980	3,440	3,640	6,800	4,010	1,130	233	102	86
16	143	325	1,410	1,750	2,800	4,200	6,220	3,740	1,120	229	100	90
17	143	362	1,280	1,560	2,570	3,060	6,070	3,740	1,040	225	97	86
18	155	548	*1,180	1,460	2,310	2,500	5,970	3,680	965	*213	92	83
19	170	697	1,100	1,320	2,010	2,600	5,610	3,460	884	205	88	77
20	241	650	1,040	1,090	1,940	3,280	4,750	3,220	804	202	83	79
21	177	857	965	1,160	1,860	4,150	3,950	*3,010	745	194	*81	79
22	164	673	884	1,390	1,680	3,790	3,550	2,910	689	191	83	79
23	155	598	857	1,340	1,460	3,130	3,160	2,960	642	188	88	81
24	143	562	857	2,160	1,430	3,300	2,920	2,960	612	180	90	83
25	152	576	804	2,920	1,460	3,960	2,770	2,770	590	177	97	81
26	167	658	762	2,730	1,150	4,190	2,700	2,570	583	170	90	88
27	180	689	673	2,600	1,140	4,200	2,750	2,450	527	164	90	90
28	225	713	745	1,750	1,060	3,730	3,870	2,320	488	158	90	90
29	425	635	1,300	b1,000	-	3,880	4,620	2,060	462	152	90	92
30	779	598	1,770	b1,050	-	3,680	3,980	1,870	437	146	97	92
31	737	-	1,540	b1,200	-	3,340	-	1,680	-	143	102	-
Total	6,615	17,202	35,106	43,002	84,910	74,180	147,580	105,850	30,308	7,865	3,218	2,661
Mean	213	573	1,132	1,387	3,032	2,393	4,919	3,415	1,010	254	104	88.7
Ac-ft	13,120	34,120	69,630	85,290	168,400	147,100	292,700	210,000	60,120	15,600	6,390	5,280
Calendar year 1950:	Max 5,200				Min 88		Mean 1,460		Ac-ft 1,057,000			
Water year 1950-51:	Max 8,200				Min 77		Mean 1,530		Ac-ft 1,108,000			

Peak discharge (base, 4,900 cfs).--Feb. 11 (4 a.m.) 8,950 cfs (9.18 ft); Mar. 15 (11 p.m.) 8,010 cfs (8.67 ft); Apr. 14 (10 a.m.) 7,180 cfs (8.21 ft); May 12 (2 a.m.) 6,790 cfs (7.98 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## John Day River at Service Creek, Oreg.

Location.--Lat 44°47'40", long. 120°00'10", in NE¼ sec. 18, T. 9 S., R. 23 E., on right bank a quarter of a mile downstream from Service Creek and three-quarters of a mile southwest of Service Creek Post Office.

Drainage area.--5,090 sq mi, approximately.

Records available.--October 1929 to September 1951 in reports of Geological Survey. March 1925 to September 1926 and October 1929 to September 1941 in reports of State engineer.

Gage.--Water-stage recorder. Datum of gage is 1,635.83 ft above mean sea level, datum of 1929. Prior to Nov. 6, 1929, staff gage at site 12 miles downstream at different datum. Nov. 6, 1929, to Sept. 25, 1930, water-stage recorder at present site at datum 0.80 ft higher.

Average discharge.--23 years (1925-26, 1929-51), 1,679 cfs.

Extremes.--Maximum discharge during year, 13,800 cfs Feb. 11 (gage height, 11.59 ft); minimum, 101 cfs Aug. 23.

1929-51: Maximum discharge, 28,900 cfs Mar. 19, 1932 (gage height, 16.75 ft), from rating curve extended above 11,000 cfs; minimum, 20 cfs Sept. 6, 1931.

Remarks.--Records good. Many diversions above station for irrigation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.6	95	5.0	1,730
2.0	185	7.0	3,830
2.5	340	9.0	7,140
3.0	540	11.0	12,200
4.0	1,050	11.3	13,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	203	1,020	1,010	2,130	1,630	1,820	5,130	5,480	2,570	630	188	123
2	222	1,020	978	1,940	2,010	1,980	5,480	5,000	2,270	590	185	138
3	254	1,440	907	2,230	2,360	1,790	6,160	4,740	2,090	544	180	140
4	277	1,340	940	2,190	2,670	1,690	7,790	4,640	1,980	522	171	136
5	326	1,160	*1,230	2,020	2,950	1,820	9,480	4,910	1,990	508	163	131
6	379	1,010	1,560	1,810	3,970	1,720	*10,000	4,890	2,350	540	150	125
7	439	929	3,060	1,510	6,250	1,680	9,850	5,320	2,420	531	147	123
8	475	896	3,430	1,290	10,800	1,620	9,230	5,700	2,330	540	145	118
9	427	1,000	2,590	*1,590	10,400	1,670	9,510	5,430	2,130	518	145	120
10	419	1,000	2,200	1,540	12,700	1,560	9,030	5,210	1,940	479	143	116
11	415	830	2,040	1,540	12,800	1,440	8,320	5,940	1,800	459	140	116
12	399	820	1,980	1,500	11,800	1,460	8,020	8,730	1,820	451	136	114
13	372	825	1,940	1,460	8,800	1,710	8,390	8,200	1,790	431	134	114
14	361	*795	1,870	1,470	6,850	2,510	9,640	7,140	1,770	395	131	112
15	350	770	2,000	2,330	5,910	3,990	10,000	6,360	1,690	372	134	112
16	344	745	2,520	2,870	5,080	8,070	9,360	5,820	1,630	350	129	118
17	344	755	2,260	2,430	4,520	5,430	8,780	5,610	1,540	333	127	120
18	361	841	*2,040	2,570	4,230	4,500	8,590	5,540	1,460	319	125	116
19	383	1,090	1,890	2,230	3,860	4,240	8,230	5,270	1,370	*291	123	116
20	415	1,100	1,800	1,910	3,490	4,760	7,420	4,940	1,270	277	118	106
21	415	1,200	1,710	1,740	3,380	6,120	6,490	4,780	1,150	254	114	106
22	383	1,180	1,590	2,150	3,150	8,140	5,750	*4,620	1,070	242	*108	108
23	372	1,050	1,520	2,240	2,880	5,270	5,190	4,480	990	236	101	106
24	358	1,000	1,510	2,960	2,600	5,100	4,870	4,510	918	225	106	110
25	344	968	1,460	5,130	2,500	5,800	4,700	4,310	880	214	108	112
26	347	1,020	1,410	4,640	2,360	6,250	4,540	4,060	868	208	108	120
27	387	1,080	1,520	4,630	1,970	8,450	4,350	3,850	815	203	112	129
28	431	1,100	1,310	3,690	2,020	5,940	4,840	3,650	760	198	110	136
29	635	1,090	1,830	2,140	-	5,800	6,750	3,450	710	195	112	136
30	1,030	1,020	2,600	1,460	-	5,940	6,200	3,100	670	193	112	140
31	1,220	-	2,550	1,520	-	5,580	-	2,730	-	190	120	-
Total	13,087	30,094	57,625	70,670	143,940	119,750	222,080	158,390	47,041	11,438	4,125	3,617
Mean	422	1,005	1,859	2,280	5,141	3,863	7,403	5,109	1,568	369	133	121
Ac-ft	25,960	59,690	114,300	140,200	285,500	237,500	440,500	314,200	93,300	22,690	8,180	7,170

Calendar year 1950: Max 7,790 Min 118 Mean 2,193 Ac-ft 1,588,000  
 Water year 1950-51: Max 12,800 Min 101 Mean 2,416 Ac-ft 1,749,000

Peak discharge (base, 5,200 cfs).--Jan. 25 (8:30 a.m.) 5,600 cfs (8.18 ft); Feb. 11 (11:30 a.m.) 13,800 cfs (11.59 ft); Mar. 16 (6:30 a.m.) 11,300 cfs (10.68 ft); Mar. 21 (12 m.) 7,080 cfs (8.97 ft); Apr. 24 (7 a.m.) 10,300 cfs (10.29 ft); May 12 (12:30 p.m.) 9,130 cfs (9.86 ft).

\* Discharge measurement made on this day.

## John Day River at McDonald Ferry, Oreg.

Location.--Lat 45°35'20", long. 120°24'30", in NW¼ sec. 11, T. 1 N., R. 19 E., on left bank at McDonald Ferry half a mile downstream from Rock Creek and 10 miles east of Klondike.

Drainage area.--7,580 sq mi, approximately.

Records available.--December 1904 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 392.27 ft above mean sea level, datum of 1929. Prior to Aug. 30, 1930, staff gage at same site and datum.

Average discharge.--46 years (1905-51), 1,970 cfs.

Extremes.--Maximum discharge during year, 13,900 cfs Feb. 12 (gage height, 7.70 ft); minimum, 104 cfs Aug. 23, 25, 26, 27 (gage height, 1.22 ft).

1904-51: Maximum discharge, 27,800 cfs Feb. 6, 1907 (gage height, 10.8 ft); maximum gage height, 13.2 ft Feb. 8, 1950 (ice jam) from floodmark; minimum discharge, 4 cfs Aug. 31, 1931 (gage height, 0.68 ft).

Maximum discharge known, 39,100 cfs, from rating curve extended above 22,000 cfs, probably occurred in 1894 (gage height, 12.8 ft).

Remarks.--Records excellent except those for period of ice effect, which are good. Diversions above station for irrigation.

Revisions (water years).--W 1094: 1894(M), 1907, 1932(M).

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

1.2	98	4.0	3,130
1.5	205	5.0	5,300
1.9	415	7.0	11,300
2.5	910	7.6	13,500
3.0	1,500		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	169	1,260	1,250	3,000	61,700	2,560	6,390	6,610	3,170	712	*197	137
2	197	*1,260	1,180	2,620	61,800	2,430	5,910	5,840	2,890	664	197	144
3	228	1,130	1,180	2,360	2,740	2,440	6,120	5,300	2,690	640	193	130
4	246	1,190	1,170	2,580	2,940	2,380	7,240	4,870	2,500	800	173	130
5	290	1,550	1,250	2,600	3,620	2,180	8,620	4,800	2,320	592	169	127
6	316	1,350	1,330	2,480	3,870	2,260	9,860	5,230	*2,260	576	162	148
7	328	1,180	2,280	2,210	5,840	2,240	10,200	5,230	2,550	560	162	151
8	379	1,050	3,580	1,840	8,590	2,180	10,100	5,550	2,720	560	162	144
9	429	1,010	4,140	1,510	11,600	2,130	9,960	6,040	2,630	560	158	134
10	508	1,010	3,220	1,760	*11,400	2,160	9,730	5,780	2,430	560	144	*130
11	485	1,120	2,720	1,890	13,200	2,060	9,370	5,630	2,190	508	144	124
12	450	1,030	2,500	1,830	13,300	1,860	8,800	6,480	1,980	485	140	127
13	443	921	*2,340	1,780	12,300	1,890	8,490	8,900	1,950	443	140	120
14	450	910	2,390	1,770	10,000	*2,600	8,740	8,650	1,920	436	137	124
15	429	910	2,380	1,740	7,920	3,420	9,700	7,530	1,920	422	144	130
16	415	870	3,040	2,110	6,860	5,870	10,100	6,890	1,800	415	140	130
17	422	850	3,300	3,220	5,970	8,990	9,530	6,150	1,740	385	134	130
18	429	850	2,850	2,900	5,450	6,480	8,990	5,890	1,640	361	134	134
19	422	1,040	2,580	2,960	4,920	5,380	8,740	5,810	1,550	344	137	134
20	415	1,140	2,410	2,620	4,500	5,080	8,520	5,600	1,460	322	130	137
21	429	1,530	2,260	2,380	4,230	5,780	7,830	5,300	1,370	311	124	137
22	457	1,400	2,130	2,290	4,010	7,240	6,920	4,920	1,250	300	114	134
23	485	1,510	2,000	2,430	3,760	7,210	6,120	4,640	1,170	290	114	130
24	457	1,360	1,890	3,000	3,480	6,510	5,500	4,450	1,080	270	114	130
25	450	1,250	1,800	*4,250	3,240	6,070	*5,010	4,520	1,010	255	114	130
26	443	1,180	1,770	6,120	3,150	6,830	4,610	4,430	932	250	108	134
27	422	1,170	1,700	5,550	3,040	7,300	4,360	4,180	890	241	108	130
28	429	1,230	1,620	5,280	2,620	7,440	4,320	3,970	850	214	114	130
29	485	1,260	1,640	4,180	-	6,920	4,870	3,760	801	223	124	134
30	747	1,290	2,110	62,300	-	6,860	7,040	3,680	756	210	130	140
31	987	-	2,900	61,600	-	6,950	-	3,420	-	201	130	-
Total	13,241	34,811	68,910	85,140	166,130	141,500	231,690	170,050	54,419	12,910	4,391	3,994
Mean	427	1,160	2,223	2,746	5,933	4,565	7,723	5,485	1,814	416	142	133
Ac-ft	26,260	69,050	136,700	168,900	329,500	280,700	459,600	337,300	107,900	25,610	8,710	7,920
Calendar year 1950:	Max	7,590	Min	140	Mean	2,360	Ac-ft	1,723,000				
Water year 1950-51:	Max	13,300	Min	108	Mean	2,705	Ac-ft	1,958,000				

Peak discharge (base, 6,300 cfs).--Jan. 26 (10 a.m.) 6,450 cfs (5.44 ft); Feb. 12 (8 a.m.) 13,900 cfs (7.70 ft); Mar. 17 (5 a.m.) 11,000 cfs (6.90 ft); Mar. 22 (11 a.m.) 8,010 cfs (5.98 ft); Mar. 28 (11 a.m.) 7,770 cfs (5.90 ft); Apr. 7 (3 p.m.) 10,300 cfs (6.71 ft); Apr. 30 (5 p.m.) 7,270 cfs (5.73 ft); May 13 (1:30 p.m.) 9,150 cfs (6.35 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## DESCHUTES RIVER BASIN

Deschutes River below Snow Creek, near Lapine, Oreg.

Location--Lat 43°48'50", long. 121°46'40", in NW¼ sec. 28, T. 20 S., R. 8 E., on left bank 50 ft downstream from Snow Creek, upstream from flowline of Crane Prairie Reservoir, and 17 miles northwest of Lapine.

Drainage area--132 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available--November 1937 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 4,445 ft (from elevation of Crane Prairie Reservoir when slack water extended nearly to gage). Prior to Sept. 9, 1938, at site 450 ft downstream at different datum.

Average discharge--13 years (1938-51), 139 cfs.

Extremes--Maximum discharge during year, 364 cfs Aug. 21 (gage height, 2.74 ft); minimum, 149 cfs Apr. 1, 2 (gage height, 1.45 ft).

1937-51: Maximum discharge, that of Aug. 21, 1951; maximum gage height, 4.12 ft Jan. 21, 1943 (ice jam); minimum discharge, 43 cfs Dec. 27, 1941 (gage height, 1.12 ft).

Remarks--Records good except those for periods of no gage-height record, which are poor. No diversion or regulation above station.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Backwater from aquatic vegetation or debris  
Apr. 27 to July 16)

1.4	139
2.0	272
2.7	361

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	261	245	204	190	161	163	149	243	279	262	348	321
2	261	259	202	190	161	163	151	243	277	266	349	320
3	262	239	209	190	161	163	151	251	277	268	349	319
4	262	233	213	190	168	168	153	255	277	270	350	316
5	272	229	204	190	168	176	153	253	279	277	350	315
6	266	229	222	190	168	178	153	264	276	279	350	312
7	262	224	220	190	170	178	153	264	274	281	351	310
8	257	226	213	190	168	173	156	262	274	285	350	307
9	251	222	211	190	166	173	156	262	272	*286	351	306
10	249	218	206	190	166	170	158	266	270	290	351	304
11	245	214	206	190	168	168	161	274	268	293	351	*301
12	243	210	204	190	168	166	166	272	268	296	350	300
13	241	208	202	190	163	161	168	272	266	300	350	298
14	240	206	209	194	161	158	176	272	264	304	*350	296
15	238	206	204	198	163	166	178	270	262	306	350	295
16	236	208	202	196	161	163	186	*270	261	309	349	293
17	234	212	200	194	161	158	193	270	259	314	348	293
18	*251	214	200	194	163	156	195	270	*257	315	346	293
19	229	216	200	194	161	153	200	272	257	318	345	292
20	226	214	197	194	163	156	202	274	257	321	343	290
21	224	212	195	200	161	153	197	277	257	324	345	288
22	220	210	195	206	161	153	200	279	259	326	345	286
23	215	208	193	202	163	151	202	283	259	331	340	286
24	213	206	192	*197	161	151	206	281	259	333	336	285
25	215	204	192	193	163	151	213	281	257	334	334	283
26	215	202	192	193	166	151	220	281	257	336	332	279
27	229	202	192	188	163	*151	222	281	257	340	331	277
28	264	*200	192	183	163	151	247	281	257	342	334	277
29	276	197	192	175	-	153	247	281	257	343	332	277
30	249	202	192	165	-	151	243	281	261	344	327	277
31	233	-	192	162	-	151	-	279	-	346	324	-
Total	7,519	6,475	6,247	5,898	4,590	4,977	5,555	8,364	7,954	9,539	10,659	8,896
Mean	243	216	202	190	164	167	185	270	265	308	344	297
Ac-ft	14,910	12,840	12,390	11,700	9,100	9,870	11,020	16,590	15,780	18,920	21,140	17,640

Calendar year 1950: Max 329 Min 83 Mean 190 Ac-ft 137,600  
 Water year 1950-51: Max 351 Min 149 Mean 237 Ac-ft 171,900

\* Discharge measurement made on this day.

Note.--No gage-height record Oct. 14-17, Nov. 9-27, Dec. 24 to Jan. 23, Jan. 29-31; discharge estimated on basis of weather records and records for Cultus Creek above Crane Prairie Reservoir near Lapine.



## Cultus River above Cultus Creek, near Lapine, Oreg.

Location.--Lat 43°49'10", long. 121°47'50", in sec. 20 or 29, T. 20 S., R. 8 E., on left bank at highway crossing upstream from flow line of Crane Prairie Reservoir, 2 miles upstream from Cultus Creek and 18 miles northwest of Lapine.

Drainage area.--16.5 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--June 1923 to September 1925, November 1937 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 4,450 ft (by barometer). Prior to Nov. 1, 1937, staff gage at site half a mile upstream at different datum.

Average discharge.--15 years (1923-25, 1938-51), 61.2 cfs.

Extremes.--Maximum discharge during year, 137 cfs May 10, July 26, 27, July 31 to Aug. 2; maximum gage height, 1.18 ft July 26, 27, July 31 to Aug. 2 (backwater from moss); minimum discharge, 64 cfs Apr. 9-13.

1923-25, 1937-51: Maximum discharge, that of May 10, July 26, 27, July 31 to Aug. 2, 1951; maximum gage height, that of July 26, 27, July 31 to Aug. 2, 1951; minimum discharge recorded, 28 cfs Mar. 22, Apr. 5-10, Nov. 18, 21, 1941.

Remarks.--Records good except those for period of backwater from moss, which are fair. No diversion or regulation above station.

Rating table, water year 1950-51, except period of backwater from moss (gage height, in feet, and discharge, in cubic feet per second)

0.7 58  
1.1 153

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	90	85	80	85	90	76	74	121	106	111	137	102
2	90	85	80	85	90	76	72	124	106	108	137	100
3	90	85	83	83	90	78	72	124	104	108	134	100
4	90	85	85	83	92	78	70	126	104	108	134	98
5	90	87	85	83	92	78	68	124	104	108	131	98
6	90	90	90	83	90	78	68	126	104	108	129	96
7	90	90	90	83	90	78	68	129	104	108	126	96
8	90	90	90	83	90	80	66	129	104	108	126	94
9	90	90	92	83	90	80	66	129	104	*108	124	94
10	90	90	92	85	90	80	64	131	104	111	121	92
11	90	90	92	85	90	80	64	131	106	111	121	*92
12	90	90	90	85	87	83	64	129	106	114	118	92
13	90	90	90	85	87	83	64	126	108	114	116	92
14	90	87	90	85	85	83	66	124	108	116	*114	92
15	90	87	90	85	85	83	68	126	111	118	114	90
16	90	83	90	85	83	83	68	*126	114	118	114	87
17	90	83	90	87	83	83	72	129	116	121	114	87
18	*92	83	90	87	80	83	74	129	*118	124	114	85
19	92	85	90	87	78	83	78	129	118	124	111	85
20	90	85	90	87	78	83	85	129	118	126	111	83
21	87	83	90	87	78	83	92	126	118	129	111	83
22	87	83	90	87	78	83	96	126	118	129	110	83
23	85	80	90	87	78	83	99	124	118	131	110	83
24	85	80	87	*87	76	83	101	121	116	134	110	85
25	83	80	87	87	76	83	106	121	116	134	108	83
26	83	78	87	87	76	83	114	118	116	137	108	85
27	80	78	87	87	76	*83	116	118	116	137	106	85
28	83	*78	87	87	76	80	121	116	116	134	106	85
29	83	80	85	87	-	78	124	111	114	134	104	85
30	83	80	85	90	-	74	121	111	111	134	104	87
31	83	-	85	90	-	74	-	108	-	134	102	-
Total	2,726	2,540	2,729	2,657	2,354	2,496	2,481	3,841	3,326	3,739	3,625	2,699
Mean	87.9	84.7	88.0	85.7	84.1	80.5	82.7	124	111	121	117	90.0
Ac-ft	5,410	5,040	5,410	5,270	4,670	4,950	4,920	7,620	6,600	7,420	7,190	5,350

Calendar year 1950: Max 111 Min 43

Water year 1950-51: Max 137 Min 64

Mean 78.4 Ac-ft 56,720

Mean 96.5 Ac-ft 69,850

\* Discharge measurement made on this day.

Note.--Backwater from moss July 2 to Sept. 30 (no gage-height record Aug. 22 to Sept. 10; discharge interpolated).

## Cultus Creek above Crane Prairie Reservoir, near Lapine, Oreg.

Location.--Lat 43°49'30", long. 121°49'30", in SW $\frac{1}{4}$  sec. 19, T. 20 S., R. 8 E., on left bank 1,000 ft upstream from highway bridge, three-quarters of a mile downstream from outlet of Cultus Lake, and 19 miles northwest of Lapine.

Drainage area.--33.2 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--Mar. to September 1924 and October 1949 to September 1951 in reports of Geological Survey. Prior to October 1949, published as Cultus Creek above Crane Prairie, near Lapine. May 1923 to September 1924 and November 1937 to September 1941 in reports of State engineer. October 1941 to September 1949 in files of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 4,545 ft (by barometer). Prior to Mar. 11, 1924, staff gages on two branches of stream at sites  $\frac{1}{2}$  miles downstream at different datums. Mar. 11 to Sept. 30, 1924, staff gage at site 100 ft upstream at different datum.

Average discharge.--13 years (1938-51), 20.8 cfs.

Extremes.--Maximum discharge during year, 109 cfs May 27 (gage height, 1.96 ft); minimum, 0.2 cfs Sept. 13-30.

1937-51: Maximum discharge, 214 cfs June 1, 1943 (gage height, 2.72 ft); maximum gage height, 2.76 ft June 15, 1950 (backwater from trees); no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to May 27

May 28 to Sept. 30

0.4	0.7	1.0	16
.5	1.6	1.2	27
.6	3.0	1.5	54
.7	5.2	2.0	115
.8	8.5		

0.36	0.2	0.6	2.5
.4	.3	.7	5.0
.5	1.0	.8	8.5

Note.--Same as preceding table above 0.8 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	31	35	35	a35	31	22	52	96	45	9.6	0.8
2	1.5	45	35	38	a35	30	22	52	92	42	9.2	.8
3	1.6	56	38	40	a35	29	21	52	88	40	8.5	.7
4	1.9	60	41	39	a38	30	21	55	86	38	7.8	.5
5	2.6	62	41	38	a40	33	21	55	85	36	7.1	.5
6	3.0	62	46	36	a42	34	22	56	82	33	6.4	.5
7	3.0	62	52	34	a42	36	22	56	78	32	6.0	.5
8	3.2	58	54	33	a42	35	23	62	77	31	5.4	.4
9	3.4	56	57	32	a40	35	23	65	75	*29	5.0	.3
10	3.4	55	57	31	43	35	23	67	73	29	4.7	.3
11	3.4	54	56	31	44	33	24	74	72	27	4.7	** .3
12	3.4	53	58	30	44	32	25	77	72	26	4.2	.3
13	3.4	51	56	30	44	31	25	81	72	25	3.6	.2
14	**3.4	49	56	31	43	29	26	82	70	24	*3.4	.2
15	3.4	47	56	31	42	30	29	82	72	23	3.4	.2
16	3.2	49	54	32	42	30	30	*83	72	22	3.4	.2
17	3.7	50	55	38	41	29	33	84	70	21	3.2	.2
18	3.9	53	51	40	41	28	34	86	*69	20	3.2	.2
19	3.2	50	49	40	40	28	36	91	67	19	2.9	.2
20	3.2	51	48	40	40	27	38	93	66	18	2.7	.2
21	3.4	49	46	40	40	26	39	94	65	16	2.5	.2
22	3.7	47	44	42	39	26	40	96	63	16	2.5	.2
23	3.4	44	43	43	37	25	40	98	61	15	2.2	.2
24	3.7	45	42	*45	35	25	41	97	57	15	1.8	.2
25	3.7	41	40	43	35	24	42	98	55	14	1.4	.2
26	4.1	40	39	43	34	24	42	104	53	13	1.2	.2
27	5.2	40	37	42	33	*23	43	107	52	12	1.0	.2
28	9.9	38	37	40	32	23	48	108	49	12	1.0	.2
29	18	36	37	a38	-	22	50	108	48	11	1.1	.2
30	23	36	38	a37	-	22	51	105	47	10	1.0	.3
31	26	-	37	a36	-	22	-	100	-	9.9	.9	-
Total	163.5	1,468	1,435	1,148	1,098	887	956	2,522	2,082	723.9	121.0	9.6
Mean	5.27	46.9	46.3	37.0	39.2	28.6	31.9	81.4	69.4	23.4	3.90	0.32
Ac-ft	324	2,910	2,850	2,280	2,180	1,760	1,900	5,000	4,150	1,440	240	19

Calendar year 1950: Max 170

Min 1.5

Mean 37.1

Ac-ft 26,890

Water year 1950-51: Max 108

Min 0.2

Mean 34.6

Ac-ft 25,050

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Odell Creek near Crescent.

Deer Creek above Crane Prairie Reservoir, near Lapine, Oreg.

Location.--Lat 43°48'20", long. 121°50'20", in NW<sup>1</sup>/<sub>4</sub> sec. 36, T. 20 S., R. 7 E., on right bank 150 ft downstream from highway bridge, 1<sup>1</sup>/<sub>2</sub> miles downstream from outlet of Little Cultus Lake, and 19 miles northwest of Lapine.

Drainage area.--21.5 sq mi.

Records available.--October 1923 to September 1924 and October 1949 to September 1951 in reports of Geological Survey. Prior to October 1949, published as Deer Creek above Crane Prairie, near Lapine. October 1923 to July 1924 and December 1937 to September 1941 in reports of State engineer. January to September 1925 and October 1941 to September 1949 in files of State engineer.

Gage.--Water-stage recorder and log control. Altitude of gage is 4,520 ft (by barometer). Prior to Oct. 1, 1925, staff gage at site 75 ft upstream at various datums. Dec. 1, 1937, to Sept. 30, 1938, water-stage recorder at highway bridge 150 ft upstream at different datum.

Average discharge.--13 years (1938-51), 7.33 cfs.

Extremes.--Maximum discharge during year, 51 cfs May 11 (gage height, 1.53 ft); maximum gage height, 2.83 ft Jan. 28 (ice jam); minimum discharge recorded, 0.2 cfs Sept. 6-10, 1923-25, 1937-51: Maximum discharge, 97 cfs Nov. 30, 1942 (gage height, 1.95 ft); maximum gage height, that of Jan. 28, 1951; no flow at times.

Remarks.--Records good except those for period of ice effect or no gage-height record and those below 1 cfs, which are poor. No diversion or regulation above station.

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.2	0.1	0.7	7.2
.3	.3	1.0	17
.4	1.2	1.3	33
.5	2.8	1.6	58

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a0.3	13	8.6	11	a16	a10	7.8	33	28	3.6	0.4	a0.4
2	a.3	18	8.3	12	17	a10	a8	32	26	3.0	.4	a.4
3	a.3	24	10	12	18	a10	8.3	32	24	2.6	.5	a.3
4	a.3	26	12	12	18	a10	8.9	35	22	2.2	a.5	a.3
5	a.3	26	13	12	18	a11	9.7	36	20	2.0	a.5	.3
6	a.4	24	17	a11	19	a12	9.7	34	20	1.9	a.5	.2
7	a.4	22	23	a10	20	a12	10	34	18	1.9	a.5	.2
8	a.4	19	25	a9.5	20	a12	11	36	17	1.8	a.5	.2
9	a.4	18	26	a9	a20	a12	12	38	16	*1.8	a.4	.2
10	a.4	16	25	a8.5	a20	a12	13	42	15	1.6	a.4	.2
11	a.5	14	24	a8	a19	a11	15	49	14	1.6	a.4	**3
12	a.5	13	23	a8	a19	a11	17	50	14	1.4	a.4	.4
13	a.5	12	21	a8.5	a18	a10	19	47	13	1.3	a.4	.4
14	**5	12	21	a8.5	a18	a10	22	44	a12	1.2	**4	.4
15	.5	11	20	a8.5	a17	a10	25	42	12	1.2	.5	.6
16	.5	12	18	a10	a17	a10	27	*41	12	1.1	.6	.6
17	.8	12	17	a12	a16	a10	29	40	11	1.1	.6	.6
18	.8	12	15	a13	a16	a10	32	41	*10	1.0	.6	.8
19	.8	12	15	a14	a15	a9.5	34	42	10	1.0	.6	.8
20	.6	12	14	a15	a14	a9	36	43	9.4	.8	a.6	.8
21	.8	12	13	a15	a14	a9	36	43	8.9	.8	a.6	1.0
22	.8	11	12	a15	a13	a9	34	45	8.3	.8	a.5	1.0
23	.6	11	12	a14	a12	a8.5	34	46	7.8	.8	a.5	1.0
24	.6	11	12	*14	a12	a8.5	35	46	7.0	.8	a.5	1.1
25	.6	10	11	14	a12	a8	32	44	6.5	.6	a.5	1.2
26	.8	9.7	11	15	a12	a8	31	43	6.2	.6	a.5	a1.2
27	2.0	9.7	10	15	a11	*7.8	31	42	5.8	.6	a.5	a1.2
28	7.2	9.2	11	b15	a11	7.8	34	40	5.3	.6	a.4	a1.2
29	14	9.2	9.7	b14	-	7.8	34	38	4.4	.5	a.4	a1.2
30	13	8.3	a10	13	-	8.0	34	34	4.2	.5	a.4	a1.2
31	12	-	11	a14	-	a8	-	32	-	.5	a.4	-
Total	61.9	429.1	478.6	370.5	452	301.9	687.4	1,244	387.8	41.2	14.9	19.7
Mean	2.00	14.3	15.4	12.0	16.1	9.74	22.9	40.1	12.9	1.33	0.48	0.66
Ac-ft	123	851	949	735	897	599	1,360	2,470	769	82	30	39

Calendar year 1950: Max 90 Min 0.3 Mean 12.2 Ac-ft 8,870  
 Water year 1950-51: Max 50 Min 0.2 Mean 12.3 Ac-ft 8,900

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Odell Creek near Crescent and Cultus Creek above Crane Prairie Reservoir near Lapine or discharge interpolated.

b Stage-discharge relation affected by ice.

## DESCHUTES RIVER BASIN

Quinn River near Lapine, Oreg.

Location.--Lat 43°47'10", long. 121°50'10", in NW¼ sec. 1, T. 21 S., R. 7 E., on left bank just upstream from flow line of Crane Prairie Reservoir, 150 ft downstream from springs at head of river and 19 miles northwest of Lapine.

Drainage area.--Stream heads in springs 150 ft above station; drainage area indeterminate.

Records available.--June 1922 to September 1925, November 1937 to September 1951.

Gage.--Water-stage recorder and log control. Datum of gage is 4,442.1 ft above mean sea level, based on elevation of Crane Prairie Reservoir when slack water reached station. June 1, 1922, to Sept. 30, 1925, staff gage at site 200 ft downstream at different datum. Nov. 1, 1937, to Sept. 13, 1938, water-stage recorder at present site and datum and natural control.

Average discharge.--16 years (1922-25, 1938-51), 21.3 cfs.

Extremes.--Maximum discharge during year, 54 cfs June 14-20; maximum gage height, 3.54 ft sometime between Mar. 27 and May 17 (backwater from reservoir); minimum discharge, 30 cfs Nov. 22 to Dec. 16, 1922-25, 1937-51; Maximum discharge, 59 cfs July 4, 1949; maximum gage height, that occurring sometime between Mar. 27 and May 17, 1951; practically no flow Nov. 14, 1941.

Remarks.--Records fair. No diversion or regulation above station.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	32	30	31	34	36	39	46	52	51	49	47
2	38	32	30	31	34	36	39	46	52	51	49	46
3	38	32	30	31	34	36	39	46	52	51	49	46
4	38	32	30	31	34	36	40	47	52	51	49	46
5	38	32	30	31	34	36	40	47	52	51	49	46
6	37	32	30	31	34	36	40	47	53	50	49	46
7	37	32	30	31	34	36	40	47	53	50	49	46
8	37	32	30	31	34	36	41	48	53	50	49	46
9	37	31	30	31	34	37	41	48	53	*50	49	45
10	37	31	30	31	34	37	41	48	53	50	49	45
11	37	31	30	31	34	37	41	48	53	50	49	*45
12	37	31	30	33	35	37	41	49	53	50	49	45
13	37	31	30	33	35	37	42	49	53	50	49	45
14	*35	31	30	33	35	37	42	49	54	50	*49	45
15	35	31	30	33	35	37	42	49	54	50	49	44
16	35	31	30	33	35	37	42	50	54	50	49	44
17	35	31	31	33	35	37	43	*50	54	50	49	44
18	34	31	31	33	35	37	43	50	*54	50	49	44
19	34	31	31	33	35	37	43	50	54	50	48	43
20	34	31	31	33	35	37	43	50	54	50	48	43
21	34	31	31	33	35	38	44	50	53	50	48	43
22	34	30	31	33	35	38	44	51	53	50	48	43
23	34	30	31	33	35	38	44	51	53	50	48	43
24	34	30	31	*33	36	38	44	51	53	50	48	42
25	34	30	31	33	36	38	44	51	53	50	48	42
26	33	30	31	33	36	38	45	51	52	50	47	42
27	33	30	31	33	36	*38	45	51	52	50	47	42
28	33	30	31	33	36	38	45	51	52	49	47	41
29	33	30	31	33	-	38	45	52	52	49	47	41
30	33	30	31	33	-	39	46	52	52	49	47	41
31	33	-	31	34	-	39	-	52	-	49	47	-
Total	1,096	929	945	1,002	974	1,152	1,268	1,527	1,587	1,851	1,500	1,321
Mean	35.4	31.0	30.5	32.3	34.8	37.2	42.3	49.3	52.9	50.0	48.4	44.0
Ac-ft	2,170	1,840	1,870	1,990	1,930	2,280	2,520	3,030	3,150	3,080	2,880	2,620
Calendar year 1950: Max	40			Min	20		Mean	29.8		Ac-ft	21,600	
Water year 1950-51: Max	54			Min	30		Mean	40.7		Ac-ft	29,460	

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 25 to June 17 except staff-gage readings made Mar. 27 and May 17, discharge interpolated. Stage-discharge relation affected by varying amounts of backwater from Crane Prairie Reservoir Oct. 26 to Nov. 11 and sometime in February to Sept. 30; discharge interpolated from measured discharge.

Charlton Creek above Crane Prairie Reservoir, near Lapine, Oreg.

Location.--Lat 43°47'00", long. 121°50'00", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 1, T. 21 S., R. 7 E., on left bank 3 miles northwest of Crane Prairie Dam and 18 miles northwest of Lapine.

Drainage area.--15.6 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--October 1949 to September 1951 in reports of Geological Survey. May 1923 to May 1924 and October 1937 to September 1941 in reports of State engineer; October 1941 to September 1949 in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 4,458.70 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. May 1, 1923, to May 23, 1924, staff gage at about same site and at different datum.

Average discharge.--14 years (1937-51), 1.42 cfs.

Extremes.--Maximum discharge during year, 21 cfs May 26 (gage height, 1.21 ft); maximum gage height, 2.17 ft about Jan. 28, from recorded range in stage (ice jam); no flow at times.

1923-24, 1937-51: Maximum discharge, 54 cfs June 12, 1950 (gage height, 1.53 ft), from rating curve extended above 17 cfs; maximum gage height, that of about Jan. 28, 1951; no flow at times.

Remarks.--Records fair except those for periods of no gage-height record and those below 2 cfs, which are poor. No diversion or regulation above station.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0	a4					a0.2	5.0	7.6			
2	0	a6					a.3	4.5	7.3			
3	0	a8					a.4	a5	7.3			
4	0	a10					a.5	a5.5	7.6			
5	0	a10					a.7	a6.5	7.6			
6	0	a9.5					a1	a8	7.6			
7	0	a9					a1.5	a10	a7.2			
8	0	**a8					a2	a9.5	a7			
9	0	a6					a3	a9	a6.8			
10	0	a4					a4	a10	a6.6			
11	0	a3					4.7	a11	a6.4			
12	0	a2		a1			5.0	a12	a6.2			
13	0	a1.5					5.7	a14	a6			
14	0	a1					6.6	a16	a5.8			
15	0	a.8				a1	6.9	a18	a5.6			
16	0	a.6	a2				7.3	a19	a5.4			
17	0	a.4					7.6	*18	a5.4			
18	0	a.3					7.9	16	*5.3			
19	0	a.2					7.9	15	4.7			
20	0	0					7.9	15	4.3			
21	0	0					7.3	15	3.9			
22	0	0					6.6	15	3.4			
23	0	0					6.3	16	2.8			
24	0	0					6.3	16	2.5			
25	0	0					6.6	18	2.0			
26	0	0					6.9	18	1.2			
27	a.2	0					7.3	18	a.7			
28	a.5	0		a1			7.9	16	a.4			
29	a1	0					6.9	13	a.2			
30	a2	0					5.7	10	a.1			
31	a3	-					-	8.5	-			
Total	6.7	84.3	62	31	28	0	148.9	390.5	144.9	0	0	0
Mean	0.22	2.81	2.0	1.0	1.0	0	4.86	12.6	4.83	0	0	0
Ac-ft	13	167	123	61	56	0	295	775	287	0	0	0
Calendar year 1950: Max	46			Min 0		Mean 3.17		Ac-ft 2,300				
Water year 1950-51: Max	19			Min 0		Mean 2.46		Ac-ft 1,780				

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

a No gage-height record; discharge estimated on basis of 2 field estimates, recorded range in stage when available, weather records, and records for Deer Creek above Crane Prairie Reservoir near Lapine.

## DESCHUTES RIVER BASIN

Deschutes River below Crane Prairie Reservoir near Lapine, Oreg.

Location.--Lat 43°45'10", long. 121°46'50", in NW¼ sec. 16, T. 21 S., R. 8 E., on left bank 600 ft downstream from Crane Prairie Dam and 15 miles northwest of Lapine.

Drainage area.--254 sq mi (revised), hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--January 1914 to June 1917, February 1922 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 4,415 ft above mean sea level (by barometer). Prior to June 9, 1922, staff gage at site half a mile upstream at different datum. June 9, 1922, to May 9, 1932, staff gage or water-stage recorder at present site and datum.

Average discharge.--30 years (1914-15, 1922-51), 191 cfs.

Extremes.--Maximum discharge during year, 893 cfs Nov. 8 (gage height, 2.92 ft); maximum gage height, 3.05 ft Nov. 16 (backwater from tree); minimum discharge, 22 cfs Jan. 15-27 (gage height, 0.48 ft).

1914-17, 1922-51: Maximum discharge, 1,170 cfs July 28, 1947 (gage height, 3.34 ft); minimum, 2 cfs Dec. 21, 1940, Nov. 1, 1942, June 13-25, 1948.

Remarks.--Records good. No diversion above station. Flow regulated since Nov. 4, 1922, by Crane Prairie Reservoir (see p. 65).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from tree Nov. 16 to Dec. 5)

0.4	14	1.5	245
.5	24	2.0	435
.7	52	2.5	655
1.0	104	3.0	945

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	49	50	766	219	23	24	126	219	355	308	280	304
2	49	50	754	*219	23	72	126	219	351	284	280	304
3	49	50	749	219	23	134	126	222	351	262	*280	308
4	49	50	744	219	23	134	126	228	351	262	280	304
5	49	52	579	219	23	134	126	232	347	262	280	304
6	49	52	209	222	23	134	126	235	347	266	280	304
7	49	202	209	222	23	134	126	242	347	266	280	304
8	49	749	212	222	23	134	126	*250	347	266	280	301
9	49	880	212	222	23	134	124	379	347	266	280	276
10	49	674	209	222	23	134	124	375	347	*266	284	228
11	49	868	*209	222	23	134	124	375	347	266	284	*206
12	49	862	209	222	24	131	124	375	347	266	284	155
13	49	862	212	222	24	131	126	375	343	266	284	156
14	*49	856	212	225	24	131	126	371	343	270	284	161
15	49	856	212	112	24	129	126	367	343	270	*312	161
16	50	*850	212	22	24	129	126	363	343	270	327	164
17	50	844	212	22	24	129	124	363	359	270	323	166
18	49	844	212	22	24	126	124	363	359	*270	323	169
19	48	838	212	22	24	126	126	359	*323	270	319	169
20	46	832	212	22	24	126	126	359	312	273	319	169
21	48	820	212	22	24	126	126	359	312	273	315	172
22	48	820	212	22	24	126	124	359	312	273	319	172
23	48	820	212	22	24	126	126	359	312	273	315	175
24	48	802	212	22	24	126	126	359	312	273	312	175
25	48	796	215	22	24	126	134	359	308	276	312	*175
26	49	796	215	22	24	*129	164	359	308	276	312	190
27	49	*784	215	22	24	129	164	359	308	*276	308	219
28	49	778	219	23	24	126	172	359	*308	276	308	215
29	49	*772	219	23	-	126	175	*359	308	276	308	215
30	50	766	219	23	-	126	*190	355	308	276	*308	215
31	50	-	219	23	-	126	-	*355	-	280	304	-
Total	1,516	19,475	9,126	3,564	661	3,852	4,009	10,212	9,965	8,427	9,284	6,538
Mean	48.9	649	294	115	23.6	134	134	329	332	272	299	218
Ac-ft	3,010	38,630	18,100	7,070	1,310	7,640	7,950	20,260	19,770	16,710	18,410	12,970
Calendar year 1950: Max		906			Min 29		Mean 301		Ac-ft 218,200			
Water year 1950-51: Max		880			Min 22		Mean 237		Ac-ft 171,800			

\* Discharge measurement made on this day.

## Brown Creek near Lapine, Oreg.

Location.--Lat 43°43'30", long. 121°48'40", in SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 30, T. 21 S., R. 8 E., on left bank  $\frac{1}{2}$  miles upstream from mouth, and 15 miles northwest of Lapine.

Drainage area.--19.7 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--May 1922 to September 1925 and October 1949 to September 1951 in reports of Geological Survey. May 1922 to September 1925, November 1925 to October 1927 (discharge measurements only) and June 1938 to September 1941 in reports of State engineer. October 1941 to September 1949 (discharge measurements only October 1945 to September 1946) in files of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 4,375 ft (by barometer). May 24, 1922, to Oct. 11, 1927, staff gage and June 17, 1938, to Nov. 1, 1945, water-stage recorder at site  $\frac{1}{4}$  miles downstream at different datum.

Average discharge.--15 years (1922-25, 1938-45, 1946-51), 35.3 cfs.

Extremes.--Maximum discharge during year, 87 cfs Oct. 28 (gage height, 1.43 ft); minimum, 48 cfs sometime between Jan. 28 and Mar. 27, 1922-25, 1938-45, 1946-51. Maximum discharge, that of Oct. 28, 1950; minimum, 16 cfs July 22-25, 1941, and at times December 1941 to March 1942.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion or regulation above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from aquatic vegetation July 3-9)

1.1	40
1.4	82

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	64	56	50	49	51	53	60	66	63	69	72
2	56	66	56	50	49	51	53	60	66	63	69	72
3	56	63	56	50	49	51	53	61	64	63	69	68
4	57	61	56	50	49	51	54	61	64	63	70	68
5	59	60	57	50	50	51	54	61	64	61	70	68
6	59	60	60	50	50	52	54	61	64	61	70	68
7	59	59	60	49	50	52	54	62	64	61	71	68
8	57	59	60	49	50	52	55	62	64	61	71	68
9	57	59	59	49	50	52	55	62	64	*61	71	68
10	57	59	57	49	50	52	55	62	64	61	72	68
11	57	59	57	49	50	52	55	63	64	62	72	*68
12	57	58	56	49	50	52	56	63	64	62	72	68
13	57	58	56	49	50	52	56	63	64	62	73	68
14	*56	58	56	49	50	52	56	63	64	63	*73	68
15	56	58	56	49	50	52	56	64	64	63	73	68
16	56	58	56	49	50	52	57	64	64	63	73	68
17	57	58	56	49	50	52	57	*64	64	64	73	68
18	57	57	56	49	50	52	57	64	*64	64	73	68
19	57	57	54	49	50	52	57	66	64	64	73	68
20	57	57	54	49	51	53	57	67	64	65	73	68
21	57	57	53	49	51	53	58	67	64	65	73	67
22	57	57	53	49	51	53	58	67	64	65	73	67
23	57	57	53	49	51	53	58	66	64	66	73	67
24	57	56	53	*49	51	53	58	66	64	66	72	67
25	57	56	52	49	51	53	59	66	64	66	72	67
26	57	56	52	49	51	53	59	66	64	67	72	67
27	60	*56	52	49	51	*53	59	66	64	67	72	66
28	68	56	52	49	51	53	59	66	64	67	72	66
29	78	56	52	49	-	53	60	66	63	68	72	66
30	66	56	52	49	-	53	60	66	63	68	72	66
31	61	-	52	49	-	53	-	66	-	68	72	-
Total	1,815	1,751	1,713	1,525	1,405	1,619	1,692	1,981	1,922	1,983	2,225	2,030
Mean	58.5	58.4	55.3	49.2	50.2	52.2	56.4	63.9	64.1	64.0	71.8	67.7
Ac-ft	3,600	3,470	3,400	3,020	2,790	3,210	3,560	3,930	3,810	3,930	4,410	4,030
Calendar year 1950: Max 78 Min 36 Mean 47.9 Ac-ft 34,670												
Water year 1950-51: Max 78 Min 49 Mean 59.3 Ac-ft 42,960												

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 9-26, Jan. 2 to Mar. 26, Apr. 2 to May 16, June 19-26, July 10 to Aug. 13; discharge interpolated.

## Odell Creek near Crescent, Oreg.

Location.--Lat 43°32'50", long. 121°57'40", in SW $\frac{1}{4}$  sec. 25, T. 23 S., R. 6 E., on left bank 1,000 ft below outlet of Odell Lake,  $3\frac{1}{2}$  miles north of Crescent Lake, and 14 miles northwest of Crescent.

Drainage area.--39.0 sq mi.

Records available.--August 1911 to August 1914 (incomplete), December 1923 to June 1924, May 1933 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 4,778.83 ft above mean sea level, datum of 1929.

Average discharge.--18 years (1933-51), 75.6 cfs.

Extremes.--Maximum discharge during year, 365 cfs Oct. 30 (gage height, 1.24 ft), from rating curve extended above 200 cfs by logarithmic plotting; minimum recorded, 10 cfs Mar. 4, 5 (caused by ice jamming at outlet of lake), but may have been less during parts of these days when stage was below lower intake.  
1911-14, 1923-24, 1933-51: Maximum discharge, 405 cfs Dec. 30, 1945 (gage height, 1.37 ft), from rating curve extended above 190 cfs; maximum gage height, 2.03 ft Jan. 5, 1947 (ice jam); minimum discharge recorded, that of Mar. 4, 5, 1951.

Remarks.--Records good except those for period of shifting control, which are fair. Flow regulated occasionally in winter by ice jams and at other times by debris which collects on fish racks or by boards used at outlet of Odell Lake to change lake levels; slightly affected at times by seiches on Odell Lake. No diversion above station.

Revisions (water years).--W 794: 1933, 1934.

Rating tables, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)

Oct. 1 to Mar. 31				Apr. 1 to Sept. 30			
0.2	16	0.7	143	0.3	32		
.3	28	1.0	260	.4	58		
.4	48	1.3	395	.6	124		
.5	74			.8	188		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	304	136	122	101	84	89	140	155	114	75	58
2	58	300	132	126	98	51	89	136	152	114	75	58
3	81	295	147	136	101	48	85	*140	149	114	72	58
4	*69	280	158	132	132	22	85	140	146	108	68	58
5	88	256	158	129	140	23	85	140	146	105	68	*58
6	94	240	173	122	143	154	85	140	143	102	68	58
7	94	220	208	115	143	189	85	140	140	102	*61	61
8	98	216	216	112	143	189	89	136	136	*99	58	58
9	98	*197	212	*108	136	189	89	136	136	95	58	61
10	94	181	204	108	136	173	89	136	136	92	*55	61
11	91	170	197	112	140	158	*89	149	136	89	55	58
12	88	158	189	108	136	147	89	152	136	89	53	55
13	88	151	177	108	132	136	92	152	136	89	50	55
14	84	147	181	112	126	126	95	152	136	89	50	55
15	84	147	177	115	122	136	99	149	143	85	53	55
16	81	166	173	122	118	136	102	149	146	89	53	55
17	88	173	166	154	115	118	108	149	146	89	53	55
18	91	204	158	158	118	112	111	149	143	89	53	58
19	91	193	151	158	112	*108	114	149	140	85	53	55
20	*88	185	143	154	108	105	118	152	136	85	53	55
21	88	170	140	165	105	101	118	152	136	82	55	50
22	88	158	132	165	101	101	118	155	133	82	55	55
23	84	147	126	162	98	98	118	158	133	82	55	50
24	81	140	122	158	94	94	118	165	127	82	53	50
25	84	132	118	151	88	91	118	168	124	82	53	53
26	88	129	112	147	94	94	114	172	124	78	53	53
27	112	126	108	136	88	94	118	175	121	78	53	*53
28	177	122	112	126	88	91	136	175	118	78	53	53
29	314	118	118	115	-	91	143	168	118	75	55	53
30	350	126	126	112	-	91	140	165	118	75	55	61
31	318	-	132	105	-	91	-	161	-	75	55	-
Total	3,468	5,552	4,802	4,055	3,256	3,441	3,128	4,700	4,089	2,792	1,779	1,674
Mean	112	185	155	131	116	111	104	152	136	90.1	57.4	55.8
Cfsm	2.87	4.74	3.97	3.36	2.97	2.84	2.67	3.90	3.49	2.31	1.47	1.43
In.	3.51	5.29	4.58	3.87	3.10	3.28	2.98	4.48	3.90	2.66	1.70	1.60
Ac-ft	6,880	11,010	9,520	8,040	6,460	6,830	6,200	9,320	8,110	5,540	3,530	3,320
Calendar year 1950: Max	350		350		Mean 118		Cfsm 3.02	In. 41.09	Ac-ft 85,460			
Water year 1950-51: Max	350		Min 22		Mean 117		Cfsm 3.00	In. 40.75	Ac-ft 84,760			

\* Discharge measurement made on this day.

Note.--Shifting-control method used Mar. 6-31.



DESCHUTES RIVER BASIN

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Deschutes River below Wickiup Reservoir, near Lapine, Oreg.

Location.--Lat 43°41'20", long. 121°41'00", in NE¼ sec. 7, T. 22 S., R. 9 E., on left bank 2,000 ft downstream from Wickiup Dam, and 9 miles west of Lapine.

Drainage area.--483 sq mi.

Records available.--June 1938 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 4,257.41 ft above mean sea level (levels by Bureau of Reclamation).

Average discharge.--13 years, 699 cfs.

Extremes.--Maximum discharge during year, 2,220 cfs Sept. 8, 9 (gage height, 7.79 ft); minimum, 14 cfs Nov. 18 (gage height, 0.89 ft).

1938-51: Maximum discharge, that of Sept. 8, 9, 1951; no flow Oct. 20, 1948.

Remarks.--Records good. Flow regulated by Crane Prairie Reservoir and since Dec. 24, 1942, by Wickiup Reservoir (see p. 65).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Sept. 4				Sept. 5-30			
1.3	44	5.0	1,000	5.0	1,020		
1.5	67	7.0	1,830	7.0	1,860		
2.0	148	7.8	2,210	7.8	2,220		
3.0	380						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,250	48	55	55	*523	634	694	1,040	1,310	1,900	2,040	2,180
2	1,150	48	56	56	523	634	694	1,030	1,310	1,900	2,020	2,180
3	1,090	48	57	56	523	634	697	1,030	1,310	1,920	2,020	2,190
4	1,040	51	59	57	538	634	697	904	1,310	1,960	2,020	*2,200
5	*1,030	51	60	*57	604	634	697	826	1,310	1,960	2,020	2,200
6	1,100	52	55	57	604	634	700	826	1,310	1,960	2,030	2,200
7	1,090	53	46	59	604	634	700	826	1,300	1,960	2,030	2,200
8	1,090	*54	47	60	604	667	703	*826	1,300	1,960	2,040	2,200
9	1,080	54	46	60	604	688	706	830	1,300	1,960	*2,050	2,200
10	815	55	46	60	607	688	*709	834	1,300	*1,960	2,080	2,180
11	938	57	46	57	607	688	706	834	*1,370	1,970	2,090	*2,150
12	932	59	46	59	607	691	709	834	1,510	1,970	2,090	1,900
13	*840	61	46	87	*616	691	709	830	1,720	1,970	2,110	1,500
14	679	52	48	141	631	694	712	830	1,810	1,960	2,130	1,340
15	550	50	48	170	631	694	712	830	1,810	1,960	2,130	1,330
16	439	51	47	170	631	694	712	830	1,800	1,960	*2,160	1,330
17	442	51	48	239	631	694	712	830	1,800	1,990	2,180	1,330
18	445	45	48	308	631	694	712	830	1,790	2,070	2,190	1,320
19	448	48	50	308	a631	694	712	830	*1,800	2,060	2,180	1,310
20	451	45	50	310	a631	*697	709	840	1,800	2,060	2,180	1,310
21	332	45	51	375	a631	697	706	844	1,800	2,060	2,180	1,300
22	259	47	51	481	a631	697	721	1,120	1,800	2,060	2,180	1,300
23	257	47	52	523	a631	697	840	1,230	1,800	2,070	2,190	1,290
24	259	51	53	523	a634	697	921	1,240	1,800	2,070	2,200	1,280
25	262	52	53	523	a634	697	1,050	1,240	1,830	2,020	2,190	1,270
26	267	54	54	523	a634	697	1,100	1,280	1,870	2,030	2,180	1,250
27	267	*55	54	523	a634	697	1,190	1,310	1,860	2,040	2,180	1,200
28	234	56	54	a523	a634	697	1,230	1,310	1,860	2,040	2,180	1,200
29	172	56	55	a523	-	697	1,220	1,310	1,900	2,030	2,180	1,200
30	134	54	55	a523	-	697	1,250	1,310	1,900	2,020	2,180	1,210
31	61	-	55	a523	-	694	-	1,310	-	2,040	2,180	-
Total	19,403	1,550	1,591	7,989	17,044	21,076	24,210	30,794	48,690	61,890	65,810	49,250
Mean	626	51.7	51.3	258	609	680	807	993	1,623	1,996	2,123	1,642
Ac-ft	38,490	3,070	3,160	15,850	33,810	41,800	48,020	61,080	96,580	122,800	130,500	97,690
Calendar year 1950: Max	2,010											
Water year 1950-51: Max	2,200											
Min												
Mean	798											
Ac-ft	577,500											
Mean	692,800											

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage when available, and records for Deschutes River at Fringle Falls.

## DESCHUTES RIVER BASIN

Deschutes River at Pringle Falls, near Lapine, Oreg.

Location.--Lat 43°44'20", long. 121°36'50", in SW $\frac{1}{4}$  sec. 23, T. 21 S., R. 9 E., on left bank half a mile upstream from bridge at Pringle Falls, 7 miles northwest of Lapine, and at mile 217.

Drainage area.--507 sq mi.

Records available.--December 1915 to June 1917, June 1922 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 4,243.14 ft above mean sea level (Forest Service benchmark). Prior to June 6, 1922, staff gage at same site at datum 3.09 ft higher. June 6, 1922, to Nov. 9, 1947, water-stage recorder at present site at datum 2.00 ft higher.

Average discharge.--28 years (1923-51), 710 cfs.

Extremes.--Maximum discharge during year, 2,160 cfs Sept. 4, 8 (gage height, 5.94 ft); minimum, 40 cfs Nov. 18 (gage height, 1.34 ft).  
1915-17, 1922-51: Maximum discharge, that of Sept. 4, 8, 1951; minimum, 30 cfs Mar. 3, Nov. 2, 1948.

Remarks.--Records good. No diversion above station. Flow regulated since 1922 by Crane Prairie Reservoir, and since Dec. 24, 1952, by Wickiup Reservoir (see p. 65).

Revisions (water years).--W 1014: 1943(m).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Sept. 4

Sept. 5-30

1.5	52	3.0	393	4.0	840
1.7	72	4.0	840	6.0	2,210
2.0	117	6.0	2,260		
2.5	232				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,280	57	59	58	514	613	685	1,030	1,300	1,870	1,990	2,120
2	1,200	57	59	60	514	613	690	1,020	1,310	1,870	1,980	2,120
3	1,110	56	61	59	514	613	690	1,020	1,310	1,860	1,970	2,140
4	1,080	56	62	59	522	613	690	939	1,300	1,920	1,970	*2,150
5	1,030	56	62	59	590	613	695	825	1,300	1,920	1,970	2,150
6	1,110	57	66	59	590	613	690	835	1,300	1,930	1,980	2,140
7	1,110	57	56	60	590	613	690	830	1,300	1,930	1,980	2,150
8	1,110	*57	56	60	590	650	690	*830	1,300	*1,920	1,990	2,150
9	1,110	57	56	60	590	665	690	830	1,300	1,920	*2,000	2,120
10	825	57	56	*60	595	665	*690	835	1,300	1,930	2,030	2,110
11	944	58	56	61	590	665	690	840	*1,340	1,930	2,040	2,080
12	934	59	55	60	590	665	690	835	1,480	1,930	2,040	1,920
13	*862	59	55	71	595	665	690	835	1,840	1,930	2,050	1,500
14	695	56	57	117	613	665	690	835	1,770	1,920	2,080	1,320
15	577	56	56	160	613	665	690	835	1,770	1,920	2,080	1,320
16	434	58	56	160	613	665	690	835	1,770	1,920	2,090	1,320
17	438	58	56	210	613	665	690	835	1,770	1,940	2,120	1,320
18	442	56	56	290	613	665	690	840	1,770	2,000	2,110	1,310
19	438	56	56	287	613	665	690	840	1,770	2,000	2,120	1,300
20	442	57	56	290	613	*665	690	840	1,790	2,000	2,110	1,300
21	350	53	56	347	613	670	695	1,030	1,790	2,000	2,140	1,290
22	246	54	56	462	613	670	695	1,100	1,790	2,000	2,130	1,290
23	238	54	56	518	613	670	815	1,210	1,780	2,010	2,140	1,280
24	240	56	57	518	613	670	878	1,230	1,780	2,010	2,140	1,270
25	243	56	57	514	613	670	1,010	1,240	1,800	1,980	2,130	1,260
26	243	56	57	514	613	885	1,090	1,280	1,840	1,980	2,120	1,240
27	249	*57	57	514	613	665	1,140	1,300	1,840	1,980	2,120	1,180
28	254	57	58	514	613	660	1,210	1,300	1,840	1,990	2,120	1,180
29	172	58	58	514	-	665	1,200	1,310	1,870	1,980	2,120	1,180
30	147	59	59	514	-	670	1,130	1,310	1,870	1,980	2,120	1,190
31	73	-	58	514	-	680	-	1,300	-	1,980	2,130	-
Total	19,616	1,700	1,784	7,743	16,579	20,276	23,663	30,954	48,090	60,470	64,110	48,400
Mean	633	56.7	57.5	250	592	654	789	999	1,603	1,951	2,068	1,613
Ac-ft	38,910	3,370	3,540	15,360	32,880	40,220	46,930	61,400	95,390	119,900	127,200	96,000
Calendar year 1950: Max	2,030				Min 53		Mean 797		Ac-ft	577,300		
Water year 1950-51: Max	2,150				Min 53		Mean 941		Ac-ft	681,100		

\* Discharge measurement made on this day.

Note.--No gage-height record Mar. 2-19, Sept. 13-30; discharge estimated on basis of recorded range in stage and records for station below Wickiup Reservoir near Lapine.

Fall River near Lapine, Oreg.

Location.--Lat 43°47'50", long. 121°34'20", in SE $\frac{1}{4}$  sec. 31, T. 20 S., R. 10 E., on left bank 50 ft downstream from spillway from ponds at State fish hatchery and 9 miles (revised) northwest of Lapine.

Drainage area.--45.1 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--May to September 1912 (fragmentary and June 1938 to September 1951 in reports of Geological Survey. October 1923 to September 1924 and July 1938 to September 1941 in reports of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 4,220 ft (by barometer). May 13 to Sept. 15, 1912, and Oct. 1, 1923, to Sept. 30, 1924, staff gages at two sites within 3 $\frac{1}{2}$  miles downstream at different datums.

Average discharge.--13 years (1938-51), 138 cfs.

Extremes.--Maximum discharge during year, 248 cfs June 1 (gage height, 1.93 ft); minimum, 139 cfs Nov. 21.

1938-51: Maximum discharge, that of June 1, 1951; minimum, 68 cfs Apr. 6, 1942.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Water diverted above station only to ponds at fish hatcheries, from which water returns to river above station.

Revisions (water years).--W 984: 1938-42(M, m).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from moss Oct. 1 to Nov. 27)

1.4 149  
2.0 262

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	162	171	169	176	178	187	187	238	242	225	223	215
2	163	169	169	178	178	187	189	238	242	225	223	215
3	165	167	169	178	178	187	191	238	242	227	223	212
4	165	167	169	178	180	189	193	238	242	227	221	*212
5	165	167	169	a178	176	189	194	238	244	225	219	210
6	167	167	172	a178	176	189	194	238	242	225	219	210
7	167	165	171	a178	178	187	196	236	244	225	217	210
8	167	165	171	a178	176	187	198	234	242	223	215	210
9	a167	163	171	a178	176	a187	202	234	240	223	*215	210
10	a167	a163	171	*178	176	a187	*202	232	238	*223	215	210
11	a165	a163	172	180	178	a187	204	234	236	223	215	210
12	a165	a163	174	178	178	a187	206	232	234	223	215	210
13	a165	a165	174	180	178	a187	208	231	234	223	214	208
14	a165	a165	174	180	178	a187	212	231	231	223	214	208
15	a165	*165	174	180	180	a187	215	229	229	223	215	208
16	a163	169	172	181	180	a187	217	*227	227	223	215	208
17	a163	169	171	181	180	a187	223	225	229	223	215	208
18	*163	169	171	180	180	a187	223	225	*227	223	215	208
19	163	167	174	181	180	a187	223	225	227	223	217	208
20	a163	167	174	180	180	a187	227	225	227	223	217	206
21	a165	167	174	180	180	a187	227	227	227	223	219	206
22	a165	167	174	178	180	a187	229	231	227	223	219	208
23	a165	167	175	180	181	a187	231	231	223	223	223	204
24	a167	167	176	178	195	a187	231	234	227	223	215	204
25	a167	167	176	180	185	a187	232	232	227	223	221	206
26	a169	167	176	180	185	a187	234	236	227	223	221	204
27	a169	167	176	178	185	a187	236	236	227	223	221	204
28	a169	167	176	178	187	a187	238	238	225	223	221	206
29	a171	167	176	178	-	a187	240	238	225	223	221	206
30	171	169	176	178	-	*187	240	240	225	223	219	206
31	171	-	176	178	-	187	-	240	-	223	219	-
Total	5,144	4,998	5,563	5,545	5,032	5,803	6,442	7,251	6,981	6,931	6,761	6,250
Mean	166	167	173	179	180	187	215	233	233	224	218	208
Ac-ft	10,200	9,910	10,640	11,000	9,980	11,510	12,780	14,340	13,850	13,750	13,410	12,400
Calendar year 1950: Max	178				Min 147	Mean 168		Ac-ft 121,700				
Water year 1950-51: Max	244				Min 162	Mean 193		Ac-ft 143,800				

\* Discharge measurement made on this day.

a No gage-height record; discharge interpolated.

## DESCHUTES RIVER BASIN

Crescent Creek at Crescent Lake, near Crescent, Oreg.

Location.--Lat 43°30'00", long. 121°58'20", in sec. 11, T. 24 S., R. 6 E., on right bank 300 ft downstream from dam at outlet of Crescent Lake and 14 miles west of Crescent.

Drainage area.--60.7 sq mi (revised).

Records available.--January 1911 to July 1915, July 1927 to September 1951.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 4,826.72 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Jan. 11, 1911, to July 31, 1915, staff gages near present site at different datums. July 19, 1927, to June 1936, water-stage recorder near present site at different datum.

Average discharge.--26 years(1911-14, 1928-51), 42.6 cfs.

Extremes.--Maximum discharge during year, 221 cfs Sept. 28 (gage height, 2.64 ft); minimum, 6.1 cfs Oct. 3-5 (gage height, 0.27 ft).

1911-15, 1927-51: Maximum discharge, 313 cfs July 9, 1929, Aug. 9, 1936; no flow at times.

Remarks.--Records good. Flow regulated since 1922 by Crescent Lake (see p. 65), storage being released for diversion below station through Deschutes County Municipal Improvement District Canal at Bend. No diversion above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.2	4	1.5	89
.5	7	2.0	142
.5	15	2.7	229
1.0	47		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.4	12	127	150	148	144	136	135	145	122	95	37
2	6.4	15	127	149	148	144	136	135	144	122	95	37
3	6.1	14	127	149	148	143	136	135	144	122	95	37
4	6.1	14	128	149	148	142	135	135	144	122	95	37
5	6.1	14	127	149	148	142	135	135	144	122	95	37
6	6.4	35	140	149	148	142	135	135	144	121	95	38
7	6.7	76	155	148	148	142	134	135	144	121	95	38
8	6.7	76	154	148	148	142	134	135	145	121	95	38
9	6.7	87	153	148	148	142	134	135	145	120	95	39
10	6.7	103	153	148	148	142	134	135	146	120	*71	39
11	6.7	103	152	149	148	142	134	135	146	120	34	39
12	6.7	103	151	149	148	142	134	136	146	120	34	39
13	6.7	103	150	149	148	142	134	136	146	120	34	40
14	6.7	103	150	148	148	142	134	136	145	120	35	40
15	6.7	103	150	146	148	142	134	136	145	120	35	39
16	6.7	103	149	145	148	142	134	136	145	120	35	38
17	6.7	103	149	145	148	142	134	136	145	107	35	38
18	7.0	103	148	145	146	142	134	138	145	94	35	38
19	7.0	103	148	145	146	142	134	138	145	95	35	38
20	7.4	108	148	145	146	142	134	139	145	95	36	38
21	7.8	129	148	145	145	142	134	139	144	95	36	38
22	7.8	128	150	146	145	141	134	140	144	95	36	38
23	7.8	128	150	146	145	141	134	141	144	95	35	88
24	8.1	128	150	148	144	141	134	141	144	95	35	153
25	8.1	128	150	148	144	140	134	142	144	95	35	153
26	8.1	127	150	148	144	140	134	142	144	95	35	151
27	8.5	127	150	148	144	140	134	143	135	95	35	180
28	8.9	127	150	148	144	139	134	143	122	95	36	221
29	10	127	150	148	-	138	135	144	122	95	36	220
30	11	127	150	148	-	138	135	144	122	95	36	219
31	11	-	150	148	-	138	-	144	-	95	37	-
Total	229.7	2,753	4,534	4,574	4,109	4,383	4,035	4,279	4,259	3,369	1,666	2,225
Mean	7.41	91.8	146	148	147	141	134	138	142	109	53.7	74.2
Ac-ft	456	5,460	8,990	9,070	8,150	8,690	8,000	8,490	8,450	6,680	3,300	4,410

Calendar year 1950: Max 219 Min 6 Mean 97.3 Ac-ft 70,410  
 Water year 1950-51: Max 221 Min 6.1 Mean 111 Ac-ft 80,150

\* Discharge measurement made on this day.

## Little Deschutes River near Lapine, Oreg.

Location.--Lat 43°41'30", long. 121°30'10", in SW $\frac{1}{4}$  sec. 2, T. 22 S., R. 10 E., on right bank just downstream from bridge at former town of Rosland,  $\frac{1}{4}$  miles north of Lapine.

Drainage area.--859 sq mi.

Records available.--September 1910 to October 1913 (incomplete), June to November 1918, August to October 1920, May 1924 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 4,192.81 ft above mean sea level, datum of 1929. Sept. 22, 1910, to Aug. 31, 1911, staff gage at present site at different datum. Mar. 1 to Sept. 28, 1912, staff gage at site  $\frac{1}{4}$  miles downstream at different datum. June 1, 1913, to Oct. 28, 1920, staff gage at present site at different datum. May 15, 1924, to Sept. 28, 1928, staff gage and Sept. 29, 1928, to Oct. 14, 1931, water-stage recorder at datum 1.0 ft higher.

Average discharge.--27 years (1924-51), 170 cfs.

Extremes.--Maximum discharge during year, 880 cfs Feb. 10 (gage height, 6.80 ft); minimum, 76 cfs Oct. 2, 3.

1910-13, 1918, 1920, 1924-51: Maximum discharge, 1,320 cfs June 13, 1950 (gage height, 7.25 ft); minimum, 8 cfs Sept. 2, 3, 1931 (gage height, 0.71 ft).

Revisions.--Maximum discharge for water year 1950 has been revised to 1,320 cfs June 13, 1950 (gage height, 7.25 ft), superseding figure published in Water-Supply Paper 1184.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Diversions for irrigation of about 13,700 acres above station. Flow regulated since August 1922 by Crescent Lake (see p.

Revisions.--Revised figures of discharge, in cubic feet per second, for the high-water period in the water year 1950, superseding those published in Water-Supply Paper 1184 are given herewith:

June 13..... 1,120  
14..... 967  
15..... 922

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
June.....	21,961	1,120	520	732	43,560
Water year 1949-50	99,351	1,120	55	272	197,100

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Apr. 30 to June 16)

1.8 69  
2.0 87  
4.0 313  
6.0 635  
6.8 880

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	611	360	443	a300	382	406	730	512	264	169	107
2	76	462	375	426	b400	370	398	692	499	259	167	101
3	77	391	366	420	b450	359	404	680	498	256	166	98
4	83	402	363	416	b500	370	420	692	458	256	164	*96
5	104	377	395	404	591	b350	443	670	*446	254	163	97
6	125	353	467	410	629	b360	469	675	430	253	162	96
7	149	325	583	416	718	b380	501	682	420	251	162	94
8	142	321	575	416	805	b400	516	639	414	*245	163	95
9	125	325	745	414	842	b400	524	617	407	239	159	94
10	119	306	750	382	852	b400	*547	595	398	234	*159	92
11	121	308	730	384	842	b410	587	597	378	228	159	91
12	103	310	*710	387	779	b420	621	591	366	226	138	92
13	*97	303	682	377	750	b420	639	593	364	221	125	91
14	92	300	690	364	698	425	670	599	360	218	120	90
15	83	295	685	385	633	426	695	607	357	217	118	88
16	88	300	655	408	581	*477	722	595	353	215	115	87
17	95	310	643	392	a550	482	748	575	352	214	114	87
18	112	342	621	290	a500	458	764	551	352	211	112	87
19	131	356	569	b250	*486	438	785	531	350	197	111	87
20	119	382	558	b260	477	434	*793	512	350	190	109	85
21	110	381	535	b280	459	438	793	*514	346	189	108	84
22	108	388	528	b300	440	437	776	519	340	186	107	83
23	106	392	512	b340	454	432	761	519	334	186	107	83
24	101	361	486	b400	414	416	745	516	330	186	106	83
25	98	339	470	b340	408	420	732	509	325	186	105	140
26	102	345	458	b300	395	422	712	507	320	184	101	173
27	127	345	442	b250	392	424	702	516	308	183	93	*179
28	185	343	431	a230	395	425	708	519	294	180	93	180
29	359	357	425	a220	-	425	712	521	276	179	95	216
30	428	361	430	a200	-	420	758	521	269	178	107	236
31	536	-	446	a200	-	418	-	521	-	174	110	-
Total	4,379	10,691	16,705	10,704	15,740	12,838	19,051	18,105	11,206	6,659	3,987	3,312
Mean	141	356	539	345	562	414	635	584	374	215	129	110
Ac-ft	6,690	21,210	33,130	21,250	31,220	25,460	37,790	35,910	22,230	13,210	7,910	6,570

Calendar year 1950: Max 1,120 Min 55 Mean 337 Ac-ft 243,900  
Water year 1950-51: Max 852 Min 76 Mean 365 Ac-ft 264,600

Peak discharge (base, 400 cfs).--Nov. 1 (2 to 6 a.m.) 647 cfs (6.06 ft); Dec. 10 (1 to 5 a.m.) 755 cfs (6.50 ft); Feb. 10 (7 p.m.) 880 cfs (6.80 ft); Apr. 20 (7 to 12 p.m.) 797 cfs (6.63 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and unpublished records for Big Marsh Creek at Hoey Ranch near Crescent.

b Stage-discharge relation affected by ice.

## Deschutes River at Benham Falls, near Bend, Oreg.

Location.--Lat 43°56'20", long. 121°24'40", in SE¼ sec. 9, T. 19 S., R. 11 E., on left bank 150 ft upstream from head of Benham Falls, 1½ miles downstream from dam site for proposed Benham Falls Reservoir, 10 miles southwest of Bend, and at mile 181.1.

Drainage area.--1,759 sq mi.

Records available.--July 1906 to September 1914, August 1920 to September 1921, February 1924 to September 1951. Published as "at West's Ranch near Lava" July 1906 to February 1909, April to September 1914. Published as "at Benham Falls, near Bend", January 1905 to June 1906, October 1913 to September 1914 but record is sum of flow for stations at Bend and intervening canals; records not equivalent owing to losses between Benham Falls and Bend, which are now known to exist.

Gage.--Water-stage recorder. Altitude of gage is 4,140 ft, revised (from river-profile map). July 21, 1906, to Feb. 20, 1909, and Apr. 2 to Sept. 30, 1914, staff gage at site 7 miles upstream at various datums. Feb. 21, 1909, to Feb. 10, 1924, staff gages at two different sites within 600 ft upstream from present site at various datums. Feb. 11, 1924, to Nov. 12, 1947, water-stage recorder at present site at datum 1.00 ft higher.

Average discharge.--34 years (1906-13, 1924-51), 1,326 cfs.

Extremes.--Maximum discharge during year, 2,770 cfs July 20 (gage height, 4.67 ft); minimum, 792 cfs Oct. 26 (gage height, 1.28 ft).  
1906-14, 1920-21, 1924-51: Maximum discharge, 5,000 cfs (estimated) Nov. 27, 1909 (gage height not determined); minimum, 448 cfs occurred during period Jan. 11 to Feb. 3, 1950 (from recorded range in stage); minimum daily, 480 cfs Feb. 12, 1948.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Small diversions above station for irrigation. Flow regulated since 1922 by Crane Prairie Reservoir and Crescent Lake, and since December 1942 by Wickiup Reservoir (see preceding page).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.0	690
2.0	1,090
3.0	1,620
5.0	3,050

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,760	968	908	960	a1,200	a1,550	a1,650	a2,500	a2,400	2,680	2,690	2,740
2	1,750	996	a920	984	a1,250	a1,550	a1,650	a2,450	a2,400	2,670	2,690	2,740
3	1,710	1,040	a920	a960	a1,300	a1,550	1,640	a2,400	a2,400	2,670	2,690	2,730
4	1,640	1,000	a930	a960	a1,350	a1,500	a1,650	a2,350	a2,400	2,670	2,680	2,730
5	1,600	936	928	a940	a1,400	a1,450	a1,650	a2,300	a2,350	2,700	2,680	2,730
6	1,570	920	968	a860	a1,500	a1,400	a1,650	a2,250	a2,350	2,720	2,670	2,730
7	1,630	896	*1,040	a840	a1,600	a1,600	a1,650	a2,200	a2,350	2,720	2,670	2,730
8	1,650	868	1,040	a840	a1,650	a1,400	a1,650	a2,150	2,350	2,720	2,670	2,730
9	1,660	848	1,080	892	a1,700	a1,450	a1,700	a2,150	2,350	2,720	2,670	2,730
10	1,640	844	1,140	932	a1,800	a1,500	a1,700	a2,100	2,350	2,710	2,670	2,730
11	1,410	836	1,260	940	a1,900	a1,550	a1,750	a2,100	2,320	2,710	2,690	2,730
12	1,460	828	*1,270	a940	a1,900	a1,550	a1,750	a2,050	2,350	2,710	2,690	2,720
13	1,460	832	1,240	a940	a1,850	1,600	a1,750	a2,050	2,430	2,710	2,700	2,650
14	1,360	832	1,240	a960	a1,850	a1,650	a1,800	a2,050	2,550	2,700	2,690	a2,400
15	1,220	832	1,240	a1,000	a1,850	a1,650	a1,800	a2,000	2,660	2,700	2,700	a2,200
16	1,080	840	1,220	a1,020	a1,800	a1,650	a1,800	a2,000	2,700	2,690	2,700	a2,000
17	972	852	1,200	a1,000	a1,750	a1,650	a1,850	a2,000	2,700	2,690	2,710	a2,000
18	980	888	1,160	a900	a1,750	a1,650	a1,850	a2,000	2,700	2,700	2,730	a2,000
19	976	892	1,160	a1,040	a1,700	a1,650	a1,900	a2,000	2,690	2,730	2,750	a1,950
20	998	892	1,130	a1,040	a1,650	a1,650	a1,950	a2,000	2,690	2,760	2,750	a1,950
21	1,000	904	1,100	a1,040	a1,600	a1,650	a2,000	a2,000	2,690	2,760	2,750	a1,950
22	892	904	1,080	a1,100	a1,600	a1,650	a2,050	a2,100	2,690	2,760	*2,750	a1,950
23	*808	900	1,050	a1,200	a1,600	a1,650	a2,050	a2,150	2,680	2,760	2,740	a1,900
24	800	908	1,040	a1,300	a1,550	a1,650	a2,100	a2,250	2,670	2,760	2,740	a1,900
25	796	908	1,030	a1,400	a1,600	a1,650	a2,150	a2,300	2,660	2,760	2,750	a1,900
26	796	888	1,010	a1,450	a1,550	a1,650	a2,250	a2,300	2,660	2,750	2,750	a1,950
27	824	876	996	a1,450	a1,550	a1,650	a2,350	a2,350	2,690	2,730	2,740	a2,000
28	924	876	992	a1,350	a1,550	a1,650	a2,400	a2,350	2,690	2,720	2,730	a2,000
29	1,080	872	992	a1,300	-	a1,650	a2,450	a2,400	2,690	2,710	2,730	a2,000
30	1,040	896	976	a1,250	-	a1,650	a2,500	a2,400	2,690	2,710	2,740	a2,000
31	1,000	-	964	a1,200	-	a1,650	-	a2,400	-	2,700	2,740	-
Total	38,476	26,772	33,224	32,838	45,350	49,150	57,090	68,100	76,240	84,200	84,050	69,470
Mean	1,241	821	1,072	1,065	1,620	1,585	1,903	2,197	2,541	2,716	2,711	2,316
Ac-ft	76,320	53,100	65,900	65,330	89,950	97,490	113,200	135,100	151,200	167,000	166,700	137,800
Calendar year 1950: Max	2,700			Min	520		Mean	1,596	Ac-ft	1,156,000		
Water year 1950-51: Max	2,760			Min	796		Mean	1,822	Ac-ft	1,319,000		

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage when available, records for stations below Lava Island adjusted for flow in Arnold Canal, and unpublished records for stations below Benham Falls and at Ryan Ranch near Bend.

## Reservoirs in Deschutes River basin above Bend, Oreg.

Crane Prairie Reservoir.--Lat 43°45'20", long. 121°46'50", on control structure at dam on Deschutes River in NW 1/4 sec. 16, T. 21 S., R. 8 E., 15 miles northwest of Lapine. Drainage area, 254 sq mi (revised), hydrologic drainage boundary uncertain owing to ground-water exchange. Records available, November 1922 to September 1951. Staff gage read once daily except Nov. 18 to Apr. 24, when occasional readings were made. Datum of gage is 4,400.0 ft above mean sea level (levels by Bureau of Reclamation). Maximum contents observed during year, 58,280 acre-ft May 7-3, 11 (elevation, 4,445.58 ft); minimum, 29,170 acre-ft Dec. 11 (elevation, 4,439.14 ft). Maximum contents observed during period 1922-51, 60,500 acre-ft June 5-7, 1943 (elevation, 4,446.0 ft); no usable contents at times.

Reservoir is formed by earth dam completed by North Canal Co. in 1922; gates were first closed Nov. 22, 1922; reconstructed as rock-faced earth dam with concrete control works by Bureau of Reclamation in 1939-40. Capacity, 55,340 acre-ft between elevation 4,424 ft (lip of fish screen structure) and 4,445 ft (crest of spillway). Natural flow passing through reservoir when outlet gates are open prevents withdrawal of storage to elevation of sill of gates. Water used for irrigation near Bend and Redmond.

Wickiup Reservoir.--Lat 43°41'10", long. 121°41'10", in gate chamber structure at dam on Deschutes River in NE 1/4 sec. 7, T. 22 S., R. 9 E., 9 miles west of Lapine. Drainage area, 482 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange. Records available, December 1942, when storage began, to September 1951. Tape gage read daily. Datum of gage is at mean sea level (levels by Bureau of Reclamation). Maximum contents observed during year, 188,800 acre-ft Apr. 17 (elevation, 4,336.64 ft); minimum observed, 18,470 acre-ft Sept. 30 (elevation, 4,293.40 ft). Maximum contents observed during period 1942-51, that of Apr. 17, 1951; minimum observed since reservoir first filled in March 1949, 13,720 acre-ft Sept. 29, 1949 (elevation, 4,289.67 ft).

Reservoir is formed by rock-faced earth-fill dam completed by Bureau of Reclamation August 1949. Timber removal practically complete. Capacity, 182,100 acre-ft between elevations 4,265.0 ft (no storage) and 4,336.0 ft (crest of spillway, with earth soft plug to elevation 4,339.0 ft). Natural flow passing through reservoir when outlet gates are open prevents withdrawal of storage below elevation 4,265.0 ft. Sill of trash rack structure elevation 4,259.75 ft. Water is diverted from Deschutes River at Bend and issued for irrigation of lands near Madras. Daily elevations and capacity table furnished by Bureau of Reclamation.

Crescent Lake.--Lat 43°30'00", long. 121°58'20", in sec. 11, T. 24 S., R. 6 E., at center of fish screen 250 ft south of dam, and 14 miles west of Crescent. Drainage area, 60.7 sq mi (revised), hydrologic drainage boundary uncertain owing to ground-water exchange. Records available, August 1922 to September 1951. Staff gage read about once each week; also staff gage at head of spillway of dam used occasionally. Datum of gage is 4,826.0 ft above mean sea level (levels by Deschutes County Municipal Improvement District); gage readings have been reduced to elevations above mean sea level. Maximum contents observed during year, 54,860 acre-ft Dec. 10 (elevation, 4,841.0 ft); minimum observed, 42,220 acre-ft Oct. 1 (elevation, 4,837.68 ft). Maximum contents observed during period 1922-51, 72,460 acre-ft July 15, 1923 (elevation, 4,845.55 ft); minimum observed, 9,640 acre-ft Oct. 21, 1931 (elevation, 4,828.75 ft).

Reservoir is formed by dam of earth and logs, completed and storage begun in 1922. Capacity, 86,050 acre-ft between elevations 4,826 ft (sill of outlet gate) and 4,849 ft (crest of spillway). Dead storage not known; records given herein represent usable contents. Water is diverted from Deschutes River at Bend and used by Deschutes County Municipal Improvement District for irrigation near Tumalo.

Revisions.--W 739: 1923 (maximum contents).

Monthly elevations and contents, water year October 1950 to September 1951

Date	Crane Prairie Reservoir			Wickiup Reservoir			Crescent Lake		
	Elevation (feet)*	Contents (acre-ft)	Change in contents during month (acre-ft)	Elevation (feet)*	Contents (acre-ft)	Change in contents during month (acre-ft)	Elevation (feet)*	Contents (acre-ft)	Change in contents during month (acre-ft)
Sept. 30.....	4,440.50	34,750	-	4,299.92	28,340	-	-	a42,100	-
Oct. 31.....	4,443.88	49,900	+15,150	4,307.61	43,380	+15,050	-	a50,270	+8,170
Nov. 30.....	-	a51,300	-18,600	4,328.38	116,400	+73,010	-	a54,100	+3,830
Dec. 31.....	-	a52,600	+1,300	4,334.18	165,800	+47,400	-	a53,240	-860
Calendar year 1950.....	-	-	-1,200	-	-	+29,500	-	-	+2,970
Jan. 31.....	-	a45,300	+12,700	4,336.47	187,000	+23,200	-	a52,740	-500
Feb. 28.....	-	a54,000	+8,700	4,336.38	186,000	-1,000	-	a51,350	-1,410
Mar. 31.....	-	a53,700	-300	4,336.60	188,400	+2,400	-	a49,100	-2,220
Apr. 30.....	4,445.40	57,350	+1,650	4,336.21	184,300	-4,100	-	a49,180	-930
May 31.....	4,445.44	57,550	+200	4,335.83	180,700	-4,000	-	a51,040	+2,860
June 30.....	4,445.24	56,530	-1,020	4,331.86	142,900	-37,400	-	a51,670	+630
July 31.....	4,445.38	57,240	+710	4,323.78	90,560	-52,340	-	a50,330	-1,340
Aug. 31.....	4,445.26	56,640	-600	4,307.94	44,100	-46,460	-	a51,700	+1,370
Sept. 30.....	4,445.38	57,240	+600	4,293.40	18,470	-25,630	-	a51,620	-80
Water year 1950-51.....	-	-	+22,490	-	-	-9,870	-	-	+9,520

\* Time of day variable.

a No gage-height record; contents interpolated.

## DESCHUTES RIVER BASIN

Deschutes River below Lava Island, near Bend, Oreg.

Location (revised).--Lat 44°00'00", long. 121°22'30", in SW $\frac{1}{4}$  sec. 23, T. 18 S., R. 11 E., on right bank three-quarters of a mile downstream from Lava Island,  $\frac{1}{4}$  miles downstream from intake of Arnold Canal, 5 miles southwest of Bend, and at mile 173.0.

Drainage area.--1,829 sq mi.

Records available.--March 1926 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 3,825 ft (by barometer). Prior to May 4, 1927, water-stage recorder at site a quarter of a mile upstream at different datum. May 4, 1927, to Nov. 11, 1947, water-stage recorder at present site at datum 1.00 ft higher.

Average discharge.--25 years, 1,105 cfs.

Extremes.--Maximum discharge during year, 2,600 cfs July 19 (gage height, 3.47 ft); minimum, 722 cfs Oct. 24, '26 (gage height, 1.38 ft).  
1926-51: Maximum discharge, that of July 19, 1951; minimum, 416 cfs Jan. 18, 1950 (gage height, 0.79 ft).

Remarks.--Records good except those for periods of no gage-height record, which are fair. Arnold Canal diverts water above station for irrigation (see p. 67). Flow regulated by Crescent Lake and Crane Prairie and Wickiup Reservoirs (see p. 65).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.3	670
2.0	1,190
3.0	2,120
3.5	2,630

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,640	898	856	912	1,200	1,490	1,580	2,280	2,170	2,440	2,420	2,530
2	1,530	905	856	933	1,240	1,480	1,590	2,230	2,180	2,430	2,420	2,530
3	1,600	972	863	933	1,280	1,460	1,590	2,180	2,170	2,420	2,410	2,530
4	1,530	980	884	926	1,330	1,430	1,550	2,170	2,170	2,430	2,400	2,520
5	1,500	905	855	905	1,430	1,410	1,540	2,200	2,160	2,460	2,400	2,530
6	1,470	877	856	840	1,510	1,370	1,550	2,100	2,140	*2,460	2,400	*2,530
7	1,520	856	933	800	1,560	1,360	1,570	2,100	2,120	2,480	*2,390	2,520
8	1,540	828	933	840	1,560	1,370	1,580	2,040	2,110	2,480	2,390	2,520
9	1,550	807	968	860	1,610	1,440	1,600	1,940	2,090	2,470	2,400	2,520
10	1,540	800	1,090	860	1,720	1,490	1,600	1,900	2,080	2,460	2,400	2,520
11	1,330	800	1,220	*898	1,830	1,500	1,600	1,880	2,060	2,460	2,410	2,510
12	1,370	787	*1,230	877	1,800	1,500	1,600	1,870	2,080	2,460	2,420	2,500
13	1,360	794	1,200	884	1,750	1,500	1,610	1,850	2,140	2,460	2,430	2,460
14	1,300	787	1,190	905	1,800	1,530	1,630	1,840	*2,240	2,450	2,430	2,240
15	1,140	787	1,190	964	1,800	1,570	1,650	1,830	2,350	2,450	2,440	1,920
16	1,010	794	1,170	980	1,750	*1,570	1,680	1,830	2,400	2,440	2,450	1,800
17	905	807	1,140	980	1,710	1,570	1,700	1,830	2,410	2,440	2,450	1,780
18	905	855	1,110	863	1,690	1,600	1,740	1,820	2,400	2,430	2,470	1,770
19	905	842	1,090	998	1,640	1,620	*1,770	1,810	2,410	2,520	2,490	1,760
20	912	842	1,070	1,000	1,600	1,630	1,790	1,800	2,410	2,500	2,500	1,740
21	919	856	1,040	1,000	1,600	1,620	1,610	1,790	2,410	2,490	2,500	1,730
22	849	856	1,010	1,070	1,570	1,610	1,630	1,860	2,410	2,490	2,520	1,730
23	*748	856	956	1,260	1,540	1,600	1,850	1,940	2,420	2,460	2,510	1,720
24	728	863	940	1,350	1,530	1,600	1,900	*2,040	2,410	2,480	2,500	1,730
25	735	863	933	1,390	1,540	1,600	1,950	2,090	2,410	2,480	2,510	1,720
26	728	842	926	1,440	1,510	1,590	2,050	2,110	2,410	2,470	2,510	1,720
27	754	828	933	1,430	1,500	1,580	2,140	2,120	2,430	2,450	2,520	1,760
28	859	828	940	1,300	1,490	1,580	2,210	2,150	2,440	2,440	2,500	1,770
29	1,010	821	940	1,250	-	1,590	2,280	2,160	2,430	2,440	2,500	1,750
30	980	842	926	1,200	-	1,580	2,290	2,170	2,440	2,440	2,520	1,760
31	953	-	919	1,150	-	1,580	-	2,170	-	2,430	2,520	-
Total	35,910	25,358	31,167	32,016	44,090	47,420	52,830	62,100	68,480	76,250	76,130	63,120
Mean	1,158	845	1,005	1,033	1,575	1,530	1,761	2,003	2,283	2,460	2,456	2,104
Ac-ft	71,230	50,300	61,820	63,500	87,450	94,060	104,600	123,200	135,600	151,200	151,000	125,200

Calendar year 1950: Max 2,450 Min 469 Mean 1,457 Ac-ft 1,055,000  
Water year 1950-51: Max 2,530 Min 728 Mean 1,685 Ac-ft 1,220,000

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 6-10, Jan. 27 to Feb. 15; discharge estimated on basis of weather records, recorded range in stage, and unpublished records for station above Lava Island near Bend adjusted for flow in Arnold Canal.



## Diversions from Deschutes River near Bend, Oreg.

The following six canals, which are equipped with water-stage recorders, are the only diversions from Deschutes River between gaging stations at Benham Falls and below Bend.

Arnold Canal diverts from right bank at head of Lava Island, in SW $\frac{1}{4}$  sec. 27, T. 18 S., R. 11 E.; water used for irrigation southeast of Bend.

Central Oregon Canal diverts from right bank in NE $\frac{1}{4}$  sec. 13, T. 18 S., R. 11 E.; water used for irrigation east of Bend. (Beginning Oct. 1, 1932, record obtained upstream from intake of Pilot Butte Canal.)

Deschutes County Municipal Improvement District Canal diverts from left bank in NE $\frac{1}{4}$  sec. 32, T. 17 S., R. 12 E., at Bend; water used to supplement flow of Tumalo project feed canal for irrigation near Tumalo; water stored at Crescent Lake Reservoir is diverted by this canal.

North Unit Main Canal diverts water from right bank in NE $\frac{1}{4}$  sec. 29, T. 17 S., R. 12 E.; water used for irrigation near Madras.

North and Swalley Canals divert from right bank in NE $\frac{1}{4}$  sec. 29, T. 17 S., R. 12 E.; water used for irrigation north of Bend, mostly near Redmond.

Records of monthly discharge of these canals, published as a group, are available from October 1926 to September 1951; records for each canal published separately prior to 1926.

Diversions, in acre-feet, water year October 1950 to September 1951

Month	Arnold Canal	Central Oregon Canal	Deschutes County Municipal Improvement District Canal	North Unit Main Canal	North Canal	Swalley Canal	Total
October .....	2,440	16,900	2,200	9,300	15,180	4,320	50,340
November .....	218	625	0	0	9,200	1,570	11,610
December .....	946	3,450	0	0	1,570	1,170	7,140
January .....	103	1,520	0	0	1,070	375	3,070
February .....	522	2,340	0	0	1,650	401	4,910
March .....	458	1,930	0	0	1,870	545	4,800
April .....	3,640	18,680	349	24,540	18,070	4,010	69,270
May .....	4,650	26,930	3,420	42,400	26,660	6,340	110,400
June .....	6,740	32,340	2,340	54,080	30,550	7,370	133,400
July .....	6,950	34,770	7,130	56,700	32,580	7,920	146,000
August .....	6,610	34,550	9,670	30,550	33,380	8,580	123,300
September .....	5,740	29,050	8,580	24,390	27,650	6,520	101,900
Water year 1950-51	39,020	203,100	33,690	242,000	199,400	49,120	766,300

## Deschutes River below Bend, Oreg.

Location.--Lat 44°05'00", long. 121°18'20", in SE<sup>1</sup>/<sub>4</sub> sec. 20, T. 17 S., R. 12 E., on right bank half a mile downstream from North Canal dam, half a mile north of Bend city limits, and at mile 164.4.

Drainage area.--1,899 sq mi.

Records available.--October 1914 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3,503.96 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Oct. 1, 1931, at site 200 ft downstream at datum 1.00 ft higher.

Average discharge.--37 years, 597 cfs.

Extremes.--Maximum discharge during year, 1,700 cfs Feb. 16 (gage height, 3.74 ft); maximum gage height recorded, 4.05 ft Jan. 30 (backwater from ice); minimum discharge, 30 cfs Sept. 24 (gage height, 1.13 ft).

1914-51: Maximum discharge, 2,500 cfs Dec. 7, 1921 (gage height, 3.9 ft, present datum); maximum gage height recorded, 4.46 ft Jan. 26, 1930, present datum (backwater from ice); minimum discharge, 1 cfs Aug. 25, 1930.

Maximum discharge known near this site since 1905, 4,820 cfs Nov. 27, 1909.

Remarks.--Records good except those for period of no gage-height record, which are fair. SIX large canals divert water above station for irrigation (see p. 67). Flow regulated by hydroelectric plant at Bend, since 1922 by Crescent Lake and Crane Prairie Reservoir, and since December 1942 by Wickiup Reservoir (see p. 65).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from moss July 24 to Sept. 17)

1.3	58
1.6	130
2.0	310
3.0	990
3.8	1,770

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	265	641	620	942	1,200	1,470	1,510	245	92	105	436	895
2	280	739	683	974	1,240	1,470	1,510	275	102	100	442	918
3	316	798	704	966	1,320	1,450	1,540	270	108	113	460	942
4	305	798	768	958	1,380	1,450	1,550	400	110	113	448	950
5	364	753	888	934	1,390	1,390	1,540	574	116	108	448	974
6	310	718	880	888	1,490	1,360	1,550	568	151	144	*454	*966
7	436	704	982	835	1,520	1,350	1,440	648	170	192	460	942
8	496	683	966	835	1,430	1,360	1,160	634	158	206	484	902
9	529	655	966	872	1,390	1,410	1,120	522	170	230	490	910
10	594	634	1,060	910	1,500	1,450	1,080	466	165	210	484	918
11	484	634	1,140	926	1,450	1,470	918	472	148	174	490	926
12	*484	614	1,180	902	1,460	1,350	*594	548	113	151	529	918
13	522	620	1,190	880	1,570	1,130	466	555	140	130	548	895
14	568	627	1,190	669	1,560	1,100	406	548	220	122	555	725
15	620	641	1,190	568	1,570	1,140	382	*529	322	108	562	430
16	522	648	1,190	594	1,640	1,170	358	454	364	88	568	295
17	370	669	1,180	790	1,680	1,330	322	334	352	80	562	260
18	364	683	1,140	888	1,680	1,520	322	270	285	58	568	240
19	370	711	1,100	1,010	1,630	1,580	275	215	250	124	594	196
20	394	725	805	1,020	1,590	1,580	225	158	225	158	600	165
21	430	760	690	1,020	1,590	1,590	210	70	165	165	600	134
22	400	768	655	1,050	1,570	*1,580	183	74	*122	178	607	108
23	230	768	*600	1,190	*1,540	1,560	178	64	119	210	620	97
24	215	768	738	1,280	1,510	1,570	183	76	122	250	620	100
25	225	753	966	1,280	1,320	1,570	140	78	124	270	627	97
26	210	725	942	1,320	1,500	1,550	119	78	102	310	634	95
27	260	704	942	1,330	1,480	1,550	108	62	122	340	676	144
28	472	697	910	1,330	1,470	1,550	148	62	119	358	690	151
29	690	676	950	1,250	-	1,550	201	68	124	376	739	178
30	620	548	934	1,220	-	1,530	250	58	116	394	805	210
31	562	-	934	1,200	-	1,510	-	88	-	418	872	-
Total	12,907	20,862	29,084	30,811	41,870	44,620	19,988	9,465	4,996	5,983	17,672	15,681
Mean	416	695	938	994	1,495	1,439	666	305	187	193	570	523
Ac-ft	25,600	41,380	57,690	61,110	83,050	88,500	39,650	18,770	9,910	11,870	35,050	31,100
Calendar year 1950:	Max	1,570			Min	38		Mean	505		Ac-ft	365,700
Water year 1950-51:	Max	1,680			Min	58		Mean	696		Ac-ft	505,700

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 28 to Feb. 2; discharge estimated on basis of records for station below Lava Island adjusted for flow in intervening canals.

## Tumalo Creek near Bend, Oreg.

Location.--Lat 44°05'20", long. 121°22'20", in SE $\frac{1}{4}$  sec. 23, T. 17 S., R. 11 E., on left bank a quarter of a mile upstream from diversion dam of feed canal of Tumalo project, 4 miles upstream from mouth, and 4 miles northwest of Bend.

Drainage area.--47.3 sq mi (revised).

Records available.--October 1906 to December 1908 and October 1910 to April 1913 (winters only), November 1913 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3,566.96 ft above mean sea level, datum of 1929. Prior to November 1910, staff gage at site half a mile upstream at different datum. November 1910 to Apr. 26, 1915, staff gage and Apr. 27, 1915, to Sept. 30, 1918, staff gage or water-stage recorder at present site and datum.

Average discharge.--36 years (1913-21, 1923-51), 80.6 cfs, excluding Columbia Southern Canal.

Extremes.--Maximum discharge during year, 354 cfs June 16 (gage height, 2.81 ft); maximum gage height, 4.24 ft about Jan. 29 (backwater from ice); minimum discharge, 32 cfs Sept. 6, 7 (gage height, 1.35 ft).

1906-8, 1911-51: Maximum discharge, 1,420 cfs about Jan. 6, 1923, from rating curve extended above 200 cfs; maximum gage height, 6.23 ft Feb. 12, 13, 1948 (backwater from ice); minimum discharge, 1 cfs June 28 to July 3, 1940.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Crater Creek Canal diverts flow of tributaries of Soda Creek into head of Tumalo Creek. Columbia Southern Canal diverts from creek above station.

Revisions (water years).--W 864: 1937.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 6		Dec. 7 to Sept. 30	
1.4	38	1.3	27
1.5	50	1.6	58
2.0	125	2.0	120
2.5	240	2.5	250
2.7	305	2.7	315

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	a150	122	109	a80	91	88	102	152	193	42	36
2	38	a300	122	111	b80	92	88	83	158	180	41	36
3	44	a250	120	106	b85	b90	91	91	162	185	39	35
4	51	a220	122	107	b90	92	96	100	172	182	39	35
5	62	a200	120	104	b95	88	104	96	*152	134	39	35
6	48	a190	202	b100	104	91	106	106	165	138	39	34
7	88	a180	241	b100	142	89	107	102	160	a135	38	*35
8	102	a200	185	*99	130	88	113	102	160	a125	*39	36
9	70	a180	165	97	122	89	*122	*113	175	a125	39	36
10	70	a150	168	97	126	a90	130	134	193	a115	39	37
11	63	a140	*162	97	128	a88	130	155	211	a105	39	38
12	*58	a130	158	96	122	a86	136	130	238	*97	40	37
13	56	a120	150	98	118	a86	150	115	250	104	40	37
14	64	*116	148	100	116	86	165	106	256	99	40	37
15	90	115	138	97	115	104	172	111	290	88	39	37
16	88	113	134	99	111	96	175	130	274	83	39	39
17	97	116	126	99	109	94	175	155	238	82	a40	39
18	108	116	122	100	109	*88	180	172	214	77	a40	38
19	108	110	124	b102	104	88	178	165	189	64	a40	39
20	111	122	128	b102	104	89	*165	178	199	56	a38	39
21	108	113	120	102	102	89	158	185	196	57	a38	39
22	94	106	120	102	100	88	150	214	196	54	a40	39
23	a85	106	152	107	99	86	145	253	193	52	a40	40
24	a80	139	132	132	96	86	140	256	193	52	a38	a42
25	a85	156	124	126	94	88	145	268	180	52	a38	a38
26	a80	133	120	118	b92	86	148	265	178	47	a42	a40
27	a75	135	115	115	91	84	158	271	185	45	a40	a40
28	a90	123	116	107	92	86	158	241	178	43	a38	a42
29	a120	122	122	a100	-	89	116	202	178	43	a36	a42
30	a110	123	116	a90	-	88	111	180	180	42	a36	42
31	a100	-	113	a85	-	88	-	160	-	43	a36	-
Total	2,481	4,474	4,307	3,202	2,956	2,763	4,100	4,941	5,875	2,897	1,211	1,139
Mean	80.0	149	139	103	106	89.1	137	159	93.5	39.1	38.0	38.0
Ac-ft	4,920	8,870	8,540	6,350	5,860	5,480	8,130	9,800	11,650	5,750	2,400	2,260

Adjusted for diversion in Columbia Southern Canal

Mean	98.6	149	139	103	106	89.1	139	225	267	165	93.5	85.0
Ac-ft	6,060	8,870	8,540	6,350	5,860	5,480	8,270	13,860	15,910	10,140	5,750	5,060

Observed

Calendar year 1950: Max	421	Min	34	Mean	112	Ac-ft	80,850
Water year 1950-51: Max	300	Min	34	Mean	111	Ac-ft	80,010

Adjusted

Calendar year 1950: Mean	135	Ac-ft	97,400
Water year 1950-51: Mean	138	Ac-ft	100,200

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage when available and records for Squaw Creek near Sisters.

b Stage-discharge relation affected by ice.

## DESCHUTES RIVER BASIN

Squaw Creek near Sisters, Oreg.

Location.--Lat 44°13'50", long. 121°34'20", in NW¼ sec. 32, T. 15 S., R. 10 E., on right bank 800 ft (revised) upstream from intake of McCallister ditch and 4 miles south of Sisters.

Drainage area.--54.8 sq mi (revised).

Records available.--July 1906 to September 1951 (irrigation seasons only 1913-25).

Gage.--Water-stage recorder. Altitude of gage is 3,490 ft (by barometer). July 1, 1906, to May 29, 1913, staff gage at site 800 ft downstream at different datum, below intake but including flow of McCallister ditch. May 30, 1913, to Sept. 2, 1915, staff gage and Mar. 24, 1916, to Oct. 5, 1928, water-stage recorder at site 100 ft downstream from present site at different datum.

Average discharge.--39 years (1906-18, 1919-20, 1925-51), 103 cfs.

Extremes.--Maximum discharge during year, 586 cfs Nov. 1; minimum, 65 cfs Oct. 1, 2. 1906-51: Maximum gage height, about 8.75 ft (over top of gage), Nov. 22, 1909, site and datum then in use (discharge not determined); maximum discharge recorded since that time, 1,130 cfs Dec. 2, 1941 (gage height, 3.33 ft); minimum, 19 cfs Dec. 6, 1922.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. A canal near mouth of Pole Creek, a tributary above station, diverts entire flow of that creek for irrigation of lands near Sisters.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1-20, Jan. 24 to Feb. 6, May 31 to July 19)

Oct. 1 to June 14			June 15 to Sept. 30		
1.4	55		1.4	64	
1.6	86		1.6	96	
2.0	175		2.0	176	
3.0	460		2.7	370	

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	214	138	b125	a100	b95	74	120	228	283	156	90
2	66	457	133	b120	a100	b90	76	116	235	286	156	88
3	103	328	140	111	a105	b85	79	120	242	280	154	86
4	120	262	155	b110	a105	86	86	136	248	277	154	85
5	131	240	150	b110	*111	84	90	131	232	259	152	83
6	99	225	286	b108	124	88	94	143	235	235	142	85
7	138	215	245	b105	182	86	96	140	235	235	138	86
8	140	248	200	*b105	160	84	*99	140	240	238	134	85
9	*107	210	188	103	158	81	103	*155	248	240	134	83
10	111	192	192	105	170	85	105	172	274	240	132	*85
11	107	182	*192	105	170	b80	107	198	286	238	124	82
12	101	172	182	103	158	76	111	178	*307	*222	120	80
13	94	150	175	101	148	78	126	160	310	245	*118	80
14	88	143	170	111	143	76	136	158	325	248	116	78
15	83	136	162	113	138	a100	138	165	358	245	116	78
16	79	131	158	111	133	a90	140	188	352	245	116	78
17	88	133	155	109	131	*85	145	225	331	245	116	82
18	92	140	150	113	124	*84	145	232	313	242	114	82
19	86	133	150	113	124	83	143	232	307	215	112	82
20	86	145	152	111	118	83	138	238	301	200	114	80
21	81	140	148	113	113	83	128	242	295	186	112	75
22	74	133	148	109	113	83	128	265	295	183	110	74
23	71	128	165	116	109	81	128	319	289	183	109	72
24	69	178	152	145	109	78	128	319	292	186	105	70
25	83	192	145	143	105	78	128	319	274	186	103	70
26	74	170	140	136	103	76	133	319	280	172	101	72
27	81	160	136	131	97	76	138	319	283	169	101	70
28	124	150	133	124	96	74	140	286	277	167	101	74
29	129	148	138	a120	-	76	151	256	280	163	100	74
30	140	148	133	a110	-	76	124	242	283	159	96	107
31	113	-	128	a105	-	74	-	238	-	156	93	-
Total	3,095	5,603	5,039	3,544	3,547	2,552	3,533	6,474	8,455	6,827	3,749	2,424
Mean	99.8	187	163	114	127	82.3	118	209	282	220	121	80.8
Ac-ft	6,140	11,110	9,990	7,030	7,040	5,060	7,010	12,840	16,770	13,540	7,440	4,810

Calendar year 1950: Max 457 Min 66 Mean 139 Ac-ft 100,800  
Water year 1950-51: Max 457 Min 66 Mean 150 Ac-ft 108,800

Peak discharge (base, 300 cfs).--Nov. 1 (12 p.m.) 586 cfs (3.28 ft); Dec. 6 (8 a.m. to 1 p.m.) 340 cfs (2.60 ft); May 23 (10 to 12 p.m.) 358 cfs (2.58 ft); June 15 (10 to 11:30 p.m.) 400 cfs (2.68 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for Tumble Creek near Bend and Lake Creek near Sisters.

b Stage-discharge relation affected by ice.

DESCHUTES RIVER BASIN

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South Fork Beaver Creek near Paulina, Oreg.

Location.--Lat 44°08', long. 119°45', in N $\frac{1}{2}$  sec. 5, T. 17 S., R. 25 E., on right bank at Palmer ranch, 11 miles east of Paulina.

Drainage area.--90 sq mi, approximately.

Records available.--October 1945 to September 1951 in reports of Geological Survey. June 1944 to September 1945 in files of Bureau of Reclamation.

Gage.--Water-stage recorder. Altitude of gage is 3,920 ft (by barometer). Prior to Sept. 16, 1948, staff gage at same site and datum.

Average discharge.--7 years, 20.4 cfs.

Extremes.--Maximum discharge during year, 420 cfs Mar. 15 (gage height, 6.27 ft), from rating curve extended above 200 cfs on basis of slope-area determination of peak flow; maximum gage height, 6.73 ft Feb. 6 (ice jam); no flow for many days.

1944-51: Maximum discharge, about 900 cfs Dec. 28 or 29, 1945, computed on basis of records for Beaver Creek near Paulina; maximum gage height, that of Feb. 6, 1951; no flow at times.

Remarks.--Records poor. Most of summer flow diverted above station for irrigation and stock water. No regulation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		0	6.3	b10	b17	a38	72	66	30	0.7	0.5	0.4
2		0	5.0	b11	b19	a36	d80	57	27	.5	.3	.4
3		0	6.1	b12	b28	a24	d95	69	25	.4	.4	.4
4		0	8.8	b11	b55	a36	d110	82	24	.3	.3	.3
5		0	10	b9	b75	a36	d130	80	26	1.0	.3	.3
6		0	91	b1.8	*b90	a36	d110	74	29	2.1	.2	.2
7		0	160	b4	b240	a34	d100	68	35	1.7	.1	.2
8		0	66	b10	162	a38	d90	67	53	1.9	.1	.1
9		0	27	b1	183	a38	d93	61	67	7.8	.1	.1
10		0	14	*12	d140	a34	80	61	d28	7.8	.1	.1
11		0	10	b12	d110	a30	77	74	d21	7.6	0	.1
12		0	11	b8	d80	a40	75	130	d18	7.1	0	0
13		0	8.5	b9	d65	a55	74	149	*12	6.2	0	0
14		0	137	16	d55	a90	70	120	10	5.6	0	0
15		0	133	23	d48	211	70	106	8.6	4.7	0	0
16		0	58	b15	a46	a160	70	95	7.8	4.4	0	0
17		0	32	b11	a42	a90	68	90	5.0	3.7	0	0
18		0	25	b7.5	a40	*74	63	82	2.1	3.4	0	0
19		1.5	20	b6	a44	105	*65	82	1.3	3.2	0	0
20		3.3	16	b4.6	a48	131	58	99	1.0	3.0	0	0
21		4.0	15	b7	a44	112	50	100	.9	2.7	9	0
22		4.0	14	b18	a42	86	d44	74	1.0	2.3	0	0
23		3.3	13	44	a40	76	d38	65	1.3	*2.2	0	0
24		4.0	12	205	a40	84	d36	54	1.3	2.0	0	0
25		4.2	12	b150	a40	87	d34	47	1.9	1.7	0	0
26		4.2	9.1	b85	a38	82	d32	43	1.3	1.4	.1	0
27		4.4	8.8	b55	a36	77	44	39	.7	1.1	.1	0
28		4.7	12	a44	*b54	75	71	35	2.2	1.0	.1	0
29		*4.9	35	a24	-	81	92	33	1.8	1.0	*.2	0
30		*7.6	58	a16	-	81	80	32	1.2	1.0	.4	0
31		-	b20	b15	-	76	-	32	-	.7	.5	-
Total	0	50.1	1,045.6	886.9	1,901	2,253	2,171	2,266	444.4	90.2	4.0	2.6
Mean	0	1.67	33.7	28.0	67.8	72.7	72.4	73.1	14.8	2.91	0.13	0.09
Ac-ft	0	99	2,070	1,720	3,770	4,470	4,310	4,490	881	179	7.9	5.2

Calendar year 1950: Max 160 Min 0 Mean 16.4 Ac-ft 11,860  
 Water year 1950-51: Max 240 Min 0 Mean 30.4 Ac-ft 22,000

Peak discharge (base, 150 cfs).--Dec. 7 (2:30 a.m.) 292 cfs (4.65 ft); Dec. 14 (5 p.m.) 289 cfs (4.64 ft); Jan. 24 (4:30 p.m.) 272 cfs (4.59 ft); Feb. 7 (4 p.m.) 354 cfs (5.86 ft); Feb. 9 (6 p.m.) 318 cfs (5.72 ft); Mar. 15 (3 p.m.) 420 cfs (6.27 ft); Mar. 20 (6:30 p.m.) 224 cfs (5.12 ft); May 12 (8:30 p.m.) 189 cfs (4.73 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for North Fork Beaver Creek and Beaver Creek near Paulina.

b Stage-discharge relation affected by ice.

d Doubtful gage-height record; discharge computed as in footnote a.

## DESCHUTES RIVER BASIN

North Fork Beaver Creek near Paulina, Oreg.

Location--Lat 44°10', long. 119°43', in NW $\frac{1}{4}$  sec. 22, T. 16 S., R. 25 E., on left bank 12 miles east of Paulina.

Drainage area--61.8 sq mi (revised).

Records available--October 1945 to September 1951 in reports of Geological Survey. January 1942 to September 1945 in files of Bureau of Reclamation.

Gage--Water-stage recorder. Datum of gage is 3,848.83 ft above mean sea level (survey by Bureau of Reclamation).

Average discharge--9 years, 26.2 cfs.

Extremes--Maximum discharge during year, 558 cfs Dec. 7 (gage height, 4.32 ft), from rating curve extended above 330 cfs; no flow July 30 to Aug. 7, Aug. 19, 20, 1942-51; Maximum discharge, 899 cfs Dec. 28, 1945 (gage height, 5.90 ft), from rating curve extended above 110 cfs; no flow July 30 to Aug. 7, Aug. 19, 20, 1951.

Remarks--Records good except those for periods of ice effect or shifting control, and those below 2 cfs, which are fair. Several small dams above station store water for irrigation and stock watering. Most of summer flow diverted above station for irrigation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.2	0.4	1.8	b20	b23	b17	74	71	5.9	0.6	0	0.2
2	.2	.6	1.7	22	b27	b17	102	55	5.1	.6	0	.2
3	.2	.5	2.4	b23	b32	b13	145	45	4.2	.6	0	.2
4	.5	.5	4.7	22	b50	16	192	48	4.2	.5	0	.2
5	.2	.5	8.9	16	b170	b16	216	53	4.6	.6	0	.2
6	.2	.5	144	b12	*b210	16	205	49	6.4	.6	0	.3
7	.2	.5	346	b10	424	b14	184	49	6.9	.5	0	.3
8	.2	.5	97	13	302	b15	174	43	5.6	.4	.1	.3
9	.2	.4	80	13	282	b15	166	34	4.2	.4	.1	.3
10	*.2	.4	67	*13	302	b14	149	31	3.3	.4	.1	.3
11	.2	.4	53	13	296	b13	128	57	2.7	.4	.1	.3
12	.2	.6	51	b12	186	13	125	144	2.6	.4	.1	.3
13	.2	.6	42	11	125	22	139	170	*2.4	.4	.1	.3
14	.2	.6	180	28	96	37	151	102	2.0	.3	.1	.3
15	.2	.6	172	83	77	157	132	72	1.8	.3	.1	.3
16	.2	.8	97	b50	57	135	109	55	1.5	.3	.1	.3
17	.4	.8	60	b36	55	74	96	44	1.3	.3	.1	.3
18	.4	.9	45	b25	48	*65	88	37	1.3	.3	.1	.3
19	.3	1.1	38	b20	39	100	*76	31	1.2	.3	0	.3
20	.3	1.3	32	b16	41	158	60	25	1.1	.2	0	.3
21	.4	1.2	28	23	34	159	45	22	1.0	.2	.1	.3
22	.4	1.1	26	24	28	113	37	19	.9	.2	.1	.3
23	.4	1.1	24	34	26	82	31	16	.9	*.2	.1	.3
24	.4	1.1	22	283	22	99	28	15	.8	.2	.1	.3
25	.4	1.1	21	206	b20	134	26	13	.8	.1	.1	.4
26	.4	1.1	16	116	b17	121	24	11	.7	.1	.1	.3
27	.4	1.1	17	b65	b17	117	26	9.6	.7	.1	.2	.3
28	.6	1.1	22	b44	*b16	100	109	7.8	.6	.1	.2	.4
29	.4	*1.3	37	b30	-	117	138	7.2	.6	.1	*.2	.4
30	.4	1.6	39	b22	-	106	90	6.7	.6	.1	.2	.6
31	.4	-	23	b21	-	84	-	6.2	-	0	.2	-
Total	9.3	24.3	1,800.5	1,326	3,062	2,159	3,264	1,348.5	75.9	9.8	2.7	9.1
Mean	0.30	0.81	58.1	42.8	109	69.6	109	43.5	2.53	0.32	0.09	0.30
Ac-ft	18	48	3,570	2,630	6,070	4,280	6,470	2,680	151	19	5.4	18

Calendar year 1950: Max 346 Min 0.2 Mean 28.9 Ac-ft 20,940  
 Water year 1950-51: Max 424 Min 0 Mean 35.9 Ac-ft 25,960

Peak discharge (base, 400 cfs).--Dec. 7 (5:30 a.m.) 558 cfs (4.32 ft); Jan. 24 (7:30 p.m.) 402 cfs (3.61 ft); Feb. 7 (9 p.m.) 514 cfs (4.13 ft); Mar. 15 (7 p.m.) 442 cfs (3.81 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--Shifting-control method used July 12 to Sept. 30.

## Beaver Creek near Paulina, Oreg.

Location.--Lat 44°10', long. 119°56', in NE $\frac{1}{4}$  sec. 26, T. 16 S., R. 23 E., on right bank three-quarters of a mile downstream from Paulina Creek, 1 $\frac{1}{2}$  miles downstream from Wolf Creek, and 3 miles northeast of Paulina.

Drainage area.--425 sq mi.

Records available.--October 1945 to September 1951 in reports of Geological Survey. October 1941 to September 1945 in files of Bureau of Reclamation.

Gage.--Water-stage recorder.

Average discharge.--10 years, 98.5 cfs.

Extremes.--Maximum discharge during year, 2,000 cfs Feb. 7 (gage height, 5.81 ft), from rating curve extended above 900 cfs on basis of discharge of Crooked River near Post; minimum, 0.4 cfs for several days in July, August, and September, 1945-51: Maximum discharge, 4,310 cfs Dec. 28, 1945 (gage height, 10.2 ft), from rating curve extended above 900 cfs on basis of discharge of Crooked River near Post; no flow Oct. 13-29, 1945.

Remarks.--Records good. No regulation. Diversions for irrigation above station, and one on left bank diverting past station for irrigation of about 700 acres.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 7				Feb. 8 to Sept. 30			
0.1	0.6	1.1	68	0.1	0.5	1.2	78
.2	3.0	1.5	136	.2	1.7	1.5	128
.3	6.5	2.0	286	.3	4.1	2.0	275
.5	15	3.0	665	.4	7.6	3.0	665
.8	36	5.0	1,600	.6	18	5.0	1,600
				.9	42		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	8.2	22	83	81	105	310	272	31	1.2	0.4	0.5
2	1.5	8.1	25	89	87	97	356	222	34	.7	.4	.5
3	1.6	11	20	92	92	64	448	180	35	.6	.4	.4
4	1.9	9.7	31	91	168	91	544	177	24	.7	.4	.4
5	3.7	8.9	40	77	580	92	620	180	16	1.1	.4	.4
6	5.1	8.9	269	48	529	92	808	169	23	.5	.5	.4
7	4.8	8.9	674	43	1,500	82	552	156	24	.5	.5	.5
8	4.8	8.5	362	80	1,800	94	512	143	25	.5	.5	.5
9	4.8	8.1	249	62	*1,040	97	484	122	22	.5	.5	.5
10	*5.1	8.1	208	*66	1,370	77	444	105	19	.5	.5	.5
11	4.4	8.1	168	66	1,580	75	396	158	17	.6	.6	.5
12	4.4	8.5	157	61	962	98	366	282	*15	3.3	.6	.6
13	4.4	9.3	136	60	568	126	370	342	13	3.0	.6	.6
14	4.0	10	290	67	404	201	368	300	9.0	3.0	.6	.6
15	4.0	10	505	110	345	369	370	225	6.9	3.0	.6	.6
16	4.4	11	362	101	247	620	331	180	6.2	3.0	.6	.6
17	4.4	11	230	104	237	*334	296	156	5.8	3.0	.6	2.3
18	4.8	11	179	83	204	272	268	138	5.8	2.3	.6	4.1
19	4.4	15	152	81	169	345	*247	120	4.8	.5	.6	3.3
20	5.8	12	134	60	160	592	219	108	5.8	.5	.6	4.1
21	5.8	11	117	84	169	800	186	97	4.1	.5	.6	4.1
22	5.8	12	108	95	148	576	164	89	3.0	.5	.6	4.1
23	5.8	12	101	106	126	436	136	75	1.4	.4	.6	4.1
24	5.8	13	94	286	124	472	124	65	.9	*.4	.6	3.8
25	5.8	14	89	553	126	548	98	60	1.2	.4	.6	3.0
26	6.2	14	78	425	102	484	91	46	1.6	.4	.7	3.6
27	6.2	14	76	283	97	460	92	41	1.6	.4	.9	3.8
28	6.5	15	78	168	*65	400	294	33	1.4	.4	.8	3.8
29	6.5	*15	128	144	-	424	432	32	1.4	.4	*.7	3.5
30	6.5	20	144	86	-	396	338	34	1.4	.4	.6	3.5
31	6.2	-	113	80	-	352	-	34	-	.4	.6	-
Total	146.9	332.3	5,339	3,814	12,920	9,271	10,084	4,341	360.3	33.6	17.8	59.4
Mean	4.74	11.1	172	123	461	299	356	140	12.0	1.08	0.57	1.98
Ac-ft	291	659	10,590	7,560	25,630	18,390	20,000	8,610	715	67	35	118

Calendar year 1950: Max 1,200 Min 0.8 Mean 94.7 Ac-ft 68,570  
 Water year 1950-51: Max 1,600 Min 0.4 Mean 128 Ac-ft 92,660

Peak discharge (base, 600 cfs).--Dec. 7 (4:30 a.m.) 764 cfs (3.22 ft); Jan. 25 (4:30 p.m.) 674 cfs (3.02 ft); Feb. 7 (8 p.m.) 2,000 cfs (5.81 ft); Feb. 11 (7 a.m.) 1,750 cfs (5.30 ft); Mar. 16 (1:30 p.m.) 755 cfs (3.20 ft); Mar. 20 (11:30 p.m.) 1,150 cfs (4.08 ft); Apr. 5 (4 to 6 p.m.) 634 cfs (2.93 ft).

\* Discharge measurement made on this day.

## DESCHUTES RIVER BASIN

North Fork Crooked River above Deep Creek, Oreg.

Location.--Lat 44°20', long. 120°05', in SW $\frac{1}{4}$  sec. 21, T. 14 S., R. 22 E., on left bank three-quarters of a mile upstream from Deep Creek, 14 miles northwest of Paulina, and 38 miles east of Prineville.

Drainage area.--159 sq mi.

Records available.--October 1945 to September 1951 in reports of Geological Survey. November 1941 to September 1945 (incomplete) in files of Bureau of Reclamation.

Gage.--Water-stage recorder. Datum of gage is 4,356.00 ft above mean sea level (surveys of Bureau of Reclamation). Prior to Oct. 1, 1946, at datum 0.33 ft higher.

Average discharge.--8 years (1943-51), 90.5 cfs.

Extremes.--Maximum discharge during year not determined (occurred about Apr. 4 during period of no gage-height record); maximum gage height, 4.93 ft, time unknown (backwater from ice); minimum discharge, 0.5 cfs Aug. 3 to Sept. 24.

1941-51: Maximum discharge, 2,060 cfs Apr. 7, 1943 (gage height, 4.17 ft), from rating curve extended above 310 cfs; maximum gage height, 8.01 ft (present datum) Jan. 1, 1943 (ice jam); minimum discharge, 0.5 cfs Aug. 14, 15, 1942, Aug. 3 to Sept. 24, 1951.

Remarks.--Records good except those below 10 cfs, which are fair, and those for periods of ice effect or no gage-height record, which are poor. No diversion or regulation above station.

Revisions.--W 1094: Drainage area.

Rating table, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used May 12 to July 5)

0.2	0.3	0.7	6.4	1.8	136
.3	.6	.8	9.6	2.2	277
.4	1.3	.9	14	2.6	507
.5	2.4	1.2	35	3.3	1,060
.6	4.0	1.5	72		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	23	40	68	a70	a55	a300	296	49	2.5	1	0.5
2	1.5	51	24	79	a90	a50	a500	248	41	2.5	1	.5
3	1.5	40	28	94	a100	a50	a700	255	38	2	.5	.5
4	2.5	26	36	98	a100	a55	a900	325	36	2	.5	.5
5	2.5	19	62	85	a110	a42	a1,000	311	41	2	.5	.5
6	3	15	325	a50	a140	a46	a950	358	53	2	.5	.5
7	3	13	764	a40	a200	a48	a900	336	46	2	.5	.5
8	2.5	12	386	a46	*b340	a48	a850	287	37	2	.5	.5
9	*2.5	10	287	*b48	a360	a48	a800	252	32	2	.5	.5
10	3	8.5	296	b50	a360	a50	a700	243	27	1.5	.5	.5
11	3	7.5	216	b48	a420	a48	a600	588	24	1.5	.5	.5
12	3	8.5	195	b46	a360	a46	a650	460	*21	1.5	.5	.5
13	3	9.5	139	b48	a300	a46	a700	352	21	1.5	.5	.5
14	2.5	11	124	b50	a240	a60	a750	277	19	1.5	.5	.5
15	2.5	8.5	172	b60	a190	a80	a600	239	16	1.5	.5	.5
16	2.5	10	195	b60	a160	a130	a550	213	14	1	.5	.5
17	3.5	17	159	b60	a140	a150	*522	198	12	1	.5	.5
18	4	51	136	b55	a130	a150	500	185	10	1	.5	.5
19	4	37	118	b50	a120	a140	428	165	9.5	1	.5	.5
20	3.5	34	126	b46	a110	a160	352	148	8.5	1	.5	.5
21	3.5	42	116	b55	a100	a260	269	131	7.5	1	.5	.5
22	3.5	28	94	b40	a85	a280	243	118	6.5	1	.5	.5
23	3.5	16	92	b65	a75	a260	216	111	5	1	.5	.5
24	3.5	21	65	b90	a70	a300	191	103	5	*1	.5	.5
25	3.5	23	77	b120	a65	a360	172	90	4.5	1	.5	1
26	4.5	25	72	b100	a60	a360	159	83	*4.5	1	.5	1
27	5.5	41	76	b85	a55	a360	178	74	4	1	.5	1
28	27	*48	60	b65	a55	a360	900	66	3.5	1	.5	1
29	79	39	70	a50	-	a400	724	62	3	1	*.5	1
30	53	57	90	a42	-	a340	386	57	2.5	1	.5	1.5
31	29	-	50	a42	-	a280	-	53	-	1	.5	-
Total	280.5	754.5	4,712	1,955	4,645	5,082	16,690	6,664	601.0	44.0	16.5	18.5
Mean	9.05	25.2	152	63.1	166	164	556	215	20.0	1.42	0.53	0.62
Ac-ft	556	1,500	9,350	3,860	9,210	10,080	33,100	13,220	1,190	87	33	37

Calendar year 1950: Max 764 Min 1 Mean 89.6 Ac-ft 64,840  
Water year 1950-51: Max 1,000 Min 0.5 Mean 114 Ac-ft 82,240

Peak discharge (base, 850 cfs).--About Apr. 4 (time and discharge unknown); Apr. 28 (3 p.m.) 1,140 cfs (3.40 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for station below Deep Creek, Beaver Creek near Paulina, and Crooked River near Post.

b Stage-discharge relation affected by ice.



## North Fork Crooked River below Deep Creek, Oreg.

Location.--Lat 44°19', long. 120°05', in SW $\frac{1}{4}$  sec. 27, T. 14 S., R. 22 E., on left bank a quarter of a mile downstream from Deep Creek, 14 miles northwest of Paulina, and 38 miles east of Prineville.

Drainage area.--264 sq mi.

Records available.--September 1946 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 4,320 ft (by barometer).

Average discharge.--5 years, 171 cfs.

Extremes.--Maximum discharge during year, 2,610 cfs Apr. 4 (gage height, 6.52 ft); minimum, 7.5 cfs Aug. 17, 18, 19, 20, (gage height, 1.07 ft).  
1946-51: Maximum discharge, that of Apr. 4, 1951; maximum gage height, 7.69 ft Feb. 12, 1947 (ice jam); minimum discharge, 7 cfs for many days during July to September 1947 and Aug. 3, 4, 5, 6, 1949.

Remarks.--Records good except those for period of ice effect, which are poor. No diversion or regulation above station.

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

1.0	6	2.5	116	4.5	660
1.2	12	3.0	200	5.0	960
1.5	25	3.5	315	6.0	1,900
2.0	61	4.0	460	6.5	2,580

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10	68	80	101	b110	119	595	592	82	13	8.5	8.5
2	10	157	58	120	b150	113	1,000	504	73	13	8	8
3	12	98	75	122	b180	111	1,490	496	68	12	8	8.5
4	15	73	77	126	b180	123	2,010	604	65	12	8	8.5
5	15	59	97	110	b200	86	2,260	568	75	14	8	8.5
6	14	52	467	67	b260	96	2,080	624	95	16	8	8.5
7	13	48	904	b80	b350	103	1,910	584	81	14	8	8.5
8	13	48	512	b80	*b540	103	1,840	520	67	13	8	8.5
9	*13	41	480	*b85	b680	102	1,720	464	59	12	8	8.5
10	13	39	480	b85	b740	108	1,460	442	52	12	8	8.5
11	13	39	391	b85	b740	106	1,310	858	47	11	8	8.5
12	13	35	352	b80	b680	97	1,360	750	*45	11	8	8.5
13	13	35	260	b85	656	97	1,530	604	45	10	8	8.5
14	12	38	230	b90	556	110	1,580	496	39	10	8	8.5
15	12	35	288	b105	445	162	1,370	430	34	10	8	8.5
16	13	37	308	b105	318	268	1,180	385	31	10	8	8.5
17	16	43	268	b105	312	325	*1,090	358	29	9.5	8	8.5
18	19	82	234	b95	280	318	981	328	26	9.5	7.5	8.5
19	17	67	218	b90	238	305	854	290	24	9.5	8	8.5
20	15	69	228	b80	242	367	685	252	23	9	7.5	8
21	15	78	204	b90	216	564	564	222	22	9	8	8
22	15	59	175	b100	192	604	512	198	20	9	8	8
23	15	53	167	b110	166	572	457	178	19	9	8	8.5
24	14	55	156	b170	159	660	418	167	18	*9	8	8.5
25	16	61	141	b210	156	814	588	151	18	9	8	8.5
26	20	72	111	b180	130	772	364	136	*17	8.5	8	9
27	21	92	113	b140	127	827	403	122	16	8.5	8	9
28	71	*90	111	b110	115	778	1,390	110	15	8.5	8.5	9.5
29	212	80	124	b85	-	918	1,460	102	14	8.5	*8.5	9.5
30	162	106	152	b70	-	695	695	93	13	8.5	8.5	12
31	74	-	102	b70	-	588	-	91	-	8.5	8.5	-
Total	906	1,909	7,561	5,211	9,118	11,011	34,956	11,699	1,252	326.5	249.5	259.5
Mean	29.2	63.6	244	104	326	355	1,160	377	41.1	10.5	8.05	8.65
Ac-ft	1,800	3,790	15,000	6,370	18,090	21,840	60,330	23,200	2,440	648	495	515
Calendar year 1950: Max		1,390		Min 9		Mean 184		Ac-ft 133,200				
Water year 1950-51: Max		2,260		Min 7.5		Mean 226		Ac-ft 163,500				

Peak discharge (base, 1,400 cfs).--Apr. 4 (5 p.m.) 2,610 cfs (6.52 ft); Apr. 28 (3:30 p.m.) 1,740 cfs (5.86 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Crooked River near Post, Oreg.

Location.--Lat 44°07', long. 120°16', in NE $\frac{1}{4}$  sec. 12, T. 17 S., R. 20 E., on right bank 1 mile downstream from North Fork and 11 $\frac{1}{2}$  miles southeast of Post.

Drainage area.--2,160 sq mi, approximately, of which 500 sq mi is probably noncontributing.

Records available.--November 1908 to August 1911, December 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3,461.72 ft above mean sea level, datum of 1929. Prior to Dec. 30, 1939, staff gage at site half a mile upstream at different datum.

Average discharge.--11 years (1940-51), 331 cfs.

Extremes.--Maximum discharge during year, about 4,100 cfs Feb. 7; maximum gage height, 6.1 ft, about Feb. 7 (ice jam); minimum discharge, 5.0 cfs July 30 (gage height, 0.88 ft). 1908-11, 1939-51: Maximum discharge, 6,190 cfs Dec. 28, 1945 (gage height, 6.66 ft), from rating curve extended above 3,800 cfs; maximum gage height, 7.21 ft Feb. 17, 1949 (ice jam); minimum discharge, 4.4 cfs July 12, 1940.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 4

Feb. 5 to Sept. 30

1.1	15	3.0	570	0.9	5.5	1.7	99	3.5	980
1.3	31	3.4	850	1.0	9.5	2.0	177	4.0	1,540
1.5	57	4.0	1,700	1.2	22	2.5	350	5.0	2,990
1.8	117	4.5	2,450	1.4	45	3.0	570		
2.3	270								

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	117	191	278	a400	316	1,010	930	125	26	6.7	9.5
2	18	218	132	298	a480	301	1,460	764	113	24	7.1	9.1
3	19	197	142	294	a500	248	1,970	693	95	23	7.5	9.1
4	27	148	167	310	a550	269	2,520	764	95	21	7.5	9.5
5	33	122	224	a260	a1,600	272	2,870	772	91	21	7.1	9.5
6	33	106	934	a170	a2,400	258	2,780	772	115	24	7.1	10
7	35	99	2,090	a150	a2,700	255	2,480	756	117	22	7.1	10
8	33	92	1,350	a190	a2,290	272	2,340	672	104	20	7.5	10
9	32	92	964	a200	2,320	283	2,220	606	93	20	7.1	10
10	38	74	904	*221	2,470	252	1,910	555	82	19	7.1	11
11	*39	76	693	214	2,690	244	1,680	898	*74	18	7.1	11
12	42	68	630	191	2,120	277	1,680	1,040	69	18	7.1	12
13	41	80	511	200	1,550	312	1,770	950	64	17	7.1	13
14	39	88	520	214	1,260	506	1,860	850	64	15	7.5	12
15	39	86	1,000	246	1,070	1,510	1,720	700	57	14	7.9	12
16	42	90	976	266	740	1,920	1,530	594	51	14	7.9	12
17	46	94	686	270	672	*1,070	1,400	530	48	16	7.9	12
18	62	130	570	b220	588	840	1,280	464	44	17	7.5	12
19	109	153	498	b190	520	860	*1,130	439	40	16	7.9	13
20	67	130	488	b170	525	1,120	950	398	40	a15	7.9	14
21	59	156	444	b200	520	1,520	764	350	41	a14	8.3	14
22	57	130	402	256	470	1,520	700	316	41	a14	8.7	13
23	56	112	378	260	414	1,290	618	283	40	a14	9.1	17
24	57	110	350	516	386	1,320	555	258	36	*13	9.1	18
25	56	117	330	650	390	1,650	498	234	36	12	9.1	16
26	56	132	282	940	342	1,500	452	215	37	10	8.7	14
27	59	*145	260	665	*312	1,540	439	186	35	11	9.1	16
28	76	173	286	511	283	1,400	1,460	168	33	9.1	9.1	18
29	272	148	306	a400	-	1,530	1,640	148	31	9.1	*9.5	18
30	242	179	422	a300	-	1,330	1,170	145	29	7.1	10	20
31	164	-	346	a300	-	1,190	-	132	-	7.1	10	-
Total	1,966	3,682	17,476	9,750	30,562	27,170	44,856	16,602	1,940	500.4	248.3	384.7
Mean	63.4	125	564	315	1,092	876	1,495	536	64.7	16.1	8.01	12.8
Ac-ft	3,900	7,300	34,660	19,340	60,620	53,890	88,970	32,930	3,850	993	492	763

Calendar year 1950: Max 2,900 Min 10 Mean 352 Ac-ft 255,000  
 Water year 1950-51: Max 2,870 Min 6.7 Mean 425 Ac-ft 307,700

Peak discharge (base, 1,600 cfs).--Dec. 7 (8 a.m.) 2,280 cfs (4.39 ft); Feb. 7 (about 3 a.m.) about 4,100 cfs; Mar. 15 (12 p.m.) 3,360 cfs (5.22 ft); Apr. 5 (1:30 a.m.) 3,160 cfs (5.10 ft); Apr. 29 (12:30 a.m.) 2,010 cfs (4.37 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of record for station above Hoffman Dam near Prineville; combined records for North Fork Crooked River below Deep Creek and Beaver Creek near Paulina, weather records, and recorded range in stage.

b Stage-discharge relation affected by ice.

## DESCHUTES RIVER BASIN

77

Crooked River above Hoffman Dam, near Prineville, Oreg.

Location.--Lat 44°08'40", long. 120°49'40", on NE¼ sec. 32, T. 16 S., R. 16 E., on right bank 0.9 mile upstream from Hoffman diversion dam and 11 miles south of Prineville.

Drainage area.--2,810 sq mi, approximately, of which 500 sq mi is probably noncontributing.

Records available.--October 1908 to September 1914, January 1940 to February 1941 (discharge measurements only), March 1941 to September 1951. Published as "near Prineville" October 1908 to December 1912; as "at Hoffman's Ranch, near Prineville" January 1913 to September 1914.

Gage.--Water-stage recorder. Datum of gage is 2,981.23 ft above mean sea level, datum of 1929. Prior to December 1912, staff gage at site at Stearns Ranch, 5½ miles downstream at different datum. January 1913 to September 1914, at site at Hoffman Ranch, 1 mile downstream, below Hoffman diversion, at different datum.

Average discharge.--16 years (1908-14, 1941-51), 378 cfs.

Extremes.--Maximum discharge during year, 4,050 cfs Feb. 7 (gage height, 6.03 ft); minimum, 1.2 cfs Sept. 20, 21 (gage height, 0.95 ft).  
1908-14, 1940-51: Maximum discharge observed, 9,080 cfs Mar. 1, 2, 1910 (gage height, 9.4 ft, site and datum then in use), from rating curve extended above 1,000 cfs; no flow at times in 1940. Maximum discharge in recent years, 6,300 cfs Mar. 28, 1943 (gage height, 7.07 ft), from rating curve extended above 3,400 cfs.

Remarks.--Records good except those for periods of ice effect, which are fair. Diversions above station for irrigation; no regulation.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 6				Feb. 7 to Sept. 30					
1.1	6	2.5	257	0.9	0.2	1.4	20	3.4	840
1.2	11	3.0	535	1.0	2.4	1.6	43	4.0	1,380
1.4	24	3.5	950	1.1	5.0	2.0	111	5.0	2,500
1.7	57	4.0	1,450	1.2	8.0	2.4	219	6.0	4,000
2.1	134	5.2	3,020	1.3	13	2.9	465		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9	159	187	361	b300	355	1,280	1,220	156	25	8.8	2.9
2	10	132	181	350	b360	350	1,360	1,010	144	24	8.0	2.7
3	12	223	146	340	b420	340	2,010	867	129	24	7.0	2.7
4	14	187	170	340	b550	300	2,240	858	111	23	5.2	2.9
5	12	152	197	340	b1,500	340	2,910	993	103	25	4.2	2.7
6	13	129	320	b250	2,890	310	3,180	939	107	23	3.7	2.7
7	22	113	2,180	b200	*3,340	310	2,880	975	118	19	3.4	2.7
8	26	107	1,760	*b160	*3,160	300	2,900	867	122	21	3.2	2.4
9	33	101	1,100	b250	2,740	350	2,580	776	113	20	3.1	1.9
10	34	99	1,000	266	*2,880	310	2,360	688	105	21	3.1	1.7
11	*34	87	849	249	3,040	287	2,060	867	*95	20	2.9	1.4
12	40	86	720	230	2,740	287	1,940	1,330	87	17	2.9	2.2
13	40	93	635	213	2,020	315	1,990	1,180	82	18	2.9	3.9
14	41	91	584	230	1,560	479	2,100	1,070	70	18	3.1	4.4
15	41	91	768	246	1,310	904	2,050	912	70	17	3.1	4.4
16	38	97	1,140	270	1,040	2,460	1,850	768	62	16	2.9	4.4
17	41	97	858	300	824	1,430	*1,660	665	56	15	2.7	4.4
18	49	105	680	b270	736	1,040	1,530	598	47	14	2.7	3.9
19	54	134	584	b230	665	984	1,360	535	44	12	2.7	2.7
20	105	154	535	b200	598	1,200	1,200	486	43	12	2.7	1.4
21	80	134	514	234	620	1,720	1,020	429	40	12	3.1	1.2
22	65	154	456	300	591	1,870	867	385	39	12	4.2	1.7
23	62	134	423	291	521	1,610	776	350	36	10	4.7	2.2
24	60	122	400	372	479	1,480	688	315	31	10	3.9	2.2
25	59	118	378	712	453	1,820	612	291	34	*10	3.9	2.9
26	57	122	350	957	441	1,800	542	261	29	9.8	3.7	4.7
27	57	*136	310	858	*394	1,780	500	242	24	9.3	3.4	6.1
28	70	152	315	665	361	1,700	1,060	209	25	9.3	*2.4	7.0
29	84	179	356	417	-	1,620	2,200	193	25	9.8	1.9	5.8
30	261	162	394	b240	-	1,720	1,570	176	25	9.3	2.9	5.2
31	219	-	453	b220	-	1,500	-	170	-	9.3	3.1	-
Total	1,742	3,850	18,952	10,521	36,533	31,241	51,275	20,623	2,171	494.8	115.5	97.4
Mean	56.2	128	611	339	1,305	1,008	1,709	665	72.4	16.0	3.73	3.25
Ac-ft	3,460	7,640	37,590	20,870	72,460	61,970	101,700	40,910	4,310	981	229	193

Calendar year 1950: Max 2,960 Min 5 Mean 385 Ac-ft 279,100  
Water year 1950-51: Max 3,340 Min 1.2 Mean 487 Ac-ft 352,300

Peak discharge (base, 2,000 cfs).--Dec. 7 (6 p.m.) 2,290 cfs (4.67 ft); Feb. 7 (3 to 6 p.m.) 4,050 cfs (6.03 ft); Mar. 16 (12:30 p.m.) 3,200 cfs (5.49 ft); Apr. 5 (6 p.m.) 3,320 cfs (5.57 ft); Apr. 29 (7 a.m.) 2,380 cfs (4.31 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Crooked River near Culver, Oreg.

Location.--Lat 44°33'35", long. 121°16'10", in sec. 3 (50 ft west of  $\frac{1}{4}$ -corner on line between secs. 2 and 3), T. 12 S., R. 12 E., on right bank 1 mile upstream from mouth, 1 mile downstream from Cove powerplant, and 4 miles northwest of Culver.

Drainage area.--4,330 sq mi, approximately, of which 500 sq mi is probably noncontributing.

Records available.--October 1917 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,664.86 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Aug. 2, 1945, staff gages at several sites within 1 mile of present site at various datums.

Average discharge.--34 years. 1,491 cfs.

Extremes.--Maximum discharge during year, 5,260 cfs Feb. 8 (gage height, 6.49 ft); minimum, 1,100 cfs July 3 (gage height, 2.17 ft); minimum daily, 1,270 cfs June 30 to July 3, July 27-30, Aug. 2, 3.  
1917-51: Maximum discharge observed, 8,260 cfs Mar. 30, 31, 1943 (gage height, 6.70 ft, site and datum then in use); minimum, 920 cfs Oct. 14, 1945 (gage height, 1.67 ft); minimum daily, 970 cfs July 12 to Sept. 5, 1921.

Remarks.--Records excellent except those for period of no gage-height record, which are fair. Flow slightly regulated by Ochoco Reservoir (capacity, 47,500 acre-ft); occasional diurnal fluctuation caused by powerplant 1 mile above station. Summer flow above Prineville affected by diversions for irrigation and return flow from irrigated areas. Springs increase flow about 1,000 cfs within an area extending 17 miles above station.

Revisions (water years).--W 864: 1922, 1925, 1928, 1932, 1936-37.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.4	1,230
3.0	1,640
4.0	2,490
5.0	3,450
6.3	4,990

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,330	1,600	1,540	1,820	1,580	2,130	3,130	3,010	1,490	1,270	1,280	1,340
2	1,320	1,560	1,530	1,720	1,660	2,000	3,400	2,750	1,480	1,270	1,270	1,370
3	1,320	*1,480	1,540	1,700	1,740	1,920	3,250	2,540	1,450	1,270	1,270	1,380
4	1,340	1,540	1,500	1,700	1,780	1,870	3,750	2,440	1,430	1,300	1,280	1,370
5	1,350	1,540	1,540	1,690	1,860	1,830	4,210	2,470	1,400	1,320	1,290	1,360
6	1,350	1,500	1,570	1,670	3,090	1,860	4,640	2,550	1,390	1,340	1,300	1,340
7	1,340	1,490	1,740	1,600	4,310	1,870	4,680	2,560	1,400	1,320	1,300	1,340
8	1,360	1,490	2,820	1,530	4,870	1,970	4,560	2,540	*1,400	1,320	1,300	1,340
9	1,370	1,460	2,990	1,500	*4,860	1,990	4,510	2,440	1,400	1,320	1,320	1,340
10	1,380	1,460	2,500	1,570	4,500	1,990	4,190	2,350	1,390	1,320	1,320	1,350
11	1,380	1,480	2,400	1,600	4,730	1,970	3,940	2,360	1,380	1,320	1,310	1,330
12	1,380	1,460	2,250	1,590	4,940	1,870	3,690	2,710	1,380	1,310	1,320	1,340
13	1,390	1,450	2,120	1,560	4,480	1,870	3,670	2,900	1,360	1,300	1,330	1,340
14	1,390	1,450	2,030	1,540	3,800	2,010	3,750	2,780	1,360	1,300	1,330	1,340
15	1,390	1,450	2,050	1,580	3,370	2,180	3,840	2,640	1,340	1,300	1,330	1,340
16	1,380	1,460	*2,280	1,600	3,140	*2,990	3,660	2,510	1,320	1,300	1,320	1,340
17	al, 400	1,460	2,520	1,660	2,810	3,790	3,470	2,360	1,330	1,290	1,320	1,340
18	al, 300	1,470	2,270	1,710	2,680	2,920	3,310	2,240	1,320	1,280	1,320	1,340
19	al, 300	1,480	2,100	1,620	2,580	2,600	3,080	2,150	1,320	1,280	1,320	1,350
20	al, 400	1,490	1,990	1,540	2,500	2,600	2,840	2,070	1,310	1,280	1,320	1,330
21	al, 400	1,520	1,940	1,560	2,440	2,870	2,660	2,010	1,300	1,280	1,320	1,320
22	al, 400	1,500	1,930	1,560	2,400	3,340	2,460	1,920	1,310	1,280	1,320	1,320
23	al, 400	1,530	1,890	1,620	2,400	3,360	2,350	1,810	1,320	1,290	1,320	1,330
24	al, 300	1,510	1,850	1,630	2,320	3,150	2,180	1,700	1,300	1,300	1,320	1,330
25	al, 300	1,490	1,820	1,780	2,280	3,220	2,080	1,660	1,280	*1,290	1,320	1,340
26	al, 300	1,490	1,760	2,180	2,260	3,560	1,950	1,620	1,290	1,290	1,330	1,330
27	al, 300	1,490	1,700	*2,360	2,220	3,440	*1,900	1,570	1,300	1,270	1,340	1,350
28	al, 400	1,490	1,660	2,180	2,160	3,450	1,990	1,510	1,290	1,270	*1,340	1,360
29	al, 600	1,500	1,690	1,680	-	3,340	2,870	1,500	1,280	1,270	1,340	1,370
30	al, 500	1,540	1,770	1,540	-	3,370	3,550	1,480	1,270	1,270	1,350	1,380
31	al, 500	-	1,810	1,530	-	3,290	-	1,480	-	1,280	1,340	-
Total	42,570	44,810	61,080	52,100	83,760	80,610	99,150	68,610	40,580	40,070	40,780	40,330
Mean	1,373	1,494	1,970	1,691	2,991	2,600	3,305	2,213	1,353	1,293	1,316	1,344
Ac-ft	84,440	88,880	121,200	103,300	166,100	159,900	196,700	136,100	80,510	79,460	80,910	79,990
Calendar year 1950: Max	3,700				Min 1,280	Mean 1,692		Ac-ft 1,225,000				
Water year 1950-51: Max	4,940				Min 1,270	Mean 1,903		Ac-ft 1,378,000				

Peak discharge (base, 2,500 cfs).--Dec. 8 (9 p.m.), 3,240 cfs (4.79 ft); Feb. 8 (8 p.m.), 5,260 cfs (6.49 ft); Mar. 17 (9:30 a.m.), 4,230 cfs (5.70 ft); Mar. 26 (12 m.), 3,620 cfs (5.16 ft); Apr. 6 (3 p.m.), 4,760 cfs (6.12 ft); Apr. 30 (8 a.m.), 3,700 cfs (5.24 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for station above Hoffman Dam, near Prineville.

## Lake Creek near Sisters, Oreg.

Location--Lat 44°25'40", long. 121°43'30", in SW $\frac{1}{4}$  sec. 24, T. 13 S., R. 8 E., on left bank a quarter of a mile downstream from Suttle Lake, 6 miles upstream from mouth, and 13 miles northwest of Sisters.

Drainage area--22.2 sq mi (revised).

Records available--1911-13 (occasional readings during summers), April 1915 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 3,430 ft (from topographic map). May 31, 1911, to Oct. 30, 1913, and Apr. 7, 1915, to Mar. 31, 1916, staff gages at two sites 1,000 ft upstream at different datums. Apr. 1, 1916, to Oct. 12, 1928, staff gage or water-stage recorder at site 40 ft downstream at different datum.

Average discharge--35 years (1915-18, 1919-51), 49.8 cfs.

Extremes--Maximum discharge during year, 196 cfs Nov. 4 (gage height, 2.62 ft); minimum, 17 cfs Aug. 4 (gage height, 0.71 ft).

1911-13, 1915-51: Maximum discharge, 351 cfs Dec. 16, 1946 (gage height, 3.50 ft); minimum, 1.0 cfs Nov. 4, 5, 1940; minimum daily, 8 cfs Nov. 5, 1940, Oct. 6, 1942.

Remarks--Records good. No diversion above station. Occasional regulation by storage in Suttle Lake.

Revisions (water years)--W 1124: 1943, 1947.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.7	17
1.0	31
1.5	65
2.0	113
2.6	193

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	39	114	82	90	99	79	61	87	94	51	33	40
2	39	128	80	94	103	78	61	86	91	50	24	40
3	39	180	82	96	104	77	50	85	87	50	21	40
4	40	188	84	90	103	80	60	85	83	49	19	39
5	42	153	84	87	*102	83	61	77	80	50	28	39
6	46	136	93	83	102	83	61	83	78	49	35	39
7	45	123	102	80	109	81	62	86	77	49	40	39
8	44	115	114	*78	117	78	*63	95	75	49	*40	39
9	*44	105	126	77	124	77	63	*95	74	49	35	39
10	42	98	130	76	134	75	65	93	73	48	41	*39
11	42	90	*131	76	149	71	66	101	72	48	41	38
12	42	87	128	74	155	69	68	103	*71	*48	41	38
13	42	82	121	74	157	67	70	112	70	47	*41	38
14	42	81	118	79	156	66	71	108	70	46	41	38
15	41	78	112	79	153	70	74	101	69	46	39	38
16	41	79	106	83	145	70	76	90	67	46	38	38
17	42	84	102	99	134	70	78	87	59	46	41	38
18	42	84	98	99	129	*69	79	90	57	46	42	38
19	42	77	98	95	120	69	81	94	54	46	42	38
20	41	78	95	90	113	68	84	97	56	44	43	38
21	41	75	93	95	107	67	87	98	56	44	43	41
22	41	70	93	96	102	68	87	100	56	44	42	41
23	41	72	92	96	97	66	87	100	56	44	41	37
24	40	75	90	94	95	64	86	101	56	44	42	41
25	40	75	89	93	92	63	86	102	54	43	41	39
26	39	75	90	98	88	63	85	105	53	41	41	38
27	42	82	90	101	84	62	84	109	49	39	39	39
28	53	86	90	104	81	62	86	112	51	39	40	39
29	65	82	98	105	-	63	86	109	51	40	39	37
30	68	82	90	104	-	65	86	104	51	39	40	35
31	87	-	91	102	-	63	-	99	-	39	40	-
Total	1,394	2,934	3,083	2,787	3,254	2,184	2,224	2,994	1,990	1,411	1,172	1,164
Mean	45.0	97.8	99.5	89.9	116	70.5	74.1	96.6	66.3	45.5	37.8	38.8
Ac-ft	2,760	5,820	6,120	5,530	6,450	4,330	4,410	5,940	3,950	2,800	2,320	2,310

Calendar year 1950: Max 188 Min 33 Mean 74.6 Ac-ft 54,040  
 Water year 1950-51: Max 198 Min 19 Mean 72.9 Ac-ft 52,740

\* Discharge measurement made on this day.

## DESCUTES RIVER BASIN

Metolius River near Grandview, Oreg.

Location--Lat 44°36'40", long. 121°27'10", in NE $\frac{1}{4}$  sec. 19, T. 11 S., R. 11 E., on right bank at Montgomery Ranch, 8 miles northwest of Grandview.

Drainage area--324 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available--April 1910 to February 1912 (gage heights only), March 1912 to December 1913, October 1921 to September 1951. Prior to October 1921, published as "at Hubbards Ranch."

Gage--Water-stage recorder. Datum of gage is 1,910 ft above mean sea level (river-profile survey). Apr. 24, 1910, to Dec. 30, 1913, staff gage at site 5 miles upstream at different datum. Oct. 1, 1921, to May 3, 1949, staff gage at site 20 ft downstream at present datum.

Average discharge--30 years (1921-51), 1,420 cfs.

Extremes--Maximum discharge during year, 2,770 cfs Feb. 11 (gage height, 1.84 ft); minimum, 1,440 cfs Oct. 1, 2 (gage height, 0.65 ft).

1921-51: Maximum discharge 5,780 cfs Jan. 7, 1923 (gage height, 3.32 ft), from rating curve extended above 2,200 cfs; minimum, 1,080 cfs Feb. 17, 1932, Oct. 2-31, Nov. 6, 7, 10-14, 1942.

Remarks--Records excellent. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to July 20		July 21 to Sept. 30	
0.5	1,380	0.6	1,480
1.0	1,830	.8	1,700
1.4	2,280		
1.9	2,940		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,440	1,830	1,690	1,850	1,950	1,820	1,780	1,760	1,790	1,740	1,640	1,560
2	1,450	2,360	1,660	1,950	1,990	1,800	1,780	1,750	1,780	1,740	1,640	1,560
3	1,510	2,080	1,700	1,940	2,010	1,800	1,780	1,760	1,780	1,740	1,630	1,560
4	1,540	*1,950	1,860	1,910	2,050	1,810	1,810	1,830	1,800	1,740	1,620	1,550
5	1,640	1,920	1,850	1,870	2,120	1,790	1,820	1,800	1,780	1,730	1,620	1,550
6	1,570	1,820	2,080	1,850	2,100	1,790	1,820	1,850	1,780	1,720	1,620	1,550
7	1,590	1,780	2,340	1,840	2,320	1,760	1,830	1,850	1,760	1,720	1,610	1,560
8	1,610	1,830	2,190	1,830	2,530	1,780	1,830	1,830	*1,750	1,720	1,620	1,560
9	1,540	1,740	2,120	1,820	2,550	1,750	1,840	1,840	1,750	1,720	1,610	1,560
10	1,500	1,680	2,060	1,820	2,610	1,730	1,840	1,870	1,780	1,720	1,600	1,560
11	1,500	1,660	2,050	1,810	2,750	1,710	1,830	1,920	1,790	1,720	1,600	1,550
12	1,480	1,640	2,040	1,790	2,640	1,720	1,840	1,880	1,810	1,720	1,600	1,550
13	1,470	1,620	1,990	1,830	2,500	1,760	1,860	1,850	1,810	1,720	1,590	1,550
14	1,470	1,610	1,960	1,980	2,390	1,760	1,900	1,830	1,830	1,720	1,590	1,550
15	1,460	1,610	*1,940	1,990	2,310	1,960	1,880	1,820	1,840	1,720	1,590	1,550
16	1,460	1,640	1,950	1,960	2,220	1,990	*1,870	1,820	1,820	1,720	1,580	1,560
17	1,490	1,700	1,920	2,160	2,180	2,000	1,860	1,860	1,800	1,720	1,580	1,550
18	1,530	1,720	1,840	2,060	2,130	1,850	1,880	1,870	1,790	1,720	1,590	1,550
19	1,540	1,660	1,840	1,990	2,070	1,840	1,860	1,850	1,780	1,710	1,580	1,550
20	1,550	1,750	1,850	1,950	2,050	1,840	1,840	1,850	1,760	1,700	1,590	1,550
21	1,490	1,730	1,820	2,090	2,020	1,850	1,820	1,860	1,780	1,700	1,590	1,540
22	1,470	1,690	1,920	2,090	1,990	1,830	1,800	1,880	1,760	1,690	1,590	1,540
23	1,460	1,660	2,040	2,100	1,940	1,810	1,790	1,840	1,760	1,690	1,580	1,550
24	1,450	1,790	1,950	2,250	1,920	1,810	1,780	1,890	1,760	1,690	1,570	1,540
25	1,470	1,790	1,910	2,270	1,900	1,810	1,780	1,950	1,740	1,710	1,570	1,560
26	1,460	1,740	1,900	2,310	1,870	1,800	1,780	1,950	1,760	*1,680	1,570	1,540
27	1,540	1,730	1,870	*2,240	1,850	1,790	1,790	1,930	1,750	1,670	1,570	1,540
28	1,750	1,710	1,900	2,130	1,820	1,800	1,810	1,900	1,740	1,670	*1,580	1,540
29	1,920	1,690	1,930	2,020	-	1,800	1,800	1,850	1,740	1,660	1,580	1,550
30	1,750	1,710	1,910	1,960	-	1,790	1,780	1,850	1,740	1,660	1,570	1,530
31	1,650	-	1,860	1,960	-	1,780	-	1,810	-	1,640	1,570	-
Total	47,730	52,820	59,940	61,620	60,780	56,130	54,700	57,590	53,270	52,920	49,470	46,620
Mean	1,540	1,761	1,934	1,988	2,171	1,811	1,823	1,858	1,776	1,707	1,596	1,554
Ac-ft	94,670	104,800	118,900	122,200	120,600	111,500	108,500	114,200	105,700	105,000	98,120	92,470

Calendar year 1950: Max 2,360 Min 1,300 Mean 1,701 Ac-ft 1,231,000  
 Water year 1950-51: Max 2,750 Min 1,440 Mean 1,791 Ac-ft 1,296,000

\* Discharge measurement made on this day.

## Deschutes River near Madras, Oreg.

Location (revised).--Lat 44°42'30", long. 121°14'10", in NE $\frac{1}{4}$  sec. 13, T. 10 S., R. 12 E., on right bank 1 mile downstream from Pelton dam site, 5 miles upstream from Shitike Creek, and  $\frac{7}{8}$  miles northwest of Madras at mile 101.6 (U.S.G.S. Plan and Profile).

Drainage area.--7,900 sq mi, approximately.

Records available.--October 1923 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,407.35 ft above mean sea level (levels by Ebasco Services Inc.). Prior to May 5, 1924, staff gage and May 25, 1924 to June 5, 1933, water-stage recorder at site 1 mile upstream at different datum.

Average discharge.--28 years, 4,251 cfs.

Extremes.--Maximum discharge during year, 11,300 cfs Feb. 8 (gage height, 6.03 ft); minimum, 3,740 cfs Sept. 24 (gage height, 1.99 ft).

1923-51: Maximum discharge, 13,300 cfs Jan. 1, 1943 (gage height, 6.89 ft); minimum, 2,940 cfs Sept. 20, 1942 (gage height, 1.41 ft).

Remarks.--Records excellent. Large diversions in upper river basin for irrigation. Some winter and spring runoff stored in Crescent Lake and in Crane Prairie, Wickiup and Ochoco Reservoirs. Slight fluctuations caused by powerplants on Deschutes River near Redmond and Crooked River near Culver.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.0	3,760
3.0	5,350
4.0	7,120
5.0	9,080
6.0	11,200

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3,960	4,900	4,900	5,640	5,980	6,590	7,750	6,170	4,390	4,180	4,180	4,560
2	3,970	5,940	4,930	5,660	6,300	6,440	7,500	5,840	4,370	4,180	4,160	4,590
3	4,090	5,860	5,060	5,720	6,480	6,320	7,800	5,690	4,350	4,150	4,200	4,630
4	4,180	5,590	5,320	5,640	6,640	6,280	8,420	5,670	4,370	4,180	4,200	4,640
5	4,320	*5,500	5,500	5,570	6,890	6,170	8,960	5,780	4,350	4,240	4,210	4,660
6	4,340	5,230	5,860	5,490	7,900	6,170	9,450	6,010	4,320	4,160	4,210	4,660
7	4,270	5,080	6,750	5,320	9,890	6,120	9,590	6,170	*4,340	4,160	4,230	4,640
8	4,500	5,150	7,580	5,230	11,000	6,210	9,030	6,080	4,320	4,230	4,240	4,590
9	4,530	5,040	7,330	5,200	*10,900	6,260	8,800	5,930	4,320	4,240	4,260	4,580
10	4,470	4,910	6,840	5,300	10,600	6,300	8,640	5,780	4,370	4,260	4,270	4,580
11	4,510	4,890	6,820	5,370	11,000	6,280	8,320	5,930	4,420	4,260	4,260	4,580
12	4,320	4,850	6,700	5,320	11,000	6,280	7,690	6,210	4,450	4,200	4,260	4,580
13	4,350	4,770	6,600	5,280	10,500	6,190	7,350	6,220	4,450	4,180	4,310	4,560
14	4,370	4,790	6,400	5,450	9,580	6,120	7,480	6,340	4,500	4,160	4,320	4,510
15	4,420	4,770	6,400	5,210	8,940	6,530	7,580	6,160	4,660	4,150	4,320	4,290
16	4,370	4,820	*6,570	5,180	8,540	*7,560	7,370	5,980	4,740	4,100	4,310	4,080
17	4,510	4,850	6,770	5,860	8,180	8,480	7,120	5,780	4,690	4,060	4,310	3,980
18	4,210	4,980	6,430	5,930	7,920	7,770	6,860	5,670	4,610	4,040	4,290	3,920
19	4,160	4,950	6,250	5,720	7,650	7,460	6,480	5,440	4,480	4,020	4,320	3,900
20	4,260	5,060	6,070	5,670	7,500	7,400	6,170	5,280	4,420	4,000	4,340	3,850
21	4,230	5,150	5,600	5,980	7,370	7,650	5,860	5,160	4,370	4,040	4,350	3,820
22	4,240	5,060	5,500	6,000	7,230	8,160	5,570	5,010	4,340	4,040	4,350	3,790
23	4,140	5,040	5,600	6,120	7,140	8,220	5,400	4,990	4,310	4,060	4,350	3,790
24	4,000	5,150	5,440	6,620	6,990	7,940	5,230	4,990	4,290	4,100	4,340	3,750
25	4,000	5,320	5,590	7,060	6,890	7,960	5,030	4,930	4,240	4,150	4,350	3,780
26	4,000	5,160	5,600	*7,400	6,840	8,340	*4,880	4,900	4,230	*4,120	4,350	3,760
27	4,060	5,110	5,570	7,460	6,750	8,240	4,800	4,850	4,210	4,100	*4,390	3,780
28	4,370	5,040	5,540	7,060	6,640	8,200	4,930	4,720	4,200	4,140	4,430	3,840
29	5,200	5,040	5,600	6,120	-	8,120	5,710	4,580	4,180	4,140	4,430	3,850
30	5,110	5,060	5,890	5,640	-	8,100	6,710	4,500	4,160	4,140	4,500	3,970
31	4,910	-	5,620	5,840	-	7,960	-	4,430	-	4,160	4,530	-
Total	134,170	153,050	186,430	181,080	229,240	221,820	212,480	171,490	131,450	128,340	133,570	126,520
Mean	4,328	5,102	6,014	5,841	8,187	7,155	7,083	5,532	4,382	4,140	4,309	4,217
Ac-ft	266,100	303,600	369,800	359,200	454,700	440,000	421,400	340,100	260,700	254,600	264,900	250,900

Calendar year 1950: Max 7,600 Min 3,800 Mean 4,918 Ac-ft 3,580,000  
 Water year 1950-51: Max 11,000 Min 3,760 Mean 5,506 Ac-ft 3,986,000

Peak discharge (base, 6,100 cfs).--Dec. 8 (6 p.m.) 7,770 cfs (4.34 ft); Jan. 27 (1 to 3 a.m.) 7,540 cfs (4.22 ft); Feb. 8 (10 p.m.) 11,300 cfs (6.03 ft); Apr. 7 (2 to 4 p.m.) 9,660 cfs (5.27 ft); Apr. 30 (10 a.m.) 6,890 cfs (3.88 ft).

\* Discharge measurement made on this day.

Warm Springs River at Hehe Mill, near Warm Springs, Oreg.

Location.--Lat 44°58', long. 121°28', in N $\frac{1}{2}$  sec. 18, T. 7 S., R. 11 E., on left bank at downstream side of highway bridge, a quarter of a mile east of abandoned Hehe Mill, 10 miles south of Bear Springs ranger station, and 18 miles northwest of Warm Springs.

Drainage area.--108 sq mi.

Records available.--June 1915, August 1949 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 746.26 ft above mean sea level (Oregon State Highway Department benchmark). During June 1915, staff gage at site one-half mile downstream at different datum.

Extremes.--Maximum discharge during year, 662 cfs Feb. 11 (gage height, 2.80 ft), from rating curve extended above 350 cfs; maximum gage height, 4.56 ft Jan. 31 (ice jam); minimum discharge, 125 cfs Oct. 16.

1915, 1949-51: Maximum discharge, that of Feb. 11, 1951; maximum gage height, that of Jan. 31, 1951; minimum discharge, 98 cfs Jan. 17, 1950; minimum daily, 102 cfs June 15-17, 1915.

A discharge of 97 cfs was measured on Sept. 5, 1915.

Remarks.--Records good except those for period of ice effect, which are fair. No regulation or diversion above station.

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.9	118
1.2	180
1.5	260
2.0	409
3.0	728

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	126	199	213	277	b290	221	238	283	254	163	148	137
2	128	277	200	328	b300	216	238	274	246	163	143	137
3	133	246	200	342	b320	208	246	274	240	163	143	135
4	133	216	243	306	327	210	260	292	238	163	143	135
5	152	*198	243	289	351	205	277	295	235	163	143	135
6	156	188	266	289	375	205	289	298	232	163	143	135
7	135	175	333	260	444	195	292	309	229	161	139	133
8	145	173	312	249	524	195	298	309	218	161	139	133
9	133	166	298	240	550	190	306	309	*216	161	139	133
10	128	158	286	238	562	182	306	318	210	158	139	133
11	128	156	280	229	652	182	306	360	208	158	139	133
12	126	156	277	221	630	182	306	363	205	158	139	133
13	126	154	269	224	569	198	315	345	202	156	139	133
14	126	152	266	318	508	208	339	333	198	156	139	133
15	126	152	266	312	468	275	354	324	192	156	139	133
16	126	166	*283	309	418	260	354	321	190	156	139	133
17	130	195	272	363	390	240	357	324	185	156	139	133
18	130	192	260	336	363	235	369	333	182	156	139	133
19	132	170	280	309	333	*240	369	321	180	156	139	132
20	133	200	266	286	318	243	*354	318	178	156	139	132
21	128	221	254	298	304	252	333	312	178	154	139	133
22	128	224	257	295	286	246	312	312	178	154	139	135
23	126	213	298	286	272	240	306	318	173	154	139	135
24	128	218	295	342	260	240	298	327	170	154	139	135
25	130	238	286	366	252	240	295	321	170	154	139	137
26	130	229	283	400	243	240	295	309	168	152	139	135
27	148	224	283	381	235	240	*295	304	168	*152	*139	135
28	185	216	292	*b360	221	240	301	292	166	150	141	135
29	235	210	301	b320	-	243	301	283	166	148	139	135
30	195	218	304	b270	-	240	292	272	163	148	139	139
31	170	-	289	b280	-	238	-	263	-	148	137	-
Total	4,345	5,900	8,435	9,303	10,765	6,949	9,201	9,616	5,938	4,851	4,338	4,028
Mean	140	197	272	300	384	224	307	310	198	156	140	134
Cfs/m	1.30	1.82	2.52	2.78	3.56	2.07	2.84	2.97	1.83	1.44	1.30	1.24
In.	1.50	2.03	2.90	3.20	3.71	2.39	3.17	3.31	2.04	1.67	1.49	1.39
Ac-ft	8,620	11,700	16,730	18,450	21,350	13,780	18,250	19,070	11,780	9,620	8,600	7,990

Calendar year 1950: Max 390 Min 110 Mean 199 Cfs/m 1.84 In. 24.96 Ac-ft 143,800

Water year 1950-51: Max 652 Min 126 Mean 229 Cfs/m 2.12 In. 28.80 Ac-ft 165,900

Peak discharge (base, 320 cfs).--Dec. 7 (8 a.m.) 342 cfs (1.78 ft); Jan. 2 (8 p.m.) 412 cfs (2.01 ft); Jan. 17 (5 a.m.) 390 cfs (1.94 ft); Jan. 26 (9 a.m. to 4 p.m.) 403 cfs (1.98 ft); Feb. 11 (1 to 7 p.m.) 662 cfs (2.80 ft); Mar. 15 (4 p.m.) 342 cfs (1.78 ft); Apr. 19 (8 a.m.) 375 cfs (1.89 ft); May 11 (2 to 7 p.m.) 378 cfs (1.90 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.



## Clear Creek near Government Camp, Oreg.

Location.--Lat 45°10'20", long. 121°41'00", in NW¼ sec. 4, T. 5 S., R. 9 E., on right bank 0.7 mile downstream from Clear Lake Outlet and 9 miles southeast of Government Camp.

Drainage area.--8.9 sq mi, approximately.

Records available.--October 1946 to September 1951 in reports of Geological Survey. December 1940 to September 1941 in reports of Oregon State engineer, published as "at Oak-grove Road near Wapinitia.

Gage.--Water-stage recorder. Datum of gage is 3,450.94 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. December 1940 to September 1941 at different datum.

Average discharge.--5 years, 23.2 cfs.

Extremes.--Maximum discharge during year, 83 cfs May 13 (gage height, 2.50 ft); maximum gage height, 2.86 ft Jan. 29 (ice jam); minimum daily discharge, 7 cfs Sept. 21-24. 1940-41, 1946-51: Maximum discharge, 150 cfs Dec. 15, 1946 (gage height, 3.00 ft); minimum observed, 1.6 cfs Nov. 1, 1940.

Remarks.--Records fair. No diversions or regulation.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 17

Apr. 18 to Sept. 30

1.3	3.5	1.4	6.5
1.7	29	1.6	17
2.1	61	2.0	46
		2.5	88

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8.6	22	26	47	29	28	26	54	52	20	10	8
2	8.6	27	26	50	29	27	28	53	48	18	10	8
3	9.8	27	26	50	31	27	31	53	47	18	10	8
4	10	27	28	47	31	26	32	60	45	18	9.6	8
5	12	27	27	45	31	26	34	61	44	18	9.6	8
6	14	27	30	42	31	25	34	64	43	18	9.6	8
7	14	26	33	39	35	25	35	65	40	18	9.6	8
8	14	26	33	38	38	24	35	66	39	18	9.6	8
9	14	25	32	37	47	24	36	66	*37	18	9.1	8
10	13	25	32	35	51	23	36	69	36	18	9.1	8
11	13	24	33	36	57	23	36	79	34	17	9.1	8
12	12	23	32	35	57	26	39	82	31	17	9.1	7.5
13	11	23	32	36	57	29	41	82	30	17	9.1	7.5
14	11	22	32	40	55	32	43	79	29	17	8.7	7.5
15	11	22	32	40	53	34	45	76	28	16	8.7	7.5
16	10	23	34	b40	51	32	47	76	27	16	8.7	7.5
17	11	25	*34	b40	49	30	50	77	26	15	8.3	7.5
18	12	25	33	38	46	28	50	76	25	15	8.3	7.5
19	12	24	*33	37	43	*27	48	74	24	15	8.3	7.5
20	12	26	34	35	43	27	48	72	24	15	8.3	7.5
21	11	26	33	35	41	28	48	70	23	*13	8.3	7
22	10	26	35	33	39	24	48	70	23	12	8.3	7
23	9.5	25	39	33	36	23	46	71	23	12	8.3	7
24	9.5	26	39	35	35	24	47	72	23	12	8.3	7
25	11	26	39	39	32	25	47	70	22	11	8.3	10
26	11	26	39	40	31	25	48	68	22	11	8.3	8
27	15	26	40	39	30	26	48	67	22	11	8.3	7.5
28	17	25	44	b35	29	26	*53	65	21	10	8.7	8
29	17	24	45	b33	-	26	59	62	20	10	8.3	10
30	15	25	48	*b31	-	26	56	59	20	10	*8.3	12
31	13	-	48	30	-	24	-	56	10	10	8	-
Total	372.0	751	1,071	1,190	1,137	820	1,271	2,114	928	464	274.2	239
Mean	12.0	25.0	34.5	38.4	40.6	26.5	42.4	68.2	30.9	15.0	8.85	7.97
Cfsm	1.35	2.81	3.88	4.31	4.56	2.98	4.76	7.66	3.47	1.69	0.994	0.896
In.	1.55	3.14	4.48	4.97	4.75	3.43	5.31	8.83	3.88	1.94	1.15	1.00
Ac-ft	738	1,490	2,120	2,360	2,260	1,650	2,520	4,190	1,840	920	544	474

Calendar year 1950: Max 89 Min 5.2 Mean 26.8 Cfsm 3.01 In. 40.92 Ac-ft 19,420  
 Water year 1950-51: Max 82 Min 7 Mean 29.1 Cfsm 3.27 In. 44.43 Ac-ft 21,090

Peak discharge (base, 80 cfs).--May 13 (3 to 7 p.m.) 83 cfs (2.50 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Oct. 23 to Nov. 4, Mar. 1-18, and Aug. 31 to Sept. 30; discharge estimated on basis of recorded range in stage when available and records for Salmon River near Government Camp.

## White River below Tygh Valley, Oreg.

Location.--Lat 45°14'30", long. 121°05'30", in NW¼ sec. 8, T. 4 S., R. 14 E., on left bank just below Pacific Power & Light Co.'s plant at White River Falls and 4½ miles east of Tygh Valley.

Drainage area.--393 sq mi.

Records available.--October 1917 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 840 ft (by barometer). Prior to July 28, 1931, water-stage recorder at site 50 ft downstream at datum 0.31 ft higher.

Average discharge.--34 years, 425 cfs.

Extremes.--Maximum discharge during year, 3,760 cfs Jan. 17 (gage height, 6.73 ft); minimum, 85 cfs Sept. 9 (gage height, 0.72 ft); minimum daily, 132 cfs Sept. 24.

1917-51: Maximum discharge, 13,300 cfs Jan. 6, 1923 (gage height, about 13.3 ft), from rating curve extended above 5,000 cfs; minimum, 10 cfs Dec. 11-14, 1919, Aug. 9, 1931; minimum daily, 71 cfs Aug. 31, 1941.

Remarks.--Records good. Diversions above station for irrigation. Some regulation at low flow by powerplant.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Feb. 12-15)

Oct. 1 to Feb. 11				Feb. 12 to Sept. 30			
1.3	152	3.0	650	1.1	125	4.0	1,440
1.6	203	4.0	1,220	1.5	185	5.5	2,700
2.0	292	5.0	1,990	2.0	331		
2.5	445	6.0	2,950	3.0	770		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	155	470	600	920	790	645	645	808	700	233	167	148
2	155	1,150	552	1,170	842	611	845	872	680	290	169	144
3	*180	*1,120	558	1,390	1,170	568	700	878	655	273	187	144
4	205	958	938	1,120	1,230	620	630	1,120	670	270	169	143
5	232	806	932	980	1,270	598	974	1,310	670	263	169	143
6	323	625	1,120	830	1,620	598	1,040	1,280	660	260	169	142
7	298	544	1,430	750	2,230	557	1,090	1,280	*650	249	167	140
8	258	576	1,270	695	2,240	575	1,120	1,300	620	238	169	142
9	256	488	1,180	640	*2,300	570	1,180	1,310	602	238	167	138
10	225	445	1,090	596	2,480	526	1,160	1,450	588	230	169	136
11	219	417	1,070	576	2,650	510	1,140	1,790	588	224	166	138
12	207	397	1,030	552	2,640	526	1,150	1,610	593	217	164	138
13	201	375	914	552	2,230	745	1,270	1,450	593	210	164	137
14	198	348	836	1,170	2,020	812	1,510	1,310	575	207	162	137
15	194	348	775	1,180	1,750	*1,170	1,530	1,240	575	200	162	137
16	190	369	1,040	1,110	1,540	1,320	1,520	1,240	548	200	161	138
17	203	407	1,030	2,660	1,400	1,020	1,520	1,380	522	196	155	138
18	207	452	890	1,500	1,300	890	1,590	1,380	490	194	156	138
19	230	391	898	1,120	1,150	818	1,470	1,280	466	192	154	136
20	277	458	938	914	1,080	782	1,310	1,210	450	*189	154	136
21	241	512	854	1,290	1,130	806	1,180	1,170	430	189	154	133
22	221	536	890	1,170	1,010	770	1,080	1,200	418	187	154	133
23	213	516	1,460	1,110	896	725	986	1,300	406	183	154	133
24	207	630	1,320	1,580	842	710	926	1,270	398	180	155	132
25	211	618	1,230	1,710	782	710	890	1,230	386	180	155	136
26	217	790	1,130	*1,720	730	710	*902	1,140	358	178	152	150
27	263	790	1,040	1,480	705	695	950	1,070	355	176	152	148
28	357	715	1,070	1,150	665	680	1,070	998	316	172	155	149
29	584	635	1,190	914	-	690	1,060	872	308	172	164	156
30	520	635	1,110	848	-	675	974	806	304	169	*154	181
31	391	-	1,000	806	-	645	-	740	-	167	149	-
Total	7,838	17,699	31,381	34,183	40,752	22,297	33,392	37,394	15,554	6,586	4,978	4,246
Mean	253	590	1,012	1,185	1,455	719	1,113	1,206	518	212	161	142
Ac-ft	15,550	35,110	62,240	67,800	80,830	44,230	66,230	74,170	30,850	13,060	9,870	8,420
Calendar year 1950: Max			3,030		Min 119	Mean 631		Ac-ft 456,700				
Water year 1950-51: Max			2,660		Min 132	Mean 702		Ac-ft 508,400				

Peak discharge (base, 1,200 cfs).--Nov. 2 (9 a.m.) 1,220 cfs (4.00 ft); Dec. 7 (10 a.m.) 1,550 cfs (4.46 ft); Dec. 23 (6:30 a.m.) 1,560 cfs (4.48 ft); Jan. 2 (8 a.m.) 1,780 cfs (4.75 ft); Jan. 17 (9 a.m.) 3,760 cfs (6.73 ft); Jan. 21 (5 p.m.) 1,880 cfs (4.68 ft); Jan. 24 (11 p.m.) 2,020 cfs (5.03 ft); Feb. 6 (11:30 p.m.) 2,780 cfs (5.83 ft); Feb. 12 (4 a.m.) 2,790 cfs (5.85 ft); Mar. 15 (8 p.m.) 1,710 cfs (4.35 ft); Apr. 18 (3 a.m.) 1,610 cfs (4.23 ft); May 11 (11 a.m.) 1,840 cfs (4.51 ft).

\* Discharge measurement made on this day.

Deschutes River at Moody, near Briggs, Oreg.

Location.--Lat 45°37'20", long. 120°54'05", in SE $\frac{1}{4}$  sec. 26, T. 2 N., R. 15 E., on right bank at Moody,  $\frac{1}{2}$  miles upstream from mouth and 5 miles southwest of Biggs.

Drainage area.--10,500 sq mi, approximately.

Records available.--October 1897 to December 1899, July 1906 to September 1951. Published as "near Moro" 1897-99.

Gage.--Water-stage recorder. Datum of gage is 167.43 ft above mean sea level, datum of 1929. October 1897 to December 1899, staff gage at site 10 miles upstream at different datum. July 1906 to July 1930, staff gage at site 300 ft downstream at datum 0.5 ft lower.

Average discharge.--46 years (1898-99, 1906-51), 5,756 cfs.

Extremes.--Maximum discharge during year, 19,500 cfs Feb. 11 (gage height, 6.18 ft); minimum, 4,320 cfs Sept. 25 (gage height, 2.44 ft).  
1897-99, 1906-51: Maximum discharge, 43,600 cfs Jan. 7, 1923 (gage height, 10.2 ft, site and datum then in use), from rating curve extended above 15,000 cfs; minimum, 2,380 cfs Sept. 16-19, 1931 (gage height, 2.06 ft).

Remarks.--Records excellent. Many diversions in upper river basin for irrigation. Some winter and spring runoff stored in Crescent Lake and in Crane Prairie, Wickiup, and Ochoco Reservoirs.

Cooperation.--Water-stage recorder inspected by agent of Eastern Oregon Lake Co.

Revisions.--W 754: Drainage area.

Rating table, water year 1950-51, (gage height, in feet, and discharge, in cubic feet per second)

2.4	4,210
3.0	6,030
4.0	9,530
5.5	16,100
6.5	21,200

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,690	6,360	6,760	7,900	8,290	8,470	9,720	8,720	6,100	5,020	4,870	5,230
2	4,660	*7,680	6,460	7,900	8,610	8,360	9,530	8,070	5,960	5,050	4,870	5,260
3	4,720	9,160	6,520	9,120	9,640	8,110	9,460	7,790	5,900	5,020	4,870	5,290
4	4,990	8,140	7,200	8,470	10,300	8,070	10,100	7,790	5,900	4,990	4,870	5,320
5	5,140	7,650	8,000	8,070	12,000	8,070	10,900	8,140	6,000	5,140	4,870	5,290
6	5,440	7,130	8,000	7,760	12,200	7,930	11,600	8,290	*5,930	5,050	4,870	5,290
7	5,380	6,690	10,500	7,440	16,800	7,860	12,100	8,540	5,860	5,050	4,900	5,290
8	5,320	6,520	11,100	7,200	18,500	7,790	12,000	8,650	5,800	5,020	4,900	5,260
9	5,480	6,560	10,800	7,060	*18,500	8,040	11,400	8,500	5,730	5,020	4,980	5,260
10	5,320	6,260	9,870	7,030	18,300	7,930	11,300	8,390	5,670	5,020	4,960	5,230
11	5,260	6,100	9,340	7,060	18,200	7,900	11,300	8,750	5,730	5,020	4,960	5,260
12	5,290	6,030	*9,420	7,060	19,000	7,860	10,500	9,090	5,770	5,020	4,930	5,280
13	5,050	5,930	9,050	6,890	17,600	8,210	9,990	9,230	5,770	4,960	4,990	5,230
14	5,110	5,830	8,830	7,580	15,700	9,340	9,990	9,090	5,770	4,900	4,990	5,230
15	5,080	5,770	8,570	8,290	14,200	*9,800	10,500	8,750	5,830	4,870	4,990	5,170
16	5,140	5,800	9,090	8,320	13,100	11,600	10,400	8,500	5,930	4,840	4,990	4,930
17	5,080	6,060	9,950	11,300	12,200	11,200	10,200	8,320	5,930	4,810	4,960	4,720
18	5,020	6,490	9,310	10,900	11,600	10,900	9,950	8,100	5,860	4,720	4,960	4,640
19	5,020	6,480	8,790	9,530	11,000	10,000	9,610	8,000	5,700	*4,750	4,980	4,580
20	5,050	6,290	8,680	8,650	10,500	9,760	9,120	7,900	5,570	4,690	4,960	4,520
21	5,050	6,860	8,320	9,120	10,400	9,800	8,650	7,600	5,480	4,690	4,960	4,460
22	4,990	6,830	7,820	11,100	10,200	10,100	8,210	7,440	5,410	4,720	4,960	4,430
23	4,930	6,660	8,360	9,720	9,760	10,400	7,860	7,300	5,350	4,750	4,990	4,430
24	4,810	6,590	8,570	11,500	9,460	10,200	7,540	7,340	5,320	4,750	4,990	4,460
25	4,690	7,130	8,180	*13,500	9,230	10,000	*7,300	7,370	5,290	4,780	4,990	4,410
26	4,690	7,270	8,210	12,600	9,050	10,200	7,060	7,270	5,200	4,810	5,020	4,410
27	4,720	7,060	8,000	12,500	8,860	10,400	6,930	7,100	5,170	4,810	5,050	4,410
28	5,110	6,930	7,860	11,000	8,650	10,200	7,000	6,960	5,140	4,840	*5,080	4,410
29	6,930	6,780	8,140	9,610	-	10,200	7,300	6,660	5,080	4,840	5,140	4,460
30	8,140	6,690	8,250	8,250	-	10,100	8,500	6,430	5,020	4,840	5,200	4,580
31	6,860	-	8,070	8,040	-	10,100	-	6,260	-	4,840	5,230	-
Total	163,160	201,690	266,020	280,470	351,850	288,900	285,720	246,240	169,170	151,630	154,240	146,720
Mean	5,263	6,723	8,581	9,047	12,570	9,313	9,524	7,943	5,653	4,881	4,975	4,891
Ac-ft	323,600	400,000	527,600	556,300	697,900	573,000	568,700	488,400	335,500	300,800	305,900	291,000
Calendar year 1950: Max	14,500			Min	4,500			Mean	6,659			
Water year 1950-51: Max	19,000			Min	4,410			Mean	7,413			
								Ac-ft	4,821,000			
									5,367,000			

Peak discharge (base, 8,800 cfs).--Nov. 3 (3 to 5 a.m.), 9,460 cfs (3.98 ft); Dec. 7 (10 p.m.) 11,900 cfs (4.58 ft); Jan. 17 (9 p.m.), 14,100 cfs (5.07 ft); Jan. 25 (10 to 11 a.m.) 14,100 cfs (5.06 ft); Feb. 11 (12 p.m.) 19,500 cfs (6.18 ft); Mar. 16 (10 a.m.) 12,600 cfs (4.74 ft); May 13 (6 to 10 p.m.) 9,340 cfs (3.95 ft).

\* Discharge measurement made on this day.

## Columbia River near The Dalles, Oreg.

Location.--Lat 45°39', long. 120°58', in NE $\frac{1}{4}$  sec. 20, T. 2 N., R. 15 E., on left bank 300 ft upstream from staff gage in entrance to Celilo Canal, just upstream from Celilo Falls, 3 miles downstream from Deschutes River, 11 miles east of The Dalles, and at mile 201.

Drainage area.--237,000 sq mi, approximately.

Records available.--June 1878 to September 1951. Maximum stage for each year in period 1858 to 1877 from readings of gage at Lower Cascades Landing.

Gage.--Water-stage recorder. Datum of gage is at mean sea level, datum of 1929. Prior to October 1931, staff gage at The Dalles, supplemented for a few short periods by gage-height records at Umatilla and Cascade Locks.

Average discharge.--73 years, 195,100 cfs.

Extremes.--Maximum discharge during year, 602,000 cfs May 30 (elevation, 144.48 ft); minimum, 93,400 cfs Sept. 25 (elevation, 129.76 ft).  
1858-1951: Maximum discharge, 1,240,000 cfs June 6, 1894 (elevation, 106.5 ft on gage at The Dalles, 160.1 ft at present site); minimum observed, 35,000 cfs Jan. 12, 1937 (elevation, 126.0 ft).

Remarks.--Records excellent. Storage and diversions for irrigation are only a small part of total runoff. Some regulation by Franklin D. Roosevelt Lake above Grand Coulee Dam during year, the total increase in contents during the year ending Sept. 30, 1951, being 16,400 acre-ft. Records of chemical analyses and water temperatures for the water year 1951 are given in Water-Supply Paper 1200.

Cooperation.--Recorder inspected and gages read by Corps of Engineers.

Revisions (water years).--W 534: 1920(m). W 554: 1879-1920 (low-water rating curve).  
W 1094: 1894.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

129	76,500	138	357,000
130	99,000	140	431,000
132	151,000	142	507,000
134	213,000	145	622,000
136	283,000		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	105,000	147,000	133,000	188,000	128,000	173,000	171,000	288,000	549,000	408,000	258,000	132,000
2	104,000	149,000	132,000	187,000	127,000	168,000	170,000	294,000	535,000	399,000	255,000	132,000
3	102,000	152,000	134,000	189,000	129,000	163,000	169,000	287,000	515,000	392,000	244,000	131,000
4	96,600	158,000	137,000	184,000	130,000	159,000	176,000	286,000	497,000	391,000	240,000	127,000
5	104,000	160,000	131,000	185,000	131,000	158,000	189,000	286,000	480,000	388,000	237,000	125,000
6	105,000	157,000	129,000	182,000	131,000	156,000	206,000	287,000	473,000	373,000	228,000	125,000
7	100,000	156,000	131,000	170,000	135,000	156,000	221,000	294,000	473,000	390,000	223,000	124,000
8	101,000	151,000	134,000	151,000	144,000	149,000	235,000	315,000	471,000	385,000	220,000	123,000
9	104,000	146,000	138,000	146,000	164,000	146,000	247,000	358,000	460,000	375,000	225,000	119,000
10	105,000	145,000	141,000	146,000	179,000	151,000	255,000	394,000	447,000	368,000	232,000	113,000
11	97,800	137,000	135,000	137,000	218,000	151,000	253,000	431,000	429,000	367,000	232,000	114,000
12	104,000	136,000	130,000	130,000	261,000	150,000	241,000	467,000	416,000	367,000	228,000	102,000
13	105,000	130,000	124,000	128,000	287,000	147,000	234,000	496,000	406,000	360,000	200,000	111,000
14	103,000	128,000	127,000	131,000	286,000	151,000	235,000	515,000	406,000	360,000	173,000	111,000
15	105,000	125,000	131,000	138,000	264,000	153,000	244,000	522,000	420,000	350,000	174,000	108,000
16	101,000	121,000	135,000	143,000	247,000	161,000	264,000	524,000	436,000	346,000	172,000	108,000
17	103,000	119,000	137,000	152,000	235,000	175,000	277,000	507,000	450,000	344,000	161,000	107,000
18	98,000	121,000	134,000	155,000	228,000	182,000	289,000	510,000	475,000	356,000	143,000	103,000
19	109,000	126,000	128,000	155,000	235,000	179,000	307,000	536,000	485,000	337,000	136,000	103,000
20	114,000	130,000	127,000	153,000	225,000	176,000	325,000	563,000	484,000	334,000	126,000	104,000
21	119,000	123,000	131,000	148,000	218,000	176,000	334,000	570,000	479,000	331,000	125,000	101,000
22	116,000	114,000	131,000	151,000	214,000	180,000	330,000	556,000	466,000	329,000	132,000	96,600
23	116,000	120,000	134,000	151,000	207,000	186,000	315,000	554,000	460,000	325,000	134,000	96,600
24	117,000	116,000	139,000	152,000	196,000	183,000	300,000	565,000	452,000	316,000	134,000	95,000
25	114,000	119,000	147,000	151,000	191,000	178,000	290,000	591,000	442,000	308,000	151,000	*94,300
26	113,000	116,000	161,000	146,000	190,000	177,000	274,000	597,000	439,000	303,000	130,000	95,400
27	113,000	122,000	170,000	150,000	188,000	179,000	258,000	581,000	440,000	294,000	131,000	96,800
28	119,000	129,000	183,000	158,000	182,000	173,000	254,000	584,000	428,000	290,000	143,000	95,400
29	125,000	137,000	189,000	158,000	-	175,000	259,000	585,000	424,000	283,000	128,000	95,700
30	128,000	140,000	188,000	149,000	-	173,000	272,000	597,000	417,000	273,000	132,000	101,000
31	136,000	-	191,000	132,000	-	171,000	-	569,000	-	265,000	134,000	-
Total	*3,382.4	*4,030	*4,412	*4,796	*5,468	*5,155	*7,593	*14,519	*13,752	*10,689	*5,561	*3,290
Mean	109,100	134,300	142,300	154,700	195,300	166,300	253,100	468,400	458,400	344,800	179,400	109,700
Cfs/m	0.460	0.567	0.600	0.653	0.824	0.702	1.07	1.98	1.93	1.45	0.757	0.463
In.	0.53	0.63	0.69	0.75	0.86	0.81	1.19	2.28	2.16	1.68	0.87	0.52
Ac-ft	*6,709	*7,993	*8,751	*9,513	*10,850	*10,220	*15,060	*28,800	*27,280	*21,200	*11,030	*6,526
Calendar year 1950: Max	739,000	Min	82,600	Mean	226,500	Cfs/m	0.956	In.	12.96	Ac-ft	*164,000	
Water year 1950-51: Max	597,000	Min	94,300	Mean	226,400	Cfs/m	0.955	In.	12.97	Ac-ft	*163,900	

\* Discharge measurement made on this day.

† Expressed in thousands.

## FIFTEENMILE CREEK BASIN

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Fifteenmile Creek near Wrentham, Oreg.

Location.--Lat 45°30'40", long. 121°02'20", in sec. 3, T. 1 S., R. 14 E., on left bank 0.1 mile below Dry Creek, 3 miles southwest of Wrentham, and 9½ miles southeast of The Dalles.

Drainage area.--171 sq mi.

Records available.--October 1946 to September 1951. December 1926 to May 1927, in reports of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 780 ft (by barometer).

Average discharge.--5 years (1946-51), 65.6 cfs.

Extremes.--Maximum discharge during year, 1,060 cfs Jan. 17 (gage height, 4.91 ft), minimum, 3.0 cfs July 30, Aug. 1, 2.

1946-51: Maximum discharge, 3,000 cfs Feb. 10, 1949, by slope-area determination; maximum gage height, 8.42 ft Feb. 10, 1949 (ice jam); minimum discharge, 0.8 cfs Aug. 22 1947.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. The town of Dufur diverts water from creek about 5 miles above station. Several small diversions above station for irrigation of about 3,700 acres.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 29, Dec. 4-7)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

1.6	6.5	1.6	2.0	2.3	42
1.7	10	1.7	4.0	2.6	90
1.9	23	1.8	7.0	3.0	190
2.1	43	1.9	11	3.5	360
2.4	89	2.1	22	4.5	640
3.0	231				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7.3	41	76	109	184	100	115	70	58	31	3.2	6
2	7.3	53	66	178	b210	95	108	69	53	29	3.6	5.5
3	8.9	48	70	206	b240	90	108	66	50	28	5.7	5.5
4	11	46	99	180	b260	100	112	76	50	27	5.4	6
5	14	43	91	153	288	90	120	86	*55	27	5.4	6
6	15	40	107	131	b360	90	122	83	56	26	5.4	6.5
7	13	36	147	118	b450	85	120	81	53	25	5.4	6.5
8	14	40	160	109	*555	85	115	79	53	22	5.7	6.5
9	13	39	165	101	695	85	112	77	49	21	6.0	6.5
10	12	34	163	95	645	80	110	83	49	20	5.7	6.5
11	11	33	163	89	600	75	104	106	50	18	5.4	6.5
12	11	32	153	80	550	90	98	102	50	16	7.0	6.5
13	10	31	140	84	450	*130	96	96	52	15	8.1	6.5
14	10	30	*133	144	388	214	104	92	52	14	7.0	6.5
15	10	30	124	200	336	439	104	85	56	14	6.3	6.5
16	9.7	31	182	231	285	356	100	83	59	12	6.0	6.5
17	13	38	200	755	260	282	98	83	58	12	6.3	6.5
18	14	51	195	*440	229	247	100	86	55	13	6.6	6
19	15	46	198	320	205	226	98	85	52	12	7.0	6
20	20	52	193	257	196	214	94	83	48	*10	6.6	6
21	16	56	182	431	220	205	86	81	42	7.0	6.3	6
22	15	59	177	372	199	193	83	81	39	7.3	5.1	5.5
23	14	58	220	*316	175	178	77	90	39	7.6	4.5	5.5
24	13	60	223	445	166	169	*74	94	39	7.0	4.2	5.5
25	14	75	200	550	150	163	70	94	36	7.3	4.2	5
26	14	76	182	525	130	155	69	86	35	6.6	5.1	5
27	17	76	185	372	120	145	69	79	34	6.3	5.4	5.5
28	24	70	153	208	110	140	81	77	34	4.8	5.7	6
29	63	66	142	152	-	138	77	74	33	4.8	*6.3	6
30	*71	75	131	140	-	130	74	66	31	4.2	6	6.5
31	39	-	116	150	-	118	-	61	-	3.4	6	-
Total	539.2	1,464	4,716	7,641	8,656	4,907	2,898	2,554	1,421	458.3	176.8	181.5
Mean	17.4	48.8	152	246	308	158	96	82.4	47.4	14.9	5.70	6.05
Ac-ft	1,070	2,800	9,350	15,160	17,170	9,730	5,750	5,070	2,820	909	351	360

Calendar year 1950: Max 750 Min 2.3 Mean 77.5 Ac-ft 56,130  
Water year 1950-51: Max 755 Min 3.2 Mean 77.6 Ac-ft 70,640

Peak discharge (base, 270 cfs).--Jan. 2 (6:30 p.m.) 300 cfs (3.29 ft); Jan. 17 (5:30 a.m.) 1,060 cfs (4.91 ft); Jan. 21 (12 m.) 815 cfs (4.05 ft); Jan. 24 (11 p.m.) 680 cfs (4.18 ft); Feb. 9 (10:30 to 12 p.m.) 750 cfs (4.32 ft); Mar. 15 (6 p.m.) 665 cfs (4.15 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Feb. 25 to Mar. 12, and Aug. 30 to Sept. 30; discharge estimated on basis of range line when available and records for Fifemile Creek near The Dalles and Eightmile Creek near Boyd.

## Eightmile Creek near Boyd, Oreg.

Location.--Lat 45°31'10", long. 121°06'40", in SE $\frac{1}{4}$  sec. 31, T. 1 N., R. 14 E., on left bank at upstream side of bridge  $2\frac{1}{2}$  miles northwest of Boyd and 7 miles southeast of The Dalles.

Drainage area.--56 sq mi, approximately.

Records available.--October 1946 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 802.17 ft above mean sea level, datum of 1929 (Oregon State Highway Department benchmark).

Average discharge.--5 years, 26.0 cfs.

Extremes.--Maximum discharge during year, 272 cfs Jan. 17 (gage height, 5.85 ft); minimum, 3.0 cfs Aug. 8.

1946-51: Maximum discharge, 385 cfs Feb. 10, 1949 (gage height, 7.11 ft); minimum, 0.8 cfs Sept. 24, 1947.

Remarks.--Records good except those for period of ice effect, which are fair. No regulation. Several small diversions above gage for irrigation of about 1,300 acres.

Rating tables, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Feb. 9-11)

Oct. 1 to Feb. 11				Feb. 12 to Sept. 30			
1.6	3.1	3.0	57	1.5	3.2	2.6	36
1.8	5.5	4.0	129	1.8	5.8	3.0	66
2.1	11	5.0	199	2.0	8.1	4.0	140
2.4	20	6.0	285	2.1	10	5.6	265
2.7	35			2.3	18		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.8	10	15	45	b55	46	66	36	25	10	5.3	4.7
2	4.0	12	12	55	b50	46	64	35	24	10	5.3	4.5
3	4.6	11	14	63	b65	44	66	34	23	9.8	5.3	4.4
4	5.2	10	21	66	b75	47	73	37	24	9.6	5.1	5.1
5	6.1	9.5	18	59	63	44	83	41	*25	9.4	5.2	5.1
6	7.3	9.3	20	55	87	44	89	40	25	8.7	5.1	5.3
7	6.3	8.9	24	50	108	41	88	38	24	7.8	4.9	5.3
8	6.1	11	26	47	*129	43	83	37	23	7.6	4.7	5.3
9	5.7	10	34	43	178	40	80	37	22	7.7	4.3	5.4
10	5.2	9.7	35	38	236	39	76	38	21	7.6	4.1	5.3
11	5.0	9.3	37	37	260	39	70	44	21	7.3	4.0	5.4
12	4.8	9.5	37	34	241	40	64	42	22	6.9	4.2	5.4
13	4.8	9.3	*35	40	207	48	61	42	22	6.9	4.4	5.3
14	4.8	8.9	34	55	175	57	64	40	22	6.7	4.0	5.2
15	5.2	9.1	31	74	152	*126	63	37	22	6.8	3.9	5.1
16	5.7	9.3	40	79	128	127	59	35	22	6.7	4.0	5.1
17	6.5	11	44	*227	113	102	57	33	22	6.5	4.1	4.9
18	6.9	12	43	*153	99	89	56	33	22	6.6	4.2	4.6
19	7.1	11	48	119	86	85	52	33	21	6.7	4.1	4.4
20	8.0	11	49	97	79	84	49	32	21	*6.7	3.8	4.4
21	7.3	13	48	128	80	87	46	32	20	6.7	3.9	4.3
22	6.9	15	49	123	71	88	44	32	18	6.6	3.8	4.4
23	6.6	12	63	*106	64	84	39	33	18	6.3	3.9	4.2
24	6.6	12	70	114	61	81	*40	34	17	6.2	4.3	4.0
25	6.8	14	69	120	56	80	38	35	16	5.8	4.5	4.0
26	6.9	14	66	135	52	78	36	33	15	5.9	4.4	3.8
27	8.2	14	61	120	49	75	37	32	15	5.6	4.4	4.0
28	9.7	14	58	92	48	73	42	32	14	5.7	4.8	4.2
29	14	15	57	b80	-	74	39	31	12	5.5	*5.1	4.4
30	*12	15	53	b70	-	72	37	30	11	5.4	5.0	5.0
31	10	-	50	b60	-	68	-	27	-	5.2	5.1	-
Total	208.1	335.8	1,261	2,584	3,087	2,091	1,761	1,095	608	220.9	139.2	142.5
Mean	6.71	11.2	40.7	83.4	110	67.5	58.7	35.3	20.3	7.13	4.49	4.75
Ac-ft	413	666	2,500	5,130	6,120	4,150	3,490	2,170	1,210	438	276	283

Calendar year 1950: Max 177 Min 2.5 Mean 28.4 Ac-ft 20,560

Water year 1950-51: Max 260 Min 3.8 Mean 37.1 Ac-ft 26,850

Peak discharge (base, 60 cfs).--Dec. 25 (1 a.m.) 71 cfs (3.11 ft); Jan. 2 (12 p.m.) 77 cfs (3.20 ft); Jan. 17 (6:30 a.m.) 272 cfs (5.85 ft); Jan. 21 (5 p.m.) 158 cfs (4.42 ft); Jan. 26 (4 a.m.) 142 cfs (4.18 ft); Feb. 11 (7:30 a.m.) 266 cfs (5.49 ft); Mar. 15 (6:30 p.m.) 253 cfs (5.45 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Fivemile Creek near The Dalles, Oreg.

Location.--Lat 45°32'30", long. 121°08'30", in W½ of sec. 25, T. 1 N., R. 13 E., on left bank 4½ miles southeast of The Dalles.

Drainage area.--32.4 sq mi.

Records available.--October 1948 to September 1951 in reports of Geological Survey. December 1925 to May 1926, December 1927 to May 1928, and February 1930 to May 1931 in reports of State engineer.

Gage.--Water-stage recorder. Altitude of gage is 740 ft (by barometer). December 1925 to May 1926, staff gage at approximately present site at different datum. December 1927 to May 1931 at site half a mile upstream at different datum.

Extremes.--Maximum discharge during year, 268 cfs Jan. 17 (gage height, 3.45 ft), from rating curve extended above 130 cfs by logarithmic plotting; no flow for many days during July and August.

1925-26, 1927-28, 1930-31, 1948-51: Maximum discharge recorded, 315 cfs Feb. 10, 1949 (gage height, 3.66 ft), from rating curve extended above 130 cfs by logarithmic plotting; no flow at times.

Remarks.--Records good except those below 3 cfs, which are fair. No regulation. Diversions for irrigation of about 50 acres above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3

0.6	0.2	0.9	2.9
.7	.6	1.1	7.1
.8	1.6	1.3	13

Dec. 4 to Sept. 30

0.6	0.2	1.4	18
.7	.6	1.7	37
.8	1.6	2.0	62
.9	2.9	2.5	118
1.1	7.1	3.2	219

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1												
2	0.5	4.8	12	33	55	26	56	25	7.1	0.2	0	0.2
3	.5	6.2	11	41	43	25	55	23	6.6	.1	0	.2
4	.6	6.2	12	60	52	23	58	21	6.4	.1	0	.2
5	.7	5.3	22	59	58	25	66	23	6.2	.1	0	.2
6	.9	4.2	20	51	56	23	81	26	*6.6	.2	0	.2
7												
8	1.0	3.8	21	45	64	23	86	26	6.4	.3	0	.2
9	.7	3.7	23	41	81	22	83	26	5.7	.2	0	.3
10	.9	4.6	25	36	98	23	80	25	5.3	.1	0	.3
11	.8	4.4	28	33	126	21	75	25	4.4	.2	0	.2
12	.7	4.2	28	29	164	20	75	25	4.0	.2	0	.2
13												
14	.7	3.8	27	27	204	18	70	28	3.7	.2	0	.2
15	.7	3.5	*25	23	202	20	63	28	3.5	.1	.1	.2
16	.7	3.3	23	23	168	*23	59	26	3.3	0	0	.2
17	.7	3.1	25	46	134	37	65	23	2.9	0	0	.2
18	.7	2.9	21	69	111	111	64	21	2.6	.1	0	.2
19												
20	.7	2.8	27	79	98	92	56	20	2.4	.1	0	.2
21	1.1	3.8	30	197	83	78	54	18	2.0	.1	0	.2
22	1.1	5.3	31	*136	72	69	53	18	1.6	.1	0	.2
23	1.1	5.0	34	99	62	66	48	17	1.6	*.1	0	.2
24	1.1	5.7	34	80	56	65	44	16	1.4	.1	0	.1
25												
26	1.2	6.4	32	95	57	69	40	15	1.2	0	0	.1
27	1.4	7.4	33	90	51	70	39	14	1.3	0	0	.2
28	1.4	6.9	47	83	47	66	34	14	1.4	0	0	.2
29	1.5	7.7	60	*87	42	64	*26	14	1.4	0	0	.2
30	1.6	12	60	92	39	63	24	13	.9	0	0	.3
31												
1	1.6	13	55	108	35	63	23	12	.6	0	0	.3
2	1.9	12	51	102	32	62	23	10	.5	0	0	.3
3	2.1	11	47	88	28	61	27	10	.3	0	.2	.4
4	4.8	10	43	75	-	61	28	9.8	.2	0	.2	.4
5	6.4	12	41	72	-	60	26	8.5	.2	0	.2	.6
6	*4.8	-	37	67	-	58	-	8.1	-	0	.3	-
7												
8	44.6	185.0	983	2,166	2,320	1,507	1,583	588.4	91.7	2.6	1.0	7.1
9	1.44	6.17	31.7	69.9	82.9	48.6	52.8	19.0	3.06	0.08	0.03	0.24
10	88	367	1,950	4,300	4,600	2,990	3,140	1,170	182	5.2	2.0	14

Calendar year 1950: Max 145 Min 0 Mean 18.9 Ac-ft 13,680  
 Water year 1950-51: Max 204 Min 0 Mean 26.0 Ac-ft 18,610

Peak discharge (base, 130 cfs).--Jan. 17 (5:30 a.m.) 268 cfs (3.45 ft); Feb. 12 (4 a.m.) 217 cfs (3.19 ft); Mar. 15 (5 p.m.) 242 cfs (3.32 ft).

\* Discharge measurement made on this day.

## CLICKITAT RIVER BASIN

Klickitat River above West Fork, near Glenwood, Wash.

Location.--Lat 46°15'40", long. 121°14'30", in S $\frac{1}{4}$  sec. 18, T. 9 N., R. 13 E., on right bank half a mile upstream from Swamp Creek,  $\frac{1}{2}$  miles upstream from West Fork, and 17 miles north of Glenwood.

Drainage area.--151 sq mi.

Records available.--November 1944 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,720 ft (from topographic map).

Average discharge.--6 years (1945-51), 380 cfs.

Extremes.--Maximum discharge during year, 2,490 cfs May 11 (gage height, 3.78 ft); minimum, 102 cfs Sept. 24 (gage height, 1.20 ft).

1944-51: Maximum discharge, 3,280 cfs May 27, 1948 (gage height, 4.28 ft); minimum, 48 cfs Nov. 14, 15, 1945 (gage height, 0.98 ft, but may have been less during period of ice effect).

Remarks.--Records good except those for period of shifting control, which are fair, and those for periods of ice effect or no gage-height record, which are poor. No diversion or regulation.

Rating table, water year 1950-51, except periods of ice effect and shifting control (gage height, in feet, and discharge, in cubic feet per second)

1.2	102	2.4	680
1.5	193	3.0	1,320
1.8	311	3.7	2,340
2.1	465		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	121	242	393	484	b210	*294	277	714	812	465	176	132
2	121	273	352	478	b270	273	298	706	*812	442	176	129
3	126	377	343	442	b270	277	339	731	841	431	173	126
4	141	484	348	419	b250	269	408	900	960	419	169	121
5	169	550	303	382	238	269	478	971	982	388	166	118
6	162	*419	348	362	223	253	529	1,050	950	357	162	118
7	159	372	352	a350	234	246	585	1,150	900	334	162	118
8	162	334	329	a350	298	246	640	1,240	860	325	159	121
9	173	286	362	a340	588	242	714	1,330	880	325	159	118
10	246	261	372	a330	1,260	238	706	1,520	940	325	153	116
11	268	253	382	325	1,350	234	714	2,340	1,020	316	153	113
12	208	242	398	307	1,080	230	774	1,960	1,050	307	150	113
13	179	219	377	311	832	238	930	1,620	1,060	303	150	110
14	169	219	367	303	688	238	1,080	1,420	1,030	294	147	110
15	162	212	357	290	600	282	1,060	1,360	1,080	282	144	107
16	159	219	382	269	523	277	1,060	1,460	993	273	141	107
17	173	208	393	261	484	257	1,120	1,720	880	265	138	107
18	215	200	372	261	454	250	1,140	1,710	822	257	135	105
19	273	197	367	257	419	250	1,040	1,550	774	250	135	105
20	334	204	388	246	398	261	900	1,510	731	242	129	105
21	261	234	425	238	329	269	794	1,510	697	234	129	105
22	230	298	579	246	311	269	748	1,650	664	230	126	105
23	204	290	1,460	246	343	265	714	1,890	640	223	126	105
24	190	405	1,270	b260	329	265	706	1,740	624	215	126	105
25	234	484	1,110	a280	320	265	740	1,640	572	*212	*124	116
26	238	543	910	a250	303	269	794	1,410	557	208	124	116
27	329	706	756	a220	303	265	812	1,350	543	200	124	107
28	294	600	672	a200	290	265	812	1,240	503	197	144	107
29	265	491	616	a195	-	*277	784	1,060	484	193	144	110
30	250	448	586	a190	-	273	740	960	471	190	141	159
31	230	-	516	*b200	-	269	-	860	-	183	135	-
Total	6,446	10,268	16,185	9,292	13,207	8,075	22,444	42,272	24,132	8,885	4,520	3,434
Mean	208	342	522	300	472	260	748	1,364	804	287	146	114
Cfsm	1.38	2.26	3.46	1.99	3.13	1.72	4.95	9.03	5.32	1.90	0.967	0.755
In.	1.59	2.53	3.99	2.29	3.25	1.99	5.53	10.41	5.94	2.19	1.11	0.85
Ac-ft	12,790	20,370	32,100	18,430	26,200	16,020	44,520	83,850	47,870	17,620	8,970	6,810

Calendar year 1950: Max 1,890 Min 110 Mean 438 Cfsm 2.90 In. 39.37 Ac-ft 316,900  
 Water year 1950-51: Max 2,340 Min 105 Mean 463 Cfsm 3.07 In. 41.67 Ac-ft 335,600

Peak discharge (base, 700 cfs).--Nov. 27 (2 p.m.) 756 cfs (2.49 ft); Dec. 23 (5 p.m.) 1,560 cfs (3.18 ft); Feb. 11 (11 a.m. to 12 m.) 1,370 cfs (3.04 ft); Apr. 17 (10:30 p.m.) 1,200 cfs (2.91 ft); May 11 (7:30 a.m.) 2,490 cfs (3.78 ft); May 17 (9:30 p.m.) 1,890 cfs (3.38 ft); May 23 (8 p.m.) 1,890 cfs (3.40 ft); June 15 (5 a.m.) 1,140 cfs (2.83 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations on nearby streams.

b Stage-discharge relation affected by ice.

Note.--Shifting-control method used June 4 to Aug. 19.



Klickitat River near Glenwood, Wash.

Location.--Lat 46°05'30", long. 121°15'30", in SE $\frac{1}{4}$  sec. 14, T. 7 N., R. 12 E., on left bank half a mile downstream from Dairy Creek, 5 miles north of Glenwood, and 7 miles upstream from Trout Creek.

Drainage area.--360 sq mi.

Records available.--October 1909 to September 1951 (1920-28 incomplete).

Gage.--Water-stage recorder. Datum of gage is about 1,703 ft above mean sea level, datum of 1929. Prior to July 19, 1910, staff gage and July 19 to Dec. 16, 1910, water-stage recorder at site 1 mile upstream at different datum. Dec. 17, 1910, to Nov. 6, 1928, water-stage recorder at site 50 ft downstream at datum 1 ft higher. Nov. 7, 1928, to Sept. 30, 1934, at present site at datum 1 ft higher.

Average discharge.--34 years (1909-20, 1928-51), 827 cfs.

Extremes.--Maximum discharge during year, 3,830 cfs May 11 (gage height, 6.63 ft); minimum, 400 cfs Sept. 28 (gage height, 3.36 ft).

1909-51: Maximum discharge, 9,870 cfs Dec. 22, 1933 (gage height, 7.9 ft, present datum), from rating curve extended above 2,000 cfs; minimum, 204 cfs Nov. 28, 1931.

Remarks.--Records fair. All low-water flow of Hellroaring Creek, a tributary of Big Muddy Creek, is diverted for irrigation. No regulation.

Discharge, in cubic feet per second, water year October 1950 to September 1950

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	441	758	1,190	1,180	773	*879	846	1,780	1,840	1,240	672	460
2	429	832	1,080	1,190	802	848	903	1,780	*1,840	1,190	657	447
3	447	959	1,060	1,140	780	825	983	1,780	1,890	1,190	643	478
4	529	1,090	1,070	1,070	765	832	1,120	2,120	2,000	1,160	643	510
5	582	1,150	1,020	999	736	818	1,240	2,240	2,000	1,080	629	503
6	542	983	1,140	911	714	810	1,320	2,280	1,940	1,020	622	510
7	562	*887	*1,120	903	773	788	1,420	2,420	1,890	983	609	529
8	588	840	1,060	895	919	788	1,520	2,480	1,840	975	602	536
9	568	736	1,130	871	1,570	758	1,620	2,610	1,840	983	602	510
10	693	686	1,160	848	2,240	744	1,620	2,740	1,940	975	595	510
11	722	664	1,150	832	2,480	729	1,620	3,690	2,000	951	588	472
12	616	629	1,150	795	2,240	735	1,720	3,340	2,060	935	582	441
13	582	582	1,110	788	1,940	751	1,940	2,940	2,060	943	582	441
14	555	582	1,100	785	1,720	751	2,180	2,740	2,060	935	582	441
15	536	588	1,070	788	1,570	887	2,180	2,610	2,120	927	582	447
16	516	602	1,240	758	1,420	871	2,240	2,740	2,060	911	555	447
17	548	582	1,280	751	1,370	818	2,280	3,060	1,890	903	555	460
18	636	562	1,190	744	1,280	795	2,360	3,060	1,840	895	548	460
19	818	516	1,190	729	1,240	788	2,240	2,870	1,720	855	542	453
20	879	555	1,240	700	1,180	802	2,060	2,800	1,670	825	536	441
21	736	679	1,240	686	1,110	825	1,940	2,870	1,620	810	542	417
22	657	825	1,520	679	1,070	810	*1,840	3,000	1,570	795	529	417
23	616	810	2,740	672	1,020	795	1,780	3,340	1,520	802	510	412
24	595	1,240	2,540	729	999	795	1,720	3,270	1,470	795	491	412
25	744	1,370	2,280	825	975	810	1,780	3,130	1,420	*780	*497	441
26	672	1,470	2,060	840	927	818	1,890	2,800	1,370	758	491	429
27	959	1,670	1,780	788	903	825	1,940	2,680	1,370	744	478	406
28	911	1,570	1,570	770	879	825	2,000	2,540	1,280	744	548	406
29	825	1,370	1,470	750	-	*840	1,940	2,280	1,280	729	516	435
30	765	1,280	1,370	740	-	832	1,890	2,120	1,280	714	472	848
31	707	-	1,280	744	-	825	-	1,940	-	686	466	-
Total	19,976	27,067	42,600	25,910	34,595	25,018	52,134	82,050	52,680	28,233	17,406	14,119
Mean	644	902	1,374	835	1,228	807	1,738	2,647	1,756	911	561	471
Cfs/m	1.79	2.51	3.82	2.32	3.41	2.24	4.85	7.35	4.88	2.53	1.56	1.31
In.	2.06	2.80	4.40	2.68	3.56	2.58	5.39	8.48	5.44	2.92	1.80	1.46
Ac-ft	39,620	53,690	84,500	51,390	68,220	49,620	103,400	162,700	104,500	56,000	34,520	28,000

Calendar year 1950: Max 3,340 Min 343 Mean 1,093 Cfs/m 3.04 In. 41.21 Ac-ft 791,400  
 Water year 1950-51: Max 3,690 Min 406 Mean 1,155 Cfs/m 3.21 In. 43.56 Ac-ft 836,200

\* Discharge measurement made on this day.

## KLICKITAT RIVER BASIN

Little Klickitat River near Goldendale, Wash.

Location.--Lat 45°51', long. 120°48', in NW¼ sec. 10, T. 4 N., R. 16 E., on right bank just below highway bridge, 2½ miles northeast of Goldendale and 13 miles upstream from mouth. Prior to Feb. 12, 1951, at site 60 ft downstream.

Drainage area.--78 sq mi, approximately.

Records available.--October 1910 to June 1912, October 1946 to September 1951 (discontinued).

Gage.--Staff gage read twice daily. Altitude of gage is 1,688 ft (by altimeter). Prior to July 1, 1912, staff gage on highway bridge at different datum. Oct. 21, 1946, to Feb. 11, 1951, water-stage recorder at site 60 ft downstream at different datum, destroyed by flood of Feb. 11, 1951.

Average discharge.--6 years (1910-11, 1946-51), 71.3 cfs.

Extremes.--Maximum discharge during year not determined, probably occurred Feb. 11 during period of no gage-height record; minimum observed, 2.0 cfs Aug. 22 (gage height, 0.08 ft, present datum).

1910-12, 1946-51: Maximum discharge, 1,760 cfs Jan. 7, 1948 (gage height, 5.55 ft, site and datum then in use), from rating curve extended above 665 cfs; minimum, 0.6 cfs Aug. 28, 1947.

Remarks.--Records good except those for periods of shifting control or no gage-height record, which are fair. Probably small diversions for domestic use and irrigation. No regulation.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 10

Apr. 11 to Sept. 30

1.0	3.9	2.0	66	3.5	486	0.08	2.0	1.0	82
1.2	8.4	2.3	114	4.0	680	.2	6.8	1.2	115
1.4	15.5	2.6	185	4.5	910	.4	18.5	1.4	153
1.7	35	3.0	307	5.0	1,210	.6	34	1.7	223
						.8	56	2.0	310

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.7	47	124	137	120	90	180	133	57	19	6.4	5.9
2	4.8	67	112	232	130	90	180	124	57	20	6.4	5.9
3	5.4	61	146	205	150	85	200	119	55	19	5.4	5.4
4	7.9	62	252	157	160	95	250	128	63	19	5.4	4.2
5	10.5	55	172	131	160	85	300	126	74	22	5.4	4.2
6	8.7	45	228	112	130	85	300	124	66	20	5.4	4.2
7	7.1	40	213	100	200	85	300	128	62	18.5	5.0	4.6
8	7.9	49	219	96	350	85	290	124	58	16.5	4.6	4.6
9	9.0	37	255	91	1,000	80	280	122	55	16.5	4.2	4.2
10	6.8	33	228	86	1,200	80	270	122	55	16	4.2	4.2
11	6.6	32	252	88	1,100	80	265	157	55	15	4.2	4.2
12	6.3	30	237	80	600	80	262	137	55	14.5	4.2	4.2
13	6.1	28	205	100	450	120	277	126	53	13.5	4.2	4.2
14	6.1	26	185	135	350	170	289	112	53	12.5	3.8	3.8
15	7.1	25	167	145	300	250	268	103	50	12	3.4	3.4
16	6.6	30	424	131	250	240	242	105	48	11.5	3.4	3.4
17	9.7	48	387	268	200	230	251	105	44	11	3.4	3.4
18	14.5	48	351	182	170	220	220	108	40	10.5	3.0	3.0
19	15.5	37	310	147	150	210	200	100	38	10.5	2.7	2.7
20	14.5	61	284	127	140	220	175	96	36	9.8	2.7	2.7
21	11	91	284	164	170	240	153	95	34	10.5	2.7	3.4
22	9.7	116	383	147	140	240	139	95	32	9.8	2.4	2.7
23	9.0	110	680	133	150	200	124	98	31	8.8	2.7	2.7
24	8.4	131	543	129	120	200	119	96	30	8.3	5.4	2.7
25	9.4	265	445	400	120	200	113	92	28	8.3	4.2	3.0
26	12	228	355	800	110	220	112	84	26	8.3	3.8	3.4
27	12	207	287	450	100	200	117	81	25	7.3	4.2	3.8
28	32	164	246	300	90	200	182	76	24	7.3	4.6	4.6
29	76	140	210	250	-	200	160	69	22	6.8	5.4	5.9
30	59	140	193	150	-	190	145	64	20	6.4	7.3	10.5
31	38	-	157	150	-	180	-	61	-	6.4	6.8	-
Total	442.3	2,454	8,524	5,924	8,290	4,950	6,343	3,308	1,546	395.5	134.9	125.1
Mean	14.3	81.8	275	191	296	160	211	107	44.9	12.8	4.35	4.17
Ac-ft	877	4,870	16,910	11,750	16,440	9,820	12,580	6,560	2,670	784	268	248
Calendar year 1950: Max	1,050			Min 3.2		Mean 99.5	Ac-ft 72,010					
Water year 1950-51: Max	1,200			Min 2.4		Mean 116	Ac-ft 85,780					

Peak discharge (base, 500 cfs).--Dec. 16 (3:30 p.m.) 581 cfs (3.74 ft); Dec. 23 (1:30 a.m.) 788 cfs (4.23 ft); about Jan. 26 (time and discharge unknown); about Feb. 11 (time and discharge unknown).

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 24 to Apr. 10; discharge estimated on basis of 2 discharge measurements, and records for stations on nearby streams. Shifting-control method used Oct. 1 to Nov. 24, June 27 to Aug. 8.

## Little Klickitat River near Wahkiacus, Wash.

Location.--Lat 45°50'30", long. 121°03'20" (revised), in SE $\frac{1}{4}$  sec. 9, T. 4 N., R. 14 E., on right bank half a mile downstream from Bowman Creek, three-quarters of a mile upstream from mouth, and 2 miles northeast of Wahkiacus.

Drainage area.--276 sq mi.

Records available.--November 1944 to September 1948, October 1950 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 580 ft (by altimeter). Prior to Dec. 29, 1950, staff gage and crest-stage indicator at same site and datum.

Extremes.--Maximum discharge during year, 3,700 cfs Feb. 9 (gage height, 7.5 ft), from rating curve extended above 2,600 cfs; minimum not determined, occurred during period of doubtful gage-height record in October.

1944-48, 1950-51: Maximum discharge observed, 3,980 cfs Jan. 7, 1948 (gage height, 9.4 ft, from high-water mark), from rating curve extended above 650 cfs on basis of velocity-area studies; minimum observed, 17 cfs Aug. 3-6, 11, 16-27, Aug. 29 to Sept. 3, 1945, Aug. 30, 1947.

Remarks.--Records good except those for periods of doubtful or no gage-height record, which are poor. Some small diversions above station for irrigation. No regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.4	23	4.0	430
2.6	44	4.5	681
2.8	72	5.0	1,000
3.0	109	6.0	1,880
3.5	239	7.0	3,020

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	31	*143	500	475	522	366	547	366	*168	75	44	46
2	31	220	450	1,120	547	366	547	346	168	77	44	47
3	35	210	572	740	740	346	598	346	155	75	43	47
4	40	210	800	572	802	366	681	366	168	70	42	44
5	45	170	572	498	802	346	740	387	181	74	42	43
6	40	150	650	430	598	327	740	366	168	77	42	42
7	35	130	600	408	843	327	740	366	168	74	41	43
8	38	175	*572	367	1,080	327	710	366	155	70	41	44
9	42	150	802	566	2,420	308	681	346	143	69	41	44
10	31	115	681	346	*2,650	308	653	346	143	68	41	42
11	33	100	750	346	2,650	300	625	408	143	66	41	43
12	32	95	650	346	1,980	300	598	387	143	62	41	43
13	30	90	580	525	1,500	420	598	346	143	60	42	43
14	30	85	522	653	1,240	550	625	327	131	58	42	42
15	32	85	475	781	1,080	750	625	308	124	57	41	41
16	32	109	1,410	723	867	700	572	290	120	57	40	41
17	37	124	1,240	1,980	802	650	572	290	116	56	40	41
18	55	131	1,000	935	740	600	547	272	111	54	40	40
19	60	120	867	740	653	580	*522	272	109	53	40	38
20	55	200	802	598	625	630	475	256	105	53	40	38
21	45	300	710	1,000	710	*653	430	239	103	54	41	38
22	43	500	1,160	802	572	653	408	239	99	54	40	38
23	40	452	1,590	*710	522	598	387	256	95	52	40	40
24	40	600	1,240	1,240	475	598	366	239	93	*49	*42	40
25	45	800	935	1,880	475	598	346	239	91	48	41	40
26	55	750	867	2,300	430	625	346	224	87	47	41	41
27	64	700	802	1,320	408	598	346	224	87	47	42	42
28	66	650	653	867	366	598	452	209	84	45	47	42
29	230	572	598	681	-	598	430	209	79	47	50	45
30	170	572	572	598	-	572	408	195	77	45	49	53
31	120	-	498	547	-	547	-	181	-	44	49	-
Total	1,682	8,688	24,120	24,914	27,099	15,505	16,315	9,211	3,757	1,837	1,310	1,273
Mean	54.3	290	778	804	968	500	544	297	125	59.3	42.3	42.4
Ac-ft	3,340	17,230	47,840	49,420	53,750	30,750	32,360	18,270	7,450	3,640	2,600	2,520

Calendar year 1950: Max - Min - Mean - Ac-ft -  
 Water year 1950-51: Max 2,650 Min 30 Mean 372 Ac-ft 269,700

Peak discharge (base, 1,600 cfs).--Dec. 16 (9 p.m.) 1,780 cfs (5.88 ft); Dec. 23 (8:15 a.m.) 1,680 cfs (5.76 ft); Jan. 2 (5 p.m.) 1,680 cfs (5.8 ft); Jan. 17 (4:30 a.m.) 3,150 cfs (7.1 ft); Jan. 26 (12:30 a.m.) 2,770 cfs (6.8 ft); Feb. 9 (6 p.m.) 3,700 cfs (7.5 ft).

\* Discharge measurement made on this day.

Note.--Doubtful gage-height record Oct. 3-9, 12-16, 18-21, 23-26, 29-31, Nov. 2-7, 11-15, 19, 24-28, Dec. 1, 2, 4, 6, 7, 11-13; no gage-height record Nov. 8-10, 20-22, Mar. 10-20; discharge estimated on basis of records for stations near Goldendale and Klickitat River near Pitt.

## Klickitat River near Pitt, Wash.

Location.--Lat 45°45', long. 120°12', in SW $\frac{1}{4}$  sec. 8, T. 3 N., R. 13 E., on left bank 3 $\frac{1}{2}$  miles south of Pitt, 5 miles upstream from Silvias Creek, and 7 miles upstream from mouth at Lyle.

Drainage area.--1,290 sq mi, approximately (revised).

Records available.--July 1909 to January 1912, October 1928 to September 1951. Published as "at Klickitat" 1909-12 and as "at Pitt" 1928-35.

Gage.--Water-stage recorder. Altitude of gage is 285 ft (from river-profile map). July 3, 1909, to Jan. 31, 1912, staff gage at Klickitat, just downstream from Snider Creek, 7 miles upstream at different datum. Oct. 1, 1928, to Sept. 30, 1935, staff gage at site 175 ft downstream from highway bridge at Pitt, 3.5 miles upstream from present site at different datum.

Average discharge.--25 years (1909-11, 1928-51), 1,530 cfs.

Extremes.--Maximum discharge during year, 12,400 cfs Feb. 11 (gage height, 9.53 ft); minimum, 770 cfs Oct. 2 (gage height, 4.01 ft).

1909-12, 1928-51: Maximum discharge observed, 21,000 cfs Dec. 22, 1933 (gage height, 12.5 ft, site and datum then in use), from rating curve extended above 3,000 cfs; minimum discharge, 466 cfs Feb. 4, 1937.

Remarks.--Records good. Small diversions above station for irrigation, 73.2 cfs measured in Hellroaring Irrigation Canal on Aug. 25, 1948. No regulation.

Revisions (water years).--W 794: 1934.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	798	1,330	2,680	3,350	2,840	2,280	3,350	3,440	*2,600	1,720	1,090	905
2	770	*1,580	2,360	4,380	3,010	2,210	3,440	3,260	2,600	1,720	1,070	895
3	798	1,580	2,520	4,880	3,620	2,140	3,710	3,260	*2,600	1,650	1,050	905
4	855	1,780	4,080	3,980	3,710	2,140	4,080	3,530	2,760	1,650	1,040	945
5	976	1,850	3,100	3,440	3,710	2,060	4,470	3,890	<u>2,840</u>	1,580	1,030	945
6	935	1,720	3,260	3,100	3,350	2,060	4,570	3,800	2,760	1,500	1,030	935
7	915	1,520	3,260	2,920	3,530	1,990	4,570	3,890	2,680	1,450	1,020	945
8	955	1,650	3,100	2,840	4,880	1,990	4,570	3,980	2,600	1,420	1,010	966
9	955	1,440	*3,440	2,680	*8,790	1,920	4,570	4,080	2,600	1,420	1,010	935
10	976	1,300	3,350	2,600	11,100	1,850	4,470	4,270	2,600	1,400	1,010	935
11	1,150	1,270	3,260	2,520	12,100	1,780	4,270	5,530	2,680	1,360	997	925
12	1,030	1,250	3,180	2,360	10,800	1,780	4,370	5,420	2,760	1,340	997	875
13	966	1,180	3,010	2,600	8,250	2,360	4,470	4,670	2,840	1,340	986	865
14	945	<u>1,160</u>	2,840	3,260	6,700	3,010	4,880	4,180	2,760	1,340	986	865
15	935	1,190	2,760	3,260	5,760	4,900	4,880	3,980	2,840	1,320	986	875
16	895	1,200	4,110	3,310	4,980	4,470	4,780	3,980	2,760	1,300	976	885
17	835	1,780	4,470	7,240	4,470	3,620	4,880	4,270	2,600	1,280	966	885
18	1,030	1,720	4,080	4,470	4,080	3,260	4,880	4,470	2,440	1,280	966	885
19	1,170	1,390	3,890	3,530	3,710	3,100	*4,780	4,180	2,360	1,270	955	875
20	1,390	1,580	3,800	3,100	3,530	3,180	4,370	3,980	2,280	1,240	945	865
21	1,190	1,720	3,710	3,710	3,530	3,350	3,980	3,890	2,210	1,240	945	846
22	1,070	1,990	4,240	3,710	3,260	*3,440	3,710	3,980	2,140	1,220	935	846
23	1,020	2,060	<u>7,980</u>	3,350	3,010	3,260	3,530	4,370	2,060	1,220	925	836
24	966	2,520	7,480	*4,270	2,840	3,180	3,440	4,370	2,060	*1,240	*925	836
25	1,060	<u>3,260</u>	6,460	6,370	2,760	3,260	3,440	4,180	1,990	1,210	925	865
26	1,140	3,100	5,530	7,720	2,520	3,350	3,440	3,800	1,920	1,190	925	855
27	1,270	3,180	4,980	5,420	2,440	3,350	3,530	3,620	1,850	1,160	915	836
28	1,580	3,010	4,470	3,980	<u>2,280</u>	3,350	3,980	3,530	1,780	1,150	966	826
29	1,650	2,680	4,180	3,350	-	3,350	3,800	3,180	1,780	1,150	977	846
30	1,530	2,680	3,980	3,180	-	3,350	3,620	2,920	<u>1,720</u>	1,130	925	1,190
31	1,280	-	3,260	2,920	-	3,260	-	<u>2,760</u>	-	<u>1,100</u>	915	-
Total	33,125	55,670	123,160	117,800	135,560	88,600	124,830	122,660	72,470	41,590	30,398	26,893
Mean	1,069	1,856	3,973	3,800	4,841	2,858	4,161	3,957	2,416	1,342	981	896
Cfsm	0.829	1.44	3.08	2.95	3.75	2.22	3.23	3.07	1.87	1.04	0.760	0.695
In.	0.95	1.60	3.55	3.40	3.91	2.55	3.60	3.54	2.09	1.20	0.88	0.78
Ac-ft	65,700	110,400	244,300	233,700	268,900	175,700	247,600	243,300	143,700	82,490	60,290	53,340

Calendar year 1950: Max 8,170 Min 762 Mean 2,332 Cfsm 1.81 In. 24.54 Ac-ft 1,689,000  
 Water year 1950-51: Max 12,100 Min 770 Mean 2,665 Cfsm 2.07 In. 28.05 Ac-ft 1,929,000

Peak discharge (base, 4,000 cfs).--Dec. 4 (4:30 a.m.) 4,780 cfs (6.63 ft); Dec. 16 (6:30 p.m.) 4,980 cfs (6.74 ft); Dec. 23 (9 p.m.) 8,250 cfs (8.11 ft); Jan. 2 (11 p.m.) 5,760 cfs (7.13 ft); Jan. 17 (5 a.m.) 9,350 cfs (8.50 ft); Jan. 26 (4 a.m.) 9,070 cfs (8.36 ft); Feb. 4 (8 p.m.) 4,270 cfs (6.40 ft); Feb. 11 (6:30 p.m.) 12,400 cfs (9.53 ft); Mar. 15 (3:30 p.m.) 6,700 cfs (7.64 ft); Apr. 14 (9 a.m.) 4,980 cfs (6.87 ft); Apr. 29 (7:30 a.m.) 4,680 cfs (6.45 ft); May 11 (3:30 to 6:30 p.m.) 5,990 cfs (7.38 ft).

\* Discharge measurement made on this day.

Green Point Creek below North Fork, near Dee, Oreg.

Location--Lat 45°35'20", long. 121°39'30", in NE $\frac{1}{4}$  sec. 11, T. 1 N., R. 9 E., on left bank three-quarters of a mile upstream from mouth,  $1\frac{1}{4}$  miles downstream from North Fork, and  $1\frac{1}{2}$  miles west of Dee.

Drainage area--20.0 sq mi.

Records available--August 1949 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 1,080 ft above mean sea level (from topographic map).

Extremes--Maximum discharge during year, 888 cfs Feb. 9 (gage height, 3.58 ft); minimum, 12 cfs Sept. 18-24.

1949-51: Maximum discharge, 1,270 cfs Feb. 24, 1950; minimum, that of Sept. 18-24, 1951.

Remarks--Records good except those for period of no gage-height record, which are fair.

Several diversions above station for irrigation of lands below station; largest is Hood River Irrigation canal (Low Line ditch) which diverted about 20 cfs during the 1951 irrigation season.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 22

Dec. 23 to Sept. 30

0.7	24	2.0	264	0.5	12	1.5	127
.9	41	2.5	439	.6	16	2.0	231
1.2	66	3.0	664	.7	22	2.5	380
1.5	140			1.0	54	3.3	720

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	28	*508	152	171	121	81	108	147	a85	35	20	14
2	27	554	130	261	157	78	116	147	a85	33	20	14
3	31	363	138	269	169	75	140	141	a85	33	20	14
4	45	244	318	196	155	76	187	177	*89	34	19	14
5	93	188	252	157	141	76	203	185	89	35	19	14
6	188	144	264	134	140	75	200	183	110	33	18	14
7	118	134	315	121	200	71	203	185	96	32	18	14
8	105	142	230	111	342	71	194	177	86	30	17	14
9	94	115	196	104	720	69	187	175	79	30	17	14
10	81	105	172	100	575	68	171	187	76	28	17	14
11	78	96	176	96	655	67	165	234	75	27	17	14
12	65	86	*178	90	470	*89	173	196	71	26	17	14
13	56	80	160	158	321	102	219	165	68	26	17	13
14	50	76	146	300	242	100	239	147	67	26	17	13
15	48	78	167	205	194	270	212	138	65	26	17	13
16	46	98	232	185	165	207	203	a150	62	26	16	13
17	64	115	222	297	149	149	214	a160	58	26	16	13
18	101	115	196	186	134	127	205	a140	55	*25	16	12
19	156	98	196	151	122	119	169	a130	54	25	16	12
20	174	150	213	132	116	121	143	a130	50	25	15	12
21	120	302	208	151	108	136	127	a130	49	25	15	12
22	98	346	440	*136	104	125	121	a140	48	25	15	12
23	84	273	585	127	99	113	*116	a150	46	23	14	12
24	76	592	390	300	96	108	114	a150	44	22	14	12
25	96	489	297	440	92	111	119	a170	43	22	14	*14
26	106	374	239	502	89	122	127	a140	42	21	14	14
27	182	382	226	315	85	119	149	a120	39	21	15	13
28	432	270	291	214	82	114	217	a110	38	21	17	13
29	489	200	288	169	-	119	192	a100	36	21	16	16
30	292	172	253	149	-	114	159	a95	35	20	15	34
31	203	-	198	131	-	106	-	a90	-	20	15	-
Total	3,826	6,889	7,468	6,068	6,043	3,358	5,092	4,689	1,925	820	513	421
Mean	123	230	241	196	218	108	170	151	64.2	26.5	16.5	14.0
Ac-ft	7,590	13,660	14,810	12,040	11,990	6,660	10,100	9,300	3,820	1,630	1,020	835

Calendar year 1950: Max 981 Mln 19 Mean 147 Ac-ft 106,300  
 Water year 1950-51: Max 720 Mln 12 Mean 129 Ac-ft 93,460

Peak discharge (base, 850 cfs)--Feb. 9 (5:30 p.m.) 888 cfs (3.58 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for West Fork Hood River near Dee.

## West Fork Hood River near Dee, Oreg.

Location.--Lat 45°36'00", long. 121°38'20", in SE $\frac{1}{4}$  sec. 1, T. 1 N., R. 9 E., on left bank a quarter of a mile upstream from Dead Point Creek, half a mile upstream from mouth, and 1 mile northwest of Dee.

Drainage area.--96 sq mi, approximately.

Records available.--September 1913 to February 1916 (incomplete), June 1932 to September 1951.

Gage.--Water-stage recorder. Datum of age is 802.08 ft above mean sea level, datum of 1929. Prior to Feb. 12, 1916, staff gage at site half a mile upstream at different datum.

Average discharge.--19 years (1932-51), 538 cfs.

Extremes.--Maximum discharge during year, 4,610 cfs Dec. 22 (gage height, 7.57 ft); minimum, 140 cfs Sept. 22, 24 (gage height, 1.45 ft).

1913-14, 1932-51: Maximum discharge, 12,900 cfs Dec. 22, 1933 (gage height, 12.4 ft), from rating curve extended above 5,000 cfs; minimum, 93 cfs Aug. 22, 1941 (gage height, 1.37 ft).

Remarks.--Records good. Diversions above station for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 15				Mar. 16 to Sept. 30			
1.6	179	4.0	1,220	1.4	129		
2.0	288	5.0	1,940	2.0	280		
3.0	665	7.0	3,900	3.0	660		
				4.0	1,220		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	207	*2,280	782	980	705	476	594	728	462	286	199	157
2	202	2,730	675	1,940	919	456	625	748	458	280	199	154
3	227	1,710	725	1,430	1,050	456	748	710	478	280	196	152
4	336	1,200	1,600	1,190	936	480	952	952	*454	295	194	152
5	520	990	1,280	974	864	460	1,020	963	474	280	191	154
6	782	770	1,460	826	963	449	1,020	936	510	292	189	157
7	629	710	1,630	735	1,400	437	1,030	902	470	268	189	161
8	616	730	1,210	685	2,000	430	990	836	442	253	189	168
9	540	604	1,040	608	*3,500	422	941	826	434	253	189	161
10	480	548	908	580	2,940	408	692	924	446	253	184	159
11	460	516	*941	556	3,510	393	870	1,110	434	256	184	152
12	393	488	936	528	2,640	*411	908	936	430	253	182	152
13	355	456	848	1,040	1,780	568	1,060	814	434	250	179	152
14	336	445	760	1,660	1,350	544	1,130	710	418	259	177	150
15	319	456	848	1,200	1,140	1,250	1,050	655	414	250	177	152
16	304	568	1,100	1,150	980	1,140	1,020	710	396	247	179	152
17	418	814	1,040	1,920	875	853	1,020	787	375	247	174	154
18	508	770	936	1,210	798	721	980	716	368	*247	174	154
19	875	612	985	968	720	660	842	655	345	236	174	152
20	914	958	1,050	820	690	655	721	640	342	228	177	148
21	642	1,460	1,010	985	647	721	650	660	352	222	177	144
22	536	1,410	2,580	*886	616	670	598	705	345	222	174	148
23	445	1,200	3,020	864	580	610	*574	614	329	222	172	148
24	422	2,560	1,850	1,880	560	590	570	809	313	222	170	148
25	512	2,160	1,420	2,420	548	602	578	902	310	219	165	162
26	556	1,610	1,210	2,600	524	665	608	721	310	212	165	159
27	745	1,570	1,130	1,830	500	655	685	650	301	209	*165	150
28	1,660	1,170	1,570	1,170	492	635	1,000	590	289	212	199	152
29	2,110	958	1,440	985	-	660	924	534	292	206	172	199
30	1,360	860	1,320	848	-	640	787	502	289	201	165	446
31	1,020	-	1,070	765	-	594	-	478	-	199	161	-
Total	19,429	33,333	36,354	36,013	34,227	16,711	25,365	23,621	11,714	7,559	5,581	4,969
Mean	627	1,111	1,237	1,182	1,122	504	846	752	390	244	180	166
Ac-ft	38,540	66,120	76,070	71,430	67,890	37,110	50,350	46,850	23,230	14,990	11,070	9,860
Calendar year 1950: Max			5,160		Min 172		Mean 792		Ac-ft 573,500			
Water year 1950-51: Max			3,510		Min 144		Mean 709		Ac-ft 513,500			

Peak discharge (base, 4,100 cfs).--Dec. 22 (9 p.m.) 4,610 cfs (7.57 ft).

\* Discharge measurement made on this day.

Pacific Power & Light Co.'s conduit near Hood River, Oreg.

Location.--Lat 45°42'20", long. 121°30'20", in NE¼ sec. 36, T. 3 N., R. 10 E., at Pacific Power & Light Co.'s plant on Hood River, half a mile southeast of town of Hood River.

Records available.--October 1913 to September 1914, January 1916 to September 1951.

Gage.--Venturi and electrical-output meter in powerhouse. Venturi meter read hourly. Prior to July 1922, in tailrace of former plant.

Average discharge.--29 years (1922-51), 375 cfs.

Extremes.--1913-14, 1916-51: Maximum daily discharge, 500 cfs Dec. 21, 1945, Jan. 19, 1946; no flow at times.

Remarks.--Records excellent. Discharge computed from relation between flow in conduit and output of powerplant, based on discharge measurements. Pacific Power & Light Co.'s conduit diverts from Hood River in SE¼ sec. 11, T. 2 N., R. 10 E., just below Neal Creek. Water is diverted around station on Hood River near town of Hood River and returned to river in NE¼ sec. 36, T. 3 N., R. 10 E.

Cooperation.--Venturi meter readings and record of daily electrical output furnished by Pacific Power & Light Co.

Revisions (water years).--W 864: 1937.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	473	472	486	488	485	483	492	488	469	486	453	341
2	480	458	486	480	464	483	491	486	473	489	444	328
3	482	463	489	466	470	470	488	490	475	490	439	318
4	480	482	480	480	480	473	486	486	474	491	439	308
5	477	489	482	490	490	484	485	491	475	491	429	307
6	471	488	480	491	490	495	485	488	477	491	415	310
7	479	489	478	487	485	495	486	493	479	492	405	328
8	489	487	481	487	480	495	486	488	479	488	412	384
9	487	488	483	466	495	481	491	481	481	171	406	358
10	484	489	485	480	461	495	296	489	483	0	400	361
11	484	488	483	480	478	495	388	484	486	0	405	350
12	486	488	473	484	480	495	469	480	486	0	404	350
13	485	486	483	485	483	495	481	476	487	0	394	346
14	484	487	481	456	485	494	477	472	489	0	370	345
15	483	486	480	479	485	488	475	471	488	0	376	353
16	482	486	478	491	486	476	478	467	486	0	386	362
17	484	475	476	478	486	490	485	472	485	0	378	380
18	480	472	476	475	487	492	485	476	482	0	376	383
19	469	478	475	486	485	489	482	477	480	0	391	362
20	489	480	474	496	486	488	493	477	482	52	394	358
21	490	474	477	493	485	488	495	475	482	452	396	336
22	496	472	480	490	481	488	494	472	481	459	398	332
23	495	476	427	494	483	490	*495	474	482	475	395	334
24	494	461	466	490	484	489	496	468	481	492	364	327
25	489	466	488	478	482	490	498	464	482	484	353	412
26	487	471	463	477	483	489	497	464	483	487	348	396
27	485	479	479	480	484	489	497	465	482	484	*344	350
28	479	486	491	477	482	489	483	461	485	477	321	79
29	477	485	488	475	-	493	488	463	486	462	396	472
30	481	486	487	462	-	492	487	464	486	446	364	474
31	*480	-	487	463	-	493	-	464	-	444	353	-
Total	14,982	14,387	14,824	14,921	13,456	15,161	14,329	14,776	14,444	9,263	12,248	10,244
Mean	483	480	478	481	481	489	478	477	481	299	395	341
Ac-ft	29,720	28,540	29,400	29,600	26,690	30,070	28,420	29,310	28,650	18,370	24,290	20,320
Calendar year 1950:	Max 496			Min 0		Mean 416		Ac-ft 301,300				
Water year 1950-51:	Max 498					Mean 447		Ac-ft 323,400				

\* Discharge measurement made on this day.

## HOOD RIVER BASIN

## Hood River near Hood River, Oreg.

Location.--Lat 45°42'00", long. 121°30'40", in SE $\frac{1}{4}$  sec. 36, T. 3 N., R. 10 E., on right bank at Powderdale, a quarter of a mile upstream from Pacific Power & Light Co.'s plant and three-quarters of a mile south of town of Hood River.

Drainage area.--329 sq mi.

Records available.--March 1913 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 106.23 ft above mean sea level, datum of 1929. Prior to Nov. 14, 1934, at site 220 ft upstream at same datum.

Average discharge.--38 years, 1,071 cfs (including flow of Pacific Power & Light Co.'s conduit).

Extremes.--Maximum discharge during year (river only), 7,760 cfs Dec. 23 (gage height, 5.84 ft); minimum, 46 cfs Aug. 4; minimum daily (including discharge of Pacific Power & Light Co.'s conduit), 370 cfs Sept. 5.

1913-51: Maximum discharge, 34,000 cfs Jan. 6, 1923 (gage height, 11.1 ft, site then in use), no diversion by power conduit; minimum, 3 cfs Aug. 9, 1926; minimum daily (including discharge of Pacific Power & Light Co.'s conduit), 165 cfs Aug. 5, 1941.

Remarks.--Records good. Daily discharge regulated by pondage at sawmill at Dee and by Pacific Power & Light Co.'s conduit, which diverts water around gage.

Cooperation.--Water-stage recorder inspected by employees of Pacific Power & Light Co.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 1				Nov. 2 to Sept. 30			
2.0	455	3.5	1,600	0.4	42	2.5	770
2.5	750	4.0	2,250	.7	74	3.0	1,180
3.0	1,120	4.5	3,170	1.0	124	4.0	2,430
Note.--Same as following table below 2.0 ft.				1.5	254	5.3	5,700
				2.0	455		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	2,500	1,260	1,560	1,310	822	981	1,020	598	288	51	56
2	52	1,700	1,040	2,630	1,600	763	1,000	1,040	578	261	50	59
3	118	2,430	*1,110	2,640	1,930	756	1,120	989	572	257	48	59
4	325	1,860	2,400	2,030	1,680	845	1,390	1,330	610	278	50	63
5	602	1,380	1,930	1,660	1,590	778	1,520	1,420	*610	239	50	63
6	1,010	1,080	2,430	1,420	1,720	735	1,520	1,350	707	233	51	63
7	848	973	2,570	1,270	2,620	679	1,580	1,320	504	178	50	64
8	737	1,080	1,950	1,150	3,370	866	1,510	1,240	553	160	52	63
9	625	808	1,710	1,060	*5,670	644	1,500	1,220	553	482	54	62
10	516	693	1,520	*989	5,110	610	1,580	1,340	591	665	56	64
11	549	617	*1,560	941	5,700	578	1,470	1,760	591	665	55	64
12	408	572	1,560	861	4,720	624	1,440	1,490	598	651	55	62
13	333	517	1,390	1,380	3,400	*997	1,620	1,280	624	644	53	61
14	298	465	1,290	2,750	2,700	985	1,800	1,140	624	658	59	61
15	264	500	1,340	2,120	2,340	2,260	1,670	1,070	679	644	59	59
16	230	700	1,960	1,890	1,990	2,100	1,590	1,100	604	*672	56	61
17	378	1,410	1,670	*3,810	1,810	1,560	1,600	1,260	541	672	56	63
18	652	1,220	1,510	2,400	1,620	1,320	1,590	1,160	490	693	73	63
19	1,090	877	1,500	1,850	1,470	1,200	1,390	1,040	441	651	62	59
20	1,160	1,410	1,650	1,540	1,400	1,180	1,220	997	422	520	59	59
21	744	1,920	1,540	2,030	1,330	1,270	1,080	1,010	417	124	59	59
22	544	1,820	2,740	1,810	1,210	1,210	997	1,080	422	107	59	60
23	436	1,590	5,370	*1,620	1,130	1,110	917	1,280	391	114	58	61
24	378	*3,150	3,210	2,850	1,070	1,040	*861	1,280	391	107	54	64
25	490	3,060	2,560	3,660	1,020	1,040	861	1,400	341	91	55	72
26	538	2,300	2,130	*4,380	965	1,090	877	1,180	337	75	58	61
27	827	2,200	2,030	2,190	909	1,070	973	1,060	325	70	59	253
28	1,740	1,700	2,370	1,880	861	1,040	1,380	973	288	77	*64	324
29	2,430	1,390	2,510	1,750	-	1,070	1,290	808	285	72	56	90
30	1,530	1,350	2,100	1,580	-	1,060	1,100	707	281	62	56	665
31	*1,170	-	1,770	1,410	-	981	-	630	-	59	56	-
Total	21,088	45,282	61,480	61,111	62,245	32,083	39,427	35,974	15,068	10,469	1,733	2,937
Mean	690	1,509	1,983	1,971	2,223	1,035	1,314	1,160	502	338	55.9	97.9
Ac-ft	41,830	89,620	121,900	121,200	123,500	63,640	78,200	71,350	29,890	20,760	3,440	5,850

Adjusted for Pacific Power & Light Co.'s conduit near Hood River

Mean	1,164	1,989	2,461	2,453	2,704	1,524	1,792	1,637	984	637	451	439
Ac-ft	71,550	118,400	151,300	150,800	150,200	93,710	106,600	100,700	58,540	39,130	27,730	26,150

Observed

Calendar year 1950: Max	8,400	Min	40	Mean	1,214	Ac-ft	878,600
Water year 1950-51: Max	5,700	Min	48	Mean	1,065	Ac-ft	771,400

Adjusted

Calendar year 1950: Mean	1,630	Ac-ft	1,180,000
Water year 1950-51: Mean	1,512	Ac-ft	1,095,000

Peak discharge (base, 4,200 cfs).--Nov. 2 (2 a.m.) 4,900 cfs (5.05 ft); Nov. 25 (1:30 a.m.) 4,240 cfs (4.82 ft); Dec. 23 (2 a.m.) 7,760 cfs (5.84 ft); Jan. 17 (5:30 a.m.) 5,210 cfs (5.15 ft); Jan. 26 (6 a.m.) 5,440 cfs (5.22 ft); Feb. 9 (4 to 5 p.m.) 6,510 cfs (5.53 ft).

\* Discharge measurement made on this day.



## White Salmon River near Underwood, Wash.

Location.--Lat 45°45'00", long. 121°31'30", in NW¼ sec. 14, T. 3 N., R. 10 E., on right bank 300 ft downstream from bridge, 1,000 ft downstream from Northwestern Electric Co's Condit powerplant, and 2 miles north of Underwood and mouth.

Drainage area.--390 sq mi (revised), approximately.

Records available.--October 1912 to February 1913, March 1915 to September 1930, September 1935 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 150 ft (from river-profile map). Prior to March 1913, reference point at dam, 1 mile upstream at different datum. March 1915 to July 16, 1918, water-stage recorder at site 200 ft upstream at datum 3.24 ft higher. July 17, 1918, to Sept. 30, 1930, water-stage recorder at site 200 ft upstream at datum 2.24 ft higher than present datum.

Average discharge.--31 years (1915-30, 1935-51), 1,067 cfs.

Extremes.--Maximum discharge during year, 6,240 cfs Feb. 11 (gage height, 8.29 ft); minimum, 101 cfs Aug. 1 (gage height, 2.07 ft); minimum daily, 662 cfs Aug. 5. 1915-30, 1935-51: Maximum discharge, 9,700 cfs Dec. 29, 1917 (gage height, 9.5 ft, site and datum then in use); practically no flow at times when powerplant is shut down.

Remarks.--Records good except those for periods of shifting control, which are fair. Water diverted to irrigate about 4,000 acres in the Trout Lake area. Low and medium flow regulated by powerplant of the Northwestern Electric Co.

Revisions (water years).--W 484: 1915-17.

Rating table, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

3.6	624	5.5	2,310
4.0	875	6.0	2,900
4.5	1,280	7.0	4,230
5.0	1,770	8.0	5,760

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	740	1,470	1,920	2,210	1,900	1,740	1,860	1,790	1,640	1,250	916	836
2	768	*1,810	1,800	2,470	1,950	1,680	1,860	1,770	1,600	1,250	943	894
3	791	1,740	1,840	2,760	2,130	1,660	1,960	1,730	1,590	1,250	890	774
4	941	1,630	2,440	2,520	2,080	1,710	2,090	1,980	*1,600	1,210	852	808
5	965	1,550	2,480	2,350	2,050	1,640	2,140	2,130	1,660	1,200	862	786
6	1,150	1,430	2,340	2,140	1,990	1,650	2,140	2,140	1,710	1,160	1,090	816
7	996	1,390	2,310	2,050	2,120	1,590	2,140	2,130	1,710	1,140	860	829
8	963	1,380	2,240	1,970	2,550	1,590	2,130	2,140	1,650	1,140	834	821
9	942	1,350	*2,230	1,890	3,920	1,540	2,160	2,170	1,630	1,140	876	692
10	882	1,250	2,230	1,850	4,810	1,530	2,140	2,230	1,620	1,120	845	778
11	965	1,180	2,180	1,830	*5,580	1,470	2,070	2,470	1,640	1,100	829	766
12	1,010	1,100	2,170	1,720	5,090	1,510	2,070	2,480	1,640	1,100	801	755
13	854	1,090	2,090	1,820	4,150	1,590	2,130	2,340	1,670	1,110	827	728
14	850	1,050	2,040	2,020	3,450	1,670	2,230	2,210	1,670	1,100	803	764
15	803	1,070	2,000	2,060	3,070	2,290	2,240	2,140	1,680	1,040	785	762
16	826	1,050	2,410	2,080	2,800	2,240	2,230	2,120	1,650	1,030	811	720
17	860	1,200	2,610	2,610	2,620	2,120	2,230	2,180	1,580	1,010	840	757
18	910	1,230	2,460	2,340	2,470	1,980	2,240	2,230	1,560	964	804	746
19	1,080	1,190	2,340	2,160	2,350	1,920	2,170	2,130	1,520	995	806	734
20	1,140	1,100	2,290	1,980	2,280	1,920	2,020	2,050	1,490	980	811	722
21	1,070	1,440	2,340	2,200	2,180	2,020	*1,900	2,040	1,470	980	802	729
22	953	1,940	2,780	2,060	2,080	*2,000	1,830	2,070	1,430	932	815	728
23	842	2,010	4,600	1,960	2,000	1,940	1,770	2,140	1,390	958	*822	666
24	897	2,330	4,170	*2,140	1,910	1,900	1,740	2,210	1,400	869	874	703
25	907	2,560	3,480	2,620	1,920	1,680	1,730	2,230	1,370	956	846	698
26	973	2,420	3,030	3,060	1,850	1,940	1,740	2,100	1,320	*959	831	710
27	1,170	2,350	2,780	2,840	1,800	1,920	1,800	2,000	1,320	954	848	721
28	1,580	2,220	2,660	2,390	1,770	1,910	1,980	1,960	1,310	910	810	671
29	1,550	2,000	2,520	*2,200	-	1,890	1,920	1,870	1,290	922	937	802
30	1,380	1,970	2,490	2,040	-	1,900	1,870	1,770	1,290	926	850	928
31	1,550	-	2,340	1,980	-	1,860	-	1,720	-	942	845	-
Total	31,108	47,500	77,610	68,280	74,910	56,200	60,530	64,650	46,100	32,717	26,165	22,824
Mean	1,003	1,583	2,504	2,203	2,675	1,813	2,018	2,085	1,537	1,055	844	761
Ac-ft	61,700	94,210	153,900	135,400	148,600	111,500	120,100	128,200	91,440	64,890	51,900	45,270
Calendar year 1950: Max	4,600					Min 158	Mean 1,620	Ac-ft 1,173,000				
Water year 1950-51: Max	5,580					Min 662	Mean 1,667	Ac-ft 1,207,000				

\* Discharge measurement made on this day.

Note.--Shifting-control method used Dec. 25 to Feb. 9, Mar. 25 to Sept. 30.

## Little White Salmon River at Willard, Wash.

Location.--Lat 45°47'00", long. 121°37'30", in NW¼ sec. 1, T. 3 N., R. 9 E., on right bank a quarter of a mile downstream from Lava Creek, at Willard.

Drainage area.--117 sq mi.

Records available.--November 1903 to August 1906 (fragmentary), December 1944 to September 1951. Published as "below Lava Creek, near Cooks" 1903-6.

Gage.--Water-stage recorder. Altitude of gage is 1,230 ft (from topographic map). Prior to Aug. 6, 1906, non-recording gage near present site.

Average discharge.--6 years (1945-51), 476 cfs.

Extremes.--Maximum discharge during year, 2,700 cfs Feb. 11 (gage height, 8.36 ft); minimum, 37 cfs Sept. 23 (gage height, 1.73 ft).  
1903-6, 1944-51: Maximum discharge, 4,140 cfs Dec. 15, 1946 (gage height, 9.50 ft), from rating curve extended above 2,500 cfs; minimum, 8.3 cfs Oct. 26, 1946.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Broughton Lumber Co. diversion may at times carry as much as 30 cfs past this station (see miscellaneous measurements at end of this volume). Other diversions above station for water supply, irrigation, and hatchery purposes. No regulation.

Rating table, water year 1950-51 (gage height, in feet, discharge, in cubic feet per second)

1.8	42	5.0	594
2.0	57	6.0	860
2.4	95	7.0	1,340
3.0	175	8.3	2,580
4.0	563		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	88	836	830	1,200	771	642	606	558	475	396	260	120
2	82	960	760	1,300	800	618	618	546	475	396	250	111
3	84	*800	760	1,500	890	606	691	546	486	396	250	107
4	93	691	1,050	1,400	860	594	830	558	*486	396	241	101
5	128	618	1,050	1,300	800	582	860	570	486	396	236	96
6	158	582	1,000	1,250	771	570	830	558	498	396	230	94
7	153	558	980	1,150	800	546	830	558	486	396	223	92
8	123	534	960	1,100	1,100	546	800	546	486	385	218	90
9	114	522	940	1,050	2,130	522	800	546	486	385	211	87
10	106	500	*920	980	2,240	510	771	546	486	374	206	84
11	102	480	880	960	*2,580	498	744	546	486	374	201	81
12	96	470	880	940	2,240	498	744	534	475	374	196	80
13	93	460	840	960	1,740	510	771	522	475	363	192	76
14	94	450	830	1,050	1,410	510	800	510	464	363	187	73
15	97	450	830	1,020	1,270	691	771	498	464	352	181	70
16	99	480	900	1,020	1,150	744	744	498	452	352	176	66
17	110	530	980	1,250	1,050	666	717	498	440	342	169	63
18	140	510	950	1,100	1,000	618	717	498	440	342	165	67
19	198	480	920	1,020	920	594	691	486	429	332	160	64
20	260	500	920	1,020	890	582	*642	486	429	332	154	57
21	206	700	950	940	830	618	642	486	418	321	151	71
22	181	1,100	1,080	900	800	642	606	486	418	321	146	78
23	167	1,150	2,000	860	771	*618	594	486	407	310	*144	64
24	160	1,400	1,650	920	744	606	594	486	407	310	140	50
25	176	1,400	1,400	1,050	717	606	582	486	407	300	136	52
26	230	1,250	1,300	*1,480	691	606	582	475	396	*290	132	48
27	352	1,200	1,250	1,340	666	606	594	475	396	290	129	46
28	642	990	1,280	1,100	642	606	642	475	396	280	132	46
29	744	880	1,280	920	-	606	606	475	396	280	126	51
30	582	840	1,250	860	-	618	582	475	396	270	124	80
31	510	-	1,200	800	-	618	-	475	-	270	119	-
Total	6,368	22,331	32,800	33,740	31,273	18,397	21,001	15,888	13,441	10,684	5,585	2,265
Mean	205	744	1,058	1,088	1,117	593	700	513	448	345	180	75.5
Ac-ft	12,630	44,290	65,060	66,920	62,030	36,490	41,650	31,510	26,660	21,190	11,080	4,490

Calendar year 1950: Max 2,350 Min 82 Mean 645 Ac-ft 466,800  
Water year 1950-51: Max 2,580 Min 46 Mean 586 Ac-ft 424,000

Peak discharge (base, 1,600 cfs).--Probably Dec. 23 (time and discharge unknown); Feb. 11 (2 p.m.) 2,700 cfs (8.36 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 10 to Dec. 9, Dec. 11 to Jan. 25; discharge estimated on basis of records for nearby stations.

Little White Salmon River below Lapham Creek, near Willard, Wash.

Location.--Lat 45°46'00", long. 121°37'40", in NW¼ sec. 12, T. 3 N., R. 9 E., on right bank 0.3 mile downstream from mouth of Lapham Creek and 1.2 miles south of Willard.

Drainage area.--123 sq mi.

Records available.--September 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 980 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,540 cfs Feb. 11 (gage height, 5.29 ft); minimum, 102 cfs Sept. 23 (gage height, 1.61 ft).  
1949-51: Maximum discharge, 2,540 cfs Feb. 24, 1950, Feb. 11, 1951; maximum gage height, 5.32 ft Feb. 24, 1950; minimum discharge, 91 cfs Nov. 7, 1949 (gage height, 1.55 ft).

Remarks.--Records good. Broughton Lumber Co. diversion may at times carry as much as 30 cfs past station (see miscellaneous measurements at end of this volume). Other diversions above station for water supply, irrigation, and hatchery purposes. Possibly some regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.6	100	3.0	562
2.0	192	4.0	1,140
2.5	352	5.2	2,400

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	147	913	940	1,260	880	712	712	645	539	443	239	179
2	144	1,180	880	1,440	910	686	739	620	539	458	296	166
3	142	*970	880	1,680	1,040	686	822	610	*544	438	232	166
4	152	851	1,220	1,580	1,000	660	1,000	645	548	438	285	161
5	176	739	1,220	1,480	910	655	1,040	635	553	438	282	156
6	209	686	1,140	1,390	880	640	1,000	630	557	443	276	154
7	206	650	1,100	1,300	910	620	1,040	620	557	438	269	154
8	179	630	1,100	1,260	1,180	620	970	610	553	430	266	152
9	171	805	1,070	1,180	2,020	600	940	605	555	422	260	152
10	166	586	*1,040	1,100	*2,080	591	910	605	553	418	256	149
11	164	576	1,040	1,070	2,400	576	880	615	553	414	250	144
12	159	567	1,000	1,000	2,080	576	880	600	544	410	247	142
13	156	553	1,000	1,070	1,680	591	910	591	539	402	238	140
14	156	544	970	1,220	1,530	596	940	581	530	402	232	133
15	159	548	940	1,180	1,390	851	910	572	521	394	229	131
16	159	576	1,070	1,140	1,300	910	880	572	512	390	226	129
17	166	615	1,100	1,440	1,220	766	851	567	503	382	220	129
18	187	596	1,070	1,300	1,140	739	822	567	494	375	217	129
19	229	572	1,040	1,180	1,100	686	794	557	485	371	212	127
20	316	596	1,040	1,070	1,070	686	*739	553	481	363	209	122
21	272	940	1,100	1,070	1,000	739	712	548	472	360	203	140
22	238	1,280	1,390	1,000	940	739	686	548	468	356	200	142
23	223	1,260	2,200	940	880	*712	686	553	464	352	198	129
24	217	1,530	1,840	1,040	851	712	686	548	464	345	192	114
25	223	1,580	1,630	1,300	822	712	660	544	455	338	189	116
26	269	1,390	1,440	1,580	766	712	660	539	451	*330	184	112
27	360	1,300	1,390	*1,440	739	712	686	534	443	323	182	110
28	686	1,180	1,390	1,220	739	712	739	534	443	316	184	110
29	940	1,040	1,390	1,070	-	712	712	534	447	313	182	118
30	712	970	1,390	970	-	739	660	539	443	309	*176	149
31	605	-	1,340	910	-	712	-	539	-	306	176	-
Total	8,288	26,003	37,360	37,880	33,457	21,360	24,666	17,960	15,208	11,897	7,127	4,155
Mean	267	867	1,205	1,222	1,195	689	822	579	507	384	230	138
Ac-ft	16,440	51,580	74,100	75,130	66,360	42,370	48,920	35,620	30,160	23,600	14,140	8,240
Calendar year 1950: Max				2,200	Min	142	Mean	721	Ac-ft	522,100		
Water year 1950-51: Max				2,400	Min	110	Mean	672	Ac-ft	486,700		

Peak discharge (base, 1,500 cfs).--Nov. 25 (1:30 a.m.) 1,630 cfs (4.62 ft); Dec. 23 (8 a.m.) 2,400 cfs (5.24 ft); Jan. 3 (6 a.m.) 1,680 cfs (4.62 ft); Jan. 26 (10 to 11 a.m.) 1,630 cfs (4.55 ft); Feb. 11 (10 a.m.) 2,540 cfs (5.29 ft).

\* Discharge measurement made on this day.

Wind River above Trout Creek, near Carson, Wash.

Location.--Lat 45°46'30", long. 121°54'30", in NE $\frac{1}{4}$  sec. 26, T. 4 N., R. 7 E., on left bank 30 ft below bridge, three-quarters of a mile upstream from mouth of Trout Creek, and 7 miles northwest of Carson.

Drainage area.--108 sq mi.

Records available.--October 1944 to September 1951.

Gage.--Staff gage and crest-stage indicator; gage read twice daily. Altitude of gage is 850 ft (from topographic map).

Average discharge.--7 years, 577 cfs.

Extremes.--Maximum discharge during year, 4,560 cfs Dec. 23 (gage height, 11.4 ft); minimum observed, 74 cfs Sept. 21, 22, 23, 24 (gage height, 1.61 ft).

1944-51: Maximum discharge, 8,880 cfs Feb. 8, 1945 (gage height, 15.5 ft, from high-water mark), from rating curve extended above 5,000 cfs; minimum observed, 52 cfs Oct. 27-30, 1945.

Remarks.--Records good. Very small regulation by fish hatchery dam above station. No diversion above station which is not returned to stream.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-26

Oct. 27 to Sept. 30

1.9	93	1.6	73	4.0	451
2.1	114	1.9	99	5.0	730
2.5	162	2.2	130	7.0	1,500
3.0	239	2.5	166	9.0	2,650
3.5	338	3.0	241	10.6	3,860
4.5	583				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	99	1,650	1,120	1,080	715	489	640	848	427	193	111	90
2	93	1,800	970	1,320	812	464	670	795	427	186	111	89
3	96	1,360	935	1,600	882	464	812	760	416	186	110	86
4	131	*1,120	1,600	1,280	795	451	1,000	882	439	186	109	86
5	212	935	1,450	1,120	730	427	1,040	935	*427	179	108	84
6	277	812	1,450	970	745	416	1,000	935	515	186	106	83
7	277	778	1,650	882	935	392	1,040	882	439	179	104	84
8	230	760	1,550	812	1,550	392	1,040	830	416	172	104	89
9	239	655	1,360	745	3,220	370	1,000	795	404	165	104	86
10	297	597	1,240	700	2,790	359	935	830	392	161	102	85
11	297	542	*1,200	670	3,860	346	900	970	392	154	102	84
12	230	502	1,200	611	3,140	359	970	900	381	149	102	85
13	189	489	1,080	670	2,030	404	1,080	812	370	146	102	80
14	175	464	1,000	900	1,600	404	1,160	745	359	143	100	79
15	168	502	1,120	935	1,320	640	1,100	670	381	145	98	78
16	156	700	1,850	935	1,120	670	1,060	700	359	141	96	77
17	175	700	1,650	1,200	1,000	597	1,030	745	328	140	95	75
18	287	626	1,400	1,040	935	528	1,000	730	317	138	94	75
19	542	542	1,240	900	830	515	920	670	307	136	92	75
20	583	730	1,160	812	612	528	850	655	297	133	90	75
21	416	1,360	1,160	935	760	589	730	655	288	131	90	75
22	348	1,550	1,650	830	685	583	685	670	268	128	89	75
23	307	1,550	3,860	778	640	555	640	715	259	130	89	75
24	277	2,580	2,450	970	626	*542	*640	700	259	124	89	75
25	392	2,330	1,700	*1,320	597	555	640	700	250	122	90	86
26	515	2,030	1,450	1,700	555	583	655	611	241	120	88	83
27	1,000	2,270	1,320	1,320	528	583	715	730	232	*118	90	79
28	1,850	1,750	1,450	1,040	502	569	1,280	542	224	118	105	80
29	1,700	1,400	1,400	970	-	611	1,120	502	208	115	*100	100
30	1,280	1,240	1,400	848	-	685	935	476	200	114	94	307
31	1,120	-	1,200	760	-	640	-	451	-	112	93	-
Total	13,958	54,324	45,285	30,653	34,774	15,692	27,287	22,841	10,222	4,550	3,057	2,677
Mean	450	1,144	1,460	989	1,242	506	909	737	341	147	98.6	89.2
Cfs/m	4.17	10.6	13.5	9.16	11.5	4.69	8.42	6.82	3.16	1.36	0.913	0.826
In.	4.81	11.82	15.59	10.56	11.97	5.40	9.39	7.87	3.52	1.57	1.05	0.92
Ac-ft	27,690	68,080	89,780	60,800	68,970	31,120	54,080	45,300	20,280	9,020	6,060	5,310

Calendar year 1950: Max 3,860 Min 84 Mean 800 Cfs/m 7.41 In. 100.55 Ac-ft 579,200

Water year 1950-51: Max 3,860 Min 74 Mean 672 Cfs/m 6.22 In. 84.47 Ac-ft 486,500

Peak discharge (base, 3,000 cfs).--Dec. 23 (time unknown) 4,560 cfs (11.4 ft); Feb. 11 (time unknown) about 3,960 cfs.

\* Discharge measurement made on this day.

## Panther Creek near Carson, Wash.

Location.--Lat 45°48'00", long. 121°51'00", in SW $\frac{1}{4}$  sec. 25, T. 4 N., R. 7 $\frac{1}{2}$  E., on left bank a third of a mile upstream from Cedar Creek and 6 miles north of Carson.

Drainage area.--30.1 sq mi.

Records available.--December 1944 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 800 ft (from topographic map).

Average discharge.--6 years (1945-51), 190 cfs.

Extremes.--Maximum discharge during year, 1,920 cfs Feb. 9 (gage height, 4.65 ft); minimum, 60 cfs Sept. 24 (gage height, 0.98 ft).

1944-51: Maximum discharge, 2,230 cfs Jan. 7, 1948 (gage height, 5.1 ft, from high-water mark in well); minimum, 47 cfs Aug. 31 to Sept. 2, 1945.

A discharge of 40 cfs was measured Oct. 30, 1944.

Remarks.--Records good. No diversion or regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11

Feb. 12 to Sept. 30

1.0	66	2.3	405	0.9	49	2.5	422
1.2	101	2.6	536	1.1	78	3.0	600
1.4	140	3.0	732	1.3	112	3.5	810
1.6	184	3.5	1,030	1.6	175	4.0	1,060
1.8	235	4.0	1,380	2.0	273	4.5	1,340
2.0	294	4.5	1,790				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73	732	288	304	214	157	232	193	122	99	83	69
2	71	706	252	365	232	151	252	177	120	101	81	69
3	74	443	260	514	275	149	314	171	120	101	81	68
4	80	*332	596	409	269	147	371	193	122	99	81	68
5	110	260	509	339	246	142	355	215	*122	99	80	68
6	124	217	422	297	246	140	331	208	128	99	80	68
7	116	194	478	263	339	136	325	196	122	98	80	69
8	114	179	478	241	843	136	308	186	118	96	78	68
9	114	168	416	219	1,620	132	286	180	116	96	78	68
10	114	159	373	204	1,270	128	265	162	114	94	78	66
11	116	150	*350	194	1,700	124	255	198	112	92	76	66
12	101	144	339	182	1,120	128	265	184	112	92	76	66
13	92	140	314	230	560	138	303	171	112	91	76	66
14	88	136	275	358	396	155	311	162	110	91	75	66
15	87	148	308	369	334	289	292	157	108	91	75	66
16	85	246	554	381	289	303	270	155	108	89	75	64
17	92	266	487	460	260	240	263	155	108	89	75	64
18	146	238	393	389	240	210	247	151	107	89	75	64
19	225	206	339	318	224	200	222	145	107	88	74	64
20	235	301	314	266	224	210	198	140	107	88	74	63
21	170	601	308	339	220	250	177	138	107	88	74	62
22	142	608	426	318	210	247	164	138	105	86	74	62
23	124	573	1,270	314	198	224	*155	142	105	86	74	62
24	114	1,060	680	504	186	*212	153	140	105	86	72	62
25	126	902	443	*732	180	227	153	136	103	84	72	66
26	155	680	354	759	173	234	157	132	103	84	72	63
27	332	630	321	509	166	230	180	130	101	*84	72	62
28	732	478	405	377	160	217	273	126	101	84	76	64
29	660	369	434	311	-	230	257	124	101	84	*74	72
30	422	-	389	263	-	247	220	124	101	83	72	101
31	369	-	343	235	-	237	-	122	-	83	70	-
Total	5,623	11,582	13,120	11,003	12,394	5,970	7,554	4,971	3,327	2,814	2,353	2,004
Mean	181	366	423	355	443	193	252	160	111	90.8	75.9	66.8
Cfs/m	6.01	12.8	14.1	11.8	14.7	6.41	8.37	5.32	3.69	3.02	2.52	2.22
In.	6.95	14.31	16.21	13.59	15.31	7.38	9.33	6.14	4.11	3.48	2.91	2.48
Ac-ft	11,150	22,970	26,020	21,820	24,580	11,840	14,980	9,860	6,800	5,580	4,670	3,970

Calendar year 1950: Max 1,700 Min 71 Mean 257 Cfs/m 8.54 In. 115.83 Ac-ft 185,900  
 Water year 1950-51: Max 1,700 Min 62 Mean 227 Cfs/m 7.54 In. 102.20 Ac-ft 164,000

Peak discharge (base, 1,000 cfs).--Nov. 24 (10:30 a.m.) 1,160 cfs (3.70 ft); Dec. 23 (8:30 a.m.) 1,460 cfs (4.11 ft); Feb. 9 (12 m.) 1,920 cfs (4.65 ft).

\* Discharge measurement made on this day.

## WIND RIVER BASIN

Wind River near Carson, Wash.

Location.--Lat 45°44'10", long. 121°48'10", in SWNE¼ sec. 21, T. 3 N., R. 8 E., on right bank three-quarters of a mile upstream from Little Wind River, 1 mile northeast of Carson, and 2½ miles upstream from mouth. Records include flow of Little Wind River.

Drainage area.--225 sq mi, includes that of Little Wind River.

Records available.--December 1934 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 150 ft (from topographic map).

Average discharge.--16 years, 1,103 cfs.

Extremes.--Maximum discharge during year, 9,460 cfs Dec. 23 (gage height, 13.38 ft); minimum, 168 cfs Sept. 21-23 (gage height, 3.03 ft).

1934-51: Maximum discharge, 16,700 cfs Dec. 29, 1937 (gage height, 17.30 ft), from rating curve extended above 5,000 cfs on basis of velocity-area studies; minimum, 136 cfs Nov. 29, Dec. 1, 1936 (gage height, 2.21 ft).

Remarks.--Records good. Flow occasionally affected by pondage at Forest Service power-plant on Trout Creek. No diversion above station.

Revisions.--W 964: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

3.0	164	4.5	491	6.5	1,370	10.0	4,370
3.3	212	5.0	660	7.0	1,670	11.0	5,620
3.6	269	5.5	860	8.0	2,400	12.0	7,050
4.0	359	6.0	1,100	9.0	3,290	13.1	8,900

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	226	4,420	2,400	2,400	1,500	1,000	1,490	1,670	800	384	249	205
2	219	4,610	2,090	3,290	1,810	925	1,550	1,550	790	384	249	202
3	216	3,290	2,020	4,250	2,240	925	1,950	1,490	760	384	247	197
4	290	2,560	4,140	3,290	2,020	950	2,400	1,740	780	384	245	192
5	535	*2,090	3,590	2,730	1,810	900	2,480	1,950	780	372	241	192
6	840	1,670	3,290	2,320	1,810	860	2,400	1,810	*925	384	236	190
7	820	1,550	3,920	2,020	2,560	820	2,400	1,670	820	372	234	192
8	700	1,460	3,590	1,740	4,250	820	2,320	1,550	760	359	230	197
9	700	1,280	3,090	1,550	7,690	780	2,160	1,490	780	347	230	195
10	700	1,150	2,730	1,460	6,450	740	2,090	1,550	720	347	230	190
11	780	1,080	*2,640	1,400	*8,900	720	2,020	1,810	700	335	228	190
12	602	1,020	2,560	1,250	6,900	760	2,090	1,670	680	324	229	189
13	506	950	2,320	1,550	4,730	925	2,400	1,490	660	324	226	181
14	450	925	2,090	2,560	3,490	1,020	2,560	1,370	640	312	225	179
15	423	1,020	2,400	2,560	2,910	2,130	2,400	1,280	640	312	221	178
16	397	1,740	4,030	2,640	2,400	2,090	2,320	1,250	620	312	217	176
17	463	2,160	3,590	3,700	2,160	1,610	2,240	1,340	585	301	216	174
18	1,000	1,810	3,000	2,910	1,880	1,370	2,160	1,250	568	301	212	173
19	1,550	1,460	2,640	2,320	1,740	1,310	1,880	1,200	550	290	212	172
20	1,670	2,090	2,480	1,950	1,740	1,340	1,610	1,150	535	290	209	170
21	1,150	4,030	2,400	2,560	1,610	1,550	1,460	1,150	520	290	209	168
22	900	4,250	3,460	2,560	1,460	1,550	1,340	1,150	506	280	207	168
23	760	3,920	8,020	2,160	1,370	1,370	*1,250	1,220	491	280	204	168
24	680	6,310	5,360	3,090	1,280	*1,340	1,250	1,200	477	280	204	170
25	880	5,360	3,920	4,250	1,220	1,370	1,250	1,200	463	269	204	190
26	1,220	4,490	3,190	4,850	1,150	1,430	1,280	1,100	450	269	202	193
27	2,620	4,730	2,820	5,590	1,100	1,400	1,490	1,020	435	*259	200	179
28	4,730	3,610	3,590	*2,730	1,020	1,370	2,730	975	423	259	225	205
29	4,490	2,910	3,390	2,240	-	1,460	2,400	900	410	259	*225	216
30	3,090	2,560	3,090	1,950	-	1,610	1,950	860	397	249	214	636
31	2,730	-	2,730	1,670	-	1,490	-	820	-	249	209	-
Total	36,337	80,705	100,380	79,540	79,250	37,935	59,320	41,875	18,656	9,761	6,888	6,027
Mean	1,172	2,690	3,238	2,566	2,830	1,224	1,977	1,351	622	315	222	201
Cfs/m	5.21	12.0	14.4	11.4	12.6	5.44	8.79	6.00	2.76	1.40	0.987	0.895
In.	6.01	13.34	16.59	13.15	13.10	6.27	9.90	6.92	3.08	1.61	1.14	1.00
Ac-ft	72,070	160,100	199,100	157,800	157,200	75,240	117,700	83,060	37,000	19,360	13,660	11,950
Calendar year 1950:	Max	8,720	Min	195	Mean	1,790	Cfs/m	7.96	In.	107.99	Ac-ft	1,296,000
Water year 1950-51:	Max	8,900	Min	168	Mean	1,525	Cfs/m	6.78	In.	92.01	Ac-ft	1,104,000

Peak discharge (base, 5,700 cfs).--Nov. 24 (9 a.m.) 6,750 cfs (11.84 ft); Dec. 23 (8:30 a.m.) 9,460 cfs (13.38 ft); Feb. 11 (9 a.m.) 9,270 cfs (13.33 ft).

\* Discharge measurement made on this day.

## Salmon River near Government Camp, Oreg.

Location.--Lat 45°16'00", long. 121°43'00", in sec. 31, T. 3 S., R. 9 E., on right bank near lower end of Red Top Meadows, 4 miles southeast of Government Camp.

Drainage area.--8.7 sq mi, approximately.

Records available.--May 1910 to May 1912, April 1926 to September 1951. Published as "near Rowe" 1910-12.

Gage.--Water-stage recorder. Datum of gage is 3,446.45 ft above mean sea level, datum of 1929. Prior to Nov. 21, 1910, staff gage at site a quarter of a mile upstream at different datum. Nov. 21, 1910, to May 31, 1912, and Apr. 21, 1926, to Sept. 30, 1933, water-stage recorder at site 75 ft upstream from former site at different datum.

Average discharge.--26 years (1910-11, 1926-51), 42.3 cfs.

Extremes.--Maximum discharge during year, 206 cfs Dec. 22 (gage height, 2.03 ft); minimum, 18 cfs Sept. 21-25.

1910-12, 1926-51: Maximum discharge, 650 cfs Dec. 22, 1933 (gage height, 3.61 ft); minimum, 12 cfs Nov. 21, 1929, Oct. 13, 1930, Nov. 2, 10-12, Nov. 28 to Dec. 4, 1936.

Remarks.--Records good. No diversion or regulation above station.

Revisions.--W 769: Drainage area.

Rating table, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.3	15
.6	32
1.0	66
1.4	113
1.7	157

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	24	127	50	68	45	38	40	64	78	55	33	22
2	24	141	48	71	49	37	43	68	74	54	33	22
3	28	109	46	65	47	36	52	77	76	55	32	22
4	37	88	101	57	45	34	57	119	79	57	32	22
5	46	*78	84	53	45	37	63	97	104	52	31	21
6	55	66	116	50	59	34	64	103	86	52	31	21
7	51	72	103	47	86	33	64	110	78	48	31	23
8	45	78	76	47	92	33	64	105	76	47	31	22
9	35	58	73	47	104	33	63	109	*78	48	31	21
10	31	52	72	45	95	32	63	131	79	47	30	21
11	30	50	74	45	124	31	67	151	80	45	30	21
12	27	46	74	43	110	36	78	113	84	45	30	20
13	25	43	63	51	84	50	91	101	85	45	29	20
14	25	41	60	68	72	43	94	92	84	43	28	20
15	25	41	58	59	65	71	91	94	82	43	28	20
16	26	45	63	51	60	57	95	109	76	41	28	20
17	41	38	*59	50	57	46	97	120	75	41	27	20
18	41	38	57	45	55	43	87	110	70	41	27	20
19	55	38	66	43	51	41	74	103	69	38	27	20
20	41	57	65	41	49	44	67	105	68	37	27	20
21	33	66	57	41	45	45	64	110	67	*37	26	18
22	30	55	118	40	45	41	63	119	65	38	26	18
23	29	50	135	43	45	39	63	131	65	38	24	18
24	28	87	91	90	43	39	67	119	61	37	23	18
25	36	80	82	78	41	41	74	128	61	36	24	26
26	34	70	75	82	41	41	78	106	61	35	23	22
27	54	68	70	63	39	40	83	103	58	35	23	20
28	52	62	88	56	38	40	*90	96	57	36	31	21
29	65	55	109	b54	-	41	76	85	*57	34	24	26
30	51	52	83	*b52	-	39	64	79	57	33	*22	42
31	42	-	71	50	-	38	-	77	-	33	22	-
Total	1,166	1,951	2,387	1,695	1,729	1,253	2,136	3,234	2,190	1,326	864	647
Mean	37.6	65.0	77.0	54.7	61.8	40.4	71.2	104	73.0	42.8	27.9	21.6
Cfsm	4.32	7.47	8.65	6.29	7.10	4.64	8.18	12.0	8.39	4.92	3.21	2.48
In.	4.98	8.34	10.20	7.25	7.39	5.36	9.13	13.82	9.36	5.67	3.69	2.77
Ac-ft	2,310	3,870	4,730	3,360	3,430	2,490	4,240	6,410	4,340	2,630	1,710	1,280

Calendar year 1950: Max 168 Min 22 Mean 59.0 Cfsm 6.78 In. 92.01 Ac-ft 42,700  
 Water year 1950-51: Max 151 Min 18 Mean 56.4 Cfsm 6.48 In. 87.96 Ac-ft 40,800

Peak discharge (base, 150 cfs).--Nov. 1 (9 p.m.) 199 cfs (1.94 ft); Dec. 6 (3 p.m.) 157 cfs (1.75 ft); Dec. 22 (9 to 11 p.m.) 206 cfs (2.03 ft); May 10 (10 p.m.) 181 cfs (1.85 ft); May 23 (8 p.m.) 154 cfs (1.71 ft).

\* Discharge measurement made on this day.

† Stage-discharge relation affected by ice.

Salmon River above Boulder Creek, near Brightwood, Oreg.

Location.--Lat 45°21'40", long. 122°00'40", in SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 25, T. 2 S., R. 6 E., on left bank 1 mile upstream from Boulder Creek,  $1\frac{1}{4}$  miles south of Brightwood, and  $2\frac{1}{4}$  miles upstream from mouth.

Drainage area.--106 sq mi.

Records available.--August 1936 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,089.2 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Average discharge.--15 years, 453 cfs.

Extremes.--Maximum discharge during year, 3,280 cfs Nov. 2 (gage height, 4.00 ft); minimum, 78 cfs Sept. 21 (gage height, 0.49 ft).  
1936-51: Maximum discharge, 11,700 cfs (revised) Dec. 14, 1946 (gage height, 7.08 ft), from rating curve extended above 4,100 cfs; minimum, 59 cfs Nov. 30, Dec. 1, 1936, Sept. 25, 26, 1940.

Revisions.--The figures of maximum discharge for some water years have been revised as shown in the following table. They supersede those shown in the water-supply papers indicated.

Water-Supply Paper	Water year	Date	Gage height (feet)	Discharge (cfs)
864.....	1937-38	Dec. 29	5.29	6,020
984.....	1942-43	Nov. 23	5.88	7,740
1064.....	1945-46	Dec. 28	7.02	11,500
1094.....	1946-47	Dec. 14	7.08	11,700
1124.....	1947-48	Jan. 7	6.40	9,380

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or regulation above station.

Revisions.--Revised figures of discharge, in cubic feet per second, for high-water periods in the water year 1947 and revised peak discharges for the water years 1947-48, superseding figures published in Water-Supply Papers 1094 and 1124, are given herewith.

Dec. 11 .....	5,000
12 .....	8,680
13 .....	7,680
14 .....	7,470
15 .....	5,540

Revised peak discharge.--1946-47: Dec. 12 (5:30 a.m.) 10,200 cfs (6.65 ft); Dec. 14 (11 p.m.) 11,700 cfs (7.08 ft).  
1947-48: Jan. 7 (6 a.m.) 9,380 cfs (6.40 ft); Feb. 22 (1 a.m.) 7,440 cfs (5.78 ft).

Month	Cfs-days	Maximum	Minimum	Mean	Per square mile	Runoff	
						Inches	Acre-feet
December 1946.....	51,642	8,680	368	1,666	15.7	18.12	102,400
Calendar year 1946...	212,591	8,680	89	582	5.49	74.58	421,600
Water year 1946-47...	179,104	8,680	87	491	4.63	62.85	355,200

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.5	80	2.0	760
.7	125	2.5	1,190
1.0	215	3.0	1,750
1.5	437	3.6	2,600



## Salmon River above Boulder Creek, near Brightwood, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	120	1,570	685	851	500	340	564	722	437	195	123	99
2	115	*2,580	596	1,690	600	320	656	760	427	195	123	97
3	141	1,560	671	1,480	750	320	859	745	412	192	120	95
4	185	1,060	1,640	992	750	340	1,030	949	412	205	120	93
5	285	875	1,480	805	750	320	949	966	454	198	120	93
6	629	700	1,960	671	900	310	974	983	412	202	118	93
7	492	622	1,850	596	1,600	300	983	1,040	386	189	118	97
8	406	692	1,250	559	1,700	290	915	966	367	182	118	103
9	422	557	974	504	1,900	280	859	932	352	176	118	93
10	293	*504	851	470	1,500	270	805	1,010	348	*176	115	93
11	268	476	812	459	2,000	260	805	1,200	338	173	115	93
12	226	437	752	437	1,800	350	907	1,020	334	167	118	88
13	202	401	664	902	1,200	*557	1,090	924	329	167	115	86
14	189	381	*609	2,040	950	602	1,140	820	320	164	*113	84
15	182	412	596	1,440	800	1,770	1,070	768	311	161	111	82
16	173	685	664	1,160	700	1,240	1,050	798	298	158	111	82
17	268	843	636	1,970	650	782	*1,060	843	281	158	108	82
18	432	760	570	1,080	600	636	992	790	277	158	106	82
19	551	564	551	798	550	629	851	722	272	152	103	82
20	671	1,100	570	657	500	722	730	692	264	149	101	80
21	448	1,380	522	915	480	798	643	685	248	147	101	80
22	348	1,110	907	843	460	685	602	708	245	147	99	80
23	293	932	1,730	835	440	589	577	768	237	144	97	82
24	285	1,940	1,050	1,930	420	557	570	745	234	144	97	82
25	285	1,630	835	1,730	400	596	602	745	226	141	95	106
26	289	1,210	722	*1,960	380	657	650	643	222	138	95	101
27	427	1,070	671	1,250	360	622	685	596	212	136	97	88
28	1,050	891	1,160	891	340	585	851	602	208	133	125	90
29	1,730	745	1,450	750	-	622	851	527	202	130	120	120
30	1,170	730	1,130	600	-	615	745	486	198	128	108	219
31	835	-	949	550	-	570	-	*464	-	125	103	-
Total	13,410	28,417	29,467	31,795	23,980	17,532	25,045	24,619	9,263	5,030	3,429	2,845
Mean	433	947	951	1,026	856	566	835	794	309	162	111	94.8
Cfsm	4.08	8.93	8.97	9.68	8.08	5.34	7.88	7.49	2.92	1.53	1.05	0.894
In.	4.70	9.97	10.34	11.16	8.41	6.15	8.79	8.64	3.25	1.76	1.20	1.00
Ac-ft	26,600	56,360	58,450	63,060	47,560	34,770	49,680	48,930	18,370	9,980	6,800	5,640
Calendar year 1950: Max	4,130	Min	101	Mean	670	Cfsm	6.32	In.	85.77	Ac-ft	485,000	
Water year 1950-51: Max	2,580	Min	80	Mean	589	Cfsm	5.56	In.	75.37	Ac-ft	426,100	

Peak discharge (base, 2,800 cfs).--Nov. 2 (3 a.m.) 3,280 cfs (4.00 ft); Jan. 13 (12 p.m.) 3,050 cfs (3.87 ft); Mar. 15 (1:30 p.m.) 3,150 cfs (3.93 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 29 to Mar. 12; discharge estimated on basis of recorded range in stage, records for station near Government Camp and Bull Run River near Bull Run, and weather records.

## SANDY RIVER BASIN

Sandy River near Marmot, Oreg.

Location.--Lat 45°23'10", long. 122°08'00" in NE $\frac{1}{4}$  sec. 24, T. 2 S., R. 5 E., on right bank 1 mile southwest of Marmot,  $\frac{1}{2}$  miles upstream from Sandy River Dam of Portland General Electric Co., and 5 miles downstream from Salmon River.

Drainage area.--262 sq mi.

Records available.--August 1911 to September 1951. Records for period January 1916 to June 1919 published as "at dam near Marmot" obtained by combining records for Sandy River below dam near Marmot with records for Sandy River Canal near Marmot.

Gage.--Water-stage recorder. Datum of gage is 742.4 ft above mean sea level (Portland General Electric Co. benchmark). Prior to Oct. 19, 1933, water-stage recorder (staff gage for short periods) at several sites ranging from  $\frac{1}{2}$  miles below to half a mile above present site at various datums.

Average discharge.--40 years, 1,330 cfs.

Extremes.--Maximum discharge during year, 7,600 cfs Jan. 14 (gage height, 9.20 ft); minimum, 289 cfs Sept. 21, 22 (gage height, 3.06 ft).

1911-51: Maximum discharge, 29,200 cfs Jan. 6, 1923 (gage height, 17.5 ft, site and datum then in use), by computation of peak flow over dam; minimum, 205 cfs Sept. 21-24, 1940.

Remarks.--Records excellent except those for periods of no gage-height record, which are good. No diversion or regulation above station.

Cooperation.--Water-stage recorder inspected by employee of Portland General Electric Co.

Revisions.--W 594: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

3.0	265	5.0	1,470
3.1	305	6.0	2,450
3.4	435	7.0	3,700
3.8	640	8.0	5,300
4.4	1,010	9.0	7,200

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	358	3,650	1,860	2,460	1,480	952	1,520	1,850	*1,120	634	426	333
2	350	6,470	1,600	4,710	1,720	926	1,620	2,000	1,080	624	417	325
3	408	*4,320	1,760	4,350	2,140	919	2,110	1,930	1,050	629	408	321
4	550	2,990	3,980	2,350	2,150	971	2,620	2,560	1,070	662	404	317
5	761	2,520	3,730	2,370	2,250	912	2,470	2,680	1,170	629	399	325
6	1,440	1,960	5,940	1,980	2,660	893	2,480	2,640	1,090	624	394	329
7	1,260	1,760	5,160	1,740	4,680	*854	2,540	2,890	1,020	575	390	341
8	1,160	1,930	3,490	1,590	5,000	854	2,340	2,640	9950	550	399	368
9	1,170	1,600	2,680	1,460	5,440	809	2,160	2,490	9900	560	399	341
10	906	1,400	2,310	1,370	4,730	779	2,020	2,600	9900	575	394	345
11	854	1,310	2,190	1,330	5,900	755	1,970	3,160	9900	*565	394	333
12	719	1,270	2,010	1,250	1,900	828	2,220	2,640	9900	570	386	321
13	651	1,140	1,760	2,280	3,880	1,450	2,680	2,320	9900	580	*386	321
14	624	1,080	*1,640	5,530	2,930	1,570	2,900	2,100	9900	550	381	325
15	607	1,130	1,620	4,170	2,470	4,280	2,680	2,190	9900	545	386	329
16	570	1,690	1,830	3,330	2,100	3,580	*2,630	2,000	874	565	390	329
17	797	2,400	1,750	5,390	1,900	2,240	2,660	2,100	809	580	390	333
18	1,200	2,200	1,580	3,260	1,730	1,610	2,450	2,000	797	575	390	329
19	1,530	1,660	1,530	2,420	1,570	1,720	2,080	2,180	767	525	390	321
20	1,880	2,670	1,520	2,010	1,480	1,900	1,780	2,170	749	495	390	313
21	1,360	3,370	1,380	3,060	1,420	2,130	1,590	2,100	743	485	390	293
22	1,070	2,890	2,210	*2,670	1,320	1,880	1,480	2,100	737	490	385	293
23	932	2,450	3,990	2,620	1,250	1,620	1,400	2,100	701	510	368	299
24	848	5,600	2,640	5,520	1,200	1,530	1,590	2,100	695	510	354	293
25	900	4,930	2,150	5,260	1,140	1,590	1,450	2,100	684	475	350	376
26	912	3,630	1,840	*5,710	1,060	1,770	1,580	2,100	673	445	350	354
27	1,110	3,170	1,720	3,690	1,010	1,700	1,710	2,100	662	450	350	309
28	2,580	2,480	3,020	2,600	978	1,580	2,300	2,100	640	450	430	305
29	4,200	2,060	3,810	2,120	-	1,670	2,250	2,100	634	435	408	390
30	2,980	2,020	3,210	1,800	-	1,700	1,960	2,100	640	426	363	785
31	2,230	-	2,710	1,600	-	1,570	-	2,100	-	426	345	-
Total	36,717	77,750	78,620	92,600	71,488	47,542	63,040	63,400	25,635	16,714	12,007	10,290
Mean	1.184	2.592	2.536	2.987	2.553	1.534	2.101	2.045	854	539	387	343
Cfsm	4.52	9.89	9.68	11.4	9.74	5.85	8.02	7.81	3.26	2.06	1.48	1.31
In.	5.21	11.04	11.16	13.14	10.15	6.75	8.95	9.00	3.64	2.37	1.70	1.46
Ac-ft	72,830	154,200	155,900	183,700	141,800	94,300	125,000	125,800	50,850	33,150	23,820	20,410
Calendar year 1950: Max	11,400	Min	345	Mean	1,845	Cfsm	7.04	In.	95.62	Ac-ft	1,336,000	
Water year 1950-51: Max	6,470	Min	293	Mean	1,632	Cfsm	6.23	In.	84.57	Ac-ft	1,182,000	

Peak discharge (base, 7,700 cfs).--No peak above base.

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for station below Bull Run River and Salmon River above Boulder Creek, near Brightwood.

## Lake Ben Morrow near Bull Run, Oreg.

Location.--Lat 45°29'00", long. 122°04'50", in SW $\frac{1}{4}$  sec. 16, T. 1 S., R. 6 E., in control house at Bear Creek Dam of city of Portland, 8 $\frac{1}{2}$  miles northeast of Bull Run.

Records available.--October 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Portland Water Bureau).

Extremes.--Maximum contents during year, 29,040 acre-ft Nov. 24 (elevation, 1,041.33 ft); minimum, 13,320 acre-ft Sept. 28 (elevation, 993.77 ft).  
1928-51: Maximum contents, 31,600 acre-ft Mar. 31, 1931 (elevation, 1,047.40 ft); minimum after first filling in May 1929, that of Sept. 28, 1951.

Remarks.--Records excellent. Lake Ben Morrow is formed by concrete dam known as Bear Creek Dam on Bull Run River, completed in March 1929 for water supply of city of Portland. Capacity of reservoir, 26,930 acre-ft at crest of spillway (elevation, 1,036 ft); dead storage, 213 acre-ft at elevation 890 ft (center of outlet valves).

Cooperation.--Water-stage recorder inspected and capacity table furnished by Portland Water Bureau.

Revisions (water years).--W 814: 1935(M).

Monthly elevation and contents, water year October 1950 to September 1951

Date	Elevation (feet) <sup>†</sup>	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	1,022.57	22,050	-
Oct. 31.....	1,038.23	27,800	+5,750
Nov. 30.....	1,037.89	27,670	-130
Dec. 31.....	1,038.06	27,730	+60
Calendar year 1950.....	-	-	+250
Jan. 31.....	1,037.2	27,400	-330
Feb. 28.....	1,038.85	27,260	-140
Mar. 31.....	1,037.36	27,460	+200
Apr. 30.....	1,037.75	27,610	+150
May 31.....	1,036.94	27,300	-310
June 30.....	1,033.71	26,060	-1,240
July 31.....	1,023.69	22,440	-3,620
Aug. 31.....	1,006.72	16,960	-5,480
Sept. 30.....	1,003.37	15,970	-990
Water year 1950-51.....	-	-	-6,080

<sup>†</sup> Elevation at 12 p.m.

g Computed from graph based on observer's once-daily staff-gage readings and recorded range in stage when available.

## Bull Run River below Lake Ben Morrow, Oreg.

Location.--Lat 45°29'00", long. 122°04'50", in SW $\frac{1}{4}$  sec. 16, T. 1 S., R. 6 E., in gate-house at Bear Creek Dam on Bull Run River, 500 ft downstream from Bear Creek, 1,000 ft upstream from Fivemile Creek, and 8 $\frac{1}{2}$  miles northeast of Bull Run.

Drainage area.--74 sq mi, approximately.

Records available.--October 1929 to September 1951.

Gage.--Water-stage recorder above crest of spillway, and scales indicating number of turns outlet needle valves are open. Datum of gage is 1,036.00 ft above mean sea level (levels by Portland Water Bureau). Gage heights shown herein are converted to elevations. Prior to Oct. 1, 1934, at site half a mile downstream at different datum.

Average discharge.--22 years, 577 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 4,880 cfs Nov. 24 (elevation, 1,041.33 ft); minimum daily, 35 cfs Sept. 30.

1929-51: Maximum discharge at dam, 16,100 cfs Mar. 31, 1931 (elevation, 1,047.40 ft with one valve open 30 turns, present datum); no flow part of Oct. 27, 1939.

Remarks.--Records good. Daily discharge determined by combining discharge through valves near base of dam and that over crest of spillway (elevation, 1,036 ft). Leakage at dam is less than 1 cfs and is disregarded. Flow regulated by Bull Run Lake and Lake Ben Morrow (see p.109). Flow from Bull Run Lake is not artificially regulated but reaches river through surface and underground channels.

Cooperation.--Water-stage recorder inspected and record of valve openings furnished by Portland Water Bureau.

Revisions (water years).--W 904: Drainage area, 1931(M).

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	164	2,600	916	1,260	464	277	581	882	326	157	201	119
2	164	3,650	725	2,560	641	260	607	1,010	310	157	194	117
3	164	2,300	829	2,360	1,080	255	753	874	304	157	178	128
4	164	1,420	2,360	1,420	1,010	260	971	1,060	294	157	178	154
5	166	1,160	2,000	1,060	942	245	934	1,150	294	141	168	152
6	170	866	3,300	824	1,170	235	916	1,040	307	114	154	143
7	373	753	2,590	676	2,200	223	942	1,110	299	134	166	100
8	1,130	945	1,560	634	2,410	225	882	984	282	157	183	83
9	1,020	732	1,080	568	2,500	220	784	869	272	157	188	101
10	718	614	874	525	2,070	210	704	866	260	157	172	104
11	651	542	824	522	2,790	205	728	1,100	255	180	139	109
12	510	503	816	490	2,700	240	857	1,000	245	187	111	116
13	407	444	672	391	1,560	677	1,010	866	243	171	136	116
14	338	413	588	2,970	1,080	749	1,090	760	235	171	169	141
15	326	428	641	2,050	848	1,600	1,020	662	230	160	*174	172
16	282	641	1,110	1,500	711	1,820	993	651	220	181	167	161
17	444	1,050	1,010	2,360	620	1,030	942	683	210	185	166	153
18	773	1,010	808	1,450	581	746	860	641	200	183	166	138
19	1,270	869	697	968	510	641	711	574	192	183	161	114
20	1,670	1,260	651	746	496	620	581	542	190	183	179	*102
21	1,010	1,540	568	1,980	499	714	510	516	220	183	199	127
22	690	1,400	1,140	1,620	451	725	477	522	256	181	195	127
23	548	1,220	2,730	1,290	419	607	444	597	197	181	169	112
24	464	3,810	1,460	2,880	377	555	458	641	173	186	157	103
25	584	2,730	1,010	3,040	371	542	461	776	187	216	140	81
26	784	1,770	760	2,960	332	600	510	641	207	213	137	87
27	925	1,710	843	1,670	316	620	581	536	213	196	135	82
28	1,860	1,290	1,630	1,090	297	591	1,240	477	218	177	116	72
29	2,830	903	2,360	925	-	607	1,270	425	223	157	99	66
30	1,920	908	1,740	623	-	648	993	371	186	158	108	35
31	1,390	-	1,350	490	-	614	-	351	-	183	119	-
Total	23,915	39,241	39,642	44,482	29,445	17,561	23,790	23,177	7,248	5,301	4,924	3,415
Mean	771	1,308	1,279	1,435	1,052	566	753	748	242	171	159	114
Ac-ft	47,430	77,830	78,630	88,230	58,400	34,830	47,190	45,970	14,380	10,510	9,770	6,770

Adjusted for change in contents in Lake Ben Morrow

Mean	865	1,306	1,280	1,430	1,049	570	796	743	221	112	69.8	97.1
Cfs/m	11.7	17.6	17.3	19.3	14.2	7.70	10.8	10.0	2.99	1.51	0.943	1.31
In.	13.47	19.69	19.94	22.27	14.76	8.88	11.99	11.57	3.33	1.75	1.09	1.46
Ac-ft	53,180	77,700	78,690	87,900	58,260	35,030	47,340	45,660	13,140	6,890	4,290	5,780

## Observed

Calendar year 1950: Max	5,960	Min	154	Mean	843	Ac-ft	610,100
Water year 1950-51: Max	3,810	Min	35	Mean	718	Ac-ft	519,900

## Adjusted

Calendar year 1950: Mean	843	Cfs/m	11.4	In.	154.64	Ac-ft	610,400
Water year 1950-51: Mean	710	Cfs/m	9.59	In.	130.20	Ac-ft	513,800

Peak discharge (base, 4,800 cfs).--Nov. 24 (9 a.m.) 4,880 cfs (1,041.33 ft).

\* Discharge measurement made on this day.

## Bull Run River near Bull Run, Oreg.

Location.--Lat 45°27'20", long. 122°07'20", in SE $\frac{1}{4}$  sec. 25, T. 1 S., R. 5 E., on left bank  $\frac{1}{2}$  miles upstream from intake of pipeline for water supply of city of Portland, and 5 miles east of Bull Run.

Drainage area.--102 sq mi.

Records available.--January 1895 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 760 ft (from surveys by city of Portland). Prior to Aug. 1, 1909, staff gages at site  $\frac{1}{2}$  miles downstream, 1,000 ft above pipeline intake, at different datum. Datum of gage at present site was raised 2 ft July 26, 1916, lowered 0.5 ft July 22, 1924, and lowered 0.5 ft again Aug. 25, 1928. Supplementary staff gage  $\frac{1}{2}$  miles downstream on headwall of intake works is read in general 3 times a day (every half hour during floods) by employees of Portland Water Bureau.

Average discharge.--44 years (1907-51), 741 cfs (adjusted for storage since 1929).

Extremes.--Maximum discharge during year, 5,850 cfs Nov. 24 (gage height, 6.86 ft); minimum, 150 cfs Sept. 28, 29.

1895-1961: Maximum discharge, 20,600 cfs Mar. 31, 1931 (gage height, 13.8 ft), by computation of peak flow over dam; minimum, 63 cfs Aug. 13-16, 1926.

Remarks.--Records excellent. Flow regulated by Bull Run Lake and Lake Ben Morrow (see p. 109). Flow from Bull Run Lake is not artificially regulated but reaches river through surface and underground channels.

Cooperation.--Water-stage recorder inspected by Portland Water Bureau.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.7	140	3.0	1,100
1.0	206	4.0	1,950
1.5	350	5.0	3,070
2.0	536	6.1	4,620
2.5	780		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	201	3,170	1,160	1,640	632	373	759	1,090	370	194	204	156
2	199	4,470	934	3,410	835	350	764	1,130	350	187	204	156
3	204	2,820	1,060	3,030	1,330	344	921	1,040	341	187	196	160
4	232	1,740	2,980	1,820	1,260	376	1,160	1,270	344	199	196	173
5	319	1,440	2,350	1,380	1,190	347	1,110	1,310	363	189	194	173
6	425	1,070	4,040	1,090	1,470	*334	1,090	1,210	360	182	184	169
7	582	*967	3,190	877	2,630	319	1,110	1,510	344	184	189	156
8	1,320	1,150	1,900	802	2,860	331	1,040	1,120	325	199	196	152
9	1,210	914	1,390	727	3,030	304	928	988	310	196	194	152
10	877	754	1,110	666	2,400	289	847	988	298	196	189	152
11	791	671	1,090	671	3,280	283	859	1,240	286	204	175	152
12	613	637	1,020	627	3,150	338	1,020	1,090	280	*222	158	154
13	502	549	841	1,230	1,880	830	1,180	967	272	216	167	154
14	451	515	754	3,670	1,320	921	1,250	824	260	201	187	162
15	429	554	818	2,630	1,080	2,160	1,160	736	252	199	*196	189
16	380	865	1,340	1,820	889	2,090	1,120	727	240	196	192	182
17	567	1,520	1,190	3,150	808	1,260	1,080	754	229	201	189	178
18	934	1,510	*988	1,860	769	934	*974	702	222	199	189	171
19	1,450	1,020	853	1,270	686	802	813	622	214	194	187	156
20	1,960	1,640	802	995	666	786	671	580	209	192	192	156
21	1,230	1,910	702	2,480	647	928	585	571	224	192	209	160
22	859	1,680	1,200	2,110	599	902	536	576	269	192	204	162
23	702	1,450	2,990	1,630	549	780	515	671	235	192	192	156
24	589	4,480	1,630	*3,660	511	712	519	712	211	192	180	154
25	748	3,290	1,190	3,690	490	696	540	853	216	182	173	152
26	974	2,150	947	3,690	448	796	580	681	229	201	169	152
27	1,090	2,100	1,020	2,120	414	813	666	585	229	201	169	152
28	2,090	1,520	2,010	1,360	390	759	1,500	*528	232	199	167	150
29	3,540	1,140	2,980	1,020	-	796	1,440	467	243	184	158	150
30	2,380	1,180	2,190	855	-	853	1,160	422	224	178	156	266
31	1,740	-	1,710	717	-	786	-	394	-	196	156	-
Total	29,588	48,876	48,379	56,677	36,213	22,592	27,897	26,220	8,181	6,046	5,711	4,907
Mean	954	1,629	1,561	1,828	1,293	729	932	846	273	175	184	164
Ac-ft	58,690	96,940	95,960	112,400	71,830	44,810	55,330	52,010	16,230	11,990	11,330	9,730

Adjusted for changes in contents of Lake Ben Morrow

Mean	1,048	1,627	1,562	1,823	1,291	732	932	841	252	136	95.1	147
Cfs/m	10.3	16.0	15.3	17.9	12.7	7.18	9.14	8.25	2.47	1.33	0.932	1.44
In.	11.85	17.80	17.65	20.61	13.18	8.27	10.20	9.50	2.76	1.54	1.08	1.61
Ac-ft	64,440	96,810	96,020	112,100	71,690	45,010	55,480	51,700	14,990	8,370	5,850	8,740

Observed

Calendar year 1950: Max	7,180	Min	180	Mean	1,028	Ac-ft	744,400
Water year 1950-51: Max	4,480	Min	150	Mean	880	Ac-ft	637,200

Adjusted

Calendar year 1950: Mean	1,028	Cfs/m	10.1	In.	136.87	Ac-ft	744,600
Water year 1950-51: Mean	872	Cfs/m	8.55	In.	116.05	Ac-ft	631,100

Peak discharge (base, 5,400 cfs).--Nov. 24 (9:30 a.m.) 5,850 cfs (6.86 ft).

\* Discharge measurement made on this day.

## Little Sandy River near Bull Run, Oreg.

Location--Lat 45°25'00", long. 122°10'20", in NE $\frac{1}{4}$  sec. 10, T. 2 S., R. 5 E., on left bank three-eighths of a mile upstream from Portland General Electric Co.'s dam and tunnel from Sandy River and 3 miles east of Bull Run.

Drainage area--23 sq mi, approximately.

Records available--May 1911 to April 1913 (fragmentary), July 1919 to September 1951.

Gage--Water-stage recorder. Datum of gage is 710.51 ft above mean sea level, adjustment of 1924 (levels by Portland General Electric Co.). Prior to Apr. 29, 1913, staff gage at site seven-eighths of a mile downstream at different datum. July 1, 1919, to Oct. 1, 1931, water-stage recorder at datum 0.28 ft higher.

Average discharge--32 years (1919-51), 140 cfs.

Extremes--Maximum discharge during year, 1,360 cfs Jan. 13 (gage height, 5.70 ft); minimum, 14 cfs Sept. 24.  
1911-13, 1919-51: Maximum discharge, 3,950 cfs Nov. 20, 1921 (gage height, 9.18 ft, present datum), from rating curve extended above 2,000 cfs; minimum, 8 cfs Aug. 20, Sept. 16, 17, 1940.

Remarks--Records good. No diversion or regulation above station.

Cooperation--Water-stage recorder graph furnished by Portland General Electric Co.

Revisions (water years)--W 1154: 1949.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.8	13	3.2	161
2.0	19	3.5	230
2.2	28	4.0	388
2.4	42	4.5	605
2.6	62	5.0	890
2.9	103	5.5	1,220

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	633	199	388	159	75	170	225	*62	23	19	16
2	25	896	170	801	174	70	172	264	58	23	19	16
3	30	542	213	569	225	70	206	218	55	24	19	16
4	60	324	542	366	228	81	238	307	55	49	18	16
5	134	284	392	284	242	75	225	261	67	36	18	15
6	242	206	896	235	331	75	223	264	64	40	18	15
7	220	*201	560	201	515	69	223	356	59	31	17	17
8	223	232	342	185	528	72	206	267	53	27	17	19
9	188	174	270	170	560	63	185	232	49	26	18	17
10	140	146	230	157	428	62	174	240	46	25	18	16
11	124	132	225	153	528	60	170	297	44	24	18	16
12	88	146	201	140	721	81	188	223	44	24	18	16
13	72	113	165	379	334	213	232	192	42	*23	18	15
14	66	103	155	801	248	*220	242	163	40	23	18	15
15	67	122	168	569	218	466	216	148	38	22	17	15
16	58	185	232	404	185	436	211	159	36	22	*17	15
17	117	388	194	620	172	275	204	168	35	22	16	15
18	165	384	*185	408	101	216	*183	142	33	21	16	15
19	241	264	155	294	142	192	153	124	32	21	16	15
20	294	366	142	242	138	192	124	117	31	21	16	15
21	197	356	122	560	132	225	110	113	30	21	16	15
22	142	304	197	449	113	204	102	117	29	21	16	15
23	117	264	310	420	108	181	100	142	28	21	16	15
24	97	795	204	*832	100	165	108	140	28	21	16	14
25	132	582	172	732	100	165	120	185	27	21	16	27
26	136	388	148	704	92	204	130	124	26	20	16	20
27	136	392	153	441	87	204	155	100	26	20	16	17
28	324	264	408	284	80	183	359	91	25	20	21	17
29	605	211	620	240	-	190	264	80	24	19	21	29
30	428	225	412	197	-	183	208	72	24	19	17	130
31	310	-	314	170	-	170	-	68	-	19	17	-
Total	5,204	9,622	8,676	12,385	7,049	5,137	5,601	5,599	1,210	749	539	614
Mean	168	321	280	400	252	168	181	181	40.3	24.2	17.4	20.5
Cfsm	7.30	14.0	12.2	17.4	11.0	7.22	8.13	7.87	1.75	1.05	0.757	0.891
In.	8.41	15.56	14.03	20.04	11.40	8.31	9.06	9.05	1.96	1.21	0.87	0.99
Ac-ft	10,320	19,080	17,210	24,590	13,980	10,190	11,110	11,110	2,400	1,490	1,070	1,220

Calendar year 1950: Max 1,400 Min 14 Mean 195 Cfsm 8.48 In. 114.94 Ac-ft 141,000  
Water year 1950-51: Max 896 Min 14 Mean 171 Cfsm 7.43 In. 100.89 Ac-ft 123,800

Peak discharge (base, 1,400 cfs)--No peak above base.

\* Discharge measurement made on this day.

## Bull Run River at Bull Run, Oreg.

Location.--Lat 45°26'20", long. 122°14'05", in NE¼ sec. 6, T. 2 S., R. 5 E., on left bank at Bull Run, 450 ft downstream from tailrace of Portland General Electric Co.'s powerplant and 1.5 miles downstream from Little Sandy River.

Drainage area.--136 sq mi.

Records available.--August 1949 to September 1951.

Gage.--Water-stage and water-temperature recorder. Altitude of gage is 310 ft (by barometer).

Extremes.--Maximum discharge during year, 8,330 cfs Nov. 24 (gage height, 11.06 ft), from rating curve extended above 4,400 cfs on basis of flow at station upstream near Bull Run where the curve is defined to 7,200 cfs; minimum, 9 cfs Sept. 24; minimum daily, 10 cfs Sept. 23.

1949-51: Maximum discharge, 11,400 cfs Feb. 24, 1950 (gage height, 12.45 ft); minimum, that of Sept. 24, 1951; minimum daily, that of Sept. 23, 1951.

Remarks.--Records good. About 85,000 acre-ft annually diverted above station by Portland Water Bureau. Low and medium flows largely regulated by Portland General Electric Co.'s powerplant but only slight regulation at extreme high flows. Some water which passes through powerplant is diverted from Sandy River.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 25

Jan. 26 to Sept. 30

3.0	180	6.0	1,410	0.3	9.0	3.5	280
3.5	275	6.5	1,850	.5	14	4.0	430
4.0	410	7.0	2,350	1.0	32	5.0	550
4.5	580	8.0	3,510	1.5	56	6.0	1,440
5.0	800	9.0	4,800	2.0	89	7.0	2,350
5.5	1,070	10.0	6,400	2.5	132	8.0	3,510
				3.0	188	9.5	5,600

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	252	4,230	1,950	2,580	1,290	1,020	1,450	1,800	922	498	554	337
2	652	6,280	1,700	4,820	1,550	964	1,470	1,980	847	664	590	28
3	511	4,610	1,800	4,450	2,070	963	1,630	1,780	303	648	448	31
4	668	2,740	4,040	2,840	2,030	685	1,950	2,100	921	652	160	571
5	791	1,940	3,540	2,280	2,070	1,010	1,840	2,140	968	706	46	568
6	1,020	*1,860	5,640	1,910	2,390	961	1,830	2,020	946	675	636	370
7	1,100	1,660	4,600	1,710	3,770	953	1,860	2,180	890	660	616	409
8	2,050	2,040	3,000	1,580	4,140	992	1,730	1,960	891	565	576	130
9	2,060	1,640	2,280	1,480	4,260	959	1,640	1,770	810	647	446	14
10	1,560	*1,430	1,930	1,390	3,490	926	1,750	1,750	191	656	340	550
11	1,460	1,380	1,890	1,390	4,490	418	1,740	2,070	850	*608	171	530
12	1,250	1,230	1,790	1,370	4,640	997	1,810	1,900	980	628	127	430
13	1,070	1,210	1,580	2,180	2,810	*1,630	1,810	1,680	850	630	538	398
14	968	1,160	1,480	5,180	2,290	1,780	1,920	1,580	801	629	*594	146
15	924	1,220	*1,520	3,840	1,940	3,220	1,630	1,420	758	359	547	19
16	838	1,640	2,120	2,900	1,690	3,440	1,810	1,440	654	638	440	17
17	1,040	2,670	2,010	4,640	1,510	2,230	*1,770	1,440	73	624	380	554
18	1,580	2,860	1,790	2,980	1,510	1,780	1,690	1,340	798	633	204	542
19	2,160	2,020	1,600	2,270	1,420	1,570	1,510	1,260	753	612	40	530
20	3,100	2,720	1,460	1,810	1,360	1,540	1,340	921	602	616	565	299
21	2,120	2,960	1,430	3,730	1,360	1,740	1,230	1,190	644	610	564	330
22	1,540	2,660	1,710	3,430	1,320	1,720	898	1,170	647	117	558	15
23	1,370	2,300	4,000	*2,710	1,260	1,530	1,150	1,280	636	620	434	10
24	1,120	6,070	2,430	5,240	1,210	1,450	1,130	1,350	381	598	338	523
25	1,340	4,750	1,920	5,220	846	1,370	1,130	1,540	632	810	100	536
26	1,640	3,240	1,680	5,210	1,130	1,540	1,190	1,360	630	617	16	493
27	1,730	3,200	2,080	3,290	1,040	1,590	1,300	936	655	553	554	386
28	3,000	2,470	2,930	2,230	1,010	1,490	2,280	*1,180	659	370	588	310
29	5,800	1,950	4,160	1,820	-	1,510	2,000	1,100	655	43	577	312
30	3,920	1,970	2,790	1,570	-	1,610	1,880	990	655	583	450	670
31	2,870	-	2,840	1,430	-	1,520	-	962	-	594	332	-
Total	51,504	78,090	75,690	89,480	59,896	45,128	48,168	47,589	20,882	17,653	12,529	10,028
Mean	1,661	2,603	2,442	2,886	2,139	1,456	1,606	1,535	696	569	404	334
Ac-ft	102,200	154,900	150,100	177,500	118,800	89,510	95,540	94,390	41,420	35,010	24,850	19,890
Calendar year 1950: Max	9,210			Min	51	Mean	1,717	Ac-ft	1,243,000			
Water year 1950-51: Max	6,260			Min	10	Mean	1,525	Ac-ft	1,104,000			

\* Discharge measurement made on this day.

Sandy River below Bull Run River, near Bull Run, Oreg.

Location.--Lat 45°27'20", long. 122°14'50", in NW<sup>1</sup>/<sub>4</sub> sec. 30, T. 1 S., R. 5 E., on left bank 1 mile downstream from Bull Run River and 2 miles northwest of Bull Run.

Drainage area.--440 sq mi.

Records available.--April 1910 to September 1914, October 1929 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 202 ft (from river-profile map). Prior to Oct. 31, 1929, staff gage at site three-quarters of a mile upstream at different datum.

Average discharge.--25 years (1910-11, 1912-14, 1929-51), 2,272 cfs.

Extremes.--Maximum discharge during year, 15,100 cfs Nov. 2 (gage height, 10.71 ft); minimum, 69 cfs sometime in August or September during period of no gage-height record; minimum daily, 75 cfs Sept. 3, 23.

1910-14, 1929-51: Maximum discharge, 58,000 cfs Mar. 31, 1931 (gage height, 20.6 ft), from rating curve extended above 18,000 cfs; minimum, 53 cfs Oct. 4, 1931 (gage height, 0.53 ft); minimum daily, that of Sept. 3, 23, 1951.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station for irrigation during year, about 65,000 acre-ft was diverted from Bull Run by Portland Water Bureau. Flow slightly regulated by Bull Run Lake and Lake Ben Morrow of Portland Water Bureau; considerable diurnal fluctuation by Bull Run powerplant of Portland General Electric Co.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.8	75	4.0	1,810
1.1	140	5.5	3,460
1.5	275	7.0	5,960
2.0	485	9.0	10,200
3.0	1,020	10.0	12,900

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	363	7,690	3,600	4,600	2,450	1,580	2,590	3,210	1,610	626	600	380
2	688	12,900	3,000	9,000	2,920	1,470	2,700	3,540	1,500	757	600	80
3	595	8,540	3,400	8,000	4,020	1,440	3,360	3,230	929	736	400	75
4	756	5,580	7,500	5,500	3,980	1,330	4,280	4,250	1,540	803	180	650
5	1,000	4,270	7,000	4,400	4,180	1,560	4,490	4,490	1,700	816	90	550
6	1,990	*3,520	11,000	3,400	4,710	*1,440	3,980	4,320	1,610	786	700	420
7	1,910	3,020	10,000	3,000	8,120	1,410	4,100	4,790	1,480	733	650	460
8	2,880	3,600	6,500	2,800	9,240	1,470	3,750	4,250	1,430	638	600	170
9	2,800	2,840	5,000	2,500	9,300	1,380	3,420	3,880	1,280	700	480	80
10	2,010	2,400	4,400	2,400	8,080	1,310	3,420	3,970	685	714	380	600
11	1,840	2,230	4,200	2,250	9,960	816	3,300	4,870	1,280	680	190	600
12	1,490	2,120	3,800	2,230	10,500	1,480	3,400	4,250	1,280	682	150	500
13	1,230	1,950	3,400	3,760	6,760	2,760	4,140	3,570	1,290	*695	600	440
14	1,100	1,820	3,200	11,200	5,170	3,090	4,510	3,200	1,230	668	*650	170
15	1,070	1,970	*3,000	8,560	4,290	7,270	5,990	2,840	1,200	418	600	80
16	993	3,060	3,400	6,200	3,590	7,010	4,050	2,930	1,070	672	500	75
17	1,290	5,490	3,200	10,500	3,160	4,490	*3,990	3,140	446	670	420	650
18	2,240	5,370	3,000	6,740	3,020	3,420	3,710	2,960	1,100	679	230	600
19	3,200	3,580	2,900	4,920	2,680	3,050	3,120	2,640	1,040	646	80	600
20	4,620	5,390	2,800	3,820	2,570	3,150	2,640	2,200	858	654	650	360
21	3,030	6,190	2,600	7,110	2,540	3,600	2,320	2,470	864	642	650	360
22	2,180	5,430	4,200	*6,540	2,330	3,400	1,880	2,500	863	170	600	80
23	1,840	4,570	7,500	5,660	2,230	2,860	2,060	2,780	837	649	480	75
24	1,490	11,800	4,600	11,000	2,070	2,650	2,020	2,830	579	654	380	600
25	1,750	9,500	3,900	10,900	1,640	2,610	2,060	3,050	796	635	120	600
26	2,120	6,720	2,800	*11,300	1,850	2,980	2,230	2,570	779	638	80	550
27	2,370	6,240	3,600	7,390	1,680	2,960	2,490	1,990	827	622	600	440
28	4,600	4,710	5,500	5,080	1,610	2,730	4,160	2,250	784	450	650	360
29	9,120	4,000	7,500	4,010	-	2,790	3,890	2,030	754	120	600	360
30	6,760	3,800	5,000	3,300	-	2,950	1,810	749	600	500	800	-
31	4,950	-	5,000	2,820	-	2,740	-	*1,700	-	640	380	-
Total	74,075	150,280	146,300	180,790	124,650	83,196	98,970	98,510	32,390	19,597	13,790	11,865
Mean	2,390	5,009	4,719	5,832	4,452	2,684	3,299	3,178	1,080	632	445	396
Cfsm	5.43	11.4	10.7	15.5	10.1	6.10	7.50	7.22	2.45	1.44	1.01	0.900
In.	6.26	12.70	12.37	15.28	10.54	7.03	8.37	8.33	2.74	1.66	1.17	1.01
Ac-ft	146,900	298,100	290,200	358,600	247,200	165,000	196,300	195,400	64,240	38,870	27,350	23,530

Calendar year 1950: Max 22,000 Min 205 Mean 3,231 Cfsm 7.34 In. 99.68 Ac-ft 2,339,000  
 Water year 1950-51: Max 12,900 Min 75 Mean 2,834 Cfsm 6.44 In. 87.46 Ac-ft 2,052,000

Peak discharge (base, 17,000 cfs).--No peak above base.

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 29 to Jan. 8, July 30 to Sept. 30; discharge computed on basis of recorded range in stage when available, weather records, and records for station at Marmot and Bull Run River at Bull Run.



West Fork Washougal River near Washougal, Wash.

Location--Lat 45°37'00", long. 122°13'00", near center sec. 32, T. 2 N., R. 5 E., on right bank 100 ft downstream from road crossing, 1,000 ft upstream from mouth, and 7 miles northeast of Washougal.

Drainage area--30.3 sq mi.

Records available--June to September 1951 (discontinued).

Gage--Water-stage recorder. Altitude of gage is 440 ft (from topographic map).

Extremes--Maximum discharge during period, 855 cfs Sept. 30 (gage height, 4.35 ft); minimum, 15 cfs Sept. 16, 22 (gage height, 2.03 ft).

Remarks--Records excellent except those for period of shifting control, which are good. No regulation or diversion.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	37	25	21
2									-	37	25	20
3									-	*39	25	19.5
4									-	51	25	18.5
5									-	40	24	18.5
6									-	42	23	19.5
7									-	35	22	25
8									(*)	33	23	24
9									-	33	24	19.5
10									-	32	*24	19
11									-	29	25	19
12									-	28	25	19
13									-	28	24	17
14									-	29	23	*16
15									-	29	22	15.5
16									-	28	22	16
17									-	28	21	16.5
18									-	29	21	16.5
19									-	28	20	17
20									-	28	19.5	16.5
21									-	28	19	16
22									-	27	19	15.5
23									-	45	26	17
24									-	44	27	19.5
25									-	43	*26	19.5
26									-	42	27	19.5
27									-	41	25	19.5
28									-	39	25	44
29									-	37	25	28
30									-	56	25	25
31									-	-	25	22
Total									-	949	715.0	1,283.0
Mean									-	30.6	23.1	42.8
Cfs/m									-	1.01	0.762	1.41
In.									-	1.16	0.88	1.57
Ac-ft									-	1,880	1,420	2,540
Calendar year	: Max			Min	Mean	Cfs/m	In.	Ac-ft				
Water year	: Max			Min	Mean	Cfs/m	In.	Ac-ft				

\* Discharge measurement made on this day.

Note.--Shifting-control method used July 4-25.

## Washougal River near Washougal, Wash.

Location.--Lat 45°37'20", long. 122°18'00", in SE $\frac{1}{4}$  sec. 27, T. 2 N., R. 4 E., on right bank half a mile upstream from Cougar Creek and  $5\frac{1}{2}$  miles northeast of Washougal.

Drainage area.--108 sq mi.

Records available.--September 1944 to September 1951.

Gage.--Staff gage and crest-stage indicator; gage read twice daily. Altitude of gage is 175 ft (from topographic map).

Average discharge.--7 years, 919 cfs.

Extremes.--Maximum discharge during year, 11,300 cfs Dec. 23 (gage height, 10.74 ft), from rating curve extended above 5,300 cfs; minimum observed, 46 cfs Sept. 22 (gage height, 1.39 ft).

1944-51: Maximum discharge, 27,100 cfs Feb. 17, 1949, Feb. 24, 1950 (gage height, 15.5 ft, from graph based on gage readings), from rating curve extended above 5,300 cfs; minimum observed, that of Sept. 22, 1951.

Remarks.--Records good. No diversion or regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.3	39	2.6	363	6.0	2,880
1.5	58	3.0	580	7.0	4,200
1.7	91	3.5	845	8.0	5,770
2.0	164	4.0	1,140	9.0	7,540
2.3	258	5.0	1,890		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	*93	3,120	1,320	1,940	845	515	1,110	550	234	104	61	56
2	91	3,240	1,110	3,910	872	475	1,140	500	221	104	64	56
3	120	2,120	1,770	3,370	1,650	505	1,350	470	208	123	64	55
4	317	1,650	5,120	2,600	1,210	525	1,530	615	199	159	64	52
5	762	1,880	2,660	2,070	1,080	465	1,280	615	218	132	61	51
6	1,810	1,080	3,240	1,460	1,210	430	1,180	605	309	132	62	51
7	1,810	1,050	2,770	1,210	2,250	406	1,180	610	269	127	61	60
8	1,320	*1,020	1,940	1,080	2,880	406	1,020	540	*234	109	61	78
9	960	900	1,420	930	4,650	378	960	465	218	100	67	58
10	1,080	818	1,210	845	3,370	360	900	440	218	87	66	54
11	1,350	680	1,180	845	5,770	360	845	500	218	84	66	54
12	735	630	*1,080	790	3,500	475	980	440	218	78	66	54
13	540	555	960	1,110	1,890	1,320	960	485	215	84	66	51
14	440	555	900	3,370	1,420	1,210	900	475	202	86	61	47
15	383	960	1,280	2,660	1,180	3,120	790	445	190	84	60	48
16	330	2,400	2,400	2,200	990	2,300	730	397	176	80	58	47
17	430	3,500	1,480	3,500	930	1,380	670	370	164	78	56	47
18	790	2,200	1,180	2,120	990	1,110	600	338	159	80	56	47
19	1,380	1,380	990	1,530	872	1,180	500	317	153	80	56	47
20	1,730	2,120	872	1,240	930	1,240	460	300	153	78	55	47
21	930	3,630	790	3,370	900	1,570	397	285	150	78	54	47
22	724	2,770	1,350	2,500	845	1,380	356	269	137	73	54	46
23	605	2,550	6,990	2,300	790	1,080	334	321	137	73	54	47
24	510	5,770	2,600	4,050	790	990	*338	325	132	73	54	49
25	630	2,880	1,570	3,910	718	1,020	352	334	132	*73	54	130
26	1,140	2,120	1,240	4,050	655	1,110	360	317	132	73	52	93
27	1,570	2,400	1,180	2,400	590	*1,110	360	300	132	75	52	64
28	2,880	1,650	3,120	1,570	535	1,020	790	285	125	75	170	93
29	2,720	1,320	3,000	1,210	-	1,180	735	262	115	68	91	173
30	1,980	1,520	2,550	*1,050	-	1,320	605	251	109	62	*64	2,500
31	2,160	-	2,550	900	-	1,140	-	248	-	64	60	-
Total	32,320	57,778	61,632	66,090	44,312	31,080	23,692	12,674	5,477	2,776	1,990	4,302
Mean	1,043	1,926	1,986	2,132	1,583	1,003	730	409	183	89.6	64.2	143
Cfsm	9.66	17.8	18.4	19.7	14.7	9.29	7.31	3.79	1.69	0.830	0.594	1.32
In.	11.13	19.90	21.22	22.76	15.26	10.70	8.16	4.36	1.89	0.96	0.69	1.48
Ac-ft	64,110	114,600	122,200	131,100	87,890	61,650	46,990	25,140	10,860	5,510	3,950	8,530
Calendar year 1950: Max	18,400	Min	54	Mean	1,161	Cfsm	10.8	In.	145.87	Ac-ft	840,100	
Water year 1950-51: Max	6,990	Min	46	Mean	943	Cfsm	8.73	In.	118.51	Ac-ft	682,500	

Peak discharge (base, 5,000 cfs).--Nov. 24 (time unknown) 8,520 cfs (9.46 ft); Dec. 4 (time unknown) 6,990 cfs (8.7 ft); Dec. 23 (time unknown) 11,300 cfs (10.74 ft); Feb. 11 (time unknown) 7,170 cfs (8.75 ft); Mar. 15 (time unknown) 5,120 cfs (7.6 ft).

\* Discharge measurement made on this day.

Little Washougal River near Washougal, Wash.

Location.--Lat 45°36'45", long. 122°21'30", in SE $\frac{1}{4}$  sec. 31, T. 2 N., R. 4 E., on right bank 20 ft downstream from highway bridge, 1 mile upstream from mouth, and 2 $\frac{1}{2}$  miles north of Washougal.

Drainage area.--23.8 sq mi.

Records available.--June to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 115 ft (from topographic map).

Extremes.--Maximum discharge during period, 106 cfs Sept. 30 (gage height, 4.48 ft); minimum, 4.6 cfs Sept. 4, 14, 22.

Remarks.--Records good. Some diversion for domestic use. No regulation.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	10.5	7.4	5.8
2									-	*12	7.8	5.5
3									-	13	7.8	5.5
4									-	21	7.4	5.2
5									-	26.5	7.1	5.2
6									-	19	6.8	6.1
7									-	15	7.1	8.2
8									+25	12.5	7.4	8.6
9									-	12.5	8.2	6.4
10									-	13	*8.2	5.8
11									-	10.5	8.2	5.8
12									-	9.0	8.2	5.8
13									-	9.4	8.2	5.5
14									-	9.8	7.8	*4.9
15									-	9.8	7.1	4.9
16									-	9.4	7.1	5.2
17									-	9.4	7.0	5.8
18									-	10	6.8	5.8
19									-	9.8	6.8	6.1
20									-	9.4	6.4	5.8
21									-	9.0	6.1	5.2
22									-	15.5	8.6	5.2
23									-	14	8.6	7.1
24									-	14	8.6	7.1
25									-	14	*8.6	7.1
26									-	13	8.2	7.1
27									-	13	7.8	7.1
28									-	12	7.8	7.1
29									-	11	7.8	8.2
30									-	10.5	7.8	6.8
31									-	-	7.4	6.1
Total									-	331.7	224.9	278.6
Mean									-	10.7	7.25	9.29
Cfsm									-	0.450	0.305	0.390
In.									-	0.52	0.35	0.44
Ac-ft									-	658	446	553

Calendar year	: Max	Min	Mean	Cfsm	In.	Ac-ft
Water year	: Max	Min	Mean	Cfsm	In.	Ac-ft

\* Discharge measurement made on this day.

† Result of discharge measurement made on this day.

## WASHOUGAL RIVER BASIN

Lacamas Creek at Proebstel, Wash.

Location.--Lat 45°40'30", long. 122°29'15", in W½ sec. 7, T. 2 N., R. 3 E., on right bank 150 ft upstream from highway crossing at Proebstel.

Drainage area.--22.5 sq mi.

Records available.--June to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 210 ft (from topographic map).

Extremes.--Maximum discharge during period, 58 cfs Sept. 30 (gage height, 1.96 ft); minimum, 0.1 cfs Aug. 12 (gage height, 1.04 ft).

Remarks.--Records good. No regulation. Some diversion for irrigation and domestic use.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	3.2	1.9	1.9
2										*4.3	2.4	1.7
3									-	5.6	2.1	1.4
4									-	12.5	1.7	2.6
5									-	9.3	1.9	2.1
6									-	11.5	1.7	2.6
7									†15	7.1	1.5	3.5
8									-	4.7	1.7	4.3
9									-	3.5	2.4	2.9
10									-	4.3	*2.6	1.9
11									-	5.2	1.5	1.7
12									-	.9	2.4	1.7
13									-	1.9	2.4	1.7
14									-	2.6	1.9	*1.1
15									-	2.9	1.2	.9
16									-	2.6	1.9	.9
17									-	2.6	1.5	.9
18									-	3.2	1.7	.5
19									-	2.6	1.9	1.4
20									-	1.9	1.9	1.5
21									-	2.9	1.1	2.1
22									4.7	2.6	1.2	1.5
23									4.7	2.1	1.4	1.4
24									5.2	2.6	1.7	2.4
25									4.7	*2.9	1.4	9.3
26									3.5	2.6	1.4	5.6
27									3.5	2.4	1.9	2.9
28									2.9	2.1	2.1	5.6
29									3.9	2.4	3.5	9.3
30									3.9	2.1	2.4	3.5
31									-	1.9	2.1	-
Total									-	119.0	58.4	112.3
Mean									-	3.84	1.88	3.74
Cfsm									-	0.171	0.084	0.166
In.									-	0.20	0.10	0.19
Ac-ft									-	236	116	223
Calendar year	: Max		Min		Mean		Cfsm		In.	Ac-ft		
Water year	: Max		Min		Mean		Cfsm		In.	Ac-ft		

\* Discharge measurement made on this day.

† Result of discharge measurement made on this day.

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., on right bank 400 ft upstream from Salt Creek and 2 miles southwest of Oakridge.

Drainage area.--392 sq mi.

Records available.--October 1913 to September 1914, September 1935 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,202.8 ft above mean sea level (from river-profile survey). October 1913 to September 1914 staff gage at site 600 ft upstream at different datum.

Average discharge.--17 years, 1,092 cfs.

Extremes.--Maximum discharge during year, 27,400 cfs Oct. 29 (gage height, 10.97 ft), from rating curve extended above 13,000 cfs by logarithmic plotting; minimum, 320 cfs Sept. 21-25, 1913-14. Maximum discharge, 34,000 cfs Dec. 28, 1945 (gage height, 12.06 ft), from rating curve extended above 13,000 cfs by logarithmic plotting; minimum, 201 cfs Nov. 27 to Dec. 2, 1936 (gage height, 1.53 ft).

Remarks.--Records good.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Sept. 30			
2.3	330	5.0	3,410	2.5	320	5.0	2,900
2.5	440	6.0	5,760	3.0	540	6.0	5,260
3.0	790	7.0	8,900	3.5	880	8.0	12,200
4.0	1,820			4.0	1,350	10.0	22,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	346	3,590	2,180	1,480	1,500	944	1,310	1,340	944	546	383	359
2	341	5,560	1,960	2,040	1,460	912	1,280	*1,270	912	535	383	359
3	*380	4,450	4,450	2,880	1,520	888	1,430	1,280	904	525	379	355
4	482	3,290	7,800	2,160	6,670	944	1,710	1,320	928	520	379	352
5	734	2,480	5,200	1,770	8,230	1,010	1,780	1,350	904	520	379	348
6	925	1,990	6,690	1,560	6,600	996	1,750	1,510	880	505	375	348
7	665	*1,700	8,510	1,430	6,970	944	1,770	1,790	856	490	371	348
8	600	1,580	5,460	1,350	6,050	944	1,740	1,640	832	475	371	348
9	642	1,460	3,910	1,320	4,350	1,040	1,740	1,560	824	470	367	344
10	513	1,270	3,140	1,360	3,890	978	1,750	1,620	848	465	367	341
11	452	1,130	2,880	1,440	4,250	928	1,770	2,100	872	450	367	341
12	424	1,130	*2,640	1,380	3,820	928	1,920	2,050	888	450	367	*341
13	396	1,030	2,300	1,400	3,040	1,140	2,240	1,920	864	450	367	338
14	385	978	2,370	2,800	2,490	1,710	2,400	1,750	872	436	363	334
15	396	969	2,210	2,920	2,210	3,120	2,400	1,580	912	436	363	330
16	390	2,310	1,970	2,510	1,940	3,400	2,370	1,530	912	431	359	327
17	506	3,860	1,820	5,160	1,780	2,600	2,230	1,590	856	426	359	327
18	750	7,909	1,670	3,600	1,640	1,900	2,000	1,590	808	426	355	327
19	565	3,800	1,610	2,470	1,520	1,800	1,790	1,500	*758	422	355	327
20	506	3,940	1,540	1,940	1,440	2,030	1,620	1,440	730	422	352	324
21	565	3,340	1,440	4,210	1,370	*2,330	1,440	1,440	716	413	352	324
22	506	2,510	1,350	4,180	1,310	2,020	1,330	1,480	695	408	352	320
23	462	2,030	1,300	*4,820	1,230	1,680	1,250	1,560	674	404	352	320
24	433	2,130	1,240	6,750	1,180	1,530	1,200	1,440	654	400	348	320
25	522	2,310	1,190	4,930	1,120	1,610	1,170	1,370	636	400	348	327
26	698	2,190	1,130	4,350	1,070	1,630	1,170	1,330	624	400	348	334
27	1,590	2,240	1,080	3,510	1,020	1,540	1,190	1,330	600	395	348	327
28	8,510	1,980	1,270	2,740	987	1,440	1,790	1,240	588	395	371	327
29	20,800	1,790	1,660	2,160	-	1,570	1,660	1,130	570	395	400	330
30	8,720	2,100	1,610	1,850	-	1,540	1,460	1,040	558	391	379	387
31	4,210	-	1,610	1,640	-	1,390	-	987	-	*587	363	-
Total	57,414	76,227	85,190	84,110	80,657	47,436	50,660	46,077	23,619	13,788	11,322	10,134
Mean	1,852	2,541	2,748	2,713	2,681	1,530	1,689	1,486	787	445	365	338
Cfsm	4.72	6.48	7.01	6.92	7.35	3.90	4.31	3.79	2.01	1.14	0.931	0.862
In.	5.45	7.23	8.08	7.98	7.65	4.50	4.81	4.37	2.24	1.31	1.07	0.96
Ac-ft	113,900	151,200	169,000	166,800	160,000	94,090	100,500	91,390	46,850	27,350	22,460	20,100

Peak discharge (base, 4,800 cfs).--Oct. 29 (5 a.m.) 27,400 cfs (10.97 ft); Nov. 2 (6 to 9 a.m.) 5,700 cfs (6.15 ft); Nov. 18 (4:30 a.m.) 9,200 cfs (7.24 ft); Dec. 4 (10 a.m.) 8,610 cfs (7.07 ft); Dec. 7 (6:30 a.m.) 8,900 cfs (7.43 ft); Jan. 17 (12:30 p.m.) 6,810 cfs (6.52 ft); Jan. 21 (5 to 6 p.m.) 5,870 cfs (6.21 ft); Jan. 24 (1 a.m.) 7,540 cfs (6.75 ft); Feb. 4 (9 to 10 p.m.) 10,600 cfs (7.60 ft); Mar. 15 (8:30 p.m.) 5,010 cfs (5.91 ft).

\* Discharge measurement made on this day.

## Salt Creek near Oakridge, Oreg.

Location.--Lat 42°43'45", long. 122°25'25", in SW $\frac{1}{4}$  sec. 23, T. 21 S., R. 3 E., on right bank 0.7 mile upstream from mouth and 2 miles southeast of Oakridge.

Drainage area.--113 sq mi.

Records available.--July 1913 to September 1914, October 1933 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,245.67 ft above mean sea level, datum of 1929. July 19, 1913, to Sept. 30, 1914, staff gage at site 0.6 mile downstream at different datum.

Average discharge.--19 years, 293 cfs.

Extremes.--Maximum discharge during year, 4,500 cfs Oct. 29 (gage height, 8.00 ft), from logarithmic extension of rating curve above 2,600 cfs; minimum, 122 cfs Sept. 20-25. 1913-14, 1933-51: Maximum discharge, that of Oct. 29, 1950; minimum, 55 cfs Jan. 8, 1937 (computed on basis of records for Salmon Creek near Oakridge).

Remarks.--Records fair. In spring of 1948, a small diversion was begun around gage to new millpond downstream and has been used intermittently since. No record kept of diversion.

Revisions (water years).--W 1014: 1943.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 5

Mar. 6 to Sept. 30

2.1	118	5.0	1,560	2.0	110	3.5	500
2.5	232	6.0	2,390	2.5	210	4.2	810
3.0	425	7.0	3,400	3.0	330		
4.0	945						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	135	854	525	425	413	282	382	419	382	224	144	136
2	132	1,580	490	535	405	275	379	399	375	218	142	154
3	145	1,230	708	635	397	287	409	*402	376	214	142	132
4	161	927	1,120	555	945	282	462	444	382	216	142	130
5	239	737	945	461	1,260	275	477	458	370	210	140	130
6	260	*620	1,140	401	1,230	284	481	544	366	204	140	130
7	242	532	1,470	365	1,290	286	481	647	354	196	138	130
8	239	563	1,080	345	1,190	289	485	608	345	188	138	130
9	242	501	862	329	1,010	284	489	592	339	186	140	128
10	199	417	752	325	901	276	496	629	351	182	140	128
11	178	381	747	325	956	271	508	795	360	180	138	126
12	164	377	*692	309	879	276	548	720	366	178	138	*128
13	156	373	600	321	752	313	616	647	360	176	138	124
14	153	361	590	448	655	392	665	592	360	172	138	124
15	156	349	545	500	605	688	678	556	379	170	136	124
16	150	515	485	470	550	735	674	560	376	170	136	124
17	193	681	443	791	500	548	665	629	351	166	134	124
18	232	1,020	405	655	461	470	638	634	*330	164	134	124
19	193	764	393	530	425	451	608	600	313	164	134	124
20	187	846	389	443	397	*512	560	588	302	160	132	122
21	199	758	365	725	385	560	492	604	297	160	132	122
22	184	630	341	*764	369	512	451	634	289	158	132	122
23	172	545	333	901	357	455	426	670	279	156	132	122
24	165	530	317	1,180	345	426	406	642	271	156	132	122
25	188	540	305	1,010	333	437	402	629	259	154	132	130
26	210	520	290	962	317	444	409	608	252	154	132	130
27	338	580	278	830	301	430	419	592	248	152	132	128
28	1,230	525	377	665	290	412	556	532	241	152	146	128
29	3,220	475	550	540	-	444	520	470	237	150	150	128
30	1,580	530	500	490	-	433	455	430	230	148	142	158
31	948	-	470	448	-	402	-	402	-	*146	138	-
Total	12,190	19,061	18,507	17,683	17,918	12,411	15,237	17,676	9,738	5,424	4,264	3,842
Mean	393	635	597	570	640	400	508	570	325	175	138	128
Cfs/m	3.48	5.62	5.28	5.04	5.66	3.54	4.50	5.04	2.88	1.55	1.22	1.13
In.	4.01	6.27	6.09	5.82	5.90	4.08	5.01	5.82	3.20	1.79	1.40	1.26
Ac-ft	24,180	37,810	36,710	35,070	35,540	24,620	30,220	35,060	19,320	10,760	8,460	7,620

Peak discharge (base, 800 cfs).--Oct. 29 (4 a.m.) 4,500 cfs (8.00 ft); Nov. 2 (3 p.m. to 8 p.m.) 1,500 cfs (4.95 ft); Nov. 13 (3 a.m.) 1,180 cfs (4.42 ft); Dec. 4 (11 a.m.) 1,180 cfs (4.43 ft); Dec. 7 (6:30 a.m.) 1,700 cfs (5.17 ft); Jan. 24 (5 a.m.) 1,210 cfs (4.48 ft); Feb. 7 (7:30 a.m.) 1,070 cfs (4.22 ft); Mar. 15 (7 p.m.) 988 cfs (4.53 ft).

\* Discharge measurement made on this day.

## Salmon Creek near Oakridge, Oreg.

Location--Lat 43°45'20", long. 122°23'00", in SW $\frac{1}{4}$  sec. 7, T. 21 S., R. 4 E., on right bank a quarter of a mile upstream from Slide Creek and 4 miles east of Oakridge.

Drainage area--117 sq mi at cable a quarter of a mile above gage, where all discharge measurements are made.

Records available--February 1913 to October 1919, October 1933 to September 1951.

Gage--Water-stage recorder. Datum of gage is 1,421.83 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. February 1913 to September 1914, staff gage at site 2 miles downstream, above Flat Creek, at different datum (incorrectly listed as below Flat Creek in previous publications). October 1914 to October 1919, water-stage recorder at site 1 mile downstream at different datum.

Average discharge--22 years (1913-15, 1917-19, 1933-51), 392 cfs.

Extremes--Maximum discharge during year, 4,870 cfs Oct. 29 (gage height, 6.65 ft); minimum, 136 cfs Sept. 25 (gage height, 1.38 ft).  
1913-19, 1933-51: Maximum discharge, 8,040 cfs Dec. 28, 1945 (gage height, 8.40 ft), from rating curve extended above 4,000 cfs by logarithmic plotting; minimum, 63 cfs Jan. 8, 1937 (gage height, 0.87 ft).

Remarks--Records good except those for period of no gage-height record, which are fair.

No regulation. Since 1936 village of Oakridge has diverted water around station in an 8-inch pipe. Tunnel and control gates that were built to divert part of outflow from Waldo Lake into Salmon Creek basin were not used during year but there is leakage under control gates, 8.0 cfs measured on Aug. 23, 1951.

Revisions (water years)--W 794: 1934. W 814: Drainage area. W 1124: 1935, 1942(M), 1943, 1946(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 4

Feb. 5 to Sept. 30

1.5	150	4.0	1,460	1.4	140	3.0	800
2.0	280	5.0	2,550	1.7	200	4.0	1,570
2.5	470	6.1	4,020	2.0	280	5.0	2,550
3.0	740			2.5	510		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	168	1,380	642	570	600	400	535	475	344	208	172	158
2	166	3,210	592	680	600	380	525	*460	332	208	170	156
3	*185	1,920	972	860	550	580	578	475	328	205	170	156
4	200	1,240	2,020	728	1,500	400	686	510	328	208	170	154
5	259	926	1,640	614	2,200	380	728	535	324	208	168	152
6	310	*734	1,890	545	2,000	400	728	632	312	205	166	152
7	274	614	2,290	505	2,100	400	734	710	304	200	166	152
8	256	586	1,650	470	1,800	400	728	656	296	196	166	152
9	268	520	1,220	448	1,600	400	728	632	288	196	166	150
10	226	461	1,000	448	1,400	580	722	650	288	194	168	148
11	205	425	*920	448	1,500	380	728	830	288	190	166	148
12	192	434	830	425	1,300	380	788	770	288	190	166	*148
13	168	397	728	448	1,100	460	881	740	284	188	166	146
14	180	381	740	770	950	600	944	698	274	188	164	144
15	185	385	652	850	850	1,000	937	644	277	186	164	142
16	180	576	592	758	800	1,200	909	638	274	186	162	142
17	215	758	555	1,060	700	800	860	662	262	184	162	142
18	247	1,270	520	902	650	700	782	644	*256	184	162	142
19	218	966	485	734	600	650	710	590	248	182	160	140
20	215	1,000	461	620	550	700	650	572	245	182	160	140
21	229	940	425	890	520	764	566	566	240	180	158	140
22	210	800	413	985	500	716	520	578	238	180	158	140
23	202	680	401	*1,370	480	644	490	590	232	178	158	140
24	195	716	381	2,310	480	596	470	545	230	178	158	140
25	218	770	365	1,840	460	602	460	515	228	178	156	152
26	232	728	349	1,690	460	608	455	495	222	176	156	148
27	353	740	358	1,390	440	596	470	475	220	176	156	144
28	1,600	558	502	1,080	420	572	440	440	218	174	144	144
29	3,990	598	758	878	-	602	550	410	212	174	178	146
30	2,040	642	686	764	-	596	500	380	210	174	168	170
31	1,180	-	650	669	-	560	-	356	-	*172	160	-
Total	14,786	25,449	25,627	26,729	27,110	17,646	19,946	17,873	8,090	5,828	5,096	4,428
Mean	477	848	827	862	968	569	665	577	270	185	164	148
Cfs/m	4.08	7.26	7.07	7.37	8.27	4.86	5.68	4.93	2.51	1.61	1.40	1.26
In.	4.70	8.09	8.15	8.50	8.62	5.61	6.34	5.68	2.57	1.85	1.62	1.41
Ac-ft	29,330	50,480	50,830	53,020	53,770	35,000	39,560	35,450	16,050	11,560	10,110	8,780

Calendar year 1950: Max 3,990 Min 164 Mean 598 Cfs/m 5.11 In. 69.41 Ac-ft 433,200  
Water year 1950-51: Max 3,990 Min 140 Mean 544 Cfs/m 4.65 In. 63.14 Ac-ft 393,900

Peak discharge (base, 1,500 cfs)--Oct. 29 (6:30 a.m.) 4,870 cfs (6.65 ft); Nov. 2 (5 a.m.) 3,640 cfs (5.84 ft); Dec. 4 (12 m.) 2,190 cfs (4.70 ft); Dec. 7 (4:30 a.m.) 2,540 cfs (4.89 ft); Jan. 24 (3 a.m.) 2,420 cfs (4.69 ft); Feb. 4 (about 9 p.m.) 2,550 cfs (5.00 ft); Mar. 15 (about 7 p.m.), discharge unknown.

\* Discharge measurement made on this day.

Note--No gage-height record Feb. 1 to Mar. 20; discharge estimated on basis of recorded range in stage and records for Salt Creek near Oakridge.

## Waldo Lake Outlet near Oakridge, Oreg.

Location.--Lat 43°46'00", long. 122°03'10", in NW¼ sec. 7, T. 21 S., R. 6 E., on right bank on artificial outlet channel of Waldo Lake, 20 miles east of Oakridge.

Drainage area.--30 sq mi, approximately.

Records available.--October 1936 to September 1951.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 5,410 ft (from topographic map).

Average discharge.--15 years, 30.6 cfs.

Extremes.--Maximum discharge during year, 125 cfs Jan. 23 (gage height, 2.66 ft); maximum gage height, 2.85 ft sometime from Jan. 29 to Feb. 15 (backwater from tree); no flow Sept. 16-30.

1936-51: Maximum discharge, 144 cfs Jan. 2, 1943 (gage height, 2.98 ft), from rating curve extended above 90 cfs; no flow at times.

Remarks.--Records good except those for period of no gage-height record and those below 3 cfs, which are poor. At times seiches on Waldo Lake cause rapid changes in stage at gage several times per hour. Lake not artificially regulated. Diversion tunnel into head of Black Creek, near south end of lake, built about 1914, is not used; but there is leakage past control gates, 8.0 cfs measured on Aug. 23, 1951.

Rating table, water year 1950-51, (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from tree Feb. 16 to July 6)

0	0	1.0	31
.1	1.3	2.0	84
.3	5.8	2.7	128
.6	15		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.6	45	76	88	a85	80	73	53	51	34	13	0.8
2	*4.4	58	77	92	a90	79	71	52	50	34	13	.6
3	4.1	62	81	95	a90	80	70	52	50	33	12	.5
4	4.8	62	86	96	a100	86	68	53	49	32	11	.4
5	6.6	61	86	95	a105	91	67	54	49	31	9.4	.3
6	8.8	61	94	94	a110	96	66	54	49	*33	9.1	.3
7	9.1	61	100	91	a110	99	64	55	48	34	8.2	.3
8	9.4	62	101	89	a110	99	63	55	47	33	7.7	.3
9	9.7	63	100	89	a110	101	62	54	47	31	6.9	.3
10	9.4	60	98	86	a110	100	61	54	46	31	6.3	.1
11	9.4	58	99	86	a110	98	60	56	46	31	5.8	.1
12	8.8	58	98	87	a105	97	58	57	46	28	5.3	.1
13	8.5	57	97	86	a105	95	57	58	46	27	5.1	.1
14	8.5	57	98	91	a100	94	56	58	46	26	4.6	.1
15	8.5	60	97	91	a100	94	55	57	45	25	4.1	.1
16	8.2	63	95	92	95	95	55	56	45	25	3.6	0
17	8.8	68	94	103	93	94	54	55	45	24	3.6	0
18	9.7	75	92	109	95	92	53	55	44	24	3.4	0
19	9.4	74	92	109	94	90	53	54	43	22	3.4	0
20	8.8	76	90	108	93	88	52	54	43	22	3.2	0
21	9.4	76	88	112	90	86	51	54	42	21	2.8	0
22	8.8	74	88	115	88	85	50	53	41	20	2.6	0
23	8.5	73	88	120	86	82	49	54	41	20	*2.1	0
24	8.5	73	86	124	85	80	49	54	40	20	1.5	0
25	9.1	72	84	122	85	79	48	54	39	19	1.3	0
26	12	71	82	123	83	78	47	54	38	18	1.2	0
27	14	71	80	120	82	77	47	54	38	17	1.0	0
28	22	70	83	120	81	*75	50	53	37	16	1.0	0
29	36	69	86	a115	-	75	52	53	36	15	1.0	0
30	40	72	87	a110	-	76	52	52	35	15	.9	0
31	41	-	89	a100	-	74	-	52	-	14	.9	-
Total	368.6	1,982	2,794	3,184	2,700	2,715	1,713	1,693	1,322	775	155.0	4.4
Mean	11.9	65.4	90.1	102	96.4	87.6	57.1	54.3	44.1	25.0	5.00	0.147
Ac-ft	732	3,890	5,540	6,280	5,360	5,590	3,400	3,340	2,620	1,540	307	8.7
Calendar year 1950: Max	101			Min 4.1		Mean 53.0		Ac-ft 36,360				
Water year 1950-51: Max	124			Min 0		Mean 53.0		Ac-ft 36,410				

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Odell Creek near Crescent.



## North Fork of Middle Fork Willamette River near Oakridge, Oreg.

Location.--Lat 43°45'30", long. 122°30'20", in SW $\frac{1}{4}$  sec. 7, T. 21 S., R. 3 E., on left bank 1 mile upstream from mouth and  $2\frac{1}{2}$  miles northeast of Oakridge.

Drainage area.--246 sq mi.

Records available.--October 1909 to September 1912 (fragmentary), published as "near Hazeldell" October 1913 to February 1916, September 1935 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,029.6 ft above mean sea level (river-profile survey). Oct. 12, 1909, to Sept. 30, 1912, staff gage at site half a mile downstream at different datum. Oct. 1, 1913, to July 7, 1914, staff gage at site three-quarters of a mile upstream at different datum. July 8, 1914, to Feb. 26, 1916, water-stage recorder at site half a mile upstream at different datum. Sept. 16, 1935, to Oct. 3, 1938, staff gage at present site and datum.

Average discharge.--16 years (1935-51), 765 cfs.

Extremes.--Maximum discharge during year, 10,200 cfs Oct. 29 (gage height, 12.72 ft); minimum, 86 cfs Sept. 24 (gage height, 2.61 ft); minimum daily, 122 cfs Sept. 24.

1909-16, 1935-51: Maximum discharge, 17,000 cfs Dec. 28, 1945 (gage height, 16.6 ft), from rating curve extended above 8,000 cfs by logarithmic plotting; minimum, 26 cfs Oct. 14, 1939.

Remarks.--Records good. Tunnel and control gates that were built to divert part of outflow from Waldo Lake into Salmon Creek basin were not used during year. Occasional diurnal fluctuation during low-water periods caused by log pond above station.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.8	122	5.0	1,120
3.0	171	7.0	2,800
3.5	330	9.0	5,020
4.0	540	12.0	9,110

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	150	3,020	1,360	1,190	1,230	683	994	916	540	251	177	153
2	148	7,110	1,270	1,530	1,210	650	982	*888	530	251	177	150
3	*199	4,230	1,810	1,890	1,220	644	1,100	880	525	248	171	143
4	292	2,710	4,120	1,490	2,780	705	1,330	934	500	251	177	140
5	481	1,950	3,510	1,260	5,080	705	1,400	1,040	505	255	174	134
6	590	1,540	4,540	1,110	4,910	688	1,420	1,110	490	248	171	136
7	476	*1,300	5,220	1,020	5,250	666	1,440	1,280	458	245	163	136
8	397	1,220	3,640	952	4,540	672	1,400	1,180	450	245	168	140
9	417	1,090	2,680	916	3,520	666	1,360	1,100	437	245	166	136
10	326	976	2,120	934	3,160	639	1,360	1,100	421	229	166	134
11	275	880	1,890	952	3,270	612	1,360	1,360	417	225	171	134
12	239	916	*1,730	916	2,910	622	1,440	1,340	417	217	166	*136
13	229	820	1,530	928	2,360	722	1,630	1,410	409	217	150	134
14	220	772	1,460	2,110	1,960	898	1,730	1,290	385	214	155	134
15	242	766	1,320	2,160	1,730	1,490	1,690	1,160	385	211	155	129
16	217	1,130	1,210	1,810	1,530	1,670	1,610	1,110	381	211	150	129
17	281	1,710	1,140	2,530	1,390	1,300	1,510	1,110	354	208	155	131
18	450	3,200	1,050	1,960	1,280	1,110	1,360	1,080	354	208	150	129
19	348	2,150	1,000	1,540	1,160	1,140	1,240	1,010	*340	208	153	129
20	334	2,310	952	1,320	1,080	1,260	1,120	964	326	202	145	129
21	330	2,150	886	1,810	1,030	1,390	994	934	323	198	143	129
22	302	1,790	862	2,080	964	*1,320	898	946	309	198	140	129
23	268	1,520	844	*2,960	916	1,190	832	952	292	191	148	129
24	264	1,690	790	4,900	862	1,100	796	910	295	193	143	122
25	281	1,880	744	3,630	820	1,110	766	838	288	188	143	150
26	351	1,690	705	3,460	772	1,120	766	802	281	185	140	163
27	595	1,640	694	2,830	727	1,090	796	772	275	168	140	145
28	3,320	1,410	1,050	2,230	700	1,050	1,080	716	268	162	158	145
29	8,690	1,290	1,610	1,760	-	1,120	1,070	656	258	179	202	155
30	4,650	1,360	1,440	1,530	-	1,120	962	617	251	177	179	226
31	2,670	-	1,330	1,400	-	1,040	-	578	-	*168	155	-
Total	28,032	56,280	54,507	57,308	58,361	30,192	36,476	30,981	11,464	6,630	4,951	4,209
Mean	904	1,876	1,758	1,849	2,084	974	1,216	999	382	214	160	140
Cfsm	3.67	7.83	7.15	7.52	8.47	3.96	4.94	4.06	1.55	0.870	0.650	0.569
In.	4.24	8.51	8.24	8.66	8.62	4.56	5.51	4.68	1.73	1.00	0.75	0.64
Ac-ft	56,600	111,600	108,100	113,700	115,600	59,880	72,350	61,450	22,740	13,150	9,920	8,350

Calendar year 1950: Max 8,690 Min 134 Mean 1,180 Cfsm 4.80 In. 65.09 Ac-ft 853,900  
 Water year 1950-51: Max 8,690 Min 122 Mean 1,039 Cfsm 4.22 In. 57.34 Ac-ft 752,500

Peak discharge (base, 3,500 cfs).--Oct. 29 (7:30 a.m.) 10,200 cfs (12.72 ft); Nov. 2 (6 a.m.) 8,440 cfs (11.54 ft); Nov. 18 (2 to 3 a.m.) 3,950 cfs (8.07 ft); Dec. 4 (3:30 p.m.) 4,610 cfs (8.66 ft); Dec. 6 (9:30 p.m.) 6,020 cfs (9.81 ft); Jan. 24 (3:30 a.m.) 5,220 cfs (9.17 ft); Feb. 7 (4 p.m.) 6,040 cfs (9.82 ft).

\* Discharge measurement made on this day.

Middle Fork Willamette River below North Fork near Oakridge, Oreg.

Location.--Lat 43°48'10", long. 122°33'30", in SW 1/4 sec. 27, T. 20 S., R. 2 E., on left bank half a mile below Whitehead Creek, 4 miles below North Fork of Middle Fork Willamette River, and 7 miles northwest of Oakridge.

Drainage area.--924 sq mi.

Records available.--March 1911 to September 1912 (fragmentary), July 1923 to September 1951. Published as "near Hazel Dell" 1911-12, as "at Eula" 1923-50. Records for site at Eula for 1951 were computed but not separately published; monthly means are published herein for purposes of comparison.

Gage.--Water-stage recorder. Datum of gage is 934.76 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Mar. 22, 1911, to Sept. 30, 1912, staff gage at site 4 miles upstream just below North Fork, at different datum. July 1, 1923, to Aug. 11, 1935, staff gage and Aug. 12, 1935, to Sept. 30, 1950, water-stage recorder at site 4 miles downstream at different datum.

Average discharge.--27 years (1923-26, 1927-51), 2,579 cfs.

Extremes.--Maximum discharge during year, 59,900 cfs Oct. 29 (gage height, 11.72 ft), from rating curve extended above 14,000 cfs by logarithmic plotting; minimum, 722 cfs Sept. 24.

1911-12, 1923-51: Maximum discharge, 65,200 cfs Dec. 28, 1945 (gage height, 18.8 ft, from floodmark, site and datum then in use), from rating curve extended above 39,000 cfs; minimum observed, 450 cfs Nov. 24, 25, Dec. 5, 6, 1929, Sept. 4-6, 16, 17, 1931.

Remarks.--Records good. No diversions; slight regulation above station by log ponds.

Revisions (water years).--W 694: 1925-28. W 814: Drainage area for site at Eula.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1-11)

1.7	740	5.0	8,300
2.0	1,050	7.0	18,200
2.5	1,700	9.0	35,000
3.0	2,560	11.0	52,000
4.0	5,000		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	780	9,580	5,330	4,020	4,000	2,400	3,430	3,190	2,230	1,280	*920	840
2	780	19,600	4,910	5,160	3,900	2,310	3,340	3,080	2,160	1,280	900	830
3	880	13,300	8,330	7,250	3,900	2,250	3,700	3,080	2,130	1,280	910	820
4	1,080	9,060	17,000	5,630	14,100	2,440	4,430	3,260	2,130	1,260	810	
5	1,580	6,800	13,200	4,580	19,700	2,560	4,670	3,460	2,100	1,240	890	800
6	2,010	5,450	15,400	3,980	17,000	2,500	4,640	3,820	2,040	1,220	890	800
7	1,610	4,670	21,400	3,580	18,000	2,380	4,670	4,610	1,980	1,180	870	800
8	1,440	4,250	13,400	3,340	15,500	2,380	4,580	4,220	1,930	1,160	870	800
9	1,550	3,900	9,420	3,230	11,600	2,540	4,520	3,980	1,900	1,150	870	790
10	1,260	3,410	7,670	3,260	10,100	2,420	4,490	4,080	1,910	1,140	870	780
11	1,100	3,080	6,970	3,340	10,600	2,290	4,490	5,210	1,930	1,100	870	*790
12	1,050	3,120	6,440	3,210	9,620	2,290	4,850	5,180	1,950	1,090	870	800
13	1,010	2,820	5,540	4,460	7,880	2,760	5,510	5,030	1,930	1,080	850	790
14	984	2,700	5,480	6,580	6,620	3,950	5,900	4,580	1,910	1,070	850	780
15	1,030	2,680	5,060	6,970	5,840	7,140	5,870	4,120	1,960	1,060	840	770
16	984	5,210	4,520	6,080	5,180	7,840	5,720	3,950	1,950	1,050	830	770
17	1,210	7,500	4,200	11,000	4,700	5,450	5,450	4,100	1,850	1,050	840	780
18	1,700	15,000	3,900	8,120	4,320	4,400	4,940	4,050	1,780	1,040	830	770
19	1,360	9,140	3,680	5,960	3,980	4,280	4,430	3,780	1,680	1,030	820	770
20	1,270	9,140	3,530	4,820	3,720	5,000	4,020	3,600	1,660	1,020	810	760
21	1,320	8,260	3,260	8,300	3,550	5,510	3,550	3,550	1,610	1,010	810	750
22	1,240	6,520	3,100	9,140	3,340	5,030	3,210	3,650	1,580	995	810	750
23	1,140	5,420	2,970	12,500	3,150	4,350	3,010	3,850	1,520	984	810	760
24	1,090	5,480	2,820	17,100	2,990	4,000	2,860	3,580	1,490	973	810	760
25	1,200	6,340	2,700	12,900	2,860	4,080	2,800	3,410	1,450	973	800	800
26	1,490	5,600	2,580	11,600	2,720	4,180	2,800	3,280	1,420	973	800	820
27	2,900	5,630	2,480	9,260	2,580	4,000	2,820	3,210	1,400	951	800	790
28	16,200	5,060	3,080	7,390	2,480	3,780	4,020	2,990	1,360	951	850	780
29	47,600	4,490	5,030	5,810	-	4,020	3,920	2,720	1,330	940	920	800
30	20,400	5,060	4,610	5,060	-	4,000	3,460	2,520	1,310	930	910	940
31	10,500	-	4,460	4,400	-	3,680	-	2,340	-	920	870	-
Total	129,748	198,270	202,470	208,030	203,930	116,210	126,100	115,480	53,580	33,340	26,542	23,800
Mean	4,185	6,609	6,531	6,711	7,283	3,749	4,203	3,725	1,786	1,075	856	793
Cfsm	4.53	7.15	7.07	7.26	7.88	4.06	4.55	4.03	1.93	1.16	0.928	0.858
In.	5.22	7.98	8.15	8.37	8.21	4.68	5.08	4.65	2.16	1.34	1.07	0.96
Ac-ft	257,400	393,300	401,600	412,600	404,500	230,500	250,100	229,100	106,300	66,130	52,650	47,210
(†)	4,230	6,378	5,943	6,527	7,511	3,861	4,420	3,869	1,847	1,053	807	732

Calendar year 1950 Max - Min - Mean - Cfsm - In. - Ac-ft -  
Water year 1950-51 Max 47,600 Min 750 Mean 3,938 Cfsm 4.26 In. 57.87 Ac-ft 2,851,000

Peak discharge (base, 11,000 cfs).--Oct. 29 (6:30 a.m.) 59,900 cfs (11.72 ft); Nov. 2 (7 a.m.) 21,700 cfs (7.54 ft); Nov. 18 (5:30 a.m.) 18,700 cfs (7.08 ft); Dec. 4 (12 m.) 18,700 cfs (7.09 ft); Dec. 7 (9 a.m.) 23,400 cfs (7.78 ft); Jan. 17 (12 m.) 14,000 cfs (6.25 ft); Jan. 21 (5:30 p.m.) 11,500 cfs (5.74 ft); Jan. 24 (2 to 3 a.m.) 18,800 cfs (7.10 ft); Feb. 4 (9:30 p.m.) 21,100 cfs (7.46 ft).

\* Discharge measurement made on this day.

† The lower figures listed as means are for the station 4 miles downstream at Eula. This station (near Oakridge) replaces the station at Eula but for 1951 the Eula records were computed independently and the means are shown here for comparison purposes. 1950 Calendar year mean 4,240 cfs; 1950-51 water year mean 3,909 cfs.

## Middle Fork Willamette River at Lowell, Oreg.

Location.--Lat 43°54'30", long. 122°46'40", in NW¼ sec. 23, T. 19 S., R. 1 W., on left bank at bridge three-quarters of a mile south of Lowell and 4½ miles upstream from Lost Creek.

Drainage area.--994 sq mi.

Records available.--October 1946 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 668.00 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Aug. 23, 1950, staff gage at same site and datum.

Average discharge.--5 years, 3,535 cfs.

Extremes.--Maximum discharge during year, 62,000 cfs Oct. 29 (gage height, 13.00 ft), from rating curve extended above 20,000 cfs by logarithmic plotting; minimum, 735 cfs Sept. 24 (gage height, 2.10 ft).  
1946-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 716 cfs Oct. 2, 1947, Oct. 3, 1949; minimum gage height, that of Sept. 24, 1951.  
Maximum stage known, 13.9 ft Dec. 28, 1945 (discharge, 68,400 cfs, estimated).

Remarks.--Records good. No large diversions above station. Occasional diurnal fluctuations during periods of low water caused by log ponds upstream.

Rating tables, water year 1950-51 (gage height, in feet, and discharge,

in cubic feet per second)  
(Shifting-control method used Jan. 29 to Feb. 4)

Oct. 1 to Feb. 4				Feb. 5 to Sept. 30			
2.4	810	6.0	8,800	2.1	735	5.0	6,600
5.0	1,380	8.0	18,800	2.5	1,130	6.5	12,400
4.0	2,880	10.0	33,300	3.0	1,810	8.5	23,100
5.0	5,270	12.0	51,000	4.0	3,780		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	850	10,200	5,890	4,360	4,340	2,680	3,760	*3,450	2,390	1,340	915	839
2	*850	20,600	5,440	5,300	4,180	2,560	3,590	3,320	2,320	1,320	915	830
3	922	14,800	8,580	8,270	4,230	2,500	3,900	3,280	2,270	1,280	806	830
4	1,170	10,300	18,200	6,280	12,000	2,780	4,680	3,450	2,270	1,290	896	820
5	1,600	7,820	14,200	5,070	23,100	3,100	4,990	3,710	2,230	1,290	896	803
6	2,270	6,080	15,200	4,310	19,700	3,000	4,990	3,970	2,180	1,250	886	803
7	1,790	5,120	22,700	3,840	20,300	2,820	4,990	5,020	2,120	1,210	877	803
8	1,540	*4,700	14,700	3,540	18,900	2,840	4,960	4,650	2,070	1,190	877	803
9	1,720	4,410	10,700	3,440	13,800	3,100	4,880	4,280	2,000	1,170	877	794
10	1,390	3,880	8,360	3,400	11,600	2,900	4,880	4,350	2,020	1,150	877	786
11	1,220	3,550	7,470	3,520	11,900	2,740	4,880	5,430	2,060	1,120	868	*786
12	1,110	3,520	6,990	3,440	11,200	2,740	5,160	5,700	2,060	1,110	868	786
13	1,060	3,300	*5,990	3,340	9,080	3,250	5,880	5,610	2,060	1,100	868	778
14	1,040	3,160	5,770	6,490	7,560	4,820	6,360	5,100	2,020	1,090	858	778
15	1,070	3,120	5,390	7,660	6,670	7,720	6,390	4,540	2,070	1,080	858	769
16	1,050	5,710	4,840	6,490	5,910	9,880	6,210	4,280	2,070	1,060	848	769
17	1,170	8,260	4,520	12,800	5,340	6,540	5,970	4,380	1,970	1,050	839	769
18	1,760	18,000	4,160	10,300	4,960	5,190	5,430	4,380	1,860	1,030	830	769
19	1,500	11,000	3,860	6,740	4,490	4,850	4,880	4,120	*1,780	1,020	830	760
20	1,370	10,100	3,720	5,180	4,250	*5,580	4,440	3,880	1,720	1,010	820	760
21	1,400	9,430	3,460	8,200	4,050	6,180	3,950	3,850	1,700	999	812	752
22	1,350	7,280	3,300	11,000	3,800	5,730	3,500	3,900	1,660	988	812	752
23	1,220	5,960	3,180	11,300	3,560	4,900	3,300	4,100	1,600	978	820	760
24	1,160	5,800	3,000	*19,300	3,560	4,440	3,120	3,880	1,560	915	820	760
25	1,190	6,420	2,880	14,400	3,230	4,510	3,040	3,660	1,520	968	812	769
26	1,560	6,020	2,740	12,400	3,060	4,570	3,020	3,540	1,480	946	820	820
27	2,690	5,960	2,660	10,000	2,900	4,410	3,020	3,450	1,450	946	812	786
28	16,300	5,470	3,040	7,810	2,800	4,150	4,150	3,230	1,410	936	868	786
29	50,100	4,870	5,120	6,150	-	4,310	4,310	2,960	1,380	936	1,010	794
30	24,470	5,360	4,870	5,270	-	4,410	3,780	2,700	1,370	*926	915	848
31	*12,400	-	4,840	4,730	-	4,020	-	2,520	-	915	858	-
Total	140,242	220,000	215,950	224,340	230,270	133,220	136,410	124,650	56,670	35,613	26,768	23,662
Mean	4,524	7,333	6,966	7,237	8,224	4,297	4,547	4,021	1,889	1,084	863	789
Cfsm	4.55	7.38	7.01	7.28	8.27	4.32	4.57	4.05	1.90	1.09	0.868	0.794
In.	5.25	8.23	8.08	8.39	8.62	4.98	5.10	4.66	2.12	1.26	1.00	0.89
Ac-ft	278,200	436,400	428,300	445,000	456,700	264,200	270,600	247,200	112,400	66,670	53,090	46,930

Calendar year 1950: Max 50,100 Min 803 Mean 4,597 Cfsm 4.62 In. 62.79 Ac-ft 3,328,000  
Water year 1950-51: Max 50,100 Min 752 Mean 4,290 Cfsm 4.32 In. 58.58 Ac-ft 3,106,000

Peak discharge (base, 12,000 cfs).--Oct. 29 (9:30 a.m.) 62,000 cfs (13.00 ft); Nov. 2 (8 a.m.) 22,900 cfs (8.63 ft); Nov. 18 (6 a.m.) 22,600 cfs (8.58 ft); Dec. 4 (1:30 p.m.) 20,400 cfs (8.26 ft); Dec. 7 (9:30 a.m.) 25,500 cfs (9.00 ft); Jan. 17 (4:30 p.m.) 17,200 cfs (7.74 ft); Jan. 24 (5 a.m.) 20,900 cfs (8.34 ft); Feb. 5 (2 a.m.) 24,400 cfs (8.71 ft); Mar. 15 (11:30 p.m.) 12,900 cfs (6.62 ft).

\* Discharge measurement made on this day.

## Fall Creek below Winberry Creek, near Fall Creek, Oreg.

Location.--Lat 43°56'40", long. 122°46'30", near center of sec. 2, T. 19 S., R. 1 W., on left bank 10 ft upstream from highway bridge, 1½ miles downstream from Winberry Creek, and 2½ miles southeast of Fall Creek.

Drainage area.--190 sq mi.

Records available.--October to December 1911 (gage heights only), September 1935 to September 1951. Published as "Big Fall Creek near Fall Creek" 1911.

Gage.--Water-stage recorder. Datum of gage is 637.80 ft above mean sea level, datum of 1929. Oct. 1 to Dec. 31, 1911, staff gage at site half a mile downstream at different datum. Sept. 9, 1935, to Mar. 3, 1950, staff gage at present site and datum.

Average discharge.--16 years, 553 cfs.

Extremes.--Maximum discharge during year, 12,900 cfs Oct. 29 (gage height, 13.79 ft), from rating curve extended above 6,500 cfs by logarithmic plotting; minimum, 23 cfs Sept. 22 (gage height, 1.03 ft).

1935-51: Maximum discharge, 22,500 cfs Dec. 28, 1945 (gage height, 18.0 ft, from floodmark), from rating curve extended above 6,500 cfs by logarithmic plotting; minimum observed, 19 cfs Dec. 1, 1936.

Remarks.--Records good. No diversion above station.

Revisions (water years).--W 1094: 1946(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 23				Jan. 24 to Sept. 30			
1.5	43	5.0	1,540	1.0	20	2.5	330
1.2	84	7.0	3,180	1.2	43	3.5	700
2.0	177	9.0	5,400	1.5	92	5.0	1,540
2.5	310	11.0	8,100	2.0	200		
3.5	690	13.0	11,400				

Note.--Same as preceding table above 5.0 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	51	2,180	1,100	1,230	668	374	612	402	155	60	43	39
2	*49	5,280	1,110	1,940	660	354	604	454	149	60	43	36
3	110	2,800	1,940	2,820	720	342	696	402	144	60	43	34
4	277	1,720	4,230	1,770	2,060	520	780	367	140	71	42	33
5	878	1,180	2,640	1,240	4,700	696	872	434	142	74	40	30
6	681	880	3,150	960	3,610	608	620	566	138	66	40	32
7	396	690	3,990	805	3,560	520	580	845	131	60	39	33
8	382	*636	2,410	694	3,140	572	540	624	129	58	39	34
9	480	588	1,580	654	2,060	684	500	490	125	55	39	33
10	274	496	1,150	676	1,600	588	465	420	121	55	38	*32
11	193	434	1,060	712	1,490	528	451	540	115	52	37	29
12	151	473	1,000	663	1,380	560	454	715	115	49	38	27
13	124	424	*890	694	1,120	1,040	465	1,310	115	49	36	29
14	117	406	830	2,790	933	1,780	454	999	107	48	36	28
15	130	434	722	2,160	835	3,580	423	715	102	46	32	27
16	114	1,300	636	1,620	715	3,020	392	576	96	46	32	27
17	264	2,890	584	5,150	648	1,620	357	476	92	46	30	27
18	434	4,750	528	3,310	624	1,170	318	409	88	46	30	26
19	304	2,490	484	1,880	596	*1,200	290	357	87	46	32	26
20	386	2,300	434	1,320	604	1,580	270	321	*85	44	29	26
21	322	1,830	403	2,530	636	1,570	250	292	81	43	29	26
22	256	1,320	375	*2,980	608	1,330	230	272	79	43	28	25
23	205	1,000	358	5,000	552	1,020	220	262	78	43	28	25
24	177	1,130	322	5,940	500	875	212	252	74	43	28	26
25	200	1,100	304	3,460	479	938	202	227	74	43	28	33
26	301	895	283	3,050	444	955	198	215	71	43	27	58
27	852	870	280	2,160	423	835	200	202	69	43	27	40
28	5,880	740	706	1,530	395	740	303	193	68	43	37	36
29	10,600	890	1,670	1,150	-	820	370	178	63	43	100	40
30	4,310	880	1,410	916	-	770	*392	169	80	*43	63	40
31	2,140	-	1,480	775	-	660	-	162	-	43	44	-
Total	51,038	42,836	38,059	62,599	35,760	31,849	12,520	13,846	3,093	1,564	1,175	1,017
Mean	1,001	1,428	1,228	2,019	1,277	1,027	417	447	103	50.5	37.9	33.9
Cfsm	5.27	7.52	6.46	10.6	6.72	5.41	2.19	2.35	0.542	0.266	0.199	0.178
In.	6.08	8.38	7.45	12.25	7.00	6.23	2.45	2.71	0.61	0.31	0.23	0.20
Ac-ft	61,560	84,960	75,490	124,200	70,930	63,170	24,830	27,460	6,130	3,100	2,330	2,020

Calendar year 1950: Max 10,600 Min 38 Mean 852 Cfsm 4.48 In. 60.90 Ac-ft 617,100  
 Water year 1950-51: Max 10,600 Min 25 Mean 754 Cfsm 3.97 In. 53.90 Ac-ft 546,200

Peak discharge (base, 3,100 cfs).--Oct. 29 (9 a.m.) 12,900 cfs (13.79 ft); Nov. 2 (4:30 a.m.) 7,040 cfs (10.24 ft); Nov. 18 (12:30 a.m.) 7,330 cfs (10.45 ft); Dec. 4 (6 a.m.) 4,750 cfs (8.46 ft); Dec. 7 (5 a.m.) 4,600 cfs (8.33 ft); Jan. 2 (8 to 9 p.m.) 3,410 cfs (7.23 ft); Jan. 14 (9:30 a.m.) 3,620 cfs (7.44 ft); Jan. 17 (11:30 a.m.) 7,820 cfs (10.80 ft); Jan. 24 (10 p.m.) 8,920 cfs (11.51 ft); Feb. 5 (11:30 a.m.) 5,150 cfs (8.79 ft); Mar. 15 (6 p.m.) 5,630 cfs (9.18 ft).

\* Discharge measurement made on this day.

## Coast Fork Willamette River at London, Oreg.

Location.--Lat 43°38'30", long. 123°05'10", in SW $\frac{1}{4}$  sec. 20, T. 22 S., R. 3 W., on left bank 0.6 mile north of London and 11 miles south of Cottage Grove.

Drainage area.--69 sq mi, approximately.

Records available.--September 1935 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 852.58 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to Oct. 18, 1935, staff gage at same site and datum.

Average discharge.--16 years, 198 cfs.

Extremes.--Maximum discharge during year, 6,790 cfs Oct. 28 (gage height, 11.43 ft), from rating curve extended above 4,000 cfs; minimum, 12 cfs Sept. 18, 19, 22, 23, 24.  
1935-51: Maximum discharge, 8,800 cfs Dec. 28, 1945 (gage height, 13.25 ft), from rating curve extended above 4,000 cfs; minimum, 10 cfs on several days in 1936, 1938, 1939, and 1940.

Remarks.--Records good except those for periods of doubtful or no gage-height record, which are fair. No diversion above station; millpond 3 miles above station may cause slight regulation at times.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.0	11	2.0	119	6.0	2,040
1.2	18	2.5	255	8.0	3,520
1.4	30	3.0	445	10.0	5,340
1.6	51	4.0	920		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1		a17	663	526	255	262	150	195	135	47	24	19	15
2		a17	666	558	698	252	142	195	126	47	24	19	15
3		a47	541	710	870	276	140	195	142	49	25	19	14
4		a135	425	1,370	607	1,120	267	225	128	50	28	19	14
5		258	339	860	454	1,280	337	195	124	50	27	19	14
6		178	281	920	373	1,080	283	167	133	47	26	*18	14
7		88	240	1,060	314	1,100	243	167	147	46	25	d18	14
8		116	214	745	272	870	379	142	130	44	24	d18	14
9		113	187	548	252	720	397	142	124	41	22	d17	14
10		73	167	437	255	517	308	*128	121	41	22	d17	14
11		*57	157	463	329	643	266	a120	121	39	22	d17	13
12		50	160	437	308	670	290	a130	142	39	22	d16	13
13		45	152	589	308	535	530	a140	210	38	*22	16	13
14		51	147	377	725	373	656	a130	170	37	22	16	13
15		73	271	337	800	337	1,130	a120	140	35	21	16	13
16		73	1,260	308	770	286	845	a110	126	34	21	16	13
17		181	1,260	297	*3,250	276	558	a100	d110	33	22	15	13
18		189	2,230	266	1,550	280	433	a90	d105	31	22	15	*12
19		140	960	243	870	266	425	a85	d95	30	23	15	12
20		178	875	216	643	276	468	a75	d90	29	22	15	13
21		133	661	195	1,260	272	458	a70	*81	29	22	15	13
22		107	494	178	1,180	249	389	a65	76	28	22	15	12
23		87	393	162	1,340	225	389	a60	71	27	21	15	12
24		76	365	154	1,390	210	325	a60	67	27	21	15	12
25		106	318	144	965	201	325	65	64	27	21	15	15
26		144	283	137	780	181	325	65	59	26	21	15	16
27		642	377	133	602	a160	255	119	57	26	20	15	15
28		3,430	314	152	481	*154	255	142	54	26	20	17	15
29		5,080	*297	160	393	-	225	167	52	25	20	24	16
30		1,830	353	240	333	-	225	130	51	24	20	19	42
31		917	-	283	290	-	225	-	49	-	19	17	-
Total	14,631	15,050	13,005	22,917	13,071	11,643	3,794	3,300	1,072	693	522	438	
Mean	472	502	420	759	467	376	126	106	35.7	22.4	16.8	14.6	
Cfs/m	6.94	7.28	6.09	10.7	6.77	5.45	1.83	1.54	0.517	0.325	0.243	0.212	
In.	7.89	8.11	7.01	12.35	7.05	6.28	2.04	1.78	0.58	0.37	0.28	0.24	
Ac-ft	29,020	29,850	25,800	45,460	25,930	23,090	7,530	6,550	2,130	1,370	1,040	869	

Peak discharge (base, 1,900 cfs).--Oct. 28 (6 p.m.), 6,790 cfs (11.43 ft); Nov. 18 (3 a.m.), 3,370 cfs (7.81 ft); Jan. 17 (11:30 a.m.), 4,930 cfs (9.56 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Row River above Pitcher Creek near Dorena and Mosby Creek near Cottage Grove.

d Doubtful gage-height record; discharge computed as in footnote "a."

## WILLAMETTE RIVER BASIN

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., in east abutment of dam on Coast Fork Willamette River,  $\frac{5}{8}$  miles south of Cottage Grove.

Drainage area.--104 sq mi

Records available.--October 1942 to September 1951.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (surveys by Corps of Engineers).

Extremes.--Maximum contents during year, 30,720 acre-ft May 24 (elevation, 788.92 ft); minimum, about 580 acre-ft Nov. 13 (elevation, about 738.2 ft), from graph based on records of inflow and outflow.

1942-51: Maximum contents, 34,750 acre-ft May 3, 1949 (elevation, 792.42 ft); minimum since first filling, that of Nov. 13, 1950.

Remarks.--Reservoir is formed by earth-fill dam with concrete spillway completed by Corps of Engineers in 1942; storage began Oct. 31, 1942 (slight pondage at times in water year 1941-42, when inflow temporarily exceeded 2,600 cfs, capacity of outlets). Capacity, 33,090 acre-ft between elevations 719.0 ft (outlet conduit) and 791.0 ft (crest of spillway). Dead storage negligible. Reservoir used for flood control and improvement of navigation below Albany. Daily contents computed from reservoir elevation at 12 p.m.

Cooperation.--Gage readings furnished and recorder inspected by Corps of Engineers.

Revisions.--Elevation for Sept. 30, 1950, published in W.S.P. 1184 has been revised to 771.31 ft, contents, 14,230 acre-ft. Resulting figures of change in contents as follows:

September 1950..... -14,690 acre-ft  
Water year 1949-50..... -2,710 acre-ft

Contents, in acre-feet, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	13,550	15,450	3,130	3,050	g3,700	12,210	22,950	27,130	30,400	29,290	26,470	20,900
2	12,860	12,510	g3,430	3,460	g4,000	12,500	23,240	27,330	30,390	29,220	26,300	20,750
3	12,330	9,300	g3,820	3,410	g4,580	12,820	23,560	27,560	30,370	29,160	26,110	20,610
4	11,760	8,290	g3,590	3,040	g5,670	13,570	23,870	27,770	30,370	29,100	25,920	20,470
5	11,590	2,140	g3,270	3,330	g5,610	14,540	24,170	27,960	30,370	29,050	25,720	20,340
6	11,410	a800	3,530	3,560	g4,910	15,490	24,410	28,200	30,370	28,970	25,520	20,200
7	11,200	1,190	3,550	3,660	g5,350	16,200	24,670	28,420	30,370	28,920	25,320	20,060
8	11,120	1,620	2,940	3,510	g5,720	17,390	24,860	28,600	30,360	28,840	25,120	19,930
9	10,740	2,000	2,400	3,140	g5,540	18,220	25,040	28,730	30,360	28,750	24,910	19,800
10	10,570	1,050	2,560	3,050	g5,400	17,920	25,180	28,870	30,340	28,680	24,820	19,630
11	10,270	a590	3,440	3,190	g6,010	17,290	25,330	29,000	30,320	28,580	24,530	19,480
12	9,960	a590	3,640	3,280	g6,760	16,710	25,480	29,260	30,300	28,460	24,330	19,340
13	9,840	a810	3,320	3,370	g7,280	16,840	25,630	29,660	30,270	28,370	24,150	19,190
14	9,790	1,070	3,110	3,280	g7,510	17,430	25,740	29,970	30,230	28,300	23,950	19,040
15	9,750	2,440	3,120	g2,810	g7,760	18,400	25,850	30,200	30,200	28,210	23,760	18,900
16	9,640	3,600	3,220	g3,340	g7,870	17,310	25,940	30,370	30,140	28,120	23,580	18,740
17	9,420	4,890	3,280	g10,730	g7,960	16,020	26,000	30,490	30,100	28,030	23,380	18,260
18	8,860	8,250	3,280	g11,760	g8,630	15,830	26,050	30,570	30,040	27,950	23,210	17,500
19	8,050	6,450	3,220	g10,250	g9,230	16,070	26,080	30,620	29,990	27,860	23,020	16,700
20	7,020	4,410	3,090	g6,770	g9,550	16,960	26,120	30,680	29,940	27,800	22,840	16,020
21	5,710	3,200	2,910	g6,070	g10,230	18,180	26,140	30,700	29,900	27,700	22,670	15,260
22	4,450	3,080	2,950	g5,420	g10,440	19,230	26,150	30,700	29,830	27,600	22,490	14,510
23	3,240	3,160	3,170	g5,180	g10,580	20,020	26,170	30,710	29,770	27,550	22,300	13,760
24	2,080	3,440	3,270	g4,830	g10,770	20,690	26,170	30,700	29,700	27,460	22,120	13,010
25	1,350	3,580	a3,330	g3,490	g10,910	20,900	26,190	30,690	29,620	27,400	21,950	12,280
26	g993	3,610	a3,300	g2,640	g11,190	20,840	26,180	30,640	29,570	27,300	21,800	11,540
27	1,520	3,890	a3,270	g2,350	g11,560	20,980	26,210	30,610	29,500	27,160	21,630	10,820
28	6,480	3,850	g3,240	g2,640	11,880	21,390	26,290	30,570	29,470	27,020	21,460	10,330
29	17,980	3,620	3,260	g3,040	-	21,800	26,660	30,500	29,420	26,890	21,330	9,590
30	20,320	3,180	3,440	g3,240	-	22,250	26,920	30,440	29,350	26,760	21,180	8,960
31	18,330	-	3,550	g3,340	-	22,620	-	30,410	-	26,630	21,060	-

a No record of elevation; contents estimated on basis of inflow and outflow records for reservoir and recorded range in stage when available.

g Computed from graph constructed on basis of observer's readings of wire-weight gage.

Monthly elevation and contents, water year October 1950 to September 1951

Date	Elevation (feet)*	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	771.31	14,230	-
Oct. 31.....	776.40	18,330	+4,100
Nov. 30.....	750.48	9,180	-15,150
Dec. 31.....	751.66	3,550	+370
Calendar year 1950.....	-	-	+410
Jan. 31.....	781.00	3,340	-21
Feb. 28.....	788.00	11,880	+8,540
Mar. 31.....	781.13	22,620	+10,740
Apr. 30.....	785.41	26,920	+4,300
May 31.....	788.64	30,410	+3,490
June 30.....	787.68	29,350	-1,060
July 31.....	785.14	26,630	-2,720
Aug. 31.....	779.47	21,060	-5,570
Sept. 30.....	763.34	8,960	-12,100
Water year 1950-51.....	-	-	-5,270

\* Elevation at 12 p.m.

† Revised.

## Coast Fork Willamette River below Cottage Grove Dam, Oreg.

Location.--Lat 43°43'00", long. 123°03'10", in NE $\frac{1}{4}$  sec. 28, T. 21 S., R. 3 W., on right bank, at bridge, a quarter of a mile downstream from Cottage Grove Dam and  $5\frac{1}{4}$  miles south of Cottage Grove.

Drainage area.--104 sq mi.

Records available.--January 1939 to September 1951. Prior to October 1944, published as "near Cottage Grove."

Gage.--Water-stage recorder. Datum of gage is 711.00 ft above mean sea level, datum of 1929 (Corps of Engineers benchmark). Jan. 1 to Feb. 13, 1939, staff gage at site three-quarters of a mile downstream at different datum. Feb. 14, 1939, to Oct. 12, 1939, staff gage at site 0.8 mile downstream at datum 15.82 ft lower. Oct. 13, 1939, to Sept. 30, 1944, water-stage recorder at site 0.8 mile downstream at datum 15.93 ft lower than present datum.

Average discharge.--12 years, 275 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 2,700 cfs Oct. 29 (gage height, 8.36 ft); minimum, 52 cfs Mar. 3-8 (gage height, 2.89 ft).

1939-51: Maximum discharge recorded, 3,340 cfs Jan. 4, 1943 (gage height, 10.06 ft, site and datum then in use); practically no flow July 5-7, 1945, Aug. 24, 1947.

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

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 17

Jan. 18 to Sept. 30

2.9	52	2.9	53	5.0	690
3.2	94	3.2	98	6.0	1,210
3.5	157	3.5	157	8.2	2,590
		4.0	290		

Note.--Same as following table above 3.5 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	366	2,420	818	609	208	74	95	88	63	56	81	91
2	362	2,390	780	564	248	72	95	88	63	56	95	86
3	376	2,430	1,000	1,250	327	65	95	88	63	56	103	84
4	438	2,430	1,790	980	1,010	52	96	88	58	60	107	84
5	372	2,310	1,460	454	2,050	52	96	88	54	61	112	84
6	362	1,290	1,130	362	2,250	52	88	88	54	61	112	84
7	232	117	1,540	378	1,520	52	83	90	54	61	*112	84
8	195	70	1,390	486	1,170	54	83	91	54	61	112	84
9	341	57	1,090	560	1,080	279	83	93	54	61	112	86
10	185	662	470	380	750	650	*83	93	54	61	112	86
11	*201	447	198	362	672	760	81	93	54	62	111	86
12	211	230	470	366	542	755	83	93	57	*82	107	86
13	106	95	740	1,220	430	755	84	93	58	62	107	86
14	80	55	650	1,450	430	760	84	93	60	62	105	88
15	79	59	470	1,450	430	1,220	84	88	60	62	107	86
16	135	1,030	362	1,000	355	1,390	84	88	60	62	105	88
17	362	1,500	362	835	230	1,570	86	88	60	62	105	88
18	564	1,720	362	*2,010	159	795	86	88	60	62	102	*406
19	814	2,350	362	2,580	159	502	84	88	62	57	102	406
20	800	2,290	362	2,440	162	233	84	88	62	56	102	338
21	840	1,600	362	2,310	195	80	84	88	61	54	102	394
22	815	765	202	2,280	239	80	84	*95	60	54	102	390
23	774	369	134	2,220	242	80	84	95	60	54	102	386
24	728	372	134	2,220	242	81	88	95	61	54	102	394
25	564	380	173	2,140	242	287	88	95	61	53	98	394
26	438	380	202	1,640	140	394	88	93	56	63	95	390
27	664	383	202	940	81	239	88	93	56	83	93	386
28	1,800	474	202	690	*74	122	88	93	54	83	93	264
29	1,440	*564	202	363	-	95	88	95	54	83	93	394
30	1,610	765	205	202	-	95	88	95	54	81	93	390
31	2,360	-	334	205	-	95	-	76	-	81	93	-
Total	18,414	30,004	18,158	34,944	15,637	12,390	2,605	2,808	1,741	1,946	3,175	6,533
Mean	594	1,000	586	1,127	558	400	86.8	90.6	58.0	62.8	102	318
Ac-ft	36,520	59,510	36,020	69,310	31,020	24,580	5,170	5,570	3,450	3,860	6,300	12,960

Adjusted for change in contents in Cottage Grove Reservoir

	Mean	661	745	592	1,124	712	574	147	40.2	18.5	11.9	14.5
Cfsm	6.36	7.16	5.69	10.8	6.85	5.52	1.53	1.41	0.387	0.178	0.114	0.139
In.	7.32	8.00	6.56	12.46	7.13	6.37	1.71	1.77	0.43	0.21	0.13	0.16
Ac-ft	40,620	44,360	36,390	69,100	39,560	35,320	9,470	5,500	2,390	1,140	730	860

Observed

Calendar year 1950: Max	2,550	Min	52	Mean	434	Ac-ft	314,400
Water year 1950-51: Max	2,580	Min	52	Mean	406	Ac-ft	294,300

Adjusted

Calendar year 1950: Mean	435	Cfsm	4.18	In.	56.72	Ac-ft	314,800
Water year 1950-51: Mean	399	Cfsm	3.84	In.	52.11	Ac-ft	289,000

\* Discharge measurement made on this day.

Row River above Pitcher Creek, near Dorena, Oreg.

Location.--Lat 43°44'10", long. 122°52'20", in NW¼ sec. 24, T. 21 S., R. 2 W., on right bank half a mile above Pitcher Creek and 1½ miles northwest of Dorena.

Drainage area.--211 sq mi.

Records available.--September 1935 to September 1951. Prior to October 1949, published as "at Star."

Gage.--Water-stage recorder. Datum of gage is 856.16 ft above mean sea level, datum of 1929. Prior to Oct. 18, 1938, staff gage read once or twice daily at site 450 ft up-stream at 1 ft higher datum.

Average discharge.--16 years, 573 cfs.

Extremes.--Maximum discharge during year, 16,700 cfs Oct. 28 (gage height, 13.41 ft), from rating curve extended above 9,300 cfs; minimum, 10 cfs Sept. 24, 25 (gage height, 1.40 ft).

1935-51: Maximum discharge, 19,600 cfs Dec. 28, 1945 (gage height, 14.33 ft), from rating curve extended above 9,300 cfs; minimum, that of Sept. 24, 25, 1951.

Remarks.--Records good. No diversion above station. Possibly slight regulation at times by log ponds.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau and Corps of Engineers.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 17				Nov. 18 to Sept. 30			
1.6	25	5.0	1,080	1.4	10	2.8	147
2.0	65	7.0	2,800	1.5	14	3.4	305
2.5	126	9.0	5,550	1.8	33	4.0	535
3.0	210	11.0	10,100	2.3	79		
3.5	345	13.0	15,500	Note.--Same as preceding table above 4.0 ft.			
4.0	535						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	30	1,880	1,230	912	650	322	625	364	110	37	21	21
2	28	2,580	1,090	1,460	610	299	625	375	108	35	20	19
3	53	1,960	2,580	2,500	685	281	828	406	101	37	20	18
4	177	1,290	4,330	1,840	4,240	382	1,030	410	100	41	21	18
5	590	903	2,630	1,220	5,200	590	876	375	98	42	21	15
6	630	695	2,800	960	4,080	504	770	486	92	42	21	14
7	294	544	3,480	798	4,060	434	750	792	90	39	20	16
8	277	487	2,300	740	3,180	470	685	595	85	36	*19	18
9	351	454	1,590	740	2,160	725	645	462	81	35	19	16
10	206	586	1,160	840	1,830	576	*605	410	78	34	19	14
11	*146	345	1,100	918	2,290	490	605	620	77	32	19	14
12	110	392	1,090	798	1,960	508	680	828	77	*30	18	14
13	93	366	930	770	1,410	1,090	730	1,020	75	29	18	14
14	87	345	876	2,260	1,060	1,960	680	846	70	29	18	15
15	132	458	765	2,230	906	3,830	600	650	69	27	18	14
16	108	2,280	680	*1,790	770	2,940	548	526	66	26	16	15
17	183	3,070	625	5,290	680	1,670	478	454	61	26	16	14
18	482	5,480	553	3,080	650	1,220	403	400	57	27	15	13
19	285	2,670	494	1,800	615	1,350	340	333	53	27	16	*13
20	288	2,620	454	1,290	605	1,900	293	290	51	27	16	12
21	309	1,980	414	3,420	610	1,800	254	263	50	25	14	13
22	260	1,390	378	3,270	553	1,390	227	*248	49	25	14	14
23	194	1,040	358	4,120	494	1,030	210	242	49	23	16	13
24	159	1,130	308	5,130	450	906	200	212	47	23	16	11
25	192	1,090	293	3,410	422	1,070	195	190	44	23	17	11
26	317	864	266	3,040	386	1,060	190	178	42	23	17	18
27	1,250	958	245	2,190	*354	900	195	165	42	23	16	17
28	8,320	*715	437	1,550	333	765	442	151	41	23	18	16
29	12,900	650	1,040	1,120	-	906	478	135	39	23	30	18
30	4,860	960	966	894	-	828	426	126	38	22	30	34
31	*2,400	-	1,050	740	-	685	-	115	-	21	23	-
Total	35,721	39,882	36,522	60,930	41,223	32,881	15,613	12,667	2,033	912	580	472
Mean	1,152	1,329	1,178	1,965	1,472	1,061	520	409	67.8	29.4	18.7	15.7
Cfsm	5.46	6.30	5.58	9.31	6.98	5.03	2.46	1.94	0.321	0.139	0.089	0.074
In.	6.30	7.03	6.44	10.74	7.27	5.80	2.75	2.23	0.36	0.16	0.10	0.08
Ac-ft	70,850	79,100	72,440	120,900	81,760	65,220	30,970	25,120	4,030	1,810	1,150	936
Calendar year 1950: Max	12,900	Min	18	Mean	870	Cfsm	4.12	In.	55.99	Ac-ft	629,900	
Water year 1950-51: Max	12,900	Min	11	Mean	766	Cfsm	3.63	In.	49.26	Ac-ft	554,300	

Peak discharge (base, 4,800 cfs).--Oct. 28 (7 p.m.) 16,700 cfs (13.41 ft); Nov. 18 (4 a.m.) 8,090 cfs (10.18 ft); Dec. 4 (7 a.m.) 5,000 cfs (8.70 ft); Jan. 17 (12 m.) 7,800 cfs (10.06 ft); Jan. 21 (4 p.m.) 5,276 cfs (8.85 ft); Jan. 23 (11 p.m.) 6,590 cfs (9.52 ft); Feb. 4 (9 p.m.) 6,550 cfs (9.50 ft); Mar. 15 (5 p.m.) 5,780 cfs (9.12 ft).

\* Discharge measurement made on this day.



## Dorena Reservoir near Cottage Grove, Oreg.

Location.--Lat 43°47', long. 122°57', in SE<sup>1</sup> sec. 32, T. 20 S., R. 2 W., on left side of dam in concrete shelter over 42" circular well in concrete portion of dam across Row River, 5 miles east of Cottage Grove.

Drainage area.--265 sq mi.

Records available.--October 1949 to September 1951.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers).

Extremes.--Maximum contents during year, 75,890 acre-ft Oct. 30 (elevation, 834.14 ft); minimum, 6,530 acre-ft Jan. 4 (elevation, 769.59 ft).  
1949-51: Maximum contents, that of Oct. 30, 1950; minimum since first filling, that of Jan. 4, 1951.

Remarks.--Reservoir is formed by earth-fill dam with concrete outlet and spillway, completed in 1949 by Corps of Engineers; storage began Oct. 11, 1949. Capacity, 131,000 acre-ft between elevation 739.0 ft (still of outlet gates) and elevation 860.0 ft (maximum planned pool elevation). Crest of spillway 835.0 ft. Dead storage, 8 acre-ft below elevation 739.0 ft. Reservoir used for flood control and improvement of navigation. Daily contents computed from elevations at 12 p.m. Capacity table computed by Corps of Engineers.

Cooperation.--Water-stage recorder inspected by Corps of Engineers.

Contents, in acre-feet, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	43,920	67,670	7,630	6,990	7,490	24,320	42,700	57,090	72,340	69,960	65,570	63,170
2	43,190	64,230	7,260	8,440	7,990	24,730	43,590	57,640	72,150	69,790	65,520	63,090
3	42,680	59,640	8,080	7,470	8,610	25,110	44,370	58,210	72,060	69,690	65,430	62,990
4	42,110	53,250	10,380	7,140	8,130	25,880	44,590	58,810	72,060	69,580	65,360	62,860
5	42,170	46,210	7,880	6,990	19,430	27,110	45,190	59,400	72,080	69,470	65,280	62,770
6	41,630	38,960	7,950	7,020	20,680	28,220	46,120	60,250	72,080	69,330	65,190	62,670
7	40,280	30,900	8,710	7,050	22,040	29,060	46,820	61,800	72,080	69,150	65,130	62,560
8	39,500	23,010	7,420	6,920	20,740	30,200	47,080	62,820	72,060	69,030	65,060	62,490
9	39,020	15,140	7,100	7,020	16,630	31,100	47,490	63,560	71,990	68,880	64,990	62,390
10	38,450	11,440	7,410	7,090	13,500	31,220	48,260	64,230	71,970	68,740	64,900	62,280
11	37,650	10,190	7,250	7,050	13,450	31,470	49,180	65,500	71,930	68,580	64,840	62,150
12	36,840	9,080	7,060	6,890	14,180	32,500	49,760	67,260	71,910	68,420	64,770	62,020
13	35,990	7,920	7,110	6,960	15,240	34,300	50,000	68,370	71,860	68,280	64,680	61,930
14	35,320	7,350	6,990	6,800	15,930	35,680	50,310	69,010	71,820	68,120	64,630	61,820
15	34,820	7,190	6,850	7,870	16,570	39,080	51,120	69,760	71,750	67,950	64,550	61,720
16	34,170	8,430	6,930	6,960	17,240	37,500	51,880	70,570	71,680	67,790	64,500	61,610
17	33,510	9,040	6,840	16,240	17,560	36,440	52,550	71,280	71,580	67,630	64,280	61,490
18	33,030	16,950	6,870	15,700	17,900	36,700	53,060	71,800	71,510	67,470	64,350	61,360
19	32,080	14,790	6,970	11,420	18,170	37,540	53,440	72,210	71,420	67,320	64,300	61,230
20	31,160	11,990	7,090	6,990	18,840	37,590	53,720	72,500	71,350	67,160	64,210	61,020
21	30,190	8,010	7,080	9,720	19,520	36,470	53,890	72,790	71,220	67,000	64,160	60,910
22	29,110	7,050	6,990	9,340	20,100	36,850	54,030	73,020	71,130	66,850	64,080	60,740
23	27,900	6,980	6,860	11,750	20,920	37,480	54,100	73,160	71,000	66,600	63,990	60,600
24	26,580	7,250	6,860	16,540	21,670	38,130	54,170	73,180	70,880	66,480	63,870	60,450
25	25,360	7,420	6,910	15,500	22,310	38,860	54,260	73,160	70,770	66,260	63,770	60,340
26	24,490	6,880	6,910	13,520	22,870	39,260	54,340	73,110	70,640	66,150	63,640	60,050
27	24,300	7,120	6,860	9,550	23,360	39,650	54,490	73,040	70,500	66,050	63,520	59,330
28	39,790	7,030	7,080	7,030	23,840	40,260	55,190	72,910	70,370	65,960	63,490	58,540
29	70,010	7,070	7,350	7,170	-	41,230	55,980	72,810	70,230	65,860	63,440	58,420
30	75,850	7,470	7,370	7,210	-	41,590	56,590	72,670	70,100	65,760	63,370	58,640
31	72,570	-	7,110	7,110	-	41,970	-	72,500	-	65,670	63,290	-

Monthly elevation and contents, water year October 1950 to September 1951

Date	Elevation (feet)*	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	814.38	44,700	-
Oct. 31.....	832.36	72,570	+27,870
Nov. 30.....	771.46	7,470	-65,100
Dec. 31.....	770.77	7,110	-360
Calendar year 1950....	-	-	+30
Jan. 31.....	770.76	7,110	0
Feb. 28.....	795.19	23,840	+16,730
Mar. 31.....	812.20	41,970	+18,130
Apr. 30.....	822.88	56,590	+14,620
May 31.....	832.32	72,500	+15,910
June 30.....	831.00	70,100	-2,400
July 31.....	828.48	65,670	-4,430
Aug. 31.....	827.07	63,290	-2,380
Sept. 30.....	824.20	58,640	-4,650
Water year 1950-51....	-	-	+13,940

\* Elevation at 12 p.m.

## WILLAMETTE RIVER BASIN

Row River near Cottage Grove, Oreg.

Location.--Lat 43°47'40", long. 122°59'30", in NE $\frac{1}{4}$  sec. 36, T. 20 S., R. 3 W., on right bank  $\frac{1}{2}$  miles upstream from Mosby Creek, 2 miles downstream from Dorena Dam, and 3 miles east of Cottage Grove.

Drainage area.--270 sq mi.

Records available.--January 1939 to September 1951. Prior to October 1947, published as "near Dorena."

Gage.--Water-stage recorder. Datum of gage is 685.24 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to Oct. 13, 1939, staff gage at site 180 ft upstream at datum 1.00 ft higher.

Average discharge.--12 years, 725 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 5,200 cfs Nov. 18 (gage height, 8.34 ft); minimum, 30 cfs Aug. 1 (gage height, 1.47 ft); minimum daily, 41 cfs Aug. 15.

1939-51: Maximum discharge, 21,400 cfs Dec. 28, 1945 (gage height, 18.20 ft); minimum, 6.7 cfs Oct. 1, 1949; minimum daily, 14 cfs Aug. 29 to Sept. 1, 1940.

Remarks.--Records good. No diversion above station. Flow regulated since October 1949 by Dorena Reservoir (see p. 131).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 30

Dec. 1 to Sept. 30

2.7	387	1.5	32	4.0	1,080
3.0	530	2.0	129	6.0	2,650
4.0	1,130	2.5	295	8.5	5,320
7.0	3,660	3.0	520		
8.5	5,410				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	452	5,000	1,560	1,260	631	199	384	196	222	102	46	58
2	452	5,020	1,700	1,500	525	199	291	192	222	102	48	60
3	452	5,000	2,950	3,730	535	199	540	192	183	105	49	80
4	550	4,960	4,700	2,350	2,490	202	1,040	196	132	105	49	62
5	740	4,940	4,720	1,630	4,260	212	696	196	116	105	49	62
6	1,070	4,920	3,800	1,230	4,800	215	966	196	116	102	49	62
7	1,120	4,870	4,400	1,010	4,810	219	520	189	116	102	*49	62
8	865	4,900	3,610	990	4,810	240	660	192	116	102	49	64
9	679	4,800	2,190	870	4,820	573	520	192	116	102	48	66
10	575	2,330	1,360	966	3,860	750	299	167	116	105	48	66
11	*575	1,180	1,530	1,120	2,760	591	*202	126	113	*105	49	71
12	575	1,140	1,500	1,070	1,980	229	430	111	110	107	49	64
13	570	1,110	1,180	924	1,150	667	665	618	110	107	49	64
14	475	720	1,180	1,910	924	1,880	580	680	110	105	44	62
15	419	688	1,060	3,220	828	3,390	287	334	107	105	41	60
16	490	2,760	810	2,620	635	4,810	206	236	107	102	42	60
17	696	3,630	822	3,410	635	2,800	206	196	107	102	43	64
18	898	4,560	870	4,710	840	1,450	206	196	105	102	43	68
19	962	5,080	590	4,780	620	1,290	206	196	107	102	43	*68
20	956	4,950	510	*3,960	448	2,170	206	196	107	102	43	84
21	943	4,630	510	3,250	448	2,820	206	192	107	102	43	73
22	943	2,050	510	4,720	425	1,570	206	189	107	102	42	69
23	930	1,450	505	4,540	229	978	199	*219	107	100	42	69
24	910	1,510	412	4,240	229	792	199	256	107	97	49	69
25	912	1,440	345	4,920	229	894	199	256	110	97	64	69
26	906	1,370	345	4,840	226	1,060	199	256	113	82	66	144
27	1,620	1,060	349	4,740	215	894	192	256	113	66	64	354
28	3,240	*1,030	380	3,100	*199	630	189	226	105	66	64	413
29	3,130	898	1,100	1,320	-	580	192	219	102	66	64	75
30	4,330	1,130	1,280	1,080	-	816	196	222	102	66	60	75
31	*5,020	-	1,510	972	-	840	-	222	-	56	60	-
Total	36,455	88,706	48,088	80,982	44,361	33,959	11,087	7,290	3,611	2,971	1,548	2,695
Mean	1,176	2,957	1,551	2,612	1,584	1,095	370	235	120	95.8	49.9	89.8
Ac-ft	72,310	175,900	95,380	160,600	87,990	67,360	21,990	14,460	7,180	5,890	3,070	5,350

Adjusted for change in contents in Dorena Reservoir

Mean	1,630	1,862	1,545	2,612	1,885	1,390	615	494	80.0	23.7	11.2	11.8
Cfsm	6.04	6.90	5.72	9.67	6.98	5.15	2.28	1.83	0.296	0.088	0.041	0.044
In.	6.95	7.69	6.58	11.15	7.27	5.94	2.54	2.10	0.33	0.10	0.05	0.05
Ac-ft	100,200	110,800	95,020	160,600	104,700	85,490	36,610	30,370	4,760	1,460	690	700

Observed

Calendar year 1950: Max	5,080	Min	97	Mean	1,130	Ac-ft	817,800
Water year 1950-51: Max	5,080	Min	41	Mean	991	Ac-ft	717,500

Adjusted

Calendar year 1950: Mean	1,130	Cfsm	4.19	In.	56.75	Ac-ft	817,800
Water year 1950-51: Mean	1,010	Cfsm	3.74	In.	50.75	Ac-ft	731,400

\* Discharge measurement made on this day.

Mosby Creek at mouth, near Cottage Grove, Oreg.

Location.--Lat 43°46'40" (corrected), long. 123°00'10", in sec. 1, T. 21 S., R. 3 W., on left bank two-thirds of a mile upstream from mouth and 3½ miles southeast of Cottage Grove.

Drainage area.--96 sq mi, approximately.

Records available.--September 1946 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 676.62 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Average discharge.--5 years, 259 cfs.

Extremes.--Maximum discharge during year, 7,160 cfs Oct. 28 (gage height, 10.82 ft), from rating curve extended logarithmically above 4,100 cfs; minimum, 4 cfs Sept. 13-15, 1946-51; Maximum discharge, that of Oct. 28, 1950; minimum, that of Sept. 13-15, 1951.

Remarks.--Records good except those for period of no gage-height record, which are fair. Small diversions above station for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 28, 29)

Oct. 1-28				Oct. 29 to Sept. 30			
1.2	9	3.0	510	1.0	4	2.1	200
1.3	16	4.0	1,080	1.1	8	2.5	370
1.5	36	5.0	1,820	1.2	14	3.0	635
1.7	67	6.0	2,650	1.3	22	4.0	1,300
2.0	133	8.0	4,350	1.5	46	6.0	3,000
2.5	296			1.8	103	10.0	6,600

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	725	600	400	240	156	173	152	40	15	9	9
2	12	781	650	850	236	148	166	143	37	15	9	8
3	25	587	1,400	1,200	248	133	192	146	36	14	9	8
4	71	435	2,100	700	1,640	240	228	140	34	16	9	7
5	253	330	1,300	500	2,190	476	189	130	36	17	7	7
6	238	248	1,400	400	1,650	397	166	156	33	18	7	7
7	108	189	1,700	340	1,670	320	156	224	33	16	7	7
8	88	170	900	300	1,340	415	140	181	33	15	*7	7
9	120	143	650	300	820	671	133	140	32	14	7	7
10	76	122	500	360	623	476	127	116	30	14	8	6
11	*53	111	550	400	755	379	*122	125	30	13	8	5
12	40	114	460	320	755	379	125	166	29	13	8	5
13	34	106	400	320	553	820	127	288	28	13	8	5
14	33	106	360	850	430	1,170	125	232	26	*12	7	4
15	50	185	320	1,000	370	1,810	111	175	25	12	7	4
16	50	1,670	290	900	307	1,380	103	136	24	12	7	5
17	130	1,790	270	3,800	236	762	96	114	23	12	6	5
18	224	3,270	250	1,900	289	531	88	96	22	12	5	5
19	139	1,320	220	1,000	307	498	81	85	22	12	5	*5
20	179	1,060	190	794	320	599	75	79	21	12	5	6
21	144	814	180	*1,840	325	553	70	72	21	12	5	6
22	118	542	160	1,850	298	455	64	*64	21	11	5	6
23	88	397	150	1,870	268	361	62	62	20	11	5	6
24	75	370	130	1,980	236	298	60	59	20	9	5	6
25	86	330	120	1,220	216	312	59	56	19	9	5	6
26	150	280	120	924	*189	298	57	51	19	10	5	6
27	600	110	701	177	252	54	19	19	9	5	6	6
28	3,770	*289	220	520	162	228	103	46	17	10	6	6
29	6,220	280	460	406	-	232	162	43	16	10	12	7
30	2,730	400	440	330	-	232	166	42	16	9	12	12
31	1,120	-	480	276	-	196	-	41	-	9	11	-
Total	17,040	17,484	17,080	28,541	16,850	15,175	3,583	3,586	782	386	221	189
Mean	550	583	551	921	602	490	519	116	26.1	12.5	7.1	6.3
Cfs/m	5.73	6.07	5.74	9.59	6.27	5.10	1.24	1.21	0.272	0.130	0.074	0.066
In.	6.80	6.77	6.62	11.06	6.53	5.88	1.39	1.39	0.30	0.15	0.09	0.07
Ac-ft	33,800	34,680	33,880	56,610	33,420	30,100	7,110	7,110	1,550	766	438	375

Calendar year 1950: Max 6,220 Min 7 Mean 343 Cfs/m 3.57 In. 48.45 Ac-ft 248,100  
Water year 1950-51: Max 6,220 Min 4 Mean 331 Cfs/m 3.45 In. 46.85 Ac-ft 239,800

Peak discharge (base, 2,500 cfs).--Oct. 28 (8 p.m.) 7,160 cfs (10.82 ft); Nov. 18 (5 a.m.) 4,470 cfs (7.69 ft); Dec. 4 (time and discharge unknown); Jan. 17 (time unknown) 5,480 cfs (8.75 ft); Jan. 21 (4:30 p.m.) 2,900 cfs (5.89 ft); Jan. 23 (11 p.m.) 2,570 cfs (5.52 ft); Feb. 4 (9 p.m.) 2,690 cfs (5.66 ft); Mar. 15 (5 p.m.) 2,540 cfs (5.49 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 29 to Jan. 19; discharge estimated on basis of range in stage and records for Row River above Pitcher Creek, near Dorena and Coast Fork Willamette River near London.

## Coast Fork Willamette River at Saginaw, Oreg.

Location.--Lat 43°50'05", long. 123°02'30", in NW $\frac{1}{4}$  sec. 15, T. 20 S., R. 3 W., on right bank at Saginaw, 1 mile downstream from Row River.

Drainage area.--529 sq mi.

Records available.--October 1923 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 595.76 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to May 9, 1930, chain gage at site 50 ft upstream at different datum and May 10, 1930, to Oct. 12, 1938, at present datum.

Average discharge.--28 years, 1,236 cfs.

Extremes.--Maximum discharge during year, 18,400 cfs Oct. 29 (gage height, 6.68 ft), from rating curve extended above 9,500 cfs; minimum, 141 cfs Sept. 15, but may have been lower during period of no gage-height record.

1923-51: Maximum discharge, 32,900 cfs Dec. 28, 1945 (gage height, 12.38 ft); minimum observed, 15 cfs Aug. 1, Sept. 4, 1928.

Revisions.--The figures of maximum discharge for some water years have been revised as shown in the following table. They supersede those shown in the water-supply papers indicated.

Water-Supply Paper	Water year	Date	Gage height (feet)	Discharge (cfs)
594.....	1923-24	Dec. 7	9.2	13,800
614.....	1924-25	Oct. 31	13.3	28,000
654.....	1926-27	Feb. 20 or 21	12.9	32,500

Remarks.--Records good except those for periods of shifting control or no gage-height record, which are fair. Small diversions and regulation by log ponds above station; regulation by Cottage Grove Reservoir (see p. 128) since October 1942, and by Dorena Reservoir (see p. 131) since October 1949.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau.

Revisions (water years).--W 794: 1934. Revised figures of discharge for the water years 1924, 1925-30, 1931, 1936 (complete tables given for the water-years 1925-30 on following pages), superseding those published in Water-Supply Papers 594, 614, 634, 654, 674, 694, 709, 724, and 814, are given herein.

Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)
1923-24		1930-31		1930-31	
Oct. 22.....	330	June 2.....	140	June 21.....	300
23.....	650	3.....	130	22.....	400
Dec. 3.....	670	4.....	125	23.....	310
4.....	640	5.....	120	24.....	250
6.....	3,880	6.....	120	25.....	180
7.....	9,780	7.....	110	27.....	240
8.....	4,380	8.....	110		
Jan. 14.....	1,480	9.....	120	1935-36	
Feb. 10.....	1,500	11.....	150	Oct. 21.....	150
11.....	1,300	12.....	130	23.....	160
12.....	1,150	13.....	120	24.....	130
13.....	1,000	20.....	500	25.....	120

Month	Total	Maximum	Minimum	Mean	Per square mile	Runoff	
						Inches	Acre-feet
October 1923.....	10,726	1,390	61	346	-	-	21,300
December.....	80,515	9,780	430	1,950	-	-	120,000
January 1924.....	39,830	2,580	550	1,250	-	-	76,900
February.....	46,350	6,400	490	1,600	-	-	92,000
June 1931.....	7,278	595	144	243	0.459	0.51	14,500
Water year 1930-31.	232,187	14,700	23	636	1.20	16.29	460,000
October 1935.....	4,732	760	28	153	.289	.33	9,390
Calendar year 1935.	351,665	7,170	25	963	1.82	24.70	697,600
Water year 1935-36.	433,725	18,400	20	1,185	2.24	30.49	860,300

## Coast Fork Willamette River at Saginaw, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1924 to September 1925

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	20,800	940	2,460	6,800	1,230	730					
2	102	16,200	940	2,800	7,440	1,230	730					
3	102	6,400	1,480	3,000	9,780	1,230	730					
4	203	6,000	3,000	4,000	9,780	1,150	730					
5	134	4,200	2,800	6,200	8,580	1,230	730					
6	102	4,560	2,300	6,400	7,800	1,150	730					
7	90	7,660	1,900	4,500	7,000	1,150	730					
8	96	5,280	1,770	4,000	6,400	1,150	765					
9	102	7,000	1,990	3,800	4,380	1,230	800					
10	227	4,200	1,770	3,800	4,560	1,150	765					
11	155	5,640	1,480	4,100	5,280	1,150	730					
12	134	3,560	1,480	3,880	5,280	975	765					
13	100	3,260	1,390	3,560	3,250	940	800					
14	75	2,980	1,390	3,880	2,580	940	800					
15	96	3,880	1,310	3,500	2,100	940	940					
16	120	3,120	1,310	3,200	1,880	975	1,040					
17	100	2,700	1,310	2,300	1,570	940	1,390					
18	90	2,980	1,230	1,800	1,480	940	1,770					
19	76	6,400	1,080	2,500	1,390	940	6,000					
20	70	8,820	870	2,800	1,460	800	5,460					
21	65	10,800	765	3,100	1,480	765	5,460					
22	80	12,400	730	2,800	1,570	765	3,880					
23	65	7,660	730	3,000	1,800	765	3,560					
24	65	3,120	640	2,500	2,500	730	3,120					
25	80	2,840	730	2,000	2,700	700	2,840					
26	179	2,340	730	3,560	1,900	670	2,460					
27	1,310	1,480	870	6,800	1,500	640	1,770					
28	1,880	1,480	1,230	6,400	1,310	540	1,990					
29	3,260	1,480	1,480	6,800	-	640	1,770					
30	4,200	1,080	6,800	7,880	-	670	1,770					
31	20,100	-	3,120	6,400	-	700	-					
Total	33,523	170,320	49,565	123,720	113,580	29,125	55,755	27,125	13,500	4,030	2,790	3,300
Mean	1,080	5,680	1,600	3,990	4,060	940	1,880	875	450	130	90.0	110
Ac-ft	66,400	338,000	98,400	245,000	225,000	57,800	111,000	53,800	26,800	7,990	5,530	6,550
Calendar year 1924: Max	20,800			Min -		Mean 1,120		Ac-ft	814,000			
Water year 1924-25: Max	20,800			Min -		Mean 1,720		Ac-ft	1,240,000			

Discharge, in cubic feet per second, water year October 1925 to September 1926

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	150	53	580	370	940	2,910	485	350		76		159
2	150	53	1,570	330	905	2,340	515	350		72		148
3	150	61	1,390	340	905	2,210	545	330		70		101
4	120	53	1,100	405	14,900	1,830	790	359		66		80
5	120	57	1,000	405	11,100	1,470	830	545		64		72
6	90	70	900	430	14,300	1,470	830	1,470	234			60
7	90	65	820	430	7,260	1,360	680	1,470	216			56
8	90	70	740	405	5,540	950	540	1,080	192			54
9	90	75	700	380	5,140	680	485	870	170			54
10	65	90	740	340	4,740	715	425	750	166			52
11	90	203	1,000	330	4,540	750	400	620	166			50
12	65	1,310	2,480	310	5,140	715	690	540	152			47
13	65	2,440	1,480	510	4,010	610	690	500	139			47
14	65	580	800	450	2,620	610	560	460	120			50
15	90	550	1,080	400	2,340	545	520	420	117			66
16	65	580	1,120	460	2,340	425	500	390	120			72
17	65	550	1,080	800	2,340	425	470	350	128			98
18	65	550	1,150	1,390	2,480	515	460	326	131			80
19	45	550	1,150	1,570	2,480	515	440	315	131			62
20	45	490	1,310	1,230	2,760	485	410	342	182			54
21	65	380	3,260	1,150	4,540	455	450	455	138			70
22	65	350	5,100	1,480	3,850	425	485	398	117			66
23	65	227	2,460	1,390	5,340	398	450	370	110			104
24	45	120	1,570	1,230	14,600	370	420	348	104			80
25	45	148	1,390	1,230	9,180	425	410	295	117			66
26	45	550	1,120	940	7,040	425	400	425	110			58
27	65	380	1,080	905	5,740	425	380	398	92			54
28	45	350	800	610	4,010	398	370	370	89			52
29	45	380	700	1,500	-	370	360	455	86			56
30	45	490	550	2,700	-	359	360	425	78			64
31	65	-	480	1,600	-	398	-	410	-			-
Total	2,370	12,225	40,690	25,820	150,780	25,978	15,260	16,186	4,934	1,631	2,576	2,132
Mean	76.5	408	1,310	833	5,380	838	509	522	184	52.6	83.1	71.1
Ac-ft	4,700	24,300	80,600	51,200	299,000	51,500	30,300	32,100	9,760	3,230	5,110	4,230
Calendar year 1925: Max	9,780			Min -		Mean 1,170		Ac-ft	649,000			
Water year 1925-26: Max	14,600			Min -		Mean 824		Ac-ft	596,000			

## Coast Fork Willamette River at Saginaw, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1926 to September 1927

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	}	104	6,800	5,340	5,740	2,970	2,000	}	}	}	}	}	
2			5,540	10,900	7,740	3,110	1,900						
3			5,940	15,200	6,600	2,700	2,570						
4			4,540	13,500	5,340	2,700	2,440						
5			3,530	10,800	4,740	2,320	2,080						
6	}	104	2,340	7,500	3,690	2,200	1,850	}	}	}	}	}	
7			1,950	4,180	3,060	2,080	1,630						
8			1,120	3,060	2,620	2,080	1,740						
9			850	2,340	2,340	2,440	1,700						
10			680	2,080	1,950	2,700	1,600						
11	}	155	680	1,950	1,470	2,970	1,500	}	}	}	}	}	
12			1,500	1,360	1,080	3,250	1,400						
13			2,080	1,500	1,170	715	3,400						1,200
14			2,210	1,300	1,080	750	2,970						1,100
15			1,260	1,200	990	870	2,970						1,200
16		5,140	2,800	950	1,040	2,440	1,270	}	}	}	}	}	
17	3,690	4,180	1,040	1,590	3,250	1,320							
18	2,340	4,540	1,710	1,950	3,870	1,420							
19	3,530	5,340	3,500	3,370	3,250	1,420							
20	7,260	4,540	2,400	19,900	2,970	1,520							
21		3,370	4,740	1,710	24,400	2,830	1,520	}	}	}	}	}	
22	2,340	2,080	1,590	12,500	2,700	1,520							
23	1,080	1,900	1,360	9,180	2,440	1,630							
24	1,040	2,300	1,470	5,540	2,440	1,850							
25	1,360	3,100	2,210	4,740	2,830	1,960							
26		3,370	2,600	1,900	4,010	2,500	3,000	}	}	}	}	}	
27	2,340	2,300	1,700	3,060	2,400	3,500							
28	2,620	2,100	4,940	3,060	2,300	2,800							
29	9,700	2,000	5,340	-	2,100	2,500							
30	7,260	3,500	3,690	-	1,900	2,000							
31	-	-	5,940	3,060	-	2,300	-		-			-	
Total	4,805	63,238	93,210	120,020	143,045	83,380	55,140	40,300	19,200	6,510	2,976	9,600	
Mean	155	2,110	3,010	3,870	5,110	2,690	1,840	1,300	640	210	96.0	320	
Cfsm	0.293	3.99	5.89	7.32	9.66	5.09	3.48	2.46	1.21	0.397	0.181	0.605	
In.	0.34	4.45	6.58	8.44	10.06	5.87	3.88	2.84	1.35	0.46	0.21	0.68	
Ac-ft	9,530	126,000	185,000	238,000	284,000	165,000	109,000	79,900	38,100	12,900	5,900	19,000	
Calendar year 1926: Max			14,600	Min	-	Mean	1,110	Cfsm	2.10	In.	28.60	Ac-ft	807,000
Water year 1926-27: Max			24,400	Min	-	Mean	1,760	Cfsm	3.33	In.	45.14	Ac-ft	1,270,000

Discharge, in cubic feet per second, water year October 1927 to September 1928

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	1,320	400	2,500	1,600	2,000	1,420	4,520	1,400	560	154	15	18	
2	1,520	328	2,100	3,000	1,600	1,420	3,870	1,600	540	144	65	19	
3	1,520	318	1,850	5,000	1,600	1,420	3,710	1,400	500	140	86	17	
4	1,630	296	1,520	5,500	1,400	1,520	2,970	1,300	470	154	58	15	
5	2,080	290	1,520	4,200	1,300	1,520	2,080	1,200	450	176	51	18	
6	1,420	279	1,630	3,100	1,200	1,740	2,080	1,200	420	185	44	22	
7	1,320	284	1,630	2,500	1,200	1,960	1,740	1,300	390	167	44	23	
8	1,130	470	1,850	1,960	1,200	2,320	1,740	1,300	350	154	51	30	
9	770	1,420	1,960	1,740	1,200	2,830	1,740	1,300	330	144	62	30	
10	405	2,700	1,740	1,600	1,100	2,970	1,630	1,300	300	136	65	34	
11	375	1,600	1,500	1,400	1,300	12,500	1,630	1,300	290	128	65	37	
12	345	1,400	1,300	1,500	1,000	8,640	1,740	1,200	270	108	58	60	
13	345	1,220	2,500	2,830	900	5,400	1,630	1,100	250	108	54	120	
14	296	770	4,000	4,690	850	3,500	1,630	1,100	240	104	40	80	
15	290	690	3,000	3,300	800	3,100	1,520	1,000	220	104	37	65	
16	279	2,440	2,300	2,500	740	2,500	1,320	1,000	210	96	37	60	
17	257	2,970	1,800	2,000	700	2,000	1,850	900	200	93	34	50	
18	252	4,030	1,600	1,800	850	1,600	1,960	900	180	93	34	52	
19	215	1,850	1,500	1,700	600	1,300	3,550	900	172	90	37	51	
20	215	1,960	1,500	1,500	540	1,100	2,570	900	172	86	40	51	
21	279	2,320	1,300	1,300	600	1,300	2,080	800	167	86	40	44	
22	301	3,000	1,100	1,200	800	1,500	1,850	800	154	79	44	40	
23	438	2,300	1,000	1,400	1,100	1,600	1,740	800	149	72	44	44	
24	540	4,520	930	1,200	1,200	2,000	1,630	800	144	72	40	51	
25	470	7,940	900	1,850	1,420	4,500	1,630	700	140	72	34	58	
26	438	6,410	840	2,000	1,420	6,400	1,520	700	132	70	34	44	
27	405	9,600	1,000	1,700	1,320	4,350	1,520	700	140	68	30	48	
28	328	11,900	1,400	1,600	1,270	2,830	1,420	700	158	66	28	37	
29	328	10,300	2,500	1,740	1,320	2,830	1,320	800	162	64	26	51	
30	296	4,000	1,700	2,000	-	6,200	1,320	730	158	64	25	30	
31	268	-	1,500	2,100	-	8,640	-	620	-	62	22	-	
Total	20,075	88,005	53,470	71,510	32,030	102,910	61,510	31,740	8,018	3,339	1,344	1,303	
Mean	648	2,930	1,720	2,310	1,100	3,320	2,050	1,020	267	108	43.4	43.4	
Cfsm	1.22	5.54	3.25	4.37	2.08	6.28	3.88	1.93	0.505	0.204	0.082	0.082	
In.	1.41	6.18	3.75	5.04	2.24	7.24	4.33	2.22	0.58	0.24	0.09	0.09	
Ac-ft	39,800	174,000	106,000	142,000	63,300	204,000	122,000	62,700	15,900	6,640	2,670	2,580	
Calendar year 1927: Max			24,400	Min	-	Mean	1,760	Cfsm	3.33	In.	45.13	Ac-ft	1,270,000
Water year 1927-28: Max			12,500	Min	15	Mean	1,300	Cfsm	2.46	In.	33.39	Ac-ft	942,000

## Coast Fork Willamette River at Saginaw, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1928 to September 1929

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	28	108	195	1,850	6,410	950	1,420	1,180	540	246	86	65
2	44	93	225	2,970	8,410	1,080	1,220	1,130	652	226	79	58
3	44	86	257	7,940	4,350	1,130	1,180	1,220	905	215	76	58
4	124	65	210	3,400	2,970	1,320	1,180	1,080	1,040	205	76	54
5	246	72	185	2,080	1,740	1,420	1,180	1,040	1,850	185	72	48
6	167	116	144	1,630	1,500	1,520	1,130	1,040	1,630	185	76	44
7	116	100	132	1,080	1,300	1,220	1,080	995	1,270	176	76	51
8	86	65	132	905	1,130	1,040	1,220	950	1,220	167	86	40
9	85	108	132	730	860	950	1,270	905	1,180	167	86	48
10	58	323	1,320	652	860	815	1,320	860	1,080	158	82	37
11	116	600	1,420	615	770	1,630	1,420	860	860	158	82	37
12	124	345	770	540	700	1,960	1,520	905	730	149	65	34
13	93	578	578	578	660	1,130	2,200	950	690	149	79	44
14	44	540	375	470	620	985	9,120	860	950	140	79	30
15	65	470	345	405	580	950	8,400	770	1,130	132	76	44
16	180	350	323	318	560	905	4,870	730	1,220	124	72	40
17	167	540	257	375	540	860	4,190	690	1,040	124	72	40
18	108	400	215	470	540	860	3,710	690	950	116	72	37
19	93	310	195	860	500	905	3,110	652	860	108	68	34
20	79	250	176	770	470	860	2,700	652	740	93	65	44
21	79	200	158	615	500	10,800	3,400	578	650	93	58	30
22	58	167	140	505	615	6,200	4,190	540	540	86	82	30
23	44	158	144	770	730	4,030	3,550	540	470	86	58	58
24	37	132	140	1,220	1,130	2,440	2,080	540	420	79	58	68
25	30	124	770	1,740	1,270	1,630	1,850	578	370	79	54	65
26	44	116	1,220	2,830	1,420	1,740	1,740	505	330	93	51	51
27	58	132	6,000	2,970	1,220	1,740	1,630	470	310	86	51	48
28	79	200	3,110	1,740	1,040	1,740	1,520	438	280	79	50	44
29	93	167	4,030	1,630	-	1,740	1,520	470	268	79	50	37
30	108	149	5,710	1,420	-	1,630	1,420	470	257	72	50	44
31	124	-	4,190	1,520	-	1,630	-	505	-	65	50	-
Total	2,801	7,064	31,198	45,708	41,285	57,820	76,540	23,793	24,432	4,119	2,117	1,362
Mean	90.4	235	1,010	1,470	1,470	1,870	2,540	768	814	133	68.3	45.4
Cfsm	0.171	0.444	1.91	2.78	2.78	3.53	4.80	1.45	1.54	0.251	0.129	0.086
In.	0.20	0.50	2.20	3.20	2.90	4.07	5.36	1.67	1.72	0.29	0.15	0.10
Ac-ft	5,560	14,000	62,100	90,400	81,600	115,000	151,000	47,200	48,400	6,180	4,200	2,700
Calendar year 1928: Max	12,500	Min	15	Mean	969	Cfsm	1.83	In.	24.95	Ac-ft	703,000	
Water year 1928-29: Max	10,800	Min	28	Mean	871	Cfsm	1.65	In.	22.36	Ac-ft	630,000	

Discharge, in cubic feet per second, water year October 1929 to September 1930

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		40	38	815	4,040	1,440	460	1,380	780	180	68	40
2		35	37	860	7,780	1,080	412	1,080	1,140	175	65	40
3	32	31	35	815	4,650	1,140	495	1,380	1,260	175	60	42
4		27	45	905	3,180	1,080	425	1,380	1,740	180	60	40
5		24	40	1,320	3,180	1,080	336	1,080	1,500	160	58	38
6	29	24	37	1,270	2,620	1,200	312	1,030	1,140	160	70	34
7	34	24	35	950	2,760	1,080	360	975	1,080	150	65	40
8	76	22	90	860	4,340	975	336	975	975	150	60	42
9	136	55	375	730	3,180	825	324	975	780	145	58	46
10	128	68	815	652	2,620	735	300	872	735	141	58	60
11	40	220	905	615	7,540	735	267	872	698	129	55	99
12	54	190	2,440	540	7,970	698	256	735	570	125	52	113
13	40	90	2,080	438	4,490	698	300	735	495	125	52	70
14	62	68	7,040	425	4,190	698	460	698	406	121	50	68
15	48	48	5,420	495	4,340	610	570	650	392	117	50	62
16	48	54	4,520	532	4,340	610	698	698	373	109	52	60
17	54	62	2,200	650	3,600	495	650	610	366	105	50	55
18	54	62	10,300	920	2,900	532	495	460	360	102	50	46
19	96	64	12,700	1,620	4,480	460	570	570	348	96	48	46
20	68	62	5,610	2,620	2,350	425	495	610	350	93	48	42
21	76	54	2,970	1,620	2,900	418	495	1,500	324	90	48	38
22	48	48	2,200	1,260	2,480	460	1,620	1,440	318	84	40	36
23	34	48	1,420	1,320	2,620	1,320	1,140	1,380	306	84	36	34
24	29	40	1,320	1,380	2,480	1,080	1,030	975	300	84	32	50
25	28	34	1,180	1,200	2,220	920	872	825	267	81	32	65
26	45	48	1,130	1,080	2,220	825	825	780	245	78	36	70
27	68	48	1,080	920	2,900	780	825	698	230	72	46	70
28	76	40	950	975	1,740	698	1,860	810	220	72	44	81
29	82	40	905	1,140	-	610	1,860	735	190	78	44	87
30	60	40	950	2,480	-	570	1,860	735	190	72	42	75
31	45	-	905	4,810	-	532	-	735	-	68	42	-
Total	1,718	1,700	69,772	36,217	99,090	24,808	20,908	28,178	18,058	3,601	1,571	1,689
Mean	55.4	56.7	2,250	1,170	3,540	800	697	909	602	116	50.7	56.3
Cfsm	0.105	0.107	4.25	2.21	6.69	1.51	1.32	1.72	1.14	0.219	0.096	0.106
In.	0.12	0.12	4.90	2.55	6.97	1.74	1.47	1.98	1.27	0.25	0.11	0.12
Ac-ft	3,410	3,370	138,000	71,900	197,000	49,200	41,500	55,900	35,800	7,130	3,120	3,350
Calendar year 1929: Max	12,700	Min	22	Mean	959	Cfsm	1.81	In.	24.60	Ac-ft	693,000	
Water year 1929-30: Max	12,700	Min	22	Mean	842	Cfsm	1.59	In.	21.60	Ac-ft	610,000	

## WILLAMETTE RIVER BASIN

## Coast Fork Willamette River at Saginaw, Oreg.--Continued

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 17

Jan. 18 to Sept. 30

0.8	525	3.0	5,400	-0.2	120	1.0	880
1.0	770	4.0	8,840	.1	215	2.0	2,840
1.5	1,590	6.1	16,200	.4	335	3.0	5,040
2.0	2,680			.7	520	5.0	10,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	784	*9,570	3,640	2,400	1,420	556	760	498	375	218	156	al60
2	770	9,570	3,930	2,940	1,340	529	834	482	360	212	147	al55
3	826	9,240	5,890	7,430	1,440	529	820	490	350	208	165	al55
4	1,020	8,940	10,100	5,070	5,130	682	1,500	475	308	204	165	al50
5	1,270	8,570	9,120	3,220	9,020	1,050	1,160	475	286	198	171	al50
6	1,550	7,510	7,400	2,400	9,150	965	897	482	282	198	168	al50
7	1,580	5,830	3,400	1,960	8,750	897	790	529	278	194	168	159
8	1,020	5,680	7,560	1,940	8,000	1,340	948	498	278	190	*168	159
9	1,110	5,490	4,840	1,850	7,250	2,240	*820	468	279	187	al70	156
10	812	3,470	2,900	1,750	5,950	2,540	574	445	278	190	al70	150
11	744	1,810	2,590	1,980	4,830	2,360	482	418	278	*184	al70	156
12	*798	1,480	2,920	1,960	4,000	1,940	622	439	278	184	al70	153
13	666	1,270	2,700	1,770	2,700	2,940	914	931	278	184	al70	150
14	582	896	2,590	4,300	2,280	4,600	880	1,200	284	180	al70	150
15	525	1,030	2,240	7,040	2,140	7,010	547	805	278	165	al70	147
16	628	7,160	1,730	5,980	1,700	8,500	460	556	278	165	al70	150
17	1,160	9,820	1,710	10,800	1,520	5,780	452	482	278	168	al70	235
18	1,770	12,600	1,480	*9,680	1,440	3,390	445	460	274	171	al70	460
19	1,810	10,700	1,360	9,020	1,440	2,760	439	439	266	174	al70	460
20	2,040	10,000	1,200	7,700	1,240	3,430	433	427	262	168	al70	*445
21	2,110	8,670	1,160	7,810	1,260	3,930	433	421	250	168	al65	468
22	2,020	4,210	1,020	9,300	1,300	2,480	427	415	254	156	al65	468
23	1,930	2,680	854	9,120	965	1,740	427	*439	254	156	al55	452
24	1,820	2,360	731	8,880	880	1,420	421	445	250	162	al55	482
25	1,680	2,380	679	8,550	880	1,720	415	445	250	165	al70	475
26	1,630	2,240	679	7,820	*730	2,080	415	439	250	168	al65	498
27	5,390	2,020	653	6,920	610	1,660	409	445	250	165	al65	805
28	11,300	2,000	666	4,950	565	1,140	452	427	236	165	al65	718
29	16,000	*1,800	1,480	2,740	-	999	498	415	226	165	al65	452
30	10,800	2,560	1,810	2,000	-	1,300	505	415	218	162	al65	452
31	10,200	-	2,310	1,840	-	1,090	-	409	-	159	al65	-
Total	84,125	161,656	97,342	161,080	87,930	73,597	18,979	15,714	8,265	5,533	5,148	9,320
Mean	2,714	5,369	3,140	5,196	3,140	2,374	633	507	276	178	166	311
Cfs/m	5.13	10.2	5.94	9.82	5.94	4.49	1.20	0.958	0.522	0.336	0.314	0.588
In.	5.91	11.36	6.84	11.32	6.18	5.17	1.33	1.10	0.58	0.39	0.36	0.68
Ac-ft	166,900	320,600	193,100	319,500	174,400	146,000	37,460	31,170	16,390	10,970	10,210	18,490
Calendar year 1950:	Max	16,000	Min	144	Mean	2,231	Cfs/m	4.22	In.	57.25	Ac-ft	1,615,000
Water year 1950-51:	Max	16,000	Min	147	Mean	1,996	Cfs/m	3.77	In.	51.20	Ac-ft	1,445,000

Peak discharge (base, 12,000 cfs)--Oct. 29 (10 a.m.) 18,400 cfs (6.68 ft); Nov. 18 (5:30 a.m.) 13,900 cfs (5.48 ft); Jan. 17 (1 p.m.) 14,100 (5.99 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Goshen and below Cottage Grove Dam.

Note.--Shifting-control method used Jan. 17, May 11 to June 28.



Coast Fork Willamette River near Goshen, Oreg.

Location.--Lat 43°58'40", long. 122°58'00", in NW $\frac{1}{4}$  sec. 29, T. 18 S., R. 2 W., on right bank at downstream side of highway bridge, 2.5 miles east of Goshen and 6 $\frac{1}{2}$  miles above confluence with Middle Fork Willamette River.

Drainage area.--642 sq mi (revised).

Records available.--August 1905 to February 1912, October 1950 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 473.80 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Feb. 7, 1912, staff gage at site 600 ft upstream at different datum.

Average discharge.--7 years (1905-11, 1950-51), 1,707 cfs.

Extremes.--Maximum discharge during year, 24,000 cfs Oct. 29 (gage height, 16.0 ft, from high-water mark), from rating curve extended above 13,000 cfs on basis of slope-area determination of peak flow; minimum, 112 cfs Sept. 11 (gage height, 2.14 ft).

1905-12, 1950-51: Maximum discharge, 58,500 cfs Nov. 22, 1909 (gage height, 19.5 ft from graph based on gage readings), from rating curve extended above 15,000 cfs by logarithmic plotting, site and datum then in use; minimum, 36 cfs Sept. 29, 30, Oct. 11, 12, 1908.

Remarks.--Records good. Flow regulated by Cottage Grove Reservoir (see p. 128), and Dorena Reservoir (see p. 131). Only small diversions above station.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1-14)

2.2	130	6.0	3,150
2.5	240	9.0	7,300
3.0	545	12.0	13,300
4.0	1,310	15.1	21,300

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	830	9,700	4,180	2,840	1,710	*755	1,040	580	399	216	140	165
2	822	9,600	4,650	3,030	1,610	727	808	545	393	212	134	162
3	878	9,030	5,910	7,400	1,830	706	894	580	381	204	151	156
4	1,090	9,000	10,700	5,780	4,800	1,170	1,530	573	340	204	158	154
5	1,330	8,240	9,880	3,620	11,600	1,820	1,400	559	296	196	162	154
6	1,710	7,590	7,570	2,910	11,400	1,810	926	552	296	196	*165	151
7	1,650	5,720	9,880	2,410	10,800	1,830	910	629	296	193	165	154
8	1,240	5,580	8,390	2,370	9,730	2,460	1,060	608	301	186	168	154
9	1,350	5,440	5,450	2,290	8,150	3,300	1,020	545	285	176	168	154
10	998	4,110	3,670	2,220	6,930	3,020	755	496	290	182	172	151
11	815	2,410	3,140	2,410	5,750	2,830	*559	468	290	*176	176	148
12	926	1,940	3,370	2,490	4,830	2,310	636	475	290	172	176	162
13	808	1,770	3,140	2,310	3,120	3,120	974	800	290	172	176	151
14	734	1,420	3,090	4,680	2,620	5,050	1,030	1,270	296	168	179	148
15	664	1,720	2,840	7,540	2,500	7,170	692	902	290	165	179	144
16	727	9,620	2,440	7,040	2,150	9,880	538	636	290	162	182	148
17	1,340	11,400	2,290	14,800	1,890	5,850	482	503	290	165	186	154
18	1,980	17,000	2,050	13,800	1,880	3,790	475	468	285	165	190	433
19	2,110	11,800	1,900	11,600	1,770	2,950	468	447	280	165	190	461
20	2,320	10,100	1,710	9,580	1,670	3,290	447	433	280	165	186	*433
21	2,350	9,000	1,610	*8,660	1,650	4,130	440	419	260	162	186	440
22	2,240	5,050	1,480	12,000	1,610	2,760	426	405	260	158	179	461
23	2,120	3,330	1,250	11,100	1,350	2,040	412	*479	265	148	176	454
24	2,040	3,000	1,140	10,600	1,210	1,680	405	461	265	162	172	461
25	1,920	2,980	974	9,980	1,210	1,760	399	454	265	162	182	496
26	1,930	2,860	1,010	8,840	1,140	2,140	393	447	265	162	179	482
27	3,490	2,800	974	7,560	886	1,880	393	433	260	158	172	699
28	all, 400	2,620	990	5,690	808	1,430	461	433	240	158	176	862
29	all, 300	2,480	1,650	3,090	-	1,190	559	419	228	158	176	503
30	*12,400	*3,050	2,140	2,160	-	1,440	580	461	224	154	172	524
31	11,200	-	2,560	2,100	-	1,370	-	412	-	151	172	-
Total	96,692	180,360	112,028	192,900	106,604	86,738	21,112	16,790	8,690	5,373	5,341	9,321
Mean	3,119	6,012	3,614	6,223	3,807	2,798	704	542	290	173	172	311
Cfsm	4.86	9.36	5.63	9.69	5.93	4.36	1.10	0.844	0.452	0.269	0.268	0.484
In.	5.60	10.45	6.49	11.17	6.18	5.02	1.22	0.97	0.50	0.31	0.31	0.54
Ac-ft	191,800	357,700	222,200	382,600	211,400	172,000	41,860	33,300	17,240	10,660	10,590	18,490

Calendar year 1950: Max - Min - Mean - Cfsm - In. - Ac-ft  
 Water year 1950-51: Max 21,300 Min 134 Mean 2,307 Cfsm 3.59 In. 48.76 Ac-ft 1,670,000

Peak discharge (base, 15,000 cfs).--Oct. 29 (about 1 p.m.) 24,000 cfs (16.0 ft); Nov. 18 (5 a.m.) 20,000 cfs (14.64 ft); Jan. 17 (5 p.m.) 21,700 cfs (15.24 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of graph based on records of upstream stations and high-water mark.

## Willamette River at Springfield, Oreg.

Location.--Lat 44°02'45", long. 123°01'40", in SE<sup>1</sup> sec. 34, T. 17 S., R. 3 W., near center of span on downstream side of highway bridge at Springfield, at mile 185.6.

Drainage area.--2,030 sq mi, approximately.

Records available.--November 1911 to December 1913, June 1919 to September 1951. Published as "at Eugene" June 1919 to September 1928. Gage-height records collected at site at Eugene since 1894 are contained in reports of United States Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 423.47 ft above mean sea level, datum of 1929. Nov. 25, 1911, to Dec. 30, 1913, chain gage on bridge a quarter of a mile upstream at different datum. June 1, 1919, to Sept. 30, 1928, staff gage at site 4 miles downstream at different datum.

Average discharge.--33 years (1921-13, 1919-51), 5,168 cfs.

Extremes.--Maximum discharge during year, 92,500 cfs Oct. 29 (gage height, 17.41 ft, from recorded range in stage), from rating curve extended above 52,000 cfs; minimum, not determined, occurred during period of no gage-height record; minimum daily, 950 cfs Sept. 9-17.

1911-13, 1919-51: Maximum discharge, 140,000 cfs Dec. 29, 1945 (gage height, 20.9 ft), from rating curve extended above 93,000 cfs; minimum, 500 cfs Aug. 11, 1926.

Maximum stage recorded by United States Weather Bureau, 22.0 ft Jan. 25, 1903, at Eugene. Floods in December 1861 and February 1890 reached about the same stage.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Slight diurnal fluctuation at low flow caused by logging operations in basin of Middle Fork Willamette River. Small diversions above station. Flow regulated at times by Cottage Grove Reservoir (see p. 128) and Dorena Reservoir (see p. 131).

Revisions (water years).--W 694: Drainage area. W 984: 1921, 1923, 1927.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1 to Jan. 2)

Oct. 1 to Feb. 5

Feb. 6 to Sept. 30

2.9	1,630	7.0	13,900	1.6	1,000	5.0	6,440
3.5	2,500	9.0	24,100	2.0	1,260	7.0	13,900
4.0	3,400	12.0	42,700	3.0	2,270	9.0	24,100
5.0	6,050	17.0	87,700	4.0	3,920	11.0	36,200

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,710	19,800	a12,000	9,180	7,160	*4,220	6,210	4,700	2,960	1,550	1,100	1,110
2	1,690	30,400	9,980	7,750	4,050	5,490	4,600	2,840	1,540	1,090	1,100	
3	1,880	25,800	a20,000	18,100	7,130	3,300	5,840	4,530	2,780	1,520	1,100	a1,000
4	2,700	20,200	a34,000	14,400	13,700	4,970	7,170	4,580	2,720	1,530	1,100	a1,000
5	3,970	16,800	a28,000	11,000	33,700	6,650	7,360	4,970	2,660	1,530	1,100	a1,000
6	5,480	14,700	a28,000	9,260	30,500	6,350	6,770	5,250	2,540	1,490	1,100	a1,000
7	4,580	12,100	a38,000	8,030	29,700	6,150	6,710	6,800	2,480	1,450	1,090	a1,000
8	3,680	11,300	a28,000	7,550	28,500	7,200	6,710	6,500	2,400	1,400	1,090	a1,000
9	4,290	10,900	a19,000	7,160	21,500	8,330	6,500	5,740	2,360	1,380	1,090	a950
10	3,200	9,380	a15,000	7,130	18,400	7,420	6,300	5,520	2,320	1,340	1,090	a950
11	2,500	7,340	a13,000	7,450	17,400	6,930	6,090	6,530	2,340	1,340	1,090	a950
12	2,400	6,720	a12,000	*7,520	16,200	6,410	*6,040	7,170	2,370	*1,310	1,090	a950
13	*2,100	6,310	a11,000	7,200	12,700	8,160	7,050	7,780	2,400	1,300	1,090	a950
14	1,880	5,790	a10,000	13,400	10,900	11,600	7,580	7,840	2,350	1,270	1,090	a950
15	1,820	6,120	a9,000	17,500	9,940	16,400	7,350	6,660	2,350	1,280	1,080	a950
16	1,830	15,800	a8,000	15,600	9,020	21,600	7,050	5,930	2,360	1,250	*1,040	a950
17	2,770	21,000	a7,500	31,100	8,160	14,800	6,770	5,710	2,270	1,250	a1,000	a950
18	a4,600	38,500	a7,000	28,000	7,900	10,400	6,350	5,550	2,160	1,240	a1,000	1,250
19	a4,200	24,400	6,720	20,200	7,330	9,200	5,840	5,250	2,050	1,230	a1,000	1,280
20	a4,400	20,600	6,380	16,000	7,020	10,000	5,350	4,940	2,010	1,210	a1,000	1,300
21	a4,600	19,400	5,920	18,000	6,960	11,500	4,840	4,750	1,920	1,200	a1,000	1,280
22	a4,400	15,800	5,610	24,600	6,590	10,000	4,350	4,720	1,900	1,190	a1,000	1,300
23	a4,200	10,900	5,180	24,700	6,350	8,400	4,110	4,920	1,830	1,180	a1,000	1,310
24	a4,000	10,500	4,800	32,700	5,570	7,490	3,920	*4,870	1,800	1,180	a1,000	1,300
25	a3,800	11,000	4,450	25,900	5,740	7,760	3,780	4,510	1,750	1,160	a1,000	1,340
26	a4,600	10,300	4,260	23,200	5,200	8,030	3,740	4,220	1,710	1,160	a1,000	1,400
27	a8,000	10,200	4,140	19,000	4,680	7,620	3,740	4,130	1,690	1,160	a1,000	*1,490
28	a40,000	*9,420	4,520	14,800	4,400	6,800	5,000	4,840	1,660	1,160	1,110	1,600
29	a85,000	8,720	6,830	10,900	-	6,680	5,490	3,620	1,610	1,130	1,250	1,350
30	a50,000	a10,000	9,070	8,950	-	6,770	5,040	3,370	1,570	1,120	1,190	1,420
31	24,600	-	9,500	8,070	-	6,560	-	3,150	-	1,110	1,180	-
Total	294,880	438,500	390,880	476,380	349,100	262,370	174,530	162,610	66,180	40,140	33,160	34,380
Mean	9,512	14,620	12,610	15,370	12,470	8,464	5,818	5,245	2,206	1,295	1,070	1,146
Cfs/m	4.69	7.20	6.21	7.57	6.14	4.17	2.87	2.58	1.09	0.638	0.527	0.565
In.	5.40	8.03	7.16	8.73	6.40	4.81	3.20	2.98	1.21	0.74	0.61	0.63
Ac-ft	584,900	869,800	775,300	944,900	692,400	520,400	346,200	322,500	131,300	79,620	65,770	68,190

Calendar year 1950: Max 85,000 Min 1,060 Mean 8,430 Cfs/m 4.15 In. 56.37 Ac-ft 6,103,000  
Water year 1950-51: Max 85,000 Min 950 Mean 7,461 Cfs/m 3.68 In. 49.90 Ac-ft 5,401,000

Peak discharge (base, 35,000 cfs).--Oct. 29 (about 12 m.) 92,500 cfs (17.41 ft); Nov. 18 (8 a.m.) 44,000 cfs (12.28 ft); Dec. 4 (time and discharge unknown); Dec. 7 (time and discharge unknown); Jan. 17 (6 p.m.) 43,100 cfs (12.10 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage when available and sum of upstream records.

## WILLAMETTE RIVER BASIN

141

McKenzie River at outlet of Clear Lake, Oreg.

Location.--Lat 44°21'40", long. 121°59'40", in SE $\frac{1}{4}$  sec. 8, T. 14 S., R. 7 E., on west bank of Clear Lake in narrow channel 150 ft above outlet, at mile 85.9 (U.S.G.S. Plan and Profile).

Drainage area.--101 sq mi.

Records available.--June 1912 to July 1915, October 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 3.015.32 ft above mean sea level (levels by Eugene Water and Electric Board). June 20, 1912, to July 31, 1951, float gage at site 1 mile north at different datum.

Average discharge.--6 years (1912-14, 1947-51), 514 cfs.

Extremes.--Maximum discharge during year, 1,850 cfs Nov. 2 (gage height, 5.90 ft); minimum, 267 cfs Sept. 27 (gage height, 1.82 ft).  
1912-15, 1947-51: Maximum discharge, 2,320 cfs Jan. 7, 1948 (gage height, 6.75 ft), from rating curve extended above 1,400 cfs by logarithmic plotting; minimum daily, 201 cfs July 31, 1951.

A discharge of 165 cfs was measured on Sept. 28, 1915.

Remarks.--Records excellent. Flow regulated by natural storage in lake. At high stages an undetermined flow enters numerous sink holes in lava rock along south edge of lake above station.

Revisions.--W 1124: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.8	263	4.0	1,000
2.0	310	5.0	1,420
2.5	445	5.7	1,750
3.0	610		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	322	964	760	696	748	582	512	796	728	481	391	308
2	322	1,720	736	704	752	568	512	784	704	478	385	305
3	*328	1,430	736	696	748	561	516	789	688	472	380	302
4	328	1,200	900	670	748	558	536	824	670	469	379	302
5	342	1,110	960	648	836	550	575	840	659	466	375	302
6	348	1,050	1,060	631	892	540	603	880	648	463	368	*300
7	352	1,000	1,280	641	1,010	522	620	952	*634	463	368	300
8	362	980	1,140	603	1,180	512	638	932	620	457	365	298
9	375	948	1,050	589	1,120	505	656	916	617	457	360	295
10	382	888	1,020	578	1,090	499	673	944	614	454	358	295
11	388	840	1,040	*572	1,190	493	688	992	610	454	352	292
12	394	800	1,050	550	1,210	487	716	992	603	451	352	290
13	397	752	1,010	550	1,130	484	772	964	600	448	350	288
14	397	708	976	610	1,070	481	832	936	589	445	348	288
15	391	673	952	673	1,040	490	868	924	586	445	345	285
16	391	652	936	704	1,010	496	876	932	586	442	342	285
17	397	638	912	708	980	519	900	960	568	439	340	285
18	394	603	876	680	952	522	908	964	561	*433	338	283
19	385	561	860	673	912	522	900	940	550	430	335	281
20	385	575	856	670	880	*522	876	920	544	427	330	278
21	385	600	828	704	848	530	852	916	533	424	330	278
22	385	592	796	712	808	533	828	924	526	424	328	276
23	385	582	792	696	760	530	808	932	516	421	325	276
24	385	617	764	792	720	526	792	928	508	418	325	274
25	388	716	736	896	680	522	784	900	502	412	322	274
26	388	736	712	908	652	519	772	876	499	409	320	272
27	412	740	696	884	620	516	772	860	496	408	318	270
28	431	732	696	840	600	516	832	840	493	405	322	270
29	616	712	748	804	-	516	848	808	490	400	*318	270
30	1,010	736	760	784	-	519	816	780	484	397	312	276
31	868	-	732	772	-	516	-	752	-	394	308	-
Total	13,283	24,855	27,370	21,611	25,186	16,156	22,281	27,696	17,426	13,582	10,688	8,598
Mean	428	828	883	697	900	521	743	893	581	438	345	287
Cfs/m	4.24	8.20	8.74	6.90	8.91	5.16	7.36	8.84	5.75	4.34	3.42	2.84
In.	4.89	9.15	10.08	7.96	9.27	5.95	8.20	10.20	6.42	5.00	3.94	3.17
Ac-ft	26,350	49,300	54,290	42,860	49,960	32,040	44,190	54,930	34,560	26,940	21,200	17,050

Calendar year 1950: Max 1,720 Min 259 Mean 651 Cfs/m 6.45 In. 87.45 Ac-ft 471,200

Water year 1950-51: Max 1,720 Min 270 Mean 627 Cfs/m 6.21 In. 84.23 Ac-ft 453,700

Peak discharge (base, 750 cfs).--Nov. 2 (11 a.m.) 1,850 cfs (5.90 ft); Dec. 7 (10 a.m.) 1,310 cfs (4.75 ft); Feb. 11 (8 to 12 p.m.) 1,240 cfs (4.60 ft); May 11 (4 to 12 p.m.) 1,010 cfs (4.02 ft).

\* Discharge measurement made on this day.

## WILLAMETTE RIVER BASIN

## McKenzie River at McKenzie Bridge, Oreg.

Location.--Lat 44°10'50", long. 122°07'20", in NE $\frac{1}{4}$  sec. 18, T. 16 S., R. 6 E., on left bank 1.7 miles east of village of McKenzie Bridge, 2 $\frac{1}{2}$  miles upstream from mouth of Horse Creek, and at mile 66.4 (U.S.G.S. Plan and Profile).

Drainage area.--345 sq mi at measuring section three-quarters of a mile upstream from gage.

Records available.--August 1910 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,419.04 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to June 12, 1932, staff gage at several sites within 2 miles of present site and at various datums.

Average discharge.--35 years (1910-14, 1915-16, 1918-21, 1923-25, 1926-51), 1,625 cfs.

Extremes.--Maximum discharge during year, 8,040 cfs Nov. 1 (gage height, 5.71 ft); minimum, 1,220 cfs Sept. 24, 25, 26, 27-29.

1910-51: Maximum discharge, 18,000 cfs Jan. 6, 1923 (gage height, 8.3 ft, from floodmarks, site and datum then in use), from rating curve extended above 2,400 cfs; minimum, 805 cfs Oct. 20, 1931.

Remarks.--Records excellent except those for period of no gage-height record, which are fair. No diversion or regulation above station.

Revisions.--W 814: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.3	1,200
2.0	1,890
3.5	3,920
5.5	7,620

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,300	4,770	2,650	2,440	2,440	1,970	2,010	2,380	2,000	1,600	1,420	1,280
2	1,290	5,720	2,510	2,640	2,520	1,930	2,010	2,320	1,980	1,600	1,420	1,280
3	1,530	4,690	2,680	2,770	2,660	1,910	2,100	2,340	1,960	1,590	*1,420	1,270
4	1,390	3,900	4,360	2,600	2,900	1,930	2,290	2,410	1,930	1,590	1,410	1,270
5	1,670	3,360	4,060	2,440	3,850	1,900	2,350	*2,460	1,910	1,580	1,410	1,270
6	1,880	3,020	5,200	2,320	4,060	1,880	2,380	a2,600	1,890	1,570	1,400	1,270
7	1,720	2,800	5,720	2,250	4,790	1,850	2,420	a2,900	1,870	1,560	1,400	1,260
8	1,670	*2,730	4,430	2,190	5,040	1,850	2,430	a2,800	1,860	1,560	1,390	1,260
9	1,640	2,580	3,770	2,130	4,360	1,810	2,440	a2,700	1,850	1,560	1,380	1,250
10	1,550	2,420	3,440	2,110	4,090	1,770	2,440	a2,800	1,850	1,550	1,370	1,250
11	*1,510	2,320	3,380	2,100	4,500	1,760	2,430	a2,900	1,850	1,550	1,360	1,250
12	1,480	2,280	3,260	2,020	4,190	1,750	2,520	a2,800	1,850	1,550	1,360	1,240
13	1,450	2,180	3,020	2,120	3,700	1,780	2,730	a2,900	1,820	1,550	1,350	*1,240
14	1,450	2,110	*2,940	3,120	3,390	1,800	2,900	a2,800	1,800	1,540	1,350	1,240
15	1,430	2,070	2,870	3,090	3,180	2,140	2,880	a2,700	1,800	1,530	1,340	1,240
16	1,420	2,160	2,820	2,880	3,000	2,240	2,840	a2,700	1,790	1,530	1,340	1,240
17	1,510	2,480	2,730	2,970	2,880	2,110	2,840	a2,700	1,770	1,520	1,340	1,230
18	1,600	2,640	2,620	2,780	2,770	2,060	2,770	a2,700	1,750	1,510	1,330	1,230
19	1,590	2,460	2,600	2,600	2,640	2,050	2,660	a2,600	1,720	1,510	1,330	1,230
20	1,650	2,820	2,620	2,470	2,560	2,100	2,530	a2,500	1,710	1,500	1,320	1,230
21	1,590	2,800	2,510	2,700	2,470	2,160	2,410	a2,400	*1,700	1,500	1,320	1,230
22	1,540	2,690	2,490	2,780	2,380	2,120	2,340	a2,500	1,690	1,490	1,310	1,230
23	1,510	2,530	2,470	3,000	2,310	2,070	2,280	2,510	1,670	1,480	1,310	1,230
24	1,490	2,950	2,380	3,990	2,240	*2,050	2,250	2,480	1,660	1,470	1,300	1,220
25	1,550	3,080	2,300	3,920	2,170	2,050	2,240	2,400	1,650	1,470	1,300	1,220
26	1,590	2,920	2,240	3,920	2,110	2,050	2,251	2,341	1,741	1,471	1,201	1,231
27	1,900	2,910	2,200	3,540	2,050	2,040	2,290	2,290	1,630	1,450	1,290	1,220
28	5,900	2,710	2,360	3,140	2,000	2,010	2,660	2,220	1,620	1,450	1,320	1,220
29	5,920	2,540	2,690	2,870	-	2,060	2,610	2,140	1,620	1,440	1,310	1,220
30	4,390	2,680	2,660	2,700	-	2,060	2,470	2,080	1,610	1,430	1,290	1,230
31	3,320	-	2,540	2,560	-	2,040	-	2,040	-	1,430	1,280	-
Total	59,030	88,520	94,510	85,160	87,250	61,300	73,770	78,510	53,450	47,120	41,760	37,360
Mean	1,904	2,951	3,049	2,747	3,116	1,977	2,459	2,533	1,782	1,520	1,347	1,245
Cfsm	5.52	8.55	8.84	7.96	9.03	5.73	7.13	7.33	5.17	4.41	3.90	3.61
In.	6.36	9.54	10.19	9.18	9.41	6.61	7.95	8.46	5.76	5.08	4.50	4.03
Ac-ft	117,100	175,600	187,500	168,900	173,100	121,600	146,300	155,700	106,000	93,460	82,630	74,100

Peak discharge (base, 3,000 cfs).--Oct. 29 (2 a.m.) 7,080 cfs (5.23 ft); Nov. 1 (11 p.m.) 8,040 cfs (5.71 ft); Dec. 7 (3 a.m.) 6,840 cfs (5.01 ft); Jan. 24 (6 p.m.) 4,140 cfs (3.63 ft); Feb. 7 (11 to 12 p.m.) 5,540 cfs (4.45 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations at outlet of Clear Lake and near Vida.

## South Fork McKenzie River near Rainbow, Oreg.

Location.--Lat 44°08'10", long. 122°14'40", in NE $\frac{1}{4}$  sec. 31, T. 16 S., R. 5 E., on right bank, 0.2 mile upstream from Cougar Creek, 2 miles south of Rainbow, and 5 miles south-east of town of Blue River.

Drainage area.--211 sq mi.

Records available.--October 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,236.42 ft above mean sea level (U. S. Public Roads Administration benchmark). December 1945 to September 1947, Corps of Engineers staff gage at site 40 ft upstream at datum 0.8 ft higher.

Extremes.--Maximum discharge during year, 12,400 cfs Oct. 29 (gage height, 7.30 ft); minimum, 222 cfs Sept. 20-25 (gage height, 1.13 ft).  
1947-51: Maximum discharge, that of Oct. 29, 1950; minimum, about 210 cfs Oct. 1, 1947.

Maximum discharge known, 24,500 cfs Dec. 28, 1945 (gage height, 8.8 ft, from floodmarks at former site and datum; corresponding gage height at present site, about 9.3 ft), by slope-area method.

Remarks.--Records good except those for periods of no gage height record, which are fair. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Sept. 30			
1.0	250	3.0	2,000	1.1	210	4.0	3,400
1.5	510	4.0	3,570	1.5	390	5.0	5,440
2.0	885	4.7	4,830	2.0	750	6.5	9,650
2.5	1,370			3.0	1,820		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	259	3,840	1,500	1,200	1,050	614	960	1,000	654	310	270	258
2	259	7,810	1,300	1,700	1,120	590	950	960	622	305	*270	258
3	300	5,940	1,700	2,300	1,180	569	1,140	885	606	310	270	258
4	406	2,490	3,000	1,800	2,280	614	1,460	*1,080	598	315	270	254
5	768	1,790	3,300	1,300	4,780	606	1,520	1,140	583	315	270	250
6	834	1,440	2,500	1,200	4,550	590	1,490	1,460	569	315	266	250
7	675	1,210	6,000	1,100	5,200	576	1,490	1,720	548	315	270	254
8	624	1,180	3,400	1,000	4,380	555	1,450	1,500	527	310	270	254
9	631	*1,050	2,400	950	3,330	555	1,430	1,420	520	310	270	246
10	*510	930	2,100	980	2,990	534	1,420	1,430	513	305	270	242
11	439	858	1,900	1,000	3,170	520	1,410	1,680	506	300	270	242
12	400	894	1,700	1,000	2,760	527	1,570	1,560	499	295	274	238
13	380	795	1,600	1,600	2,160	590	1,850	1,520	492	290	274	*234
14	370	759	*1,510	2,800	1,790	777	1,260	1,400	478	290	270	234
15	380	734	1,400	2,300	1,580	1,720	1,920	1,300	464	290	266	230
16	355	1,000	1,300	2,000	1,400	1,730	1,630	1,270	450	286	266	230
17	434	1,760	1,200	3,200	1,260	1,210	1,760	1,340	426	286	266	230
18	610	2,610	1,150	2,100	1,150	1,030	1,580	1,280	414	286	266	226
19	510	1,670	1,050	1,600	1,040	1,060	1,420	1,200	396	286	262	226
20	530	2,260	1,000	1,300	980	1,250	1,250	1,160	385	286	262	222
21	516	2,020	940	2,000	912	1,370	1,100	1,140	*375	278	258	222
22	486	1,630	900	2,400	858	1,250	1,000	1,180	370	278	258	222
23	450	1,500	900	2,900	804	*1,120	930	1,210	360	274	254	222
24	428	1,400	860	4,800	759	1,030	894	1,130	355	278	250	222
25	474	1,700	840	3,400	718	1,060	894	1,060	350	278	254	238
26	510	1,500	780	3,000	686	1,090	903	1,000	345	274	250	234
27	817	1,400	780	2,500	654	1,040	930	960	340	274	254	230
28	4,690	1,300	1,200	1,800	630	1,000	1,300	885	330	270	295	230
29	9,160	1,250	1,700	*1,430	-	1,100	1,200	795	320	270	300	234
30	4,040	1,400	1,400	1,300	-	1,090	1,060	734	315	270	274	230
31	2,270	-	1,300	1,150	-	1,010	-	686	-	270	262	-
Total	33,515	54,120	52,610	58,920	54,171	28,377	40,071	37,085	13,710	9,019	8,281	7,180
Mean	1,081	1,804	1,697	1,901	1,935	915	1,336	1,196	457	291	267	239
Cfsm	5.12	8.55	8.04	9.01	9.17	4.34	6.33	5.67	2.17	1.58	1.27	1.13
In.	5.91	9.54	9.27	10.39	9.55	5.00	7.06	6.54	2.42	1.59	1.46	1.27
Ac-ft	66,480	107,300	104,400	116,900	107,400	56,280	79,480	73,560	27,190	17,890	16,450	14,240

Calendar year 1950: Max 9,180 Min 228 Mean 1,250 Cfsm 5.92 In. 80.45 Ac-ft 905,300  
Water year 1950-51: Max 9,160 Min 232 Mean 1,088 Cfsm 5.16 In. 70.00 Ac-ft 787,600

Peak discharge (base, 3,500 cfs).--Oct. 29 (3 a.m.) 12,400 cfs (7.30 ft); Nov. 2 (3 a.m.) 10,500 cfs (6.74 ft); Nov. 18 (12:30 a.m.) 3,510 cfs (4.06 ft); Dec. 7 (time unknown) 7,030 cfs (5.66 ft); Jan. 17 (time and discharge unknown); Jan. 24 (time unknown) 4,840 cfs (4.72 ft); Feb. 7 (5 p.m.) 5,730 cfs (5.13 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 23 to Dec. 13, Dec. 15 to Jan. 28; discharge estimated on basis of recorded range in stage, weather records, and records for McKenzie River near Vida and at McKenzie Bridge and Blue River near Blue River.

## Mann Creek near McKenzie Bridge, Oreg.

Location--Lat 44°17'50", long. 122°10'20", T. 15 S., R. 5 E., (unsurveyed), on right bank 600 ft upstream from confluence with Wolf Creek and 8½ miles north of town of McKenzie Bridge.

Drainage area--5.12 sq mi.

Records available--October 1948 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 2,490 ft (barometric levels by U. S. Forest Service).

Extremes--Maximum discharge during year, 585 cfs Nov. 1 (gage height, 3.97 ft), from rating curve extended above 290 cfs by logarithmic plotting; minimum, 1.0 cfs Sept. 15, 16, 18-25.  
1948-51: Maximum discharge, that of Nov. 1, 1950; minimum, that of Sept. 15, 16, 18-25, 1951.

Remarks--Records good except those below 30 cfs, which are fair. No diversion or regulation above station.

Cooperation--Gage-height record and 12 discharge measurements furnished by Corps of Engineers.

Rating tables, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from debris Oct. 5-26)

Oct. 1 to Feb. 7

Feb. 8 to Sept. 30

1.3	2.4	2.3	73	0.9	0.8	1.7	22
1.4	5.1	2.5	105	1.0	1.6	1.9	35
1.6	13	3.0	215	1.1	2.7	2.1	52
1.8	23	3.4	335	1.3	6.6	2.5	105
2.0	37			1.5	13	3.0	215

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.8	224	70	49	38	20	33	55	27	7.8	2.7	1.8
2	2.8	321	54	45	45	20	34	51	26	7.8	2.9	1.6
3	7.0	156	92	41	53	b19	46	53	24	7.8	2.7	1.5
4	12	102	218	35	102	b19	71	58	24	8.3	2.6	1.4
5	27	76	161	32	208	b18	74	60	23	7.5	2.4	1.4
6	33	58	*255	29	195	b18	75	83	*22	7.2	2.3	1.3
7	27	49	210	27	232	b17	81	86	21	6.4	2.3	1.6
8	24	45	127	26	202	b17	81	75	20	6.2	*2.2	1.5
9	20	37	93	26	143	16	81	*71	20	5.9	2.2	1.4
10	16	33	79	27	129	15	78	75	20	5.9	2.2	*1.2
11	12	31	82	27	170	15	78	82	18	*5.7	2.2	1.2
12	11	29	*75	25	141	15	91	71	18	5.5	2.2	1.2
13	9.4	27	*60	31	103	18	117	89	*18	5.5	2.1	1.2
14	8.2	25	55	107	81	18	127	63	18	5.1	2.0	1.1
15	7.9	25	54	105	67	37	119	60	17	5.1	1.9	1.0
16	7.8	27	53	76	59	42	112	63	16	4.6	1.9	1.0
17	16	35	49	58	51	35	103	67	15	4.6	1.8	1.1
18	20	35	44	46	46	32	89	62	14	4.4	1.8	1.1
19	20	32	48	38	41	30	75	56	14	*4.4	1.6	1.0
20	23	66	44	33	37	33	62	53	*13	4.1	1.6	1.0
21	20	63	43	66	34	37	52	52	12	3.9	1.6	1.0
22	17	57	43	63	32	37	46	52	12	3.7	1.6	1.0
23	15	53	40	95	29	34	43	*54	11	3.7	1.6	1.0
24	14	107	36	222	27	33	43	50	11	3.6	1.6	1.0
25	18	125	34	172	26	33	46	45	10	3.6	1.5	3.0
26	19	112	30	154	24	34	47	41	9.8	3.7	1.5	1.6
27	40	110	28	118	23	33	56	38	*9.5	*3.6	1.5	1.3
28	106	85	46	100	21	33	92	35	9.2	3.6	3.4	1.5
29	291	*66	64	63	-	35	78	32	8.6	3.4	3.4	1.9
30	137	80	76	51	-	36	64	*29	8.3	3.2	2.2	22
31	84	-	63	43	-	34	-	27	-	2.9	1.9	-
Total	1,167.8	2,291	2,444	2,030	2,859	833	2,196	1,768	489.4	158.7	65.4	60.9
Mean	37.7	75.4	78.8	65.5	84.2	26.9	73.2	57.0	16.3	5.12	2.11	2.03
Cfsm	7.36	14.9	15.4	12.8	18.4	5.25	14.3	11.1	3.18	1.00	0.412	0.396
In.	8.48	16.64	17.75	14.75	17.14	6.05	15.95	12.84	3.55	1.15	0.48	0.44
Ac-ft	2,320	4,540	4,850	4,030	4,680	1,650	4,360	3,510	971	315	130	121

Calendar year 1950: Max 321 Min 2.0 Mean 52.9 Cfsm 10.3 In. 140.13 Ac-ft 39,250  
Water year 1950-51: Max 321 Min 1.0 Mean 43.5 Cfsm 8.50 In. 115.22 Ac-ft 31,480

Peak discharge (base, 200 cfs)--Oct. 29 (1 a.m.) 394 cfs (3.56 ft); Nov. 1 (11 p.m.) 585 cfs (3.97 ft); Dec. 5 (2 a.m.) 232 cfs (3.07 ft); Dec. 7 (12:30 p.m.) 300 cfs (3.30 ft); Jan. 24 (9 a.m.) 232 cfs (3.07 ft); Feb. 7 (9 p.m.) 261 cfs (3.17 ft).

\* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

## Wolf Creek near McKenzie Bridge, Oreg.

Location.--Lat 44°17'40", long. 122°10'10", T. 15 S., R. 5 E. (unsurveyed), on left bank 150 ft upstream from confluence with Mann Creek and 8½ miles north of town of McKenzie Bridge.

Drainage area.--2.1 sq mi (revised) approximately.

Records available.--October 1948 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,490 ft (barometric levels by U. S. Forest Service).

Extremes.--Maximum discharge during year, 117 cfs Oct. 29 (gage height, 3.44 ft); maximum gage height, 3.54 ft Mar. 6 (ice jam); minimum discharge, 0.5 cfs Sept. 22, 23. 1948-51: Maximum discharge, 124 cfs May 1, 1949 (gage height, 3.57 ft); minimum, that of Sept. 22, 23, 1951.

Remarks.--Records fair. No diversion or regulation above station.

Cooperation.--Gage-height record and 13 discharge measurements furnished by Corps of Engineers.

Rating tables, water year 1950-51, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 7

Feb. 8 to Sept. 30

1.83	1.1	2.4	18	1.7	0.4	2.3	18
1.9	1.7	2.6	31	1.8	2.7	2.5	26
2.0	3.2	2.8	46	1.9	5.7	2.8	46
2.1	5.6	3.0	65	2.1	12	3.1	76
2.2	9.0	3.3	101				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	61	24	20	14	9.6	14	24	9.0	3.3	2.4	1.4
2	1.5	83	20	19	16	9.0	15	22	8.7	3.3	2.4	1.2
3	2.2	56	30	16	18	b8.8	16	21	8.4	3.3	2.2	.9
4	4.1	40	70	14	27	b8.5	20	22	7.8	3.3	2.2	.9
5	9.4	29	61	12	44	b8.2	a22	24	7.8	3.3	1.6	.7
6	14	22	*81	11	50	b8.0	a24	28	*7.5	3.3	1.4	.7
7	13	18	83	9.4	65	b7.8	a26	29	6.6	3.0	1.4	.9
8	11	17	58	8.7	68	b7.6	26	*28	6.3	3.0	*1.4	.9
9	9.4	14	41	8.3	50	7.5	26	25	6.0	3.0	1.2	.9
10	7.6	11	33	8.7	40	7.2	26	*25	6.0	3.0	1.2	*.9
11	a6	10	32	8.7	52	7.2	26	28	5.7	*2.7	1.2	.9
12	a5	9.8	*28	8.0	44	7.5	28	27	5.7	2.7	1.2	.9
13	a4	8.3	*23	11.0	33	9.3	34	26	*5.7	2.7	1.2	.9
14	a3.5	7.6	22	32	28	9.3	36	24	5.7	2.7	1.2	.9
15	a3.5	7.6	21	34	26	16	35	23	5.7	2.7	1.4	.9
16	a3.5	9.4	20	28	24	16	35	22	5.4	2.7	1.4	.7
17	7.3	16	19	22	21	15	35	22	5.4	2.7	1.4	.7
18	8.3	17	16	19	19	15	33	21	5.4	2.4	1.4	.7
19	7.6	14	19	16	17	14	29	20	5.1	*2.4	1.4	.7
20	a9.5	28	19	14	16	14	25	18	*5.1	2.4	1.4	.7
21	a8	27	16	22	*14	15	22	17	5.1	2.4	1.4	.7
22	a7	23	16	24	14	15	20	17	4.8	2.4	1.4	.5
23	a6	19	16	30	13	14	19	*17	4.5	2.4	1.4	.5
24	a6	31	15	57	12	14	18	16	4.2	2.4	1.4	1.4
25	a7	37	11	47	11	14	18	15	4.2	2.4	1.2	1.4
26	*8.0	34	11	42	11	14	18	13	3.9	2.4	1.2	1.2
27	18	34	10	35	11	14	21	12	*3.9	*2.4	1.2	.9
28	62	28	16	32	10	14	30	12	3.6	2.4	1.9	1.2
29	101	*23	26	24	-	14	30	11	3.3	2.4	1.9	1.4
30	62	27	27	20	-	14	26	*11	3.3	2.4	1.4	7.2
31	42	-	22	16	-	14	-	2.6	-	2.4	1.4	-
Total	459.0	761.7	904	668.8	768	361.5	753	629.6	169.8	84.3	46.4	33.1
Mean	14.8	25.4	29.2	21.6	27.4	11.7	25.1	20.3	5.66	2.72	1.50	1.10
Cfs/m	7.05	12.1	13.9	10.3	13.0	5.57	12.0	9.67	2.70	1.30	0.714	0.524
In.	8.13	13.49	16.01	11.84	13.60	6.40	13.34	11.15	3.01	1.49	0.82	0.59
Ac-ft	910	1,510	1,790	1,330	1,520	717	1,490	1,250	337	167	92	66

Calendar year 1950: Max 104 Min 1.4 Mean 20.2 Cfs/m 9.62 In. 130.48 Ac-ft 14,610  
 Water year 1950-51: Max 101 Min 0.5 Mean 15.5 Cfs/m 7.38 In. 99.87 Ac-ft 11,180

Peak discharge (base, 75 cfs).--Oct. 29 (7 a.m.) 117 cfs (3.44 ft); Nov. 2 (5 a.m.) 101 cfs (3.32 ft); Dec. 6 (12 p.m.) 92 cfs (3.23 ft); Feb. 8 (12:30 a.m.) 82 cfs (3.15 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Mann Creek near McKenzie Bridge.

b Stage-discharge relation affected by ice.

## Blue River above Quentin Creek, Oreg.

Location.--Lat 44°16'00", long. 122°12'00", in T. 15 S., R. 5 E. (unsurveyed), on left bank about 1½ miles upstream from Quentin Creek, 7 miles north of town of McKenzie Bridge, and 11 miles northeast of town of Blue River.

Drainage area.--11.5 sq mi.

Records available.--October 1947 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,960 ft (barometric levels by U. S. Forest Service). Prior to Nov. 20, 1947, staff gage at site 15 ft upstream at same datum.

Extremes.--Maximum discharge during year, 1,090 cfs Oct. 29 (gage height, 3.60 ft), from rating curve extended above 530 cfs by logarithmic plotting; maximum gage height, 3.70 ft Nov. 1 (backwater from logjam); minimum discharge, 2.1 cfs Sept. 19-25 (gage height, 0.62 ft).  
1947-51: Maximum discharge, 1,410 cfs Feb. 24, 1950 (gage height, 3.87 ft); minimum, that of Sept. 19-25, 1951.

Remarks.--Records good. No diversion or regulation above station.

Cooperation.--Gage-height record and five discharge measurements furnished by Corps of Engineers.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28					Oct. 29 to Sept. 30				
0.6	1.6	1.7	83		0.6	1.6	1.5	112	
.7	5.2	1.7	118		.7	5.2	2.0	238	
.8	11	2.0	196		.8	11	2.5	410	
1.0	23	2.5	385		1.0	29	3.0	660	
1.2	39	3.0	640		1.2	55	3.3	860	

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.3	527	152	110	76	39	76	104	40	12	5.2	3.5
2	4.3	642	128	119	87	36	78	93	39	12	4.7	3.5
3	10	338	194	124	104	34	106	95	37	12	4.7	3.5
4	21	224	464	102	163	37	142	104	36	*12	4.7	3.1
5	*61	159	356	87	332	34	147	108	34	12	4.3	3.1
6	74	124	530	78	321	33	147	137	33	12	4.3	3.1
7	55	102	*486	70	434	32	149	145	*30	11	4.3	3.1
8	47	93	284	64	430	31	147	130	29	10	4.3	3.1
9	39	78	192	62	284	29	145	*124	27	9.6	*4.3	2.7
10	29	67	154	65	247	27	142	121	26	9.6	4.3	2.7
11	23	62	149	70	324	27	140	133	26	9.2	4.3	*2.7
12	20	60	137	67	278	27	157	124	26	8.6	4.3	2.7
13	18	52	*119	83	207	35	189	124	25	8.6	4.3	2.4
14	16	49	110	218	164	39	202	117	24	8.0	3.9	2.4
15	16	49	108	218	140	89	192	110	23	8.0	3.9	2.4
16	16	87	108	166	124	104	182	110	22	8.0	3.9	2.4
17	29	135	102	140	112	83	169	112	21	7.4	3.5	2.4
18	39	137	95	112	99	72	149	104	19	7.4	3.5	2.4
19	39	110	102	93	87	69	133	95	18	7.4	3.5	2.1
20	48	174	104	82	80	78	117	89	18	6.8	3.5	2.1
21	38	164	95	133	70	87	102	87	17	6.8	3.1	2.1
22	32	147	95	135	64	85	87	87	17	6.8	3.1	2.1
23	28	130	91	187	57	78	82	89	17	6.2	3.1	2.1
24	25	216	83	363	52	74	80	83	16	6.2	3.1	2.1
25	31	253	76	284	49	76	82	76	15	6.2	3.1	3.9
26	34	221	70	253	47	76	83	69	14	5.7	3.1	3.1
27	116	213	85	192	44	74	95	62	14	5.7	3.1	2.4
28	802	172	100	140	41	74	145	54	13	5.7	4.7	2.4
29	832	142	159	114	-	83	133	49	13	5.7	6.8	3.1
30	386	166	149	95	-	85	117	45	13	5.2	4.3	2.7
31	235	-	128	83	-	80	-	42	-	5.2	3.9	-
Total	2,967.6	5,073	5,185	4,109	4,517	1,827	3,915	3,022	702	257.0	125.1	105.7
Mean	95.7	169	167	133	161	58.9	130	97.5	23.4	8.29	4.04	3.52
Cfsm	8.32	14.7	14.5	11.6	14.0	5.12	11.3	8.48	2.03	0.721	0.351	0.306
In.	9.60	16.41	16.77	13.29	14.61	5.91	12.66	9.77	2.27	0.83	0.40	0.34
Ac-ft	5,890	10,060	10,280	8,150	8,960	3,620	7,770	5,990	1,390	510	248	210

Calendar year 1950: Max 884 Min 3.5 Mean 109 Cfsm 9.48 In. 129.19 Ac-ft 79,240  
Water year 1950-51: Max 832 Min 2.1 Mean 87.1 Cfsm 7.57 In. 102.86 Ac-ft 65,080

Peak discharge (base, 400 cfs).--Oct. 29 (2 a.m.) 1,090 cfs (3.60 ft); Nov. 1 (11 p.m.) 1,060 cfs (3.56 ft); Dec. 4 (2 p.m.) 490 cfs (2.69 ft); Dec. 7 (1 a.m.) 678 cfs (3.03 ft); Feb. 7 (10 p.m.) 572 cfs (2.85 ft).

\* Discharge measurement made on this day.



## Lookout Creek near Blue River, Oreg.

Location (revised).--Lat 44°12'40", long. 122°15'20", in T. 15 or 16 S., R. 5 E., (unsurveyed), on left bank 0.4 mile upstream from mouth and 6 miles northeast of Blue River post office.

Drainage area.--24.1 sq mi.

Records available.--August 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is about 1,370 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,800 cfs Oct. 29 (gage height, 5.83 ft), from rating curve extended above 450 cfs by logarithmic plotting; minimum, 8.2 cfs Sept. 20, 21, 24, 25.  
1949-51: Maximum discharge, 1,980 cfs Feb. 24, 1950 (gage height, 5.98 ft), from rating curve extended above 450 cfs by logarithmic plotting; minimum, that of Sept. 20, 21, 24, 25, 1951.

Remarks.--Records good. No regulation or diversion.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 7				Feb. 8 to Sept. 30			
2.0	12	3.5	248	1.8	8.2		
2.2	22	4.0	442	2.0	19		
2.4	37	4.5	700	2.4	44		
2.8	90	5.6	1,550	2.8	90		

Note.--Same as preceding table above 2.8 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	14	699	213	180	148	75	142	129	57	26	15	12
2	14	1,020	187	360	175	72	144	121	55	25	*15	11
3	24	560	341	414	218	71	180	123	54	25	15	11
4	40	353	869	261	392	77	242	*140	52	26	15	11
5	118	242	646	195	724	76	254	146	50	26	15	10
6	159	187	1,050	161	748	72	248	220	48	25	15	10
7	133	155	974	140	904	68	248	258	46	24	15	11
8	114	153	570	127	834	66	242	208	44	23	15	11
9	104	*129	374	121	605	62	236	187	43	23	15	10
10	71	114	277	129	515	60	230	180	43	23	14	9.8
11	*54	104	242	144	580	56	224	205	41	22	14	9.8
12	44	104	210	140	510	60	248	192	40	22	14	9.8
13	37	90	190	229	374	77	*294	208	40	21	14	*9.3
14	34	84	*170	676	294	95	308	187	*39	21	13	9.3
15	32	88	168	515	245	232	287	168	38	21	13	9.3
16	30	153	159	383	208	242	270	164	37	20	12	9.3
17	61	396	153	471	185	170	242	161	36	20	12	9.3
18	97	447	140	301	164	142	210	146	35	20	12	9.3
19	87	270	153	213	146	138	180	129	34	20	12	9.3
20	105	349	123	173	138	161	157	123	33	19	11	9.3
21	85	326	114	315	127	178	136	118	32	18	11	8.7
22	71	277	114	349	118	168	121	116	32	18	11	8.7
23	60	233	112	501	109	*150	114	118	31	18	11	8.7
24	54	415	105	883	104	142	109	111	30	17	11	8.7
25	63	410	98	670	97	144	107	100	30	17	11	12
26	79	323	92	610	89	146	107	92	29	17	11	11
27	153	290	88	456	83	144	114	84	28	16	11	9.8
28	942	224	170	319	79	140	168	75	27	16	17	11
29	1,530	192	260	242	-	157	159	69	27	16	19	12
30	112	215	242	*192	-	157	140	64	26	16	14	4
31	*433	-	208	164	-	150	-	61	-	16	13	-
Total	5,554	8,602	8,612	10,034	8,913	3,748	5,861	4,403	1,157	637	416	332.4
Mean	179	287	284	324	318	121	195	142	38.6	20.5	13.4	11.1
Cfs/m	7.43	11.9	11.8	13.4	13.2	5.02	8.09	5.89	1.60	0.851	0.556	0.461
In.	8.57	13.27	13.60	15.48	13.75	5.78	9.04	6.79	1.79	0.98	0.64	0.51
Ac-ft	11,020	17,060	17,480	19,900	17,680	7,430	11,630	8,730	2,290	1,260	825	659
Calendar year 1950: Max	1,530					200		8.30		112.77	Ac-ft	144,900
Water year 1950-51: Max	1,530					160		6.64		90.20	Ac-ft	116,000

Peak discharge (base, 800 cfs).--Oct. 29 (1 a.m.) 1,800 cfs (5.83 ft); Nov. 1 (11:30 p.m.) 1,430 cfs (5.48 ft); Dec. 4 (1:30 p.m.) 904 cfs (4.82 ft); Dec. 7 (1:30 a.m.) 1,290 cfs (5.32 ft); Jan. 24 (5 to 9 a.m.) 932 cfs (4.86 ft); Feb. 7 (8 p.m.) 1,050 cfs (5.03 ft).

\* Discharge measurement made on this day.

## Blue River near Blue River, Oreg.

Location.--Lat 44°11'00", long. 122°16'50", near line between secs. 13 and 14, T. 16 S., R. 4 E., on right bank 3 miles upstream from Quartz Creek and  $3\frac{1}{2}$  miles northeast of Blue River post office.

Drainage area.--75 sq mi, approximately.

Records available.--September 1935 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is about 1,225 ft (from profile map of McKenzie River).

Average discharge.--16 years, 378 cfs.

Extremes.--Maximum discharge during year, 5,900 cfs Oct. 28 (gage height, 6.08 ft); minimum, 17 cfs Sept. 17.

1935-51: Maximum discharge, 13,300 cfs Dec. 28, 1945 (gage height, 9.80 ft), from rating curve extended above 6,500 cfs; minimum, 13 cfs Sept. 27, 28, Oct. 1, 2, 1938.

Remarks.--Records good except those for period of no gage-height record, which are fair.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Sept. 30			
1.0	17	2.5	760	1.0	17	2.2	495
1.1	36	3.0	1,180	1.1	36	3.0	1,100
1.4	122	4.0	2,340	1.3	85	4.5	3,060
1.7	255	5.0	3,900	1.6	195	5.5	4,800
2.0	420						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	32	2,510	741	581	402	213	434	412	167	60	30	30
2	32	2,090	607	1,080	519	200	462	396	159	60	30	29
3	70	1,690	1,190	1,210	778	200	659	396	147	60	30	29
4	235	1,000	3,250	748	1,320	220	862	*429	144	60	29	25
5	569	699	2,030	588	2,500	210	854	451	140	55	29	25
6	688	555	3,300	490	2,230	210	822	626	128	55	29	25
7	510	462	2,980	434	2,900	195	815	734	125	55	29	27
8	390	446	1,590	385	2,600	191	785	581	117	50	27	27
9	360	*385	1,010	380	1,770	187	762	513	117	50	27	27
10	235	335	778	440	1,570	179	720	507	114	50	25	25
11	*174	305	713	507	1,930	167	692	562	111	50	27	23
12	138	295	646	458	1,540	171	785	581	107	45	27	23
13	115	267	568	632	1,100	240	919	685	107	45	29	*21
14	98	249	525	2,160	830	340	919	594	101	45	29	21
15	90	272	*531	1,630	706	998	838	519	98	45	27	19
16	87	519	543	1,110	607	854	770	495	95	45	27	19
17	188	1,410	525	1,300	537	537	699	473	88	45	27	19
18	327	1,320	478	765	478	440	614	424	88	45	25	21
19	285	762	468	594	424	446	525	375	85	40	25	19
20	344	1,230	484	495	390	574	456	345	82	40	25	19
21	270	1,030	440	1,160	375	633	390	330	*80	40	27	19
22	215	862	429	1,150	335	543	345	325	77	40	25	19
23	179	699	412	1,530	310	*462	325	335	72	40	25	19
24	157	1,310	360	2,600	285	440	310	320	69	40	25	19
25	192	1,290	345	1,980	272	478	315	276	67	40	23	30
26	260	973	330	1,900	254	490	325	249	65	35	23	30
27	770	896	305	1,280	240	468	345	231	65	35	25	26
28	3,540	699	602	870	226	440	581	208	65	35	36	26
29	4,690	568	1,100	652	-	537	549	195	65	30	52	30
30	2,060	741	838	*543	-	525	478	183	65	30	38	163
31	1,150	-	685	456	-	468	-	179	-	30	32	-
Total	18,449	25,869	28,823	30,338	27,428	12,256	18,355	12,929	3,010	1,395	884	854
Mean	595	862	930	979	980	395	612	417	100	45.0	28.5	28.5
Cfs/m	7.93	11.5	12.4	13.1	13.1	5.27	8.16	5.56	1.33	0.600	0.380	0.380
In.	9.15	12.83	14.29	15.04	13.60	6.08	9.10	6.41	1.49	0.69	0.44	0.42
Ac-ft	36,590	51,310	57,170	60,170	54,400	24,310	36,410	25,640	5,970	2,770	1,750	1,690

Calendar year 1950: Max 4,690 Min 23 Mean 603 Cfs/m 8.04 In. 109.20 Ac-ft 436,800  
 Water year 1950-51: Max 4,690 Min 19 Mean 495 Cfs/m 6.60 In. 89.54 Ac-ft 358,200

Peak discharge (base, 2,600 cfs).--Oct. 28 (8 p.m.) 5,900 cfs (6.08 ft); Nov. 2 (12:30 a.m.) 5,140 cfs (5.68 ft); Dec. 4 (4 to 6 a.m.) 3,500 cfs (4.77 ft); Dec. 7 (2:30 a.m.) 3,900 cfs (5.00 ft); Jan. 24 (2 to 4 a.m.) 3,030 cfs (4.45 ft); Feb. 7 (7 a.m.) 3,530 cfs (4.79 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record June 26 to Aug. 2; discharge estimated on basis of recorded range in stage and records for station above Quentin Creek.

## McKenzie River near Vida, Oreg.

Location.--Lat 44°07'30", long. 122°28'10", in NE $\frac{1}{4}$  sec. 5, T. 17 S., R. 3 E., on left bank 1 mile upstream from head of Martin Rapids, and 5 miles east of Vida, at mile 44.3 (U.S.G.S. Plan and Profile).

Drainage area.--930 sq mi, approximately.

Records available.--June 1910 to March 1911 (gage heights only), September 1924 to September 1951. Published as "at Martin Rapids, near Vida" 1910-11.

Gage.--Water-stage recorder. Datum of gage is 855.56 ft above mean sea level, datum of 1929. June 25, 1910, to Mar. 31, 1911, staff gage at site of Martin Rapids, 3 miles downstream, at different datum. Sept. 22, 1924, to Nov. 16, 1928, staff gage at site 20 ft upstream at present datum.

Average discharge.--27 years, 3,797 cfs.

Extremes.--Maximum discharge during year, 35,600 cfs Oct. 29 (gage height, 11.30 ft); minimum, 1,810 cfs Sept. 24 (gage height, 0.89 ft).

1924-51: Maximum discharge, 64,400 cfs Dec. 28, 1945 (gage height, 17.70 ft), from rating curve extended above 32,000 cfs by logarithmic plotting; minimum, 1,260 cfs Nov. 7, 1930, Sept. 17, Oct. 4, 8, 9, 1931 (gage height, 0.36 ft).

Remarks.--Records good except those for periods of no gage-height record, which are fair.

Cooperation.--Water-stage recorder inspected by employee of Eugene Water Board.

Revisions (water years).--W 1124: 1943.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.9	1,820	5.5	13,000
1.5	2,750	7.0	18,200
2.5	4,650	10.0	30,200
4.0	8,250		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,000	14,000	7,050	5,950	5,540	3,800	4,880	5,030	3,780	2,610	2,230	2,000
2	1,990	26,100	6,500	7,650	5,750	3,690	4,900	4,880	3,670	2,600	*2,240	1,990
3	2,220	15,300	7,850	9,420	6,520	3,670	5,480	4,900	3,650	2,600	2,240	1,980
4	2,880	a11,000	a14,500	7,250	8,940	3,900	6,420	5,180	3,650	2,610	2,200	1,960
5	4,260	a9,000	a14,000	6,200	16,400	3,960	6,450	*5,410	3,590	2,600	2,180	1,960
6	4,880	7,120	a14,500	5,590	15,700	3,780	6,380	6,320	3,480	2,560	2,170	1,960
7	4,160	6,250	21,200	5,220	18,000	3,570	6,400	7,480	3,440	2,530	2,160	1,980
8	3,740	5,980	14,000	4,960	17,500	3,610	6,200	6,580	3,370	2,520	2,140	1,960
9	3,780	a5,600	10,700	4,840	13,500	3,570	6,180	6,120	3,320	2,520	2,140	1,950
10	*3,150	*5,180	9,090	4,850	12,000	3,480	6,050	6,120	3,320	2,480	2,120	1,930
11	2,850	4,820	8,550	5,050	12,900	3,390	5,950	6,850	3,320	2,470	2,120	1,930
12	2,680	4,780	8,190	4,860	11,800	3,410	6,320	6,800	3,300	2,450	2,110	1,920
13	2,550	4,440	*7,320	5,110	9,840	3,860	7,100	7,050	3,280	2,450	2,120	1,920
14	2,470	4,240	7,050	12,600	8,430	4,610	7,480	6,420	3,240	2,450	2,110	*1,900
15	2,470	4,200	6,720	10,600	7,650	7,650	7,350	5,900	3,240	2,440	2,110	1,900
16	2,420	a6,000	6,450	8,670	6,980	8,040	7,080	5,790	3,210	2,440	2,110	1,900
17	2,850	a9,000	6,180	12,400	6,480	8,020	6,920	5,860	3,120	2,420	2,110	1,890
18	3,590	a14,500	5,790	9,090	6,080	5,350	6,480	5,720	3,060	2,420	2,100	1,880
19	3,240	a12,000	5,610	7,300	5,680	5,390	5,980	5,480	2,990	2,400	2,080	1,880
20	3,480	a10,000	5,540	6,300	5,460	6,080	5,570	5,280	2,970	2,390	2,080	1,850
21	3,240	a9,500	5,260	8,730	5,220	6,420	5,110	5,220	2,900	2,370	2,060	1,830
22	2,990	a8,500	5,090	9,570	5,200	*6,000	4,840	5,260	2,900	2,370	2,050	1,830
23	2,820	a7,500	5,090	11,500	4,710	5,410	4,650	5,390	2,850	2,340	2,050	1,820
24	2,720	a8,000	4,860	17,000	4,520	5,180	4,570	5,280	2,820	2,340	2,040	1,820
25	2,900	9,000	4,650	14,100	4,380	5,300	4,480	5,030	2,780	2,320	2,040	1,920
26	3,240	7,850	4,440	13,400	4,180	5,370	4,540	4,860	2,750	2,290	2,020	1,900
27	4,650	7,600	4,380	10,900	3,980	5,240	4,650	4,710	2,700	2,280	2,020	1,850
28	16,700	6,780	5,350	8,730	3,860	5,070	5,860	4,500	2,650	2,260	2,180	1,850
29	30,000	6,120	7,850	*7,380	-	5,410	5,720	4,240	2,630	2,260	2,230	1,860
30	15,600	6,820	7,020	6,560	-	5,390	5,500	4,040	2,610	2,240	2,110	1,820
31	10,400	-	8,520	5,950	-	5,090	-	3,880	-	2,240	2,040	-
Total	156,920	257,180	247,300	258,110	237,200	150,710	175,290	171,600	94,570	75,270	65,710	57,520
Mean	5,062	8,573	7,977	8,326	8,471	4,862	5,843	5,535	3,152	2,428	2,120	1,917
Cfs/m	5.44	9.22	8.58	8.95	9.11	5.23	6.28	5.95	3.39	2.61	2.28	2.06
In.	6.28	10.22	9.89	10.32	9.49	6.03	7.01	6.66	3.78	3.01	2.63	2.30
Ac-ft	311,200	510,100	490,500	512,000	470,500	298,900	347,700	340,400	187,600	149,300	130,300	114,100

Calendar year 1950: Max 30,000 Min 1,990 Mean 5,856 Cfs/m 6.30 In. 85.47 Ac-ft 4,239,000  
Water year 1950-51: Max 30,000 Min 1,820 Mean 5,335 Cfs/m 5.74 In. 77.88 Ac-ft 3,863,000

Peak discharge (base, 15,000 cfs).--Oct. 29 (5 a.m.) 35,600 cfs (11.30 ft); Nov. 2 (1:30 a.m.) 31,800 cfs (10.38 ft); Dec. 7 (4:30 to 5 a.m.) 24,700 cfs (8.62 ft); Jan. 24 (3 a.m.) 18,200 cfs (7.00 ft); Feb. 7 (9:30 p.m.) 20,600 cfs (7.61 ft).

\* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of recorded range in stage when available and records for stations at McKenzie Bridge and near Coburg.

## WILLAMETTE RIVER BASIN

Gate Creek at Vida, Oreg.

Location--Lat 44°08'45", long. 122°34'15", in sec. 28, T. 16 S., R. 2 E., on right bank  
300 ft downstream from bridge on U. S. Highway 28, 1,000 ft upstream from mouth at Vida.

Drainage area--47.6 sq mi.

Records available--June to September 1951.

Gage--Water-stage recorder. Datum of gage is 764.56 ft above mean sea level, datum of  
1923, supplementary adjustment of 1947.

Extremes--Maximum discharge during period, 174 cfs Sept. 30 (gage height, 3.03 ft); mini-  
mum, 15 cfs Sept. 19-25.

Remarks--Records good.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	35	22	19
2									-	35	*22	19
3								†124	-	36	22	18
4									-	39	21	18
5									-	38	20	17
6									-	37	20	18
7									-	35	20	20
8									-	33	20	20
9									-	32	20	18
10	†94								-	31	20	17
11									56	31	20	17
12									55	30	20	17
13									*55	30	20	16
14									52	29	20	*16
15									50	28	19	16
16									49	28	19	16
17									47	28	19	16
18									46	28	19	16
19									45	28	18	15
20									44	27	18	15
21									43	26	17	15
22								†547	42	26	17	15
23									41	25	17	15
24									40	25	17	15
25									39	24	17	20
26									38	24	17	20
27									38	24	17	17
28									37	24	26	17
29									36	24	36	20
30				†421					35	22	22	71
31									-	22	20	-
Total									-	904	621	569
Mean									-	29.2	20.0	19.0
Cfsm									-	0.613	0.420	0.399
In.									-	0.71	0.49	0.44
Ac-ft									-	1,790	1,230	1,130

Calendar year	: Max	Min	Mean	Cfsm	In.	Ac-ft
Water year	: Max	Min	Mean	Cfsm	In.	Ac-ft

\* Discharge measurement made on this day.

† Result of discharge measurement.

## Mohawk River near Springfield, Oreg.

Location--Lat 44°06', long. 122°57', in sec. 17, T. 17 S., R. 2 W., on downstream side of bridge near midspan, 1 mile upstream from mouth and 4½ miles northeast of Springfield.

Drainage area--180 sq mi.

Records available--September 1935 to September 1951.

Gage--Wire-weight gage read once daily during low-water periods, two or more times daily at other times. Altitude of gage is 460 ft (by barometer).

Average discharge--16 years, 541 cfs.

Extremes--Maximum discharge during year, 6,790 cfs Oct. 29 (gage height, 18.60 ft, observed by peak); minimum, 11 cfs Sept. 22.

1935-51: Maximum discharge, 8,600 cfs Dec. 28, 1945 (gage height, 22.1 ft, from floodmark); minimum observed, 11 cfs Sept. 17, 1938, Sept. 22, 1951.

Remarks--Records good except those for period of shifting control, which are fair. No diversion above station; some regulation at low flow caused by log ponds.

Rating tables, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

1.0	23	7.0	1,570	0.8	10	3.0	430
1.3	52	10.0	2,720	1.0	23	5.0	1,020
1.6	92	14.0	4,550	1.3	52	7.0	1,690
2.0	167	18.0	6,490	1.6	92	10.0	2,840
4.0	660			2.0	167	15.0	5,030

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	29	1,780	1,320	1,120	936	506	582	232	159	48	22	26
2	29	3,760	1,270	1,520	906	466	528	212	144	51	22	20
3	77	2,720	1,360	2,620	942	466	534	208	144	52	21	18
4	161	1,980	3,150	1,970	1,120	987	584	200	140	64	21	18
5	197	1,420	2,500	1,640	2,630	1,050	542	205	140	63	21	18
6	208	1,140	2,800	1,350	2,560	927	514	268	134	65	22	19
7	132	914	3,840	1,180	2,700	786	489	452	128	53	20	25
8	121	812	2,810	1,050	2,970	891	452	357	122	48	20	29
9	144	680	2,140	960	2,300	1,050	424	270	122	43	20	23
10	98	582	1,710	957	1,910	840	391	240	115	43	20	22
11	76	528	1,540	*945	2,800	756	*368	352	110	40	20	21
12	*65	508	1,320	930	2,500	810	374	559	106	*38	21	20
13	59	450	1,120	942	1,950	1,320	402	972	103	38	19	17
14	59	452	1,070	2,420	1,610	1,720	427	765	95	39	18	15
15	72	1,050	984	2,540	1,440	2,340	388	559	94	38	*17	15
16	65	3,530	1,040	2,120	1,230	2,720	360	480	84	38	17	15
17	355	3,260	972	4,620	1,150	1,930	346	424	89	36	16	17
18	368	4,650	873	4,180	1,090	1,530	318	374	84	37	15	15
19	590	3,040	828	3,050	966	1,330	280	335	82	36	14	15
20	737	2,560	750	2,300	1,000	1,300	225	307	80	36	15	12
21	398	2,480	678	2,680	924	1,290	205	282	77	34	14	12
22	290	1,660	648	3,440	840	1,160	185	248	72	34	14	11
23	228	1,350	603	3,150	765	1,010	167	301	67	31	15	12
24	192	1,460	548	4,050	702	906	165	*255	64	30	15	13
25	210	1,390	514	3,220	663	855	159	230	69	29	15	20
26	275	1,200	486	2,860	600	813	154	208	63	30	14	*33
27	947	1,260	469	2,280	567	744	169	198	63	29	14	25
28	2,620	1,060	*852	1,830	*531	684	301	185	58	26	20	23
29	6,100	890	1,380	1,450	-	678	285	169	51	27	52	29
30	4,600	1,110	1,260	1,200	-	672	222	161	49	26	33	92
31	2,810	-	1,250	1,050	-	615	-	161	-	22	28	-
Total	22,302	49,576	42,065	65,624	40,282	33,152	10,500	10,169	2,908	1,224	615	650
Mean	719	1,653	1,357	2,117	1,439	1,069	350	328	96.9	39.5	19.8	21.7
Cfsm	3.99	9.18	7.54	11.8	7.99	5.94	1.94	1.82	0.558	0.219	0.110	0.121
In.	4.61	10.24	8.69	13.56	8.32	6.85	2.17	2.10	0.60	0.25	0.13	0.13
Ac-ft	44,240	98,330	85,450	130,200	79,900	65,760	20,830	20,170	5,770	2,430	1,220	1,290
Calendar year 1950: Max	6,380	Min	17	Mean	844	Cfsm	4.69	In.	63.66	Ac-ft	611,200	
Water year 1950-51: Max	6,100	Min	11	Mean	765	Cfsm	4.25	In.	57.65	Ac-ft	553,600	

Peak discharge (base, 2,700 cfs)--Oct. 29 (4 p.m.) 6,790 cfs (18.60 ft); Nov. 2 (12:30 p.m.) 4,290 cfs (15.45 ft); Nov. 18 (9 a.m.) 5,460 cfs (15.9 ft); Dec. 4 (12:30 p.m.) 3,220 cfs (11.11 ft); Dec. 7 (8 a.m.) 3,940 cfs (12.56 ft); Jan. 3 (8 a.m.) 2,770 cfs (9.83 ft); Jan. 14 (5 p.m.) 2,820 cfs (9.36 ft); Jan. 17 (5 p.m.) 5,960 cfs (26.91 ft); Jan. 24 (8 a.m.) 4,200 cfs (15.16 ft); Feb. 8 (7:50 a.m.) 3,180 cfs (10.80 ft); Mar. 16 (8 a.m.) 2,900 cfs (10.20 ft).

\*Discharge measurement made on this day.

Note.--Shifting-control method used Mar. 16 to May 12.

## McKenzie River near Coburg, Oreg.

Location (revised).--Lat 44°06'45", long. 123°02'45", in NE<sup>1</sup>/<sub>4</sub> sec. 9, T. 17 S., R. 3 W., on left bank at downstream side of Armitage Bridge, 2 miles southeast of Coburg, and 3 miles upstream from mouth.

Drainage area.--1,310 sq mi, approximately.

Records available.--October 1944 to September 1951. Gage-height records collected at same site December 1943 to April 1944 are contained in files of United States Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 395.96 ft above mean sea level, datum of 1929. Prior to Nov. 24, 1944, wire-weight gage at same site and datum.

Average discharge.--7 years, 5,990 cfs.

Extremes.--Maximum discharge during year, 52,100 cfs Oct. 29 (gage height, 14.66 ft); minimum, 1,460 cfs Sept. 22 (gage height, 0.78 ft).  
1944-51: Maximum discharge, 88,200 cfs Dec. 29, 1945 (gage height, 17.36 ft), from rating curve extended above 36,000 cfs; minimum daily, 1,310 cfs Oct. 29, 1944.

Remarks.--Records excellent except those for period of no gage-height record, which are fair. Slight diurnal fluctuation caused by log ponds and powerplants upstream. Water supply for city of Eugene is diverted about 10 miles upstream; small diversions above station for irrigation.

Cooperation.--Wire-weight gage read once daily during fall and winter months by employees of United States Weather Bureau.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29		Oct. 30 to Sept. 30	
2.0	2,250	1.1	1,780
3.5	4,920	2.5	3,470
5.5	10,500	4.5	7,450
7.5	18,500	8.0	18,400
10.0	29,000	12.0	35,900
14.0	48,400		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	2,250	14,900	10,500	8,860	8,460	5,470	7,000	a6,000	4,030	2,630	2,130	2,000	
2	2,250	33,300	9,960	9,650	8,200	5,260	6,820	a5,500	3,880	2,590	2,120	1,990	
3	2,480	22,500	10,700	15,400	9,080	5,120	7,210	a5,000	3,770	2,590	2,030	1,990	
4	3,030	16,000	21,500	12,100	10,400	5,930	8,280	a5,500	3,720	2,670	2,040	1,960	
5	3,880	12,500	20,600	10,300	20,700	6,820	8,600	a6,000	3,680	2,630	2,120	1,960	
6	5,620	10,500	21,500	9,080	21,300	6,310	8,410	a6,500	3,580	2,590	2,120	1,940	
7	4,920	9,190	30,000	8,300	22,900	5,890	8,330	a8,500	3,540	2,520	2,040	2,000	
8	4,160	8,600	21,400	7,760	25,200	6,020	8,200	a8,000	3,440	2,510	2,000	2,010	
9	4,600	8,120	15,800	7,380	19,300	6,330	7,940	a7,500	3,430	2,500	2,010	1,990	
10	3,790	7,580	13,100	7,280	16,700	5,760	7,820	a7,000	3,370	2,460	2,000	1,960	
11	3,320	6,800	11,800	*7,470	17,700	5,470	*7,590	a7,500	3,370	*2,430	2,030	1,940	
12	*3,100	6,660	11,300	7,450	17,500	5,490	7,790	a8,000	3,340	2,400	2,030	1,960	
13	2,920	6,270	10,100	7,210	14,500	6,600	8,460	a8,500	3,350	2,390	2,020	1,940	
14	2,840	6,080	9,540	15,300	12,500	8,360	9,030	a8,000	3,220	2,390	2,010	1,900	
15	2,840	6,800	9,080	16,600	11,600	10,900	9,030	a7,500	3,250	2,380	*2,010	1,910	
16	2,810	11,700	8,840	13,500	10,600	15,700	8,620	a7,500	3,200	2,330	2,000	1,900	
17	3,240	13,800	8,460	22,900	9,740	11,600	8,460	a7,500	3,190	2,340	2,000	1,890	
18	4,300	24,600	7,990	20,700	9,270	9,740	8,020	a7,000	3,100	2,400	2,000	1,890	
19	4,340	15,700	7,620	14,900	8,510	9,220	a7,500	a7,000	3,050	2,390	1,990	1,880	
20	4,990	14,200	7,500	12,000	8,280	9,650	a7,000	a6,500	2,980	2,330	1,970	1,870	
21	4,420	13,900	7,070	13,500	7,940	10,100	a6,500	a6,500	2,920	2,310	1,960	1,850	
22	3,900	12,000	6,770	17,500	7,450	9,760	a5,500	a6,200	2,880	2,300	1,960	1,810	
23	3,600	10,600	6,750	17,100	6,980	8,780	a5,500	*6,600	2,850	2,300	1,940	1,870	
24	3,380	10,900	6,440	27,000	6,710	8,170	a5,500	6,530	2,810	2,280	1,960	1,880	
25	3,340	12,400	6,180	22,900	6,530	8,070	a5,100	6,060	2,770	2,250	1,940	1,910	
26	3,980	11,200	5,890	20,300	6,180	8,070	a5,000	5,780	2,730	2,230	1,940	*2,010	
27	5,190	10,800	5,820	17,000	5,890	7,860	a5,000	5,550	2,730	2,220	1,920	1,960	
28	14,500	9,880	6,420	13,300	*5,680	7,450	a5,500	5,260	2,690	2,210	2,000	1,930	
29	44,300	*6,890	10,500	11,600	-	7,570	a7,000	4,860	2,620	2,200	2,310	1,970	
30	31,300	9,350	9,930	10,100	-	7,890	a6,500	4,550	2,650	2,180	2,140	2,160	
31	17,800	-	9,680	9,160	-	7,400	-	4,240	-	2,140	2,030	-	
Total	207,190	365,520	348,750	414,200	335,800	242,760	217,210	203,430	96,120	74,090	62,770	58,230	
Mean	6,684	12,180	11,250	13,360	11,990	7,831	7,240	6,562	3,204	2,390	2,025	1,941	
Cfs/m	5.10	9.30	8.59	10.2	9.15	5.98	5.53	5.01	2.45	1.82	1.55	1.48	
In.	5.88	10.38	9.90	11.76	9.53	6.89	6.17	5.77	2.73	2.10	1.78	1.65	
Ac-ft	411,000	725,000	691,700	821,600	666,000	481,500	430,800	403,500	190,700	147,000	124,500	115,500	
Calendar year 1950: Max	44,300			Min	2,120	Mean	7,895	Cfs/m	6.03	In.	81.81	Ac-ft	5,716,000
Water year 1950-51: Max	44,300			Min	1,810	Mean	7,195	Cfs/m	5.48	In.	74.54	Ac-ft	5,209,000

Peak discharge (base, 24,000 cfs).--Oct. 29 (6 p.m.) 52,100 cfs (14.66 ft); Nov. 2 (2 p.m.) 38,900 cfs (12.56 ft); Nov. 18 (7:30 a.m.) 28,500 cfs (10.47 ft); Dec. 7 (11:30 a.m.) 31,800 cfs (11.19 ft); Jan. 17 (5:30 p.m.) 30,600 cfs (10.93 ft); Jan. 24 (9 a.m.) 28,200 cfs (10.39 ft); Feb. 8 (4:30 a.m.) 27,400 cfs (10.22 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, records for station at Vida and downstream comparisons.

## Willamette River at Harrisburg, Oreg.

Location.--Lat 44°16'05", long. 123°10'25", in SW 1/4 sec. 16, T. 15 S., R. 4 W., on right bank 10 ft downstream from State highway bridge at Harrisburg and at mile 162.9.

Drainage area.--3,420 sq mi.

Records available.--October 1944 to September 1951. Gage-height records (October to April each year) collected at same site since December 1927 are contained in reports of United States Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 290.07 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1944, wire-weight gage on bridge 10 ft upstream at datum 2.0 ft higher, and at present datum Oct. 1 to Nov. 14, 1944.

Average discharge.--7 years, 12,630 cfs.

Extremes.--Maximum discharge during year 139,000 cfs Oct. 30 (gage height, 18.03 ft), from rating curve extended above 89,000 cfs; minimum, 2,650 cfs Sept. 13-18.

1944-51: Maximum discharge, 210,000 cfs Dec. 29, 1945 (gage height, 19.69 ft), from rating curve extended above 89,000 cfs; minimum, 1,990 cfs Oct. 30, 1944.

Flood of 1861 reached a stage of about 21 ft (present site and datum), from information by local residents. Flood of Jan. 1, 1943, reached a stage of 19.1 ft (present datum), from United States Weather Bureau records.

Remarks.--Records good except those for periods of shifting control, which are fair.

Many small diversions above station for irrigation; about 15 cfs diverted from McKenzie River for city of Eugene water supply. Flow regulated at times by Cottage Grove Reservoir (see p. 128) and Dorena Reservoir (see p. 131).

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29				Oct. 30 to Sept. 30			
2.7	3,950	9.0	29,000	2.9	2,600		
3.0	4,550	12.0	47,300	4.0	5,900		
4.0	7,100	15.0	73,800	6.0	14,700		
6.0	14,300	17.0	111,000	9.0	29,000		

Note.--Same as preceding table above 9.0 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,170	40,500	23,000	19,900	16,400	9,390	13,200	10,600	7,140	4,380	3,380	2,980
2	4,130	55,600	23,800	19,000	15,000	9,080	12,300	10,300	8,860	4,350	3,350	2,900
3	4,270	60,500	24,400	33,200	16,200	8,670	12,500	9,930	6,740	4,320	3,320	2,800
4	4,810	42,800	43,400	31,400	19,300	9,660	14,800	9,980	6,620	4,350	3,280	2,800
5	6,000	34,100	54,700	24,200	48,500	13,400	16,200	10,800	6,540	4,350	3,300	2,780
6	10,500	28,700	44,000	20,700	56,800	12,900	15,600	11,100	6,420	4,290	3,320	2,780
7	10,200	24,000	60,500	18,100	53,800	12,400	15,200	15,000	6,300	4,170	3,250	2,800
8	7,910	21,300	56,400	16,600	58,000	12,600	15,000	14,700	6,100	4,110	3,180	2,820
9	8,270	20,500	39,700	15,400	47,200	16,100	14,700	13,200	5,980	4,050	3,180	2,800
10	7,190	18,300	30,600	14,800	38,900	14,400	14,200	12,400	5,860	3,990	3,150	2,720
11	6,000	14,700	25,700	*15,100	37,000	13,200	*13,700	13,200	5,860	*3,960	3,150	2,720
12	*5,520	12,900	24,900	16,000	37,300	12,100	13,700	15,200	5,820	3,870	3,120	2,700
13	5,200	12,200	23,000	14,700	30,600	14,100	15,200	17,400	5,860	3,840	3,120	2,700
14	5,020	11,500	21,500	24,400	26,200	20,200	16,600	17,600	5,700	3,810	3,050	2,650
15	4,930	12,100	20,600	37,600	23,400	25,200	16,700	15,200	5,700	3,780	*3,100	2,650
16	4,910	26,000	19,300	33,500	21,400	41,100	16,000	13,500	5,660	3,750	3,100	2,650
17	5,400	35,600	18,100	43,200	19,100	31,600	15,500	12,900	5,620	3,690	3,050	2,650
18	7,760	62,300	17,100	62,700	18,300	23,200	14,700	12,700	5,430	3,720	3,050	2,720
19	8,860	57,300	16,200	43,200	16,800	20,000	13,600	12,000	5,290	3,750	3,080	2,820
20	9,940	39,000	15,500	32,900	15,800	20,400	12,400	11,200	5,180	3,660	2,950	2,850
21	9,560	39,000	14,500	29,800	15,500	23,100	11,400	10,800	5,080	3,660	2,920	2,850
22	8,720	30,800	13,600	44,800	14,500	22,200	10,300	10,600	4,980	3,600	2,900	2,850
23	7,760	24,600	13,000	42,200	13,500	19,000	9,620	*10,800	4,900	3,580	2,880	2,880
24	7,430	22,300	12,500	58,700	12,400	16,800	9,120	11,000	4,840	3,550	2,850	2,900
25	7,190	25,000	11,200	56,900	12,000	15,800	8,850	10,300	4,800	3,520	2,850	2,950
26	7,700	23,400	10,800	47,000	11,300	16,600	8,670	9,750	4,710	3,520	2,850	*3,150
27	10,400	22,400	9,750	41,300	10,400	16,200	8,620	9,390	4,620	3,500	2,820	3,180
28	27,100	*21,200	8,750	33,200	*9,840	14,800	8,840	9,030	4,590	3,480	2,880	3,250
29	90,400	19,200	18,700	25,400	-	14,200	12,400	8,440	4,470	3,450	3,220	3,250
30	*108,000	19,500	20,400	20,600	-	15,200	11,600	7,860	4,410	3,420	3,280	3,250
31	*56,200	-	20,700	18,500	-	14,500	-	7,420	-	3,400	3,080	-
Total	471,450	872,300	757,100	955,000	715,440	527,900	392,220	364,300	168,080	118,870	96,010	85,800
Mean	15,210	29,080	24,420	30,810	25,550	17,030	13,070	11,750	5,603	3,835	3,097	2,860
Cfsm	4.45	8.50	7.14	9.01	7.47	4.98	3.82	3.44	1.64	1.12	0.906	0.836
In.	5.13	9.49	8.23	10.38	7.78	5.74	4.27	3.96	1.83	1.29	1.04	0.93
Ac-ft	935,100	*1,730	*1,502	*1,894	*1,419	*1,047	778,000	722,600	333,400	235,800	190,400	170,200

Calendar year 1950: Max 108,000 Min 3,590 Mean 17,040 Cfsm 4.98 In. 67.66 Ac-ft 12,340,000  
 Water year 1950-51: Max 108,000 Min 2,650 Mean 15,140 Cfsm 4.43 In. 60.07 Ac-ft 10,960,000

Peak discharge (base, 59,000 cfs).--Oct. 30 (1 a.m.) 139,000 cfs (18.03 ft); Nov. 2 (10 p.m.) 72,400 cfs (14.88 ft); Nov. 18 (8 p.m.) 73,900 cfs (15.01 ft); Dec. 7 (11 p.m.) 66,800 cfs (14.38 ft); Jan. 18 (5 a.m.) 73,100 cfs (14.94 ft); Jan. 24 (7 a.m.) 64,200 cfs (14.12 ft); Feb. 8 (10:30 a.m.) 60,100 cfs (13.68 ft).

\* Discharge measurement made on this day.

† Expressed in thousands.

Note.--Shifting-control method used Oct. 1-26, Dec. 13 to Jan. 2, Jan. 5-13.

## Long Tom River near Noti, Oreg.

Location.--Lat 44°03'00", long. 123°25'30", in sec. 33, T. 17 S., R. 6 W., on left bank an eighth of a mile upstream from railroad bridge, 1 mile downstream from Noti Creek, and 1½ miles southeast of Noti.

Drainage area.--88 sq mi, approximately.

Records available.--October 1935 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 388.76 ft above mean sea level (levels by U. S. Weather Bureau). Prior to Nov. 6, 1940, staff gage at same site and datum.

Average discharge.--16 years, 234 cfs.

Extremes.--Maximum discharge during year, 3,330 cfs Nov. 16 (gage height, 17.13 ft); minimum, 11 cfs Sept. 23 (gage height, 0.53 ft).

1935-51: Maximum discharge, 4,930 cfs Feb. 18, 1949 (gage height, 18.62 ft); minimum observed, 7 cfs Sept. 25-27, 1939.

Remarks.--Records good. No diversion above station. Slight diurnal fluctuation caused by log pond above Noti.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 15

Nov. 16 to Sept. 30

0.6	12	3.0	228	0.5	10	7.0	692
.8	20	6.0	585	.7	18	10.0	1,150
1.0	32	9.0	960	1.0	36	13.0	1,780
1.5	71	12.5	1,500	2.0	123	16.1	2,690
2.0	119			4.0	324		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	609	*720	417	460	295	267	126	78	32	19	17
2	15	607	908	562	431	*287	246	121	76	30	18	16
3	*28	526	800	1,080	471	280	218	140	74	30	19	15
4	42	405	990	832	498	405	212	152	72	32	20	15
5	65	328	967	645	610	700	206	135	74	34	19	15
6	80	273	952	534	699	576	194	125	76	35	18	15
7	58	238	1,080	460	748	527	182	118	81	34	17	17
8	44	229	912	366	810	615	181	111	74	32	16	20
9	39	185	724	375	786	842	166	106	67	32	17	19
10	31	160	598	400	692	649	157	103	64	*28	*17	17
11	26	190	545	476	1,030	550	163	103	62	25	18	16
12	24	146	497	488	1,170	522	*155	138	61	25	18	15
13	22	130	448	450	858	641	151	280	61	25	18	14
14	22	127	436	670	698	846	148	236	59	27	17	13
15	24	478	461	1,070	608	967	144	181	57	26	16	13
16	25	2,750	594	1,110	528	1,180	143	154	53	26	15	13
17	41	*2,610	657	2,000	483	886	135	136	50	25	15	14
18	98	2,860	562	2,690	526	695	130	122	49	25	15	14
19	121	1,660	502	*1,840	496	589	130	115	47	25	14	14
20	111	1,070	446	1,380	508	534	126	109	46	25	14	*13
21	75	769	394	1,800	495	501	122	103	46	24	14	12
22	53	580	364	2,730	447	452	119	100	46	25	13	12
23	45	480	338	2,040	449	404	115	100	45	24	12	12
24	38	467	313	1,790	395	372	113	*105	43	24	14	13
25	44	437	296	1,400	384	352	115	96	42	23	14	13
26	84	384	286	1,150	359	334	111	90	41	22	14	14
27	272	406	287	919	327	313	111	87	38	22	14	14
28	887	371	310	773	310	295	148	85	38	22	15	14
29	1,470	360	359	624	-	276	139	82	37	21	20	17
30	1,310	479	376	530	-	284	122	80	35	22	20	18
31	873	-	444	518	-	280	-	82	-	20	18	-
Total	6,081	20,294	17,466	32,179	16,279	16,448	4,669	3,821	1,692	822	507	444
Mean	196	676	563	1,038	581	531	156	123	56.4	26.5	16.4	14.8
Cfsm	2.23	7.68	6.40	11.8	6.60	6.03	1.77	1.40	0.641	0.301	0.186	0.168
In.	2.57	8.58	7.58	13.60	6.88	6.95	1.97	1.61	0.72	0.35	0.21	0.19
Ac-ft	12,060	40,250	34,640	63,830	32,290	32,630	9,260	7,580	3,360	1,630	1,010	881

Calendar year 1950: Max 2,860 Min 12 Mean 374 Cfsm 4.25 In. 57.70 Ac-ft 270,800  
 Water year 1950-51: Max 2,860 Min 12 Mean 331 Cfsm 3.76 In. 51.01 Ac-ft 239,400

Peak discharge (base, 1,300 cfs).--Oct. 29 (10 p.m.) 1,530 cfs (12.63 ft); Nov. 16 (1 p.m.) 3,330 cfs (17.13 ft); Jan. 18 (1 a.m.) 3,020 cfs (16.42 ft); Jan. 22 (5 a.m.) 2,970 cfs (16.31 ft).  
 \* Discharge measurement made on this day).



## Coyote Creek near Crow, Oreg.

Location.--Lat 44°01'19", long. 123°15'17", in NE¼ sec. 11, T. 18 S., R. 5 W., on right bank just upstream from backwater of Fern Ridge Reservoir, 1 mile downstream from Spencer Creek, and 5 miles northeast of Crow.

Drainage area.--94 sq mi, approximately.

Records available.--June 1940 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gage is 374.0 ft above mean sea level (Corps of Engineers benchmark). Prior to Aug. 31, 1940, staff gage near same site at different datums.

Average discharge.--11 years, 180 cfs.

Extremes.--Maximum discharge during year, 8,500 cfs Nov. 16 (gage height, 13.89 ft), from rating curve extended above 4,700 cfs; minimum, 0.1 cfs Aug. 11-13, 15, 17-31, Sept. 29, 30.

1940-51: Maximum discharge, 9,260 cfs Dec. 28, 1945 (gage height, 14.13 ft), from rating curve extended above 4,700 cfs; no flow at times in August and September 1940.

Remarks.--Records excellent except those between 10 and 20 cfs, which are good, and those below 10 cfs, which are poor.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29						Oct. 30 to Sept. 30					
0.4	1.3	2.0	75	9.0	785	0.2	0.1	1.0	30	10.0	1,180
.5	2.7	3.0	131	10.0	1,210	.3	.4	2.0	81	11.0	2,150
.6	5.0	5.0	260	11.0	1,980	.4	1.2	4.0	215	12.0	3,600
.7	12	7.0	430	12.0	3,220	.5	2.6	7.0	485	13.2	6,300
.7	14					.6	5.4	9.0	778		
1.0	30	8.0	557	13.0	5,490	.7	11	9.5	910		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	1,070	640	166	186	*140	80	36	13	2.8	0.7	0.2
2	1.3	812	796	321	209	128	74	36	12	2.8	.6	.4
3	1.6	604	901	754	218	124	69	42	11	2.3	.8	.7
4	14.0	463	1,270	682	327	291	65	50	11	2.3	.5	.5
5		338	1,130	481	877	494	61	43	11	2.6	.5	.5
6	16	258	938	334	1,060	616	56	38	11	3.2	.5	.4
7	17	205	1,010	270	1,040	665	52	37	11	3.2	.4	.4
8	11	171	886	163	1,170	812	49	30	11	3.2	.3	.4
9	7.6	149	670	174	805	1,370	46	26	10	3.0	.3	.4
10	6.0	124	507	233	604	880	43	25	9.6	*3.0	*.2	.4
11	6.0	108	435	249	1,200	641	41	25	9.1	2.4	.2	.4
12	4.8	99	386	257	1,320	543	*40	32	8.6	2.4	.1	.3
13	*4.0	89	326	266	791	573	38	50	8.6	2.3	.2	.3
14	3.5	95	342	642	554	670	37	42	8.6	2.1	.2	.3
15	3.1	779	349	1,180	467	720	35	32	8.0	2.0	.2	.2
16	3.1	6,100	367	1,420	400	682	34	28	7.0	2.1	.2	.3
17	5.0	3,670	362	3,250	326	540	32	26	5.9	1.8	.2	.3
18	28	4,100	321	2,940	387	406	30	23	5.4	2.0	.1	.4
19	38	1,840	294	1,910	336	316	29	22	4.9	2.4	.1	.3
20	59	1,120	269	1,290	347	261	28	21	4.5	2.3	.1	.2
21	62	752	225	1,340	342	227	26	21	4.2	2.1	.1	*.2
22	42	528	201	*2,090	293	197	25	21	4.5	2.0	.1	.2
23	26	497	175	1,560	254	170	25	20	4.5	1.4	.1	.2
24	18	360	157	1,170	225	148	25	*20	4.5	.9	.1	.2
25	18	337	144	868	220	133	24	19	4.5	.6	.1	.2
26	53	275	134	702	195	123	23	18	4.2	.4	.1	.3
27	235	386	122	537	169	110	23	18	3.8	.3	.1	.3
28	1,330	359	121	396	152	100	28	16	3.4	.5	.1	.3
29	4,310	511	120	290	-	97	33	15	3.2	.4	.1	.2
30	3,550	*451	341	230	-	100	33	14	5.0	.5	.1	.1
31	1,940	-	182	203	-	21	-	13	-	.8	.2	-
Total	11,718.6	26,440	13,921	26,368	14,474	12,368	1,204	859	221.0	60.1	7.6	9.4
Mean	378	881	449	851	517	399	40.1	27.7	7.37	1.94	0.25	0.31
Cfsm	4.02	9.37	4.78	9.05	5.50	4.24	0.427	0.295	0.078	0.021	0.0027	0.0033
In.	4.64	10.46	5.51	10.43	5.73	4.89	0.48	0.34	0.09	0.02	0.003	0.004
Ac-ft	23,240	52,440	27,610	52,300	28,710	24,530	2,390	1,700	438	119	15	19
Calendar year 1950:	Max 6,100	Min 0.1	Mean 327	Cfsm 3.48	In. 47.23	Ac-ft 236,800						
Water year 1950-51:	Max 6,100	Min 0.1	Mean 295	Cfsm 3.14	In. 42.59	Ac-ft 213,500						

Peak discharge (base, 1,600 cfs).--Oct. 29 (10 p.m.) 5,690 cfs (12.98 ft); Nov. 16 (8:30 a.m.) 8,500 cfs (13.89 ft); Jan. 17 (7:30 p.m.) 4,790 cfs (12.61 ft); Jan. 22 (1 p.m.) 2,320 cfs (11.14 ft); Feb. 12 (3 a.m.) 1,690 cfs (10.58 ft).

\* Discharge measurement made on this day.

## WILLAMETTE RIVER BASIN

Fern Ridge Reservoir near Elmira, Oreg.

Location.--Lat 44°07'18", long. 123°17'56", near center of sec. 4, T. 17 S., R. 5 W., in control house at spillway section of dam across Long Tom River and Coyote Creek, 4½ miles northeast of Elmira.

Drainage area.--252 sq mi.

Records available.--October 1941 to September 1951.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers).

Extremes.--Maximum contents during year, 86,640 acre-ft May 24 (elevation, 371.86 ft); minimum observed, 189 acre-ft Nov. 11 (elevation, 344.00 ft).  
1941-51: Maximum contents, 105,400 acre-ft Jan. 1, 1943 (elevation, 373.94 ft, corrected); minimum since first filling in 1942, that of Nov. 11, 1950.

Remarks.--Reservoir is formed by earth-fill dam with concrete outlet and spillway, completed in 1941 by Corps of Engineers; storage began Nov. 13, 1941. Capacity, 101,200 acre-ft between elevations 340 ft (sill of outlet gate) and 373.5 ft (maximum operating pool level); dead storage, 23 acre-ft below elevation 340 ft. Reservoir used for flood control and improvement of navigation. Daily contents computed from elevations at 12 p.m. Capacity table computed by Geological Survey on basis of areas furnished by Corps of Engineers.

Cooperation.--Water-stage recorder inspected by employees of Corps of Engineers.

Contents, in acre-feet, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58,570	37,880	17,540	6,350	38,370	39,130	70,200	80,000	86,470	83,640	77,880	40,010
2	57,260	35,590	14,210	8,240	32,710	40,150	70,750	80,480	86,470	83,480	77,490	38,640
3	56,850	32,550	12,760	8,910	27,030	41,470	71,330	80,960	86,470	83,400	77,260	37,180
4	55,550	28,900	12,050	8,550	22,530	43,480	71,980	81,280	86,390	83,150	76,950	35,760
5	55,010	24,570	11,800	7,510	19,170	45,710	72,200	81,690	86,390	82,990	76,640	34,150
6	54,050	20,180	10,930	7,450	18,040	47,990	72,870	81,850	86,390	82,900	76,100	32,470
7	53,050	15,270	10,080	7,500	17,250	47,450	73,310	82,170	86,310	82,740	75,190	30,870
8	51,950	9,930	8,620	7,280	17,200	47,030	73,610	82,420	86,310	82,580	74,360	29,330
9	50,810	5,390	7,380	6,940	17,120	47,720	73,910	82,660	86,310	82,500	73,540	27,790
10	49,580	323	7,270	6,840	17,510	47,290	74,210	82,620	86,310	82,090	72,720	26,150
11	48,370	519	7,680	6,960	18,890	47,560	74,660	83,150	86,220	82,010	71,840	24,510
12	47,240	2,030	7,540	7,040	20,300	49,250	75,040	83,890	86,220	81,770	70,960	22,900
13	45,870	389	7,180	7,280	21,000	51,320	75,420	84,390	86,140	81,690	69,810	21,380
14	44,840	1,330	7,070	8,390	22,010	53,930	75,640	84,970	86,140	81,520	68,390	19,780
15	43,630	8,100	6,930	9,890	23,620	56,100	75,950	85,300	86,050	81,440	66,980	18,130
16	42,640	27,300	7,100	10,850	24,900	57,200	76,180	85,550	85,970	81,200	65,670	16,460
17	41,660	45,040	7,300	19,390	26,350	57,630	76,480	85,720	85,630	81,120	64,180	15,460
18	39,130	62,110	7,220	33,020	27,440	57,950	76,640	85,890	85,470	80,960	62,840	14,670
19	35,640	71,910	7,010	42,290	28,200	58,950	76,950	86,050	85,300	80,640	61,460	13,840
20	31,350	75,570	6,540	48,320	28,900	60,250	77,180	86,220	85,300	80,560	59,840	13,000
21	27,370	72,790	5,810	51,890	29,510	61,070	77,330	86,310	85,220	80,400	58,200	12,210
22	23,300	67,260	5,890	59,780	30,460	61,920	77,490	86,390	85,050	80,320	56,520	11,340
23	19,220	61,650	6,540	66,360	31,580	63,110	77,720	86,560	84,880	80,080	54,950	10,490
24	15,420	56,100	6,980	70,100	32,860	63,640	77,800	86,470	84,640	79,920	53,280	9,580
25	11,990	50,300	7,160	73,910	34,390	64,310	78,030	86,390	84,640	79,600	51,490	8,740
26	9,150	44,380	7,130	71,400	35,890	65,060	78,190	86,390	84,470	79,530	49,860	8,360
27	7,700	38,500	6,880	67,190	37,000	66,090	78,660	86,470	84,390	79,290	48,210	8,270
28	8,940	32,470	7,060	62,180	38,140	66,850	78,970	86,470	84,300	78,890	46,710	8,260
29	20,360	26,620	7,300	56,830	-	67,820	79,370	86,390	84,140	78,660	44,940	7,720
30	33,560	21,770	7,410	50,870	-	68,530	79,760	86,470	83,810	78,270	43,230	7,000
31	39,000	-	6,880	44,690	-	69,310	-	86,470	-	78,030	41,620	-

Monthly elevation and contents, water year October 1950 to September 1951

Date	Elevation (feet)†	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	368.24	59,910	-
Oct. 31.....	364.41	39,000	-20,910
Nov. 30.....	359.72	21,770	-17,230
Dec. 31.....	352.93	6,880	-14,890
Calendar year 1950.....	-	-	-370
Jan. 31.....	365.59	44,690	+37,810
Feb. 28.....	364.22	38,140	-5,550
Mar. 31.....	369.63	69,310	+31,170
Apr. 30.....	371.02	79,760	+10,450
May 31.....	371.84	86,470	+6,710
June 30.....	371.52	83,810	-2,660
July 30.....	370.80	78,030	-5,780
Aug. 31.....	364.97	41,620	-36,410
Sept. 30.....	353.01	7,000	-34,620
Water year 1950-51.....	-	-	-52,910

† Elevation at 12 p.m.

Long Tom River below Fern Ridge Dam, near Smithfield, Oreg.

Location.--Lat 44°07'25", long. 123°18'00", in NW $\frac{1}{4}$  sec. 4, T. 17 S., R. 5 W., on left bank in canalized river channel 1,000 ft downstream from Fern Ridge Dam, which impounds runoff of Long Tom River and Coyote Creek, and  $\frac{1}{2}$  miles south of Smithfield.

Drainage area.--252 sq mi.

Records available.--August 1939 to September 1951. Prior to October 1943, published as "at Smithfield."

Gage.--water-stage recorder and masonry control. Datum of gage is 332.00 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to Oct. 1, 1943, at site  $\frac{1}{2}$  miles downstream at different datum.

Average discharge.--12 years, 524 cfs (adjusted for diversion to Coyote Creek since 1943).

Extremes (not including diversion to Coyote Creek).--Maximum discharge during year, 3,510 cfs Nov. 22 (gage height, 6.83 ft); minimum daily, 22 cfs Apr. 17.

1943-51: Maximum discharge, 4,500 cfs (gage height, 7.33 ft), from rating curve extended above 1,400 cfs on basis of former curve defined to 3,000 cfs; no flow part of June 11, 12, 1944.

Remarks.--Records of flow in river channel, good; records of diversion to Coyote Creek, poor. A few small diversions above station; several cubic feet per second diverted around station to Coyote Creek channel through 24-inch concrete pipe 600 ft long, several hundred feet upstream, record of which is based on daily staff-gage readings and occasional measurements. Fern Ridge Dam, 1,000 ft above station, was completed in 1941, and has regulated flow since Nov. 13, 1941 (see preceding page). Monthly discharge not adjusted for storage or release from Fern Ridge Dam as evaporation from Reservoir at times exceeds natural flow and diversions.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 20				Nov. 21 to Sept. 30			
1.5	22	3.0	510	1.5	22	3.0	540
1.6	34	4.0	1,160	1.7	49	4.0	1,240
1.8	65	5.0	2,000	2.0	114	5.0	2,030
2.1	136	6.0	2,970	2.5	285	7.0	3,660
2.5	274						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	598	2,800	3,210	922	3,390	29	33	24	37	36	87	704
2	598	2,760	3,120	752	3,370	*25	32	30	37	36	87	698
3	598	2,740	2,790	1,480	3,350	29	33	32	37	36	87	684
4	598	2,750	2,570	1,890	3,340	194	33	34	37	36	87	684
5	592	2,750	2,540	1,830	3,290	474	34	34	37	36	87	730
6	592	2,660	2,610	1,220	2,810	945	34	34	37	36	230	800
7	587	2,890	2,640	945	2,640	1,860	34	36	37	36	370	800
8	587	2,660	2,650	988	2,440	2,350	34	36	37	36	385	793
9	582	2,420	2,260	922	2,010	2,350	34	36	37	*34	*385	779
10	570	1,660	1,550	865	1,690	2,260	29	36	36	34	380	765
11	570	312	1,200	863	2,050	1,530	30	36	36	34	375	779
12	*570	96	1,220	870	2,250	652	*37	36	37	34	375	779
13	565	466	1,190	938	1,890	485	37	34	37	33	534	758
14	570	121	1,170	1,350	1,170	485	37	34	37	33	620	751
15	570	536	1,170	1,910	821	1,050	38	34	37	33	613	765
16	565	560	1,170	2,490	639	1,550	26	36	37	33	613	800
17	782	30	1,180	1,890	502	1,550	22	38	37	33	606	*576
18	1,220	30	1,180	892	678	1,280	34	38	37	34	613	390
19	1,850	27	1,170	614	772	733	34	38	37	34	613	385
20	2,040	1,230	1,150	641	772	400	30	38	37	34	730	380
21	2,010	2,910	1,120	2,250	779	410	34	38	37	34	765	405
22	1,900	3,440	684	*1,800	490	410	33	38	37	34	758	405
23	1,820	3,360	395	1,590	360	410	33	38	36	36	772	405
24	1,710	3,300	405	1,770	104	410	30	*40	36	34	772	395
25	1,620	3,290	502	1,080	32	240	33	40	36	34	758	395
26	1,500	3,320	540	3,010	32	165	34	38	36	46	751	163
27	1,430	3,410	600	3,370	30	76	34	38	36	78	800	43
28	1,750	3,350	463	3,350	29	36	34	38	36	87	842	42
29	1,170	3,340	466	3,360	-	34	33	38	36	87	842	247
30	26	3,240	631	3,370	-	34	33	38	34	87	828	380
31	654	-	952	3,380	-	33	-	37	-	85	772	-
Total	30,794	62,258	44,478	52,560	41,930	22,491	986	1,115	1,098	1,333	16,537	16,880
Mean	995	2,075	1,435	1,695	1,498	726	32.9	36.0	36.6	43.0	533	556
Ac-ft	61,080	123,500	88,220	104,300	83,170	44,610	1,960	2,210	2,180	2,640	32,800	33,080

Adjusted for diversion to Coyote Creek channel

	Mean	Cfsm	In.	Ac-ft
Oct.	1,010	2,089	1,450	1,711
Nov.	-	-	-	-
Dec.	-	-	-	-
Jan.	-	-	-	-
Feb.	-	-	-	-
Mar.	735	33.1	39.7	41.7
Apr.	-	-	-	-
May	-	-	-	-
June	-	-	-	-
July	-	-	-	-
Aug.	-	-	-	-
Sept.	538	562	-	-
Ac-ft	62,100	124,300	89,160	105,200

Observed

	Calendar year 1950: Max	4,300	Min	21	Mean	850	Ac-ft	615,700
	Water year 1950-51: Max	3,440	Min	22	Mean	801	Ac-ft	579,800

Adjusted

	Calendar year 1950: Mean	858	Cfsm	3.40	In.	46.21	Ac-ft	621,100
	Water year 1950-51: Mean	810	Cfsm	3.21	In.	43.63	Ac-ft	586,400

\* Discharge measurement made on this day.

## WILLAMETTE RIVER BASIN

Long Tom River at Monroe, Oreg.

Location.--Lat 44°18'50", long. 123°17'45", in NE¼ sec. 33, T. 14 S., R. 5 W., on left bank in canalized river channel at Monroe, 800 ft upstream from a concrete drop structure and just downstream from Shafer Creek.

Drainage area.--391 sq mi.

Records available.--November 1920 to September 1951 (1925-27 incomplete).

Gage.--Water-stage recorder and concrete control. Datum of gage is 270.00 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to Nov. 24, 1944, staff gages at various sites ranging from present site to 1½ miles downstream at different datums.

Average discharge.--28 years (1921-25, 1927-51), 744 cfs.

Extremes.--Maximum discharge during year, 7, 100 cfs Nov. 16 (gage height, 8.89 ft); minimum, 25 cfs July 21 (gage height, 4.15 ft).  
1920-51: Maximum discharge, 19,300 cfs Jan. 2, 1943 (gage height, 17.14 ft, site and datum then in use, from graph based on gage readings), includes some overflow from Willamette River near Junction City; no flow Oct. 20-22, 1944 (water filling pool at gage); minimum observed prior to regulation of flow, 7 cfs Sept. 29, Oct. 1, 1939.

Remarks.--Records excellent except those below 100 cfs, which are good. A few small diversions above station. Flow regulated by Fern Ridge Reservoir beginning Nov. 13, 1941 (see p. 156). In 1943 and 1944 river channel was improved from outlet of Fern Ridge Reservoir to a point below Monroe.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau. Water-stage recorder inspected by employee of Corps of Engineers.

Revisions.--W 654: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-17

Oct. 18 to Sept. 30

5.1	530	4.1	14	4.8	320	7.0	2,990
5.2	610	4.2	38	5.1	550	8.0	4,940
5.4	800	4.3	72	5.5	920	8.7	6,600
		4.5	155	6.0	1,500		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	619	4,020	5,180	1,320	4,340	238	175	91	68	44	87	712
2	619	3,900	4,980	1,710	4,470	222	165	87	68	44	87	712
3	628	3,650	4,810	3,080	4,680	232	155	95	68	47	87	705
4	637	3,520	4,720	2,990	4,810	802	150	95	68	47	87	705
5	646	3,580	4,260	2,770	5,500	1,420	*142	91	68	47	87	721
6	646	3,250	4,560	1,980	5,070	1,790	142	91	68	47	119	*802
7	637	3,140	4,530	1,370	4,530	3,080	132	95	68	47	320	802
8	637	3,130	4,080	1,380	4,300	4,660	128	91	68	44	362	795
9	619	2,890	3,560	*1,360	3,110	4,590	114	83	64	38	362	784
10	619	2,280	2,470	1,350	3,080	3,750	110	83	64	41	362	784
11	610	703	1,910	1,460	4,180	2,690	102	83	64	36	355	775
12	610	290	1,860	1,370	4,380	1,450	106	95	60	36	355	775
13	610	373	1,710	1,400	3,160	1,250	110	142	60	36	454	775
14	610	495	1,760	2,440	2,080	1,230	110	124	60	36	622	766
15	602	1,570	1,900	3,670	1,470	1,640	106	99	57	33	622	766
16	602	6,500	2,130	4,510	1,330	2,480	99	*95	54	33	622	811
17	750	5,460	2,030	5,600	1,040	2,260	83	91	54	33	622	804
18	1,240	4,510	1,830	4,340	1,330	1,910	91	87	51	33	622	376
19	*1,960	2,580	1,730	3,540	1,330	1,330	95	80	51	33	622	369
20	2,400	2,050	1,680	2,010	*1,330	784	91	80	*51	33	694	355
21	2,340	4,060	1,580	4,810	1,320	748	83	76	51	33	775	369
22	2,190	4,760	1,240	4,790	1,040	721	83	76	47	36	766	390
23	2,100	4,590	712	4,020	730	694	83	76	47	36	775	365
24	2,000	4,570	694	4,080	559	676	83	76	44	*36	775	376
25	1,890	4,510	730	1,800	334	568	80	76	47	36	766	369
26	1,800	4,450	793	4,360	320	376	80	72	44	36	757	278
27	1,890	4,640	820	4,760	284	320	83	72	47	54	784	51
28	3,150	4,530	802	4,570	254	210	99	72	47	87	830	44
29	5,030	*4,430	811	4,380	-	205	95	68	44	87	830	114
30	3,560	4,870	960	4,360	-	200	91	68	44	87	820	334
31	2,370	-	1,400	4,560	-	185	-	68	-	87	802	-
Total	44,631	103,101	72,032	95,940	70,361	42,711	3,266	2,678	1,696	1,403	16,230	16,596
Mean	1,440	3,437	2,324	3,095	2,513	1,378	109	86.4	56.5	45.3	524	553
Cfsm	-	-	-	-	-	-	-	-	-	-	-	-
In.	-	-	-	-	-	-	-	-	-	-	-	-
Ac-ft	88,520	204,500	142,900	190,300	139,600	84,720	6,480	5,310	3,360	2,780	32,190	32,920

Calendar year 1950: Max 6,500 Min 44 Mean 1,595 Cfsm 3.57 In. 48.42 Ac-ft 1,010,000  
Water year 1950-51: Max 6,500 Min 33 Mean 1,289 Cfsm 3.30 In. 44.77 Ac-ft 935,600

\* Discharge measurement made on this day.

## Rock Creek near Philomath, Oreg.

Location.--Lat 44°30'05", long. 123°26'20", in NE $\frac{1}{4}$  sec. 29, T. 12 S., R. 6 W., on right bank 250 ft upstream from State Highway 34, a quarter of a mile upstream from mouth, and 4 $\frac{1}{2}$  miles southwest of Philomath.

Drainage area.--14.6 sq mi.

Records available.--October 1945 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gage is 354.16 ft above mean sea level (Oregon State Highway Department bench mark).

Average discharge.--6 years, 59.3 cfs.

Extremes.--Maximum discharge during year, 1,080 cfs Nov. 16 (gage height, 4.70 ft); minimum, 0.4 cfs Sept. 15, 16.

1945-51: Maximum discharge, 1,650 cfs Jan. 6, 1948 (gage height, 5.78 ft), from rating curve extended above 810 cfs by logarithmic plotting; minimum, 0.2 cfs Aug. 24, 1946, and several days in summers of 1949 and 1950.

Remarks.--Records good except those for period of no gage-height record and those below 1 cfs, which are poor. Flow regulated by small storage reservoir operated by city of Corvallis; most of low-water flow diverted to Corvallis water-supply system.

Revisions (water years).--W 1124: 1946(m).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.5	0.4	1.5	18
.6	.7	1.7	34
.7	1.2	1.9	59
.9	3.0	2.3	139
1.1	5.9	3.0	350
1.3	10	4.0	750

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a0.4	134	206	97	84	51	73	26	14	4.5	1.2	0.8
2	a4.3	142	169	261	103	46	69	24	13	4.3	1.3	1.0
3	a4.0	99	191	253	125	52	*74	27	12	4.3	1.1	.8
4	a10	74	241	169	134	106	78	24	12	5.1	1.1	*.6
5	a18	58	203	130	152	103	69	22	12	4.9	1.1	.6
6	a20	48	238	108	156	80	64	23	12	7.0	1.0	.6
7	a16	40	247	95	301	64	59	22	11	4.6	1.0	.8
8	a12	35	186	87	288	71	55	19	11	3.8	.9	.8
9	a10	30	146	*80	183	64	51	18	10	3.6	1.1	.7
10	a9.0	28	121	82	200	58	46	17	9.3	3.5	1.0	.7
11	a6.0	26	110	105	265	56	44	18	9.3	3.1	1.0	.6
12	a5.5	24	95	97	194	86	44	41	9.5	2.9	.8	.5
13	a5.0	22	87	95	152	139	44	112	10	3.0	.8	.6
14	a4.5	22	91	183	125	144	41	84	9.3	3.0	.7	.5
15	a6.0	318	206	265	110	244	38	*45	8.2	2.9	.6	.5
16	a9.0	567	326	290	97	206	36	36	8.2	2.5	.9	.5
17	a12	*710	217	714	95	149	33	30	7.7	2.4	.7	.7
18	*43	363	159	368	101	123	30	28	7.3	2.7	.7	.5
19	37	208	134	253	97	121	27	25	*7.3	2.6	.7	.5
20	25	203	110	208	*125	125	26	23	6.8	2.2	.6	.5
21	15	169	97	536	108	128	24	22	6.4	2.2	.6	.5
22	11	142	97	382	93	118	23	21	6.1	2.4	.7	.5
23	9.8	118	101	340	82	101	22	22	5.9	2.2	.6	.5
24	8.8	146	89	322	73	91	22	19	5.6	*1.9	.5	.6
25	19	130	80	268	66	95	20	18	5.6	1.9	.5	.7
26	58	112	73	247	62	91	19	17	5.3	1.9	.5	.8
27	183	118	69	172	56	84	23	16	5.3	2.0	.6	.7
28	256	99	93	142	53	76	52	15	4.8	1.8	.7	.8
29	200	*87	89	118	-	80	33	14	4.6	1.6	1.3	1.0
30	162	169	101	103	-	87	27	14	4.6	1.5	1.4	8.4
31	137	-	106	91	-	80	-	15	-	1.2	.9	-
Total	1,312.3	4,441	4,478	6,662	3,660	3,119	1,268	837	254.1	93.5	26.6	27.3
Mean	42.3	148	144	215	131	101	42.3	27.0	8.47	3.02	0.86	0.91
Ac-ft	2,600	8,810	8,880	13,210	7,260	6,190	2,520	1,660	504	185	53	54

Calendar year 1950: Max 444 Min 0.2 Mean 81.8 Ac-ft 59,220  
 Water year 1950-51: Max 714 Min 0.3 Mean 71.7 Ac-ft 51,930

Peak discharge (base, 500 cfs).--Nov. 16 (1 a.m.) 1,080 cfs (4.70 ft); Jan. 17 (7 a.m.) 980 cfs (4.50 ft); Jan. 21 (9 a.m.) 746 cfs (3.99 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Marys River near Philomath.

## Marys River near Philomath, Oreg.

Location.--Lat 44°31'35", long. 123°20'00", in SW $\frac{1}{4}$  sec. 18, T. 12 S., R. 5 W., near mid-span on upstream side of bridge 2 miles southeast of Philomath and  $3\frac{1}{2}$  miles (revised) upstream from Muddy Creek.

Drainage area.--159 sq mi, revised (including drainage area of Evergreen Creek above road crossing  $1\frac{1}{2}$  miles south of station).

Records available.--October 1940 to September 1951.

Gage.--Wire-weight gage read twice daily, oftener during floods. Altitude of gage is 218 ft (by barometer).

Average discharge.--11 years, 450 cfs.

Extremes.--Maximum discharge during year, 6,480 cfs Jan. 17 (gage height, 20.3 ft, from graph based on gage readings); minimum, 8 cfs Sept. 15, 19-23.  
1940-51: Maximum discharge, 8,250 cfs Dec. 15, 1946 (gage height, 20.67 ft, from floodmark); minimum observed, 6 cfs Sept. 12, 13, 1944, Aug. 23, Sept. 9, 13, 22-24, 1950.

Remarks.--Records good. Records include flow of Evergreen Creek (tributary to Muddy Creek) at road crossing 1 $\frac{1}{2}$  miles south, with which overflow from Marys River may at times be mingled. City of Corvallis diverts municipal supply from headwaters; other small diversions above station for irrigation of 1,500 acres. Slight regulation by small storage reservoir on Rock Creek operated by city of Corvallis.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 3

Jan. 4 to Sept. 30

3.3	15	10.0	1,200	2.2	8	4.0	102
3.5	32	13.0	1,930	2.5	12	5.0	210
4.0	89	17.0	3,200	2.7	16	7.0	526
5.0	230	19.0	4,380	3.0	28	10.0	1,180
7.0	560	20.0	5,800	3.5	60	13.0	1,950

Note.--Same as preceding table above 13.0 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	17	1,210	1,780	1,090	706	470	474	209	126	30	13	12
2	16	1,710	1,680	1,800	798	439	440	205	117	30	13	11
3	34	1,460	1,720	2,420	884	434	422	211	112	32	13	10
4	60	1,060	1,990	980	879	*405	207	110	37	13	13	*9
5	129	779	1,960	1,570	1,200	1,350	382	189	109	38	13	9
6	139	610	2,190	1,210	1,320	1,150	366	206	107	44	13	9
7	107	502	2,370	982	1,810	940	344	206	106	40	12	10
8	81	443	1,960	840	1,970	1,110	326	185	103	35	12	11
9	77	383	1,580	*738	1,570	972	508	174	90	30	12	11
10	67	332	1,250	738	1,500	794	296	166	90	28	12	11
11	44	299	1,130	846	2,090	730	284	170	88	26	13	11
12	40	276	930	849	1,700	899	274	204	87	23	13	10
13	38	252	800	816	1,380	1,860	265	499	87	20	13	9
14	36	244	796	1,510	1,130	2,120	258	531	83	20	12	9
15	49	804	1,130	2,410	1,000	2,880	248	413	73	21	12	8
16	61	*4,810	2,160	2,600	833	3,190	258	*358	68	21	11	9
17	*64	*5,420	1,940	5,420	778	2,400	224	292	64	19	11	9
18	178	4,620	1,510	5,060	834	1,800	216	261	62	19	11	9
19	173	2,970	1,270	3,430	806	1,440	210	237	58	20	10	8
20	188	2,280	1,050	2,500	*925	1,280	201	216	*54	19	10	8
21	136	1,670	880	4,290	893	1,150	190	201	51	17	10	8
22	82	1,280	796	4,310	814	1,050	165	185	50	17	9	8
23	136	1,080	922	3,680	739	904	178	183	50	17	9	8
24	71	1,110	938	3,240	662	782	177	180	46	*16	9	9
25	76	1,030	844	2,670	622	714	169	166	45	16	9	9
26	208	894	738	2,210	594	654	164	156	41	15	9	9
27	1,892	998	702	1,740	539	582	173	148	39	15	9	9
28	1,850	880	915	1,380	499	551	294	141	37	15	10	9
29	2,030	*792	1,050	1,090	-	506	247	135	32	15	11	13
30	1,580	1,360	1,160	906	-	542	214	129	31	14	13	18
31	1,360	-	1,180	790	-	522	-	129	-	14	13	-
Total	9,982	41,558	41,491	65,145	29,607	35,074	8,172	6,872	2,225	723	353	293
Mean	322	1,385	1,338	2,101	1,057	1,131	272	222	74.2	23.3	11.4	9.8
Cfs/m	2.03	6.71	8.42	13.2	6.65	7.11	1.71	1.40	0.467	0.147	0.072	0.062
In.	2.33	9.72	9.70	15.24	6.93	8.20	1.91	1.61	0.52	0.17	0.08	0.07
Ac-ft	19,799	82,430	82,300	129,200	58,720	69,570	16,210	13,630	4,410	1,430	700	581
Calendar year 1950:	Max	5,420	Min	6	Mean	736	Cfs/m	4.63	In.	62.80	Ac-ft	532,500
Water year 1950-51:	Max	5,420	Min	6	Mean	662	Cfs/m	4.16	In.	56.48	Ac-ft	479,000

Peak discharge (base, 2,500 cfs).--Nov. 16 (8 a.m.) 6,220 cfs (20.19 ft); Nov. 17 (1 to 2 p.m.) 6,220 cfs (20.19 ft); Jan. 17 (4 p.m.) 6,480 cfs (20.3 ft); Jan. 21 (4 p.m.) 5,060 cfs (19.58 ft); Mar. 15 (5 p.m.) 3,440 ft (17.53 ft).

\* Discharge measurement made on this day.

## Calapooya River at Holley, Oreg.

Location.--Lat 44°21'00", long. 122°47'00", in SE $\frac{1}{4}$  sec. 15 (revised), T. 14 S., R. 1 W., on right bank a quarter of a mile southwest of Holley and 5 miles (revised) upstream from Brush Creek.

Drainage area.--105 sq mi (revised).

Records available.--September 1935 to September 1951.

Gage.--Staff gage read once daily below, and two or more times daily above 3.0 ft gage height. Datum of gage is 527.20 ft above mean sea level, datum of 1929.

Average discharge.--16 years, 426 cfs.

Extremes.--Maximum discharge during year, 5,870 cfs Oct. 29 (gage height, 9.27 ft, observed at peak); minimum, 20 cfs Sept. 23, 24.  
1935-51: Maximum discharge, 12,200 cfs Dec. 28, 1945 (gage height, 14.1 ft, from floodmark), from rating curve extended above 5,300 cfs by logarithmic plotting; minimum observed, 13 cfs Sept. 8, 1940.

Remarks.--Records good. No diversion above station; slight regulation at times during low-water periods by small dam upstream.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau.

Revisions (water years).--W 1044: 1943.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Jan. 17 to Feb. 4)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

1.0	34	3.0	660	0.8	18	2.5	370
1.3	65	4.0	1,230	1.0	29	3.0	590
1.6	118	6.0	2,730	1.3	56	4.0	1,160
2.0	222	9.0	5,580	1.6	101	6.0	2,730
2.5	415			2.0	202	8.0	4,580

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	36	2,250	972	735	482	316	510	281	159	53	33	28
2	34	3,270	810	1,430	530	288	482	288	132	53	32	27
3	46	1,900	1,120	1,780	645	267	600	274	127	53	31	26
4	*181	1,510	2,860	1,270	842	555	720	284	*122	55	31	25
5	420	1,010	1,930	972	2,320	520	640	323	120	51	31	25
6	525	785	2,800	805	1,940	434	590	323	116	59	30	24
7	338	680	2,630	715	2,410	394	575	640	112	53	30	25
8	262	635	1,730	660	2,100	555	540	450	107	51	29	28
9	379	560	1,260	620	1,500	530	490	362	101	49	29	27
10	216	475	1,010	645	1,310	426	466	323	98	48	29	25
11	155	415	912	770	2,090	378	442	390	94	46	29	25
12	127	406	775	700	1,520	394	458	394	92	45	28	24
13	106	354	690	650	1,150	725	482	794	94	44	28	24
14	94	338	640	2,370	944	884	478	660	89	43	28	23
15	102	1,150	620	1,900	872	*1,970	450	520	84	42	27	23
16	108	2,310	670	1,640	730	1,450	410	458	81	*42	27	22
17	318	3,180	630	2,870	670	956	378	398	78	41	27	22
18	424	3,200	560	2,160	630	764	334	354	76	41	26	22
19	565	1,870	*530	1,450	570	730	302	316	74	41	26	22
20	685	1,910	520	1,040	550	896	281	284	74	40	25	22
21	470	1,500	460	2,180	520	908	248	260	70	39	25	22
22	338	1,250	451	1,880	478	788	224	248	68	39	25	21
23	262	1,080	415	2,280	434	670	208	230	66	37	24	20
24	222	1,260	388	3,300	402	610	196	267	65	36	24	20
25	213	1,170	350	2,170	394	625	194	224	64	36	24	24
26	330	966	330	2,080	362	655	*188	202	61	36	24	31
27	984	930	346	1,400	342	620	185	194	60	35	24	27
28	3,550	760	442	1,050	323	580	288	180	59	35	*26	25
29	5,280	670	1,210	*800	-	625	346	168	56	35	45	25
30	3,000	822	978	640	-	610	323	163	54	35	41	38
31	1,850	-	822	540	-	550	-	142	-	33	31	-
Total	21,620	38,396	29,861	44,502	27,060	20,673	12,028	10,401	2,633	1,356	889	742
Mean	697	1,280	963	1,436	966	667	401	336	87.8	43.7	28.7	24.7
Cfs/m	6.64	12.2	9.17	13.7	9.20	6.35	3.82	3.20	0.836	0.416	0.273	0.235
In.	7.66	13.60	10.58	15.76	9.58	7.32	4.26	3.68	0.93	0.48	0.31	0.26
Ac-ft	42,880	76,160	59,230	88,270	53,670	41,000	23,860	20,630	5,220	2,690	1,760	1,470

Calendar year 1950: Max 5,280 Min 26 Mean 672 Cfs/m 6.40 In. 90.18 Ac-ft 486,300  
Water year 1950-51: Max 5,280 Min 20 Mean 576 Cfs/m 5.49 In. 74.42 Ac-ft 416,800

Peak discharge (base, 2,600 cfs).--Oct. 29 (8 a.m.) 5,870 cfs (9.27 ft); Nov. 2 (1 a.m.) 4,260 cfs (7.68 ft); Nov. 17 (about 9 p.m.) 4,880 cfs (8.3 ft); Dec. 4 (9 a.m.) 2,980 cfs (6.28 ft); Dec. 7 (about 2 a.m.) 3,180 cfs (6.5 ft); Jan. 17 (9:30 a.m.) 5,060 cfs (8.66 ft); Jan. 21 (12 m.) 2,930 cfs (6.40 ft); Jan. 24 (2 a.m.) 3,770 cfs (7.34 ft); Feb. 7 (8 p.m.) 2,820 cfs (6.10 ft).

\* Discharge measurement made on this day.

## Calapooya River at Albany, Oreg.

Location.--Lat 44°37'15", long. 123°07'40", in NW $\frac{1}{4}$  sec. 13, T. 11 S., R. 4 W., near right bank on upstream side of highway bridge, half a mile downstream from Oak Creek,  $\frac{1}{2}$  miles southwest of Albany, and 3 miles upstream from mouth.

Drainage area.--372 sq mi (revised).

Records available.--October 1940 to September 1951.

Gage.--Wire-weight gage read twice daily, oftener at high stages. Datum of gage is 180.37 ft above mean sea level, datum of 1929.

Average discharge.--11 years, 896 cfs.

Extremes.--Maximum discharge observed during year, 16,000 cfs Oct. 30 (gage height, 19.75 ft); maximum gage height, 20.70 ft Oct. 31 (backwater from Willamette River); minimum discharge observed, 5 cfs Aug. 14, 21, 28, Sept. 18; minimum daily, 6 cfs Aug. 14, 21, 28, Sept. 18.

1940-51: Maximum discharge, 24,900 cfs Jan. 8, 1948; maximum gage height, 25.5 ft Jan. 2, 1943, from graph based on gage readings (backwater from Willamette River); minimum discharge observed, that of Aug. 14, 21, 28, Sept. 18, 1951; minimum daily, that of Aug. 14, 21, 28, Sept. 18, 1951.

Remarks.--Records fair. A few small diversions above station for irrigation. Diurnal fluctuation caused by ponds at flour mills near Shedd.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from Willamette River Oct. 30 to Nov. 1, Nov. 4-6, 20, Dec. 8-10, Jan. 26-28, Feb. 7-10; backwater from debris Nov. 30 to Dec. 8)

0.9	4.6	3.0	203	17.0	7,550
1.1	11	4.0	428	18.0	9,840
1.5	31	6.0	1,010	20.0	17,100
1.9	59	12.0	3,470		
2.4	114	15.0	5,320		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	61	*5,830	*2,790	1,460	986	*575	724	383	175	58	29	34
2	30	4,450	2,850	1,550	928	554	673	347	164	41	27	35
3	54	4,850	2,470	3,430	1,850	533	643	347	156	71	18	19
4	45	3,920	3,240	3,620	2,160	1,280	715	337	148	72	20	16
5	76	2,800	3,810	2,790	3,500	2,200	799	332	144	52	33	12
6	176	1,960	4,380	1,860	4,420	2,010	733	371	144	64	19	20
7	513	1,390	4,290	1,350	4,540	2,530	697	486	140	69	11	26
8	438	1,090	4,660	1,220	4,350	3,530	631	652	137	85	22	19
9	330	975	3,490	1,070	3,910	4,310	607	516	131	44	20	18
10	408	844	2,540	1,150	3,000	2,990	*586	440	118	*77	20	21
11	*296	724	1,920	1,360	4,160	1,680	544	396	115	41	20	18
12	203	652	1,940	*1,500	4,670	1,390	526	453	110	44	24	17
13	172	607	1,480	1,200	3,950	2,180	526	619	106	41	16	17
14	145	546	1,280	2,070	2,500	2,230	546	944	102	45	*6	16
15	117	1,060	1,670	4,080	1,850	2,140	523	778	101	34	18	20
16	115	6,170	2,420	4,640	2,080	2,640	490	628	95	24	18	36
17	135	13,700	2,420	4,870	1,850	2,990	473	533	77	35	17	17
18	193	12,100	1,590	7,410	1,850	1,850	433	458	85	39	14	8
19	533	10,600	1,190	7,860	1,570	1,350	380	420	82	38	26	15
20	715	5,490	1,210	5,500	1,270	1,200	366	386	91	33	15	15
21	1,090	3,730	989	4,050	1,370	1,290	337	347	86	29	6	16
22	712	3,020	847	4,560	1,160	1,300	305	*323	81	49	19	15
23	513	2,260	784	5,630	928	1,130	266	309	84	20	16	30
24	413	1,640	706	5,540	811	947	247	373	71	30	15	12
25	359	2,130	664	5,630	805	853	252	286	61	30	13	*10
26	483	2,010	616	4,440	814	919	239	256	73	29	19	12
27	766	2,020	622	3,740	700	877	231	235	69	27	14	16
28	2,000	2,370	703	3,010	625	793	239	225	70	26	6	26
29	4,640	1,510	1,240	2,120	-	745	347	176	71	35	17	30
30	14,500	1,800	1,710	1,430	-	799	410	186	62	19	17	26
31	*9,840	-	1,850	1,150	-	820	-	181	-	24	25	-
Total	40,071	102,248	62,371	101,090	62,307	50,635	14,488	12,723	3,149	1,325	560	590
Mean	1,293	3,408	2,012	3,261	2,225	1,633	483	410	105	42.7	18.1	19.7
Cfs/m	3.48	9.16	5.41	8.77	5.98	4.39	1.30	1.10	0.282	0.115	0.049	0.053
In.	4.01	10.22	6.24	10.11	6.23	5.06	1.45	1.27	0.31	0.13	0.06	0.06
Ac-ft	79,480	202,800	123,700	200,500	123,600	100,400	28,740	25,240	6,250	2,630	1,110	1,170
Calendar year 1950: Max	14,500			Min 14		Mean 1,451	Cfs/m 3.90	In. 52.95	Ac-ft 1,050,000			
Water year 1950-51: Max	14,500			Min 6		Mean 1,237	Cfs/m 3.33	In. 45.15	Ac-ft 895,600			

\* Discharge measurement made on this day.



## Willamette River at Albany, Oreg.

Location--Lat 44°38'20", long. 123°06'20", in SW<sup>1</sup>/<sub>4</sub> sec. 6, T. 11 S., R. 3 W., on right bank at Albany, a quarter of a mile downstream from Calapooya River and at mile 120.0.

Drainage area--4,840 sq mi, approximately.

Records available--November 1878 to April 1882, 1883 to 1888 (fragmentary), January 1892 to September 1951.

Gage--Water-stage recorder. Datum of gage is 171.70 ft above mean sea level, datum of 1929. Prior to Sept. 27, 1906, staff gage at site a quarter of a mile upstream at same datum. Sept. 27, 1906, to Nov. 14, 1934, staff gage at site 300 ft upstream at same datum.

Average discharge--56 years (1895-1951), 13,920 cfs.

Extremes--Maximum discharge during year, 146,000 cfs Oct. 31 (gage height, 26.01 ft); minimum, 3,300 cfs Sept. 18.

1878-82, 1892-1951: Maximum discharge, 266,000 cfs Jan. 14, 1881 (gage height, 32.8 ft); minimum, 1,840 cfs Sept. 1, 2, 1940.

Maximum stage known, 36.0 ft Dec. 4, 1861 (discharge, 340,000 cfs, from rating curve extended above 220,000 cfs). Flood of Feb. 4, 1890, reached a stage of 33.9 ft (discharge, 291,000 cfs).

Remarks--Records good. Flow regulated at times by Cottage Grove, Fern Ridge, and Dorena Reservoirs (see pp. 128, 131, 159). Albany power canal diverts water from South Santiam River into Willamette River above station; small diversions for irrigation.

Revisions (water years)--W 694: Drainage area. W 904: 1939. W 964: 1862(M), 1881, 1890, 1894, 1897, 1901, 1903, 1907, 1908, 1910, 1916, 1923, 1927, 1932(M). W 984: 1916.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used May 21 to Sept. 26)

Oct. 1 to Aug. 31				Sept. 1-30	
-0.9	3,300	14.0	56,200	-1.3	3,340
0.0	4,480	20.0	91,600	-1.5	4,400
2.0	8,320	26.0	146,000		
8.0	29,200				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4,530	95,800	34,500	26,700	27,700	13,400	17,000	12,700	8,980	4,760	3,500	3,950
2	4,480	67,300	37,900	26,800	25,600	12,800	15,800	12,400	8,580	4,880	3,440	3,820
3	4,670	73,700	37,700	35,400	26,900	12,400	15,200	12,200	8,230	4,880	3,420	3,710
4	5,000	81,100	44,000	48,200	28,900	14,500	16,200	11,900	8,070	4,900	3,380	3,660
5	6,520	61,100	61,200	42,300	39,900	20,300	18,400	12,200	7,890	4,630	3,590	3,630
6	9,040	45,200	73,000	32,600	63,800	22,500	18,600	12,900	7,840	4,690	3,420	3,680
7	12,200	37,000	69,200	26,600	76,600	23,700	17,900	14,400	7,580	4,620	3,440	3,740
8	10,800	30,800	78,900	19,800	77,500	27,700	17,600	17,500	7,370	4,480	3,570	3,760
9	9,330	28,000	79,100	21,500	78,600	33,100	17,400	16,300	7,200	4,350	3,520	3,760
10	9,860	25,700	57,600	*20,700	68,100	30,400	*16,800	15,000	7,020	*4,320	3,510	3,720
11	*8,020	21,200	41,600	21,100	60,300	25,200	16,200	14,600	6,900	4,230	3,500	3,680
12	6,900	17,000	35,900	22,000	59,900	22,000	15,700	16,300	6,920	4,100	3,500	3,630
13	6,290	15,500	33,200	21,200	56,200	22,600	16,400	18,200	6,920	4,080	3,500	3,640
14	5,790	14,900	30,100	24,300	44,000	25,900	17,800	20,700	6,830	4,080	*3,690	3,620
15	5,510	15,800	29,800	44,100	35,300	31,300	18,800	19,400	6,770	4,020	3,750	3,580
16	5,350	39,700	31,300	53,800	31,900	40,900	18,200	17,000	6,720	4,010	3,740	3,580
17	5,590	68,900	30,300	56,500	28,400	51,200	17,600	15,700	6,680	3,870	3,670	3,580
18	7,310	78,200	27,200	72,700	26,700	40,000	17,000	15,100	6,700	3,870	3,670	3,420
19	11,100	80,800	24,400	89,900	30,400	30,200	16,000	14,500	6,480	3,880	3,690	3,380
20	12,800	84,000	22,700	75,400	23,600	26,600	15,000	13,700	6,100	3,840	3,640	3,450
21	13,900	61,100	21,100	55,200	23,100	27,600	13,900	13,200	5,950	3,750	3,650	3,450
22	12,800	54,700	19,500	58,400	21,800	28,900	12,700	*12,700	5,770	3,750	3,640	3,540
23	11,600	43,400	18,000	69,900	19,900	26,100	11,700	12,600	5,630	3,700	3,630	3,520
24	10,500	35,200	16,900	70,200	18,200	22,700	11,100	12,900	5,470	3,690	3,630	3,560
25	9,720	35,200	15,800	79,100	16,900	20,600	10,700	12,600	5,410	3,640	3,630	*3,590
26	9,810	35,800	15,100	65,900	*15,900	20,300	10,300	12,000	5,370	3,620	3,630	3,660
27	12,200	34,100	14,500	69,800	15,300	20,400	10,200	11,500	5,220	3,610	3,620	3,690
28	21,100	33,600	14,700	59,200	14,300	19,100	10,600	11,200	5,140	3,610	3,690	3,680
29	45,200	*30,600	17,500	46,400	-	17,700	13,200	10,600	5,000	3,610	3,870	3,760
30	92,500	30,100	26,800	36,000	-	17,900	14,000	9,980	4,840	3,590	4,230	3,900
31	*38,000	-	25,900	30,700	-	18,500	-	9,360	-	3,550	4,120	-
Total	528,480	*1,305.5	*1,085.3	*1,440.4	*1,050.7	786,300	458,000	431,340	199,580	126,810	112,280	109,340
Mean	17,050	46,180	35,010	46,460	37,520	24,720	15,270	13,910	6,653	4,091	3,622	3,645
Cfsm	4.32	9.54	7.23	9.60	7.75	5.11	3.15	2.87	1.37	0.845	0.748	0.753
In.	5.06	10.65	8.34	11.07	8.07	5.89	3.52	3.31	1.53	0.97	0.86	0.84
Ac-ft	*1,048	*2,748	*2,153	*2,857	*2,084	*1,520	908,400	855,600	395,900	251,500	222,700	216,900
Calendar year 1950: Max	136,000	Min	3,420	Mean	22,910	Cfsm	4.73	In.	64.27	Ac-ft	16,590,000	
Water year 1950-51: Max	136,000	Min	3,380	Mean	21,080	Cfsm	4.36	In.	59.11	Ac-ft	15,260,000	

Peak discharge (base, 59,000 cfs)--Oct. 31 (6:30 a.m.) 146,000 cfs (26.01 ft); Nov. 4 (5 to 6 a.m.) 84,800 cfs (19.05 ft); Nov. 19 (9:30 p.m.) 95,400 cfs (20.47 ft); Dec. 9 (2 a.m.) 84,500 cfs (18.98 ft); Jan. 19 (10:30 a.m.) 94,600 cfs (20.38 ft); Jan. 25 (11:30 p.m.) 83,200 cfs (18.81 ft); Feb. 9 (12 m.) 79,600 cfs (18.23 ft).

\* Discharge measurement made on this day.

\* Expressed in thousands.

## North Santiam River at Detroit, Oreg.

Location.--Lat 44°43'30", long. 122°08'00", in NE $\frac{1}{4}$  sec. 12, T. 10 S., R. 5 E., on right bank 1 mile east of Detroit, 2 $\frac{1}{2}$  miles upstream from Breitenbush River, and 2 $\frac{1}{2}$  miles downstream from Boulder Creek.

Drainage area.--224 sq mi.

Records available.--January 1907 to July 1909, October 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,475.68 ft above mean sea level, datum of 1929. Jan. 24, 1907, to July 31, 1909, staff gage at site a quarter of a mile upstream at different datum. Oct. 1, 1928, to June 30, 1932, staff gage at site half a mile downstream at different datum.

Average discharge.--24 years (1907-8, 1928-51), 970 cfs.

Extremes.--Maximum discharge during year, 9,360 cfs Nov. 2 (gage height, 8.00 ft); minimum, 416 cfs Sept. 3 (gage height, 0.62 ft); minimum daily, 461 cfs Sept. 21, 22, 24, 1907-9, 1928-51; Maximum discharge, 20,300 cfs Dec. 28, 1945 (gage height, 11.24 ft); minimum, 254 cfs Oct. 7, 1940 (gage height, 0.15 ft).

Remarks.--Records good. No diversion above station. Slight diurnal fluctuation by power-plant at Idanha.

Revisions.--W 814: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Backwater from debris Aug. 19-30)

0.7	440	4.0	2,610
1.0	530	5.0	3,710
2.0	1,020	6.0	5,200
3.0	1,720	7.1	7,190

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	524	4,270	1,750	1,520	1,360	948	1,150	1,470	1,120	740	570	488
2	527	*7,070	1,580	1,790	1,520	918	1,180	1,400	1,100	715	566	485
3	622	4,220	1,710	1,770	1,670	906	1,330	1,400	1,100	710	562	485
4	678	3,080	3,210	1,610	1,890	924	1,600	1,580	1,120	705	554	485
5	954	2,510	3,110	1,450	2,690	894	1,720	1,640	1,120	686	554	485
6	*1,140	2,050	4,830	1,330	2,750	888	1,750	2,000	*1,080	674	558	479
7	1,030	1,780	5,250	1,230	3,680	858	1,810	2,180	1,040	658	562	488
8	1,020	1,790	3,440	1,170	4,340	864	1,810	1,970	1,010	650	566	485
9	996	1,550	2,750	1,140	3,520	830	1,800	1,910	1,010	650	562	479
10	825	1,420	2,380	1,140	3,310	800	1,760	2,010	1,040	642	550	479
11	750	1,280	2,310	1,140	4,900	780	1,750	2,260	1,040	634	542	473
12	690	1,230	2,220	1,080	4,080	795	1,880	2,030	1,040	638	530	473
13	654	1,130	1,940	1,200	3,110	*894	2,140	1,820	1,030	638	534	473
14	634	1,080	1,830	2,100	2,560	912	2,340	1,680	1,040	634	530	470
15	626	*1,130	1,810	2,260	2,220	1,350	2,320	1,610	1,080	630	530	473
16	618	1,440	1,830	2,050	1,940	1,470	2,280	1,670	1,040	626	530	473
17	820	1,840	1,740	2,210	1,780	1,270	2,270	1,820	990	626	530	473
18	1,020	1,690	1,630	1,830	1,640	1,180	2,140	1,800	954	626	527	470
19	1,110	1,470	1,620	1,620	1,500	1,140	1,960	1,700	912	*618	528	467
20	1,260	1,980	1,690	1,450	1,430	1,180	1,770	1,660	894	614	521	464
21	1,070	2,100	*1,550	2,000	1,350	1,230	1,570	1,690	876	606	521	461
22	936	1,870	1,640	1,890	1,250	1,200	1,450	1,790	864	602	518	461
23	846	1,700	1,870	1,910	1,180	1,160	1,380	1,910	840	606	515	464
24	790	2,360	1,680	2,670	1,150	1,130	1,380	1,940	830	602	512	461
25	835	2,620	1,540	2,690	1,100	1,130	*1,380	1,800	810	594	509	485
26	900	2,360	1,420	2,830	1,050	1,130	1,420	1,710	800	586	512	470
27	1,370	2,330	1,380	2,410	1,010	1,130	1,480	1,580	790	582	512	467
28	3,000	2,020	1,560	2,010	972	1,120	1,860	1,450	770	582	530	467
29	5,550	1,800	1,850	1,740	-	1,190	1,770	1,320	765	574	542	479
30	3,400	1,870	1,780	1,570	-	1,190	1,600	1,240	755	570	*508	634
31	2,480	-	1,640	*1,480	-	1,160	-	1,160	-	570	495	-
Total	37,675	65,020	66,540	54,270	60,952	32,571	52,050	53,200	28,860	19,588	16,580	14,399
Mean	1,215	2,167	2,146	1,751	2,177	1,051	1,735	1,716	962	632	535	480
Cfsm	5.42	9.67	9.58	7.82	9.72	4.69	7.75	7.66	4.29	2.82	2.39	2.14
In.	6.26	10.80	11.05	9.01	10.12	5.41	8.64	8.83	4.79	3.25	2.75	2.39
Ac-ft	74,730	129,000	132,000	107,600	120,900	64,600	103,200	105,500	57,240	38,850	32,890	28,560
(†)	1,221	2,112	2,082	1,640	2,096	1,016	1,669	1,700	958	640	529	490

Calendar year 1950: Max 7,070 Min 512 Mean 1,523 Cfsm 6.80 In. 92.29 Ac-ft 1,102,000  
Water year 1950-51: Max 7,070 Min 461 Mean 1,375 Cfsm 6.14 In. 83.30 Ac-ft 995,100

Peak discharge (base, 3,300 cfs).--Oct. 29 (2:30 a.m.) 6,560 cfs (6.78 ft); Nov. 2 (4 a.m.) 9,360 cfs (8.00 ft); Dec. 7 (5:30 a.m.) 6,490 cfs (6.72 ft); Feb. 7, 11 p.m. to 1 a.m. Feb. 8, 4,850 cfs (5.78 ft); Feb. 11 (12 m.) 5,410 cfs (6.13 ft).

\* Discharge measurement made on this day.

† Mean discharge for station below Boulder Creek near Detroit, which will replace present station when Detroit Reservoir fills.

## Breitenbush River above French Creek, near Detroit, Oreg.

Location.--Lat 44°45'00", long. 122°08'00", in NE $\frac{1}{4}$  sec. 36, T. 9 S., R. 5 E., on left bank 500 ft downstream from Canyon Creek,  $\frac{1}{2}$  miles upstream from French Creek, and 2 miles northeast (revised) of Detroit.

Drainage area.--108 sq mi.

Records available.--June 1932 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,559.64 ft above mean sea level, datum of 1929.

Average discharge.--19 years, 552 cfs.

Extremes.--Maximum discharge during year, 6,350 cfs Nov. 2 (gage height, 8.19 ft); minimum, 127 cfs Sept. 20, 21, 24, 25.  
1932-51: Maximum discharge, 11,600 cfs Dec. 28, 1945 (gage height, 11.86 ft); minimum, 87 cfs Sept. 2, 1940 (gage height, 0.36 ft).

Remarks.--Records good except those for periods of backwater from debris, which are fair. No diversion or regulation above station.

Revisions (water years).--W 1044: 1943(M).

Rating tables, water year 1950-51, except periods of backwater from debris (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-31

Nov. 1 to Sept. 30

1.0	160	4.0	1,580	0.8	127	3.0	1,010
1.5	290	5.0	2,400	1.0	163	5.0	2,800
2.0	470	6.0	3,500	1.5	295	7.0	4,830
3.0	940			2.0	480		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	178	3,180	968	840	616	379	660	630	436	358	182	152
2	178	*4,690	818	1,140	720	365	675	602	440	344	180	150
3	250	2,850	982	1,210	902	358	835	607	456	350	180	144
4	344	1,840	2,430	926	1,110	372	1,050	786	480	323	178	144
5	604	1,470	2,040	780	1,660	354	1,070	813	440	306	176	142
6	*770	1,090	3,710	720	1,740	344	1,050	992	*432	286	174	141
7	740	884	3,200	695	3,010	330	1,080	1,040	408	289	174	146
8	698	938	1,970	675	3,020	334	1,040	890	390	283	171	146
9	595	742	1,480	650	2,420	312	998	874	412	286	169	142
10	446	655	1,270	640	2,320	298	950	980	456	289	169	141
11	366	598	1,210	640	3,740	295	926	1,130	472	292	169	141
12	329	584	1,080	598	2,630	323	1,020	914	480	283	169	139
13	296	516	908	778	1,810	424	1,240	780	472	271	167	137
14	275	484	818	1,700	1,370	*489	1,380	680	502	259	165	134
15	269	*520	852	1,660	1,110	1,200	1,270	650	512	247	165	134
16	266	796	968	1,320	932	1,080	1,190	710	468	247	163	132
17	474	1,160	884	1,540	830	764	1,180	657	440	244	161	132
18	755	980	791	1,110	725	665	1,080	830	412	241	161	132
19	921	730	796	874	640	665	938	730	400	*230	159	130
20	994	1,240	835	774	616	700	813	710	390	219	157	130
21	676	1,380	736	1,480	594	764	690	730	390	216	155	130
22	538	1,240	*1,080	1,280	561	705	630	624	386	208	157	130
23	466	1,040	1,700	1,200	525	670	598	914	386	206	157	130
24	414	2,130	1,140	2,280	460	660	*594	896	393	206	155	130
25	458	2,140	902	2,050	468	665	594	796	372	203	155	152
26	478	1,700	786	2,080	436	665	620	730	376	198	154	141
27	892	1,580	715	1,550	412	660	670	675	379	196	154	136
28	2,450	1,250	908	1,100	393	655	890	594	365	194	174	134
29	3,460	1,010	1,210	800	-	680	802	516	368	186	171	150
30	1,830	1,060	1,130	700	-	680	665	480	365	186	*163	256
31	1,290	-	956	*630	-	670	-	444	-	182	157	-
Total	22,700	40,457	39,273	34,420	35,790	17,525	27,218	23,804	12,678	7,813	5,141	4,278
Mean	732	1,342	1,267	1,110	1,278	565	907	768	423	252	166	143
Cfsm	6.78	12.4	11.7	10.3	11.8	5.23	8.40	7.11	3.92	2.33	1.54	1.32
In.	7.82	13.86	13.52	11.85	12.32	6.03	9.37	8.20	4.37	2.69	1.77	1.47
Ac-ft	45,020	79,850	77,900	68,270	70,990	34,760	53,990	47,210	25,150	15,500	10,200	8,490

Peak discharge (base, 4,000 cfs).--Oct. 29 (1:30 a.m.) 4,700 cfs (6.92 ft); Nov. 2 (1 a.m.) 6,350 cfs (8.19 ft); Dec. 6 (11:30 a.m.) 4,150 cfs (6.43 ft); Feb. 11 (9:30 a.m.) 4,150 cfs (6.43 ft).

\* Discharge measurement made on this day.

Note.--Backwater from debris Jan. 24 to Feb. 4, Feb. 15 to Mar. 15.

## North Santiam River above Mayflower Creek, near Detroit, Oreg.

Location.--Lat 44°43'30", long. 122°15'10", in NW $\frac{1}{4}$  sec. 7, T. 10 S., R. 5 E., on left bank 1,600 ft downstream from axis of Detroit dam, 0.3 mile upstream from Mayflower Creek, and 5 miles west of Detroit.

Drainage area.--438 sq mi.

Records available.--October 1938 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,189.50 ft above mean sea level, datum of 1929. Prior to Oct. 4, 1939, staff gage at site 1,600 ft upstream at datum 10.50 ft higher. Oct. 4 to Nov. 16 1939, staff gage and Nov. 17, 1939, to Sept. 8, 1949, water-stage recorder at site 800 ft upstream at datum 2.70 ft higher.

Average discharge.--13 years, 2 090 cfs.

Extremes.--Maximum discharge during year 26,600 cfs Nov. 2 (gage height, 15.83 ft), from rating curve extended above 7,400 cfs by logarithmic plotting; minimum, 596 cfs Sept. 21, 22, 24.

1938-51: Maximum discharge, 41,200 cfs Dec. 28, 1945 (gage height, 18.20 ft, site and datum then in use), from rating curve extended above 18,000 cfs by logarithmic plotting; minimum, 410 cfs Oct. 25, 1942 (gage height, 2.87 ft, site and datum then in use); minimum daily, 432 cfs Sept. 1, 1940.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station. Slight diurnal fluctuation by powerplant at Idanha.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

4.8	600	9.0	5,600
5.0	710	11.0	10,000
6.0	1,440	14.1	19,600
7.0	2,490		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a700	9,330	3,710	3,000	*2,390	1,600	2,230	2,490	1,710	1,180	788	680
2	a700	19,300	3,170	4,100	a2,800	1,540	2,320	2,370	1,710	1,140	782	688
3	a800	10,400	3,620	4,380	a3,000	1,500	2,770	2,360	1,720	1,130	776	662
4	a1,200	6,960	3,460	3,440	a3,400	1,570	3,560	2,760	1,730	1,090	770	656
5	a1,700	5,490	7,310	2,920	a5,000	1,500	3,680	2,870	1,680	1,080	764	662
6	*2,770	4,360	10,800	2,610	a5,500	1,460	3,620	3,580	*1,630	1,040	764	656
7	2,480	3,600	11,300	2,360	a8,000	1,420	3,740	4,070	1,610	1,030	752	668
8	2,260	3,620	6,980	2,220	a10,000	1,430	3,640	3,460	1,540	985	758	674
9	2,150	3,070	5,260	2,130	a8,000	1,350	3,520	3,260	1,570	968	734	650
10	1,640	2,710	4,480	2,140	a7,500	1,300	3,340	3,470	1,640	974	734	650
11	1,420	2,480	4,330	2,200	a12,000	1,260	3,260	3,880	1,690	981	734	645
12	1,240	2,450	4,030	2,060	9,750	1,290	3,560	3,420	1,700	974	728	640
13	1,120	2,230	3,460	2,500	6,300	1,640	4,230	3,030	1,690	967	722	640
14	1,080	*2,130	3,140	5,740	4,910	*1,810	4,650	2,730	1,700	960	716	635
15	1,030	2,280	3,170	5,820	4,150	3,650	4,580	2,570	1,750	904	710	635
16	1,000	3,360	3,580	4,800	3,580	3,660	4,180	2,670	1,670	904	710	630
17	1,600	4,800	3,290	5,970	3,170	2,730	4,130	2,970	1,570	904	710	635
18	2,630	4,350	2,960	4,260	2,860	2,410	3,830	2,940	1,510	904	710	635
19	3,060	3,260	2,920	3,440	2,600	2,330	3,420	2,690	1,450	*860	704	620
20	3,440	4,910	*3,000	2,920	2,470	2,440	2,970	2,600	1,400	860	704	610
21	2,490	5,080	2,740	4,980	2,320	2,680	2,600	2,600	1,400	848	698	605
22	2,010	4,580	3,070	aa,000	2,190	2,530	2,390	2,800	1,360	848	692	605
23	1,730	3,890	4,380	aa,000	2,080	2,330	2,250	3,040	1,320	842	680	605
24	1,540	6,410	3,440	a6,500	1,960	2,240	*2,250	3,110	1,310	842	668	605
25	1,700	6,600	2,890	a6,500	1,880	2,240	2,240	2,740	1,260	830	656	662
26	1,840	5,460	2,650	a6,500	1,800	2,250	2,290	2,590	1,250	824	656	645
27	3,560	5,350	2,500	aa,600	1,700	2,240	2,450	2,410	1,240	818	656	625
28	8,000	4,410	3,030	a5,800	1,640	2,200	3,540	2,250	1,250	816	716	620
29	13,000	3,700	4,190	a3,200	-	2,390	3,140	2,020	1,200	812	758	650
30	*7,910	3,910	3,910	a2,900	-	2,430	2,740	1,890	1,190	800	*710	995
31	5,240	-	3,420	a2,700	-	2,270	-	1,770	-	788	698	-
Total	82,940	150,480	134,870	118,690	122,930	63,690	96,710	87,360	45,430	28,935	22,358	19,568
Mean	2,675	5,016	4,351	3,829	4,390	2,055	3,224	2,819	1,514	933	721	652
Cfs/m	6.11	11.5	9.93	8.74	10.02	4.69	7.36	6.44	3.46	2.13	1.65	1.49
In.	7.04	12.78	11.45	10.08	10.44	5.41	8.21	7.42	3.86	2.46	1.90	1.66
Ac-ft	164,500	298,500	287,500	235,400	243,600	126,300	191,800	173,300	90,110	57,390	44,350	36,810
Calendar year 1950:	Max 19,300	Min 700	Mean 3,169	Cfs/m 7.24	In. 98.19	Ac-ft 2,294,000						
Water year 1950-51:	Max 19,300	Min 605	Mean 2,668	Cfs/m 6.09	In. 82.70	Ac-ft 1,932,000						

Peak discharge (base, 10,000 cfs).--Oct. 29 (3 a.m.) 16,800 cfs (15.30 ft); Nov. 2 (2:30 a.m.) 26,600 cfs (15.83 ft); Dec. 7 (4:30 a.m.) 13,100 cfs (12.14 ft); Feb. 8 (time unknown) about 11,000 cfs; Feb. 11 (about 4 p.m.) 13,400 cfs (12.24 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations at Detroit and at Mehama.

## Little North Santiam River near Mehama, Oreg.

Location.--Lat 44°47'30", long. 122°34'40", in NW¼ sec. 16, T. 9 S., R. 2 E., on left bank 2 miles east of Mehama and 2 miles upstream from mouth.

Drainage area.--110 sq mi.

Records available.--October 1931 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 655.41 ft above mean sea level, datum of 1929. Oct. 1-26, 1931, staff gage at site 4 miles upstream at different datum. Oct. 27, 1931, to June 10, 1948, wire-weight gage at about present site at same datum.

Average discharge.--20 years, 753 cfs.

Extremes.--Maximum discharge during year, 10,800 cfs Nov. 2 (gage height, 11.18 ft); minimum, 23 cfs Sept. 20-22.

1931-51: Maximum discharge, 19,900 cfs Dec. 28, 1945 (gage height, 15.20 ft), from rating curve extended above 9,700 cfs by logarithmic plotting; minimum, 21 cfs Sept. 11, 1934, Sept. 27, 28, 1938, Sept. 1, 1940.

Revisions.--The figures of minimum discharge for water years 1949 and 1950 have been revised to 30 cfs Sept. 9, 14, 1949 (gage height, 2.44 ft) and 28 cfs Sept. 23, 24, 1950 (gage height, 2.41 ft), superseding those published in Water-Supply Papers 1154 and 1184, respectively.

Remarks.--Records good. No regulation or diversion above station.

Revisions (water years).--W 754: 1932. Revised figures of discharge for periods in water years 1934, 1938, 1949, and 1950 are given herewith. They supersede those published in Water-Supply Papers 769, 814, 1154 and 1184.

Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)
1933-34		1948-49		1948-49	
Feb. 17.....	240	Aug. 19.....	44	Sept. 12.....	38
18.....	225	20.....	43	13.....	32
		21.....	44	14.....	31
1935-36		22.....	41	15.....	128
Nov. 27.....	395	23.....	42		
May 24.....	905	24.....	40	1949-50	
		25.....	41	Sept. 9.....	39
1948-49		26.....	40	10.....	38
Aug. 2.....	74	27.....	38	11.....	37
4.....	70	28.....	37	12.....	34
5.....	67	29.....	36	13.....	33
6.....	65	30.....	35	14.....	33
7.....	65	31.....	37	15.....	33
8.....	68	Sept. 1.....	36	16.....	33
9.....	64	2.....	34	17.....	32
10.....	61	3.....	32	18.....	32
11.....	58	4.....	32	19.....	32
12.....	61	5.....	32	20.....	32
13.....	62	6.....	31	21.....	30
14.....	57	7.....	30	22.....	30
15.....	52	8.....	30	23.....	28
16.....	50	9.....	31	24.....	32
17.....	49	10.....	32		
18.....	46	11.....	36		

Month	Cfs-days	Maximum	Minimum	Mean	Per square mile	Runoff	
						Inches	Acres-feet
February 1934.....	8,881	580	166	317	2.88	3.00	17,620
Water year 1933-34.....	260,449	12,400	21	714	6.49	88.07	516,600
Calendar year 1934.....	256,512	7,790	21	703	6.39	86.80	508,800
November 1935.....	13,347	1,280	86	445	4.05	4.51	26,470
Calendar year 1935.....	180,287	2,400	24	494	4.49	60.94	357,600
May 1936.....	30,260	2,030	395	976	8.87	10.23	60,020
Water year 1935-36.....	241,953	9,960	27	661	6.01	81.84	479,900
Calendar year 1936.....	234,014	9,960	22	639	5.81	79.15	464,200
August 1949.....	1,636	77	35	52.8	.480	.55	3,240
September.....	3,075	756	30	102	.927	1.04	6,100
Water year 1948-49.....	265,126	6,070	30	726	6.60	89.63	525,900
Calendar year 1949.....	271,198	6,070	30	743	6.75	91.68	537,900
September 1950.....	2,037	388	28	67.9	.617	.69	4,040
Water year 1949-50.....	330,690	8,000	28	906	8.24	111.79	656,000

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28

Oct. 29 to Sept. 30

2.9	83	5.0	880	2.2	21	4.5	590
3.5	190	6.0	1,670	2.5	33	5.0	900
4.0	330	7.0	2,820	2.8	64	6.0	1,800
4.5	570	8.0	4,260	3.1	112	7.0	3,000
				3.5	204	9.0	6,300
				4.0	365		

## Little North Santiam River near Mehama, Oreg.-Continued

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	94	4,250	1,250	1,370	*657	362	765	681	288	77	32	28
2	84	*5,940	1,020	2,640	837	334	817	741	278	75	31	27
3	134	2,880	1,330	2,690	1,380	330	1,200	681	265	77	30	26
4	570	1,920	3,590	1,770	1,400	393	1,620	765	262	94	30	26
5	*1,140	1,510	2,610	1,380	2,340	389	1,440	765	*253	92	29	25
6	1,690	1,130	5,570	1,100	2,430	362	1,280	1,020	232	91	28	25
7	1,320	949	5,450	914	3,680	326	1,320	1,300	221	80	28	26
8	1,150	1,180	2,200	791	3,250	344	1,170	935	204	72	28	29
9	1,120	978	1,590	717	2,460	320	1,020	804	201	68	28	30
10	698	778	1,260	717	2,300	295	914	824	199	64	28	28
11	495	669	1,180	759	4,020	285	858	865	194	60	28	27
12	368	875	1,030	699	3,030	*381	970	900	191	57	28	27
13	298	806	865	1,450	2,020	1,130	1,270	1,040	183	56	27	26
14	259	*535	747	4,000	1,480	1,280	1,340	844	178	54	27	26
15	235	645	772	2,820	1,240	3,640	1,140	723	171	52	27	25
16	218	1,700	1,220	2,080	1,020	2,710	1,020	711	164	51	26	24
17	586	3,500	1,090	3,700	907	1,660	963	735	154	50	26	24
18	1,530	2,740	900	2,200	824	1,220	817	645	143	49	26	24
19	2,260	1,680	784	1,570	735	1,120	689	535	136	47	25	24
20	2,160	2,240	*723	1,160	711	1,340	550	486	128	*45	25	23
21	1,260	2,200	645	2,690	669	1,500	468	486	120	42	24	23
22	880	1,790	1,230	2,250	618	1,340	409	505	114	42	24	24
23	673	1,420	2,800	2,750	550	1,040	*377	759	112	40	24	24
24	542	3,360	1,500	5,220	515	928	377	851	107	40	24	26
25	698	2,580	1,040	3,320	486	928	397	628	103	38	24	46
26	1,010	1,890	844	3,420	445	956	429	535	98	38	25	47
27	1,450	1,860	765	2,200	405	893	463	463	94	37	25	31
28	3,900	1,440	1,500	1,540	377	817	865	409	89	34	28	31
29	5,200	1,070	2,440	1,120	-	921	900	362	84	34	49	38
30	3,140	1,180	2,000	907	-	956	711	326	80	33	39	342
31	2,180	-	1,640	753	-	830	-	306	-	32	*30	-
Total	37,340	55,275	49,585	60,677	40,786	29,310	26,539	21,830	5,046	1,721	873	1,152
Mean	1,205	1,842	1,600	1,957	1,457	945	865	698	168	55.5	28.2	38.4
Cfs/m	10.9	16.7	14.5	17.8	13.2	8.59	8.05	6.35	1.53	0.505	0.256	0.349
In.	12.62	18.69	16.76	20.51	13.79	9.91	8.97	7.31	1.71	0.58	0.30	0.39
Ac-ft	74,060	109,600	98,350	120,400	80,900	58,140	52,640	42,900	10,010	3,410	1,730	2,280
Calendar year 1950: Max	8,000	Min	28	Mean	1,085	Cfs/m	9.86	In.	133.89	Ac-ft	785,500	
Water year 1950-51: Max	5,940	Min	23	Mean	904	Cfs/m	8.22	In.	111.54	Ac-ft	654,400	

Peak discharge (base, 8,200 cfs).--Nov. 2 (12:30 a.m.) 10,800 cfs (11.18 ft).

\* Discharge measurement made on this day.

## North Santiam River at Mehama, Oreg.

Location.--Lat 44°47'20", long. 122°37'00", in NW $\frac{1}{4}$  sec. 18, T. 9 S., R. 2 E., on right bank 300 ft downstream from highway bridge and 0.5 mile downstream from Little North Santiam River.

Drainage area.--665 sq mi.

Records available.--July 1905 to March 1907, October 1910 to September 1914, September 1921 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 601.78 ft above mean sea level, datum of 1929. Prior to June 15, 1933, staff gage at site 100 ft upstream at same datum.

Average discharge.--35 years (1905-6, 1910-14, 1921-51), 3,252 cfs.

Extremes.--Maximum discharge during year, 43,300 cfs Nov. 2 (gage height, 11.51 ft); minimum, 594 cfs Sept. 21.  
1905-7, 1910-14, 1921-51: Maximum discharge, 76,600 cfs Dec. 28, 1945 (gage height, 15.37 ft), from rating curve extended above 36,000 cfs on basis of slope-area determination of peak flow; maximum gage height, 17.5 ft Nov. 20, 1921, Jan. 6, 1923, from floodmarks, at former site; minimum, 400 cfs Sept. 29, Oct. 13, 1934; minimum daily, 420 cfs Sept. 18, 1924.

Remarks.--Records excellent. Slight regulation at low flow caused by mill dam at Mill City. No diversion above station.

Revisions (water years).--W 634: Drainage area. W 739: 1922(M), 1923(M). W 1044: 1934-38, 1942(M), 1943.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.7	650	5.0	6,430
2.0	920	7.0	13,700
3.0	2,120	9.0	24,800
4.0	3,870	10.1	32,400

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	848	16,100	5,940	5,350	*3,720	2,380	3,600	3,660	2,220	1,320	866	749
2	839	32,200	4,940	8,110	4,270	2,270	3,700	3,600	2,160	1,260	857	740
3	1,090	15,900	5,270	9,430	5,970	2,240	4,690	3,460	2,140	1,230	848	740
4	1,940	10,300	13,500	6,730	6,430	2,530	6,110	3,940	2,180	1,230	848	731
5	*3,020	7,870	12,400	5,410	10,900	2,420	6,050	4,320	*2,150	1,240	830	722
6	4,860	6,080	19,300	4,570	10,400	2,350	5,790	5,300	2,080	1,210	830	722
7	4,090	4,890	18,300	3,980	15,100	2,210	5,940	2,030	1,980	1,140	821	731
8	3,680	5,140	11,600	3,600	17,000	2,270	5,830	5,540	1,880	1,120	812	740
9	3,850	4,390	8,460	3,350	13,100	2,180	5,330	4,890	1,850	1,100	812	731
10	2,640	3,680	6,910	3,310	11,900	2,020	5,040	5,040	1,910	1,100	812	722
11	2,120	3,290	6,340	3,440	19,200	1,940	4,840	5,570	1,950	1,090	803	704
12	1,830	3,290	5,970	3,250	17,200	2,210	5,300	5,170	1,950	1,090	794	695
13	1,610	*2,980	5,040	4,010	11,200	*3,740	6,280	4,920	1,920	1,070	784	695
14	1,480	2,810	4,500	12,200	8,400	4,180	6,870	4,320	1,900	1,050	785	686
15	1,440	3,270	4,530	11,100	7,060	9,940	6,580	3,850	1,970	1,030	785	686
16	1,330	6,520	5,440	8,630	5,910	8,940	6,080	3,870	1,880	1,010	785	686
17	2,210	11,900	4,920	13,400	5,250	5,850	6,000	4,270	1,760	1,000	776	677
18	4,670	9,820	4,480	8,900	4,770	4,690	5,440	4,180	1,700	1,010	758	677
19	5,940	6,520	4,200	6,550	4,270	4,410	4,770	3,740	1,640	990	758	677
20	7,030	8,600	*4,500	5,220	4,050	4,740	4,140	3,540	1,590	*940	758	668
21	4,460	8,870	3,850	10,700	3,830	5,250	3,320	3,480	1,570	940	758	668
22	3,350	7,710	4,530	9,790	3,500	4,790	3,180	3,680	1,540	911	749	650
23	2,770	6,280	7,970	9,680	3,250	4,180	*2,980	4,200	1,510	911	749	659
24	2,420	11,200	5,600	16,600	3,050	3,870	2,910	4,650	1,510	911	749	650
25	2,720	11,400	4,530	13,400	2,950	3,850	2,930	3,910	1,450	902	740	722
26	3,330	8,870	3,910	13,400	2,720	3,890	3,070	3,620	1,420	893	740	740
27	5,450	8,500	3,680	9,970	2,580	3,760	3,220	3,290	1,400	893	740	695
28	14,300	6,910	4,860	7,310	2,470	3,620	4,690	3,000	1,350	884	776	677
29	24,900	5,570	7,970	5,710	-	3,960	4,740	2,660	1,330	875	848	704
30	*15,100	5,880	7,150	4,790	-	4,110	4,090	2,480	1,320	866	812	1,240
31	9,900	-	6,280	4,160	-	3,790	-	2,330	-	866	*776	-
Total	145,217	246,720	216,670	235,990	210,430	118,560	143,610	127,510	53,210	32,082	24,569	21,575
Mean	4,684	8,224	6,989	7,613	7,515	3,625	4,787	4,113	1,774	1,035	793	719
Cfs/m	7.04	12.4	10.5	11.4	11.3	5.75	7.20	6.18	2.67	1.56	1.19	1.08
In.	8.12	13.80	12.12	13.20	11.77	6.63	8.03	7.13	2.98	1.79	1.37	1.21
Ac-ft	288,000	489,400	429,800	468,100	417,400	235,200	284,800	252,900	105,500	63,630	48,730	42,790
Calendar year 1950: Max	32,200	Min	749	Mean	4,964	Cfs/m	7.46	In.	101.34	Ac-ft	3,594,000	
Water year 1950-51: Max	32,200	Min	650	Mean	4,315	Cfs/m	6.49	In.	88.15	Ac-ft	3,126,000	

Peak discharge (base, 19,000 cfs).--Oct. 29 (6:30 a.m.) 29,800 cfs (9.75 ft); Nov. 2 (1 a.m.) 43,300 cfs (11.51 ft); Dec. 6 (1:30 p.m.) 23,800 cfs (8.85 ft); Feb. 7 (12 p.m.) 19,500 cfs (8.14 ft); Feb. 11 (6 p.m.) 22,700 cfs (8.68 ft).

\* Discharge measurement made on this day.

## South Santiam River below Cascadia, Oreg.

Location.--Lat 44°23'30", long. 122°30'35", in SE $\frac{1}{4}$  sec. 36, T. 13 S., R. 2 E., on right bank 100 ft downstream from bridge at Cascadia ranger station, half a mile downstream from Tollgate Creek, half a mile (revised) upstream from Deer Creek, and  $1\frac{1}{2}$  miles southwest of Cascadia. All records computed are for site at gaging cable 0.7 mile upstream, above Tollgate Creek.

Drainage area.--174 sq mi, at gaging cable.

Records available.--September 1935 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 759.38 ft above mean sea level, datum of 1929. Prior to Nov. 1, 1935, staff gage at same site and datum.

Average discharge.--16 years, 766 cfs.

Extremes.--Maximum discharge during year, 15,000 cfs Nov. 2 (gage height, 14.55 ft); minimum, 53 cfs Sept. 23 (gage height, 1.41 ft).  
1935-51: Maximum discharge, 23,400 cfs Dec. 28, 1945 (gage height, 18.65 ft), from rating curve extended above 12,000 cfs by logarithmic plotting; minimum, 23 cfs Dec. 1, 2, 1936 (gage height, 0.98 ft).

Remarks.--Records good. No diversion or regulation above station.

Cooperation.--Water-stage recorder inspected by employee of United States Forest Service.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.4	52	4.0	940
1.7	88	6.0	2,470
2.0	134	8.0	4,570
2.5	257	12.0	7,320
3.0	440	10.0	10,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	5,250	1,640	1,390	832	452	844	650	325	110	64	68
2	70	3,710	1,420	2,380	946	420	910	620	308	108	64	67
3	90	4,080	2,020	2,580	1,220	420	1,080	650	297	106	64	64
4	*400	2,520	5,120	1,770	1,800	496	1,370	730	294	114	63	63
5	822	1,810	3,460	1,350	3,870	512	1,270	814	*287	117	63	62
6	1,220	1,340	4,840	1,110	3,650	464	1,200	1,390	274	116	63	62
7	832	1,060	5,140	964	4,510	432	1,200	1,730	257	105	63	64
8	812	1,110	2,990	898	4,370	452	1,150	1,230	251	102	62	67
9	755	940	2,130	850	2,980	472	1,080	1,010	236	99	62	64
10	508	784	1,670	922	2,540	456	1,010	970	236	98	62	62
11	400	695	1,570	1,000	4,030	412	988	1,160	230	94	62	62
12	325	725	1,350	904	3,270	458	1,130	1,140	227	89	62	60
13	280	625	1,140	1,000	2,300	976	1,330	1,360	222	88	61	60
14	251	580	1,050	3,970	1,750	1,310	1,400	1,140	211	88	61	59
15	248	1,040	1,040	3,350	1,480	*3,200	1,350	946	203	87	60	58
16	236	2,410	1,060	2,510	1,240	2,560	1,240	892	193	85	60	56
17	610	3,740	946	4,520	1,090	1,570	1,150	880	176	*83	59	56
18	820	3,750	*892	2,750	982	1,200	1,010	790	169	80	59	56
19	874	2,180	*850	1,920	898	1,220	874	700	158	79	58	56
20	1,200	2,990	856	1,530	844	1,570	745	655	154	78	56	55
21	844	2,590	755	3,710	808	1,640	640	630	148	76	55	54
22	845	2,150	740	3,210	735	1,410	565	645	142	75	54	54
23	536	1,750	730	4,320	675	1,150	524	690	136	74	54	54
24	476	2,580	670	6,310	630	1,030	500	675	134	74	54	54
25	580	2,610	620	4,280	580	1,080	*496	560	131	73	54	65
26	710	2,130	590	3,860	540	1,150	516	520	127	71	54	75
27	1,940	1,990	590	2,670	508	1,030	540	480	124	70	54	67
28	6,690	1,590	1,310	1,910	472	946	892	436	119	69	65	63
29	9,710	1,300	2,300	1,440	-	1,060	850	392	116	68	*98	64
30	4,590	1,600	1,850	*1,160	-	1,040	705	360	112	67	84	132
31	2,630	-	1,690	946	-	916	-	332	-	65	74	-
Total	40,179	67,629	53,029	71,464	49,550	31,494	28,539	25,177	5,997	2,708	1,928	1,903
Mean	1,296	2,254	1,711	2,305	1,770	1,016	951	812	200	87.4	62.2	63.4
Cfsm	7.45	13.0	9.83	13.2	10.2	5.84	5.47	4.67	1.15	0.502	0.357	0.364
In.	8.59	14.45	11.33	15.27	10.59	6.73	6.10	5.38	1.28	0.58	0.41	0.41
Ac-ft	79,690	134,100	105,200	141,700	98,280	62,470	56,610	49,940	11,890	5,370	3,820	3,770

Peak discharge (base, 5,300 cfs).--Oct. 29 (6 to 7 a.m.) 11,700 cfs (12.71 ft); Nov. 2 (2 a.m.) 15,000 cfs (14.55 ft); Nov. 17 (10 p.m.) 5,890 cfs (9.00 ft); Dec. 4 (5 a.m.) 5,690 cfs (8.86 ft); Dec. 7 (5:30 a.m.) 6,410 cfs (9.37 ft); Jan. 17 (9 a.m.) 6,060 cfs (9.12 ft); Jan. 23 (11:30 p.m.) 7,810 cfs (10.32 ft); Feb. 7 (6 p.m.) 5,670 cfs (8.84 ft).

\* Discharge measurement made on this day.



Middle Santiam River at mouth, near Foster, Oreg.

Location.--Lat 44°25'25", long. 122°37'20", in NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 24, T. 13 S., R. 1 E., on right bank half a mile upstream from mouth and  $2\frac{1}{2}$  miles northeast of Foster.

Drainage area.--287 sq mi.

Records available.--January to September 1951.

Gage.--Staff gage read twice daily. Datum of gage is 562.14 ft above mean sea level, datum of 1929 (Corps of Engineers benchmark).

Extremes.--Maximum discharge during period, 14,600 cfs Jan. 24 (gage height, 13.5 ft, from graph based on gage readings); minimum, 72 cfs Sept. 22-24 (gage height, 0.77 ft). For flood of Dec. 28, 1945, flow of 41,800 cfs occurred at former station upstream where drainage area is 6 per cent smaller.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No Regulation or diversions above station.

Rating table, Jan. 1 to Sept. 30, 1951 (gage height, in feet, and discharge, in cubic feet per second)

0.7	65	3.0	373	7.0	2,420
1.0	95	4.0	590	9.0	5,050
1.5	153	5.0	940	11.0	8,800
2.0	219	6.0	1,500	13.0	13,300

Discharge, in cubic feet per second, January to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				a2,800	1,660	872	1,750	1,450	572	227	128	109
2				a4,800	1,840	824	1,820	1,490	552	225	126	101
3				a5,000	2,680	776	2,520	1,400	545	222	126	96
4				a3,600	3,110	940	3,200	1,510	525	236	123	94
5				a2,700	6,780	924	2,690	1,700	522	244	121	93
6				a2,200	6,560	844	2,520	2,420	a500	236	116	91
7				a1,900	8,600	774	2,680	3,150	a480	222	116	99
8				a1,700	8,390	760	2,530	2,260	a460	212	114	105
9				a1,600	5,650	750	2,360	1,860	a440	205	113	97
10				1,750	5,050	a720	2,200	1,790	a420	197	112	92
11				1,990	9,900	a700	2,160	1,920	a420	169	109	89
12				1,730	7,200	a800	2,320	2,010	410	186	109	87
13				2,000	4,630	1,640	2,730	2,630	396	182	107	85
14				9,020	3,340	1,900	2,850	2,090	380	179	105	83
15				6,610	2,850	5,570	2,600	1,780	373	176	105	81
16				4,770	2,390	4,910	2,430	1,650	358	174	103	80
17				9,680	2,150	2,920	2,200	1,630	339	171	102	79
18				5,500	1,940	2,160	1,950	1,490	329	167	99	77
19				3,550	1,730	2,130	1,680	1,310	316	163	99	75
20				2,750	1,650	2,630	1,480	1,200	307	161	97	74
21				7,370	1,560	2,910	1,280	1,160	298	157	94	73
22				5,810	1,430	2,560	1,140	1,180	289	154	95	75
23				7,070	1,320	2,110	1,050	1,260	286	150	91	72
24				12,500	1,220	1,890	1,020	1,290	276	150	91	72
25				8,180	1,140	2,050	1,010	1,080	268	146	89	109
26				7,740	1,060	2,050	1,060	1,000	260	145	89	129
27				5,010	990	1,940	1,090	916	256	141	87	99
28				3,540	928	1,820	1,930	813	247	138	*115	87
29				2,750	-	2,160	1,790	708	239	136	179	96
30				2,240	-	2,190	1,600	659	233	134	a140	440
31				1,670	-	1,880	-	614	-	130	121	-
Total				139,710	97,948	57,106	59,940	47,400	11,296	5,557	3,419	3,039
Mean				4,507	3,498	1,842	1,998	1,529	377	179	110	101
Cfs/m				15.7	12.2	6.42	6.96	5.33	1.31	0.624	0.383	0.352
In.				18.10	12.69	7.40	7.77	6.14	1.46	0.72	0.44	0.39
Ac-ft				277,100	194,300	113,500	118,900	94,020	22,410	11,020	6,780	6,030

Calendar year	: Max	Min	Mean	Cfs/m	In.	Ac-ft
Water year	: Max	Min	Mean	Cfs/m	In.	Ac-ft

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for South Santiam River below Cascadia and at Waterloo.

## WILLAMETTE RIVER BASIN

Wiley Creek near Foster, Oreg.

Location.--Lat 44°22'20", long. 122°37'20", in NE¼ sec. 12, T.14 S., R.1 E., on right bank 0.4 mile downstream from Little Wiley Creek and 3½ miles southeast of Foster.

Drainage area.--52 sq mi, approximately.

Records available.--October 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 718.08 ft above mean sea level (Corps of Engineers benchmark).

Extremes.--Maximum discharge during year, 3,630 cfs Oct. 29 (gage height, 6.21 ft); minimum, 7.4 cfs Sept. 21, 22 (gage height, 0.75 ft).  
1947-51: Maximum discharge, 5,410 cfs Jan. 7, 1948 (gage height, 7.52 ft); minimum, 6.9 cfs Sept. 4, 5, 1949.

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Jan. 17 to Feb. 6)

Oct. 1-28				Oct. 29 to Sept. 30			
0.9	14	2.4	365	0.7	5.6	2.0	230
1.2	39	3.0	650	.8	10	3.0	680
1.5	82	4.0	1,340	1.0	23	4.0	1,350
1.9	180	5.0	2,240	1.2	44	5.0	2,240
				1.5	92	6.0	3,360

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	1,080	440	318	206	128	237	126	60	20	12	12
2	16	1,120	400	739	237	119	237	122	55	20	12	12
3	41	892	560	808	289	119	289	119	55	20	12	11
4	*92	605	1,110	550	469	198	336	124	*52	22	12	11
5	206	458	772	422	904	202	310	160	51	23	12	10
6	270	354	1,020	341	796	160	285	292	50	23	12	10
7	143	289	1,100	289	970	a150	273	341	48	22	11	11
8	208	281	710	258	928	a210	254	248	45	20	11	13
9	186	237	516	240	680	a200	234	195	43	19	11	11
10	120	206	404	262	590	a160	216	168	42	18	11	11
11	92	189	359	323	1,020	a150	206	206	40	18	11	11
12	75	192	293	289	760	a170	216	244	39	17	11	10
13	65	185	258	297	550	a340	220	364	39	16	11	9.4
14	84	162	240	1,030	431	a420	212	285	37	18	11	9.4
15	67	550	240	828	366	a950	195	234	36	16	11	8.6
16	65	*1,220	258	725	332	*730	180	195	34	15	10	8.5
17	251	1,680	237	1,820	297	476	157	171	33	*15	10	8.4
18	297	1,530	*206	874	281	377	142	149	31	15	9.4	8.4
19	369	790	195	560	251	372	126	134	30	15	9.4	8.4
20	459	952	183	454	244	444	114	119	29	15	8.9	7.5
21	305	748	168	1,120	230	462	103	110	29	14	8.9	7.9
22	212	610	162	928	202	400	94	99	28	14	8.9	7.4
23	166	503	149	1,200	186	328	87	105	27	14	8.9	7.9
24	138	615	139	1,570	174	297	82	103	26	14	8.9	7.9
25	177	585	129	1,030	162	310	79	88	26	14	8.9	16
26	209	472	124	868	149	323	78	81	24	14	8.9	17
27	608	440	129	624	142	297	*79	78	24	14	8.9	12
28	2,110	354	283	458	132	281	132	72	23	13	14	11
29	2,950	310	481	*346	-	310	147	68	22	13	*26	12
30	1,480	400	436	281	-	289	139	64	21	12	16	56
31	656	-	416	237	-	254	-	63	-	12	14	-
Total	12,311	18,589	12,119	20,087	11,998	9,624	5,459	4,927	1,099	513	353.0	357.8
Mean	397	620	391	648	428	310	182	159	36.6	16.5	11.4	11.9
Cfsm	7.63	11.9	7.52	12.5	8.23	5.96	3.50	3.06	0.704	0.317	0.219	0.229
In.	8.80	13.29	8.67	14.37	8.58	6.88	3.90	3.52	0.79	0.37	0.25	0.26
Ac-ft	24,420	36,870	24,040	39,840	23,800	19,090	10,830	9,770	2,180	1,020	700	710

Calendar year 1950: Max 2,950 Min 11 Mean 310 Cfsm 5.96 In. 80.96 Ac-ft 224,600  
Water year 1950-51: Max 2,950 Min 7.4 Mean 267 Cfsm 5.13 In. 69.68 Ac-ft 193,300

Peak discharge (base, 1,400 cfs).--Oct. 29 (7:30 a.m.) 3,630 cfs (6.21 ft); Nov. 2 (1:30 a.m.) 2,340 cfs (5.16 ft); Nov. 17 (9 p.m.) 2,760 cfs (5.49 ft); Jan. 17 (8 a.m.) 2,800 cfs (5.53 ft); Jan. 21 (12 m.) 1,670 cfs (4.39 ft); Jan. 23 (9 p.m.) 2,120 cfs (4.88 ft); Mar. 15 (about 8 p.m.) 1,450 cfs (4.13 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for Calapooia River at Holley and Mohawk River near Springfield.

## South Santiam River at Waterloo, Oreg.

Location.--Lat 44°29'55", long. 122°49'20", in NW $\frac{1}{4}$  sec. 28, T. 12 S., R. 1 W., on left bank 600 ft downstream from bridge at Waterloo and 2 miles (revised) upstream from Hamilton Creek.

Drainage area.--640 sq mi, approximately.

Records available.--July 1905 to March 1907, October 1910 to December 1911, July 1923 to September 1951. January to December 1911, gage heights only.

Gage.--Water-stage recorder. Datum of gage is 370.39 ft above mean sea level, datum of 1929. Prior to Dec. 31, 1911, staff gage at site half a mile downstream at datum about 5.0 ft lower. July 1, 1923, to Nov. 12, 1934, staff gage at present site and datum.

Average discharge.--29 years (1905-6, 1923-51), 2,798 cfs.

Extremes.--Maximum discharge during year, 45,500 cfs Nov. 2 (gage height, 16.71 ft); minimum, 120 cfs Sept. 21 (gage height, 1.86 ft).  
1905-7, 1910-11, 1923-51: Maximum discharge, 74,200 cfs Dec. 28, 1945 (gage height, 22.85 ft), from rating curve extended above 37,000 cfs; minimum, 96 cfs Sept. 1, 2, 1940.

Remarks.--Records good. No diversion or regulation above station. Some diurnal fluctuation caused by numerous log ponds above station.

Cooperation.--Gage-height record collected in cooperation with United States Weather Bureau.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 10				Feb. 11 to Sept. 30			
2.3	241	5.0	3,500	1.8	105	4.0	1,920
2.6	392	6.0	5,650	2.0	160	5.0	3,700
3.0	680	8.0	11,400	2.5	370	6.0	6,060
3.5	1,200	11.0	21,700	3.0	720	7.0	8,800
4.0	1,850	14.0	33,800	3.5	1,240	9.0	15,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	264	13,200	5,850	5,000	3,350	1,880	3,290	2,480	1,110	394	230	198
2	250	33,600	5,090	8,080	3,420	1,770	3,250	2,480	1,050	394	226	178
3	331	14,700	5,780	10,800	4,820	1,700	4,010	2,380	1,020	400	218	169
4	*1,140	9,130	17,700	7,050	5,320	2,280	5,260	2,570	*990	406	214	163
5	2,050	6,590	12,700	5,460	13,400	2,550	5,020	3,020	960	436	210	160
6	3,890	5,020	17,400	4,490	11,400	2,200	4,580	3,800	930	436	206	157
7	3,090	4,090	18,000	3,870	13,600	1,980	4,580	6,190	890	412	198	163
8	2,440	4,010	10,800	3,440	15,000	2,300	4,360	4,430	830	382	190	175
9	3,040	3,580	7,550	3,180	10,200	2,380	4,050	3,600	801	360	190	172
10	1,860	3,040	5,880	3,170	9,700	2,020	3,800	3,330	774	350	190	163
11	1,360	2,680	5,180	3,650	14,900	1,880	3,620	3,640	756	335	190	157
12	1,080	2,640	4,800	3,440	13,500	2,070	3,840	3,760	747	316	194	151
13	880	2,360	4,110	3,350	9,580	4,050	4,520	5,040	738	311	190	148
14	770	2,240	3,690	14,200	7,850	5,140	4,820	4,250	696	306	187	145
15	752	3,650	3,580	12,700	5,620	*10,600	4,560	3,520	672	302	181	142
16	680	9,280	4,050	9,130	4,800	10,700	4,210	3,200	640	*302	181	136
17	1,670	*13,200	3,830	17,500	4,410	6,560	3,990	3,080	608	298	178	136
18	3,600	15,000	3,390	11,400	4,210	4,970	3,540	2,840	584	298	175	133
19	4,260	8,290	*3,090	7,740	5,620	4,540	3,060	2,460	560	293	172	135
20	6,150	9,490	3,060	5,720	3,460	5,280	2,700	2,260	532	286	169	130
21	3,690	9,010	2,730	12,000	3,390	5,750	2,350	2,130	518	284	166	122
22	2,630	7,600	2,780	12,400	3,080	5,280	2,020	2,070	504	275	163	122
23	2,050	6,120	3,350	12,400	2,840	4,340	1,840	2,180	490	270	157	125
24	1,720	9,320	2,930	22,200	2,610	3,680	1,770	2,400	472	270	157	128
25	1,820	9,820	2,580	14,600	2,500	3,900	1,720	2,000	460	266	157	145
26	2,730	7,490	2,310	13,500	2,260	4,120	1,780	1,940	454	262	157	214
27	4,980	6,860	2,280	9,730	2,100	3,840	*1,810	1,740	442	252	157	198
28	19,300	5,600	4,010	7,080	1,960	3,540	2,690	1,500	436	252	*175	169
29	32,800	4,660	8,530	5,340	-	3,820	3,330	1,370	412	248	284	169
30	17,100	5,130	6,700	*4,470	-	3,990	2,860	1,240	406	239	306	296
31	10,400	-	5,980	3,790	-	3,580	-	1,170	-	230	234	-
Total	138,757	237,400	189,710	260,880	182,900	122,890	103,430	87,860	20,482	9,867	6,002	4,799
Mean	4,476	7,913	6,120	8,415	6,532	3,964	3,448	2,834	683	318	194	160
Cfsm	6.99	12.4	9.58	13.1	10.2	6.19	5.39	4.45	1.07	0.497	0.303	0.250
In.	8.06	13.80	11.02	15.16	10.63	7.14	6.01	5.11	1.19	0.57	0.35	0.28
Ac-ft	275,200	470,900	376,300	517,400	362,800	243,700	205,200	174,300	40,630	19,570	11,900	9,520

Calendar year 1950: Max 33,600 Min 167 Mean 4,406 Cfsm 6.88 In. 93.43 Ac-ft 3,189,000  
Water year 1950-51: Max 33,600 Min 122 Mean 3,740 Cfsm 5.84 In. 79.32 Ac-ft 2,707,000

Peak discharge (base, 21,000 cfs).--Oct. 29 (9 a.m.) 37,400 cfs (14.83 ft); Nov. 2 (5:30 a.m.) 45,500 cfs (16.71 ft); Nov. 18 (12:30 a.m.) 21,500 cfs (10.95 ft); Dec. 7 (about 6 a.m.) 22,800 cfs (11.3 ft); Jan. 17 (12:30 p.m.) 24,400 cfs (11.71 ft); Jan. 24 (4 a.m.) 24,500 cfs (11.74 ft).

\* Discharge measurement made on this day.

## Albany power canal near Lebanon, Oreg.

Location.--Lat 44°33'10" (revised), long. 122°54'20", in SW $\frac{1}{4}$  sec. 2, T. 12 S., R. 2 W., on left bank an eighth of a mile downstream from spillway and 1 mile north of Lebanon.

Records available.--April 1926 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 322.90 ft above mean sea level, datum of 1929. Prior to June 24, 1938, staff gage at same site and datum.

Average discharge.--25 years, 216 cfs.

Extremes.--1926-51: Maximum daily discharge, 332 cfs Dec. 29, 1936; minimum daily, 10 cfs Apr. 29 to May 4, 1926, July 29, 30, 1927, Oct. 17-28, 1928.

Remarks.--Records good except those for periods of backwater from debris and those for January, which are fair. Canal diverts from South Santiam River at Lebanon and discharges into Calapooya River at mouth. Lebanon ditch discharges into canal just below canal intake. Water is used for power and water supply at Albany.

Cooperation.--Recorder inspected by employee of Mountain States Power Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	116	197	172	176	188	123	172	165	146	140	82	111
2	122	213	181	161	198	115	166	165	148	142	80	104
3	129	213	213	192	220	207	187	158	156	145	80	105
4	145	224	170	143	166	148	211	165	*153	149	76	90
5	*181	224	161	137	162	173	218	187	151	154	81	83
6	225	225	174	137	201	156	208	200	150	155	75	81
7	212	221	175	137	217	142	203	240	150	151	74	86
8	198	216	182	134	221	130	197	218	140	140	72	86
9	208	212	164	135	209	132	194	201	137	135	74	100
10	183	205	193	151	187	146	188	193	130	129	74	93
11	165	203	205	187	150	133	177	199	132	124	74	88
12	148	202	201	194	189	*140	174	203	153	123	79	81
13	133	195	192	210	214	169	189	224	151	149	78	75
14	127	194	189	186	208	174	196	223	147	150	71	75
15	125	188	188	121	204	180	192	220	142	149	70	73
16	116	74	199	143	205	166	182	208	136	*146	69	70
17	153	*37	195	117	206	169	192	203	130	139	69	70
18	210	133	188	119	205	167	197	195	133	138	67	66
19	221	191	*184	135	197	185	187	177	143	137	69	81
20	239	194	184	166	183	206	171	159	140	134	65	56
21	211	192	175	177	189	216	148	145	144	129	64	52
22	187	188	175	158	184	203	128	142	148	129	64	56
23	182	178	185	146	176	192	110	148	148	120	64	56
24	185	190	178	166	170	185	103	166	147	116	62	54
25	181	194	172	209	168	180	97	135	146	105	63	59
26	211	185	164	214	156	185	98	118	146	96	66	66
27	205	182	161	235	144	187	*100	108	145	93	64	67
28	174	177	180	238	133	178	167	108	143	90	*75	60
29	125	170	211	*211	-	180	196	120	142	92	107	61
30	140	158	202	208	-	184	182	138	139	87	123	70
31	189	-	190	202	-	179	-	135	-	82	113	-
Total	5,344	5,553	5,683	5,183	5,270	5,130	5,130	5,362	4,318	3,968	2,344	2,265
Mean	172	185	183	167	188	165	171	173	144	128	75.6	75.5
Ac-ft	10,600	11,010	11,270	10,280	10,450	10,180	10,180	10,640	8,560	7,870	4,650	4,490
Calendar year 1950: Max	269			Min 37		Mean 188		Ac-ft 135,900				
Water year 1950-51: Max	240				Min 37	Mean 152		Ac-ft 110,200				

\* Discharge measurement made on this day.

Note.--Backwater from debris July 26 to Aug. 30.

## Santiam River at Jefferson, Oreg.

Location.--Lat 44°42'55", long. 123°00'40", in SE $\frac{1}{4}$  sec. 11, T. 10 S., R. 3 W., on right bank 350 ft upstream from railroad bridge at Jefferson, 2 miles downstream from confluence of North Santiam and South Santiam Rivers, and 9 miles upstream from mouth.

Drainage area.--1,790 sq mi., approximately.

Records available.--October 1905 to June 1906 (gage heights and discharge measurements only), October 1907 to September 1916, and October 1939 to September 1951 in reports of Geological Survey. Gage-height records collected at same site since April 1904 are contained in reports of United States Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 199.63 ft above mean sea level, datum of 1929. Oct. 8, 1905, to June 30, 1906, Oct. 1, 1907, to May 14, 1908, July 1, 1914, to Sept. 30, 1916, Oct. 1, 1939, to Sept. 21, 1940, staff gage at site 350 ft downstream, and May 15, 1908, to June 30, 1914, staff gage at site 150 ft downstream, all at datum 3.00 ft higher.

Average discharge.--21 years (1907-16, 1939-51), 7,549 cfs.

Extremes.--Maximum discharge during year, 92,200 cfs Nov. 2 (gage height, 19.88 ft); minimum, 555 cfs Sept. 22, '23 (gage height, 2.15 ft).

1905-6, 1907-16, 1939-51: Maximum discharge observed, 161,000 cfs Nov. 22, 1909 (gage height, 18.2 ft, from floodmark, site and datum then in use; corresponding gage height at present site, 23.0 ft from curve of relation), from curve of relation between gages based on reading from 1940 to 1945, and rating curve for gage at present site extended above 140,000 cfs; minimum observed, 260 cfs Aug. 15-22, Aug. 24 to Sept. 2, 1940 (gage height, 1.00 ft, site and datum then in use).

Maximum discharge known, about 202,000 cfs Nov. 21, 1921 (gage height, 19.5 ft at railroad bridge 350 ft downstream, site and datum in use prior to Oct. 1, 1940; corresponding gage height at present site, 24.4 ft from curve of relation).

Remarks.--Records excellent. Salem Canal diverts from North Santiam River at Stayton for irrigation and power use; most of this water reaches Willamette River through Mill Creek at Salem. Stayton Canal diverts from North Santiam River at Stayton for irrigation of lands near West Stayton; some return flow reaches North Santiam River above station. Albany power canal diverts from South Santiam River at Lebanon; return flow reaches Willamette River at Albany. No regulation.

Revisions (water years).--W 904: Drainage area. W 1094: 1908, 1910, 1912, 1922(M), 1943.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 6

Dec. 7 to Sept. 30

2.9	990	12.0	27,100
4.0	2,230	15.0	45,800
6.0	5,770	19.0	80,400
9.0	14,200		

2.1	530	9.0	14,800
3.0	1,230	12.0	27,100
4.0	2,420	15.5	49,600
6.0	6,260		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,060	27,400	*15,800	14,200	9,510	*5,360	8,300	6,860	3,550	1,300	712	680
2	1,010	74,500	15,800	18,100	9,460	5,110	8,110	6,870	3,350	1,350	696	634
3	1,140	45,400	15,700	30,100	13,000	4,850	9,160	6,380	3,240	1,330	696	616
4	2,230	27,100	30,800	21,300	13,600	6,500	11,600	6,640	3,190	1,280	688	610
5	4,470	19,300	34,000	16,300	27,600	7,650	12,400	7,650	3,150	1,240	688	598
6	8,640	15,000	39,300	13,200	26,600	6,890	11,600	8,380	3,030	1,230	672	598
7	8,670	12,100	49,200	11,300	31,000	6,360	11,600	14,400	2,870	1,180	664	616
8	6,850	11,200	31,700	10,100	39,800	8,300	11,400	11,700	2,700	1,130	664	634
9	8,770	10,400	22,600	*9,190	29,300	8,810	10,700	9,670	2,580	1,100	672	634
10	5,970	8,750	17,900	9,160	25,300	6,840	*10,000	9,000	2,550	1,080	680	622
11	*4,490	7,620	15,700	9,730	35,000	6,080	9,510	9,380	2,580	1,040	704	616
12	5,580	7,290	14,500	9,400	39,500	6,600	9,760	9,810	2,530	1,010	680	804
13	3,040	6,710	12,300	8,860	26,500	11,400	11,200	10,900	2,530	*999	640	598
14	2,710	6,230	11,100	27,700	19,900	13,100	12,300	10,100	2,420	956	*622	586
15	2,560	7,950	10,800	31,600	16,700	19,000	12,100	8,620	2,390	948	616	580
16	2,390	24,400	12,600	24,800	14,300	29,000	11,200	7,910	2,330	922	610	575
17	3,120	32,100	12,300	38,200	12,700	18,000	10,800	7,910	2,190	914	610	575
18	8,340	44,800	10,900	33,100	12,200	13,500	9,940	7,750	2,080	880	604	570
19	10,800	25,000	9,920	25,100	10,700	11,800	8,890	6,960	1,950	872	586	570
20	17,400	23,000	9,760	17,400	10,100	12,000	7,800	6,380	1,890	856	586	570
21	11,800	24,000	8,940	26,400	9,570	13,200	6,760	6,030	1,830	832	560	560
22	8,320	20,500	8,700	33,600	8,810	12,900	5,960	*6,010	1,770	808	580	555
23	6,520	16,300	13,000	27,400	8,010	11,000	5,460	6,400	1,720	800	580	555
24	5,480	21,000	11,100	49,000	7,360	9,840	5,190	7,590	1,660	792	580	560
25	5,500	27,600	9,400	39,300	7,120	9,540	5,110	6,640	1,580	784	575	*586
26	7,570	21,800	8,270	33,500	6,600	9,590	5,170	5,940	1,520	776	565	640
27	10,700	19,000	7,930	26,700	6,080	9,300	5,300	5,460	1,440	760	565	672
28	30,300	16,600	9,220	20,000	5,700	8,730	7,020	5,010	1,400	752	592	664
29	69,100	13,600	20,300	15,100	-	8,860	8,920	4,500	1,360	752	648	672
30	54,100	14,100	18,400	12,500	-	9,670	7,880	4,030	1,320	728	728	776
31	31,100	-	16,800	10,800	-	9,050	-	3,770	-	720	720	-

Total	347,720	630,750	520,740	671,140	482,020	318,730	271,140	234,450	68,700	30,121	19,803	18,326
Mean	11,220	21,020	16,800	21,650	17,220	10,280	9,038	7,563	2,290	972	639	611
Ac-ft	689,700	*1,251	*1,033	*1,531	956,100	632,200	537,800	465,000	136,300	59,740	39,280	36,350

Calendar year 1950:	Max	82,300	Min	760	Mean	11,650	Ac-ft	8,432,000
Water year 1950-51:	Max	74,500	Min	555	Mean	9,900	Ac-ft	7,167,000

Peak discharge (base, 39,000 cfs).--Oct. 29 (5 p.m.) 79,100 cfs (18.89 ft); Nov. 2 (2:30 p.m.) 92,200 cfs (19.88 ft); Nov. 18 (4 a.m.) 52,900 cfs (15.92 ft); Dec. 6 (11 p.m.) 54,700 cfs (16.15 ft); Jan. 17 (7:30 p.m.) 49,300 cfs (15.47 ft); Jan. 21 (11 p.m.) 40,900 cfs (14.32 ft); Jan. 24 (2 p.m.) 53,000 cfs (15.94 ft); Feb. 8 (6 a.m.) 43,000 cfs (14.62 ft); Feb. 12 (12:30 a.m.) 47,100 cfs (15.17 ft).

\* Discharge measurement made on this day.

\* Expressed in thousands.

## Luckiamute River near Hoskins, Oreg.

Location.--Lat 44°43'10", long. 123°30'10", in NE $\frac{1}{4}$  sec. 11, T. 10 S., R. 7 W., on right bank a quarter of a mile downstream from Benton County line and  $3\frac{1}{2}$  miles northwest of Hoskins.

Drainage area.--34 sq mi, approximately.

Records available.--May 1934 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 378.7 ft above mean sea level (river-profile survey).

Average discharge.--17 years, 202 cfs.

Extremes.--Maximum discharge during year, 2,770 cfs Jan. 17 (gage height, 8.42 ft); minimum, 7.3 cfs Sept. 13-16, 18-23.

1934-51: Maximum discharge, 5,560 cfs Dec. 14, 1946, Feb. 17, 1949; maximum gage height, 13.22 ft Dec. 14, 1946; minimum discharge, 7 cfs Sept. 2-5, 10, 21, 22, 1934.

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or regulation above station; log ponds upstream cause diurnal fluctuation at times.

Revisions (water years).--W 834: 1936(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Aug. 31					Sept. 1-30	
1.2	7.4	3.0	400		1.2	4.8
1.3	15	5.0	1,130		1.3	12
1.6	52	8.0	2,560		1.4	21
2.0	127				1.7	61
					2.1	140

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	883	570	a500	296	172	274	132	63	24	14	8.0
2	12	1,270	514	a900	367	157	251	123	62	25	14	8.0
3	36	696	522	al,100	504	179	240	132	60	25	14	8.0
4	49	478	728	a900	500	313	*227	112	58	26	13	8.7
5	116	340	700	a700	487	323	208	104	58	26	13	8.7
6	116	293	1,180	a500	525	285	192	110	57	33	13	*8.7
7	148	262	1,050	a420	756	243	174	108	54	26	13	19
8	94	232	749	a580	774	238	162	100	52	24	13	16
9	72	197	570	a320	634	205	150	94	49	23	13	10
10	90	172	448	*310	634	187	141	92	46	22	13	8.0
11	108	155	394	349	790	174	132	96	45	20	13	8.0
12	79	143	337	334	658	313	125	197	44	19	12	8.0
13	62	129	296	484	528	616	116	382	42	19	12	8.0
14	57	134	288	518	453	553	110	296	41	19	12	7.3
15	54	487	412	998	376	978	106	238	39	20	11	7.3
16	51	1,400	894	1,170	319	898	100	*192	38	20	11	7.3
17	*57	1,980	682	2,260	325	606	92	169	34	20	10	8.0
18	127	*1,270	504	1,210	337	463	90	150	33	20	9.4	8.0
19	211	735	427	822	*325	424	86	132	33	20	9.4	7.3
20	184	700	343	648	430	403	82	119	32	20	9.4	7.3
21	129	665	307	1,540	385	418	79	106	*32	19	8.7	7.3
22	100	546	884	1,400	340	415	75	100	30	19	8.0	7.3
23	86	463	1,430	1,250	296	367	73	116	28	*18	8.0	8.0
24	73	654	a750	1,520	271	337	70	100	27	18	8.0	8.7
25	86	644	a500	1,230	251	316	68	96	27	17	8.0	20
26	123	532	a440	998	219	302	66	84	26	17	8.0	15
27	394	511	a400	749	197	285	93	81	25	16	8.0	9.4
28	786	430	a700	578	187	265	219	75	25	16	11	15
29	728	373	a700	466	-	285	152	72	25	16	14	34
30	564	*484	a650	388	-	322	129	68	25	15	10	138
31	528	-	a550	337	-	302	-	66	-	15	8.7	-
Total	5,332	17,258	18,919	25,679	12,144	11,349	4,077	4,040	1,210	637	342.6	442.3
Mean	172	575	610	828	434	366	136	130	40.3	20.5	11.1	14.7
Cfsm	5.06	16.9	17.9	24.4	12.8	10.8	4.00	3.82	1.19	0.603	0.326	0.432
In.	5.33	18.88	20.69	28.09	13.28	12.41	4.46	4.42	1.32	0.70	0.37	0.48
Ac-ft	10,580	34,230	37,530	50,930	24,090	22,510	8,090	8,010	2,400	1,260	680	877
Calendar year 1950: Max	1,980				Min 8.7	Mean 306	Cfsm 9.00	In. 122.09	Ac-ft 221,400			
Water year 1950-51: Max	2,260				Min 7.3	Mean 278	Cfsm 8.18	In. 110.93	Ac-ft 201,200			

Peak discharge (base, 2,000).--Nov. 17 (8:30 a.m.) 2,190 cfs (7.26 ft); Dec. 22 (11 p.m.) 2,160 cfs (7.13 ft); Jan. 17 (5:30 a.m.) 2,770 cfs (8.42 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Pedee and near Suver, and recorded range in stage.

## Luckiamute River at Pedee, Oreg.

Location.--Lat 44°44'35", long. 123°25'25", in SE¼ sec. 33, T. 9 S., R., 6 W., on left bank half a mile downstream from Pedee Creek, and three-quarters of a mile (revised) southwest of Pedee.

Drainage area.--115 sq mi.

Records available.--October 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 245.47 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to July 1, 1949, staff gage at site 1,700 ft downstream at datum 1.85 ft lower.

Average discharge.--11 years, 460 cfs.

Extremes.--Maximum discharge during year, 6,720 cfs Jan. 17 (gage height, 13.62 ft); minimum, 13 cfs Aug. 21, Sept. 22.

1940-51: Maximum discharge, 13,500 cfs Feb. 17, 1949 (gage height, 18.46 ft, from floodmark, present site and datum), from rating curve extended above 7,800 cfs by logarithmic plotting; minimum observed, 7 cfs Sept. 12, 1944.

Remarks.--Records excellent except those for periods of doubtful gage-height record, which are fair. Small diversions above station for irrigation. Some diurnal fluctuation in summer caused by log ponds above station.

Revisions (water years).--W 964: 1941. W 1044: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 14

Mar. 15 to Sept. 30

1.5	20	3.0	330	1.4	13	2.7	245
1.7	36	4.0	745	1.5	19	4.0	780
2.0	72	8.0	2,800	1.9	61	8.0	2,800
2.4	145	12.0	5,350	2.2	112		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	21	1,390	1,480	1,030	664	d400	498	245	148	53	24	21
2	20	2,510	1,320	2,100	750	d360	466	233	140	53	23	18
3	46	1,440	1,340	2,420	1,020	393	446	242	135	54	22	18
4	82	995	1,740	1,730	1,090	778	*418	227	135	57	22	16
5	163	758	1,640	1,320	1,190	d900	390	209	130	56	21	*16
6	170	606	2,380	1,060	1,270	d750	362	224	128	64	21	18
7	197	516	2,340	890	1,660	d650	340	224	126	59	20	24
8	138	468	1,720	768	1,740	740	322	209	121	51	19	39
9	123	400	1,330	686	1,440	660	301	200	112	49	21	29
10	100	358	1,040	*660	1,410	596	287	191	108	48	22	23
11	141	323	910	740	1,740	565	273	194	102	45	23	20
12	109	295	745	709	1,490	d950	262	322	102	43	23	19
13	90	274	655	865	1,220	1,840	248	681	102	42	22	17
14	84	274	642	1,820	1,020	1,700	242	555	94	44	21	17
15	92	1,080	835	2,220	875	2,650	230	450	89	42	18	17
16	*81	3,870	1,840	2,420	745	2,460	221	382	82	41	18	16
17	95	*5,250	1,540	5,650	718	1,710	208	*336	78	41	17	16
18	145	3,560	1,180	3,480	783	1,330	203	308	77	40	17	15
19	264	2,040	980	2,340	*709	1,130	197	284	75	40	15	15
20	278	1,720	805	1,760	875	1,040	191	262	74	39	15	15
21	203	1,460	696	3,900	830	990	182	230	*69	36	14	14
22	160	1,210	1,150	3,820	745	d900	178	221	67	34	14	14
23	138	1,020	2,610	3,280	673	d800	168	233	67	*33	14	14
24	123	1,200	1,540	3,510	610	717	168	224	65	33	15	19
25	127	1,200	1,130	2,750	588	672	162	209	64	31	15	19
26	212	1,040	930	2,180	d500	627	160	191	61	31	15	31
27	652	1,060	830	1,670	d460	565	175	182	61	29	17	23
28	1,540	900	1,580	1,300	d420	532	362	172	60	28	21	23
29	1,590	820	1,570	1,040	-	519	280	165	57	27	34	40
30	*1,210	*1,160	1,360	875	-	586	242	158	55	25	31	163
31	1,180	-	1,190	750	-	542	-	155	-	23	24	-
Total	9,574	39,197	41,048	59,743	27,215	29,050	8,193	8,118	2,782	1,291	618	745
Mean	309	1,307	1,324	1,927	972	937	273	262	92.7	41.6	19.9	24.8
Cfs/m	2.69	11.4	11.5	16.8	8.45	8.15	2.37	2.28	0.806	0.362	0.173	0.216
In.	3.10	12.68	13.27	19.32	8.80	9.39	2.65	2.63	0.90	0.42	0.20	0.24
Ac-ft	18,990	77,750	81,420	118,500	53,980	57,620	16,230	16,100	5,520	2,560	1,230	1,480

Calendar year 1950: Max 5,250 Min 14 Mean 704 Cfs/m 6.12 In. 83.08 Ac-ft 509,500  
 Water year 1950-51: Max 5,650 Min 14 Mean 625 Cfs/m 5.42 In. 73.60 Ac-ft 451,400

Peak discharge (base, 3,500 cfs).--Nov. 17 (10:30 a.m.) 5,780 cfs (12.54 ft); Jan. 17 (9 a.m.) 6,720 cfs (13.62 ft); Jan. 21 (5 to 3 p.m.) 4,860 cfs (11.30 ft).

\* Discharge measurement made on this day.

d Doubtful gage-height record; discharge computed on basis of records for stations at Hoskins and near Suver and appearance of recorder chart.

## Luckiamute River near Suver, Oreg.

Location.--Lat 44°47'00", long. 123°14'00", in SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 18, T. 9 S., R. 4 W., on right bank 10 ft upstream from highway bridge at Helmick State Park, 3 miles northwest of Suver, and  $4\frac{1}{2}$  miles (revised) downstream from Little Luckiamute River.

Drainage area.--240 sq mi.

Records available.--August 1905 to October 1911, July 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 171.92 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Aug. 18, 1905, to Oct. 31, 1911, staff gage at same site at different datum. Aug. 20 to Oct. 15, 1940, staff gage at present site and datum.

Average discharge.--17 years (1905-11, 1940-51), 918 cfs.

Extremes.--Maximum discharge during year, 10,800 cfs Jan. 18 (gage height, 28.42 ft); minimum, 25 cfs Aug. 22-25, Sept. 22-24.

1905-11, 1940-51: Maximum discharge, 23,800 cfs Feb. 18, 1949 (gage height, 33.10 ft), from rating curve extended above 14,000 cfs by logarithmic plotting; minimum, 21 cfs Sept. 10, 1944.

Maximum stage known 33.5 ft probably Dec. 29, 1937, from information by local residents (discharge, 25,000 cfs, from rating curve extended above 14,000 cfs by logarithmic plotting).

Remarks.--Records good. A few small diversions above station for irrigation; no diversion around station. Some diurnal fluctuation during periods of low flow caused by millpond above station.

Revisions (water years).--W 1044: Drainage area. W 1094: 1945-46.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.7	19	15.0	1,930
3.0	106	23.0	4,040
5.0	280	26.0	6,030
8.0	680	28.0	9,810

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	37	2,700	*2,770	2,120	1,410	859	965	448	246	84	42	36
2	36	2,780	2,420	1,490	808	904	441	223	84	41	33	33
3	43	3,670	2,670	4,690	2,420	782	864	424	220	83	40	31
4	100	2,560	3,030	4,340	2,590	1,180	*840	424	215	86	40	28
5	153	1,780	3,320	3,160	2,800	1,820	806	387	215	91	38	26
6	347	1,330	3,770	2,350	2,610	1,570	763	383	211	92	38	*27
7	401	1,100	4,750	1,940	3,190	1,410	728	429	202	102	37	30
8	341	997	4,340	1,710	3,870	1,490	690	384	198	87	34	41
9	261	858	3,300	1,490	3,460	1,510	650	359	189	80	33	53
10	198	749	2,530	*1,460	2,890	1,290	610	339	178	77	35	40
11	242	672	2,070	1,480	3,530	1,220	586	335	169	71	36	32
12	235	614	1,810	1,510	3,510	1,390	573	378	168	66	36	30
13	183	555	1,540	1,460	2,800	2,870	556	1,000	189	63	38	29
14	155	528	1,420	2,550	2,250	3,270	534	1,050	162	63	36	27
15	152	980	1,600	3,890	1,910	3,290	504	822	154	65	36	28
16	*144	4,230	2,840	4,410	1,650	4,410	476	680	144	63	31	26
17	147	*8,470	3,750	6,480	1,470	3,780	449	*586	136	61	31	27
18	173	9,670	3,000	9,110	1,650	2,700	424	519	131	59	30	27
19	383	5,900	2,280	8,290	*1,480	2,110	407	471	128	60	29	27
20	616	4,150	1,910	4,730	1,720	1,840	389	434	*125	59	29	26
21	448	3,510	1,610	4,380	1,750	1,690	367	401	122	57	27	26
22	325	3,010	1,590	8,010	1,550	1,630	349	372	114	55	25	25
23	264	2,340	3,740	6,600	1,370	1,480	336	359	113	*53	25	25
24	223	2,340	4,240	6,460	1,240	1,320	323	396	109	52	25	26
25	203	2,820	2,920	6,210	1,160	1,220	313	346	108	51	25	26
26	290	2,510	2,150	5,220	1,120	1,160	302	324	102	51	26	31
27	715	2,360	1,930	4,080	1,000	1,090	299	306	98	51	27	40
28	2,050	2,130	2,120	3,050	926	1,020	806	292	94	48	28	34
29	3,080	1,790	3,040	2,290	-	965	597	279	90	46	38	39
30	2,720	1,970	2,710	1,880	-	1,060	476	266	87	46	49	94
31	2,750	-	2,470	1,610	-	1,060	-	259	-	45	43	-
Total	17,415	79,853	84,000	117,360	58,816	53,274	16,686	13,893	4,626	2,049	1,048	987
Mean	562	2,662	2,710	3,786	2,101	1,719	556	448	154	66.1	33.8	32.9
Cfsm	2.34	11.1	11.3	15.8	8.75	7.16	2.32	1.87	0.642	0.275	0.141	0.137
In.	2.70	12.37	13.02	18.19	9.11	8.26	2.59	2.15	0.72	0.32	0.16	0.15
Ac-ft	34,540	158,400	166,600	232,800	116,700	105,700	33,100	27,560	9,180	4,060	2,080	1,960

Peak discharge (base, 5,600 cfs).--Nov. 18 (2:30 a.m.) 10,700 cfs (28.37 ft); Jan. 18 (1 a.m.) 10,800 cfs (28.42 ft); Jan. 22 (10:30 a.m.) 8,510 cfs (27.42 ft).

\* Discharge measurement on this day.



## Willamette River at Salem, Oreg.

Location.--Lat 44°56'40", long. 123°02'30", in SW $\frac{1}{4}$  sec. 22, T. 7 S., R. 3 W., on right bank 300 ft upstream from Center Street bridge at Salem and at mile 85.1.

Drainage area.--7,280 sq mi, approximately.

Records available.--October 1909 to December 1916, October 1927 to September 1951. Gage-height records collected at about the same site since 1892 are contained in reports of United States Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 113.61 ft above mean sea level, datum of 1929. Oct. 1, 1909, to Dec. 31, 1916, staff gage at site half a mile upstream at about present datum. Oct. 1, 1927, to Nov. 26, 1934, staff gage at Center Street bridge at present datum.

Average discharge.--31 years, 22,700 cfs.

Extremes.--Maximum discharge during year, 159,000 cfs Nov. 1 (gage height, 21.10 ft); minimum, 3,960 cfs Sept. 24 (gage height, -3.82 ft).  
1909-16, 1927-51: Maximum discharge observed, 315,000 cfs Nov. 25, 1909 (gage height, 30.5 ft); minimum, 2,470 cfs Aug. 27, 1940 (gage height, -4.45 ft).  
Maximum discharge known, 500,000 cfs Dec. 4, 1861 (gage height, about 39 ft), from rating curve extended above 250,000 cfs in 1916. Flood of Feb. 5, 1890, reached a stage of 37.1 ft. Flood of Jan. 8, 1923, was measured at 344,000 cfs, at or very close to peak (gage height, 30.35 ft).

Remarks.--Records excellent except those for periods of no gage-height record, which are fair. Many small diversions for irrigation above station; part of flow of Salem Canal, which diverts water from North Santiam River, returns to Willamette River below station, through Mill Creek at Salem. Flow regulated at times by Cottage Grove, Fern Ridge and Dorena Reservoirs (see pp. 128, 131, 156). Records of chemical analyses and water temperatures for the water year 1951 are given in Water-Supply Paper 1200.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)

-3.8	4,000	9.0	60,500
-1.2	10,800	15.0	99,500
+4.0	33,400	21.0	158,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6,020	*147,000	55,000	46,600	42,800	21,800	28,000	21,400	12,800	a6,500	4,400	a4,800
2	5,800	123,000	57,900	47,500	39,100	20,800	26,100	20,000	12,200	a6,500	4,300	a4,600
3	6,020	130,000	57,100	65,300	42,900	19,800	25,700	19,600	11,900	a7,000	4,200	a4,600
4	6,750	115,000	65,600	72,400	47,400	22,000	27,800	19,200	11,500	a7,000	4,240	a4,400
5	10,100	95,800	86,200	67,600	59,300	29,600	31,600	19,900	11,400	a6,500	4,180	a4,400
6	15,000	67,100	98,000	55,600	79,200	32,800	32,200	21,200	11,200	a6,500	4,180	a4,400
7	21,100	56,500	115,000	45,700	94,300	33,200	30,900	26,400	10,900	6,350	4,180	a4,520
8	19,800	47,900	115,000	39,300	108,000	37,900	30,400	30,300	10,600	6,200	4,280	a4,660
9	18,800	43,400	108,000	35,400	110,000	47,300	*29,400	27,300	10,200	*6,050	4,300	4,700
10	*18,000	39,100	90,900	*33,700	102,000	43,900	28,100	24,500	10,000	5,950	4,320	4,700
11	14,600	34,000	67,900	33,800	92,300	37,200	26,800	23,800	9,900	5,850	4,280	4,640
12	12,200	28,300	57,500	34,900	97,600	33,600	26,000	25,400	9,870	5,680	4,300	4,580
13	10,800	25,600	52,500	33,800	93,900	39,600	27,100	28,300	9,780	5,600	*4,320	4,520
14	9,780	23,800	47,400	44,200	76,300	44,900	30,000	31,800	9,750	5,550	4,400	4,500
15	9,270	24,500	45,400	71,600	60,800	50,700	31,600	30,200	9,510	5,480	a4,400	4,460
16	8,760	55,500	49,800	81,400	53,000	69,600	30,700	26,500	9,420	5,420	a4,600	4,420
17	8,850	89,100	51,900	87,000	47,400	73,800	29,300	24,200	9,300	5,320	a4,400	4,380
18	12,800	118,000	47,200	105,000	44,400	85,000	28,000	23,300	9,060	5,200	a4,400	4,360
19	20,500	122,000	41,500	113,000	41,700	51,100	26,100	22,300	8,760	5,120	a4,400	4,100
20	28,800	114,000	38,000	109,000	38,700	44,200	23,900	20,900	8,430	5,150	a4,400	4,060
21	29,600	89,400	35,200	88,800	37,200	43,800	22,100	*19,800	8,130	5,000	a4,400	4,080
22	23,800	92,400	32,300	94,400	35,300	45,500	20,200	19,000	7,860	4,920	a4,400	4,060
23	20,300	70,100	36,500	97,800	32,200	42,600	18,800	18,800	7,720	4,850	a4,400	4,060
24	17,700	59,800	37,400	106,000	29,200	37,400	17,700	20,000	7,600	4,760	a4,400	*4,060
25	16,200	66,500	32,700	119,000	27,500	33,700	17,000	20,000	7,450	4,700	a4,400	4,140
26	17,400	64,400	29,000	118,000	*26,300	32,600	16,500	18,500	7,300	4,620	a4,400	4,200
27	20,600	*60,200	27,200	108,000	24,600	32,400	16,500	17,300	7,100	4,580	a4,400	4,320
28	37,700	57,800	27,100	89,800	23,000	30,600	17,400	16,500	6,700	4,540	a4,600	4,260
29	73,700	51,900	37,500	72,400	-	28,800	21,500	15,600	a7,000	4,500	a4,600	4,300
30	109,000	49,900	48,000	57,600	-	29,300	23,000	14,300	a6,500	4,500	a4,800	4,540
31	141,000	-	48,900	48,300	-	29,800	-	13,400	-	a4,40	a5,000	-

Total	770,750	*2,161.1	*1,739.6	*2,222.9	*1,606.2	*1,205.3	760,400	679,700	280,140	170,330	136,340	131,820
Mean	24,600	72,040	56,120	71,710	57,360	38,880	25,350	21,930	9,338	5,495	4,398	4,394
Cfsm	3.35	9.90	7.71	9.85	7.88	5.34	3.48	3.01	1.28	0.755	0.603	0.604
In.	3.94	11.04	8.89	11.36	8.21	6.16	3.88	3.47	1.43	0.87	0.70	0.67
Ac-ft	*1,529	*4,286	*3,450	*4,409	*3,186	*2,391	*1,508	*1,348	555,600	337,800	270,400	261,500
Calendar year 1950: Max	150,000	Min	4,000	Mean	36,900	Cfsm	5.07	In.	68.82	Ac-ft	26,720,000	
Water year 1950-51: Max	147,000	Min	4,060	Mean	32,510	Cfsm	4.47	In.	60.62	Ac-ft	23,530,000	

Peak discharge (base, 95,000 cfs).--Nov. 1 (1 to 2 a.m.) 159,000 cfs (21.10 ft); Nov. 18 (11 p.m.) 127,000 cfs (18.09 ft); Dec. 7 (7 to 8 p.m.) 119,000 cfs (17.23 ft); Jan. 19 (11 p.m.) 117,000 cfs (17.02 ft); Jan. 25 (4 to 9 p.m.) 120,000 cfs (17.34 ft); Feb. 9 (12:30 a.m.) 113,000 cfs (16.58 ft).

\* Discharge measurement made on this day.

† Expressed in thousands.

a No gage-height record; discharge estimated on the basis of records for station at Albany and Santiam River at Jefferson.

## Mill Creek at penitentiary annex, near Salem, Oreg.

Location.--Lat 44°52'55", long. 122°58'35", in NE $\frac{1}{4}$  sec. 18, T. 8 S., R. 2 W., on left bank at State penitentiary annex, 2 $\frac{1}{2}$  miles (revised) downstream from Battle Creek, 5 miles southeast of Salem, and 7 miles upstream from mouth.

Drainage area.--104 sq mi (revised).

Records available.--October 1940 to September 1951 in reports of Geological Survey. November 1938 to September 1941 in reports of Oregon State engineer.

Gage.--Water-stage recorder. Datum of gage is 231.96 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Average discharge.--12 years (1939-51), 369 cfs.

Extremes.--Maximum discharge during year, 4,370 cfs Nov. 17 (gage height, 7.23 ft); minimum, 47 cfs July 3, 4.  
1938-51: Maximum discharge, 5,140 cfs Feb. 18, 1949 (gage height, 7.67 ft); minimum, 44 cfs July 4 (revised), 1939, July 6, 1949.  
Maximum discharge known, 8,320 cfs Dec. 29, 1937, computed by velocity-area method on basis of discharge measurement of 7,300 cfs made that day.

Remarks.--Records good. Salem power canal diverts water to Mill Creek from North Santiam River at Stayton; some diversions for irrigation from canal and creek above station. Flow diverted for irrigation on left bank between gage and control is not included in record. Diurnal fluctuations caused by changes at headgates and small powerplants above station.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 28 to Nov. 10)

0.4	44	3.0	830
.6	60	4.0	1,440
1.0	110	5.0	2,220
1.5	215	7.0	4,120
2.0	375		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	150	1,200	1,240	447	361	266	200	188	138	144	131	140
2	148	1,400	*946	1,300	447	*242	188	181	133	92	124	142
3	163	912	1,010	1,500	612	251	176	178	127	48	122	138
4	202	685	1,510	924	702	790	167	178	129	90	118	131
5	282	562	1,260	735	902	770	159	176	133	150	115	125
6	279	483	1,970	594	902	640	152	235	133	156	122	131
7	185	399	1,900	515	1,200	626	142	238	127	138	124	133
8	190	358	1,160	467	1,220	1,370	135	237	124	138	117	138
9	208	318	874	*427	845	1,190	*129	205	122	*138	108	136
10	*169	266	715	471	922	790	124	192	117	133	108	133
11	152	251	765	540	1,800	715	122	198	124	131	85	131
12	148	237	675	467	1,290	1,060	124	220	122	124	110	131
13	140	212	544	479	863	1,760	152	272	124	124	131	129
14	138	248	549	1,040	690	1,250	152	226	120	125	142	120
15	140	795	630	1,210	665	1,450	150	202	122	125	142	118
16	138	3,180	1,020	1,260	576	1,180	146	188	122	127	144	117
17	198	*3,870	830	2,460	645	815	142	181	118	127	*140	118
18	319	3,080	640	2,130	720	645	140	169	113	140	142	117
19	387	1,680	567	2,020	562	549	140	169	118	135	140	115
20	576	1,390	528	1,360	567	483	138	163	110	133	136	117
21	407	1,030	443	2,120	526	447	135	*159	110	133	136	118
22	316	790	439	2,140	463	407	135	159	106	135	133	120
23	269	660	594	1,870	383	354	131	172	113	133	133	122
24	251	896	463	2,140	350	319	127	174	112	135	133	127
25	316	973	407	1,360	368	302	125	163	142	133	138	129
26	471	725	375	1,240	350	298	129	165	131	133	138	135
27	800	1,240	354	896	308	254	161	163	133	142	*124	
28	1,480	895	549	695	275	237	200	152	167	131	150	131
29	2,320	685	598	531	-	234	205	150	154	131	161	140
30	1,980	1,120	576	439	-	231	192	150	148	129	159	161
31	*1,540	-	531	391	-	220	-	142	-	124	150	-
Total	14,462	30,528	24,670	34,166	19,515	20,155	4,518	5,794	3,822	3,968	4,074	3,867
Mean	457	1,018	796	1,102	697	650	151	187	127	128	131	129
Ac-ft	28,680	60,550	48,930	67,710	38,710	39,980	8,960	11,490	7,580	7,870	8,080	7,670

Calendar year 1950: Max 3,870 Min 67 Mean 520 Ac-ft 376,500  
Water year 1950-51: Max 3,870 Min 48 Mean 464 Ac-ft 336,300

\* Discharge measurement made on this day.

## Mill Creek at Salem, Oreg.

Location.--Lat 44°56'05", long. 123°01'00", in NE<sup>1</sup> sec. 26, T. 7 S., R. 3 W., on left bank, at State Street Bridge in Salem, 220 ft downstream from 19th Street diversion.

Drainage area.--110 sq mi (revised).

Records available.--October 1940 to September 1951 in reports of Geological Survey. November, December 1934, and July 1938 to September 1941 in reports of Oregon State engineer.

Gage.--Water-stage recorder. Datum of gage is 166.12 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. November, December, 1934, staff gage at site three-quarters of a mile downstream at different datum. July 21, 1938, to Oct. 9, 1940, water-stage recorder at site 200 ft upstream at different datum.

Average discharge.--12 years (1939-51), 141 cfs.

Extremes.--Maximum discharge during year, 894 cfs Nov. 17 (gage height, 4.72 ft); minimum, 7.2 cfs June 22.

1938-51: Maximum discharge recorded, 1,230 cfs Feb. 19, 1949 (gage height, 6.38 ft); no flow Oct. 2, 1938 (corrected).

Remarks.--Records good except those for period of no gage-height record, which are fair. Salem power canal diverts water into Mill Creek near Stayton; several diversions from Mill Creek, including Shelton flood bypass 1½ miles upstream, and 19th Street power diversion 220 ft upstream. Diurnal fluctuation caused by powerplants above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11				Feb. 12 to Sept. 30			
0.8	29	2.0	225	0.4	5.0	0.7	22
1.0	50	3.0	465	.5	9.4	1.0	50
1.5	125	4.0	715				

Note.--Same as preceding table above 1.0 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	39	170	151	147	132	178	88	a80	31	24	a20	24
2	37	174	*141	266	138	*151	76	a80	27	51	a19	24
3	54	156	143	306	168	136	69	a75	22	28	18	24
4	92	143	168	221	184	392	60	69	23	65	16	22
5	162	166	158	192	278	462	59	60	23	151	16	18
6	174	186	218	166	466	395	48	a70	24	106	16	20
7	89	174	214	147	585	392	42	a140	22	21	17	22
8	70	168	147	158	592	556	40	122	21	21	14	24
9	88	162	a130	158	475	621	*37	a100	21	21	13	24
10	*66	158	a110	143	478	470	34	a85	20	21	13	21
11	49	a140	a100	149	638	438	30	88	19	21	11	23
12	39	a140	a95	139	540	498	27	94	14	18	12	22
13	36	a120	a80	139	468	692	43	139	17	*17	16	21
14	29	a150	a80	214	412	590	43	108	16	18	22	17
15	33	a250	149	*257	400	608	42	92	15	16	22	16
16	31	a600	a190	264	363	585	39	83	14	17	24	13
17	76	708	a180	452	372	478	34	76	15	17	*22	16
18	176	820	152	395	432	415	31	86	13	21	23	14
19	221	306	152	390	370	365	32	64	14	20	23	13
20	327	239	151	289	363	329	30	39	12	19	21	14
21	284	199	145	390	341	310	29	*40	12	19	21	15
22	212	174	143	425	312	280	30	44	9.0	19	21	16
23	166	172	154	351	271	236	29	56	9.0	19	20	15
24	122	162	141	408	241	203	26	63	9.0	20	18	18
25	152	145	136	289	253	188	22	53	20	18	19	20
26	225	130	139	269	246	182	20	50	13	19	20	24
27	225	154	147	216	203	149	42	49	35	21	24	18
28	266	158	162	186	180	118	76	38	41	20	27	19
29	365	129	176	166	-	110	86	37	35	20	34	25
30	292	147	166	a150	-	103	a100	37	30	a20	35	41
31	207	-	156	a140	-	103	-	35	-	a19	32	-
Total	4,394	6,480	4,574	7,532	9,901	10,733	1,364	2,260	594.0	907	629	602
Mean	142	216	148	243	354	346	45.5	72.9	19.8	29.3	20.3	20.1
Ac-ft	8,720	12,850	9,070	14,940	19,640	21,290	2,710	4,480	1,180	1,800	1,250	1,190

Calendar year 1950: Max 860 Min 7.2 Mean 176 Ac-ft 127,500  
 Water year 1950-51: Max 708 Min 9.0 Mean 137 Ac-ft 99,120

\* Discharge measurement made on this day.  
 a No gage-height record; discharge estimated on basis of recorded range in stage and records for station at penitentiary annex, near Salem.

## South Yamhill River near Willamina, Oreg.

Location (revised).--Lat 45°02'50", long. 123°30'10", in sec. 14, T. 6 S., R. 7 W., on left bank  $2\frac{1}{4}$  miles southwest of Willamina and 3 miles upstream from Willamina Creek.

Drainage area.--133 sq mi.

Records available.--May 1934 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 235.55 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Average discharge.--17 years, 595 cfs.

Extremes.--Maximum discharge during year, 9,370 cfs Jan. 17 (gage height, 10.81 ft); minimum, 4.2 cfs Sept. 18 (gage height, 0.41 ft); minimum daily, 5.6 cfs Sept. 18. 1934-51: Maximum discharge, 15,200 cfs Feb. 10, 1949 (gage height, 14.80 ft); minimum, 3 cfs Aug. 22, 1938, Oct. 16, 1942; minimum daily, that of Sept. 18, 1951.

Remarks.--Records good except those for periods of backwater from debris, which are fair. Slight regulation occasionally during summer by millpond upstream; no diversion above station.

Revisions.--W 814: Drainage area.

Rating table, water year 1950-51, except periods of backwater from debris (gage height, in feet, and discharge, in cubic feet per second)

0.3	2.0	0.9	58	4.0	1,470
.4	6.0	1.2	124	5.0	2,250
.5	12	2.0	377	7.0	4,270
.7	30	3.0	845	10.0	8,200

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	24	2,030	2,030	1,330	670	495	750	292	138	44	21	13
2	24	2,780	1,730	3,800	1,250	463	*880	279	135	45	19	13
3	35	1,770	1,820	3,500	1,830	490	635	279	132	48	19	12
4	95	1,240	1,900	2,350	1,600	1,150	620	269	114	53	18	12
5	312	930	1,630	1,750	1,340	1,100	575	250	109	55	19	12
6	330	740	2,460	1,320	1,470	936	522	262	109	73	18	12
7	419	605	2,470	1,080	2,930	810	479	272	107	60	15	13
8	316	522	1,890	910	2,630	750	447	243	104	48	17	25
9	250	447	1,640	800	2,610	670	407	228	95	44	16	24
10	237	392	1,290	920	2,510	610	385	213	92	40	16	17
11	266	354	1,180	1,070	3,310	555	370	216	90	38	16	*13
12	192	319	966	950	2,360	906	362	326	90	38	17	12
13	148	238	810	1,370	1,760	1,700	362	504	88	37	15	14
14	124	312	760	2,600	1,350	1,600	355	*419	81	37	18	11
15	114	1,820	1,640	4,790	1,150	3,290	337	362	75	36	15	8.2
16	97	3,870	2,560	4,570	918	3,130	312	326	71	35	14	8.8
17	95	4,450	2,060	*7,660	845	2,170	302	292	68	34	9.4	8.2
18	180	3,480	1,570	4,270	861	1,630	289	285	*68	34	12	5.6
19	253	2,180	1,380	2,680	790	1,340	285	262	71	31	12	10
20	259	2,760	1,130	2,030	1,260	1,200	269	253	69	30	11	7.6
21	198	2,340	948	4,710	1,120	1,210	240	237	68	29	8.8	6.6
22	160	1,720	2,000	3,800	960	1,240	216	207	68	29	8.2	6.6
23	132	1,360	2,610	3,140	780	1,100	207	207	68	27	7.6	6.6
24	116	2,140	1,780	2,990	745	972	195	204	68	26	7.1	8.8
25	154	1,930	1,380	2,610	710	878	189	195	66	*26	7.1	11
26	*362	1,600	1,150	2,320	645	823	183	180	58	26	8.8	15
27	1,740	1,740	1,040	1,710	570	760	253	165	58	25	8.8	18
28	2,530	1,320	1,130	1,340	*522	700	580	165	53	24	12	18
29	1,860	1,100	1,500	1,060	-	695	381	151	48	23	18	37
30	*1,340	1,790	1,590	890	-	863	312	148	47	23	21	298
31	1,370	-	1,520	750	-	845	-	138	-	21	18	-
Total	13,732	48,339	49,574	75,090	39,496	35,081	11,499	7,829	2,506	1,139	442.8	677.0
Mean	443	1,611	1,598	2,422	1,411	1,132	363	253	83.5	36.7	14.3	22.6
Cfsm	3.35	12.1	12.0	18.2	10.6	8.51	2.98	1.90	0.628	0.276	0.108	0.170
In.	3.84	13.52	13.86	21.00	11.04	9.81	3.22	2.19	0.70	0.32	0.12	0.19
Ac-ft	27,240	95,880	98,330	148,900	78,340	69,580	22,810	15,530	4,970	2,260	878	1,340

Calendar year 1950: Max 5,540 Min 10 Mean 857 Cfsm 6.44 In. 87.46 Ac-ft 620,400  
 Water year 1950-51: Max 7,680 Min 5.6 Mean 782 Cfsm 5.88 In. 79.82 Ac-ft 566,100

Peak discharge (base, 5,700 cfs).--Jan. 17 (7 a.m.) 9,370 cfs (10.81 ft); Jan. 21 (11 a.m. to 12 m.) 5,990 cfs (8.40 ft).

\* Discharge measurement made on this day.

Note.--Backwater from debris Oct. 1-26, Aug. 2 to Sept. 30.

## Willamina Creek near Willamina, Oreg.

Location (revised).--Lat 45°08'30", long. 123°29'35", in W<sup>1</sup>NE<sup>1</sup> sec. 13, T. 5 S., R. 7 W., on left bank  $4\frac{1}{2}$  miles north of Willamina and 7 miles upstream from mouth.

Drainage area.--65 sq mi, approximately.

Records available.--June 1934 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 315.1 ft above mean sea level (river-profile survey). Prior to Oct. 1, 1939, at datum 1.00 ft higher.

Average discharge.--17 years, 243 cfs.

Extremes.--Maximum discharge during year, 3,790 cfs Jan. 17 (gage height, 8.32 ft); minimum, 10 cfs Sept. 22 (gage height, 1.33 ft).

1934-51: Maximum discharge, 6,380 cfs Feb. 17, 1949 (gage height, 10.25 ft), from rating curve extended above 3,400 cfs by logarithmic plotting; minimum, 9 cfs Sept. 3, 4, 1934, Sept. 9, 1935, Aug. 8-10, 19, Sept. 22-27, 1939, Aug. 17, 18, 1940.

Flood of Mar. 31, 1931, reached a stage of about 12 ft, from information by local resident (discharge, 9,500 cfs).

Remarks.--Records excellent except those for periods of backwater from debris, which are good. No regulation or diversion above station.

Revisions.--W 964: Drainage area.

Rating table, water year 1950-51, except periods of backwater from debris (gage height, in feet, and discharge, in cubic feet per second)

1.3	9.2	3.0	260
1.4	13	4.0	580
1.6	24	5.0	1,040
1.9	49	6.0	1,620
2.4	123	8.0	3,450

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	21	718	786	600	379	260	397	131	75	32	19	15
2	20	930	692	1,510	584	242	*370	121	72	33	19	14
3	38	624	674	1,360	930	252	364	121	71	34	19	14
4	51	463	*764	1,000	759	362	355	120	69	37	19	12
5	132	370	710	772	632	375	328	113	71	37	18	12
6	183	305	980	616	652	331	302	127	71	42	18	13
7	200	270	955	516	980	298	285	129	69	37	17	22
8	101	242	786	449	995	295	265	118	67	33	17	23
9	93	208	660	407	1,040	270	242	109	62	32	18	17
10	108	188	548	391	1,080	260	228	106	60	31	18	14
11	109	174	484	407	1,310	242	215	106	59	28	18	*14
12	82	161	414	370	1,060	356	205	136	59	26	19	14
13	69	148	370	484	836	552	198	240	59	26	19	13
14	62	152	349	790	674	564	188	*190	55	26	17	12
15	57	342	564	1,330	572	1,270	176	165	51	26	16	12
16	54	804	850	1,720	477	1,130	165	148	49	25	15	11
17	57	1,270	759	2,270	432	855	157	136	48	26	14	11
18	98	*1,116	624	*1,690	428	705	148	127	*47	27	14	11
19	109	736	544	1,160	418	636	140	121	45	26	14	11
20	98	890	463	895	548	612	132	114	45	25	13	11
21	84	945	418	1,760	480	628	127	109	42	24	12	11
22	75	804	734	1,530	428	612	121	103	41	23	12	10
23	68	678	1,010	1,350	565	540	118	106	41	22	13	11
24	64	900	750	1,410	358	498	114	101	41	23	13	14
25	68	845	600	1,360	340	474	111	100	40	23	13	23
26	*104	700	526	1,210	310	463	108	92	37	*23	13	20
27	319	624	488	940	*288	435	140	88	37	22	13	16
28	678	508	875	728	272	400	200	87	35	22	18	25
29	600	458	746	580	-	407	144	84	33	21	24	35
30	508	632	723	491	-	474	131	81	32	20	20	120
31	584	-	678	424	-	442	-	80	-	20	17	-
Total	4,894	17,179	20,524	31,020	17,647	15,258	6,174	3,709	1,583	852	509	561
Mean	158	573	662	1,001	630	492	206	120	52.8	27.5	16.4	18.7
Cfs/m	2.43	8.82	10.2	15.4	9.69	7.57	3.17	1.85	0.812	0.423	0.252	0.288
In.	2.80	9.83	11.74	17.75	10.10	8.73	3.53	2.12	0.91	0.49	0.29	0.32
Ac-ft	9,710	34,070	40,710	61,530	35,000	30,260	12,250	7,360	3,140	1,690	1,010	1,110

Calendar year 1950: Max 2,890 Min 13 Mean 361 Cfs/m 5.55 In. 75.41 Ac-ft 261,400  
 Water year 1950-51: Max 2,970 Min 10 Mean 329 Cfs/m 5.08 In. 68.61 Ac-ft 237,800

Peak discharge (base, 2,300 cfs).--Jan. 17 (4:30 a.m.) 3,790 cfs (8.32 ft).

\* Discharge measurement made on this day.

Note.--Backwater from debris Oct. 27 to Nov. 5, Nov. 15 to Jan. 16.

## South Yamhill River near Whiteson, Oreg.

Location.--Lat 45°10'10", long. 123°12'25", in NW¼ sec. 5, T. 5 S., R. 4 W., on downstream side of Whiteson Bridge, near left bank, on Pacific Highway West, 1 mile downstream from Salt Creek and 1¼ miles northwest of Whiteson.

Drainage area.--502 sq mi.

Records available.--July 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 82.30 ft above mean sea level, datum of 1929. Prior to Sept. 20, 1940, wire-weight gage at same site and datum.

Average discharge.--11 years, 1,636 cfs.

Extremes.--Maximum discharge during year, 22,000 cfs Jan. 17 (gage height, 41.49 ft); minimum, 15 cfs Aug. 22, 23 (gage height, 0.98 ft).  
1940-51: Maximum discharge, 28,900 cfs Feb. 11, 1949 (gage height, 43.39 ft); minimum, that of Aug. 22, 23, 1951.

Remarks.--Records fair. Slight regulation during low-water periods from log pond upstream. Small diversions above station for irrigation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	69	4,180	5,630	3,970	2,000	1,430	1,980	720	303	78	37	42
2	65	5,650	5,810	4,600	2,090	1,340	*1,770	659	289	77	36	37
3	72	5,610	5,100	8,660	4,180	1,220	1,630	618	272	82	37	30
4	106	4,250	5,360	8,900	4,760	2,010	1,580	613	254	91	31	27
5	274	3,110	5,200	6,410	4,460	3,530	1,480	572	249	95	36	24
6	752	2,270	5,340	a4,500	3,910	3,050	1,340	552	254	99	37	22
7	928	1,790	*6,600	a3,400	4,810	2,680	1,230	637	248	118	31	*25
8	822	1,530	5,660	a2,800	6,940	2,560	1,150	581	241	103	27	35
9	647	a1,300	5,260	a2,350	6,640	2,570	1,060	538	224	90	26	56
10	469	a1,100	4,240	2,420	6,230	2,340	981	505	213	79	27	56
11	593	a1,000	3,440	2,580	7,330	2,180	924	484	202	72	27	42
12	528	a900	3,080	2,650	9,170	2,530	884	502	199	62	29	33
13	397	a850	2,560	2,460	5,320	5,160	865	908	201	60	33	30
14	317	a950	2,240	4,570	4,500	5,960	852	*1,050	193	60	33	28
15	276	1,950	3,280	7,670	3,520	6,460	811	845	178	60	31	27
16	247	7,140	6,430	11,200	3,010	9,110	762	746	166	63	27	22
17	231	14,500	8,260	*16,700	2,540	8,000	722	667	161	56	26	25
18	254	*15,700	6,590	*18,800	2,550	5,790	682	602	*156	50	25	24
19	586	11,600	4,660	13,800	2,500	4,160	645	560	143	57	22	21
20	772	8,590	3,700	10,300	3,120	3,510	608	518	138	55	24	23
21	612	7,240	3,080	9,250	3,460	3,280	572	481	131	56	21	23
22	474	6,220	2,950	13,800	2,980	3,280	538	452	122	56	16	21
23	393	4,650	6,220	12,300	2,520	3,000	519	432	121	55	16	21
24	336	4,310	5,980	10,500	2,180	2,650	498	455	120	49	18	24
25	289	5,320	4,500	9,280	2,010	2,390	484	422	118	46	18	26
26	506	5,020	3,510	7,950	1,950	2,250	468	402	110	*49	19	30
27	*1,300	4,870	3,210	6,400	*1,750	2,100	457	371	105	50	20	47
28	4,480	4,280	3,940	4,620	1,560	1,930	960	357	102	49	21	47
29	5,270	3,490	4,870	3,400	-	1,810	986	352	93	44	24	51
30	4,230	3,670	4,390	2,750	-	1,960	799	331	84	48	42	113
31	3,800	-	4,390	2,300	-	2,190	-	320	-	41	50	-
Total	30,095	142,840	146,680	221,290	107,990	102,430	28,236	17,252	5,390	2,050	867	1,033
Mean	971	4,761	4,732	7,158	3,857	3,304	941	557	180	66.1	28.0	34.4
Cfsm	1.93	9.48	9.45	14.2	7.68	6.58	1.87	1.11	0.359	0.132	0.056	0.069
In.	2.23	10.58	10.37	16.39	8.00	7.59	2.09	1.28	0.40	0.15	0.06	0.08
Ac-ft	59,690	283,300	290,900	438,900	214,200	203,200	56,010	34,220	10,690	4,070	1,720	2,050

Calendar year 1950: Max 26,100 Min 35 Mean 2,083 Cfsm 4.15 In. 56.33 Ac-ft 1,508,000  
Water year 1950-51: Max 18,800 Min 16 Mean 2,209 Cfsm 4.40 In. 59.72 Ac-ft 1,599,000

Peak discharge (base, 9,300 cfs).--Nov. 18 (10:30 a.m.) 16,200 cfs (39.40 ft); Jan. 4 (12:30 a.m.) 9,810 cfs (34.02 ft); Jan. 17 (11 p.m.) 22,000 cfs (41.49 ft); Jan. 22 (5 p.m.) 14,800 cfs (38.69 ft); Mar. 16 (5 p.m.) 9,400 cfs (33.33 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of record for station near Willamina and recorded range in stage.

## Haskins Creek near McMinnville, Oreg.

Location.--Lat 45°18'50", long. 123°21'55", in NE¼ sec. 13, T. 3 S., R. 6 W., on left bank 300 ft upstream from high-water line of McMinnville water-supply reservoir, 200 ft downstream from Idlewild Creek, and 11 miles northwest of McMinnville.

Drainage area.--6.7 sq mi, approximately (revised).

Records available.--October 1928 to September 1951 (discontinued).

Gage.--Water-stage recorder and wooden control. Altitude of gage is 815 ft above mean sea level (by barometer). Prior to Oct. 1, 1930, at datum 1.00 ft higher.

Average discharge.--23 years, 26.4 cfs (adjusted for diversion), revised.

Extremes (not adjusted for diversion).--Maximum discharge during year, 316 cfs Jan. 17 (gage height, 2.94 ft, from high-water mark); minimum, 0.7 cfs July 22, 23.

1928-51: Maximum discharge, 610 cfs Mar. 31, 1931 (gage height, 4.00 ft, before control was built); minimum prior to diversion above station, 1.0 cfs Oct. 8, 1932.

Revisions.--The figures of maximum discharge for water years 1932 and 1935 have been revised to 285 cfs Jan. 18, 1932, and 226 cfs Mar. 12, 1935 (gage height, 2.45 ft), superseding those published in Water Supply Papers 739 and 794 respectively.

Remarks.--Records good except those for periods of no gage-height record and those below 2 cfs, which are fair. Since Sept. 2, 1937, a small amount of water has been diverted at a point 800 ft upstream for municipal supply of McMinnville. Actual amount of diversion not known for water years 1938-39, 1948-51. No regulation.

Cooperation.--Water-stage recorder inspected by employees of city of McMinnville.

Revisions.--Revised figures of discharge for the water years 1930 and 1931 (complete tables) and for scattered periods in water years 1939, 1945-48 (partial tables) are given herein. They supersede those published in Water-Supply Papers 709, 724, 884, 1044, 1064, 1094 and 1124.

Discharge, in cubic feet per second, water year October 1928 to September 1930

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	1.4	2.3	1.9	32	74	45	23	10	11	5.7	2.9	1.7	
2	1.5	2.3	1.9	30	64	41	21	9.8	10	5.2	2.9	1.5	
3	1.6	2.3	1.9	27	46	38	22	9.5	12	5.2	2.7	1.5	
4	1.7	2.3	1.9	33	53	35	21	9.1	11	5.2	2.7	1.6	
5	1.7	2.3	1.9	29	112	33	19	8.7	10	4.8	2.7	1.7	
6	1.6	2.6	1.9	25	79	31	17	9.5	9.8	4.8	2.6	1.9	
7	1.6	2.4	1.9	22	210	29	17	9.1	9.1	4.8	2.6	2.1	
8	2.6	2.3	7.0	21	119	28	15	8.4	8.7	4.4	2.6	3.2	
9	2.6	2.4	14	19	84	27	15	8.4	8.0	4.4	2.6	2.3	
10	2.0	4.0	21	17	96	25	14	7.7	8.0	4.4	2.4	2.3	
11	1.9	3.2	12	16	86	24	13	7.0	8.0	4.0	2.4	2.7	
12	2.1	2.7	8.0	15	78	22	12	8.4	7.7	4.0	2.3	2.4	
13	2.0	2.7	43	13	76	22	12	8.4	7.3	4.0	2.0	2.3	
14	2.0	2.7	80	12	72	21	13	8.7	6.8	4.0	2.0	2.0	
15	2.0	2.7	32	12	64	19	11	8.7	6.5	4.0	2.1	2.0	
16	2.0	2.7	33	12	55	19	11	8.0	6.5	4.0	2.4	1.7	
17	2.6	3.2	26	12	50	17	11	7.7	6.5	4.0	2.3	1.6	
18	2.4	3.1	53	10	53	17	11	7.7	6.2	4.0	2.3	1.6	
19	2.6	2.9	44	11	76	16	11	10	6.0	3.8	2.3	1.6	
20	2.3	2.9	32	9.5	107	17	11	28	6.0	3.2	2.3	1.4	
21	2.1	2.9	26	9.8	93	36	11	49	6.0	3.2	2.3	1.4	
22	2.0	2.9	34	9.5	91	50	10	32	6.0	2.9	2.1	1.5	
23	2.0	2.9	48	9.1	85	45	10	25	6.0	2.9	2.1	1.9	
24	1.9	2.9	37	9.1	73	43	10	21	5.7	2.9	2.1	3.4	
25	2.0	3.1	42	8.4	70	40	10	19	6.0	3.2	2.1	2.4	
26	2.1	2.8	36	8.0	61	36	9.8	16	6.2	3.2	2.0	2.4	
27	2.4	2.6	32	8.0	55	34	15	14	6.0	3.1	2.0	2.4	
28	2.4	2.4	27	8.4	50	32	13	13	6.0	2.9	1.7	2.6	
29	2.3	2.2	23	24	-	29	12	13	5.4	2.7	1.7	2.1	
30	2.3	2.1	22	22	-	28	11	13	5.1	2.7	1.9	1.7	
31	2.3	-	22	27	-	26	-	11	-	2.7	1.9	-	
Total	64.0	80.8	767.3	520.8	2,232	925	411.8	418.8	223.5	120.3	71.0	60.9	
Cfsm	0.307	0.401	3.70	2.51	11.9	4.45	2.04	2.01	1.11	0.579	0.342	0.303	
In.	0.35	0.45	4.27	2.89	12.39	5.13	2.28	2.32	1.24	0.67	0.39	0.34	
Ac-ft	127	160	1,520	1,030	4,430	1,830	815	830	443	239	141	121	
Calendar year 1929: Max	116			Min	1.4	Mean	15.5	Cfsm	2.31	In.	31.49	Ac-ft	11,250
Water year 1929-30: Max	210			Min	1.4	Mean	16.2	Cfsm	2.42	In.	32.72	Ac-ft	11,690

## Haskins Creek near McMinnville, Oreg.--Continued

Discharge, in cubic feet per second, water year October 1930 to September 1931

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.		
1	1.7	2.5	3.8	11	32	36	280	20	6.0	4.5	1.6	1.4		
2	1.8	2.4	7.3	21	27	35	175	20	6.0	4.4	1.5	1.4		
3	1.8	2.5	6.8	32	26	33	130	16	6.0	4.4	1.5	1.4		
4	1.8	2.5	6.5	41	23	30	119	14	5.5	4.1	1.4	1.4		
5	1.8	2.5	6.5	70	22	28	77	14	5.5	3.7	1.6	1.4		
6	1.9	2.3	6.2	63	20	26	70	14	5.5	3.1	1.7	3.1		
7	3.6	2.2	5.7	50	19	24	90	14	5.3	3.3	1.6	2.6		
8	2.4	4.4	5.4	40	17	23	81	13	5.5	3.1	1.5	2.1		
9	2.5	6.8	5.7	33	16	45	68	12	5.5	3.3	1.4	1.9		
10	2.2	5.4	5.7	28	15	52	59	11	6.0	3.3	1.5	2.0		
11	2.0	3.8	6.5	26	15	60	50	11	5.5	3.3	1.5	1.9		
12	1.9	9.8	12	25	14	60	44	11	5.1	3.1	1.5	1.9		
13	1.8	6.5	28	22	14	54	41	11	5.3	3.3	1.4	1.8		
14	1.9	4.2	18	25	14	48	46	11	6.5	3.3	1.5	1.7		
15	2.3	22	14	28	14	43	42	10	8.0	3.0	1.4	1.8		
16	2.2	28	14	53	14	38	38	11	6.8	2.9	1.4	1.7		
17	2.0	17	18	54	43	40	35	11	6.4	2.7	1.4	1.8		
18	2.0	11	17	46	53	66	31	11	6.2	2.4	1.4	3.4		
19	1.9	11	17	38	52	88	29	9.7	5.8	2.3	1.5	2.9		
20	1.9	11	15	33	43	93	27	9.4	5.3	2.1	1.4	2.1		
21	1.9	9.5	14	34	38	85	24	9.1	5.3	2.1	1.5	2.0		
22	1.9	7.7	12	64	34	74	23	9.1	6.0	2.0	1.4	1.7		
23	2.2	6.8	14	116	31	64	22	8.5	5.5	2.0	1.4	1.5		
24	3.6	6.0	13	98	28	58	23	8.2	5.1	2.0	1.4	1.5		
25	3.1	5.4	12	90	28	52	21	8.0	5.5	1.9	1.4	1.6		
										1.7				
26	3.1	4.9	11	80	32	47	19	7.7	9.4	1.7	1.4	1.7		
27	3.6	4.4	11	66	42	45	18	7.1	6.8	1.8	1.4	1.7		
28	4.2	6.0	10	56	40	58	18	6.6	5.1	1.7	1.4	1.8		
29	2.5	4.0	9.5	48	-	68	18	6.4	5.3	1.8	1.4	2.5		
30	2.4	4.0	9.1	42	-	142	18	6.0	4.7	1.7	1.4	3.4		
31	2.4	-	8.7	38	-	500	-	6.0	-	1.7	1.4	-		
Total	70.7	214.7	343.4	1,473	766	2,115	1,736	336.8	176.4	86.0	45.2	59.1		
Mean	2.28	7.16	11.1	47.5	27.4	68.2	57.9	10.9	5.88	2.77	1.46	1.97		
Cfsm	0.340	1.07	1.66	7.09	4.09	10.2	8.64	1.63	0.878	0.413	0.218	0.294		
In.	0.39	1.19	1.91	8.17	4.26	11.76	9.64	1.88	0.98	0.48	0.25	0.33		
Ac-ft	140	426	682	2,920	1,520	4,190	3,450	670	350	170	90	117		
Calendar year 1930: Max				210	Min	1.4	Mean	15.4	Cfsm	2.30	In.	31.14	Ac-ft	11,130
Water year 1930-31: Max				500	Min	1.4	Mean	20.3	Cfsm	3.03	In.	41.24	Ac-ft	14,720

Day (water year)	Discharge (cubic feet per second)	Day (water year)	Discharge (cubic feet per second)	Day (water year)	Discharge (cubic feet per second)
1938-39					
Dec. 2.....	105	Jan. 19.....	65	Jan. 28.....	85
3.....	95	20.....	55	29.....	70
4.....	60	Feb. 7.....	165	Feb. 2.....	170
5.....	47	8.....	135	3.....	120
6.....	40	9.....	90	4.....	80
7.....	35	10.....	70	5.....	60
8.....	30	11.....	60	1947-48	
Jan. 2.....	70	12.....	75	Oct. 17.....	50
3.....	90	13.....	110	18.....	55
4.....	95	14.....	80	19.....	70
5.....	85	15.....	65	20.....	85
6.....	65	1945-46		21.....	55
7.....	50	Nov. 18.....	50	Nov. 1.....	65
8.....	45	17.....	70	2.....	50
Feb. 11.....	70	18.....	110	3.....	40
13.....	130	19.....	85	4.....	36
14.....	170	20.....	55	5.....	34
1944-45		Jan. 22.....	70	6.....	40
Jan. 6.....	55	23.....	65	7.....	65
7.....	90	24.....	130	8.....	95
8.....	70	25.....	65	9.....	70
13.....	60	26.....	65	10.....	55
14.....	55	1946-47		11.....	40
15.....	75	Jan. 25.....	130	12.....	35
16.....	85	26.....	120	13.....	40
17.....	80	27.....	95	14.....	45
18.....	75				



## Haskins Creek near McMinnville, Oreg.--Continued

Month	Observed				Diversion for McMinnville water supply (acre-feet)	Adjusted for diversion			
	Maxi-mum (cfs)	Mini-mum (cfs)	Mean (cfs)	Runoff (acre-feet)		Runoff (acre-feet)	Mean (cfs)	Per square mile	Runoff in inches
December 1938.....	105	8.3	25.7	1,580	-	-	-	-	-
Calendar year 1938..	213	.2	22.9	16,600	-	-	-	-	-
January 1939.....	95	22	40.0	2,460	-	-	-	-	-
February.....	237	31	69.6	3,870	-	-	-	-	-
Water year 1938-39..	237	.2	17.1	12,410	-	-	-	-	-
Calendar year 1939..	237	.2	17.1	12,410	-	-	-	-	-
January 1945.....	90	19	43.4	2,670	106	2,780	45.1	6.73	7.77
February.....	165	27	56.4	3,130	114	3,240	58.4	8.72	9.08
Water year 1944-45..	179	.3	20.9	15,160	1,090	16,250	22.4	3.34	45.48
November 1945.....	160	4.1	43.1	2,570	29	2,600	43.6	6.51	7.26
Calendar year 1945..	195	.3	28.0	20,270	965	21,240	29.3	4.37	59.43
January 1946.....	149	25	69.5	4,280	68	4,350	70.7	10.6	12.16
Water year 1945-46..	280	1.2	29.2	21,140	705	21,840	30.2	4.51	61.15
Calendar year 1946..	280	1.2	29.3	21,240	812	22,050	30.5	4.55	61.70
January 1947.....	144	14	40.8	2,510	116	2,630	42.7	6.37	7.55
February.....	170	22	52.5	2,910	109	3,020	54.4	8.12	8.46
Water year 1946-47..	-	1.3	23.3	16,920	890	17,810	24.6	3.67	49.80
October 1947.....	85	3.7	25.6	1,580	-	-	-	-	-
November.....	95	15	40.7	2,420	-	-	-	-	-
Calendar year 1947..	144	1.5	22.2	16,070	-	-	-	-	-
Water year 1947-48	238	.8	29.8	21,630	-	-	-	-	-

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-27				Oct. 28 to Sept. 30			
1.2	0.8	1.6	16	1.2	0.8	1.8	40
1.3	2.5	1.8	35	1.3	2.5	2.1	88
1.4	5.5	2.0	61	1.4	6.0	2.4	154
1.5	10			1.5	11	2.7	238
				1.6	18		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a1.4	*70	75	a60	56	29	50	17	8.4	2.0	2.5	2.8
2	a2	74	65	a130	72	27	50	17	8.4	2.2	2.5	2.5
3	a4	57	67	a120	75	26	51	14	6.0	2.2	2.5	2.5
4	a6	46	75	a100	70	30	53	14	5.6	2.2	2.5	2.5
5	a11	36	75	a90	65	28	51	a14	5.6	2.0	2.5	2.5
6	a12	30	88	a65	72	25	48	a14	5.2	2.5	2.0	2.0
7	a11	26	88	a55	104	24	46	a14	5.2	2.0	2.2	2.5
8	a7	25	81	a50	110	24	41	a13	4.8	2.0	2.5	2.8
9	a6	23	74	a46	123	22	*39	12	4.8	1.7	2.5	2.2
10	a8	23	62	a46	128	21	36	12	4.8	1.7	*2.2	2.2
11	a7	a20	57	a46	149	19	35	11	4.4	1.7	2.2	1.8
12	a6	a18	50	a46	112	29	33	13	4.1	1.5	2.5	1.7
13	a5	a16	44	a60	94	35	32	16	4.1	1.3	2.5	1.5
14	a4.5	a17	43	a80	77	34	29	13	4.1	1.3	2.8	1.5
15	a4	a25	65	a140	70	76	28	12	4.1	1.5	2.8	1.5
16	a4	*50	84	a160	60	72	25	11	3.7	1.5	2.8	1.5
17	a5	79	81	*238	54	62	24	11	3.4	1.2	2.8	1.5
18	a12	67	70	170	53	54	21	10	3.1	1.5	2.8	*1.5
19	a11	54	82	112	53	50	20	10	3.1	1.5	2.8	1.7
20	a5.5	a70	53	94	59	48	19	10	*3.1	1.3	3.1	1.7
21	a7	a25	47	186	53	53	17	9.4	3.4	1.2	3.1	1.7
22	a6.5	a80	a60	159	48	51	17	8.9	3.4	1.2	3.1	1.8
23	a6	a70	a100	132	46	48	17	9.4	3.1	1.7	3.1	2.0
24	a5.5	a80	a90	149	43	44	16	8.9	3.1	2.8	2.2	2.2
25	*7.8	a75	a70	172	40	44	15	8.9	3.1	3.1	3.1	3.4
26	11	a70	a60	177	*35	46	14	8.4	2.5	3.1	3.4	2.8
27	50	a65	a55	132	32	46	20	7.9	2.5	2.8	3.1	2.5
28	72	a55	a90	100	30	44	24	7.4	2.5	2.8	4.4	4.1
29	60	a50	a85	81	-	48	19	7.4	2.2	2.5	4.4	6.0
30	53	a70	a75	70	-	57	17	6.9	2.0	2.5	3.7	16
31	57	-	a65	64	-	54	-	6.9	-	2.5	3.1	-
Total	471.2	1,536	2,156	3,330	1,983	1,270	907	348.4	119.8	61.0	87.4	82.6
Mean	15.2	51.2	69.5	107	70.8	41.0	30.2	11.2	3.99	1.97	2.82	2.75
Ac-ft	935	3,050	4,280	6,600	3,930	2,520	1,800	691	238	121	173	164

Calendar year 1950: Max 320 Min 0.7 Mean 39.4 Ac-ft 28,530  
Water year 1950-51: Max 238 Min 1.2 Mean 33.8 Ac-ft 24,500

Peak discharge (base, 180 cfs).--Jan. 17 (about 2 a.m.) 316 cfs (2.94 ft); Jan. 21 (10 a.m.) 217 cfs (2.63 ft); Jan. 25 (9 to 10 a.m.) 208 cfs (2.60 ft).

\* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of records for North Yamhill River near Pike, South Yamhill River near Willamina, and recorded range in stage.

## North Yamhill River near Pike, Oreg.

Location.--Lat 45°22'15", long. 123°17'10", in NE $\frac{1}{4}$  sec. 27, T. 2 S., R. 5 W., on left bank  $1\frac{1}{2}$  miles west of Pike, 2 miles (revised) downstream from Haskins Creek, and  $5\frac{1}{2}$  miles northwest of Yamhill.

Drainage area.--48.8 sq mi.

Records available.--October 1940 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 249.22 ft above mean sea level, datum of 1929 (Corps of Engineers benchmark). Prior to Oct. 23, 1940, staff gage at same site and datum.

Average discharge.--11 years, 184 cfs.

Extremes.--Maximum discharge during year, 2,640 cfs Jan. 17 (gage height, 6.66 ft); minimum, 6.2 cfs Sept. 18.

1940-51: Maximum discharge, 4,780 cfs Feb. 10, 1949 (gage height, 9.28 ft), from rating curve extended above 2,500 cfs; minimum, 4.2 cfs Sept. 11, 1944; minimum daily, 6.0 cfs Sept. 10, 1944.

Remarks.--Records good. Occasional diurnal fluctuations caused by small dams upstream; no seasonal regulation. Water supply for city of McMinnville is diverted from Haskins Creek above station.

Revisions.--W 1154: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Jan. 17 to Feb. 5)

Oct. 1 to Jan. 16				Jan. 17 to Sept. 30			
1.0	4.5	2.5	266	1.0	5.5	1.5	57
1.2		3.5	615	1.1	15	2.0	143
1.5	51	4.5	1,120	1.3	32	2.5	266
1.9	121	6.0	2,050	Note.--Same as preceding table above 2.5 ft.			

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10	555	611	397	326	a160	278	82	40	18	10	10
2	11	583	492	1,110	499	a160	260	77	39	19	11	9.2
3	25	404	488	1,050	599	a160	263	76	38	19	11	9.2
4	34	302	*551	696	523	212	266	76	42	20	11	7.8
5	79	230	563	527	453	204	256	71	45	20	11	7.8
6	90	185	795	432	523	187	238	77	39	23	10	8.5
7	88	171	723	364	765	176	225	77	36	20	10	14
8	49	160	567	323	785	176	212	71	34	19	10	15
9	39	166	495	296	895	162	*194	67	36	18	*11	11
10	51	238	408	311	870	156	178	71	33	18	11	9.2
11	57	125	371	305	1,010	151	169	76	32	17	11	9.2
12	40	103	308	281	770	266	162	82	39	16	12	9.2
13	34	95	278	400	595	377	156	96	37	16	12	8.5
14	32	94	263	607	481	384	147	80	32	15	12	7.8
15	30	359	488	1,110	414	882	137	77	30	15	11	7.0
16	29	760	750	1,190	361	678	130	73	27	15	11	7.0
17	31	835	624	2,000	329	495	122	68	27	15	11	*7.8
18	97	633	488	1,160	317	418	116	67	27	15	11	7.0
19	86	436	428	*830	293	390	111	65	26	15	10	7.8
20	64	646	358	740	345	390	105	63	*25	15	9.2	7.8
21	52	855	317	1,590	296	397	100	*60	24	14	8.5	7.0
22	45	664	606	1,210	266	384	94	53	23	13	8.5	7.8
23	40	543	900	972	244	342	92	54	23	12	9.2	8.5
24	37	674	587	1,050	222	311	89	56	23	12	9.2	11
25	*43	591	464	1,110	220	308	87	60	22	13	8.5	16
26	79	484	411	1,050	*200	305	84	52	21	14	8.5	14
27	426	456	384	760	a190	290	103	50	20	12	8.5	12
28	620	368	678	275	a170	118	53	20	12	11	17	
29	488	320	547	478	-	284	91	52	19	12	14	25
30	414	543	511	411	-	336	84	45	18	12	13	58
31	470	-	453	361	-	308	-	40	-	11	11	-
Total	3,690	12,558	15,807	23,704	12,901	9,724	4,669	2,067	897	485	326.1	357.1
Mean	119	419	510	765	463	314	156	66.7	29.9	15.6	10.5	11.9
Cfsm	2.44	8.59	10.5	15.7	9.49	6.43	3.20	1.37	0.613	0.320	0.215	0.244
In.	2.81	9.57	12.05	18.06	9.88	7.41	3.56	1.58	0.68	0.37	0.25	0.27
Ac-ft	7,320	24,910	31,350	47,020	25,710	19,290	9,260	4,100	1,780	962	647	708
Calendar year 1950: Max	2,410	Min	6.9	Mean	274	Cfsm	5.61	In.	76.29	Ac-ft	198,600	
Water year 1950-51: Max	2,000	Min	7.0	Mean	239	Cfsm	4.90	In.	66.49	Ac-ft	173,100	

Peak discharge (base, 1,800 cfs).--Jan. 17 (3 a.m.) 2,640 cfs (6.66 ft); Jan. 21 (9 a.m.) 2,020 cfs (5.80 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of record for station at Pike and recorded range in stage.

## North Yamhill River at Pike, Oreg.

Location.--Lat 45°22'10", long. 123°15'15", in NW¼ sec. 25, T. 2 S., R. 5 W., on right bank 500 ft downstream from Turner Creek, 0.5 mile southeast of Pike, and 4 miles northwest of Yamhill.

Drainage area.--66.8 sq mi.

Records available.--October 1948 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 192.66 ft above mean sea level, datum of 1929 (Corps of Engineers benchmark). Prior to Aug. 21, 1950, at datum 1.02 ft higher.

Extremes.--Maximum discharge during year, 3,400 cfs Jan. 17 (gage height, 7.34 ft); minimum, 6.6 cfs Aug. 22, Sept. 16.  
1948-51: Maximum discharge, 6,280 cfs Feb. 10, 1949 (gage height, 9.98 ft); minimum, that of Aug. 22 and Sept. 16, 1951.

Remarks.--Records good except those for period of no gage-height record, which are fair. Occasional diurnal fluctuations caused by small dams upstream; no seasonal regulation. Water supply for city of McMinnville is diverted from Haskins Creek above station and water supply for city of Yamhill is diverted from Turner Creek above station. Small diversions above station for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 16				Jan. 17 to Sept. 30			
1.1	10	2.4	143	0.8	6.1	2.3	140
1.4	24	2.9	285	1.0	12	2.8	268
1.7	46	4.0	725	1.2	21	3.5	535
2.0	78	5.5	1,610	1.5	39	4.9	1,330
				1.9	79	6.5	2,580

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	626	735	477	a380	210	334	95	45	19	11	9.4
2	13	630	590	1,230	a600	202	310	91	45	20	12	8.5
3	28	457	585	1,210	a700	202	307	89	44	20	11	8.5
4	40	355	*639	826	a600	274	310	89	47	22	11	8.0
5	98	278	634	644	a550	259	300	83	51	22	11	7.7
6	109	225	902	533	a650	241	278	89	47	24	11	8.0
7	109	199	815	461	a850	227	265	92	41	22	11	13
8	64	191	648	408	a950	227	244	84	41	20	10	14
9	50	184	581	376	1,080	210	*227	79	41	19	*11	11
10	66	284	493	404	1,030	202	210	84	38	19	11	9.4
11	72	148	453	390	1,230	200	197	88	36	16	11	8.8
12	51	123	386	362	936	374	189	93	41	16	11	8.8
13	43	114	348	506	730	526	182	111	42	16	11	8.5
14	39	111	334	760	595	535	170	95	36	16	10	7.7
15	36	508	608	1,340	512	1,210	159	89	33	16	9.4	7.7
16	34	946	902	1,440	436	926	150	83	31	16	9.4	7.2
17	38	990	750	2,450	397	670	140	79	30	16	9.1	*7.4
18	114	755	584	1,350	385	571	133	75	29	18	8.8	7.7
19	103	537	521	*980	370	522	127	73	28	17	8.3	7.7
20	82	760	445	879	440	517	120	69	*27	16	8.0	7.7
21	66	946	400	1,990	378	517	116	*66	26	16	7.4	7.7
22	57	725	718	1,440	341	490	108	59	24	15	7.2	7.7
23	50	603	924	1,170	310	432	105	82	24	14	7.7	8.5
24	46	730	680	1,240	290	397	102	63	24	15	8.0	10
25	*49	652	557	1,270	281	385	99	65	24	15	7.7	16
26	88	553	497	1,170	*259	381	96	59	22	15	7.7	15
27	439	529	485	874	238	356	122	57	22	14	8.0	12
28	666	429	800	680	224	358	140	58	20	13	9.4	17
29	537	380	644	a550	-	345	106	59	20	13	12	27
30	493	657	603	a500	-	408	96	51	12	12	12	68
31	545	-	537	a420	-	370	-	46	-	12	11	-
Total	4,236	14,605	18,808	28,340	15,744	12,722	5,442	2,374	999	524	304.1	365.6
Mean	137	487	607	914	562	410	181	76.6	33.3	16.9	9.81	12.2
Cfs/m	2.05	7.29	9.09	13.7	8.41	6.14	2.71	1.15	0.499	0.253	0.147	0.183
In.	2.36	8.13	10.47	15.78	8.77	7.08	3.03	1.32	0.56	0.29	0.17	0.20
Ac-ft	8,400	28,970	37,310	56,210	31,230	25,230	10,780	4,710	1,980	1,040	603	725

Calendar year 1950: Max 2,840 Min 7.8 Mean 333 Cfs/m 4.99 In. 67.59 Ac-ft 240,800

Water year 1950-51: Max 2,450 Min 7.2 Mean 286 Cfs/m 4.28 In. 58.16 Ac-ft 207,200

Peak discharge (base, 2,500 cfs).--Jan. 17 (3:30 a.m.) 3,400 cfs (7.34 ft); Jan. 21 (9:30 a.m.) 2,570 cfs (6.49 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for station near Pike and recorded range in stage.

## Willamette River at Wilsonville, Oreg.

Location.--Lat 45°17'30", long. 122°46'30", in SW $\frac{1}{4}$  sec. 23, T. 3 S., R. 1 W., on right bank 1 mile downstream from Corral Creek and 3 miles upstream from Molalla River at Boones Ferry, town of Wilsonville.

Drainage area.--8,400 sq mi, approximately.

Records available.--October 1948 to September 1951.

Gage.--Staff gage read twice daily. Datum of gage is at mean sea level, datum of 1929. Supplementary staff gage at Butteville 4 miles upstream, datum of which is 50 ft above mean sea level, datum of 1929. Records for the entire period of record obtained from gage at Butteville.

Extremes.--Maximum discharge during year, 147,000 cfs Nov. 2 (elevation at Butteville, 79.05 ft); minimum daily, 4,200 cfs Sept. 19-25 (computed from records for station at Salem and South Yamhill River near Whiteson).

1948-51: Maximum discharge, 196,000 cfs Feb. 20, 1949 (elevation at Butteville, 85.20 ft; elevation at Wilsonville, 83.20 ft); minimum daily, 3,700 cfs Sept. 5-8, 1949 (computed from records for station at Salem).

Maximum elevation known, about 105 ft at Wilsonville, Dec. 4, 1861.

Remarks.--Records excellent except those for periods of backwater from stoplogs, gates and locks at dam, which are fair. Flow slightly regulated by Cottage Grove, Fern Ridge, and Dorena Reservoirs. Many small diversions for irrigation above station.

Rating table, water year 1950-51, except periods of backwater from stoplogs, gates and locks at dam at Oregon City (gage height, in feet, and discharge, in cubic feet per second)

54.0	9,600	70.0	85,500
57.0	20,100	75.0	118,000
61.0	37,100	79.0	147,000
65.0	56,700		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6,200	138,000	59,200	51,400	47,800	24,100	30,600	22,500	13,400	7,000	4,600	5,000
2	6,000	145,000	64,100	51,400	43,100	22,700	28,200	20,800	12,900	7,000	4,600	4,800
3	8,200	132,000	63,600	68,200	45,200	21,500	26,100	19,900	11,900	7,500	4,400	4,800
4	7,000	130,000	66,600	81,100	52,400	22,200	28,100	19,800	11,600	7,500	4,400	4,600
5	10,000	116,000	79,500	81,900	57,200	29,900	31,000	20,400	11,300	7,000	4,400	4,600
6	14,000	92,900	99,000	68,200	78,300	35,400	32,600	21,100	11,200	7,000	4,400	4,600
7	21,000	66,900	112,000	54,400	92,900	35,700	31,600	23,800	10,900	7,000	4,400	4,800
8	22,000	54,300	123,000	45,600	110,000	38,000	30,900	28,200	10,500	6,500	4,400	4,800
9	20,000	45,600	121,000	40,500	121,000	43,100	30,100	28,500	10,500	6,500	4,400	5,000
10	19,000	40,000	108,000	38,000	120,000	47,400	29,200	25,600	10,000	6,500	4,400	5,000
11	16,000	35,500	89,800	37,000	114,000	42,400	27,700	24,200	10,000	6,000	4,400	5,000
12	14,000	31,300	71,700	37,600	111,000	39,000	26,900	24,300	10,000	6,000	4,400	4,800
13	12,000	27,100	58,400	37,100	111,000	46,600	26,600	26,500	10,000	6,000	4,400	4,600
14	10,000	25,200	51,000	42,100	98,800	52,800	28,800	29,900	10,000	6,000	4,600	4,600
15	9,500	26,000	47,600	68,800	76,400	57,200	30,700	30,100	10,000	6,000	4,600	4,600
16	9,000	48,500	52,800	88,000	62,800	71,900	30,800	27,500	9,500	5,500	4,600	4,600
17	9,000	93,600	62,000	101,000	53,200	83,500	29,200	25,100	9,500	5,500	4,600	4,600
18	12,000	120,000	*58,000	118,000	48,600	79,700	28,200	23,700	9,500	5,500	4,400	4,400
19	17,000	134,000	51,100	*130,000	45,800	63,600	27,000	22,700	9,000	5,500	4,400	4,200
20	26,000	133,000	44,000	132,000	43,100	*50,900	24,900	21,500	9,000	5,500	4,400	4,200
21	28,000	125,000	39,200	124,000	41,700	47,300	22,900	20,200	8,500	5,500	4,400	4,200
22	25,000	108,000	36,700	118,000	39,800	47,800	20,800	19,200	8,500	5,500	4,400	4,200
23	*21,000	88,500	40,900	120,000	34,400	47,200	19,300	18,700	8,000	5,000	4,400	4,200
24	19,000	73,200	45,600	124,000	33,100	41,600	18,500	19,100	8,000	5,000	4,400	4,200
25	17,000	73,700	42,100	131,000	30,600	37,300	17,000	20,400	8,000	5,000	4,400	4,200
26	18,000	75,400	36,000	135,000	29,000	35,100	16,500	19,600	7,500	4,800	4,400	4,400
27	21,000	70,400	32,600	131,000	27,400	34,400	16,400	18,200	7,500	4,800	4,400	4,400
28	32,200	67,100	32,100	116,000	25,500	33,400	17,900	16,800	7,500	4,800	4,800	4,400
29	61,100	60,800	39,000	95,200	-	31,500	20,600	16,000	7,000	4,600	4,600	4,600
30	88,100	54,300	49,700	71,500	-	30,600	23,300	15,000	7,000	4,600	5,000	4,800
31	111,000	-	53,300	56,300	-	31,800	-	14,100	-	4,600	5,000	-
Total	707,300	*2,429.3	*1,929.6	*2,594.3	*1,794.1	*1,325.2	772,400	683,400	288,200	181,200	139,400	137,200
Mean	22,820	80,980	62,250	83,690	64,080	42,750	25,750	22,050	9,607	5,845	4,497	4,573
Cfsm	2.72	9.64	7.41	9.36	7.63	5.09	3.07	2.62	1.14	0.696	0.535	0.544
In.	3.13	10.76	8.54	11.49	7.94	5.87	3.42	3.03	1.28	0.80	0.62	0.61
Ac-ft	*1,403	*4,818	*3,827	*5,146	*3,559	*2,628	*1,532	*1,356	571,600	359,400	276,500	272,100
Calendar year 1950: Max	158,000	Min	4,000	Mean	40,330	Cfsm	4.80	In.	65.20	Ac-ft	29,200,000	
Water year 1950-51: Max	143,000	Min	4,000	Mean	35,570	Cfsm	4.23	In.	57.49	Ac-ft	25,750,000	

\* Discharge measurement made on this day.

† Expressed in thousands.

Note.--Backwater from stoplogs, gates and locks at dam at Oregon City Oct. 1-27, June 8 to Sept. 30. Computed discharge for these periods represents flow into the gage pool which, because of pondage, may not represent flow passing gage.

Molalla River above Pine Creek, near Wilhoit, Oreg.

Location.--Lat 45°00'30", long. 122°29'00", near line between secs. 30 and 31, T. 6 S., R. 3 E., on right bank 1,700 ft upstream from Pine Creek and 5 miles southeast of Wilhoit.

Drainage area.--96 sq mi, approximately.

Records available.--October 1935 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 780 ft (by barometer). Prior to Sept. 30, 1945, water-stage recorder at present site at datum 2.02 ft higher.

Average discharge.--16 years, 513 cfs.

Extremes.--Maximum discharge during year, 5,940 cfs Nov. 1 (gage height, 12.14 ft); minimum, 24 cfs Sept. 21-24.

1935-51: Maximum discharge, 12,200 cfs Jan. 7, 1948 (gage height, 13.17 ft); from rating curve extended above 4,800 cfs on basis of shape of previous curve defined to 6,500 cfs; maximum gage height, 13.95 ft Feb. 17, 1949; minimum discharge, 19 cfs Aug. 30 to Sept. 2, 1940.

Remarks.--Records good. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 1				Nov. 2 to Sept. 30			
3.5	59	5.4	1,050	3.2	21	4.7	300
3.8	117	8.0	2,550	3.5	45	6.0	1,160
4.1	215	11.0	4,880	3.8	80	11.0	4,880
4.5	450			4.3	180		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	3,250	1,140	853	672	315	600	528	198	66	40	33
2	84	4,180	980	1,840	832	296	648	512	*185	66	39	32
3	106	2,160	1,140	1,810	1,030	288	839	488	180	64	38	32
4	256	1,370	2,350	1,180	1,110	340	992	536	178	69	38	29
5	880	1,040	1,850	914	1,520	350	914	536	180	70	37	28
6	1,180	825	3,370	755	1,520	300	866	672	168	72	36	28
7	672	648	2,720	640	2,610	276	890	818	162	66	35	30
8	715	600	1,790	568	2,710	288	832	688	153	62	35	35
9	750	488	1,330	512	2,050	272	755	576	147	*59	35	32
10	443	431	1,110	556	1,990	260	688	568	145	58	35	30
11	309	380	*1,020	584	3,340	251	656	576	143	56	35	29
12	250	368	884	504	2,690	*305	727	568	141	55	34	29
13	203	315	776	672	1,700	734	860	608	139	54	34	29
14	179	292	704	2,050	1,250	797	896	512	135	53	34	27
15	169	544	839	2,230	1,080	2,300	825	452	129	53	33	26
16	159	1,580	1,140	1,610	926	1,730	750	424	121	53	32	27
17	326	3,180	986	2,780	860	1,090	700	431	117	52	*31	27
18	954	2,260	839	1,570	790	884	650	380	113	52	31	27
19	1,260	1,280	776	1,100	720	804	*528	330	106	52	31	26
20	1,450	1,860	755	920	672	878	452	300	100	51	31	26
21	904	1,820	664	3,670	640	938	380	284	96	49	30	26
22	560	1,460	890	2,370	568	860	325	296	90	47	29	24
23	415	1,220	1,360	2,100	520	755	300	362	88	46	29	24
24	320	3,240	932	3,510	480	680	292	410	83	45	29	24
25	492	2,410	755	*2,760	438	688	289	356	82	45	29	35
26	608	1,720	648	2,620	398	727	300	310	79	45	29	40
27	1,430	1,630	600	1,740	356	696	350	272	74	44	28	32
28	3,270	1,280	932	1,240	330	640	783	254	72	43	44	32
29	4,050	1,060	1,350	992	-	704	734	233	70	43	43	46
30	*2,600	1,170	1,180	860	-	696	584	218	69	42	43	260
31	1,820	-	992	755	-	640	-	210	-	41	36	-
Total	26,840	44,061	36,782	46,225	33,802	20,762	19,404	13,708	3,743	1,673	1,071	1,124
Mean	866	1,469	1,187	1,491	1,207	670	647	442	125	54.0	34.5	37.5
Cfs/m	9.02	15.3	12.4	15.5	12.6	6.98	6.74	4.60	1.30	0.563	0.359	0.391
In.	10.40	17.07	14.25	17.91	13.09	8.04	7.52	5.31	1.45	0.65	0.41	0.44
Ac-ft	53,240	87,390	72,960	91,690	67,050	41,180	38,490	27,190	7,420	3,320	2,120	2,230

Calendar year 1950: Max 5,500 Min 29 Mean 807 Cfs/m 8.41 In. 114.14 Ac-ft 584,400

Water year 1950-51: Max 4,180 Min 24 Mean 683 Cfs/m 7.11 In. 96.54 Ac-ft 494,300

Peak discharge (base, 3,600 cfs).--Oct. 28 (9 p.m.) 4,740 cfs (10.84 ft); Nov. 1 (12 p.m.) 5,940 cfs (12.14 ft); Nov. 17 (3:30 p.m.) 3,910 cfs (9.89 ft); Nov. 24 (9:30 a.m.) 4,000 cfs (10.00 ft); Dec. 6 (10 a.m.) 4,190 cfs (10.22 ft); Jan. 21 (11 a.m.) 5,200 cfs (11.35 ft); Jan. 24 (6 a.m.) 3,720 cfs (9.85 ft).

\* Discharge measurement made on this day.

## WILLAMETTE RIVER BASIN

Malalla River near Malalla, Oreg.

Location.--Lat 45°07'10", long. 122°32'00", in SW $\frac{1}{4}$  sec. 23, T. 5 S., R. 2 E., on right bank  $\frac{1}{2}$  miles downstream from Little Cedar Creek and 3 miles southeast of Malalla.

Drainage area.--281 sq mi.

Records available.--October 1905 to September 1909, October 1946 to September 1951 (discontinued). July 1938 to September 1942 (irrigation seasons only) at site  $\frac{3}{4}$  miles downstream; records not equivalent.

Gage.--Water-stage recorder. Altitude of gage is 400 ft (by barometer). Prior to July 12, 1909, staff gage at site 1 mile downstream at different datum. Oct. 14, 1946 to Sept. 30, 1947, water-stage recorder at present site at datum 2.13 ft higher.

Average discharge.--9 years, 999 cfs.

Extremes.--Maximum discharge during year, 9,050 cfs Nov. 2 (gage height, 8.40 ft), from rating curve extended above 4,600 cfs on basis of shape of previous curve defined to 14,000 cfs; minimum, 42 cfs Sept. 21, 22.

1905-9, 1946-51: Maximum discharge, 23,700 cfs Jan. 7, 1948 (gage height, 12.87 ft); minimum, 40 cfs July 28-31, 1907.

Remarks.--Records good except those for periods of no gage-height record or shifting control, which are fair.

Revisions.--W 1094: Drainage area. Revised figures of discharge for a few scattered days in water years 1907, 1908, 1909 are given herein, superseding those published in Water-Supply Paper 370.

Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)	Day (water year)	Discharge (cfs)
1906-7		1906-7		1908-9	
Mar. 7.....	900	Mar. 16.....	900	July 7.....	900
8.....	850	17.....	1,000	8.....	700
9.....	850			9.....	600
10.....	1,300	1907-8		10.....	650
12.....	1,100	Dec. 13.....	5,000		
13.....	1,100	14.....	3,000		
15.....	900	15.....	2,100		

Month	Total	Maximum	Minimum	Mean	Per square mile	Runoff
						Inches Acre-feet
March 1907.....	36,220	1,860	850	1,170	5.82	6.71 71,900
Water year 1906-7.....	385,168	9,800	40	1,060	5.27	71.24 763,000
December 1907.....	78,120	5,880	1,030	2,520	12.5	11.41 155,000
Calendar year 1907.....	365,550	9,800	40	1,000	4.98	67.58 725,000
Water year 1907-8.....	347,178	8,550	50	949	4.72	64.16 688,000
July 1909.....	10,982	1,380	100	354	1.76	2.03 21,800

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	115	4,710	1,620	1,430	a1,000	a550	1,000	808	310	113	72	68
2	104	6,820	1,390	2,800	a1,200	a500	1,020	808	*298	113	72	68
3	188	3,700	1,740	3,370	a1,500	a500	1,310	778	290	113	72	64
4	450	1,640	3,310	2,200	a1,700	a550	1,580	838	283	122	71	61
5	1,150	2,060	2,660	1,590	a2,200	a650	1,540	860	298	130	69	60
6	1,960	1,570	5,180	1,260	a2,300	a600	1,440	1,000	290	135	68	61
7	1,130	1,330	4,330	1,070	a3,600	a550	1,440	1,400	269	120	68	68
8	1,310	1,300	2,840	949	a4,000	a600	1,320	1,130	255	110	66	79
9	1,370	1,130	2,000	868	a3,200	a650	1,190	985	241	*104	66	71
10	860	983	1,570	884	a2,900	a550	1,090	932	234	104	66	64
11	652	920	*1,430	924	a5,000	a500	1,050	949	224	101	66	63
12	510	890	1,250	845	a4,000	*535	1,110	908	220	99	66	61
13	426	790	1,070	932	a2,500	1,930	1,320	949	220	99	64	58
14	375	750	976	3,670	a1,900	2,020	1,410	838	211	97	63	55
15	375	1,670	1,080	4,260	a1,800	5,350	1,280	755	202	97	60	54
16	330	3,800	1,490	2,960	a1,600	4,100	1,180	718	190	94	58	53
17	687	7,250	1,350	5,270	a1,500	2,400	1,120	718	182	94	*58	53
18	1,410	4,400	1,150	3,250	a1,400	1,760	1,020	675	178	92	57	52
19	1,850	2,730	1,060	2,180	a1,300	1,550	*884	605	172	90	55	50
20	2,560	3,460	1,010	1,710	a1,200	1,650	762	549	168	88	54	46
21	1,740	3,210	884	5,930	a1,100	1,800	668	514	160	85	*53	43
22	1,160	2,630	1,420	4,420	a1,900	1,370	1,570	549	150	85	52	42
23	910	2,260	1,820	3,760	a900	1,300	549	598	150	85	52	44
24	741	5,050	1,280	6,380	a850	1,150	528	682	145	85	53	45
25	1,000	3,800	1,030	*4,820	a800	1,150	521	640	145	85	54	64
26	1,290	2,660	892	4,490	a750	1,210	528	563	138	83	55	68
27	2,170	2,490	838	2,980	a650	1,140	577	494	130	81	54	61
28	4,730	1,680	1,300	1,500	a600	1,040	448	125	79	71	60	56
29	7,050	1,480	2,150	1,490	-	1,150	1,060	392	120	78	113	85
30	*4,680	1,710	1,930	a1,300	-	1,120	892	360	118	76	88	266
31	3,370	-	1,720	a1,100	-	1,060	-	335	-	74	72	-
Total	46,671	80,073	53,335	81,162	52,450	41,215	31,094	22,741	6,121	3,011	2,008	2,005
Mean	1,508	2,669	1,720	2,618	1,673	1,330	1,036	734	204	97.1	64.8	66.8
Cfs/m	7.49	13.63	8.56	13.0	9.32	6.82	5.15	3.65	1.01	0.483	0.322	0.332
In.	8.54	14.82	9.87	15.02	10.70	7.63	5.75	4.23	1.13	0.56	0.37	0.37
Ac-ft	92,570	158,800	105,800	161,000	104,000	81,750	61,670	45,110	12,140	5,970	3,980	3,980
Calendar year 1950: Max	9,180				Min 55	Mean 1,401	Cfs/m 6.97	In. 94.66	Ac-ft 1,014,000			
Water year 1950-51: Max	7,250				Min 42	Mean 1,156	Cfs/m 5.75	In. 78.07	Ac-ft 836,800			

Peak discharge (base, 5,000 cfs).--Oct. 29 (7 a.m.) 7,920 cfs (7.97 ft); Nov. 2 (1 a.m.) 9,050 cfs (8.40 ft); Nov. 17 (to 2 p.m.) 8,280 cfs (8.11 ft); Nov. 24 (8 a.m.) 5,940 cfs (7.33 ft); Dec. 6 (10 a.m.) 6,360 cfs (7.50 ft); Jan. 17 (7:30 a.m.) 8,540 cfs (7.57 ft); Jan. 21 (12 m.) 8,390 cfs (8.28 ft); Jan. 24 (7 a.m.) 6,740 cfs (7.65 ft); Feb. 11 (about 7 a.m.) about 5,500 cfs; Mar. 15 (2:30 p.m.) 7,920 cfs (8.11 ft).

\* Discharge measurement made on this day.

a No gage height record; discharge estimated on basis of weather records and records for stations above Pine Creek near Willhoit and near Canby.

Note.--Shifting-control method used July 11 to Sept. 30.

Molalla River near Canby, Oreg.

Location.--Lat 45°14'40" long. 122°41'10" in NE $\frac{1}{4}$  sec. 9, T. 4 S., R. 1 E., on downstream side of center pier of bridge  $1\frac{1}{2}$  miles downstream from Milk Creek and  $1\frac{1}{2}$  miles south of Canby.

Drainage area.--323 sq mi.

Records available.--August 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 105.00 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Oct. 24, 1933, staff gage at same site and datum.

Average discharge.--23 years, 1,078 cfs.

Extremes.--Maximum discharge during year, 14,100 cfs Nov. 17 (gage height, 10.79 ft); minimum daily, 50 cfs Aug. 21-23.

1928-51: Maximum discharge, 25,100 cfs Jan. 7, 1948 (gage height, 14.9 ft); minimum, 25 cfs Sept. 14, 1938; minimum daily, 38 cfs Sept. 7, 1935, Aug. 18, 23, 1940.

Remarks.--Records good except those for periods of no gage-height record, which are fair.

A few small diversions above station for irrigation.

Cooperation.--Staff gage read once daily October to March by employees of United States Weather Bureau.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

(Shifting-control method used Dec. 13-27, Jan. 7-13, Feb. 1, 2)

Oct. 1 to Nov. 17				Nov. 18 to Sept. 30			
0.9	126	4.0	2,060	0.2	40	4.0	2,120
1.4	258	5.0	3,240	.7	127	5.0	3,260
2.0	494	7.0	6,460	1.2	260	7.0	6,460
2.5	770	9.0	10,200	2.0	590	9.0	10,200
3.0	1,130			3.0	1,250		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	148	*5,000	2,710	2,400	1,630	855	1,250	911	378	117	70	75
2	141	9,100	2,350	3,620	1,750	802	1,250	932	*354	117	70	69
3	172	5,420	2,410	5,130	2,510	760	1,410	876	330	119	70	66
4	402	3,420	4,440	3,450	2,780	946	1,650	946	323	131	70	59
5	909	2,670	4,080	2,620	3,960	1,140	1,830	995	358	147	70	56
6	2,260	2,060	6,370	2,150	3,660	1,090	1,740	1,110	326	149	70	56
7	1,470	1,680	6,770	1,830	5,080	1,020	1,650	1,730	316	152	70	69
8	1,310	1,680	4,520	1,870	6,140	*1,070	1,570	1,450	295	136	65	80
9	1,830	1,430	3,180	1,510	4,490	1,160	1,490	1,230	274	129	65	88
10	1,190	1,250	2,560	1,500	3,860	1,020	1,330	1,130	264	*123	65	78
11	854	1,090	2,300	1,510	5,880	960	1,250	1,130	257	111	65	75
12	656	1,120	2,070	1,430	6,200	1,510	1,250	1,120	254	101	65	75
13	523	958	*1,790	1,450	4,200	2,890	1,410	1,140	257	96	65	72
14	446	924	1,660	4,900	3,060	3,120	1,570	1,040	248	94	60	64
15	460	1,230	1,710	6,700	2,660	6,220	1,410	925	236	92	60	64
16	398	4,920	2,230	4,710	2,240	*6,440	1,410	848	221	94	*60	62
17	655	9,690	2,180	8,140	2,020	3,490	1,330	834	209	96	60	62
18	1,470	9,960	1,920	5,930	1,680	2,570	1,250	784	200	103	55	59
19	1,936	4,760	1,720	3,730	1,660	2,220	*995	706	192	92	55	62
20	3,160	4,580	1,670	2,770	1,580	2,220	662	640	187	88	55	62
21	2,270	4,340	1,480	7,770	1,510	2,330	742	595	174	88	50	59
22	1,600	3,610	1,460	7,710	1,390	2,220	670	590	169	86	50	56
23	1,230	2,910	2,530	5,680	1,280	1,830	615	625	162	83	50	56
24	980	5,700	1,920	9,010	1,150	1,770	580	754	159	80	*51	62
25	1,080	6,140	1,640	6,880	1,140	1,490	570	700	136	85	53	75
26	1,620	4,380	1,440	6,190	1,060	1,570	570	646	149	80	51	86
27	2,210	4,000	1,350	4,410	960	1,570	585	565	145	83	53	98
28	4,850	3,160	2,550	3,090	883	1,410	1,050	518	136	78	56	86
29	8,920	2,570	2,950	*2,440	-	1,330	1,250	468	125	75	88	96
30	6,740	2,630	2,900	2,020	-	1,410	1,050	442	121	75	98	203
31	4,760	-	2,790	1,740	-	1,330	-	414	-	75	85	-
Total	56,644	112,482	81,654	124,090	76,673	59,363	35,589	26,824	6,955	3,177	1,970	2,232
Cfsm	1,827	3,749	2,634	4,003	2,738	1,915	1,186	865	232	102	63.5	74.4
In.	6.52	12.95	8.45	12.4	8.48	5.93	3.67	2.68	0.718	0.316	0.197	0.230
Ac-ft	112,400	223,100	162,000	246,100	152,100	117,700	70,590	53,200	13,800	6,300	3,910	4,430

Calendar year 1950: Max 14,000 Min 69 Mean 1,863 Cfsm 5.77 In. 78.31 Ac-ft 1,349,000  
Water year 1950-51: Max 9,960 Min 50 Mean 1,610 Cfsm 4.98 In. 67.68 Ac-ft 1,166,000

Peak discharge (base, 7,200 cfs).--Oct. 29 (1 p.m.) 9,540 cfs (8.67 ft); Nov. 2 (7 a.m.) 10,800 cfs (9.30 ft); Nov. 17 (12 p.m.) 14,100 cfs (10.79 ft); Nov. 24 (4 p.m.) 7,620 cfs (7.65 ft); Dec. 6 (4 p.m.) 8,380 cfs (8.07 ft); Jan. 17 (1 p.m.) 9,800 cfs (8.80 ft); Jan. 21 (5:30 p.m.) 11,600 cfs (9.67 ft); Jan. 24 (9:50 a.m.) 9,520 cfs (8.66 ft); Mar. 15 (8 p.m.) 10,300 cfs (9.07 ft).

\* Discharge measurement made on this day

Note.--No gage-height record July 29 to Aug. 23; discharge estimated on basis of record for stations near Molalla and above Pine Creek near Wilhoit. Discharge computed from once-daily wire-weight or staff-gage readings Mar. 19 to Apr. 18, Aug. 24-28, Sept. 2-7, 12-25.

## Pudding River near Mount Angel, Oreg.

Location.--Lat 45°03'50", long. 122°49'45", in SE $\frac{1}{4}$  sec. 8, T. 6 S., R. 1 W., on left bank on downstream side of Cline Bridge,  $\frac{1}{2}$  miles (revised) west of Mount Angel and 4 miles upstream from Little Pudding River.

Drainage area.--204 sq mi (revised).

Records available.--October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 119.76 ft above mean sea level, datum of 1929. Prior to Sept. 22, 1945, staff or wire-weight gages at same site and datum.

Average discharge.--11 years (1939-44, 1945-51), 692 cfs.

Extremes.--Maximum discharge during year, 8,970 cfs Nov. 18; maximum gage height, 28.47 ft Nov. 18; minimum discharge, 8 cfs Aug. 18, 22.

1939-51: Maximum discharge, 15,000 cfs Feb. 17, 1949; maximum gage height, 30.38 ft Feb. 18, 1949; minimum discharge that of Aug. 18, 22, 1951.

Remarks.--Records good except those for periods of backwater from debris, which are fair. Small diversions for irrigation above station; no regulation.

Revisions (water years).--W 1094: 1943.

Rating table, water year 1950-51, except periods of backwater from debris (gage height, in feet, and discharge, in cubic feet per second)  
(Rate of change in stage used as a factor Oct. 5, 8, 17, 19, Nov. 2-4, 15-19, Dec. 4, 6, 8, 23, Jan. 2, 14, 17, 21)

0.2	7	4.0	290	22.0	4,120
.5	16	6.0	570	26.0	6,020
1.0	34	10.0	1,190	27.4	7,040
2.0	92	14.0	1,900		
3.0	177	18.0	2,770		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	44	3,010	1,980	1,410	1,110	658	788	435	206	40	16	20
2	42	3,500	1,850	1,790	1,050	627	726	425	192	42	16	18
3	52	3,300	1,750	2,770	1,280	590	724	392	181	38	16	17
4	155	2,600	2,580	2,620	1,360	729	768	396	167	43	16	16
5	392	2,180	2,460	2,200	1,860	888	768	400	164	57	16	14
6	759	1,760	3,000	1,800	1,710	910	744	481	164	57	16	14
7	568	1,410	3,580	1,480	1,910	915	723	795	156	55	15	16
8	561	1,260	3,150	1,290	2,240	*1,180	693	678	147	46	14	22
9	753	1,110	2,620	1,130	2,070	1,210	648	576	136	*43	14	26
10	528	955	2,150	1,070	1,850	1,130	602	506	129	38	15	22
11	406	846	1,830	1,100	2,120	1,010	576	501	125	34	16	19
12	324	802	*1,610	1,080	2,450	1,020	582	554	113	30	17	18
13	267	732	1,350	1,030	2,150	1,630	582	708	114	27	17	17
14	232	704	1,190	2,060	1,770	1,900	574	651	110	26	14	16
15	230	961	1,150	2,710	1,570	2,190	538	579	101	26	14	15
16	209	*2,930	1,350	2,630	1,420	2,810	502	524	91	27	14	15
17	337	5,860	1,480	*3,620	1,270	2,270	473	472	87	23	13	15
18	633	7,030	1,560	*4,170	1,270	1,870	434	425	82	23	10	14
19	838	4,890	1,220	3,760	1,200	1,620	395	389	77	24	11	13
20	1,190	4,310	1,150	3,140	1,150	1,420	*359	359	75	23	*12	13
21	1,130	3,590	1,020	3,690	1,090	1,350	325	329	71	22	10	13
22	937	2,930	974	4,660	1,010	1,280	302	303	67	22	9	12
23	780	2,370	1,310	4,270	934	1,160	288	307	66	24	9	13
24	664	2,420	1,230	4,380	866	1,060	274	423	62	20	10	15
25	699	2,690	1,080	4,500	831	993	265	343	64	20	11	17
26	947	2,320	964	4,010	796	950	260	311	58	19	11	26
27	1,170	2,270	936	3,140	742	902	258	279	55	20	12	30
28	1,780	2,150	1,010	2,390	693	849	449	268	52	18	13	26
29	3,170	1,810	1,400	*1,930	-	848	540	*246	46	18	27	33
30	3,620	1,800	1,520	1,570	-	858	486	228	43	18	30	63
31	*3,390	-	1,560	1,290	-	810	-	219	-	17	23	-
Total	26,797	74,500	51,554	79,290	59,552	37,637	15,626	13,499	3,201	940	457	588
Mean	864	2,483	1,663	2,558	1,413	1,214	521	435	107	30.3	14.7	19.6
Cfs/m	4.24	12.2	8.15	12.5	6.93	5.95	2.55	2.13	0.525	0.149	0.072	0.096
In.	4.89	13.58	9.40	14.45	7.21	6.86	2.85	2.46	0.58	0.17	0.28	0.11
Ac-ft	53,150	147,800	102,300	157,300	79,450	74,650	30,990	26,770	6,350	1,980	906	1,170

Calendar year 1950: Max 7,030 Min 18 Mean 1,126 Cfs/m 5.52 In. 74.96 Ac-ft 813,600  
Water year 1950-51: Max 7,030 Min 9 Mean 941 Cfs/m 4.61 In. 62.64 Ac-ft 681,700

Peak discharge (base, 2,000 cfs).--Nov. 2 (6 p.m.) 3,780 cfs (21.14 ft); Nov. 18 (1:30 a.m.) 8,970 cfs (28.0 ft); Dec. 7 (2 p.m.) 3,650 cfs (20.81 ft); Jan. 3 (3 p.m.) 2,890 cfs (18.39 ft); Jan. 18 (7 a.m.) 4,240 cfs (22.29 ft); Jan. 24 (7 p.m.) 5,000 cfs (24.32 ft); Feb. 12 (8 a.m.) 2,490 cfs (18.19 ft); Mar. 16 (8 to 9 a.m.) 2,890 cfs (19.60 ft).

\* Discharge measurement made on this day.

Note.--Backwater from debris Jan. 24 to May 6, June 5 to Sept. 30.



## Butte Creek at Monitor, Oreg.

Location.--Lat 45°06'05", long. 122°44'50", in SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 25, T. 5 S., R. 1 W., on left downstream abutment of highway bridge in Monitor, 4 $\frac{1}{2}$  miles (revised) upstream from mouth.

Drainage area.--57.4 sq mi (revised).

Records available.--October 1940 to September 1951 in reports of Geological Survey. January to December 1936 in reports of State engineer.

Gage.--Staff gage read once or twice daily. Datum of gage is 151.35 ft above mean sea level, datum of 1929. Jan. 20 to Oct. 22, 1936, staff gage at present site at different datum. Oct. 23 to Dec. 19, 1936, staff gage at site 70 ft downstream at different datum.

Average discharge.--11 years, 223 cfs.

Extremes.--Maximum discharge observed during year, 2,990 cfs Nov. 17 (gage height, 9.26 ft); minimum, 3.6 cfs Sept. 18. 1936, 1940-51: Maximum discharge, 5,600 cfs Feb. 17, 1949 (gage height, 13.5 ft, from graph based on gage readings); minimum observed, that of Sept. 18, 1951.

Remarks.--Records good. Small diversions above station for irrigation. Some diurnal fluctuation caused by mills at Scotts Mills.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used May 28-31)

Oct. 1 to Nov. 17

Nov. 18 to Sept. 30

2.8	14	4.0	240	2.9	2.7	3.7	115
3.0	26	5.0	630	3.0	7.1	4.0	200
3.2	50	9.0	2,830	3.2	26	5.0	595
3.5	105			3.4	54	8.0	2,230

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	15	1,080	613	340	308	173	230	132	61	18	7.1	8.4
2	14	1,400	464	726	340	164	230	128	58	18	6.5	7.1
3	13	840	478	890	532	152	244	120	58	17	6.5	6.5
4	50	640	810	654	588	227	286	122	56	19	5.9	5.9
5	130	491	721	478	730	240	279	128	56	21	5.9	5.9
6	270	361	1,250	364	694	215	279	182	56	22	5.9	4.4
7	165	305	1,090	286	790	194	265	258	52	18	5.4	5.9
8	155	284	785	248	960	*251	2444	203	51	16	5.4	10
9	150	240	600	215	790	237	230	179	50	*15	5.4	8.4
10	128	189	460	212	672	206	212	155	48	15	4.9	7.1
11	105	180	432	237	1,040	194	212	149	46	14	6.5	7.1
12	88	198	*340	209	920	324	218	167	46	12	5.4	6.5
13	71	170	286	218	694	690	224	161	42	11	6.5	5.9
14	63	162	258	835	564	608	218	158	42	11	6.5	5.4
15	68	375	272	990	532	1,200	206	143	39	11	7.1	4.4
16	58	1,570	436	800	420	910	188	135	36	11	*6.5	4.4
17	73	2,590	396	*1,910	396	676	182	125	34	11	6.5	4.0
18	180	1,690	324	1,050	388	514	164	112	33	12	5.9	3.6
19	305	1,030	286	775	356	460	146	106	32	11	5.9	4.0
20	455	1,020	268	640	344	432	*125	99	32	9.2	5.4	4.0
21	326	860	224	1,990	312	460	110	90	30	9.2	5.9	4.0
22	277	750	212	1,460	293	412	97	86	29	9.2	5.4	4.0
23	219	622	380	1,180	268	356	92	80	26	8.4	5.4	4.0
24	175	1,080	304	1,440	240	320	90	90	24	7.7	5.4	4.4
25	165	920	258	*1,160	230	312	90	90	22	7.7	5.4	7.1
26	264	694	218	1,100	212	286	88	84	23	7.7	5.9	8.4
27	322	770	208	845	200	265	84	76	21	7.7	6.5	10
28	930	577	218	640	179	254	170	76	20	7.7	7.1	11
29	1,520	452	332	518	-	279	158	*72	18	7.7	18	14
30	1,130	577	436	428	-	268	152	67	18	7.7	16	26
31	*880	-	416	356	-	251	-	63	-	7.7	11	-
Total	8,820	22,117	15,773	23,194	13,990	11,530	5,513	3,836	1,158	380.6	213.1	211.8
Mean	285	737	444	748	500	372	184	124	38.6	12.3	6.87	7.06
Cfs/m	4.97	12.8	7.74	13.0	8.71	6.48	3.21	2.16	0.672	0.214	0.120	0.123
In.	5.71	14.33	8.92	15.03	9.06	7.47	3.57	2.49	0.75	0.25	0.14	0.14
Ac-ft	17,490	43,870	27,320	46,000	27,750	22,870	10,930	7,610	2,300	755	423	420

Calendar year 1950: Max 3,400 Min 6.8 Mean 343 Cfs/m 5.98 In. 81.19 Ac-ft 248,100  
Water year 1950-51: Max 2,590 Min 3.6 Mean 287 Cfs/m 5.00 In. 67.86 Ac-ft 207,700

Peak discharge (base, 1,200 cfs).--Oct. 29 (8 a.m.) 1,690 cfs (7.01 ft); Nov. 1 (about 12 p.m.) 1,900 cfs (7.40 ft); Nov. 17 (4 p.m.) 2,990 cfs (9.26 ft); Dec. 6 (8 a.m.) 1,310 cfs (6.43 ft); Jan. 17 (8 a.m.) 2,130 cfs (7.64 ft); Jan. 21 (about 12 m.) 2,650 cfs (8.70 ft); Mar. 15 (5 p.m.) 1,650 cfs (7.03 ft).

\* Discharge measurement made on this day.

## Pudding River at Aurora, Oreg.

Location.--Lat 45°14'00", long. 122°45'00", in SE $\frac{1}{4}$  sec. 12, T. 4 S., R. 1 W., on upstream side of highway bridge at Aurora, half a mile upstream from Mill Creek.

Drainage area.--479 sq mi (revised).

Records available.--October 1928 to September 1951.

Gage.--Wire-weight gage read twice daily Oct. 1 to June 30, once daily thereafter. Datum of gage is 79.93 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Oct. 1, 1934, staff gage at same site and datum. June 1 to Sept. 15, 1947, temporary staff gage 40 ft upstream at same datum.

Average discharge.--23 years, 1,161 cfs.

Extremes.--Maximum discharge during year, 10,800 cfs Nov. 18 (gage height, 20.65 ft); minimum, 42 cfs Aug. 24, 25.

1928-51: Maximum discharge, 25,400 cfs Dec. 30, 1937 (gage height, 24.5 ft, from graph based on gage readings), from rating curve extended above 16,000 cfs; minimum, 37 cfs Sept. 9, 12, 1935.

Maximum stage known, 25.0 ft about Jan. 7 (revised), 1923 (discharge, 27,900 cfs, from subsequent rating curve extended above 16,000 cfs).

Remarks.--Records good. Small diversions above station; slight regulation at times in summer by mills on tributaries.

Revisions (water years).--W 1094: 1923(M), 1931, 1934, 1936(M), 1938, 1943.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 18

Nov. 19 to Sept. 30

0.5	89	12.0	3,390	-0.1	36	7.0	1,530
1.5	222	17.0	6,000	+5	92	14.0	4,180
3.0	505	19.0	7,700	1.5	220	18.0	6,750
5.0	1,010	20.5	10,400	3.0	485	20.0	9,200
8.0	1,910						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	108	*4,830	4,080	2,800	3,160	1,240	1,360	815	356	92	52	83
2	96	5,080	4,060	2,760	2,440	1,180	1,270	760	334	90	50	73
3	113	5,540	3,720	3,840	2,630	1,110	1,210	702	314	94	47	65
4	158	5,350	3,780	4,490	3,230	1,170	1,230	665	300	96	47	63
5	314	4,830	4,190	4,430	3,680	*1,840	1,270	670	288	99	46	57
6	735	4,400	4,440	4,040	4,060	2,040	1,250	675	286	113	49	56
7	1,120	3,770	5,270	3,560	4,330	2,150	1,210	905	286	128	48	58
8	870	3,080	5,800	2,990	4,810	2,450	1,170	1,210	269	122	49	61
9	956	2,490	5,430	2,470	4,850	3,160	1,100	1,060	253	116	50	66
10	1,060	1,990	4,940	2,100	4,540	3,190	1,040	920	238	*101	50	69
11	785	1,660	4,460	2,020	4,520	2,980	965	820	229	99	49	73
12	578	1,450	*3,990	2,050	4,910	2,870	952	820	223	90	50	68
13	497	1,380	3,440	1,920	4,940	3,920	950	895	214	83	55	65
14	429	1,280	2,800	2,440	4,570	4,160	952	1,030	212	75	54	61
15	389	1,420	2,410	4,400	4,100	4,130	930	968	202	71	53	58
16	377	3,350	2,580	5,300	3,710	4,820	890	875	191	70	50	57
17	363	6,490	3,220	5,820	3,220	4,980	830	795	177	70	48	56
18	525	10,200	3,120	7,110	2,900	4,570	780	720	169	69	55	56
19	986	8,020	2,740	6,890	2,720	4,090	725	652	161	67	56	55
20	1,430	7,690	2,410	6,370	2,480	3,610	*662	590	155	66	*47	53
21	1,840	7,260	2,110	6,490	2,300	3,160	605	551	147	65	49	52
22	1,650	6,520	2,840	8,240	2,110	2,780	553	518	138	65	46	52
23	1,390	5,860	2,050	7,630	1,910	2,420	525	481	136	64	53	50
24	1,150	5,290	2,410	8,010	1,700	2,130	499	501	130	64	42	50
25	980	5,480	2,160	7,700	1,600	1,880	483	583	131	64	42	56
26	1,180	5,570	1,890	7,160	1,570	1,740	479	523	128	60	43	60
27	1,600	5,250	1,720	6,770	1,480	1,640	476	477	121	55	43	66
28	2,280	5,190	1,740	6,130	1,350	1,540	523	441	114	53	47	78
29	5,440	4,580	2,200	*5,510	-	1,480	840	*420	101	55	57	93
30	4,180	3,990	2,550	4,850	-	1,480	898	390	96	53	70	112
31	4,680	-	2,860	4,040	-	1,460	-	368	-	54	82	-
Total	36,259	139,290	100,410	150,430	89,820	81,340	26,617	21,797	6,099	2,463	1,569	1,922
Mean	1,170	4,643	3,259	4,853	3,208	2,624	887	703	203	79.5	50.6	64.1
Cfsm	2.44	9.69	6.78	10.1	6.70	5.48	1.85	1.47	0.424	0.166	0.106	0.134
In.	2.32	10.31	7.80	11.63	6.97	6.32	2.07	1.69	0.47	0.19	0.12	0.15
Ac-ft	71,920	276,300	199,200	298,400	178,200	161,300	52,790	43,230	12,100	4,890	3,110	3,810
Calendar year 1950-51: Max	10,200											
Water year 1950-51: Max	10,200											
Calendar year 1950-51: Min	54											
Water year 1950-51: Min	42											
Calendar year 1950-51: Mean	2,049											
Water year 1950-51: Mean	1,803											
Calendar year 1950-51: Cfsm	4.28											
Water year 1950-51: Cfsm	3.76											
Calendar year 1950-51: In.	58.09											
Water year 1950-51: In.	51.09											
Calendar year 1950-51: Ac-ft	1,483,000											
Water year 1950-51: Ac-ft	1,305,000											

Peak discharge (base, 4,500 cfs).--Nov. 3 (4 p.m.) 5,580 cfs (16.38 ft); Nov. 18 (7 a.m.) 10,800 cfs (20.65 ft); Dec. 3 (5 a.m.) 5,820 cfs (16.75 ft); Jan. 4 (4 p.m.) 4,500 cfs (14.59 ft); Jan. 22 (12:30 p.m.) 8,920 cfs (19.79 ft); Feb. 13 (8:50 a.m.) 4,980 (15.39 ft); Mar. 17 (8 a.m.) 5,040 cfs (15.48 ft).

\* Discharge measurement made on this day.

## Tualatin River at Gaston, Oreg.

Location.--Lat 45°26'15", long. 123°10'05", in W½ sec. 34, T. 1 S., R. 4 W., on right bank 1.5 miles west of Gaston.

Drainage area.--51 sq mi, approximately, at measuring section at Gaston.

Records available.--October 1940 to September 1951.

Gage.--Staff gage read twice daily. Altitude of gage is 175 ft (by barometer). Prior to May 20, 1942, water-stage recorder at site 1.5 miles downstream at datum 164.18 ft above mean sea level, datum of 1929. May 20, 1942, to Aug. 24, 1949, staff gage at present site at datum 1.00 ft higher.

Average discharge.--11 years, 192 cfs.

Extremes.--Maximum discharge observed during year, 2,670 cfs Jan. 17 (gage height, 11.19 ft); minimum, 0.2 cfs Sept. 22, 23.

1940-51: Maximum discharge, 4,820 cfs on Feb. 17, 1949 (gage height, 12.23 ft, present datum); maximum gage height, 13.88 ft Dec. 19, 1941, site and datum then in use; minimum discharge, that of Sept. 22, 23, 1951.

Remarks.--Records good. Slight diurnal fluctuation caused by log ponds upstream. Small diversions above station for irrigation. In 1949 city of Hillsboro began diverting about 5 cfs for municipal supply.

Revisions.--W 1044: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Sept. 1 to Jan. 17

Jan. 18 to Sept. 30

0.9	5.1	3.0	220	0.4	0.1	1.7	60
1.0	7.6	4.0	414	.5	.5	2.0	90
1.1	11	8.0	1,050	.6	1.7	2.5	160
1.5	36	9.0	1,270	.7	3.8	4.0	445
2.0	75	10.0	1,700	.9	11	8.0	1,100
2.5	135	11.0	2,450	1.3	31	9.0	1,330

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	5.8	470	688	384	297	165	303	98	42	11	2.8	3.5
2	5.8	550	602	745	*455	154	297	95	40	10	4.1	2.8
3	9.0	350	481	1,050	715	149	313	91	38	14	5.8	2.6
4	35	326	536	676	512	181	323	89	*38	15	2.6	2.2
5	46	197	584	505	419	188	305	86	40	17	2.6	1.5
6	36	173	815	411	464	172	285	88	40	17	2.8	1.4
7	40	164	784	352	734	185	264	98	40	16	2.2	2.6
8	46	146	604	304	1,060	160	240	87	38	15	2.4	7.9
9	54	131	530	280	1,180	155	214	81	35	14	2.2	6.8
10	56	117	404	286	971	147	197	78	33	13	2.8	3.3
11	117	109	344	296	1,190	152	190	77	32	11	2.4	2.2
12	68	103	266	286	895	*203	179	81	33	9.4	3.3	1.7
13	42	96	240	414	625	482	165	110	35	8.7	4.5	1.7
14	37	116	436	835	483	439	163	91	31	9.4	3.5	1.4
15	33	364	559	864	373	580	141	86	28	8.7	2.6	1.4
16	30	760	601	1,130	351	913	132	79	24	8.3	2.6	1.7
17	36	634	559	1,940	309	561	123	77	22	*7.5	2.4	1.7
18	56	550	420	1,310	295	412	118	74	24	8.7	1.7	1.5
19	94	448	364	1,050	293	375	112	65	24	8.7	2.0	1.0
20	66	678	308	1,140	335	386	105	61	23	7.9	1.2	.4
21	61	919	*292	1,280	287	390	101	60	21	7.1	1.4	.4
22	51	700	505	1,080	258	384	97	57	20	7.1	1.9	.2
23	46	660	1,110	842	234	331	94	55	20	7.1	2.0	.3
24	39	328	662	894	222	305	*91	58	19	6.4	1.1	.6
25	46	698	454	1,180	206	319	87	64	19	6.4	1.1	2.4
26	138	547	375	1,150	197	327	83	54	18	6.8	1.5	7.9
27	475	508	454	828	184	323	101	50	17	6.8	3.8	5.4
28	565	390	646	620	174	305	160	50	16	5.1	*3.8	6.4
29	517	318	532	432	-	319	118	49	14	4.5	2.4	18
30	312	439	484	377	-	464	105	47	12	4.1	4.8	62
31	*583	-	448	323	-	570	-	45	-	3.3	4.5	-
Total	5,545.6	12,589	16,087	23,264	13,719	10,176	5,206	2,281	836	295.0	84.8	152.9
Mean	114	420	519	750	490	328	174	75.6	27.9	9.52	2.74	5.10
Cfsm	2.24	8.24	10.2	14.7	9.61	6.43	3.41	1.44	0.547	0.187	0.054	0.100
In.	2.59	9.18	11.73	16.96	10.00	7.42	3.80	1.66	0.61	0.22	0.06	0.11
Ac-ft	7,030	24,970	31,910	46,140	27,210	20,180	10,330	4,520	1,660	585	168	303

Calendar year 1950: Max 3,100 Min 2.7 Mean 274 Cfsm 5.37 In. 72.92 Ac-ft 198,300  
 Water year 1950-51: Max 1,940 Min 0.2 Mean 242 Cfsm 4.75 In. 64.34 Ac-ft 175,000

Peak discharge (base, 2,000 cfs).--Jan. 17 (8 a.m.) 2,670 cfs (11.19 ft).

\* Discharge measurement made on this day.

## Scoggin Creek near Gaston, Oreg.

Location.--Lat 45°27'30", long. 123°09'15", in NW $\frac{1}{4}$  sec. 26, T. 1 S., R. 4 W., on left bank 100 ft upstream from highway bridge,  $1\frac{1}{2}$  miles upstream from mouth, and 1.7 miles northwest of Gaston.

Drainage area.--44.0 sq mi.

Records available.--October 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 168.92 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Oct. 1, 1947, water-stage recorder at site 300 ft upstream at same datum. Oct. 1, 1947, to June 7, 1950, staff gage at site 150 ft upstream at same datum.

Average discharge.--11 years, 133 cfs.

Extremes.--Maximum discharge during year, 1,550 cfs Jan. 17 (gage height, 11.91 ft); minimum, 1.5 cfs Sept. 5.

1940-51: Maximum discharge, 3,460 cfs Feb. 17, 1949 (gage height, 15.53 ft); minimum, 1.2 cfs Aug. 22, 1941, Oct. 7, 8, 1943.

Remarks.--Records good except those below 10 cfs, which are fair. Small diversions by pumping above station for irrigation. Part of water supply (about 1 cfs) for Hillsboro is diverted from Sein Creek above station; some diurnal fluctuation caused by log ponds above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Nov. 15 to Dec. 11, Dec. 15 to Jan. 2, July 31, Aug. 2, 9-13, 27-29, Sept. 4-6, 13-18)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

2.2	7.2	5.0	314	1.6	1.2	2.4	14	4.0	243
2.3	9.6	8.0	690	2.0	5.1	2.5	21	8.0	740
2.5	20	10.0	1,020	2.2	8.3	2.7	41	12.0	1,580
3.0	64			2.3	11	3.0	84		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.0	279	467	305	246	135	206	67	33	13	3.3	7.4
2	9.0	319	393	624	317	130	185	61	36	12	7.4	7.2
3	11	*224	384	919	450	128	177	60	33	9.0	7.6	7.0
4	23	144	390	654	426	145	174	62	*31	13	7.6	*4.9
5	44	108	368	475	362	144	159	61	28	18	7.2	1.6
6	50	91	551	368	414	137	145	64	31	21	7.2	2.8
7	50	82	560	302	657	132	140	71	32	18	7.2	7.6
8	37	79	460	250	806	132	130	62	32	16	5.9	11
9	32	68	405	202	956	130	123	60	31	13	2.7	9.2
10	37	62	340	212	847	123	111	57	29	9.2	2.9	7.8
11	45	61	293	215	1,020	125	108	58	26	8.5	3.3	7.8
12	32	58	252	201	810	*206	104	58	23	8.5	4.1	6.4
13	26	54	215	285	607	384	103	74	26	11	5.0	2.2
14	23	51	187	533	478	397	98	64	28	11	7.0	2.2
15	21	132	304	822	384	754	92	57	25	11	7.0	2.7
16	19	557	487	916	318	758	87	54	25	*11	6.2	2.3
17	19	*493	469	1,400	282	535	81	54	24	9.4	6.1	2.4
18	37	439	388	1,000	255	443	79	53	23	7.0	6.4	2.7
19	49	304	335	764	223	401	79	51	18	8.5	5.9	5.9
20	42	371	*279	634	281	389	74	49	18	11	5.7	6.2
21	36	528	244	1,160	236	380	73	48	20	10	5.4	5.7
22	31	476	352	1,030	209	362	70	44	16	9.2	4.9	4.7
23	26	387	840	816	191	517	67	41	16	8.2	5.5	5.4
24	20	522	585	847	175	289	*65	45	19	9.0	5.5	6.2
25	20	478	417	904	166	278	64	46	20	7.6	5.8	4.3
26	34	389	353	914	154	272	60	45	16	4.7	5.9	9.0
27	130	357	305	711	145	250	65	44	12	5.0	4.7	8.8
28	360	288	453	535	135	219	108	42	12	7.9	2.5	11
29	310	248	437	419	-	216	78	40	14	8.5	4.6	13
30	178	543	395	342	-	262	71	40	13	7.2	7.2	44
31	242	-	357	*289	-	240	-	36	-	2.9	8.5	-
Total	2,002	7,992	12,265	19,048	11,550	8,813	3,176	1,668	710	320.3	176.2	219.4
Mean	64.6	266	396	614	412	284	106	53.8	23.7	10.3	5.68	7.31
Cfsm	1.47	6.05	9.00	14.0	9.36	6.45	2.41	1.22	0.539	0.234	0.129	0.166
In.	1.69	6.76	10.37	16.10	9.76	7.45	2.68	1.41	0.60	0.27	0.15	0.19
Ac-ft	3,970	15,850	24,330	37,780	22,910	17,480	6,300	3,310	1,410	635	349	435

Peak discharge (base, 1,100 cfs).--Jan. 17 (10 a.m.) 1,550 cfs (11.91 ft); Jan. 21 (3 p.m.) 1,390 cfs (11.29 ft).

\* Discharge measurement made on this day.

## Tualatin River near Dilley, Oreg.

Location (revised).--Lat 45°28'30", long. 123°07'25", in NW¼ sec. 24, T. 1 S., R. 4 W., on left bank 5 ft above highway bridge, 1¼ miles downstream from Scoggin Creek, and 1 mile south of Dilley.

Drainage area.--133 sq mi.

Records available.--October 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 151.57 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to June 16, 1950, chain, wire-weight, or staff gages at several sites within 200 ft of present site at same datum.

Average discharge.--11 years, 385 cfs.

Extremes.--Maximum discharge during year, 4,200 cfs Jan. 17 (gage height, 12.65 ft); minimum, 0.4 cfs Sept. 5.

1940-51: Maximum discharge, 9,460 cfs Feb. 17, 1949 (gage height, 13.89 ft, from graph based on gage readings); minimum, that of Sept. 5, 1951.

Remarks.--Records good except those below 10 cfs, which are fair. Diversions above station for municipal water supply and irrigation, chiefly in Wapato Lake area. Diurnal fluctuation caused by dam below Gaston.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

0.7	13	10.0	700	0.2	0.9	3.0	125	11.0	1,500
1.0	24	11.0	1,030	.3	1.9	6.0	347	12.0	2,750
3.0	125	11.5	1,380	.5	5.7	9.0	640	12.5	3,800
7.0	412	12.0	2,130	.7	11	10.0	819		
				1.0	22	10.5	980		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	779	1,260	884	756	357	586	197	74	20	1.2	10
2	16	936	1,210	1,020	789	356	539	186	73	21	4.9	10
3	20	827	1,130	1,820	1,280	320	527	179	70	19	5.7	8.8
4	54	660	1,150	1,530	1,280	382	536	180	*68	26	8.0	8.0
5	118	551	1,160	1,260	1,060	428	513	173	66	32	10	1.7
6	159	449	1,340	1,040	1,030	401	470	174	68	36	9.3	1.6
7	174	386	1,520	860	1,550	388	443	198	73	32	5.7	7.0
8	123	370	1,360	738	2,030	398	406	177	71	26	5.7	12
9	98	322	1,210	670	2,190	401	364	166	66	25	3.1	16
10	122	288	1,050	662	2,220	383	322	155	63	20	3.1	11
11	224	272	908	658	2,380	381	290	153	60	18	3.8	9.3
12	121	256	785	658	2,230	*478	273	148	56	17	6.2	7.7
13	89	235	690	661	1,900	1,020	262	204	60	15	6.0	3.4
14	78	220	645	1,130	1,510	1,210	258	178	60	15	11	1.6
15	72	399	700	1,480	1,180	1,560	238	152	56	15	7.7	1.7
16	65	1,150	1,220	1,910	966	2,090	220	138	51	14	6.0	2.6
17	76	1,450	1,340	3,580	833	1,650	204	131	50	*11	7.2	2.2
18	125	1,460	1,170	3,010	750	1,290	197	124	49	8.2	6.4	2.2
19	224	1,120	1,020	2,390	665	1,080	194	121	42	7.7	5.3	3.4
20	191	1,130	*868	2,150	727	996	185	115	41	11	3.6	5.1
21	147	1,360	724	2,560	683	948	174	109	40	10	2.8	4.6
22	129	1,540	754	3,100	612	928	167	100	34	11	2.2	4.2
23	111	1,290	1,420	2,410	956	812	162	96	32	10	4.3	4.0
24	92	1,350	1,480	2,300	509	737	*155	100	37	9.0	2.8	4.2
25	90	1,440	1,200	2,380	480	693	149	103	36	8.2	3.3	4.2
26	156	1,240	995	2,410	451	680	143	96	28	4.9	4.6	11
27	344	1,130	872	2,220	413	654	159	92	24	4.6	*4.4	14
28	764	956	1,122	1,790	382	611	302	90	22	6.7	2.2	16
29	904	812	1,260	1,370	-	592	235	87	23	9.3	4.6	25
30	889	896	1,120	1,000	-	646	201	84	21	7.7	8.8	82
31	*718	-	1,020	*880	-	650	-	80	-	2.6	11	-
Total	6,309	25,274	33,493	50,611	31,392	23,500	8,872	4,286	1,514	472.9	169.9	294.5
Mean	204	842	1,080	1,633	1,121	758	296	138	50.5	13.8	5.48	9.82
Cfsm	1.53	6.33	8.12	12.3	8.43	5.70	2.23	1.04	0.380	0.104	0.041	0.074
In.	1.76	7.07	9.37	14.15	8.78	6.57	2.48	1.20	0.42	0.12	0.05	0.08
Ac-ft	12,510	50,130	66,430	100,440	62,270	46,610	17,600	8,500	3,000	849	337	584

Calendar year 1950: Max 4,300 Min 4 Mean 543 Cfsm 4.08 In. 55.42 Ac-ft 395,100  
 Water year 1950-51: Max 3,560 Min 1.2 Mean 510 Cfsm 3.83 In. 52.05 Ac-ft 369,200

Peak discharge (base, 4,000 cfs).--Jan. 17 (2:30 p.m.) 4,200 cfs (12.65 ft).

\* Discharge measurement made on this day.

## Gales Creek near Forest Grove, Oreg.

Location.--Lat 45°33'20", long. 123°11'05", in E½ sec. 21, T. 1 N., R. 4 W., on left bank at downstream side of bridge, 2½ miles southeast of village of Gales Creek and 4½ miles northwest of Forest Grove.

Drainage area.--66 sq mi, approximately.

Records available.--October 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 203.25 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Sept. 13, 1941, water-stage recorder at site 1.4 miles downstream at datum 15.33 ft lower.

Average discharge.--11 years, 212 cfs.

Extremes.--Maximum discharge during year, 2,070 cfs Jan. 17 (gage height, 5.90 ft); minimum, 5.6 cfs Sept. 21 (gage height, 0.56 ft).  
1940-51: Maximum discharge, 6,410 cfs Feb. 17, 1949 (gage height, 10.90 ft, from floodmark); minimum, 1 cfs Aug. 19, 1947.

Remarks.--Records good. Small diversions above station for irrigation. Some diurnal fluctuation at low flow caused by log ponds upstream.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Dec. 16 to Jan. 21)

Oct. 1 to Jan. 21

Jan. 22 to Sept. 30

0.9	12	2.5	300	0.5	3.4	1.5	120
1.0	18	3.0	450	.6	7.1	2.0	250
1.2	36	4.0	840	.8	18	3.0	610
1.5	78	6.0	1,930	1.0	38	5.0	1,680
2.0	175			1.2	64		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	*418	796	586	384	232	304	98	44	19	11	12
2	16	488	672	1,090	522	214	285	92	42	20	12	12
3	23	345	648	1,260	662	214	280	89	42	20	11	11
4	33	258	652	920	656	247	271	92	42	23	11	*10
5	78	202	632	712	582	235	256	65	*42	24	12	6.4
6	84	158	970	579	622	217	238	92	43	26	11	6.7
7	65	142	960	495	975	208	223	94	42	23	11	19
8	49	130	792	436	1,140	208	208	85	40	21	11	14
9	40	112	704	387	1,650	199	193	81	38	20	11	11
10	62	103	579	594	1,580	190	175	78	36	19	12	12
11	68	98	509	404	1,530	188	165	74	36	16	12	12
12	47	92	425	378	1,160	314	155	79	38	16	12	11
13	37	88	366	481	870	498	150	94	39	16	12	9.6
14	33	86	333	872	674	*526	140	79	35	16	11	9.1
15	30	372	525	1,180	570	1,100	136	71	32	16	10	8.1
16	29	935	812	1,350	474	1,050	128	66	30	*15	9.6	7.1
17	31	*965	780	*1,820	429	715	124	66	30	14	8.1	7.6
18	62	772	656	1,240	404	590	120	66	29	16	8.1	7.6
19	75	540	568	890	387	542	116	64	28	15	8.1	7.6
20	64	652	481	756	494	534	110	61	27	14	8.1	8.5
21	54	940	*418	1,420	432	534	104	58	25	14	8.1	7.1
22	46	788	744	1,390	394	510	100	54	24	14	8.5	7.1
23	41	664	1,440	1,070	359	450	96	56	24	13	8.1	9.6
24	37	930	1,020	1,160	331	412	94	56	24	12	9.6	18
25	40	840	692	1,350	310	408	*92	56	24	14	9.6	14
26	51	680	608	1,280	286	370	90	53	22	14	9.6	19
27	270	600	523	985	262	345	108	51	22	14	9.6	17
28	544	498	716	735	247	320	148	51	20	12	17	16
29	411	652	594	450	324	108	50	19	12	12	14	22
30	306	624	652	*498	-	366	102	49	19	12	14	64
31	327	-	652	432	-	331	-	46	-	12	12	-
Total	3,108	13,921	20,978	27,144	18,188	12,591	4,817	2,186	958	512	342.1	395.1
Cfs	100	464	677	876	650	406	161	70.5	31.9	16.5	11.0	13.2
In.	1.52	7.03	10.3	13.3	9.85	6.15	2.44	1.07	0.483	0.250	0.167	0.200
Ac-ft	1.75	7.84	11.82	15.30	10.25	7.09	2.71	1.23	0.54	0.29	0.19	0.22
Ac-ft	6,160	27,610	41,610	53,840	36,080	24,970	9,550	4,340	1,900	1,020	678	786
Calendar year 1950: Max	2,870			Min 11	Mean 322	Cfsm 4.88	In. 66.24	Ac-ft 233,200				
Water year 1950-51: Max	1,820			Min 6.4	Mean 288	Cfsm 4.36	In. 59.23	Ac-ft 208,500				

Peak discharge (base, 1,100 cfs).--Nov. 16 (3 a.m.), 1,180 cfs (4.71 ft); Dec. 23 (6 a.m.), 1,610 cfs (5.32 ft); Jan. 2 (10 p.m.), 1,490 cfs (5.11 ft); Jan. 17 (7 a.m.), 2,070 cfs (5.90 ft); Jan. 21 (11 a.m.), 1,670 cfs (5.27 ft); Jan. 25 (10 p.m.), 1,460 cfs (4.64 ft); Feb. 9 (6 a.m.), 1,760 cfs (5.13 ft); Mar. 15 (4 p.m.), 1,490 cfs (4.69 ft).  
\* Discharge measurement made on this day.

## East Fork Dairy Creek at Mountaindale, Oreg.

Location.--Lat 45°38'05", long. 123°02'35", in NW $\frac{1}{4}$  sec. 27, T. 2 N., R. 3 W., on left bank at dam site three-quarters of a mile north of village of Mountaindale.

Drainage area.--43.0 sq mi, including two small streams on left bank which enter creek below station.

Records available.--October 1940 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 183.04 ft above mean sea level, datum of 1929.

Average discharge.--11 years, 107 cfs.

Extremes.--Maximum discharge during year, 896 cfs Feb. 11 (gage height, 11.46 ft); maximum gage height, 11.94 ft Jan. 21; minimum discharge, 8 cfs many days in August and September.

1940-51: Maximum discharge, 1,420 cfs Feb. 17, 1949 (gage height, 12.54 ft); minimum, 7 cfs Sept. 10-12, 1944.

Remarks.--Records fair. Records include measured or estimated discharge of two small streams which flow through dam site at station and enter creek from left bank about a mile below station. Probably some pumping for irrigation above station. Diurnal fluctuation at low flow caused by log pond upstream.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	14	104	329	268	245	154	175	65	36	18	11	9
2	14	107	305	458	252	144	163	61	34	18	11	9
3	17	99	309	584	230	140	153	58	34	18	11	9
4	20	85	315	464	224	149	143	66	34	19	11	8
5	53	81	294	345	207	145	134	63	*35	19	11	*8
6	38	67	331	270	236	138	126	63	35	19	10	9
7	36	62	327	230	328	132	116	68	34	18	10	11
8	34	60	279	209	443	132	110	60	32	16	10	13
9	30	53	255	188	661	126	105	56	31	16	11	10
10	37	50	223	164	663	121	101	54	29	16	11	9
11	35	48	205	176	835	116	95	61	29	15	11	9
12	24	45	171	164	757	136	91	57	30	14	12	9
13	21	43	157	172	601	193	87	60	30	14	11	9
14	20	44	152	201	488	*236	84	55	28	14	10	8
15	20	118	205	363	417	334	81	53	26	14	10	8
16	20	407	290	501	348	406	78	50	25	*13	9	8
17	23	498	311	589	314	326	75	49	24	13	9	8
18	39	413	*278	519	289	294	73	48	24	13	9	8
19	39	280	255	414	264	286	71	46	23	14	9	8
20	33	252	216	344	290	299	68	45	22	13	8	8
21	27	253	190	736	274	306	66	44	22	13	8	8
22	24	258	236	751	262	293	62	42	21	13	8	8
23	23	230	512	627	242	269	62	44	21	13	9	9
24	22	264	446	637	221	252	60	42	21	13	9	9
25	23	270	336	727	205	242	*57	42	21	13	8	11
26	26	252	270	698	192	232	56	41	20	13	9	11
27	55	254	231	587	177	221	62	39	19	12	9	10
28	121	221	250	459	164	207	81	39	18	12	10	14
29	115	200	255	370	-	202	88	39	18	12	10	15
30	*90	259	299	*309	-	202	65	38	17	11	10	26
31	89	-	313	270	-	186	-	37	-	11	9	-
Total	1,182	5,377	8,545	12,830	9,829	6,619	2,768	1,585	793	451	304	299
Mean	38.1	179	276	414	351	214	92.3	51.1	26.4	14.5	9.8	10
Cfsm	0.886	4.16	6.42	9.63	8.16	4.98	2.15	1.19	0.614	0.337	0.228	0.233
In.	1.02	4.58	7.39	11.10	9.59	5.72	2.39	1.37	0.69	0.39	0.26	0.26
Ac-ft	2,340	10,670	16,950	25,450	19,500	13,130	5,490	3,140	1,570	895	603	593

Calendar year 1950: Max 1,260 Min 11 Mean 174 Cfsm 4.05 In. 54.31 Ac-ft 125,900  
 Water year 1950-51: Max 835 Min 8 Mean 139 Cfsm 3.23 In. 43.74 Ac-ft 100,300

Peak discharge (base, 700 cfs).--Jan. 21 (5 p.m.) 857 cfs (11.94 ft); Feb. 11 (7 p.m.) 896 cfs (11.46 ft).

\* Discharge measurement made on this day.

## McKay Creek near North Plains, Oreg.

Location.--Lat 45°37'35", long. 122°58'30" (revised), in SE $\frac{1}{4}$  sec. 30, T. 2 N., R. 2 W., on downstream end of left timber bridge bent, 1 $\frac{1}{4}$  miles (revised) upstream from Creek and 2 $\frac{1}{2}$  miles northeast of North Plains.

Drainage area.--27.6 sq mi.

Records available.--October 1940 to September 1943, October 1948 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 172.57 ft above mean sea level, datum of 1929. October 1940 to September 1943 at same site at datum 0.25 ft higher.

Average discharge.--6 years, 67.5 cfs.

Extremes.--Maximum discharge during year, 782 cfs Jan. 21 (gage height, 10.50 ft); minimum, 0.4 cfs Aug. 17, 18, 22.  
1940-43, 1948-51: Maximum discharge, 2,100 cfs Feb. 17, 1949 (gage height, 11.23 ft); minimum, that of Aug. 17, 18, 22, 1951.

Remarks.--Records good except those for period of no gage-height record, which are fair. Some diurnal fluctuation in summer caused by pumping for irrigation.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Backwater from debris Oct. 27 to Mar. 15)

0.5	0.8	4.0	85
.6	1.5	5.0	138
.8	3.4	7.0	300
1.0	6.0	8.0	412
1.5	14	9.2	616
2.5	33		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.2	*72	288	198	69	43	57	17	9.3	2.9	1.7	1.9
2	3.2	91	270	372	74	39	53	16	8.7	3.3	2.0	1.7
3	4.7	72	249	506	68	38	50	15	8.4	3.4	1.6	1.8
4	7.2	55	241	340	67	46	48	18	8.7	4.1	1.6	1.5
5	18	45	218	223	66	45	44	18	*9.3	4.1	1.7	*1.2
6	20	34	274	156	90	41	41	17	9.6	4.1	1.8	1.4
7	14	30	305	117	189	38	38	21	9.4	3.9	1.4	2.5
8	13	29	240	92	292	39	35	17	8.8	3.2	1.2	3.5
9	13	27	190	74	364	38	33	16	8.0	3.1	2.0	2.8
10	12	25	142	72	376	35	31	15	7.2	3.3	2.0	2.3
11	13	24	120	70	543	34	30	18	7.0	2.6	2.0	2.0
12	8.6	23	90	62	498	64	29	18	7.6	2.8	2.4	2.1
13	6.9	21	75	66	366	188	28	18	8.1	2.6	2.2	2.1
14	6.3	21	70	104	236	*261	27	17	7.4	3.2	1.9	a1.5
15	6.6	87	108	276	182	438	25	16	6.4	3.2	1.8	a1.5
16	7.1	457	220	384	129	570	24	15	5.9	*3.0	1.4	a1.2
17	9.8	498	279	*529	113	390	23	14	5.4	2.9	.9	a1.2
18	14	404	*233	441	98	304	22	14	5.3	3.1	1.0	a1.2
19	17	271	178	320	85	290	21	14	5.0	3.0	.8	a1.2
20	15	223	127	237	107	299	20	13	4.7	3.0	1.1	a1.2
21	11	213	97	577	110	285	19	12	4.5	2.0	.9	a1.2
22	9.6	198	115	604	102	236	18	12	4.2	2.0	.9	a1.2
23	8.7	158	469	439	88	188	17	12	4.1	2.0	1.2	a2.0
24	8.0	174	413	453	75	157	17	13	4.2	2.0	1.2	a3.0
25	8.4	200	268	495	65	137	*17	12	4.1	1.7	1.2	a2.5
26	10	180	183	423	57	116	16	11	3.4	2.0	1.4	a3.0
27	19	188	136	310	50	98	18	11	3.6	1.7	1.4	a3.0
28	50	166	153	201	45	83	26	11	3.4	2.0	1.7	a3.0
29	73	140	203	136	-	78	20	11	3.1	2.1	2.2	a5.0
30	52	193	226	*106	-	71	17	10	2.8	2.0	2.1	a15
31	56	-	229	82	-	61	-	10	-	1.5	2.1	-
Total	518.3	4,319	6,409	8,465	4,604	4,750	864	452	187.6	85.8	48.8	74.5
Mean	16.7	144	207	273	164	153	28.8	14.6	6.25	2.77	1.57	2.48
Cfs/m	0.605	5.22	7.50	9.89	5.94	5.54	1.04	0.529	0.226	0.100	0.057	0.090
In.	0.70	5.82	8.64	11.41	6.20	6.40	1.16	0.61	0.25	0.12	0.07	0.10
Ac-ft	1,030	8,570	12,710	16,790	9,130	9,420	1,710	897	372	170	97	148

Calendar year 1950: Max 946 Min 1.4 Mean 106 Cfs/m 3.84 In. 51.98 Ac-ft 76,510

Water year 1950-51: Max 604 Min 0.8 Mean 84.3 Cfs/m 3.05 In. 41.48 Ac-ft 61,040

Peak discharge (base, 600 cfs).--Jan. 21 (7 p.m.) 782 cfs (10.50 ft); Mar. 15 (12 p.m.) 682 cfs (9.44 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Gales Creek near Forest Grove and East Dairy Creek at Mountindale.



## Tualatin River at Farmington, Oreg.

Location.--Lat 45°27'00", long. 122°57'00", in SE 1/4 sec. 29, T. 1 S., R. 2 W., on left bank attached to timber bents at upstream side of highway bridge at Farmington, 7 1/2 miles southwest of Beaverton.

Drainage area.--568 sq mi.

Records available.--October 1939 to September 1951.

Gage.--Staff gage read once or twice daily. Datum of gage is 100.42 ft above mean sea level, datum of 1929. Prior to July 9, 1941, at datum 2.00 ft higher. Auxiliary staff gage read twice daily at highway bridge 6 1/2 miles downstream.

Average discharge.--12 years, 1,303 cfs.

Extremes.--Maximum discharge during year, 11,100 cfs Jan. 23 (gage height, 33.0 ft, from graph based on observer's readings); minimum 6.8 cfs Aug. 26.

1939-51: Maximum discharge, 17,400 cfs Feb. 18, 1949; maximum gage height, 34.5 ft Feb. 18, 1949, from graph based on gage readings; minimum discharge, that of Aug. 26, 1951.

Maximum stage known, about 37 ft at Farmington and 33.4 ft at gage near Scholls, Dec. 22 or 23, 1933.

Remarks.--Records good. Slight regulation by log ponds and dam below Gaston have little effect at this station; considerable pondage between this station and station near Willamette. Some diversions by pumping for irrigation above station, chiefly at Wapato Lake, near Gaston.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method or stage-discharge  
fall relations Oct. 29 to Feb. 23, Mar. 14-25)

2.1	6.0	3.5	73	18.0	2,520
2.3	10	5.0	223	22.0	3,850
2.6	19	8.0	622	30.0	8,470
3.0	37	12.0	1,320	32.1	10,900

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	1,820	3,890	3,800	4,500	1,640	1,840	564	217	39	19	37
2	71	1,910	3,940	3,660	*4,170	1,460	1,760	543	204	43	16	37
3	75	*2,020	3,940	4,750	3,980	1,420	1,650	511	188	49	12	32
4	89	2,040	4,120	5,190	3,630	1,510	1,560	485	169	57	11	32
5	141	1,950	4,210	6,010	3,080	1,500	1,480	483	175	57	11	30
6	241	1,720	4,410	5,860	3,950	1,690	1,560	498	*190	77	12	25
7	386	1,480	4,460	5,370	4,800	1,690	1,510	544	188	82	13	20
8	425	1,210	4,810	4,720	4,540	1,780	1,230	595	190	82	11	22
9	429	1,060	4,950	4,310	4,250	1,860	1,030	534	182	70	11	32
10	428	923	4,850	4,070	5,080	1,770	1,030	472	174	66	13	54
11	392	804	4,700	3,620	5,920	1,800	948	441	164	56	12	53
12	357	736	4,370	3,470	7,970	1,990	903	422	157	40	11	49
13	313	673	3,980	3,260	8,250	*2,830	875	441	167	31	14	41
14	249	622	3,620	3,280	7,600	3,330	830	469	167	27	18	37
15	182	990	3,520	3,320	6,610	3,600	765	474	159	27	18	31
16	165	2,310	3,860	3,790	6,240	3,870	717	448	149	30	17	24
17	163	3,320	5,050	5,950	4,110	680	381	131	*32	16	22	
18	164	3,540	4,150	*8,480	4,880	4,660	619	365	123	32	14	19
19	197	3,790	*4,090	10,400	4,740	4,760	600	340	114	30	13	21
20	347	4,160	4,120	9,620	4,510	4,610	568	326	98	25	13	19
21	385	4,320	3,970	9,360	3,710	4,270	547	311	91	26	12	19
22	363	4,350	3,750	10,200	3,430	4,060	541	294	88	26	8.8	12
23	304	4,160	3,750	10,800	3,130	3,870	508	283	75	26	8.8	21
24	224	4,150	3,870	10,000	3,060	3,470	469	273	68	29	7.6	23
25	200	4,220	4,240	9,050	3,010	3,350	446	283	75	25	7.6	27
26	195	4,270	4,510	8,390	2,700	2,950	*444	290	79	21	6.8	33
27	288	4,310	4,680	8,060	2,190	2,700	456	276	65	19	*7.6	37
28	589	4,340	4,410	7,350	1,790	2,480	516	257	57	18	12	49
29	1,280	4,320	4,310	6,670	-	2,260	550	246	55	18	21	59
30	1,680	3,980	4,220	5,790	-	2,070	559	237	48	18	23	93
31	1,780	-	4,080	5,120	-	1,950	-	230	-	18	30	-
Total	12,172	79,498	130,090	192,780	127,670	85,310	26,771	12,316	4,007	1,196	420.2	1,016
Mean	393	2,650	4,196	6,219	4,560	2,752	892	397	134	38.6	13.6	33.9
Cfs/m	0.692	4.67	7.39	10.9	8.03	4.85	1.57	0.699	0.236	0.068	0.024	0.060
In.	0.80	5.21	8.52	12.62	8.36	5.59	1.75	0.81	0.28	0.08	0.03	0.07
Ac-ft	24,140	157,700	258,000	382,400	253,200	169,200	53,100	24,430	7,950	2,370	833	2,020
Calendar year 1950	Max	13,500	Min	23	Mean	2,154	Cfs/m	3.79	In.	51.50	Ac-ft	1,559,000
Water year 1950-51	Max	10,800	Min	6.8	Mean	1,845	Cfs/m	3.25	In.	44.10	Ac-ft	1,335,000

\* Discharge measurement made on this day.

## Oswego Canal near Oswego, Oreg.

Location.--Lat 45°23'30", long. 122°43'10", in NW $\frac{1}{4}$  sec. 20, T. 2 S., R. 1 E., on left bank half a mile downstream from point of diversion from Tualatin River, 1 mile upstream from Oswego Lake and 3 miles southwest of Oswego.

Records available.--October 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 96.50 ft above mean sea level, datum of 1929. Prior to Nov. 15, 1928, staff gage at site 800 ft upstream at different datum. Nov. 15, 1928, to June 1, 1939, staff gage at site 900 ft downstream at different datum. Auxiliary gage at outlet of Oswego Lake at datum 92.64 ft for determination of backwater from lake on stages at canal gage.

Average discharge.--23 years, 69.0 cfs.

Extremes.--1928-51: Maximum discharge, 6,000 cfs Dec. 23, 1933 (gage height, 16.1 ft, site and datum then in use), computed by conveyance method and from lake spillway data; maximum daily discharge, 5,000 cfs Dec. 23, 1933; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Oswego Canal diverts water from Tualatin River in NW $\frac{1}{4}$  sec. 20, but diversion dam is in NE $\frac{1}{4}$  sec. 33, about 3 miles downstream. Water used for development of power below Oswego Lake and returned to Willamette River at that point.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	0.5	63	156	*167	78	a100	95	77	a36	26	22
2	56	.5	12	168	162	72	a90	93	75	a36	25	24
3	57	.5	12	177	156	67	a90	92	74	a36	26	26
4	59	.5	19	175	146	68	a80	91	74	a37	21	29
5	63	.5	39	175	144	74	a70	90	73	a38	20	29
6	68	.5	40	176	148	80	a70	92	*73	a40	20	*29
7	73	*1.5	40	178	157	82	a60	94	73	a42	19	30
8	76	1.5	40	175	161	86	a60	94	73	a45	18	30
9	76	1.5	40	168	161	81	a60	94	74	a48	18	30
10	73	2	40	160	165	91	a60	91	a70	a50	18	35
11	70	2	40	150	181	91	a50	89	a70	a50	18	38
12	71	3	39	139	197	100	a50	89	a70	a45	18	41
13	73	3	38	130	212	*124	a50	88	a65	a42	18	43
14	70	3.5	37	134	222	139	a50	89	a65	a36	19	44
15	66	7.5	37	152	<u>225</u>	146	a50	89	a60	a36	20	44
16	64	16	38	160	218	149	a45	88	a55	a36	20	43
17	62	38	38	175	208	150	a45	86	a55	a35	19	42
18	62	38	38	187	193	152	a45	85	a50	*36	19	41
19	64	28	38	166	178	157	a45	84	a50	35	18	40
20	68	23	37	232	165	<u>158</u>	a40	83	a48	33	18	38
21	71	5	100	258	151	156	a40	83	a46	32	18	38
22	70	3.5	*146	263	137	149	a30	82	a44	32	17	36
23	68	4.5	147	270	127	143	a30	81	a42	30	16	36
24	65	9	146	282	117	134	a30	81	a40	30	15	36
25	26	8.5	147	272	110	a130	a85	81	a38	30	15	38
26	0	7.5	151	254	102	a130	*87	81	a40	30	15	40
27	.5	85	156	237	94	a120	86	81	a42	30	14	41
28	.5	132	160	221	86	a120	92	80	a44	30	14	44
29	.5	129	161	209	-	a100	96	79	a40	29	16	49
30	.5	130	160	196	-	a100	98	79	a36	28	18	57
31	.5	-	158	184	-	a100	-	78	-	26	19	-
Total	1,629.5	683.0	2,356	5,979	4,491	3,537	1,866	2,682	1,736	1,119	575	1,113
Mean	52.6	22.8	76.0	193	160	114	62.9	86.5	57.9	36.1	18.5	37.1
Ac-ft	3,230	1,350	4,670	11,860	8,910	7,020	3,740	5,320	3,440	2,220	1,140	2,210
Calendar year 1950: Max		395		Min	0	Mean	97.8	Ac-ft	70,770			
Water year 1950-51: Max		282		Min	0	Mean	76.1	Ac-ft	55,110			

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of summation of records for Oswego Canal and Tualatin River near Willamette, compared with records for Tualatin River near Farmington.

## Tualatin River near Willamette, Oreg.

Location.--Lat 45°21'05", long. 122°40'35", in SW $\frac{1}{4}$  sec. 34, T. 2 S., R. 1 E., on left bank 300 ft upstream from county bridge, 1 mile northwest of Willamette, and  $1\frac{1}{2}$  miles above mouth.

Drainage area.--710 sq mi, approximately.

Records available.--July 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 85.61 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). Prior to June 12, 1941, staff gage at datum 1.02 ft higher.

Average discharge.--23 years, 1,425 cfs (including flow of Oswego Canal).

Extremes (river only).--Maximum discharge during year, 10,600 cfs Jan. 24 (gage height, 12.53 ft); minimum, 4.2 cfs Sept. 14.

1928-51: Maximum discharge, 23,300 cfs Dec. 23, 1933 (gage height, 17.72 ft, present datum); minimum observed, 2 cfs Aug. 14-21, 1928 (gage height, 1.27 ft, present datum).

Remarks.--Records excellent above 50 cfs and good below except those for period of no gage-height record, which are fair. Oswego Canal (see p. ) diverts water  $4\frac{1}{2}$  miles above station for recreational use in Oswego Lake and development of power between outlet of that lake and Willamette River, to which water is returned. Several small diversions above station for irrigation. Some regulation in low-water season by flashboards on crest of diversion dam for Oswego Canal.

Revisions (water years).--W 1014: 1943. W 1184: 1947.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 30 to Jan. 25)

1.4	3.8	2.9	237
1.5	7.4	3.5	455
1.6	13	5.0	1,290
1.8	29	7.0	2,880
2.0	52	9.0	5,110
2.4	115	12.5	10,700

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	37	2,140	4,600	4,350	*5,620	a2,200	1,990	605	208	19	14	14
2	32	2,250	4,520	4,780	5,110	a2,000	1,900	545	200	19	14	13
3	42	2,290	4,490	5,240	4,850	a1,700	1,790	514	184	19	14	12
4	67	2,280	4,520	5,120	4,410	a1,600	1,650	487	179	20	14	9.6
5	101	2,170	4,490	5,140	4,130	a1,700	1,580	473	171	24	14	11
6	171	1,960	4,760	5,250	4,110	a1,700	1,510	491	*167	28	13	*9.1
7	291	*1,670	4,940	5,270	4,460	a1,800	1,440	570	164	33	13	10
8	370	1,410	4,920	5,110	4,560	a1,800	1,330	585	169	35	11	12
9	366	1,180	4,900	4,820	4,590	a1,900	1,220	560	169	36	11	8.5
10	284	1,020	4,890	4,440	4,660	a2,000	1,140	500	162	39	11	7.0
11	228	893	4,860	4,050	5,240	a2,100	1,050	451	157	39	12	6.7
12	246	900	4,720	3,640	5,930	a2,200	975	439	150	35	12	6.0
13	281	728	4,460	3,320	6,490	*3,550	910	439	142	29	13	4.9
14	222	675	4,160	3,450	a7,000	3,860	871	447	135	25	13	4.5
15	164	969	3,870	4,100	a6,800	4,010	855	460	133	26	12	4.9
16	137	3,200	4,160	4,380	a6,500	4,190	816	426	127	25	12	4.9
17	125	4,800	4,590	5,200	a6,000	4,220	783	390	115	26	12	6.7
18	131	4,710	4,520	5,680	a5,500	4,310	759	355	113	*25	12	7.4
19	164	4,400	*4,480	6,720	a5,000	4,440	695	329	108	25	10	7.4
20	228	4,440	4,420	7,910	a4,800	4,480	645	315	101	21	8.5	9.1
21	308	4,520	4,240	9,060	a4,400	4,370	630	294	97	18	8.0	10
22	291	4,490	4,020	9,510	a4,100	4,170	600	288	84	16	7.4	11
23	240	4,440	3,990	9,870	a3,600	3,900	575	271	90	14	7.0	8.5
24	205	4,550	3,910	10,500	a3,300	3,660	527	262	77	14	6.7	7.4
25	197	4,670	3,990	10,200	a3,100	3,430	322	259	70	13	6.3	9.1
26	249	4,650	4,180	9,420	a3,000	3,160	*374	259	65	13	6.3	8.5
27	351	4,820	4,360	8,630	a2,800	2,940	414	256	48	13	6.3	9.1
28	690	4,750	4,460	7,990	a2,500	2,710	509	243	27	13	7.0	10
29	1,250	4,550	4,540	7,480	-	2,500	625	234	24	12	14	24
30	1,750	4,540	4,480	6,920	-	2,280	670	225	19	12	14	13
31	2,030	-	4,440	6,250	-	2,120	-	214	-	13	14	-
Total	11,248	89,965	137,910	193,800	132,560	91,000	29,145	12,186	3,665	700	340.5	279.3
Mean	363	2,999	4,449	6,252	4,734	2,935	972	393	122	22.6	11.0	9.31
Ac-ft	22,310	178,400	273,500	384,400	262,900	180,500	57,810	24,170	7,270	1,390	675	554

Adjusted for diversion by Oswego Canal

Mean	415	3,022	4,524	6,445	4,694	3,049	1,035	480	180	58.7	29.6	46.4
Cfs/m	0.585	4.26	6.48	9.08	6.89	4.29	1.46	0.676	0.254	0.083	0.042	0.065
In.	0.67	4.75	7.47	10.47	7.18	4.95	1.63	0.78	0.28	0.09	0.05	0.07
Ac-ft	25,540	179,800	278,200	396,300	271,800	187,500	61,600	29,490	10,710	3,610	1,820	2,760

observed

Calendar year 1950: Max	11,000	Min	13	Mean	2,210	Ac-ft	1,600,000
Water year 1950-51: Max	10,500	Min	4.5	Mean	1,925	Ac-ft	1,394,000

Adjusted

Calendar year 1950: Mean	2,308	Cfs/m	3.25	In.	44.24	Ac-ft	1,671,000
Water year 1950-51: Mean	2,001	Cfs/m	2.82	In.	38.39	Ac-ft	1,449,000

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for station at Farmington and Oswego Canal.

## WILLAMETTE RIVER BASIN

Clackamas River at Big Bottom, Oreg.

Location.--Lat 45°01'00" long. 121°54'50", in sec. 26, T. 6 S., R. 7 E., on right bank just downstream from Pot Creek at lower end of Big Bottom, half a mile upstream from site of proposed dam and 28 miles southeast of Estacada. Inflow between gage and measuring section 2,000 ft downstream is included in records.

Drainage area (revised).--136 sq mi at measuring section 2,000 ft downstream. Prior to December 1949, 134 sq mi at measuring section 1,000 ft downstream.

Records available.--April 1920 to September 1951.

Gage.--Water-stage recorder.

Average discharge.--31 years, 462 cfs.

Extremes.--Maximum discharge during year, 3,290 cfs Nov. 2 (gage height, 6.43 ft); minimum, 292 cfs Sept. 20-22, 24, 25 (gage height, 2.15 ft).

1920-51: Maximum discharge, 6,750 cfs Mar. 31, 1931, Dec. 15, 1946, from rating curves extended above 3,500 and 1,700 cfs, respectively; maximum gage height, 8.58 ft, Dec. 15, 1946; minimum discharge, 184 cfs Sept. 12, 1942.

Remarks.--Records excellent except those above 1,500 cfs, which are good. No regulation or diversion above station.

Cooperation.--Water-stage recorder graph and 12 discharge measurements furnished by Portland General Electric Co.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28		Oct. 28 to Sept. 30	
2.1	297	2.1	280
2.5	392	2.5	403
3.0	565	3.0	610
3.5	785		5.8
			2,570

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	314	1,620	*888	765	*720	*524	534	780	650	372	317	302
2	314	2,560	790	882	810	504	*542	*750	625	368	317	300
3	358	1,620	820	888	860	492	578	750	615	365	314	300
4	387	1,280	1,280	795	850	500	640	888	615	368	314	300
5	471	1,110	1,170	735	1,010	496	690	915	615	365	314	298
6	565	959	1,780	685	992	492	720	1,050	592	361	314	298
7	443	845	2,060	647	1,410	480	750	1,110	570	354	314	300
8	434	820	1,450	820	1,790	480	765	1,020	547	348	311	300
9	443	730	1,220	592	1,590	464	775	1,000	538	341	311	300
10	387	670	1,090	578	1,570	456	770	1,080	538	337	314	298
11	365	625	1,070	565	2,540	448	770	1,260	538	334	314	298
12	353	596	1,020	538	2,080	460	800	1,110	534	331	311	298
13	346	556	932	578	1,550	508	876	998	520	328	311	298
14	341	534	866	964	1,290	492	986	932	512	325	311	298
15	343	552	915	1,060	1,140	625	1,000	904	508	325	311	295
16	341	690	992	948	1,010	695	1,010	932	496	325	311	295
17	409	765	932	1,000	937	615	1,040	1,000	480	325	308	295
18	526	750	860	860	866	574	1,040	992	468	325	308	295
19	585	645	860	795	800	556	992	937	456	325	308	295
20	650	912	888	735	765	552	904	915	452	322	305	295
21	538	1,040	825	932	725	560	830	915	444	322	305	292
22	470	964	930	893	685	552	785	959	*429	322	305	295
23	440	855	1,250	850	650	538	765	1,040	422	322	305	295
24	*418	1,160	1,020	1,150	625	529	760	1,040	414	322	302	295
25	443	1,280	915	1,210	601	529	755	986	403	320	302	305
26	447	*1,150	850	1,280	574	529	765	920	396	322	302	298
27	766	1,140	820	1,130	556	529	795	871	389	320	302	*298
28	1,440	1,010	845	976	534	524	964	810	386	320	317	295
29	2,290	904	915	850	-	542	915	750	382	320	*314	300
30	1,340	948	888	800	-	542	830	705	375	*320	308	351
31	964	-	*811	750	-	538	-	670	-	317	305	-
Total	17,931	29,270	31,952	26,051	29,530	16,325	24,346	28,989	14,909	10,371	9,605	8,982
Mean	578	976	1,051	840	1,055	527	812	935	497	335	310	299
Cfs/m	4.38	7.39	7.81	6.36	7.99	3.99	6.15	7.08	3.77	2.54	2.35	2.27
In.	5.05	8.25	9.00	7.34	8.32	4.60	6.86	8.17	4.20	2.92	2.71	2.53
Ac-ft	35,570	58,060	63,380	51,670	58,570	32,380	48,290	57,500	29,570	20,570	19,050	17,820
Calendar year 1950: Max	2,560	Min	305	Mean	713	Cfs/m	5.40	In.	73.35	Ac-ft	516,400	
Water year 1950-51: Max	2,560	Min	292	Mean	680	Cfs/m	5.15	In.	69.95	Ac-ft	492,400	

Peak discharge (base, 1,200 cfs)--Oct. 29 (3 a.m.) 2,830 cfs (6.07 ft); Nov. 2 (2:30 a.m.) 3,290 cfs (6.43 ft); Nov. 24 (6 to 11 p.m.) 1,360 cfs (4.37 ft); Dec. 7 (5:30 a.m.) 2,470 cfs (5.69 ft); Dec. 23 (4 a.m.) 1,370 cfs (4.37 ft); Jan. 26 (6 to 7 a.m.) 1,330 cfs (4.34 ft); Feb. 11 (1 to 2 p.m.) 2,840 cfs (6.05 ft); May 11 (8 a.m.) 1,290 cfs (4.25 ft).

\* Discharge measurement made on this day.

## Oak Grove Fork above powerplant intake, Oreg.

Location--Lat 45°04'30", long. 121°57'00", in SW 1/4 sec. 3, T. 6 S., R. 7 E., on right bank just upstream from Spring Creek, two-thirds of a mile upstream from Kink Creek, 1 mile upstream from intake of power development of Portland General Electric Co., and 24 miles southeast of Estacada. Records include flow of Spring Creek.

Drainage area--126 sq mi, includes that of Spring Creek.

Records available--May 1909 to December 1923 (incomplete), December 1923 to September 1951.

Gage--Water-stage recorder. Datum of gage is 2,052.31 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. May 21, 1909, to Nov. 17, 1911, staff gage and Mar. 26, 1912, to Sept. 30, 1923, water-stage recorders at various sites three-quarters of a mile downstream below Kink Creek, at different datum.

Average discharge--27 years (1924-51), 475 cfs.

Extremes--Maximum discharge during year, 1,570 cfs Feb. 11 (gage height, 3.78 ft); maximum gage height, 3.80 ft Feb. 11 (backwater from drift); minimum discharge, 352 cfs Oct. 2.

1909-51: Maximum discharge, 5,000 cfs Jan. 7, 1923 (gage height, 5.45 ft, site and datum then in use), computed from flow at stations on Clackamas River; minimum, 236 cfs Oct. 15, 16, 18, 1931 (gage height, 1.42 ft).

Remarks--Records excellent except those above 1,200 cfs, which are good. Discharge includes flow of Spring Creek, just below gage. No diversion or regulation above station.

Cooperation--Water-stage recorder graph and 12 discharge measurements furnished by Portland General Electric Co.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 1		Nov. 2 to Sept. 30	
2.2	330	2.3	375
2.5	487	3.0	900
3.1	900	3.7	1,510

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	357	870	715	828	708	610	595	860	812	512	431	403
2	357	1,330	678	916	*738	595	*602	*852	790	512	431	389
3	375	1,130	692	876	745	588	632	844	775	505	431	396
4	396	980	844	805	745	588	685	940	768	505	431	396
5	452	892	828	760	768	572	715	972	760	498	431	396
6	544	805	964	722	798	565	752	1,030	738	505	431	389
7	469	760	1,090	708	972	542	775	1,060	715	498	431	389
8	446	745	988	685	1,130	542	782	1,040	700	490	424	389
9	423	685	916	662	1,170	528	782	1,060	685	490	424	389
10	396	648	876	648	1,230	512	775	1,150	670	482	424	389
11	386	625	888	640	1,500	505	775	1,380	655	475	424	382
12	375	610	852	618	1,480	520	820	1,280	655	468	424	382
13	366	580	805	678	1,290	550	884	1,210	640	468	417	382
14	362	572	775	884	1,170	542	948	1,150	632	460	417	382
15	362	572	775	868	1,080	622	956	1,120	632	460	417	382
16	357	610	790	827	996	655	972	1,120	618	452	417	382
17	391	602	775	852	940	610	996	1,160	610	452	410	382
18	417	565	758	775	892	*602	1,090	1,150	595	452	410	382
19	446	542	745	750	828	588	908	1,110	582	452	410	382
20	452	632	760	700	805	602	908	1,090	580	452	410	375
21	417	708	722	722	775	610	852	1,080	572	445	410	375
22	402	700	798	678	745	602	820	1,100	*565	445	410	375
23	*391	678	988	678	715	595	812	1,170	558	438	403	375
24	391	790	900	828	692	588	805	1,160	550	438	403	375
25	396	*836	844	*876	670	595	798	1,120	542	438	403	403
26	391	812	820	948	648	595	805	1,060	542	438	403	*382
27	500	805	812	900	625	595	828	1,020	535	438	403	382
28	657	768	884	836	618	595	924	980	528	438	*417	382
29	830	730	980	782	-	602	924	916	520	431	403	396
30	727	745	*948	760	-	602	892	876	520	*431	403	424
31	643	-	868	730	-	595	-	844	-	431	403	-
Total	13,874	22,327	26,038	23,920	25,453	18,059	24,786	32,904	19,050	14,399	12,906	11,614
Mean	448	744	840	772	909	583	826	1,060	635	464	416	387
Cfs/m	3.56	5.90	6.67	6.13	7.21	4.63	6.56	8.41	5.04	3.68	3.30	3.07
In.	4.10	6.59	7.69	7.06	7.51	5.33	7.32	9.71	5.62	4.25	3.81	3.43
Ac-ft	27,520	44,280	51,650	47,440	50,490	35,820	49,160	65,260	37,790	28,560	25,600	23,040

Calendar year 1950: Max 1,350 Min 352 Mean 646 Cfs/m 5.13 In. 69.60 Ac-ft 467,600  
 Water year 1950-51: Max 1,500 Min 357 Mean 672 Cfs/m 5.33 In. 72.42 Ac-ft 486,800

Peak discharge (base, 940 cfs)--Nov. 2 (1 to 2 a.m.) 1,400 cfs (3.58 ft); Dec. 7 (6 to 7 a.m.) 1,140 cfs (3.29 ft); Dec. 23 (3 a.m.) 1,040 cfs (3.17 ft); Jan. 14 (2:30 a.m.) 948 cfs (3.07 ft); Jan. 26 (8 a.m.) 964 cfs (3.11 ft); Feb. 11 (10 to 12 p.m.) 1,570 cfs (3.78 ft); May 10 (7 to 9 a.m.) 1,390 cfs (3.57 ft).

\* Discharge measurement made on this day.

## Clackamas River above Three Lynx Creek, Oreg.

Location.--Lat 45°07'30", long. 122°04'20", in NE<sup>1</sup> sec. 21, T. 5 S., R. 6 E., just downstream from powerplant, 500 ft upstream from Three Lynx Creek and 17 miles southeast of Estacada.

Drainage area.--479 sq mi.

Records available.--October 1911 to December 1913, October 1921 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,091.69 ft (revised) above mean sea level, datum of 1929, supplementary adjustment of 1947 (levels by Portland General Electric Co.). Oct. 1, 1911, to Dec. 31, 1913, staff gage at about same site and datum.

Average discharge.--32 years, 1,889 cfs.

Extremes.--Maximum discharge during year, 17,100 cfs Nov. 2 (gage height, 9.98 ft); minimum, 417 cfs Sept. 28 (gage height, 0.63 ft); minimum daily, 775 cfs Sept. 27. 1911-13, 1921-51: Maximum discharge, 34,800 cfs Mar. 31, 1931 (gage height, 15.5 ft), from rating curve extended above 11,000 cfs; minimum observed, 375 cfs Aug. 10, 16, 1924, Sept. 20, 1936; minimum daily, 536 cfs Oct. 22, 1930.

Remarks.--Records excellent. Water diverted from Oak Grove Fork is used by powerplant on Clackamas River just above station. Considerable diurnal fluctuation during periods of low flow.

Cooperation.--Water-stage recorder graph and 12 discharge measurements furnished by Portland General Electric Co.

Revisions.--W 1184: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.3	745
2.0	1,220
3.0	2,120
5.0	4,730
7.0	8,740
9.0	14,100

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	829	8,130	*3,650	3,310	2,590	1,880	2,310	3,040	2,150	1,170	930	835
2	835	12,700	3,220	4,320	2,870	1,810	2,380	2,900	2,070	1,200	924	817
3	965	7,500	3,340	4,700	3,640	1,780	2,760	2,820	2,050	1,180	924	823
4	1,360	5,460	5,930	3,800	3,590	1,820	3,350	3,290	2,040	1,140	924	817
5	1,910	4,430	5,700	3,280	4,550	1,740	3,630	3,500	2,030	1,180	904	835
6	2,960	3,690	8,910	2,870	4,440	1,710	3,730	3,840	1,930	1,150	891	829
7	2,180	3,170	8,690	2,620	6,480	1,650	3,870	4,350	1,850	1,130	898	847
8	1,920	2,950	6,040	2,440	8,640	1,650	3,860	3,880	1,780	1,090	937	853
9	2,070	2,600	4,840	2,300	7,240	1,560	3,720	3,740	1,750	1,130	951	853
10	1,640	2,340	4,250	2,180	7,020	1,500	3,570	4,000	1,750	1,100	965	884
11	1,440	2,190	4,070	2,160	10,700	1,460	3,480	4,500	1,760	1,070	924	853
12	1,270	2,110	3,860	2,050	9,240	1,520	3,530	4,140	1,730	1,060	876	859
13	1,170	1,960	3,420	2,340	6,630	1,830	4,140	3,730	1,700	1,050	965	865
14	1,080	1,900	3,130	5,150	5,250	1,880	4,680	3,390	1,690	1,040	937	865
15	1,100	2,080	3,300	5,630	4,550	3,160	4,580	3,240	1,680	1,020	937	872
16	1,080	3,080	3,940	4,740	4,040	3,840	4,420	3,310	1,650	1,000	937	865
17	1,360	4,180	3,790	6,200	3,660	3,040	4,400	3,590	1,600	1,010	930	878
18	2,320	3,760	3,400	4,440	3,420	2,590	4,260	3,560	1,560	1,010	910	865
19	3,020	2,900	3,300	3,610	3,120	2,390	3,870	3,310	1,540	1,000	917	847
20	3,420	4,330	3,390	3,170	2,980	2,390	3,460	3,200	1,500	979	891	835
21	2,500	5,010	3,130	4,940	2,820	2,530	3,070	3,200	1,470	972	898	829
22	2,000	4,540	3,520	4,670	2,600	2,470	2,810	3,310	1,450	958	891	823
23	1,780	3,860	5,440	4,140	2,470	2,320	2,660	3,600	1,440	958	878	823
24	1,590	6,480	4,230	6,260	2,350	2,260	2,600	3,690	1,400	958	859	823
25	1,660	6,630	3,700	*6,300	2,240	2,270	2,600	3,430	1,360	951	910	841
26	1,770	5,490	3,340	6,580	2,130	2,280	*2,660	3,210	1,340	951	847	823
27	3,030	5,120	3,180	5,300	*2,010	*2,300	2,810	2,980	1,300	972	859	*775
28	6,990	4,330	*3,550	4,260	1,920	2,230	3,800	2,780	1,270	958	878	787
29	10,200	3,680	4,140	3,550	-	2,330	3,720	*2,530	1,250	898	*878	817
30	6,320	3,800	4,040	3,170	-	2,390	3,310	2,380	1,220	937	847	1,090
31	*4,540	-	3,720	2,820	-	2,330	-	2,250	-	*930	835	-
Total	76,309	130,400	132,220	123,300	123,180	66,910	104,120	104,690	49,310	32,112	28,052	25,428
Mean	2,462	4,347	4,265	3,977	4,400	2,158	3,471	3,377	1,644	1,056	905	848
Cfs/m	5.14	9.08	8.90	8.30	9.19	4.51	7.25	7.05	3.43	2.16	1.89	1.77
In.	5.92	10.12	10.27	9.57	9.56	5.19	8.08	8.13	3.83	2.49	2.18	1.97
Ac-ft	151,400	258,600	262,300	244,600	244,300	132,700	206,500	207,600	97,800	63,690	55,640	50,440
Calendar year 1950: Max	13,000	Min	782	Mean	2,973	Cfs/m	6.21	In.	84.24	Ac-ft	2,153,000	
Water year 1950-51: Max	12,700	Min	775	Mean	2,729	Cfs/m	5.70	In.	77.31	Ac-ft	1,976,000	

Peak discharge (base, 8,100 cfs).--Oct. 29 (3:30 a.m.) 11,900 cfs (9.24 ft); Nov. 2 (1:30 a.m.) 17,100 cfs (9.98 ft); Dec. 6 (1:30 p.m.) 10,800 cfs (7.81 ft); Feb. 8 (3 a.m.) 9,620 cfs (7.36 ft); Feb. 11 (4 p.m.) 11,900 cfs (8.22 ft).

\* Discharge measurement made on this day.

## Clackamas River near Cazadero, Oreg.

Location.--Lat 45°14'30", long. 122°16'20", in NE<sup>1</sup> sec. 11, T. 4 S., R. 4 E., on right bank half a mile upstream from backwater from Cazadero Dam of Portland General Electric Co. and 3 miles southeast of Cazadero.

Drainage area.--657 sq mi.

Records available.--January 1909 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 532.0 ft above mean sea level (levels by Portland General Electric Co.); gage readings have been reduced to elevations above mean sea level. Jan. 1 to Nov. 19, 1909, staff gage and Nov. 20, 1909, to Oct. 9, 1922, water-stage recorder at site half a mile downstream at different datum. Oct. 10, 1922, to Nov. 14, 1922, staff gage at present site and datum.

Average discharge.--42 years, 2,636 cfs.

Extremes.--Maximum discharge during year, 23,500 cfs Nov. 2 (elevation, 545.96 ft); minimum, 560 cfs Sept. 22 (elevation, 533.45 ft); minimum daily, 870 cfs Sept. 21, 1909-51: Maximum discharge, 60,800 cfs Mar. 31, 1931 (elevation, 558.5 ft), by computation of peak flow over dam, from data furnished by Portland General Electric Co.; minimum, 410 cfs Oct. 20, 1925, Sept. 28, 1930 (elevation, 532.03 ft), caused by shut-down in powerplant at Three Lynx; minimum daily, 587 cfs Aug. 17, 1930.

Remarks.--Records excellent. Some diurnal fluctuation during low flow caused by Oak Grove powerplant. No diversion above station.

Cooperation.--Water-stage recorder graph and 12 discharge measurements furnished by Portland General Electric Co.

Revisions.--W 1184: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

534.1	820
534.5	1,050
536.0	2,260
538.0	4,720
541.0	10,500
544.1	18,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,010	10,200	5,110	4,980	3,610	2,410	3,180	3,820	2,550	1,530	1,060	972
2	1,010	18,400	4,410	6,680	4,030	2,310	3,260	3,670	2,470	1,380	1,060	960
3	1,140	10,300	4,590	7,510	5,160	2,260	3,840	3,550	2,440	1,360	1,060	942
4	1,610	7,530	8,070	5,870	5,350	2,410	4,610	4,260	2,450	1,330	1,060	936
5	2,330	6,360	7,690	4,820	6,630	2,350	4,840	4,540	2,470	1,350	1,030	930
6	4,270	5,140	12,100	4,120	*6,520	2,280	4,860	4,930	2,350	1,360	1,030	930
7	2,970	4,370	11,800	3,730	9,350	2,170	4,960	5,920	2,270	1,330	1,010	930
8	2,660	4,150	8,240	3,410	11,700	2,170	4,860	5,140	2,170	1,250	1,040	954
9	2,910	3,650	6,800	3,150	9,850	2,070	4,580	4,780	2,090	1,270	1,050	936
10	2,220	3,270	5,890	3,010	9,480	1,980	4,340	4,980	2,070	1,240	1,040	930
11	1,900	3,020	5,550	2,960	14,100	1,940	4,170	5,680	2,070	1,240	1,030	930
12	1,670	2,910	5,190	2,770	12,400	2,130	4,410	5,200	2,050	1,220	963	919
13	1,520	2,860	4,610	5,280	8,860	3,240	5,060	4,640	2,010	1,200	1,060	914
14	1,420	2,530	4,200	8,550	7,040	3,360	5,820	4,190	1,970	1,190	1,020	908
15	1,410	2,780	4,360	9,200	6,180	6,720	5,620	3,940	1,940	1,130	1,020	897
16	1,380	4,920	5,220	7,180	5,310	6,830	5,360	3,980	1,890	1,190	1,010	897
17	1,790	7,290	5,000	10,300	4,820	4,880	5,390	4,290	1,820	1,150	1,000	902
18	2,900	6,450	4,510	6,950	4,410	4,040	5,160	4,240	1,760	1,180	972	897
19	3,850	4,480	4,270	5,410	4,000	3,760	4,720	3,940	1,700	1,140	984	875
20	4,940	6,700	4,400	4,520	3,610	3,870	4,170	3,770	1,670	1,140	972	875
21	3,480	7,350	4,000	7,830	3,630	4,120	3,700	3,730	1,630	1,130	972	870
22	2,710	6,650	4,330	7,240	3,370	3,900	3,370	3,870	1,610	1,120	972	875
23	2,340	5,620	7,060	6,700	3,180	3,500	3,160	4,240	1,580	1,120	972	875
24	2,020	9,090	5,770	10,400	3,020	3,280	3,120	4,380	1,550	1,090	966	875
25	2,190	9,460	4,820	9,460	2,680	3,300	3,100	4,160	1,520	1,090	978	942
26	2,370	7,730	4,270	9,730	2,700	3,360	*3,180	3,820	1,490	1,080	966	942
27	3,760	7,180	4,020	7,730	*2,580	*3,310	3,360	3,520	1,460	1,100	966	902
28	8,660	6,090	*5,210	6,110	2,490	3,200	4,580	3,320	1,440	1,090	1,010	902
29	14,800	*5,050	6,800	5,020	-	3,340	4,690	*3,000	1,400	1,080	1,030	972
30	9,060	5,430	6,360	4,410	-	3,410	4,160	2,800	*1,380	1,030	*996	*1,236
31	*6,570	-	5,700	3,950	-	3,270	-	2,670	-	*1,060	972	-
Total	102,870	186,760	180,350	186,800	166,450	101,170	129,630	128,970	57,270	36,940	31,271	27,819
Mean	3,318	6,225	5,818	6,026	5,945	3,264	4,321	4,160	1,909	1,192	1,009	927
Cfs/m	5.05	9.47	8.88	9.17	9.05	4.97	6.58	6.33	2.91	1.81	1.54	1.41
In.	5.82	10.57	10.21	10.57	9.42	5.73	7.34	7.30	3.24	2.09	1.77	1.57
Ac-ft	204,000	370,400	357,700	370,500	330,100	200,700	257,100	255,800	113,600	73,270	62,030	55,180
Calendar year 1950: Max	20,100	Min	888	Mean	4,044	Cfs/m	6.16	In.	83.56	Ac-ft	2,928,000	
Water year 1950-51: Max	18,400	Min	870	Mean	3,661	Cfs/m	5.57	In.	75.63	Ac-ft	2,650,000	

Peak discharge (base, 11,000 cfs).--Oct. 29 (6 a.m.) 16,300 cfs (543.28 ft); Nov. 2 (2:30 a.m.) 23,500 cfs (545.96 ft); Nov. 24 (3 to 4 p.m.) 11,200 cfs (541.26 ft); Dec. 6 (2:30 p.m.) 14,900 cfs (542.73 ft); Jan. 17 (7 a.m.) 12,800 cfs (541.92 ft); Jan. 24 (5 p.m.) 11,000 cfs (541.18 ft); Feb. 8 (2 a.m.) 13,300 cfs (542.10 ft); Feb. 11 (3 p.m.) 15,400 cfs (542.92 ft).

\* Discharge measurement made on this day.

## Johnson Creek at Sycamore, Oreg.

Location.--Lat 45°28'40", long. 122°30'30", in lot 2, SW 1/4 sec. 13, T. 1 S., R. 2 E., on right bank a third of a mile southwest of Sycamore station.

Drainage area.--28.2 sq mi.

Records available.--June 1940 to September, 1951.

Gage.--Water-stage recorder and concrete control with steel weir for low flows. Datum of gage is 228.03 ft above mean sea level, datum of 1929. Prior to Aug. 26, 1940, staff gage at same site and datum.

Average discharge.--11 years, 52.1 cfs.

Extremes.--Maximum discharge during year, 1,160 cfs Nov. 17 (gage height, 10.62 ft); minimum, 0.8 cfs Sept 15 (gage height, 0.82 ft).

1940-51: Maximum discharge, 2,110 cfs Feb. 10, 1949 (gage height, 13.77 ft); minimum, 0.2 cfs Aug. 14-16, 18-22, 1940, Aug. 2, 21, 22, 1941.

Remarks.--Records good except those for periods of no gage-height record and those below 3 cfs, which are fair. Small diversions above station for irrigation. No regulation.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 30 to Nov. 14)

0.8	0.7	2.0	46
1.9	1.3	3.0	106
1.0	2.2	5.0	290
1.1	4.5	8.0	560
1.5	22	11.0	1,240

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.6	228	201	149	42	34	28	a17	3.8	1.8	1.7	1.8
2	1.2	334	146	424	107	30	24	a15	3.8	2.0	1.7	1.8
3	2.1	*183	181	339	226	38	a12	3.8	1.8	1.8	1.3	
4	4.3	112	259	200	199	107	20	a25	3.4	2.0	1.8	1.2
5	7.8	99	176	139	181	99	18	a19	*3.4	1.8	1.8	1.8
6	11	70	481	102	292	93	17	a25	3.4	2.0	1.3	1.3
7	8.2	73	377	82	353	*88	15	a33	3.4	2.1	1.6	1.8
8	19	111	209	80	240	151	13	a25	3.4	2.0	1.7	1.9
9	28	74	148	66	186	120	12	a20	3.6	1.4	1.8	1.6
10	12	55	108	85	151	106	12	a16	2.9	1.8	1.8	1.6
11	10	44	125	102	189	119	11	a16	2.9	1.6	1.8	1.6
12	8.2	40	102	86	207	366	10	a14	3.6	*1.3	1.9	1.4
13	6.6	32	*83	163	137	468	9.9	a13	3.8	1.3	1.4	1.3
14	6.1	41	80	507	101	291	9.4	a11	3.4	1.3	1.6	1.2
15	7.0	400	115	428	114	347	9.0	a10	3.1	1.4	1.8	1.2
16	6.1	*874	254	274	91	244	8.2	a9.5	2.9	1.3	1.7	1.2
17	9.4	*1,050	213	446	113	156	8.2	a8.5	3.4	1.4	1.6	1.2
18	14	554	143	347	140	107	8.2	a7.5	2.9	1.3	1.6	1.3
19	20	254	109	284	121	81	*7.0	a6.5	2.4	1.3	1.4	1.4
20	48	253	83	215	139	66	6.1	a6.0	2.4	1.8	1.2	1.3
21	37	181	68	674	102	60	5.7	a5.5	2.2	1.5	1.4	1.8
22	26	131	69	428	80	52	5.3	6.6	2.1	1.8	1.5	1.3
23	22	114	130	370	66	45	5.3	7.4	2.7	1.3	1.2	1.8
24	17	396	93	448	57	40	5.3	7.8	2.7	1.7	1.2	1.3
25	23	344	88	264	55	37	4.9	7.4	2.7	1.9	1.6	4.3
26	47	213	73	217	50	36	4.5	6.6	2.7	1.6	1.2	1.9
27	80	347	72	147	42	31	5.7	5.7	2.4	1.8	1.2	2.0
28	209	190	198	100	36	27	22	5.3	2.1	1.8	2.9	1.9
29	280	139	292	71	-	26	20	5.3	1.8	1.8	2.4	2.9
30	194	220	290	57	-	30	a17	4.9	1.8	1.4	1.8	7.8
31	149	-	222	*47	-	36	-	4.0	-	1.8	1.5	-
Total	1,322.6	7,164	5,188	7,341	3,817	3,511	363.7	375.5	88.9	51.1	50.9	56.2
Mean	42.7	239	167	237	136	113	12.1	12.1	2.96	1.65	1.64	1.87
Cfsm	1.51	8.48	5.92	8.40	4.82	4.01	0.429	0.429	0.105	0.059	0.058	0.066
In.	1.74	9.45	6.84	9.68	5.03	4.63	0.48	0.50	0.12	0.07	0.07	0.07
Ac-ft	2,620	14,210	10,290	14,560	7,570	8,960	721	745	176	101	101	111

Calendar year 1950: Max 1,050 Min 1.0 Mean 87.6 Cfsm 3.11 In. 42.18 Ac-ft 63,440  
Water year 1950-51: Max 1,050 Min 1.2 Mean 80.4 Cfsm 2.85 In. 38.68 Ac-ft 58,160

Peak discharge (base, 450 cfs).--Nov. 17 (10:30 a.m.) 1,160 cfs (10.62 ft); Nov. 24 (10:30 p.m.) 476 cfs (6.62 ft); Dec. 6 (10 to 11 a.m.) 617 cfs (7.69 ft); Jan. 2 (2:30 p.m.) 632 cfs (7.80 ft); Jan. 14 (7 to 9 p.m.) 722 cfs (8.44 ft); Jan. 17 (10:30 a.m.) 532 cfs (7.05 ft); Jan. 21 (3 p.m.) 848 cfs (9.14 ft); Jan. 24 (3:30 a.m.) 573 cfs (7.37 ft); Mar. 12 (10:30 p.m.) 610 cfs (7.64 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Pudding River near Mount Angel, Butte Creek at Monitor, Haskins Creek near McMinnville, and recorded range in stage.



Salmon Creek near Battle Ground, Wash.

Location.--Lat 45°46'25', long. 122°26'35', in NE¼SW¼ sec. 4, T. 3 N., R. 3 E., on left bank 100 ft upstream from highway bridge, 150 ft downstream from Rock Creek, and 4 miles east of Battle Ground.

Drainage area.--18.3 sq mi.

Records available.--October 1943 to September 1951.

Gage.--Staff gage and crest-stage indicator; gage read once daily. Datum of gage is 354.88 ft above mean sea level (river-profile survey). Prior to Oct. 1, 1950, staff gage at same site at datum 1.0 ft higher.

Average discharge.--7 years (1944-51), 64.9 cfs.

Extremes.--Maximum discharge, 844 cfs Dec. 23 (gage height, 3.14 ft); minimum observed, 1.3 cfs Sept. 14-16, 22.  
1943-51: Maximum discharge observed, 1,440 cfs Feb. 17, 1949 (gage height, 3.10 ft), from rating curve extended above 520 cfs; minimum observed, 1.3 cfs Aug. 20, 22, 28-30. Sept. 5-9, 13, 14, 1949, Sept. 14-16, 22, 1951.

Remarks.--Records fair except those for period of no gage-height record, which are poor. No diversion or regulation.

Revisions (water years).--W 1044: 1944.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.8	1.3	1.8	68
1.0	3.4	2.0	120
1.2	6.8	2.3	225
1.4	14	2.6	395
1.6	32	2.9	610

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.7	132	132	201	60	42	58	19.5	11.5	4.2	2.3	2.3
2	2.5	193	120	594	84	38	54	19.5	11	5.3	2.5	2.1
3	*5.2	150	126	421	73	35	50	18	11	4.2	2.5	1.7
4	7.2	126	201	285	68	64	45	18	11	9.4	2.5	1.5
5	14	100	157	185	64	56	37	28	11.5	6.8	2.3	1.5
6	19	84	225	150	105	52	34	23	14	9.4	2.3	1.7
7	17.5	79	178	120	120	45	34	42	*12.5	6.8	2.1	3.2
8	17.5	*84	144	105	157	45	31	38	11	5.3	2.1	2.3
9	26	73	120	90	193	35	29	32	11	5.3	2.7	2.1
10	16	60	95	84	201	45	26	30	9.4	5.6	2.7	1.9
11	10	52	95	73	402	42	25	38	9.4	4.6	2.9	1.9
12	10	48	*68	64	323	120	25	30	9.4	3.7	2.9	1.9
13	10	35	64	100	209	347	25	28	9.4	3.4	2.7	1.5
14	9.4	52	60	275	150	335	23	25	9.4	3.7	2.5	1.3
15	9.4	205	64	323	144	488	21	25	8.8	3.7	2.1	1.3
16	9.1	610	255	275	115	347	21	23	8.2	3.7	1.9	1.3
17	9.7	395	157	395	110	189	19.5	21	7.7	3.4	1.9	1.5
18	20	275	120	255	144	135	19.5	19.5	7.2	3.9	1.9	1.5
19	22	185	105	201	132	123	18	19.5	7.7	3.7	1.9	1.7
20	26	171	79	171	120	108	18	18	7.7	3.7	1.7	1.5
21	23	157	68	447	all 0	95	16.5	16.5	6.8	3.4	1.5	1.5
22	18	138	132	299	90	84	16.5	15	6.8	3.2	1.7	1.3
23	18	120	562	287	79	68	16.5	15	6.8	3.2	1.7	1.7
24	23	275	299	64	64	64	15	12.5	6.8	3.2	1.7	1.9
25	31	265	245	235	60	60	*16	18	6.8	*3.2	1.9	7.7
26	50	265	138	185	56	56	14	15	5.6	3.2	1.9	3.2
27	82	255	126	171	48	*52	14	15	6	2.9	2.1	2.5
28	112	178	359	120	45	48	23	15	5.3	2.9	*3.7	8.2
29	144	132	347	100	-	52	23	14	4.9	2.7	2.7	8.2
30	132	157	311	*94	-	60	15	12.5	4.6	2.7	2.5	1.9
31	120	-	245	*68	-	56	-	12.5	-	2.5	2.3	-
Total	1,014.2	5,051	5,363	6,642	3,526	3,386	785	681.5	258.4	132.9	70.1	89.9
Mean	32.7	168	173	214	126	109	26.2	22.0	8.61	4.29	2.26	3.00
Cfsm	1.79	9.18	9.45	11.7	6.89	5.96	1.43	1.20	0.470	0.234	0.123	0.164
In.	2.06	10.26	10.90	13.50	7.17	6.88	1.60	1.38	0.53	0.27	0.14	0.18
Ac-ft	2,010	10,020	10,640	13,170	6,990	6,720	1,560	1,350	513	264	139	178

Calendar year 1950: Max 546 Min 1.6 Mean 83.2 Cfsm 4.55 In. 61.74 Ac-ft 60,270  
Water year 1950-51: Max 610 Min 1.3 Mean 74.0 Cfsm 4.04 In. 54.87 Ac-ft 53,550

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations on nearby streams.

## Salmon Creek near Vancouver, Wash.

Location.--Lat 45°42'30", long. 122°38'30", in SE $\frac{1}{4}$  sec. 26, T. 3 N., R. 1 E., on left bank a quarter of a mile upstream from Highway 99 crossing and 4 miles north of Vancouver.

Drainage area.--76.9 sq mi.

Records available.--June to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 75 ft (from topographic map).

Extremes.--Maximum discharge during period, 107 cfs Sept. 30 (gage height, 2.82 ft); minimum, 12.5 cfs Aug. 19, 21 (gage height, 2.07 ft).

Remarks.--Records good except those for periods of shifting control, which are fair. No regulation. Some diversion for domestic use.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	22	15.5	17.5
2									-	*23	15.5	15.5
3									-	24	16	15.5
4									-	28	16	15.5
5									38	31	15.5	14
6									40	33	15	15.5
7									40	28	14	18
8									35	26	15	20
9									*33	24	15	19.5
10									30	24	*16	18
11									29	22	17.5	17.5
12									31	20	17.5	16.5
13									32	20	16	16
14									29	20	15.5	*15
15									28	18.5	15.5	14
16									27	19.5	14	13.5
17									26	18	14	13.5
18									25	18	14	14
19									26	18	15	14
20									26	17.5	13.5	15
21									24	18	12.5	15
22									24	17.5	13.5	15
23									23	16.5	14	15.5
24									24	16.5	13.5	16
25									24	16	13.5	25
26									23	*16	13	25
27									24	16	15	18.5
28									23	16	16.5	23
29									22	16.5	18.5	33
30									22	15.5	18	81
31									-	15.5	17.5	-
Total									-	634.5	469.5	585
Mean									-	20.5	15.1	19.3
Cfsm									-	0.267	0.196	0.251
In.									-	0.31	0.23	0.28
Ac-ft									-	1,260	931	1,150
Calendar year	: Max		Min		Mean		Cfsm		In.		Ac-ft	
Water year	: Max		Min		Mean		Cfsm		In.		Ac-ft	

\* Discharge measurement made on this day.

Note.--Shifting-control method used June 21 to July 14, July 19-30.

## Lewis River near Cougar, Wash.

Location.--Lat 46°03'30", long. 122°12'50", in SE $\frac{1}{4}$  sec. 29, T. 7 N., R. 5 E., on left bank 1 mile downstream from Swift Creek and 4 miles east of Cougar.

Drainage area.--481 sq mi.

Records available.--July to October 1909, November 1909 to March 1912 (gage heights only), June 1924 to September 1951. Published as "at Peterson ranch, near Cougar" 1909.

Gage.--Water-stage recorder. Datum of gage is 576.4 ft above mean sea level (river-profile survey). July 1909 to June 1910 staff gage at site 1,000 ft upstream from Swift Creek at different datum. July 1910 to March 1912 staff gage at approximately present location at different datum. June 19 to Aug. 25, 1924, staff gage and Aug. 26, 1924, to Dec. 28, 1934, water-stage recorder at present site at datum 2.0 ft higher.

Average discharge.--27 years (1924-51), 2,803 cfs.

Extremes.--Maximum discharge during year, 25,800 cfs Feb. 11 (gage height, 11.43 ft); minimum, 798 cfs Sept. 22, 23 (gage height, 3.14 ft).  
1909-12, 1924-51: Maximum discharge, 54,400 cfs Dec. 21, 1933 (gage height, 15.7 ft, datum then in use), from rating curve extended above 15,000 cfs; minimum, 454 cfs Oct. 21, 1931 (gage height, 0.01 ft, datum then in use).

Remarks.--Records excellent. No diversion or regulation.

Revisions (water years).--W 904: 1939. W 964: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

3.1	770	5.0	2,800	8.0	9,950
3.3	915	5.5	3,590	9.0	13,700
3.6	1,150	6.0	4,570	10.0	18,200
4.0	1,530	6.5	5,880	11.0	23,400
4.5	2,110	7.0	6,940		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	975	8,060	5,680	5,220	*3,340	2,440	2,580	4,680	3,020	2,110	1,110	892
2	*945	8,960	4,890	5,800	3,680	2,300	2,720	4,280	3,100	1,990	1,110	885
3	982	8,060	4,680	5,920	3,860	2,300	3,100	4,160	3,180	1,930	1,110	878
4	1,110	7,210	7,490	5,220	3,500	2,300	3,770	5,000	3,260	1,870	1,070	870
5	1,870	6,540	7,490	4,570	3,260	2,180	4,160	6,040	3,340	1,750	1,070	862
6	1,990	5,450	8,350	4,160	3,420	2,110	4,360	5,920	3,340	1,750	1,060	855
7	2,050	5,110	8,960	3,770	5,450	2,050	4,680	5,800	3,180	1,640	1,050	885
8	2,110	4,780	8,060	3,500	8,960	2,050	4,680	5,450	3,020	1,580	1,050	915
9	2,050	*4,160	7,490	3,260	17,700	1,990	4,570	5,340	3,100	1,580	1,050	878
10	3,020	3,770	6,800	3,100	17,700	1,930	4,460	5,800	3,180	1,580	1,050	870
11	3,020	3,420	6,800	2,950	23,400	1,870	4,360	7,210	3,340	1,530	1,030	855
12	2,370	3,180	6,540	2,800	16,200	1,990	4,680	6,800	3,260	1,480	1,010	848
13	1,990	2,950	*6,040	3,020	10,600	2,050	5,340	5,920	3,180	1,480	998	848
14	1,870	2,800	5,450	3,340	8,060	2,050	5,920	5,110	3,180	1,480	990	840
15	1,700	2,800	6,040	3,590	6,670	2,720	6,040	4,780	3,420	1,430	990	840
16	1,580	3,100	8,650	3,500	5,560	2,800	5,920	4,690	3,340	1,430	990	840
17	1,640	3,020	8,960	3,680	5,000	2,440	5,920	5,450	*3,180	1,380	975	833
18	2,580	2,800	8,060	3,340	4,460	2,300	5,800	5,450	3,020	1,380	975	833
19	3,100	2,580	6,940	3,100	4,060	2,300	5,220	5,000	2,880	1,330	960	826
20	3,590	3,100	6,670	2,950	3,860	2,370	4,680	4,780	2,800	1,280	960	812
21	3,020	5,110	6,940	3,420	3,590	2,510	4,160	4,690	2,650	*1,280	960	805
22	2,650	6,940	10,200	3,180	3,340	2,510	3,770	5,220	2,580	1,240	952	798
23	2,370	7,490	19,700	2,950	3,100	2,440	3,590	6,040	2,510	1,240	930	798
24	2,240	12,100	13,300	3,960	3,020	2,370	3,500	5,800	2,510	1,240	915	805
25	3,590	11,000	9,610	5,560	2,880	*2,440	3,500	5,450	2,370	1,240	915	930
26	4,360	10,300	7,770	7,210	2,720	2,440	3,590	4,780	2,300	1,200	908	855
27	6,410	12,500	6,800	6,040	2,580	2,440	*4,060	4,360	2,240	1,200	908	819
28	9,280	10,300	6,410	5,000	2,440	2,440	6,160	4,060	2,180	1,150	1,010	892
29	8,960	8,060	6,280	4,260	-	2,580	6,160	3,680	2,180	1,150	975	1,110
30	7,210	6,670	6,280	3,860	-	2,720	5,340	3,340	2,110	1,150	922	2,720
31	6,160	-	5,680	3,500	-	2,580	-	3,100	-	1,150	*908	-
Total	96,792	182,320	239,010	125,730	182,410	72,010	136,790	158,560	86,950	45,220	30,911	27,697
Mean	3,122	6,077	7,710	4,056	6,515	2,323	4,560	5,115	2,898	1,459	997	923
Cfsm	6.49	12.6	16.0	8.43	13.5	4.83	9.48	10.6	6.02	3.03	2.07	1.92
In.	7.46	14.10	19.48	9.72	14.10	5.57	10.58	12.26	6.72	3.50	2.39	2.14
Ac-ft	192,000	361,600	474,100	249,400	361,600	142,800	271,300	314,500	172,500	69,690	61,310	54,940
Calendar year 1950: Max	19,700	Min	915	Mean	4,432	Cfsm	9.21	In.	125.08	Ac-ft	3,209,000	
Water year 1950-51: Max	23,400	Min	798	Mean	3,793	Cfsm	7.89	In.	107.04	Ac-ft	2,746,000	

Peak discharge (base, 9,000 cfs).--Oct. 28 (9:30 p.m.) 9,950 cfs (8.01 ft); Nov. 1 (9:30 p.m.) 9,810 cfs (7.88 ft); Nov. 24 (6:30 a.m.) 12,900 cfs (8.82 ft); Nov. 27 (10 a.m.) 13,500 cfs (8.92 ft); Dec. 7 (6 a.m.) 9,280 cfs (7.84 ft); Dec. 17 (4 a.m.) 9,280 cfs (7.63 ft); Dec. 23 (6 a.m.) 21,800 cfs (10.74 ft); Feb. 11 (10:30 a.m.) 25,800 cfs (11.43 ft).

\* Discharge measurement made on this day.

## Lewis River at Ariel, Wash.

Location.--Lat 45°57'10", long. 122°33'45", in NW¼NE¼ sec. 4, T. 5 N., R. 2 E., on right bank at Ariel, half a mile downstream from Ariel Dam and powerplant and 3 miles upstream from Cedar Creek.

Drainage area.--781 sq mi.

Records available.--July to November 1909 (gage heights only for November), July 1922 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 44 ft above mean sea level, unadjusted (levels by Northwestern Electric Co.). Prior to Nov. 30, 1909, staff gage at site 3 miles upstream at different datum. July 27, 1922, to Apr. 20, 1930, staff gage at site half a mile downstream at datum 44.9 ft above mean sea level, unadjusted (levels by Northwestern Electric Co.).

Average discharge.--28 years (1923-51), 4,573 cfs (adjusted).

Extremes.--Maximum discharge during year, 40,200 cfs Dec. 23 (gage height, 17.30 ft); minimum, 656 cfs Mar. 25; minimum daily, 668 cfs Mar. 31.

1909, 1922-51: Maximum discharge, 129,000 cfs Dec. 22, 1933 (gage height, 35.0 ft, from floodmarks); from rating curve extended above 22,000 cfs and from spillway-gate openings; no flow at times June 30, July 1-3, 6-9, 1931 (caused by regulation during construction of Ariel Dam); minimum daily discharge, 1 cfs July 6, 1931.

Remarks.--Records good. No diversion. Flow regulated by Lake Merwin on Lewis River, lat 45°57'30" long. 122°33'10", in SW¼ sec. 34, T. 6 N., R. 2 E., at Ariel, completed in 1931; usable storage 246,000 acre-ft between elevations 165 ft (set by Federal Power Commission) and 235 ft (spillway crest) above mean sea level. Water is used for power. Cooperation.--Gage-height record collected in cooperation with Pacific Power & Light Co.

Revisions (water years).--W 884: 1938. W 984: 1936-37, 1940-42.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	872	12,700	8,230	9,100	5,900	5,710	1,020	6,310	5,080	766	1,250	789
2	1,540	15,200	7,490	11,800	5,590	5,640	3,900	6,020	3,680	3,000	1,590	786
3	1,850	12,700	7,250	13,000	5,450	5,580	3,870	5,680	1,270	2,670	1,780	792
4	*1,830	11,000	14,800	10,100	6,760	5,000	4,160	6,020	5,080	773	768	1,150
5	4,660	9,500	13,200	8,420	5,940	5,660	4,970	7,610	4,810	3,520	752	1,200
6	5,330	8,160	14,700	7,670	5,740	5,850	5,270	7,350	4,770	3,720	1,600	4,230
7	3,740	7,730	15,000	7,380	8,910	5,720	5,440	7,760	4,970	1,610	1,120	2,740
8	3,690	7,580	12,900	6,060	16,000	5,930	4,450	7,550	4,830	758	1,400	772
9	4,270	*6,800	10,800	5,690	27,200	5,740	5,330	6,680	2,760	2,190	1,740	768
10	5,280	5,990	9,710	5,040	26,500	5,410	5,440	6,930	920	1,480	1,710	4,600
11	5,860	5,200	9,530	4,960	36,600	5,250	5,310	8,660	4,420	1,370	768	4,780
12	4,830	5,140	9,180	4,880	26,600	5,460	5,370	8,050	4,590	2,190	751	4,760
13	4,180	5,420	8,260	5,060	16,700	5,460	5,410	7,520	4,530	2,680	1,530	3,350
14	3,760	5,340	7,590	7,650	12,400	5,270	5,460	7,380	*4,320	772	1,370	2,020
15	1,200	5,550	7,780	8,330	10,200	5,220	4,270	7,020	4,420	746	1,440	780
16	2,170	5,810	12,800	8,090	8,480	5,290	7,410	5,660	4,120	1,940	1,380	752
17	2,310	5,720	13,000	9,480	7,870	5,360	7,740	6,270	1,620	2,190	1,380	791
18	4,490	7,160	10,900	7,360	7,420	4,450	7,770	7,570	4,420	2,040	785	772
19	5,820	9,400	7,340	6,670	5,210	5,360	7,560	7,500	4,550	1,520	752	771
20	6,600	5,840	8,780	7,300	6,190	5,030	6,430	4,540	4,570	1,860	1,070	765
21	5,620	8,750	9,080	7,250	5,720	4,600	5,590	6,220	3,360	*748	1,220	771
22	3,990	13,400	15,800	7,200	5,510	4,400	4,710	6,030	3,760	740	1,020	773
23	5,760	13,700	32,800	7,440	6,130	4,410	5,650	6,950	2,180	2,000	998	744
24	5,600	24,000	20,800	9,740	5,320	3,880	5,700	7,370	800	2,120	1,140	785
25	5,500	18,100	14,200	13,000	4,500	*1,890	5,600	6,900	2,620	2,260	762	774
26	5,740	16,200	10,700	15,500	4,540	4,290	5,570	6,640	3,580	1,500	752	779
27	5,070	19,300	10,000	11,600	5,270	3,840	5,210	5,050	3,440	1,720	1,590	768
28	15,400	15,400	12,100	8,480	5,230	3,910	5,540	6,300	3,080	764	1,400	784
29	15,000	11,400	11,900	7,810	-	3,890	6,840	5,740	3,270	730	1,450	788
30	11,700	9,930	7,700	-	-	3,930	5,950	3,720	1,280	998	1,460	785
31	9,670	-	9,840	6,350	-	668	-	5,060	-	932	*1,360	-
Total	161,912	302,930	369,820	256,780	295,340	147,948	162,820	205,060	107,190	52,307	38,508	45,099
Mean	5,223	10,100	11,930	8,283	10,550	4,773	5,427	6,615	3,573	1,687	1,242	1,503
Ac-ft	321,100	600,900	733,500	509,300	585,800	293,500	322,900	406,700	212,600	103,700	76,360	89,450
(t)	+600	-800	+1,990	-3,580	-9,900	-41,190	+53,080	-4,370	-400	+5,970	-3,190	-18,130

Adjusted for change in contents in Lake Merwin

	Mean	5,235	10,090	11,960	8,224	10,370	4,103	6,319	6,543	3,566	1,784	1,190	1,199
Cfsm	7.16	13.8	16.4	11.3	14.2	5.61	8.64	8.95	4.88	2.44	1.63	1.63	1.64
In.	8.26	15.39	18.87	12.97	14.77	6.47	9.64	10.32	5.44	2.81	1.88	1.83	1.80
Ac-ft	321,900	600,100	735,500	505,700	575,900	252,300	376,000	402,300	212,200	109,700	73,190	71,320	

## Observed

Calendar year 1950: Max	32,600	Min	732	Mean	7,223	Ac-ft	5,229,000
Water year 1950-51: Max	36,600	Min	668	Mean	5,879	Ac-ft	4,256,000

## Adjusted

Calendar year 1950: Mean	7,224	Cfsm	9.88	In.	134.15	Ac-ft	5,230,000
Water year 1950-51: Mean	5,851	Cfsm	8.00	In.	108.65	Ac-ft	4,236,000

\* Discharge measurement made on this day.

† Change in contents in Lake Merwin, in acre-feet.

## Chelatchie Creek at Amboy, Wash.

Location.--Lat 45°54'45", long. 122°26'45", in SW $\frac{1}{4}$  sec. 16, T 5 N., R. 3 E., on left bank 300 ft upstream from confluence with Cedar Creek, at Amboy.

Drainage area.--12.8 sq mi.

Records available.--June to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 375 ft (from topographic map).

Extremes.--Maximum discharge during period, 55 cfs Sept. 30 (gage height, 2.10 ft); minimum, 1.4 cfs Sept. 22 (gage height, 1.20 ft).

Remarks.--Records good. No regulation. Some diversion for domestic use and irrigation above station.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	5.7	3.7	3.5
2									-	5.5	3.5	3.3
3									-	5.7	3.7	3.3
4									-	6.0	3.3	3.0
5									-	6.5	3.5	3.0
6									-	7.1	3.3	3.1
7									*13.5	5.7	3.3	4.1
8									12	5.5	3.7	4.1
9									11	5.5	*3.7	3.7
10									10	5.2	3.5	3.3
11									9.8	5.0	3.5	3.0
12									9.8	5.2	3.7	3.0
13									10	5.0	3.5	*2.8
14									9.4	4.5	3.1	2.8
15									9.0	4.7	3.1	3.1
16									8.7	4.5	3.1	2.8
17									8.4	4.5	3.1	3.0
18									8.4	4.7	3.0	2.8
19									8.4	4.5	3.0	3.0
20									8.0	4.5	3.0	2.8
21									7.7	4.1	3.0	2.8
22									7.4	4.1	3.0	2.8
23									7.4	4.1	3.0	2.8
24									7.4	4.1	3.0	3.1
25									7.1	5.0	3.0	7.7
26									6.8	*8.7	3.0	4.1
27									*6.5	8.4	3.1	3.7
28									6.2	5.7	5.0	7.4
29									6.2	4.1	4.1	8.0
30									5.7	3.9	3.9	2.4
31									-	3.7	3.7	-
Total									-	161.4	105.1	129.9
Mean									-	5.21	5.39	4.33
Cfsm									-	0.407	0.265	0.338
In.									-	0.47	0.31	0.38
Ac-ft									-	320	208	258
Calendar year	: Max		Min		Mean		Cfsm		In.		Ac-ft	
Water year	: Max		Min		Mean		Cfsm		In.		Ac-ft	

\* Discharge measurement made on this day.

## Cedar Creek near Ariel, Wash.

Location.--Lat 45°55'50", long. 122°31'40", in W $\frac{1}{2}$  sec. 11, T. 5 N., R. 2 E., on right bank at downstream side of highway bridge, 1 $\frac{1}{2}$  miles upstream from Pup Creek and 2 $\frac{1}{2}$  miles southeast of Ariel.

Drainage area.--41.3 sq mi.

Records available.--June to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 290 ft (from topographic map).

Extremes.--Maximum discharge during period, 108 cfs Sept. 30 (gage height, 2.81 ft); minimum, 4.6 cfs Sept. 16 (gage height, 1.66 ft).

Remarks.--Records good except those for periods of shifting control, which are fair, and those for periods of no gage-height record, which are poor. No regulation. Some diversion for domestic use and irrigation above station.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									-	18.5	12	8.2
2									-	18.5	12	7.7
3									-	18.5	12	7.7
4									-	21	12.5	6.7
5									-	22	10.5	6.2
6									-	26	9.7	6.7
7									*42	22	9.7	9.2
8									a38	19	<u>9.2</u>	10
9									a35	18	*9.7	9.7
10									a32	18	10	8.2
11									a31	16	11	7.2
12									a30	15.5	12	6.7
13									a30	15	12	*5.8
14									a29	14	11	<u>5.4</u>
15									a28	14	10.5	5.4
16									a26	14	10.5	5.4
17									a25	14	11	5.4
18									a25	15	10.5	5.4
19									a25	14	10.5	6.7
20									a24	13.5	10.5	9.2
21									a23	13	10.5	9.7
22									22	12.5	a10	10
23									22	12.5	a10	10
24									22	12	a10	13
25									22	12.5	a10	30
26									20	*17	a10	22
27									*20	17	a11	19
28									20	16	<u>13.5</u>	30
29									20	12.5	10	33
30									18.5	11	9.2	<u>84</u>
31									-	12.5	9.2	-
Total									-	495	330.2	403.6
Mean									-	16.0	10.7	13.5
Cfsm									-	0.387	0.259	0.327
In.									-	0.45	0.30	0.36
Ac-ft									-	982	655	801
Calendar year		: Max		Min		Mean		Cfsm	In.		Ac-ft	
Water year		: Max		Min		Mean		Cfsm	In.		Ac-ft	

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

Note.--Shifting-control method used July 26 to Aug. 9, Aug. 14-21.

## East Fork Lewis River near Yacolt, Wash.

Location.--Lat 45°49'00", long. 122°15'30", in NE¼ sec. 24, T. 4 N., R. 4 E., on left bank at downstream side of Forest Service bridge at Sunset Guard Station, 8 miles southeast of Yacolt.

Drainage area.--31.4 sq mi.

Records available.--June to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 960 ft (from topographic map).

Extremes.--Maximum discharge during period, 368 cfs Sept. 30 (gage height, 2.77 ft); minimum, 9.3 cfs Sept. 15, 16, 21, 22 (gage height, 0.94 ft).

Remarks.--Records good except those for period of no gage-height record, which are fair.  
No diversion or regulation.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									a84	34	19	13.5
2									a80	33	18.5	13
3									a76	36	18.5	12
4									a74	42	18.5	11.5
5									76	37	17.5	11.5
6									108	41	17	12
7									100	33	17	15.5
8									94	32	17.5	17
9									90	32	*18.5	14
10									85	29	18.5	13.5
11									80	26	18.5	13.5
12									78	26	18.5	13
13									73	26	17.5	*11.5
14									67	26	16.5	10.5
15									64	26	15.5	10
16									*60	25	15	10.5
17									56	25	15	10.5
18									54	25	14	10.5
19									52	25	13.5	11.5
20									48	24	13	10.5
21									47	23	12	10
22									45	22	13	10
23									43	22	13	10.5
24									43	22	13	11.5
25									42	22	12	42
26									40	*22	12	21
27									38	20	13	15
28									*37	21	25	31
29									35	20	17	42
30									34	19	15	283
31									-	18.5	14	-
Total									1,903	834.5	496.5	721.5
Mean									63.4	26.9	16.0	24.0
Cfsm									2.02	0.857	0.510	0.764
In.									2.25	0.99	0.59	0.85
Ac-ft									3,770	1,660	985	1,430
Calendar year	: Max			Min	Mean			Cfsm	In.	Ac-ft		
Water year	: Max			Min	Mean			Cfsm	In.	Ac-ft		

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for station near Heisson.

## East Fork Lewis River near Heisson, Wash.

Location.--Lat 45°50', long. 122°28', in N½ sec. 17, T. 4 N., R. 3 E., on right bank 60 ft downstream from Basket Creek, 1½ miles northeast of Heisson, and 20 miles upstream from mouth.

Drainage area.--125 sq mi.

Records available.--September 1929 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 366.8 ft above mean sea level (from river-profile surveys).

Average discharge.--22 years, 729 cfs.

Extremes.--Maximum discharge during year, 6,690 cfs Dec. 23 (gage height, 8.31 ft); minimum observed, 32 cfs Sept. 21 (gage height, 0.11 ft).

1929-51: Maximum discharge, 15,600 cfs Dec. 22, 1933 (gage height, 12.3 ft), from rating curve extended above 12,000 cfs; minimum, 29 cfs Nov. 3, 1935 (gage height, 0.04 ft).

Remarks.--Records good except those for periods of staff-gage readings, which are fair. No diversion or regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.1	32	1.6	258	4.0	1,340
.3	47	2.0	371	5.0	2,160
.5	66	2.5	547	6.0	3,240
.8	102	3.0	763	7.0	4,570
1.1	149	3.5	1,020	8.0	6,170

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	2,630	1,380	1,980	811	472	992	528	240	94	59	45
2	59	2,890	1,140	3,710	1,020	437	1,020	528	224	98	62	44
3	*63	2,160	1,300	3,480	1,080	437	1,170	509	217	99	61	42
4	118	1,680	2,890	2,510	965	472	1,340	672	224	135	60	39
5	476	1,340	2,210	2,020	836	430	1,110	672	233	113	57	38
6	717	1,050	2,780	1,600	1,020	400	1,050	672	288	130	56	37
7	765	1,080	2,510	1,300	2,070	374	1,050	694	284	106	54	51
8	811	*1,140	1,890	1,110	2,890	391	938	629	256	98	52	61
9	763	965	1,480	938	3,740	356	836	567	240	97	57	45
10	694	836	1,200	885	3,480	338	763	547	224	96	58	44
11	717	717	1,170	885	5,180	332	763	608	208	82	60	42
12	528	650	992	787	3,610	645	860	528	206	75	60	38
13	400	567	*885	1,530	2,360	1,480	910	528	203	75	57	38
14	332	567	787	2,780	1,720	1,410	836	490	188	76	52	36
15	287	1,140	952	2,560	1,440	2,990	740	454	180	75	49	34
16	246	2,780	1,980	2,360	1,140	2,460	694	437	*168	74	48	33
17	266	2,780	1,640	3,000	1,080	1,680	650	430	160	72	47	36
18	582	2,310	1,270	2,210	1,080	1,340	587	397	157	76	45	36
19	860	1,640	1,080	1,720	965	1,270	490	362	149	72	43	34
20	938	1,980	910	1,410	965	1,340	427	338	140	72	42	34
21	672	2,670	811	3,000	885	1,480	381	326	132	68	42	32
22	509	2,780	1,620	2,460	811	1,300	350	312	129	66	39	35
23	437	2,460	5,160	2,160	740	1,080	338	338	126	63	44	37
24	384	4,570	2,780	3,480	694	965	338	344	124	63	41	39
25	709	3,120	1,980	4,000	650	965	*341	393	121	65	47	112
26	1,140	2,360	1,520	3,740	587	992	347	324	115	*66	45	81
27	2,260	2,670	1,270	2,510	547	965	406	301	112	62	41	52
28	3,000	2,020	2,560	1,720	509	*938	860	306	103	63	*70	83
29	2,460	1,560	2,890	1,300	-	1,080	694	281	98	64	61	130
30	1,940	1,410	2,670	1,080	-	1,170	567	261	94	62	50	961
31	1,640	-	2,310	*910	-	1,020	-	248	-	62	47	-
Total	24,843	56,522	56,057	65,135	42,875	30,989	21,848	14,024	5,353	2,514	1,606	2,369
Mean	801	1,884	1,808	2,101	1,531	1,000	728	452	178	81.1	51.8	79.0
Cfsm	6.41	15.1	14.5	16.8	12.2	8.00	5.82	3.62	1.42	0.649	0.414	0.632
In.	7.39	16.82	16.68	19.38	12.76	9.22	6.50	4.17	1.59	0.75	0.49	0.70
Ac-ft	49,280	112,100	111,200	129,200	85,040	61,470	43,530	27,820	10,620	4,990	3,190	4,700
Calendar year 1950: Max	7,610	Min	38	Mean	1,047	Cfsm	8.38	In.	113.76	Ac-ft	758,400	
Water year 1950-51: Max	5,180	Min	32	Mean	888	Cfsm	7.10	In.	96.44	Ac-ft	642,900	

Peak discharge (base, 6.100 cfs).--Dec. 23 (6 a.m.) 6,690 cfs (8.31 ft).

\* Discharge measurement made on this day.

Note.--Discharge computed from once-daily staff-gage readings Aug. 18-27, Sept. 1-6, 9-24.



Kalama River below Italian Creek, near Kalama, Wash.

Location.--Lat 46°02'30", long. 122°49'00", in NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 33, T. 7 N., R. 1 W., on right bank  $2\frac{1}{2}$  miles northeast of Kalama, 4 miles upstream from mouth, and 5 miles downstream from Italian Creek.

Drainage area.--201 sq mi.

Records available.--September 1946 to September 1951.

Gage.--Staff gage and crest-stage indicator; gage read twice daily. Altitude of gage is about 20 ft (from topographic map).

Average discharge.--5 years, 1,286 cfs.

Extremes.--Maximum discharge during year, 8,660 cfs Feb. 11 (gage height, 10.12 ft), from rating curve extended above 6,700 cfs by logarithmic plotting; minimum observed, 186 cfs Sept. 13 (gage height, 1.76 ft).

1946-51: Maximum discharge observed, 14,400 cfs Dec. 13, 1946 (gage height, 14.30 ft), from rating curve extended above 6,700 cfs; minimum observed, that of Sept. 13, 1951.

Remarks.--Records good except those for period of shifting control, which are fair. No known diversion or regulation.

Rating table, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

1.7	164	3.5	1,070	6.0	3,230
2.0	278	4.0	1,420	7.0	4,350
2.5	510	4.5	1,820	8.0	5,600
3.0	780	5.0	2,240	10.0	8,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	254	2,810	2,420	2,510	1,420	1,010	1,500	1,010	555	320	254	*215
2	242	2,510	2,060	4,470	*1,660	890	1,420	890	535	320	246	208
3	250	2,150	2,150	4,350	1,660	890	1,580	835	535	320	246	208
4	*299	1,820	3,560	3,450	1,660	950	1,820	1,070	535	320	238	208
5	890	1,500	3,450	2,610	1,500	890	1,740	1,270	560	342	238	200
6	780	1,340	3,780	2,150	1,660	835	1,580	1,130	568	342	238	200
7	1,070	1,270	3,780	1,820	2,910	*780	1,580	1,130	535	320	238	211
8	1,200	1,270	3,010	1,660	4,230	780	1,500	1,010	510	320	230	208
9	1,010	1,130	2,420	1,500	5,860	780	1,340	890	510	320	230	208
10	1,660	*1,010	2,150	1,420	5,210	725	1,270	1,010	485	299	230	200
11	1,660	890	2,150	1,500	8,050	725	1,200	1,200	485	299	230	196
12	1,010	835	1,820	1,340	5,730	1,270	1,270	1,270	*460	299	230	193
13	725	780	1,660	1,820	3,780	1,660	1,500	1,200	460	*299	227	199
14	642	780	*1,500	2,710	2,810	1,500	1,500	1,070	460	278	223	200
15	535	1,900	1,740	3,560	2,420	2,910	1,420	950	435	278	223	193
16	510	4,000	2,810	3,560	1,980	2,420	1,340	950	435	278	223	193
17	535	3,450	2,710	3,670	1,820	1,900	1,340	1,010	410	278	219	193
18	890	2,330	2,240	2,910	1,820	1,580	1,270	890	410	278	215	193
19	1,070	1,820	2,060	2,510	1,740	1,580	1,130	780	387	278	215	193
20	1,130	1,740	1,740	1,980	1,900	1,580	1,010	780	387	278	215	193
21	890	2,330	1,660	3,780	1,740	1,660	890	725	387	270	215	193
22	780	3,120	2,510	3,230	1,580	1,580	780	780	364	270	215	196
23	670	3,450	6,140	2,710	1,420	1,420	780	835	364	270	215	208
24	615	6,000	4,000	3,450	1,270	1,420	725	835	364	270	211	215
25	698	4,350	2,610	4,230	1,270	1,340	780	780	364	266	211	320
26	835	3,890	2,150	4,470	1,130	1,340	780	698	364	262	211	270
27	1,900	5,210	1,980	3,450	1,070	1,340	890	670	342	262	208	238
28	3,670	3,450	3,010	2,610	1,010	1,270	*1,820	615	342	254	238	299
29	3,670	2,510	2,910	2,060	-	1,340	1,420	588	342	254	234	410
30	2,710	2,510	2,810	1,740	-	1,580	1,130	560	320	254	223	1,420
31	2,420	-	2,810	1,580	-	1,500	-	560	-	254	215	-
Total	35,220	72,155	81,800	84,810	70,310	41,445	38,305	27,991	13,210	8,952	7,024	7,771
Mean	1,136	2,405	2,639	2,736	2,511	1,337	1,277	903	440	289	227	259
Cfs/m	5.65	12.0	13.1	13.6	12.5	6.65	6.35	4.49	2.19	1.44	1.13	1.29
In.	6.52	13.35	15.14	15.69	13.01	7.67	7.09	5.18	2.44	1.66	1.30	1.44
Ac-ft	69,860	143,100	162,200	168,200	139,500	82,200	75,980	55,520	26,200	17,760	13,930	15,410

Calendar year 1950: Max 10,400 Min 204 Mean 1,630 Cfs/m 8.11 In. 110.09 Ac-ft 1,180,000  
 Water year 1950-51: Max 8,050 Min 189 Mean 1,340 Cfs/m 6.67 In. 90.49 Ac-ft 969,900

Peak discharge (base, 6,000 cfs).--Nov. 24 (time unknown) 6,850 cfs (8.93 ft); Nov. 27 (time unknown) 6,000 cfs (8.34 ft); Dec. 23 (time unknown) 7,000 cfs (9.01 ft); Feb. 11 (time unknown) 8,660 cfs (10.12 ft).

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 1-28.

## Lake Creek near Packwood, Wash.

Location.--Lat 46°35'55", long. 121°34'15", in sec. 21, T. 13 N., R. 10 E., on left bank 500 ft downstream from outlet of Packwood Lake and 6 miles east of Packwood.

Drainage area.--18.8 sq mi.

Records available.--September 1911 to September 1924, September 1930 to October 1942, October 1949 to September 1951. Published as "at outlet of Packwood Lake, near Lewis" 1911-24.

Gage.--Water-stage recorder. Altitude of gage is 2,800 ft (from topographic map). Prior to Aug. 3, 1918, staff gages at several sites at or within 100 ft of present site at various datums. Aug. 3, 1918, to Sept. 30, 1924, water-stage recorder at site 110 ft upstream at different datum.

Average discharge.--27 years, 100 cfs.

Extremes.--Maximum discharge during year, 548 cfs Feb. 11 (gage height, 4.15 ft); minimum, 38 cfs Sept. 24 (gage height, 1.80 ft).  
1911-24, 1930-42, 1949-51: Maximum discharge, 1,400 cfs Dec. 22, 1933 (gage height, 5.9 ft); minimum, 19 cfs Dec. 1, 1936, Oct. 9, 1941.  
Maximum stage recorded, 6.0 ft Dec. 18, 1917, datum then in use, (discharge not determined).

Remarks.--Records good. No diversions. Natural regulation in Packwood Lake.

Revisions (water years).--W 394: 1912. W 739: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.8	38	2.8	174
2.0	55	3.1	237
2.2	76	3.6	370
2.5	120	4.1	530

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	115	161	141	80	65	57	100	128	188	81	44
2	50	115	137	146	88	64	57	*95	125	182	79	43
3	49	151	123	150	90	65	60	92	132	180	77	42
4	51	*182	134	134	81	73	66	101	142	172	75	41
5	72	207	150	115	74	72	72	128	146	155	74	41
6	88	182	200	104	73	68	76	142	146	135	73	40
7	104	166	247	96	80	64	80	150	146	122	70	43
8	130	148	217	90	94	64	82	153	144	117	69	56
9	142	127	192	85	212	*63	84	153	150	117	69	57
10	207	112	184	81	445	61	84	168	163	125	68	55
11	228	101	188	77	530	59	88	288	178	130	67	52
12	174	92	188	75	430	64	100	289	190	135	63	50
13	139	85	*170	80	299	65	120	237	200	142	61	48
14	117	81	151	86	222	61	146	198	217	142	59	46
15	102	79	142	90	180	76	153	170	249	135	59	46
16	89	82	141	94	151	80	155	184	249	132	59	46
17	82	82	137	95	134	74	157	190	230	132	59	47
18	94	77	128	85	120	69	157	207	217	132	58	47
19	127	72	123	77	109	66	146	202	202	125	57	46
20	184	73	122	73	101	63	132	194	194	117	57	44
21	161	88	134	75	94	66	120	196	192	109	59	42
22	134	132	157	74	86	73	110	217	194	106	60	40
23	112	153	358	*70	81	68	104	*278	190	109	57	40
24	101	242	370	80	77	65	100	326	194	112	53	40
25	130	302	320	94	76	62	96	320	194	107	50	61
26	141	307	254	122	74	62	98	264	188	*100	49	*85
27	151	323	209	123	69	61	102	222	184	92	47	57
28	159	276	184	112	67	59	109	202	180	89	*50	52
29	151	215	166	100	-	58	109	178	184	88	49	55
30	137	182	163	92	-	59	104	159	186	85	47	55
31	120	-	151	84	-	58	-	141	-	82	45	-
Total	3,780	4,549	5,701	3,000	4,217	2,027	3,124	5,904	5,434	3,894	1,900	1,471
Mean	122	152	184	96.8	151	65.4	104	190	181	126	61.3	49.0
Cfsm	6.49	8.09	9.79	5.15	8.03	3.48	5.53	10.1	9.63	6.70	3.26	2.61
In.	7.48	9.00	11.28	5.93	8.34	4.01	6.18	11.68	10.75	7.70	3.76	2.91
Ac-ft	7,500	9,020	11,310	5,950	8,360	4,020	6,200	11,710	10,780	7,720	3,770	2,920
Calendar year 1950: Max	495			Min 41	Mean 145	Cfsm 7.71	In. 104.77	Ac-ft 105,000				
Water year 1950-51: Max	530			Min 40	Mean 123	Cfsm 6.54	In. 89.02	Ac-ft 89,260				

\* Discharge measurement made on this day.

## Cowlitz River at Packwood, Wash.

Location.--Lat 46°36'40", long. 121°40'45", in SE<sup>1</sup>/<sub>4</sub> sec. 16, T. 13 N., R. 9 E., on right bank 100 ft upstream from Forest Service bridge, half a mile upstream from Skate Creek, and half a mile northwest of Packwood.

Drainage area.--287 sq mi.

Records available.--July 1911 to December 1919, September 1929 to September 1951. Published as "at Lewis" 1911-19.

Gage.--Water-stage recorder. Altitude of gage, about 1,040 ft (from topographic map). July 1, 1911, to Dec. 31, 1919, staff gages at sites about 1 mile upstream at different datums. Sept. 30, 1929, to Jan. 2, 1930, staff gage at same site and datum.

Average discharge.--30 years, 1,600 cfs.

Extremes.--Maximum discharge during year, 12,400 cfs Feb. 9 (gage height, 9.98 ft); minimum, 290 cfs Sept. 24 (gage height, 3.50 ft).  
1911-19, 1929-51: Maximum discharge, 36,600 cfs Dec. 21, 1933 (gage height, 13.0 ft), from rating curve extended above 12,600 cfs; minimum, 160 cfs Nov. 21, 1929 (gage height, 2.10 ft).

Remarks.--Records good except those for periods of shifting control, which are fair. No diversion or regulation.

Revisions (water years).--W 884: 1938.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 22

Dec. 23 to Sept. 30

4.0	395	5.6	1,840	3.5	290	5.5	2,310
4.2	500	6.0	2,400	3.7	405	6.0	3,120
4.4	620	6.5	3,170	3.9	540	6.5	4,020
4.7	850	7.0	4,000	4.1	695	7.0	5,010
5.0	1,140	8.0	5,890	4.4	960	8.0	7,340
5.3	1,460	9.0	8,210	4.7	1,270	9.0	10,000
				5.0	1,620	10.0	13,000

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	435	2,180	2,110	2,020	1,240	807	1,120	1,620	2,090	2,620	888	464
2	400	2,620	1,710	2,090	1,260	763	1,200	1,560	2,380	2,460	852	457
3	400	4,440	1,610	2,160	1,240	763	1,450	1,560	2,620	2,460	843	464
4	662	4,170	2,110	1,680	1,190	783	1,860	2,020	2,700	2,160	816	464
5	1,250	3,920	2,400	1,680	1,130	712	2,090	2,460	2,540	1,750	798	464
6	1,170	2,930	4,440	1,500	1,110	687	2,090	2,540	2,620	1,560	772	477
7	2,320	2,550	4,530	1,380	1,620	*671	2,240	2,620	2,540	1,460	754	533
8	2,320	2,180	3,410	1,290	2,860	663	2,240	2,540	2,540	1,500	754	533
9	1,970	1,840	3,170	1,220	9,620	647	2,160	2,620	2,950	1,620	736	496
10	5,300	1,620	3,350	1,150	10,000	615	2,020	3,470	3,200	1,750	780	470
11	3,410	1,440	3,410	1,100	7,090	600	2,020	5,120	3,470	1,620	763	431
12	2,320	1,270	3,250	1,060	*6,360	655	2,380	4,500	3,290	1,620	655	424
13	1,780	1,150	2,620	1,090	3,920	746	2,950	3,290	3,290	1,750	600	431
14	1,610	1,080	2,180	1,130	2,860	763	3,290	2,700	3,650	1,620	600	444
15	1,400	1,040	*2,040	1,240	2,380	1,190	3,120	2,620	4,400	1,560	631	438
16	1,230	1,080	2,180	1,240	1,950	1,500	2,950	3,200	3,920	1,500	663	431
17	1,210	1,020	2,400	1,220	1,750	1,320	*3,120	4,120	3,470	1,500	647	450
18	1,780	950	2,180	1,130	1,560	1,200	2,950	3,740	3,290	1,500	623	450
19	2,480	859	2,250	1,080	1,430	1,190	2,460	3,290	3,120	1,300	623	438
20	2,700	*931	2,550	1,020	1,320	1,280	2,090	3,200	3,120	1,170	663	405
21	2,110	1,710	3,010	1,030	1,230	1,380	1,820	3,560	3,120	1,150	695	363
22	1,700	4,220	4,440	990	1,190	1,560	1,680	4,210	3,040	1,160	631	354
23	4,060	10,900	9,610	1,090	1,090	1,620	1,620	*2,440	2,950	1,220	533	328
24	1,280	7,450	9,740	*1,290	1,030	1,220	1,620	4,900	2,950	1,220	512	312
25	2,320	7,950	7,850	2,090	980	1,190	1,750	4,400	2,760	*1,110	505	655
26	2,040	6,750	3,740	2,860	915	1,190	1,880	3,470	2,760	1,040	498	470
27	2,620	6,970	2,950	2,310	870	1,170	2,020	3,120	2,620	1,010	498	*399
28	2,700	4,710	2,620	1,820	825	1,140	2,020	2,860	2,620	990	585	470
29	2,550	3,330	2,460	1,660	-	1,150	1,950	3,360	2,700	990	*491	648
30	2,250	2,550	2,460	1,440	-	1,160	1,820	2,090	2,760	942	477	1,640
31	1,900	-	2,240	1,310	-	1,120	-	2,020	-	915	470	-
Total	59,047	88,990	106,290	45,331	69,980	30,885	64,000	98,240	89,540	46,227	20,358	15,305
Mean	1,905	2,966	3,429	1,462	2,499	996	2,133	3,169	2,985	1,491	657	510
Cfsm	6.64	10.3	11.9	5.09	8.71	3.47	7.43	11.0	10.4	5.20	2.29	1.78
In.	7.65	11.53	15.77	5.87	9.07	4.00	8.29	12.73	11.60	5.99	2.64	1.98
Ac-ft	117,100	176,500	210,800	89,910	138,800	61,260	126,900	194,900	177,600	91,690	40,580	30,360

Calendar year 1950: Max 10,900 Min 400 Mean 2,419 Cfsm 8.43 In. 114.42 Ac-ft 1,752,000  
Water year 1950-51: Max 10,900 Min 312 Mean 2,011 Cfsm 7.01 In. 95.12 Ac-ft 1,456,000

Peak discharge (base, 8,000 cfs).--Oct. 10 (9:30 a.m.) 8,210 cfs (8.80 ft); Nov. 25 (4:30 to 5:30 p.m.) 9,290 cfs (9.30 ft); Dec. 23 (3:30 a.m.) 11,500 cfs (9.50 ft); Feb. 9 (5:30 p.m.) 12,400 cfs (9.98 ft).

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 10 to Nov. 29, Dec. 24 to Mar. 15, Sept. 25-30.

## Johnson Creek near Packwood, Wash.

Location.--Lat 46°34', long. 121°41', in SW $\frac{1}{4}$  sec. 33, T. 13 N., R. 9 E., on left bank 1 mile upstream from mouth and 2 $\frac{1}{2}$  miles southwest of Packwood. Prior to July 16, 1951, at site 1 mile downstream.

Drainage area.--49.1 sq mi.

Records available.--August 1907 to September 1914, October 1918 to September 1924, October 1946 to November 1948, July 1950 to September 1951 (fragmentary), discontinued. Published as "at mouth, near Lewis" 1907-14, 1918-24.

Average discharge.--14 years (1907-13, 1918-24, 1946-48), 201 cfs.

Gage.--Water-stage recorder. Altitude of gage is 1,100 ft (from topographic map). Prior to Sept. 24, 1914, staff gage and Oct. 1, 1918, to Sept. 23, 1924, water-stage recorder at approximately same site and datum. Oct. 1, 1946, to Nov. 30, 1948, July 6 to Oct. 24, 1950, water-stage recorder at site 1 mile downstream at different datum.

Extremes.--Maximum discharge during periods October 1950, July to September 1951, 613 cfs Oct. 10 (gage height, 5.07 ft, site and datum then in use); minimum, 31 cfs Sept. 24 (gage height, 1.04 ft).  
1907-14, 1918-24, 1946-48, 1950-51: Maximum discharge, 2,990 cfs Dec. 11, 1946; maximum gage height, 8.22 ft Dec. 11, 1946 (result of drift caught on control for 7 $\frac{1}{2}$  hours, datum then in use); minimum discharge, 15 cfs Oct. 17-19, 1946.

Remarks.--Records excellent except those for period Oct. 1-24, which are good. No diversion or regulation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55									-	72	43
2	54									-	71	42
3	54									-	67	40
4	62									-	67	39
5	65									-	66	39
6	94									-	64	38
7	100									-	63	40
8	115									-	61	44
9	119									-	58	38
10	370									-	57	38
11	250									-	57	37
12	178									-	55	37
13	140									-	54	*36
14	123									-	*53	35
15	110									-	51	34
16	103									114	51	34
17	100									116	50	34
18	127									114	48	34
19	178									108	48	34
20	222									*103	47	33
21	185									99	45	32
22	160									98	45	32
23	142									96	45	32
24	127									91	44	32
25	-									89	44	44
26	-									*84	43	37
27	-									82	43	34
28	-									80	48	*34
29	-									77	45	36
30	-									74	45	72
31	-									74	*44	-
Total	-	-	-	-	-	-	-	-	-	-	1,651	1,134
Mean	-	-	-	-	-	-	-	-	-	-	53.3	37.8
Cfsm	-	-	-	-	-	-	-	-	-	-	1.09	0.770
In.	-	-	-	-	-	-	-	-	-	-	1.25	0.86
Ac-ft	-	-	-	-	-	-	-	-	-	-	3,270	2,250
Calendar year	: Max		Min		Mean		Cfsm		In.		Ac-ft	
Water year	: Max		Min		Mean		Cfsm		In.		Ac-ft	

\* Discharge measurement made on this day.

## Niggerhead Creek near Randle, Wash.

Location.--Lat 46°25'45", long. 121°49'45", in SE $\frac{1}{4}$  sec. 20, T. 11 N., R. 8 E., on left bank 1 mile upstream from mouth and  $\frac{1}{2}$  miles southwest of Randle.

Drainage area --66.3 sq mi (revised).

Records available.--June 1950 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,400 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,940 cfs Feb. 9 (gage height, 5.14 ft); minimum, 31 cfs Sept. 21-24, 27, 28 (gage height, 0.58 ft).  
1950-51: Maximum discharge, that of Feb. 9, 1951; minimum, that of Sept. 21-24, 27, 28, 1951.

Remarks.--Records good except those for period of no gage-height record, which are fair.  
No diversion or regulation.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)

0.5	25	1.9	279	4.0	1,620
.7	42	2.2	390	4.5	2,140
1.0	78	2.6	570	5.0	2,740
1.3	131	3.0	800		
1.6	195	3.5	1,170		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	46	545	575	426	a230	186	245	366	276	155	56	38
2	45	626	466	484	a250	177	286	332	293	147	*54	38
3	45	758	439	466	242	172	398	324	306	145	53	37
4	50	842	600	402	226	170	520	475	310	139	52	36
5	107	782	626	346	215	162	550	656	303	127	51	36
6	118	805	776	310	210	157	545	656	303	125	50	*35
7	101	511	940	282	406	151	580	638	289	114	49	38
8	129	439	807	260	1,050	149	570	590	270	108	49	40
9	137	370	770	242	2,200	145	530	605	282	105	48	37
10	174	324	782	231	2,610	139	493	710	310	103	47	36
11	168	289	821	220	*2,550	135	484	905	324	99	47	36
12	143	264	770	205	1,770	137	570	752	310	96	47	35
13	123	240	638	212	*1,170	149	704	590	293	94	46	35
14	110	223	*540	223	856	155	758	498	296	92	45	34
15	99	231	638	343	686	276	728	462	339	89	44	34
16	91	299	940	317	580	286	686	525	317	88	44	33
17	91	254	1,050	293	480	242	686	650	276	84	43	33
18	186	226	863	260	418	223	*656	632	254	80	42	32
19	279	208	752	240	370	231	560	550	234	77	41	32
20	358	248	734	220	343	*267	462	525	223	75	41	32
21	282	540	764	237	306	306	390	540	215	74	40	32
22	226	740	984	212	282	282	354	610	208	71	40	31
23	190	800	1,820	200	260	257	328	698	200	68	39	31
24	177	1,430	1,380	270	248	251	324	*620	198	65	39	31
25	612	1,570	1,010	*414	231	254	339	590	188	64	39	38
26	662	1,570	782	560	215	280	366	466	179	63	39	34
27	1,100	1,770	626	470	202	251	402	422	172	62	38	32
28	1,210	1,300	555	a370	193	245	493	386	166	59	48	32
29	940	905	502	a310	-	254	475	335	164	58	43	38
30	692	728	506	a270	-	251	422	293	162	58	40	80
31	525	-	462	a250	-	237	-	276	-	57	39	-
Total	9,216	19,637	23,918	9,545	18,779	6,557	14,904	16,677	7,660	2,841	1,393	1,086
Mean	297	655	772	308	671	212	497	538	255	91.8	44.9	56.2
Cfs/m	4.48	9.88	11.6	4.65	10.1	3.20	7.50	8.11	3.65	1.38	0.677	0.546
In.	5.17	11.02	13.42	5.35	10.53	3.68	8.36	9.35	4.30	1.59	0.78	0.61
Ac-ft	18,280	38,950	47,440	18,930	37,250	13,010	29,560	33,080	15,190	5,640	2,760	2,150

Calendar year 1950: Max - Min - Mean - Cfs/m - In. - Ac-ft -  
Water year 1950-51: Max 2,610 Min 31 Mean 362 Cfs/m 5.46 In. 74.16 Ac-ft 262,200

Peak discharge (base, 1,600 cfs).--Nov. 27 (7:30 a.m.) 1,920 cfs (4.30 ft); Dec. 23 (10:30 a.m.) 1,920 cfs (4.30 ft); Feb. 9 (7 p.m.) 2,940 cfs (5.14 ft).

\* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of records for stations on nearby streams.

## Cispus River near Randle, Wash.

Location.--Lat 46°26'50", long. 121°51'35", in NW $\frac{1}{4}$  sec. 18, T. 11 N., R. 8 E. (unsurveyed), on left bank 60 ft upstream from bridge to Tower Rock ranger station, 4 miles downstream from North Fork, and 8 miles southeast of Randle.

Drainage area.--323 sq mi.

Records available.--October 1910 to February 1912, September 1929 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,220 ft (from topographic map). Prior to Feb. 29, 1912, staff gage at site a quarter of a mile upstream. Sept. 28 to Oct. 31, 1929, staff gage and Nov. 1, 1929, to Nov. 26, 1949, water-stage recorder at site 450 ft upstream at different datums.

Average discharge.--23 years (1910-11, 1929-51), 1,297 cfs.

Extremes.--Maximum discharge during year, 8,570 cfs Feb. 11 (gage height, 8.77 ft); minimum, 351 cfs Sept. 24 (gage height, 3.12 ft).  
1910-12, 1929-51: Maximum discharge, 20,000 cfs Dec. 22, 1933 (gage height, 12.7 ft, site and datum then in use), from rating curve extended above 8,000 cfs; minimum, 183 cfs Dec. 30, 1936; minimum gage height, 2.55 ft Oct. 25, 1942, site and datum then in use.

Remarks.--Records good except those for period Oct. 1-24 and those for period of shifting control, which are fair. No diversion or regulation.

Revisions (water years).--W 794: 1934.

Rating tables, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-24			Oct. 25 to Sept. 30			
3.6	410		3.1	340	5.0	1,960
3.8	530		3.3	450	5.5	2,580
4.0	670		3.5	570	6.0	3,280
4.3	910		3.7	700	6.5	4,060
4.6	1,200		4.0	920	7.5	5,860
5.0	1,640		4.3	1,200	8.6	8,130
			4.6	1,510		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	446	2,080	2,700	2,100	1,270	992	1,040	1,730	1,780	1,300	642	406
2	454	2,260	2,250	2,100	1,310	947	1,130	1,620	1,840	1,240	*635	406
3	428	3,000	2,000	2,080	1,270	929	1,350	1,620	1,840	1,220	622	406
4	470	2,800	2,700	1,960	1,210	920	1,730	2,080	1,960	1,170	622	406
5	685	2,650	2,800	1,780	1,150	888	1,900	2,640	1,900	1,070	615	406
6	738	2,400	3,000	1,680	1,110	864	1,900	2,640	1,900	1,020	596	406
7	683	2,200	3,100	1,560	1,620	833	2,080	2,710	1,840	956	590	428
8	801	2,000	2,900	1,460	2,990	826	2,080	2,640	1,780	947	590	462
9	876	1,800	2,800	1,400	6,050	812	2,020	2,710	1,840	947	593	428
10	1,030	1,650	2,650	1,350	7,060	784	1,960	3,060	1,960	956	583	428
11	1,200	1,500	2,600	1,270	*8,130	770	1,960	4,230	2,080	929	576	406
12	919	1,300	2,500	1,210	6,050	777	2,200	3,900	2,020	912	564	395
13	817	1,250	2,300	1,210	*4,230	812	2,580	3,200	2,080	912	558	395
14	753	1,200	*2,200	1,250	3,200	826	2,850	2,710	2,080	904	552	395
15	708	1,300	2,450	1,510	2,710	1,110	2,850	2,520	2,260	872	552	395
16	656	1,600	3,060	1,460	2,320	1,180	2,780	2,710	2,200	856	552	400
17	670	1,300	3,280	1,460	2,080	1,060	2,780	3,200	2,020	840	540	400
18	884	1,200	2,900	1,350	1,900	1,000	*2,780	3,200	1,840	840	540	400
19	1,210	1,100	2,700	1,280	1,730	1,010	2,450	2,920	1,780	798	534	384
20	1,640	1,300	2,700	1,220	1,620	1,070	2,140	2,850	1,730	763	534	378
21	1,360	*1,900	3,100	1,260	1,510	*1,170	1,900	2,920	1,680	735	534	373
22	1,170	2,450	3,500	1,200	1,400	1,130	1,780	3,130	1,620	728	528	368
23	1,010	3,900	6,000	*1,150	1,300	1,070	1,680	3,580	1,560	735	*474	368
24	955	4,800	5,400	1,320	1,240	1,060	1,620	*3,430	1,560	742	450	322
25	1,780	4,400	4,500	1,730	1,180	1,060	1,680	3,280	1,510	714	439	417
26	1,960	4,800	3,500	2,020	1,120	1,080	1,730	2,850	1,460	694	444	395
27	2,780	4,600	2,700	1,840	1,060	1,060	1,840	2,640	1,460	680	439	368
28	3,200	4,100	2,500	1,560	1,010	1,050	2,140	2,450	1,350	674	486	368
29	2,780	*3,600	2,300	1,460	-	1,070	2,080	2,140	1,350	668	456	390
30	2,320	3,100	2,200	1,400	-	1,060	1,900	1,960	1,350	654	428	668
31	1,980	-	2,100	1,510	-	1,030	-	1,840	1,350	648	417	-
Total	37,323	73,540	91,390	46,940	68,830	30,250	60,910	85,110	53,630	27,124	16,675	12,207
Mean	1,204	2,451	2,948	1,514	2,458	976	2,030	2,745	1,788	875	538	407
Cfs/m	3.73	7.59	9.13	4.69	7.61	3.02	6.28	8.50	5.54	2.71	1.66	1.26
In.	4.30	8.47	10.52	5.40	7.93	3.48	7.01	9.80	6.17	3.12	1.92	1.41
Ac-ft	74,030	145,900	181,300	93,100	136,500	60,000	120,800	168,800	106,400	53,800	33,070	24,210

Calendar year 1950: Max 6,000 Mdn 427 Mean 1,934 Cfs/m 5.99 In. 81.29 Ac-ft 1,400,000  
Water year 1950-51: Max 8,130 Mdn 362 Mean 1,655 Cfs/m 5.12 In. 69.53 Ac-ft 1,198,000

Peak discharge (base, 3,400 cfs).--Oct. 27 (10:30 p.m.), 3,430 cfs (6.11 ft); probably Nov. 27 (time unknown) 5,670 cfs (7.44 ft); probably Dec. 23 (time and discharge unknown); Feb. 11 (9 a.m.) 8,570 cfs (8.77 ft); May 11 (6 p.m.) 4,400 cfs (6.67 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 3-21, Nov. 23 to Dec. 13, Dec. 19 to Jan. 2; discharge estimated on basis of 1 discharge measurement and records for stations on nearby streams. Shifting-control method used May 11 to June 1.

## Tower Rock Springs near Randle, Wash.

Location.--Lat 46°26'45", long. 121°52'00", in NE $\frac{1}{4}$  sec. 13, T. 11 N., R. 7 E., on right bank at culvert on road to Tower Rock ranger station, 8 miles southeast of Randle.

Drainage area.--2.18 sq mi (revised).

Records available.--June 1950 to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 1,220 ft (from topographic map).

Extremes.--Maximum discharge during year, 13.5 cfs Feb. 11; maximum gage height, 3.36 ft Aug. 24 (backwater from weeds and debris); minimum discharge not determined, probably occurred sometime during period of backwater in September.

1950-51: Maximum discharge, that of Feb. 11, 1951; minimum, that of sometime during September 1951.

Remarks.--Records fair except those for period of backwater, which are poor. No diversion or regulation.

Rating table, water year 1950-51, except period of backwater (gage height, in feet, and discharge, in cubic feet per second)

1.8	2.4	2.6	9.8
2.0	3.4	2.8	11
2.2	5.5	3.1	13
2.4	7.8		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.5	6.9	9.8	10.5	9.8	9.2	7.0	7.6	7.2	4.8	4.3	3.0
2	*3.3	6.9	9.4	11.5	10.5	9.0	7.2	7.8	7.0	4.7	*4.4	2.8
3	3.3	7.2	9.4	11.5	10.5	9.0	7.2	7.6	6.9	4.7	4.3	2.7
4	3.3	7.2	9.9	11	10	9.4	7.4	8.4	7.0	4.8	4.3	3.0
5	3.8	7.4	9.5	11	9.8	9.2	7.4	8.4	7.2	4.8	4.3	2.9
6	4.0	7.4	9.8	10.5	9.9	8.9	7.6	8.4	7.4	5.0	4.2	3.0
7	3.8	7.8	10	10	10	8.8	7.8	8.8	7.0	4.8	4.0	3.3
8	4.1	7.6	9.9	10	10.5	8.6	8.2	8.6	6.9	4.7	3.7	3.5
9	4.1	7.2	9.4	9.7	11.5	8.6	8.2	8.6	6.6	4.6	3.5	3.7
10	*4.4	6.9	9.7	9.6	*12	8.4	8.4	8.6	6.4	4.6	3.5	3.6
11	4.5	6.5	9.7	9.5	13	8.2	8.4	9.6	6.4	4.6	3.3	-
12	4.5	6.4	9.7	9.3	*13	8.4	8.4	9.4	6.4	4.5	3.4	3.4
13	4.3	6.1	9.5	9.4	12.5	8.8	8.4	9.0	6.5	4.4	3.5	*3.5
14	4.1	6.1	9.4	9.8	12	8.8	8.6	8.9	6.4	4.4	3.3	3.4
15	3.9	7.4	*9.6	11	12	8.8	8.6	8.4	6.3	4.3	3.3	3.1
16	3.9	8.8	10	10.5	11.5	9.1	8.8	8.4	6.3	4.3	3.3	3.1
17	3.8	8.4	10	11	11.5	8.8	8.8	8.2	6.1	4.3	3.1	3.1
18	4.1	8.0	9.8	10.5	11	8.4	*8.8	8.4	6.0	4.2	3.1	3.0
19	4.1	7.8	9.7	10	11	8.2	8.6	8.2	5.8	4.2	3.1	2.9
20	3.9	7.8	9.6	9.9	11	*8.2	8.6	8.2	5.8	4.3	3.2	2.9
21	4.8	8.4	9.6	11	10.5	8.2	8.4	8.2	5.7	4.5	3.0	2.9
22	4.6	9.4	10	10.5	10.5	8.2	8.2	8.2	5.5	4.5	2.9	2.9
23	4.5	9.1	11.5	10.5	10	7.8	8.2	8.4	5.5	4.4	3.1	2.9
24	4.5	9.5	11.5	10.5	9.9	7.8	8.0	*8.8	5.4	4.8	2.9	3.0
25	5.5	9.7	11	*10.5	9.8	7.6	7.8	8.6	5.5	5.0	3.1	3.2
26	5.7	9.7	10.5	10.5	9.6	7.6	7.8	8.2	5.4	4.7	2.9	3.1
27	7.6	10	10.5	10.5	9.5	7.4	7.6	7.8	5.4	4.5	3.2	3.3
28	8.2	10.9	10.5	10	9.3	7.2	8.2	7.8	5.2	4.4	3.3	3.4
29	8.0	9.8	10.5	9.9	-	7.4	8.0	7.8	5.1	4.3	3.3	3.6
30	7.6	10	10.5	10	-	7.2	8.0	8.2	5.0	4.4	3.3	3.9
31	7.0	-	10.5	9.9	-	7.2	-	7.4	-	4.3	3.3	-
Total	146.7	241.4	310.8	320.0	302.1	258.4	242.6	258.9	185.3	140.8	107.4	95.6
Mean	4.73	8.05	10.0	10.3	10.8	8.34	8.09	8.35	6.18	4.54	3.46	3.19
Cfsm	2.17	3.69	4.59	4.72	4.95	3.83	3.71	3.83	2.83	2.08	1.59	1.46
In.	2.50	4.12	5.30	5.46	5.15	4.41	4.14	4.42	3.16	2.40	1.83	1.63
Ac-ft	291	479	616	635	599	513	481	514	368	279	213	190

Calendar year 1950: Max - Min 7.15 Cfsm - 3.28 In. - 4.45 Ac-ft - 5,180  
 Water year 1950-51: Max 13 Min 2.7 Mean 7.15 Cfsm 3.28 In. 4.45 Ac-ft 5,180

\* Discharge measurement made on this day.

Note.--Backwater from weeds and debris July 28 to Sept. 30.

## Cowlitz River near Kosmos, Wash.

Location.--Lat 46°28'00", long. 122°07'20", in SE $\frac{1}{4}$  sec. 1, T. 11 N., R. 5 E., on right bank half a mile downstream from Tumwater Creek,  $\frac{1}{2}$  miles downstream from Cispus River, and 4 miles southeast of Kosmos.

Drainage area.--1,042 sq mi (revised).

Records available.--November 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 759.29 ft above mean sea level (levels by city of Tacoma). Prior to Dec. 3, 1948, staff gage at site half a mile upstream at different datum.

Extremes.--Maximum discharge during year, 33,800 cfs Feb. 11 (gage height, 16.60 ft); minimum, 990 cfs Sept. 24 (gage height, 3.30 ft).  
1947-51: Maximum discharge, that of Feb. 11, 1951; minimum, that of Sept. 24, 1951.

Remarks.--Records good. No diversion or regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11						Feb. 12 to Sept. 30	
3.6	1,250	5.0	2,380	7.5	5,540	3.3	990
3.8	1,390	5.5	2,690	8.0	6,350	3.5	1,130
4.0	1,530	6.0	3,460	10.0	10,600	3.7	1,290
4.3	1,770	6.5	4,090	12.0	16,200	4.0	1,530
4.6	2,020	7.0	4,780	16.3	32,600	Note.--Same as preceding table above 4.0 ft.	

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,370	5,860	8,590	7,440	4,840	3,470	3,960	5,540	5,240	4,820	1,980	1,150
2	1,310	7,020	7,180	7,780	4,840	3,330	4,090	5,140	5,440	4,560	1,950	1,130
3	1,270	8,730	6,840	8,570	4,920	3,220	4,640	5,860	5,860	4,500	1,910	1,120
4	1,340	10,400	7,700	7,900	4,570	3,220	5,760	5,700	6,100	4,320	1,870	1,120
5	2,030	10,000	8,920	7,020	4,530	3,110	6,600	7,600	6,000	3,870	1,830	1,130
6	2,790	8,220	11,400	6,320	4,210	2,990	6,710	7,940	5,920	3,540	1,800	*1,150
7	2,910	7,220	14,800	5,780	4,870	2,880	7,040	8,220	5,880	3,290	1,750	1,210
8	3,760	6,570	12,800	5,360	8,570	2,820	7,220	8,070	5,700	3,180	1,740	1,380
9	4,140	5,760	11,000	4,980	18,300	2,760	7,000	7,980	5,690	3,150	1,740	1,320
10	5,840	5,220	10,800	4,680	29,300	2,660	6,690	9,080	6,350	3,260	1,730	1,270
11	8,180	4,800	10,700	4,460	32,300	2,580	6,450	13,000	6,710	3,240	1,750	1,170
12	5,350	4,420	*10,700	4,180	30,400	2,770	6,990	13,400	6,740	3,140	1,700	1,120
13	4,170	4,080	9,250	4,230	19,200	3,000	8,400	10,400	6,690	3,140	1,620	1,110
14	3,560	3,840	7,980	4,580	13,800	3,110	9,880	8,440	6,640	3,190	1,570	1,120
15	3,220	3,820	7,580	5,200	10,900	3,930	9,920	7,480	7,660	3,040	1,580	1,140
16	2,860	4,210	8,550	5,380	8,900	5,360	9,480	7,800	7,680	2,970	1,590	1,150
17	2,740	4,040	9,150	5,510	7,620	4,840	9,550	9,600	6,900	2,900	1,590	1,150
18	3,070	3,820	8,590	5,180	6,860	4,460	9,450	10,100	6,450	2,930	1,570	1,180
19	4,210	3,550	7,820	4,810	6,180	4,280	8,420	8,920	6,150	2,790	1,550	1,160
20	5,600	3,650	7,680	4,510	5,760	4,400	*7,200	6,330	6,000	2,590	1,550	1,130
21	4,940	*5,110	8,730	4,610	*5,560	*4,740	6,350	8,530	5,840	2,440	1,580	1,070
22	4,230	8,040	9,650	4,430	4,960	4,840	5,800	*9,500	5,750	2,400	1,590	1,050
23	3,710	11,700	22,000	4,190	4,640	4,580	5,380	11,300	5,560	2,400	1,480	1,020
24	3,330	16,200	22,400	4,630	4,430	4,400	5,200	11,500	5,570	2,440	1,390	1,000
25	4,330	19,400	17,100	6,550	4,220	4,350	5,230	10,700	5,290	2,370	1,350	1,130
26	5,700	20,600	13,400	*9,280	3,970	4,350	5,540	9,010	5,120	2,260	1,330	1,420
27	6,590	20,700	10,800	8,880	3,780	4,320	5,830	7,980	5,080	*2,180	1,320	1,120
28	8,570	17,600	9,380	7,220	3,590	4,160	6,370	7,460	4,870	2,150	1,440	1,060
29	8,150	12,800	8,680	6,180	-	4,140	6,520	6,660	4,810	2,110	1,460	1,190
30	7,090	10,300	8,680	5,680	-	4,210	6,050	5,920	4,820	2,060	1,300	2,500
31	6,150	-	8,090	5,180	-	4,060	-	5,440	-	2,020	1,210	-
Total	132,510	257,660	326,940	180,690	265,620	117,280	203,720	261,730	178,710	93,250	49,820	35,970
Mean	4,275	8,589	10,550	5,828	8,496	3,783	6,791	8,443	5,957	3,008	1,607	1,199
Cfs	4.10	8.24	10.1	5.22	9.10	3.63	6.52	8.10	5.72	2.89	1.54	1.15
In.	4.73	9.20	11.67	6.45	9.48	4.19	7.27	9.34	6.38	3.33	1.78	1.28
Ac-ft	262,800	511,100	648,500	358,400	526,800	232,600	404,100	519,100	354,500	185,000	98,820	71,350
Calendar year 1950: Max	22,400	Min	1,270	Mean	6,857	Cfs	6.58	In.	89.45	Ac-ft	4,964,000	
Water year 1950-51: Max	32,300	Min	1,000	Mean	5,764	Cfs	5.53	In.	75.10	Ac-ft	4,173,000	

Peak discharge (base, 16,000 cfs).--Nov. 27 (4:30 p.m.) 21,600 cfs (13.54 ft); Dec. 23 (9:30 p.m.) 25,400 cfs (14.51 ft); Feb. 11 (7 p.m.) 33,800 (16.60 ft).

\* Discharge measurement made on this day.



## Rainy Creek near Kosmos, Wash.

Location.--Lat 46°30'30", long. 122°09'15", at west line sec. 23, T. 12 N., R. 5 E., on left bank 25 ft upstream from highway bridge and 2 miles northeast of Kosmos.

Drainage area.--17.5 sq mi.

Records available.--June 1950 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 800 ft (from topographic map).

Extremes.--Maximum discharge during year, 525 cfs Feb. 11 (gage height, 4.49 ft); minimum, 0.3 cfs Sept. 14-24 (gage height, 1.23 ft).  
1950-51: Maximum discharge, that of Feb. 11, 1951; minimum, that of Sept. 14-24, 1951.

Remarks.--Records good except those for periods of shifting control or no gage-height record, which are fair. No diversion or regulation.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 23

Nov. 24 to Sept. 30

1.9	3.4	3.1	41	1.2	0.2	2.6	105
2.1	6.8	3.5	68	1.4	4.6	3.0	165
2.3	11	4.0	109	1.6	14	3.5	260
2.5	16.5	4.5	166	1.8	27	4.0	380
2.8	27			2.0	42	4.5	525
				2.3	69		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.3	48	130	152	a85	71	91	43	20	7.0	a3	1.0
2	3.9	63	110	232	120	68	90	40	19.5	7.0	a3	.9
3	*5.9	64	117	272	117	67	100	40	18.5	7.0	*2.9	.9
4	6.2	58	186	242	105	66	114	54	18.5	7.0	2.9	.6
5	*15.5	53	202	202	96	63	110	53	19.5	7.4	2.9	.4
6	27	50	305	174	96	60	101	56	18.5	7.8	2.9	.5
7	20	53	300	152	132	58	102	55	18	7.0	2.9	.6
8	20	52	244	136	182	57	96	49	18	6.2	2.9	1.2
9	24	46	204	125	408	55	88	46	17	5.8	2.9	.7
10	56	43	172	111	*592	54	80	49	16	5.8	2.6	.5
11	*53	40	160	101	480	53	77	59	16	5.4	2.6	.5
12	32	38	141	93	392	77	84	52	15.5	5.4	2.6	.4
13	25	36	123	122	295	96	96	44	15.5	5.0	2.6	.4
14	20	35	110	146	236	95	100	40	15.5	5.0	2.2	.4
15	17.5	42	*105	153	202	158	92	36	14	4.6	2.2	.3
16	16	55	106	148	176	152	85	36	13.5	4.6	1.4	.3
17	16	60	101	154	159	126	*94	39	13	4.6	1.2	.3
18	21	55	96	144	148	112	77	36	12.5	4.6	1.0	.3
19	22	49	90	130	138	*112	66	32	12	4.3	1.0	.3
20	23	55	89	122	130	122	58	31	11.5	4.3	.9	.3
21	20	80	90	132	122	128	53	30	11	4.3	.9	.3
22	18	136	141	122	112	124	48	*30	10.5	a4	.7	.3
23	16.5	154	342	116	106	116	46	31	10.5	a3.7	.7	.3
24	15.5	261	262	162	98	110	44	30	9.8	a3	*.7	.3
25	17	232	198	216	87	106	44	29	9.3	a3	.7	*1.7
26	17	184	162	*270	81	110	45	26	8.8	a4	.7	1.2
27	24	218	142	224	78	110	47	25	8.3	a3.8	.7	.6
28	30	180	165	172	74	105	51	26	7.8	a3.6	4.3	.9
29	40	152	159	a140	-	102	51	25	7.4	a3.4	2.2	1.9
30	38	138	165	a115	-	105	48	22	7.4	a3.2	1.4	1.9
31	37	-	152	a100	-	96	-	21	-	a3	1.4	1.9
Total	709.3	2,730	5,068	4,888	4,847	2,934	2,268	1,194	413.3	154.8	61.0	36.3
Mean	22.9	91.0	163	158	173	94.6	75.6	38.5	13.8	4.99	1.97	1.21
Cfsm	1.31	5.20	9.31	9.03	9.89	5.41	4.32	2.20	0.789	0.285	0.113	0.069
In.	1.51	5.80	10.77	10.39	10.30	6.24	4.82	2.54	0.88	0.33	0.13	0.08
Ac-ft	1,410	5,410	10,050	9,700	9,610	5,820	4,500	2,370	820	307	121	72

Calendar year 1950: Max - Min - Mean - Cfsm - In. - Ac-ft -  
Water year 1950-51: Max 480 Min 0.3 Mean 69.3 Cfsm 3.96 In. 53.79 Ac-ft 50,190

Peak discharge (base, 300 cfs).--Dec. 7 (3:30 a.m.) 342 cfs (4.00 ft); Dec. 23 (9:30 a.m.) 380 cfs (4.08 ft); Feb. 11 (3 p.m.) 525 cfs (4.49 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations on nearby streams.

Note.--Shifting-control method used Oct. 6 to Jan. 28, Feb. 2-9, June 9 to July 21, Aug. 3-16, Sept. 5-30.

## Cowlitz River at Mossyrock, Wash.

Location.--Lat 46°33'00", long. 122°29'30", in SE $\frac{1}{4}$  sec. 1, T. 12 N., R. 2 E., on left bank 200 ft upstream from Harmony Bridge and 1 mile north of Mossyrock.

Drainage area.--1,170 sq mi.

Records available.--January 1912 to September 1917 (incomplete), March 1926 to September 1935, August 1946 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 357.31 ft above mean sea level (levels by city of Tacoma). Prior to Sept. 18, 1913, chain gage on Harmony Bridge 200 ft downstream at different datum. Sept. 18, 1913, to Sept. 30, 1917, March 1926 to Dec. 10, 1933, staff gage within 100 ft of present site at different datum. Dec. 11, 1933, to Mar. 8, 1934, stage determined from reference marks on bridge and staff-gage readings at various sites just upstream from bridge at different datums. Mar. 9, 1934, to September 1935, wire-weight gage on bridge at previous staff-gage datum.

Average discharge.--19 years, 5,369 cfs.

Extremes.--Maximum discharge during year, 37,300 cfs Feb. 11 (gage height, 21.35 ft); minimum, 1,000 cfs Sept. 24 (gage height, 3.57 ft).

1912-17, 1926-35, 1946-51: Maximum discharge observed, 81,000 cfs Dec. 22, 1933 (gage height, 36.55 ft, site and datum then in use); minimum, 630 cfs Nov. 21-24, Dec. 3, 5-8, 1929.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion or regulation.

Revisions (water years).--W 769: 1933.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 6 to Nov. 1, Nov. 3-23, Dec. 22 to Feb. 15, Feb. 27 to Mar. 4, Mar. 14-18, July 2-27)

3.5	930	7.0	5,730
4.0	1,450	8.0	7,510
4.5	2,030	10.0	11,400
5.0	2,670	14.0	19,600
6.0	4,100	17.0	26,300
6.5	4,890	21.0	35,900

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a1,480	6,000	10,200	9,260	5,610	*3,980	4,870	6,020	5,490	4,870	2,010	1,220
2	a1,420	a8,000	8,350	10,100	5,700	3,890	4,860	5,560	5,540	4,600	1,970	1,160
3	a1,400	9,660	7,510	11,500	5,820	3,850	5,270	5,340	5,870	4,510	1,930	1,150
4	a1,440	11,200	8,780	10,600	5,390	3,840	*6,290	5,850	5,810	4,390	1,900	1,140
5	a2,100	10,800	10,500	9,220	5,050	a3,700	7,260	7,960	6,140	a4,000	1,660	1,150
6	2,840	9,280	13,200	8,000	4,940	a3,500	7,490	8,350	6,020	*3,640	1,810	1,160
7	2,750	7,860	17,600	7,130	5,440	a3,400	7,700	8,650	5,350	3,350	1,790	1,220
8	3,360	7,130	15,700	6,480	9,560	a3,300	7,970	8,610	5,830	3,220	*1,750	1,350
9	3,950	6,160	*13,200	*5,950	19,400	a3,200	7,740	8,420	5,900	3,190	1,730	1,400
10	4,870	5,520	12,600	5,530	32,700	a3,100	7,440	9,120	6,340	3,290	1,720	1,310
11	9,960	5,100	12,300	5,190	35,600	a3,000	7,150	12,600	6,740	3,290	1,740	1,250
12	5,620	4,700	12,300	4,830	34,100	a3,300	7,490	14,400	6,790	3,160	1,770	1,160
13	4,380	4,360	10,700	4,910	23,300	a3,700	8,840	11,300	6,740	3,160	1,680	1,130
14	3,780	4,120	9,120	5,480	17,400	3,940	10,500	6,950	6,680	3,180	1,590	1,130
15	3,460	4,070	8,330	6,070	13,700	4,810	10,900	*7,780	7,530	3,080	1,600	1,140
16	3,170	4,490	9,300	6,540	a11,200	6,480	10,400	7,720	7,830	2,980	1,620	1,160
17	3,010	4,500	10,100	6,680	9,490	5,900	10,300	9,200	7,020	2,900	1,630	1,160
18	3,140	4,260	9,620	6,270	8,440	5,410	10,300	10,000	6,560	2,910	1,590	1,170
19	4,060	3,970	8,650	5,800	7,530	5,170	9,320	8,990	6,230	2,840	1,580	*1,160
20	5,330	3,950	8,520	5,340	6,900	5,240	8,040	8,310	6,040	2,660	1,560	1,140
21	5,020	5,070	9,390	5,560	6,410	5,580	7,020	8,350	5,880	2,510	1,580	1,100
22	4,380	8,560	10,300	5,340	5,900	5,750	6,340	9,160	5,820	2,450	1,600	1,050
23	3,900	14,300	22,800	5,070	5,490	5,510	5,900	10,900	5,630	2,440	1,550	1,040
24	*3,570	16,500	27,500	5,370	a5,150	5,250	5,680	11,800	5,590	2,480	1,450	1,020
25	4,010	23,600	21,600	7,510	a4,690	5,170	5,640	11,200	5,420	2,440	1,370	*1,100
26	5,680	24,600	16,800	11,200	a4,620	5,240	5,870	9,540	5,200	2,320	1,360	1,380
27	6,330	*24,700	13,300	11,400	4,350	5,240	6,110	8,360	5,120	2,200	1,360	1,220
28	9,020	21,500	11,700	9,280	4,140	a5,190	6,700	7,810	4,950	2,190	1,470	1,120
29	8,080	15,700	10,800	7,510	-	a5,190	6,920	7,040	4,890	2,140	1,540	1,200
30	7,590	12,400	10,600	6,770	-	5,190	6,560	6,270	4,890	2,090	1,360	1,900
31	6,330	-	9,960	6,070	-	5,000	-	5,730	-	2,240	1,280	-
Total	135,330	293,960	381,330	222,200	309,220	141,000	222,870	269,310	180,770	94,520	50,750	35,990
Mean	4,365	9,799	12,300	7,188	11,040	4,548	7,429	8,687	6,026	3,049	1,637	1,200
Cfsm	3.73	8.58	10.5	6.13	9.44	3.89	6.35	7.42	5.15	2.61	1.40	1.03
In.	4.30	9.34	12.12	7.06	9.83	4.48	7.08	8.56	5.75	3.00	1.61	1.14
Ac-ft	268,400	583,100	756,400	440,700	613,300	279,700	442,100	534,200	358,600	187,500	100,700	71,390

Calendar year 1950: Max 27,500 Min 1,380 Mean 7,654 Cfsm 6.54 In. 88.79 Ac-ft 5,541,000  
Water year 1950-51: Max 35,600 Min 1,020 Mean 6,403 Cfsm 5.47 In. 74.27 Ac-ft 4,636,000

Peak discharge (base, 15,000 cfs).--Nov. 27 (7 p.m.) 25,500 cfs (16.50 ft); Dec. 7 (3 p.m.) 18,000 cfs (15.26 ft); Dec. 24 (7:30 a.m.) 29,200 cfs (18.05 ft); Feb. 11 (8 p.m.) 37,300 cfs (21.35 ft).  
\* Discharge measurement made on this day.

† No gage-height record; discharge estimated on basis of records for stations on nearby streams.

West Fork Tilton River near Morton, Wash.

Location.--Lat 46°36'45", long. 122°14'45", in NE $\frac{1}{4}$  sec. 13, T. 13 N., R. 4 E., on left bank three-quarters of a mile upstream from mouth and 4 miles northeast of Morton.

Drainage area.--16.4 sq mi.

Records available.--June 1950 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,150 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,460 cfs Feb. 9 (gage height, 6.05 ft, from high-water mark in well); minimum, 4.8 cfs Aug. 25, Sept. 20-24 (gage height, 0.87 ft). 1950-51: Maximum discharge, that of Feb. 9, 1951; minimum, that of Aug. 25, Sept. 20-24, 1951.

Remarks.--Record good except those for periods of shifting control and above 500 cfs, which are fair, and those for periods of no gage-height record, which are poor. No diversion or regulation.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 7				Feb. 7 to Sept. 30					
1.7	18	3.2	230	0.8	3.3	2.1	86	4.0	700
1.9	31	3.6	350	1.0	8.2	2.4	134	4.5	1,000
2.1	48	4.0	510	1.2	15.5	2.8	225	5.0	1,400
2.3	69	4.5	780	1.5	30	3.2	345	5.5	1,870
2.6	111	5.0	1,140	1.8	53	3.6	505		
2.9	165								

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	25	532	200	170	95						7.1	6.3
2	22	300	170	350	130	50	140	81	35	12.5	7.1	6.3
3	23	240	230	400	235	47	238	76	35	12.5	*6.8	6.0
4	31	203	310	205	191	50	277	129	34	12.5	6.8	5.8
5	138	167	300	159	147	47	238	152	32	13.5	6.6	5.5
6	195	140	470	127	*131	43	220	132	31	14	6.6	5.5
7	175	130	510	110	438	38	222	111	28	12.5	6.3	10.5
8	159	115	450	98	750	37	190	94	27	12	6.6	12.5
9	141	105	300	88	*1,870	35	174	96	27	12	6.8	8.5
10	600	95	230	85	*1,310	33	156	127	26	11	6.8	6.8
11	297	85	200	85	1,480	32	169	195	26	10.5	7.1	6.3
12	175	75	170	85	675	100	215	150	26	10	7.1	6.0
13	119	70	150	151	384	178	235	113	25	9.8	6.8	5.8
14	99	60	130	181	265	142	228	93	24	9.8	6.3	5.8
15	78	70	150	195	220	354	208	85	23	9.5	6.3	5.5
16	67	135	170	179	178	268	200	92	23	9.5	6.0	5.5
17	65	130	200	171	152	178	188	94	21	9.5	6.0	5.5
18	90	110	170	131	130	138	154	80	20	9.2	5.8	5.3
19	116	100	140	108	116	138	*118	71	19	8.9	5.5	5.3
20	117	180	150	95	114	165	93	67	18	8.5	5.5	5.1
21	96	*480	230	118	105	181	79	70	17.5	8.2	5.3	4.8
22	81	760	458	100	90	156	73	78	16.5	8.2	5.3	4.8
23	68	640	696	90	81	129	68	78	16	7.9	5.3	4.8
24	61	1,000	380	419	76	120	72	75	15.5	7.9	*5.3	5.8
25	73	700	260	595	68	121	76	*65	15	7.9	5.1	23
26	77	550	200	579	65	129	82	54	14.5	7.9	5.1	11
27	212	650	177	294	58	*132	93	48	14	7.7	5.5	8.2
28	322	400	250	195	54	125	161	48	13.5	7.7	19.5	45
29	303	300	240	140	-	144	140	43	13	7.4	8.9	91
30	248	250	230	110	-	148	102	38	13	7.4	7.4	338
31	205	-	180	100	-	136	-	36	-	7.1	6.8	-
Total	4,478	8,572	8,081	5,911	9,606	3,641	4,787	2,745	683.5	305.5	209.4	666.2
Mean	144	286	261	191	343	117	160	86.5	22.8	9.85	6.75	22.2
Cfs/m	8.78	17.4	15.9	11.6	20.9	7.13	9.76	5.40	1.39	0.601	0.412	1.35
In.	10.15	19.44	18.33	13.40	21.78	8.28	10.86	6.22	1.55	0.69	0.47	1.51
Ac-ft	8,880	17,000	16,030	11,720	19,050	7,220	9,490	5,440	1,360	608	415	1,320

Calendar year 1950: Max - Min - Mean - Cfs/m - In. - Ac-ft -  
 Water year 1950-51: Max 1,870 - Min 4.8 - Mean 136 - Cfs/m 8.29 - In. 112.66 - Ac-ft 98,530

Peak discharge (base, 800 cfs).--Oct. 10 (10 a.m.) 810 cfs (4.55 ft); probably Nov. 24 (time unknown) 1,230 cfs (5.11 ft); Dec. 22 (8:30 p.m.) 910 cfs (4.70 ft); Jan. 25 (11 p.m.) 840 cfs (4.60 ft); Feb. 9 (12:30 p.m.) 2,460 cfs (6.05 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 7-20, Nov. 23 to Dec. 20, Dec. 25, 26, Dec. 28 to Jan. 3, Jan. 30 to Feb. 1; discharge estimated on basis of records for stations on nearby streams. Shifting-control method used Feb. 7, Feb. 10 to May 25.

## Tilton River near Cinebar, Wash.

Location.--Lat 46°34'35", long. 122°31'15", in SW $\frac{1}{4}$  sec. 26, T. 13 N., R. 2 E., on left bank 1,000 ft downstream from Cinnabar Creek, 2 miles southeast of Cinebar, and 2 $\frac{1}{2}$  miles upstream from mouth.

Drainage area.--158 sq mi.

Records available.--February 1941 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 397.6 ft above mean sea level (river-profile survey). Prior to Apr. 18, 1941, staff gage at same site and datum.

Average discharge.--10 years, 905 cfs.

Extremes.--Maximum discharge during year, 12,200 cfs Feb. 9 (gage height, 12.59 ft), from rating curve extended above 4,000 cfs; minimum, 60 cfs Sept. 21, 22, 23, 24 (gage height, 3.54 ft).  
1941-51: Maximum discharge, 14,500 cfs sometime during period of no gage-height record in December 1946 (gage height, 14.36 ft, from high-water mark in well), from rating curve extended above 4,000 cfs; minimum, that of Sept. 21, 22, 23, 24, 1951.

Remarks.--Records excellent. No diversion or regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

3.5	56	4.7	282	6.5	1,280	9.0	4,310
3.7	79	5.0	390	7.0	1,750	10.0	6,000
3.9	107	5.3	520	7.5	2,300	11.0	8,100
4.1	140	5.6	670	8.0	2,920	12.0	10,600
4.4	200	6.0	900	8.5	3,590		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	158	1,650	1,700	1,900	1,000	*605	1,200	615	305	120	82	74
2	149	2,120	1,420	3,240	1,370	560	1,280	555	267	121	80	73
3	140	1,800	1,500	3,870	1,800	535	1,500	525	258	118	79	72
4	154	1,500	3,050	2,790	1,600	555	1,850	695	255	123	79	69
5	398	1,370	3,120	2,180	1,320	506	*1,650	1,000	255	123	79	68
6	900	1,160	4,460	1,750	1,240	480	1,460	840	252	128	78	67
7	720	1,120	3,870	1,460	2,240	444	1,460	810	247	123	*77	73
8	695	1,040	2,860	1,280	3,870	450	1,370	695	236	118	77	109
9	695	900	2,300	1,120	10,100	406	1,200	645	220	113	77	88
10	2,970	780	1,900	*1,040	7,650	390	1,080	670	212	110	78	78
11	2,070	720	1,850	1,000	9,050	374	1,080	970	205	110	79	73
12	1,120	665	1,650	935	5,100	625	1,280	900	205	104	80	71
13	780	600	1,420	1,420	3,240	1,280	1,460	720	208	101	79	69
14	635	570	1,240	1,960	2,360	1,120	1,460	635	205	100	77	67
15	520	670	1,240	2,020	1,900	2,070	1,320	565	187	98	75	66
16	448	1,000	1,460	1,900	1,600	2,240	1,240	*550	176	96	73	66
17	414	970	1,460	2,070	1,460	1,550	1,200	565	170	96	72	66
18	475	970	1,320	1,650	1,370	1,280	1,040	520	164	95	71	*65
19	590	810	1,160	1,420	1,240	1,200	900	470	164	92	69	65
20	660	1,120	1,120	1,240	1,240	1,320	750	439	154	92	68	64
21	570	2,480	1,420	1,550	1,120	1,460	670	430	147	92	68	63
22	488	5,450	2,490	1,420	1,000	1,460	605	439	145	89	67	62
23	430	4,310	5,810	1,280	900	1,280	565	466	142	88	67	62
24	*394	6,190	3,520	2,480	840	1,160	550	457	138	87	67	63
25	402	4,160	2,600	3,730	810	1,200	555	462	135	87	66	137
26	406	3,450	2,020	4,310	720	1,280	575	386	133	91	66	137
27	750	3,590	1,800	2,790	670	1,420	620	347	*133	88	67	94
28	1,460	*2,660	2,240	1,960	640	1,280	935	344	128	86	125	149
29	1,800	2,020	2,360	1,550	-	1,280	900	347	125	84	104	205
30	1,500	1,850	2,300	1,160	-	1,370	720	305	121	83	83	1,280
31	1,320	-	1,960	1,120	-	1,280	-	282	-	82	78	-
Total	24,209	57,695	68,620	59,595	67,450	32,440	32,475	17,649	5,692	3,138	2,387	3,695
Mean	781	1,923	2,214	1,922	2,409	1,046	1,082	569	190	101	77.0	123
Cfs/m	4.94	12.2	14.0	12.2	15.2	6.62	6.85	3.60	1.20	0.639	0.487	0.778
In.	5.70	13.58	16.15	14.03	15.88	7.64	7.64	4.15	1.34	0.74	0.56	0.87
Ac-ft	48,020	114,400	136,100	118,200	133,800	64,340	64,410	35,010	11,290	6,220	4,730	7,330
Calendar year 1950: Max			9,930	Min 97		Mean 1,280	Cfs/m 8.10	In. 109.95	Ac-ft 926,400			
Water year 1950-51: Max			10,100	Min 62		Mean 1,028	Cfs/m 6.51	In. 88.28	Ac-ft 743,800			

Peak discharge (base, 7,000 cfs).--Nov. 22 (4 p.m.) 7,000 cfs (10.47 ft); Nov. 24 (4 a.m.) 7,870 cfs (10.89 ft); Feb. 9 (5 p.m.) 12,200 cfs (12.59 ft); Feb. 11 (9:30 a.m.) 10,300 cfs (11.92 ft).

\* Discharge measurement made on this day.

## Klickitat Creek at Mossyrock, Wash.

Location.--Lat 46°31'15", long. 122°28'05", on line between secs. 17 and 18, T. 12 N., R. 3 E., on left bank at upstream side of highway bridge 1 mile southeast of Mossyrock and 4 1/4 miles upstream from mouth.

Drainage area.--3.86 sq mi.

Records available.--August 1948 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 668.41 ft above mean sea level (levels of city of Tacoma).

Extremes.--Maximum discharge during year, 82 cfs Jan. 2 (gage height, 2.65 ft), from rating curve extended above 35 cfs; no flow Oct. 2, 3, June 28 to Sept. 30.  
1948-51: Maximum discharge, 165 cfs Feb. 17, 1949 (gage height, 3.62 ft), from rating curve extended above 35 cfs; no flow for long periods during each year.

Remarks.--Records good except those for periods of extreme low flow and shifting control, which are fair, and those for periods of no gage-height record, which are poor. No known diversion or regulation.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.1	8.7	36	32	17.5	12	13	3.2	1.0			
2	0	a12	26	61	28	11	12.5	2.9	.8			
3	0	a11	28	56	25	11	11.5	2.7	.7			
4	.1	a9	40	54	20	14	*11	5.7	1.0			
5	.7	a10	31	44	18	11.5	10	4.4	1.8			
6	2.9	a8	49	38	21	11	9.9	4.0	3.0			
7	2.3	a9	41	32	25	9.9	9.3	5.2	2.3			
8	4.0	a8	34	28	28	9.9	9.0	3.7	1.8		(*)	
9	3.6	6.3	36	25	44	9.3	8.4	2.6	1.3			
10	6.9	6.0	30	*23	40	9.0	7.8	2.3	1.0			
11	2.9	5.7	30	20	46	10	7.2	5.7	.9			
12	1.6	6.0	25	19.5	*38	28	6.9	3.7	1.0			
13	1.0	5.7	22	23	34	25	6.6	2.7	.8			
14	1.1	7.2	21	26	30	21	6.0	*2.6	.7			
15	1.0	16	21	27	28	37	5.7	2.1	.4			
16	.8	20	22	30	26	30	5.2	1.9	.3			
17	.9	28	20	34	28	27	5.2	1.6	.3			
18	1.3	19	17	28	28	25	5.2	1.5	.2			
19	1.8	16.5	16.5	26	25	*23	4.9	1.5	.2			
20	a1.9	*19	16	25	23	21	4.4	1.4	.2			
21	a1.3	25	15.5	39	20	21	4.2	1.2	.1			
22	a.9	33	29	34	18.5	23	4.0	1.0	.1			
23	a.7	30	47	32	17	19.5	4.0	1.1	.1			
24	*.5	40	34	34	16	17	3.4	1.3	.1			
25	1.5	36	31	32	15.5	17	3.2	1.5	*.1	(*)		
26	a1.5	28	28	32	14	18	3.2	1.3	.1			
27	a5	38	28	27	12.5	15.5	4.0	1.1	.1			
28	a10	*28	31	24	*12	14	7.8	2.0	0			
29	a12	25	27	22	-	15	5.4	2.0	0			
30	a9.5	30	34	20	-	18	3.7	1.4	0			
31	7.2	-	27	18	-	14	-	1.1	-			-
Total	85.0	544.1	893.0	965.5	698.0	547.6	202.6	76.4	20.4	0	0	0
Mean	2.74	18.1	28.8	31.1	24.9	17.7	6.75	2.46	0.68	0	0	0
Ac-ft	169	1,080	1,770	1,920	1,380	1,090	402	152	40	0	0	0

Calendar year 1950: Max 72

Min 0

Mean 12.7

Ac-ft 9,230

Water year 1950-51: Max 61

Min 0

Mean 11.0

Ac-ft 8,000

Peak discharge (base, 60 cfs).--Dec. 6 (5:30 a.m.) 64 cfs (2.38 ft); Dec. 22 (10 p.m.) 62 cfs (2.35 ft); Jan. 2 (1 p.m.) 82 cfs (2.65 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations on nearby streams.

Note.--Shifting-control method used Oct. 1-19, 24-25, Nov. 15-21, Apr. 28 to June 24.

## Winston Creek near Mayfield, Wash.

Location.--Lat 46°29'00", long. 122°31'15", about center of sec. 35, T. 12 N., R. 2 E., on left bank 100 ft downstream from bridge, 3 miles southeast of Mayfield, and 3½ miles upstream from mouth.

Drainage area.--40.0 sq mi.

Records available.--October 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 470 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,010 cfs Jan. 2 (gage height, 5.58 ft); minimum, 0.6 cfs Aug. 24 (gage height, 1.63 ft).  
1949-51: Maximum discharge, 1,960 cfs Feb. 24, 1950 (gage height, 6.94 ft); minimum, that of Aug. 24, 1951.

Remarks.--Records good. Slight regulation by Long Bell Lumber Co. for millpond.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 10				Feb. 11 to Sept. 30			
2.1	9.7	3.6	215	1.7	1.2	3.3	156
2.4	26	4.0	325	1.9	3.4	3.6	221
2.7	56	4.5	490	2.1	11	4.0	326
3.0	98	5.0	695	2.4	30	4.5	490
3.3	150	5.5	955	2.7	62	5.0	695
				3.0	104		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10.5	190	283	263	158	98	189	43	28	8.8	3.9	5.5
2	9.7	188	235	551	218	90	176	40	26	9.1	4.2	4.9
3	9.7	181	256	745	243	89	176	39	24	8.4	4.2	4.2
4	14	182	406	568	218	96	*166	61	25	8.0	4.2	3.7
5	65	170	360	409	188	86	152	66	28	8.0	3.9	3.7
6	101	146	472	326	206	81	139	56	38	9.9	3.3	2.9
7	60	168	436	263	263	75	130	76	34	9.3	*3.3	3.5
8	96	158	351	218	348	75	122	62	29	9.5	3.3	7.7
9	92	139	323	188	628	71	109	55	26	9.1	3.7	5.8
10	162	126	258	164	586	66	101	51	23	8.4	4.4	3.9
11	131	117	243	*150	695	65	94	79	22	7.4	5.2	2.6
12	94	108	204	137	*566	164	90	71	24	7.0	5.5	2.6
13	75	96	179	164	434	240	86	61	23	6.4	5.2	2.6
14	65	92	166	210	338	231	83	56	21	6.7	4.4	2.0
15	56	167	160	277	301	552	78	*54	16.5	6.4	3.7	2.8
16	48	283	168	305	243	454	71	50	18	6.1	3.3	2.6
17	47	373	154	393	223	341	66	47	16	6.1	1.5	2.6
18	54	291	142	311	221	279	65	43	14.5	6.7	3.3	2.6
19	54	232	135	261	203	253	61	41	14	6.4	3.5	*2.6
20	59	243	122	222	200	248	55	38	14.5	5.8	2.9	2.6
21	49	399	121	185	180	258	51	36	13	4.9	2.8	2.3
22	44	527	218	168	164	240	50	34	13	4.4	2.9	2.6
23	*43	490	327	266	150	221	48	36	12.5	4.7	2.9	2.6
24	40	607	393	348	139	210	46	37	12	4.7	1.6	2.4
25	50	527	326	406	127	205	41	37	13.5	5.5	1.8	6.7
26	50	409	269	454	115	223	39	34	*11.5	5.5	2.2	8.8
27	124	560	243	360	107	216	42	30	11.5	5.2	2.4	5.2
28	204	*416	258	286	*100	207	58	36	10.5	5.5	17	11.5
29	225	338	245	230	-	210	63	44	13.5	5.2	12.5	15
30	208	308	272	199	-	221	51	33	10.5	4.2	7.0	4.6
31	181	-	258	170	-	203	-	29	-	3.7	5.2	-
Total	2,518.9	8,211	8,183	9,276	7,562	6,068	2,698	1,474	586.0	207.6	135.2	174.5
Mean	81.3	274	264	299	270	196	89.9	47.5	19.5	6.70	4.36	5.82
Cfsm	2.03	6.85	6.60	7.48	6.75	4.90	2.25	1.19	0.498	0.168	0.109	0.146
In.	2.34	7.63	7.61	8.62	7.03	5.64	2.51	1.37	0.54	0.19	0.13	0.16
Ac-ft	5,000	16,290	16,230	18,400	15,000	12,040	5,350	2,920	1,160	412	268	346

Calendar year 1950: Max 1,640 Min 2.8 Mean 157 Cfsm 3.92 In. 53.42 Ac-ft 114,000

Water year 1950-51: Max 746 Min 1.5 Mean 129 Cfsm 3.22 In. 43.77 Ac-ft 93,420

Peak discharge (base, 900 cfs).--Jan. 2 (9 p.m.) 1,010 cfs (5.58 ft).

\* Discharge measurement made on this day.

## Cowlitz River near Mayfield, Wash.

Location.--Lat 46°30'40", long. 122°36'50", in NE $\frac{1}{4}$  sec. 24, T. 12 N., R. 1 E., on right bank 1 mile upstream from Mill Creek, 2 miles downstream from Winston Creek, and  $2\frac{1}{2}$  miles west of Mayfield.

Drainage area.--1,401 sq mi (revised).

Records available.--August 1910 to November 1911, April 1934 to September 1951. Published as "at Mayfield" 1910-11. Monthly discharges only October, November 1911, in Water-Supply Paper 492.

Gage.--Water-stage recorder. Datum of gage is 226.6 ft above mean sea level, datum of 1929. August 1910 to November 1911 staff gage at site  $2\frac{1}{2}$  miles upstream at different datum. Apr. 27 to June 30, 1934, staff gage at present site and datum.

Average discharge.--17 years (1934-51), 5,872 cfs.

Extremes.--Maximum discharge during year, 51,200 cfs Feb. 11 (gage height, 22.5 ft, from high-water mark in well); minimum, 1,120 cfs Sept. 24 (gage height, 8.05 ft). 1910-11, 1934-51. Maximum discharge, 58,000 cfs Dec. 13, 1946 (gage height, 24.75 ft); minimum, 766 cfs Nov. 30, Dec. 1, 1936 (gage height, 7.18 ft). Flood of December 1933 is known to have exceeded that of Dec. 13, 1946.

Remarks.--Records excellent except those for period of no gage-height record, which are fair. No diversion or regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 9				Feb. 10 to Sept. 30			
8.5	1,500	11.0	6,000	8.0	1,060	10.5	5,040
8.7	1,760	12.0	8,430	8.3	1,410	11.0	6,090
9.0	2,180	13.0	11,100	8.6	1,810	12.0	8,440
9.3	2,630	14.0	14,000	9.0	2,390	13.0	11,100
9.6	3,120	15.0	17,500	9.5	3,190	14.0	14,000
10.0	3,860	16.0	21,500	10.0	4,070	15.0	17,400
10.5	4,880	18.0	29,500				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,630	8,180	12,900	11,500	7,360	4,760	6,090	6,710	5,790	5,040	2,090	1,330
2	1,550	9,740	10,800	12,000	7,800	4,580	6,130	6,160	5,850	4,840	2,060	1,290
3	1,500	10,600	10,100	13,000	8,460	4,430	6,740	5,830	6,200	4,720	2,020	1,280
4	1,540	12,200	12,600	12,000	7,900	4,510	8,120	6,800	6,510	4,600	1,980	1,270
5	2,260	11,900	14,000	11,500	7,240	4,320	*9,110	9,050	6,500	4,220	1,950	1,270
6	3,860	10,600	18,000	10,500	6,950	4,070	9,210	9,370	6,440	3,850	1,920	1,270
7	3,610	9,370	21,700	9,500	8,300	3,930	9,370	9,660	6,380	3,570	1,880	1,300
8	4,520	8,640	18,900	8,500	13,500	3,840	9,520	9,520	6,220	3,380	*1,840	1,420
9	5,060	7,530	15,600	*7,680	27,500	3,760	9,160	9,240	6,240	3,360	1,820	1,460
10	7,580	6,760	14,600	7,310	41,800	3,600	8,660	9,960	6,690	3,390	1,820	1,370
11	11,500	6,210	14,200	6,900	48,100	3,460	8,260	13,200	7,100	3,440	1,810	1,340
12	7,240	5,700	13,900	6,570	42,000	4,220	8,770	15,500	7,200	3,290	1,820	1,270
13	5,410	5,250	12,400	6,900	27,800	5,450	10,200	12,300	7,100	3,280	1,740	1,240
14	4,480	4,950	10,900	8,180	19,800	5,410	11,800	9,980	7,080	3,310	1,660	1,230
15	3,940	5,120	10,300	8,790	15,700	7,700	12,100	8,740	7,840	3,210	1,630	1,240
16	3,520	6,180	11,300	9,230	13,000	9,600	11,600	*8,690	8,220	3,090	1,640	1,230
17	3,300	6,490	11,900	10,000	11,200	8,140	11,500	10,100	7,410	3,000	1,640	1,270
18	3,440	5,930	11,300	8,980	10,200	7,220	11,300	11,200	6,850	3,000	1,620	*1,270
19	4,590	5,300	10,800	8,160	9,110	6,780	10,300	10,200	6,510	2,940	1,600	1,270
20	6,090	5,590	10,600	7,480	8,460	6,880	8,950	9,340	6,310	2,760	1,590	1,240
21	5,880	8,100	12,000	8,180	7,820	7,360	7,750	9,290	6,130	2,590	1,600	1,210
22	5,010	13,900	20,000	7,980	7,170	7,630	6,990	10,000	6,020	2,510	1,620	1,150
23	*4,380	18,300	28,000	7,380	6,640	7,060	6,440	11,700	5,830	2,500	1,590	1,140
24	3,920	23,700	33,000	8,690	6,220	6,710	6,160	12,500	5,790	2,540	1,500	1,130
25	4,260	26,600	28,000	11,700	5,960	6,550	6,090	11,700	5,620	2,510	1,450	1,270
26	6,420	27,000	20,000	15,400	5,580	6,710	6,350	10,200	*5,410	2,400	1,410	1,490
27	7,350	26,900	16,000	14,100	5,240	6,780	6,740	8,900	5,320	2,320	1,410	1,350
28	10,700	24,500	14,000	11,700	*4,960	6,460	7,680	8,320	5,140	2,260	1,590	1,330
29	11,000	*16,400	13,000	9,740	-	6,420	8,040	7,580	5,060	2,220	1,630	1,440
30	9,660	14,800	11,000	8,770	-	6,620	7,440	6,840	5,040	2,180	1,480	2,990
31	8,480	-	12,000	7,930	-	6,380	-	6,090	-	2,120	1,390	-
Total	163,660	354,440	471,800	296,310	391,770	181,340	256,570	294,070	189,900	98,440	52,800	40,360
Mean	5,279	11,810	15,220	9,558	13,990	5,850	8,552	9,488	6,330	3,175	1,703	1,345
Cfs/m	3.77	8.43	10.9	6.82	9.99	4.18	6.10	6.77	4.52	2.27	1.22	0.960
In.	4.34	9.41	12.52	7.87	10.40	4.81	6.81	7.81	5.04	2.61	1.40	1.07
Ac-ft	324,600	703,000	935,800	587,700	777,100	359,700	508,900	583,300	376,700	195,300	104,700	80,050

Calendar year 1950: Max 31,000 Min 1,480 Mean 9,117 Cfs/m 6.51 In. 88.37 Ac-ft 6,600,000  
 Water year 1950-51: Max 48,100 Min 1,130 Mean 7,648 Cfs/m 5.46 In. 74.09 Ac-ft 5,537,000

Peak discharge (base, 16,000 cfs).--Nov. 27 (7 p.m.) 27,600 cfs (17.53 ft); Dec. 7 (11 a.m.) 22,100 cfs (16.16 ft); Dec. 23 (time unknown) 45,200 cfs (21.33 ft); Feb. 11 (1 p.m.) 51,200 cfs (22.5 ft); May 12 (4 a.m.) 16,400 cfs (14.73 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Dec. 18 to Jan. 8; discharge estimated on basis of recorded range in stage, high-water mark, and records for stations near Kosmos and at Mossybrook.

## South Fork Toutle River at Toutle, Wash.

Location.--Lat 46°19'20", long. 122°41'45", in SW $\frac{1}{4}$  NW $\frac{1}{4}$  sec. 28, T. 10 N., R. 1 E., on left bank half a mile southwest of Toutle,  $\frac{1}{2}$  miles upstream from mouth, and  $\frac{3}{4}$  miles downstream from Johnson Creek.

Drainage area.--118 sq mi.

Records available.--October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (from river-profile survey). Prior to Nov. 11, 1939, staff gage at same site at datum 451.12 ft above mean sea level.

Average discharge.--12 years, 589 cfs.

Extremes.--Maximum discharge during year, 6,180 cfs Feb. 11 (elevation, 456.83 ft); minimum, 69 cfs Sept. 20-23 (elevation, 452.60 ft).

1939-51: Maximum discharge, 8,710 cfs Dec. 11, 1946 (elevation, 458.54 ft); minimum, 63 cfs Sept. 4, 1947.

Remarks.--Records excellent except those for period of shifting control, which are fair. No diversion or regulation.

Revisions (water years).--W 1184: 1949.

Rating table, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

52.6	69	53.9	680	56.0	3,900
52.8	110	54.2	970	56.5	5,150
53.0	166	54.6	1,430	57.0	6,650
53.3	280	55.0	2,000		
53.6	440	55.5	2,880		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	110	1,240	1,360	1,210	682	440	780	590	276	133	92	86
2	108	1,210	1,120	2,330	910	416	770	534	272	133	92	84
3	113	1,170	*1,250	2,240	1,080	404	850	496	272	131	92	82
4	139	992	2,160	1,590	950	404	970	644	272	136	90	80
5	484	910	1,880	1,250	810	386	960	716	276	*136	88	78
6	410	707	2,330	992	880	359	900	689	308	154	88	78
7	380	725	2,330	830	1,730	*348	900	752	289	142	86	86
8	489	716	1,720	734	2,600	348	850	653	272	133	86	103
9	489	608	1,460	653	4,750	332	790	582	259	131	86	88
10	1,140	550	1,230	608	4,250	318	*707	635	255	126	88	84
11	900	489	1,240	599	5,580	308	680	770	251	123	88	82
12	558	440	1,080	550	3,580	656	752	780	246	115	90	80
13	416	398	910	707	2,240	900	890	653	238	113	80	80
14	354	380	790	1,080	1,640	800	940	574	234	113	*84	78
15	304	791	1,100	1,820	1,390	1,560	880	510	230	113	84	75
16	272	1,700	1,520	1,730	1,150	1,330	850	534	218	110	82	75
17	276	1,560	1,430	1,960	1,040	981	840	558	208	108	82	73
18	593	1,050	1,180	1,380	970	1,010	752	518	197	108	82	71
19	608	770	981	1,080	900	780	653	475	190	106	82	71
20	599	900	880	920	930	860	566	434	180	106	82	*71
21	482	1,560	840	1,590	850	930	503	434	169	106	82	69
22	404	1,980	1,670	1,310	781	850	454	*482	166	103	82	69
23	548	2,000	3,270	1,080	680	761	416	534	163	103	82	71
24	313	3,580	2,000	1,790	617	698	398	518	160	101	82	73
25	*475	2,980	1,510	2,240	574	707	398	482	157	103	82	108
26	582	2,420	1,190	2,420	542	716	416	416	151	101	82	103
27	1,980	3,580	1,100	1,740	489	698	518	375	145	99	82	84
28	2,510	2,240	1,270	1,250	468	662	1,150	364	139	99	129	115
29	1,960	1,560	1,360	1,010	-	752	960	332	136	97	105	131
30	1,480	1,480	1,800	830	-	850	734	304	133	95	92	476
31	1,190	-	1,350	716	-	820	-	285	-	92	88	-
Total	20,446	40,686	45,011	40,249	43,023	21,384	22,207	16,623	6,463	3,569	2,720	2,904
Mean	660	1,356	1,452	1,298	1,537	690	740	536	215	115	87.7	96.8
Cfsm	5.59	11.5	12.3	11.0	13.0	5.85	6.27	4.54	1.82	0.975	0.743	0.820
In.	6.44	12.82	14.19	12.69	13.56	6.74	7.00	5.24	2.04	1.12	0.86	0.92
Ac-ft	40,550	80,700	89,280	79,830	85,330	42,410	44,050	32,970	12,820	7,080	5,400	5,760

Calendar year 1950: Max 6,020 Min 94 Mean 906 Cfsm 7.68 In. 104.25 Ac-ft 556,100  
 Water year 1950-51: Max 5,580 Min 69 Mean 727 Cfsm 6.16 In. 83.62 Ac-ft 526,200

Peak discharge (base, 4,200 cfs).--Nov. 24 (5 a.m.) 4,250 cfs (56.17 ft); Nov. 27 (8 a.m.) 4,750 cfs (56.36 ft); Feb. 11 (7 a.m.) 6,180 cfs (56.83 ft).

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 1-28.



## Toutle River near Silver Lake, Wash.

Location.--Lat 46°20'10", long. 122°43'30", in SE $\frac{1}{4}$  sec. 19, T. 10 N., R. 1 E., on left bank at highway bridge half a mile downstream from confluence of North and South Forks and 5 miles northeast of Silver Lake. Prior to Oct. 4, 1950, on right bank just downstream from highway bridge.

Drainage area.--474 sq mi.

Records available.--September 1909 to August 1912, October 1919 to December 1923 (fragmentary), September 1929 to September 1951. Published as "near Castle Rock" 1909-12.

Gage.--Water-stage recorder. Datum of gage is 407.3 ft above mean sea level (from river-profile survey). Prior to Aug. 4, 1912, staff gage at site 2 miles downstream, datum of gage, 307.3 ft above mean sea level (unadjusted). Oct. 9, 1919, to Dec. 14, 1923, water-stage recorder at site 300 ft downstream at different datum. Sept. 25, 1929, to Nov. 10, 1929, chain gage and Nov. 11, 1929, to Oct. 6, 1938, water-stage recorder at same site and datum. Oct. 7, 1938, to Oct. 3, 1950, water-stage recorder just downstream from bridge at same datum.

Average discharge.--27 years (1909-11, 1919-21, 1922-23, 1929-51), 1,994 cfs.

Extremes.--Maximum discharge during year, 14,100 cfs Feb. 11 (gage height, 11.30 ft), minimum, 316 cfs Sept. 23, 24 (gage height, 1.69 ft).  
1909-12, 1919-23, 1929-51. Maximum discharge observed, 35,600 cfs Mar. 2, 1910; maximum gage height recorded, 22.7 ft Dec. 23, 1933; minimum discharge, 240 cfs Nov. 21, 1929.

Remarks.--Records good except those for period Dec. 3 to Jan. 19, and those above 10,000 cfs, which are fair, and those for periods of no gage-height record, which are poor.  
No diversion or regulation.

Revisions (water years).--W 292: 1909 (calendar year). W 754: 1930-32.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-3			Oct. 4 to Sept. 30							
1.9	440		1.7	320	2.7	950	4.5	3,120	8.0	8,860
2.0	495		1.9	420	3.0	1,210	5.0	4,000	9.0	10,560
			2.1	530	3.5	1,720	6.0	5,660	10.0	12,100
			2.4	720	4.0	2,360	7.0	7,260	11.0	13,700

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	473	3,290	4,350	4,090	2,430	1,610	2,290	2,000	1,300	846	430	385
2	462	3,550	3,750	5,660	3,040	1,500	2,220	1,900	1,260	806	425	390
3	466	3,640	*3,823	3,640	3,640	1,450	2,360	1,800	1,300	763	420	370
4	600	3,290	5,500	5,660	3,290	1,500	2,650	2,200	1,300	*783	415	385
5	1,200	3,200	5,340	4,690	2,800	1,500	2,650	2,300	1,400	762	410	390
6	1,100	2,580	6,460	4,090	2,880	1,450	2,500	2,100	1,450	762	405	385
7	1,000	2,500	6,620	3,550	4,260	*1,400	2,500	2,300	1,400	713	405	395
8	1,400	2,500	5,500	3,120	6,140	1,400	2,430	2,100	1,300	678	405	460
9	1,500	2,160	4,860	2,880	11,300	1,400	2,290	1,900	1,300	657	405	425
10	1,700	1,960	4,350	2,720	11,300	1,300	*2,160	2,100	1,300	650	405	400
11	2,000	1,780	4,180	2,650	13,700	1,300	2,090	2,500	1,300	632	410	395
12	1,800	1,660	4,000	2,430	10,600	1,900	2,160	2,500	1,300	620	415	385
13	1,550	1,500	3,380	2,650	6,620	2,720	2,430	2,100	1,300	620	415	380
14	1,200	1,450	3,120	3,640	4,860	2,500	2,650	1,900	1,300	602	*400	385
15	1,100	2,350	3,460	5,180	4,180	4,520	2,580	1,800	1,350	584	400	370
16	1,000	4,690	4,260	5,340	3,550	4,090	2,500	1,900	1,300	572	395	380
17	1,100	4,690	4,180	5,340	3,120	3,040	2,500	2,000	1,260	566	390	375
18	1,700	3,380	3,730	4,260	2,880	2,650	2,360	1,900	1,200	560	395	370
19	2,500	2,500	3,380	*3,550	2,720	2,650	2,160	1,800	1,170	542	395	370
20	2,100	2,720	3,120	3,120	2,720	2,580	1,960	1,700	1,110	524	395	*355
21	1,800	4,180	3,040	4,690	2,500	2,650	1,780	1,700	1,090	512	395	330
22	1,550	4,260	4,260	4,260	2,290	2,650	1,680	*1,960	1,060	500	390	340
23	1,300	6,140	5,660	2,220	2,430	1,560	2,160	1,040	894	494	390	330
24	1,200	9,820	6,460	4,690	2,160	2,290	1,500	2,160	1,020	494	385	320
25	1,800	8,380	5,180	5,660	2,020	2,290	1,500	2,090	1,010	482	380	410
26	3,000	6,940	4,350	6,460	1,960	2,290	1,500	1,840	950	476	380	470
27	5,200	9,370	4,180	5,180	1,780	2,290	2,000	1,720	934	460	380	400
28	6,200	6,780	4,350	4,180	1,660	2,220	3,900	1,610	894	455	*476	430
29	5,000	5,020	4,350	5,460	-	2,290	5,200	1,610	894	450	476	444
30	*3,910	4,690	4,520	2,960	-	2,430	2,200	1,450	862	445	420	1,150
31	3,290	-	4,350	2,650	-	2,360	-	1,350	-	440	410	-
Total	59,803	122,530	142,080	129,870	122,620	68,650	68,140	60,450	35,622	18,470	12,617	12,424
Mean	1,929	4,064	4,583	4,189	4,379	2,215	2,271	1,950	1,187	596	407	414
Cfs/m	4.07	8.62	9.67	8.84	9.24	4.67	4.79	4.11	2.50	1.26	0.859	0.873
In.	4.69	9.61	11.15	10.19	9.62	5.39	5.35	4.74	2.79	1.45	0.99	0.97
Ac-ft	118,600	243,000	281,800	257,600	243,200	136,200	135,200	119,900	70,660	36,630	25,030	24,640

Calendar year 1950: Max 16,500 Min 400 Mean 2,919 Cfs/m 6.16 In. 83.58 Ac-ft 2,113,000  
Water year 1950-51: Max 13,700 Min 320 Mean 2,338 Cfs/m 4.93 In. 66.94 Ac-ft 1,692,000

Peak discharge (base, 9,000 cfs).--Nov. 24 (8 a.m.) 10,900 cfs (9.28 ft); Nov. 27 (9:30 a.m.) 11,400 cfs (9.61 ft); Dec. 23 (9 a.m.) 10,600 cfs (9.06 ft); Jan. 2 (10 p.m.) 9,820 cfs (8.57 ft); Feb. 11 (10 a.m.) 14,100 cfs (11.30 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Oct. 4-29, Apr. 25 to May 21; discharge estimated on basis of records for nearby streams.

## Cowlitz River at Castle Rock, Wash.

Location.--Lat 46°16'30", long. 122°55'00", in SE $\frac{1}{4}$  sec. 10, T. 9 N., R. 2 W., on right bank at highway bridge in Castle Rock,  $2\frac{1}{2}$  miles downstream from Toutle River and 14 miles upstream from mouth.

Drainage area.--2,238 sq mi (revised).

Records available.--December 1926 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 19.73 ft above mean sea level, datum of 1929. Prior to Dec. 18, 1933, staff gage at site 2 miles upstream at different datum. Dec. 18, 1933, to June 13, 1934, wire-weight gage on highway bridge at present datum.

Average discharge.--24 years (1927-51), 8,799 cfs.

Extremes.--Maximum discharge during year, 67,200 cfs Feb. 12 (gage height, 21.80 ft); minimum, 1,540 cfs Sept. 24 (gage height, 7.09 ft).  
1926-51: Maximum discharge observed, 139,000 cfs Dec. 23, 1933 (gage height, 31.6 ft, present datum), from rating curve extended above 65,000 cfs; minimum, 998 cfs Nov. 7, 8, 1935.

Remarks.--Records excellent except those for periods of doubtful gage-height record, which are fair. No diversion or regulation.

Revisions.--W 964: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

7.1	1,550	8.4	3,900	14.0	22,000
7.3	1,860	8.7	4,500	16.0	31,700
7.5	2,190	9.0	5,250	18.0	42,700
7.8	2,720	10.0	7,900	20.0	54,700
8.1	3,300	12.0	14,200	21.5	65,100

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2,280	12,500	22,000	17,600	11,000	7,540	10,200	9,490	7,690	6,180	2,720	1,920
2	2,120	14,500	*18,300	23,900	12,000	*7,180	9,880	8,740	7,270	6,050	2,680	1,840
3	2,070	14,800	16,400	31,600	14,700	8,820	10,300	8,260	7,900	*5,850	2,650	1,810
4	2,140	16,600	20,500	24,800	14,100	7,060	11,600	8,680	8,350	5,800	2,590	1,800
5	3,060	16,400	22,600	20,400	12,400	7,330	12,700	11,900	8,560	5,520	2,560	1,780
6	5,180	14,700	27,000	17,200	11,700	6,750	12,800	12,200	8,470	5,150	2,500	1,760
7	5,100	12,900	32,600	14,900	13,600	6,500	12,800	12,800	8,360	4,720	2,470	1,800
8	5,420	12,200	29,400	13,400	20,800	6,300	13,000	12,600	8,140	4,440	d2,430	1,910
9	6,720	10,800	23,900	12,100	d43,200	6,250	12,600	11,900	7,870	4,360	d2,410	2,070
10	8,500	9,730	21,400	11,200	d57,800	5,980	*11,800	12,200	8,320	4,300	d2,410	1,970
11	14,700	8,860	20,300	*10,700	63,900	5,750	11,400	15,000	8,800	4,400	d2,380	1,880
12	10,400	8,140	19,700	10,100	*62,700	7,060	11,600	19,300	9,100	4,240	d2,400	1,830
13	7,420	7,420	17,800	9,240	44,600	12,200	13,000	16,200	8,920	4,180	*2,360	1,750
14	6,120	8,920	15,600	12,300	d30,800	11,900	14,900	13,200	8,920	4,180	2,290	1,720
15	5,350	8,460	14,700	15,900	d23,500	16,000	15,500	11,600	9,220	4,140	2,210	1,720
16	4,700	16,100	16,600	18,200	d20,600	20,000	14,900	11,100	10,200	3,980	2,220	1,700
17	4,420	18,600	17,800	21,800	d18,100	15,400	14,700	12,200	9,490	3,860	2,220	1,700
18	4,780	13,900	16,800	18,000	d16,300	12,900	14,500	13,700	8,770	3,820	2,210	1,700
19	5,920	10,700	15,200	15,700	d14,800	11,700	13,600	12,900	8,260	3,820	d2,190	1,690
20	7,420	10,600	14,400	13,700	14,300	11,400	12,000	11,800	7,900	3,640	d2,190	1,680
21	7,720	13,900	15,200	16,700	13,200	11,800	10,600	*11,500	7,690	3,440	d2,190	*1,610
22	6,600	20,700	18,200	19,200	11,900	12,200	9,640	12,000	7,510	3,300	d2,190	1,560
23	5,780	28,400	41,700	15,600	11,000	11,500	8,920	13,600	7,330	3,240	2,210	1,560
24	5,120	35,100	42,900	16,400	10,200	10,800	8,470	15,200	7,180	3,240	2,160	1,550
25	*5,150	39,200	33,300	19,600	9,700	10,400	8,290	14,500	7,030	3,260	2,040	1,660
26	7,720	36,700	25,800	24,200	9,160	10,400	8,440	13,200	6,750	3,200	1,970	1,960
27	10,400	40,100	21,600	22,800	8,470	10,500	8,950	11,500	6,600	3,060	1,940	1,990
28	17,500	36,000	20,100	19,500	7,930	10,100	10,600	10,800	6,400	2,990	1,700	1,810
29	18,400	27,100	20,200	15,400	-	10,100	11,400	10,200	6,250	2,910	1,540	2,050
30	15,500	23,000	19,800	13,400	-	10,800	10,500	9,070	6,180	2,850	2,210	3,520
31	14,000	-	19,700	11,900	-	11,000	-	8,230	-	2,800	2,000	-
Total	227,710	545,010	681,500	527,140	602,460	311,620	349,790	375,570	239,450	126,920	71,440	55,300
Mean	7,345	18,170	21,980	17,000	21,520	10,050	11,680	12,120	7,982	4,094	2,305	1,843
Cfsm	3.28	8.12	9.82	7.60	9.62	4.49	5.21	5.42	3.57	1.63	1.03	0.824
In.	3.78	9.06	11.32	8.78	10.01	5.18	5.81	6.24	3.98	2.11	1.19	0.92
Ac-ft	451,700	*1,081	*1,352	*1,046	*1,195	618,100	693,800	744,900	774,900	251,700	141,700	109,700
Calendar year 1950:	Max 54,000	Min 2,000	Mean 13,560	Cfsm 5.97	In. 80.96	Ac-ft 9,670,000						
Water year 1950-51:	Max 63,900	Min 1,550	Mean 11,270	Cfsm 5.04	In. 68.36	Ac-ft 8,160,000						

Peak discharge (base, 32,000 cfs).--Nov. 27 (3:30 p.m.) 41,800 cfs (17.85 ft); Dec. 7 (12 m.) 33,400 cfs (16.34 ft); Dec. 23 (3 p.m.) 46,200 cfs (18.58 ft); Jan. 3 (2 to 3 a.m.) 34,700 cfs (16.60 ft); Feb. 12 (3 to 5 a.m.) 67,200 cfs (21.80 ft).

\* Discharge measurement made on this day.

† Expressed in thousands.

d Computed from doubtful gage-height record.

## Arkansas Creek near Castle Rock, Wash.

Location.--Lat 46°15'50", long. 122°58'00", in W $\frac{1}{2}$  sec. 17, T. 9 N., R. 2 W., on right bank 3 miles upstream from mouth and 3 miles west of Castle Rock.

Drainage area.--19.4 sq mi.

Records available.--May 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 75 ft (from topographic map).

Extremes.--Maximum discharge during year, 950 cfs Dec. 22 (gage height, 4.67 ft); minimum, 1.3 cfs Aug. 22 (gage height, 0.63 ft).  
1949-51: Maximum discharge, 1,790 cfs Feb. 24, 1950 (gage height, 5.77 ft); minimum, that of Aug. 22, 1951.

Remarks.--Records excellent except those for periods of shifting control, which are good, and those for periods of sluggish intake action, which are poor. Some diversion for domestic use. No regulation.

Rating table, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

0.66	1.5	2.0	65	3.5	387
.8	2.7	2.3	104	3.8	505
1.0	5.7	2.6	156	4.2	695
1.3	15	2.9	216		
1.7	40	3.2	291		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.3	175	237	203	142	73	156	34	14	6.3	2.9	2.7
2	4.1	156	*210	417	173	*67	147	33	13.5	6.3	2.9	2.7
3	5.5	147	212	491	199	67	147	31	13.5	*6.5	3.2	2.6
4	6.5	133	256	359	201	82	138	49	15	6.8	3.1	1.9
5	33	119	256	283	181	74	126	44	16.5	6.5	3.1	2.0
6	51	104	311	234	191	69	112	41	18	7.7	2.8	2.4
7	46	98	306	199	246	66	102	44	16	6.8	2.6	7.0
8	36	85	262	175	349	67	90	39	14	5.9	2.8	6.1
9	32	75	234	154	651	63	*91	34	13	6.1	3.2	3.7
10	221	69	197	142	550	59	76	33	11.5	5.7	3.3	3.1
11	112	64	179	135	*554	58	70	36	12	4.8	3.6	2.9
12	63	60	152	119	417	228	66	33	13	4.1	3.7	2.4
13	47	55	133	187	320	306	81	36	12.5	4.1	*3.5	2.2
14	44	55	118	246	256	254	58	31	11.5	4.1	2.7	2.0
15	36	114	136	300	218	453	56	29	10.5	4.1	2.4	2.0
16	32	191	143	311	185	366	53	27	9.7	4.1	2.4	2.0
17	32	288	140	380	173	269	51	24	8.8	4.1	2.1	2.1
18	58	212	131	314	162	223	49	24	8.5	4.3	2.0	2.0
19	69	171	123	*269	156	206	47	22	8.5	4.1	1.8	2.2
20	67	191	118	234	177	201	44	21	8.0	4.1	1.6	2.2
21	57	283	143	373	160	206	41	*20	7.7	3.6	1.5	*1.7
22	50	421	401	346	145	189	39	19.5	7.5	3.4	1.5	1.6
23	44	362	695	297	130	167	38	23	7.5	3.3	1.7	1.9
24	39	362	433	330	118	156	35	23	7.5	3.4	1.9	2.5
25	39	308	314	398	107	149	34	22	7.0	3.7	2.0	13.5
26	39	252	256	414	96	149	33	18.5	7.0	4.0	2.0	6.8
27	*82	246	223	320	85	145	39	17.5	7.0	3.4	2.2	4.5
28	169	208	272	254	77	136	53	17.5	6.3	3.2	5.0	9.7
29	175	181	262	210	-	151	39	17	6.3	3.4	4.0	16
30	193	206	249	181	-	185	36	15	6.1	3.1	3.1	39
31	183	-	221	156	-	166	-	15	-	2.9	2.9	-
Total	2,069.4	5,391	7,323	8,421	6,419	5,050	2,117	873.0	317.9	143.9	83.5	153.4
Mean	66.8	180	236	272	229	163	70.6	28.2	10.6	4.64	2.69	5.11
Cfsm	3.44	9.28	12.2	14.0	11.8	8.40	3.64	1.45	0.546	0.239	0.139	0.263
In.	3.97	10.33	14.04	16.14	12.31	9.68	4.06	1.67	0.61	0.28	0.16	0.29
Ac-ft	4,100	10,690	14,520	16,700	12,730	10,020	4,200	1,730	631	285	166	304

Calendar year 1950: Max 1,240 Min 2.6 Mean 125 Cfsm 6.44 In. 87.79 Ac-ft 90,830  
Water year 1950-51: Max 695 Min 1.5 Mean 105 Cfsm 5.41 In. 73.54 Ac-ft 76,080

Peak discharge (base, 1,000 cfs).--No peak above base.

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 10 to Dec. 22, Mar. 12 to May 12, May 22 to June 17.  
Sluggish intake action May 13-21, June 18 to July 3.

Coweman River above Mulholland Creek, near Kelso, Wash.

Location.--Lat 46°10'15", long. 122°43'00", in SW $\frac{1}{4}$  sec. 17, T. 8 N., R. 1 E., on right bank 300 ft upstream from mouth of Mulholland Creek and 9 $\frac{1}{2}$  miles east of Kelso.

Drainage area.--50.5 sq mi.

Records available.--June to September 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage is 450 ft (from topographic map).

Extremes.--Maximum discharge during period, 256 cfs Sept. 30 (gage height, 2.63 ft); minimum, 17 cfs Sept. 15, 16, 22 (gage height, 1.20 ft).

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or regulation.

Discharge, in cubic feet per second, June to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									a76	37	25	22
2									a74	40	26	22
3									a72	40	26	22
4									a78	46	25	21
5									a90	45	25	20
6									a110	48	24	21
7									a90	42	23	25
8									a82	38	*24	30
9									a74	38	25	24
10									a70	37	25	21
11									a68	34	27	21
12									66	*32	27	*20
13									*65	32	25	20
14									61	32	24	18.5
15									58	32	22	<u>18</u>
16									56	31	22	18
17									55	31	21	18
18									54	32	21	18.5
19									52	31	21	19
20									50	31	20	19
21									48	29	19	18.5
22									46	28	19	18
23									46	27	20	19
24									47	27	20	20
25									45	29	20	51
26									*43	29	20	32
27									43	27	21	25
28									40	27	46	49
29									38	27	30	67
30									37	26	25	<u>194</u>
31									-	<u>25</u>	24	-
Total									1,834	1,030	742	911.5
Mean									61.1	33.2	23.9	30.4
Cfsm									1.21	0.657	0.473	0.602
In.									1.35	0.76	0.55	0.67
Ac-ft									3,640	2,040	1,470	1,810

Calendar year	: Max	Min	Mean	Cfsm	In.	Ac-ft
Water year	: Max	Min	Mean	Cfsm	In.	Ac-ft

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Coweman River near Kelso.

Coweman River near Kelso, Wash.

Location.--Lat 46°07'40", long. 122°50'10", in S $\frac{1}{2}$  sec. 32, T. 8 N., R. 1 W., on right bank 3 miles downstream from Goble Creek, 3.8 miles southeast of Kelso, and 5 $\frac{1}{2}$  miles upstream from mouth.

Drainage area.--119 sq mi.

Records available.--July 1950 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 100 ft (from topographic map).

Extremes.--Maximum discharge during year, 3,390 cfs Jan. 2 (gage height, 9.90 ft); minimum, 22 cfs Sept. 22 (gage height, 3.75 ft).

1950-51: Maximum discharge, that of Jan. 2, 1951; minimum, that of Sept. 22, 1951.

Flood of Feb. 24, 1950, reached a stage of 12.8 ft, from floodmarks (discharge, 7,730 cfs, from rating curve extended above 2,200 cfs on basis of slope-area determination of peak flow).

Remarks.--Records good. No known diversion or regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

3.7	18	6.0	560
4.0	45	6.5	780
4.5	116	7.0	1,040
5.0	225	8.0	1,690
5.5	370	9.0	2,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	42	640	1,170	930	520	358	685	200	106	50	32	*30
2	37	580	930	2,320	662	337	620	185	102	55	33	30
3	42	520	1,010	2,330	*805	325	600	173	101	55	32	29
4	55	444	*1,720	1,620	755	364	600	240	108	62	32	27
5	247	422	1,340	1,190	662	349	540	242	122	64	31	25
6	190	364	1,310	905	805	*325	480	230	147	*67	30	26
7	173	405	1,220	755	1,160	304	448	271	128	80	30	32
8	218	422	980	640	1,380	304	416	230	114	53	30	44
9	230	367	830	560	1,690	289	377	205	102	50	33	32
10	502	*325	685	520	1,660	274	349	195	96	51	34	30
11	404	292	640	520	*2,160	271	*328	289	94	*45	36	28
12	235	271	560	464	1,660	917	322	349	*96	43	37	27
13	169	240	500	830	1,190	1,340	331	304	96	42	35	26
14	141	242	*464	1,480	905	1,100	322	265	90	42	31	25
15	122	1,140	520	1,880	805	2,100	301	240	81	42	*30	24
16	106	2,410	730	1,730	662	1,620	277	218	77	42	28	24
17	113	2,005	730	2,340	662	1,170	271	205	74	41	28	24
18	262	1,250	640	1,580	708	855	253	190	75	43	27	23
19	277	805	560	1,220	685	805	235	173	70	41	26	24
20	280	730	480	1,010	830	855	218	163	67	41	25	24
21	222	930	430	2,120	780	855	202	155	65	38	24	*23
22	182	1,410	832	1,720	662	755	192	151	62	37	24	*22
23	155	1,380	2,510	1,310	580	640	182	*165	62	36	25	23
24	139	1,880	1,410	*1,690	520	600	175	173	64	36	25	25
25	149	1,520	980	1,920	476	580	171	169	64	38	25	53
26	169	1,160	755	1,720	436	560	169	145	60	41	26	53
27	720	1,440	685	1,280	398	540	195	135	61	36	27	33
28	1,160	1,170	1,040	955	370	*500	*310	133	56	35	64	64
29	980	830	1,100	755	-	560	265	129	52	35	46	73
30	830	905	1,220	640	-	685	228	118	50	33	35	232
31	*730	-	1,100	560	-	755	-	113	-	32	32	-
Total	9,281	26,494	28,681	39,494	24,588	21,292	10,062	6,153	2,538	1,384	973	1,155
Mean	299	863	932	1,274	788	687	335	198	84.6	44.6	31.4	38.5
Cfs/m	2.51	7.42	7.83	10.7	7.38	5.77	2.82	1.66	0.711	0.375	0.264	0.324
In.	2.90	8.28	9.03	12.34	7.68	6.65	3.14	1.92	0.79	0.43	0.30	0.36
Ac-ft	18,410	52,550	57,280	78,540	48,770	42,230	19,960	12,200	5,030	2,750	1,930	2,290

Calendar year 1950: Max - Min - Mean - Cfs/m - In. - Ac-ft -  
 Water year 1950-51: Max 2,410 Min 22 Mean 472 Cfs/m 3.97 In. 53.82 Ac-ft 341,700

Peak discharge (base, 2,600 cfs).--Nov. 16 (4:30 a.m.) 2,860 cfs (9.41 ft); Dec. 23 (6 a.m.) 2,680 cfs (9.18 ft); Jan. 2 (3:30 p.m.) 3,390 cfs (9.90 ft); Jan. 17 (4 a.m.) 2,680 cfs (9.21 ft); Mar. 15 (3 p.m.) 2,770 cfs (9.32 ft).

\* Discharge measurement made on this day.

Abernethy Creek near Longview, Wash.

Location.--Lat 46°12'10", long. 123°09'15", in SE $\frac{1}{4}$  sec. 3, T. 8 N., R. 4 W., on left bank 1 mile upstream from mouth and 11 miles northwest of Longview.

Drainage area.--20.3 sq mi.

Records available.--April 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is about 70 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,350 cfs Dec. 22 (gage height, 5.19 ft), from rating curve extended above 650 cfs; minimum, 5.0 cfs Sept. 5, 22.  
1949-51: Maximum discharge, 2,700 cfs Feb. 24, 1950 (gage height, 6.66 ft), from rating curve extended above 650 cfs; minimum, that of Sept. 5, 22, 1951.

Remarks.--Records good except those for periods of shifting control, which are fair, and those for periods of no gage-height record, which are poor. Some diversion for domestic use. No regulation.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 22

Dec. 23 to Sept. 30

1.1	6.0	2.7	194
1.3	14	3.0	272
1.5	26	3.5	432
1.8	51	4.0	632
2.1	87	4.5	890
2.4	134	5.0	1,210

0.9	3.4	1.3	15.5
1.1	8.5	1.5	26

Note.--Same as preceding table above 1.5 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.2	187	290	258	170	91	160	39	24	11.5	7.9	6.5
2	8.8	172	269	526	210	84	150	39	22	11.5	7.9	6.5
3	10.5	162	281	588	230	82	140	36	22	11.5	7.9	6.3
4	14	150	*314	425	240	93	130	48	24	12.5	7.9	5.7
5	37	138	302	359	210	83	120	42	25	13	7.6	5.5
6	74	124	378	281	230	*79	110	41	25	15.5	7.6	6.3
7	82	114	372	236	300	77	100	41	24	13	7.4	13
8	56	100	330	201	500	73	95	38	22	11.5	7.6	12.5
9	45	90	293	172	1,000	70	90	35	20	11.5	7.9	8.5
10	355	83	244	156	*700	68	85	34	20	*11	7.9	7.4
11	148	78	213	143	610	65	*80	37	19.5	9.7	8.5	6.8
12	84	72	183	131	446	250	77	42	20	9.1	9.1	6.8
13	62	67	160	228	343	350	73	52	20	9.4	8.5	6.3
14	59	66	147	281	284	270	70	41	18.5	9.4	7.6	6.0
15	48	118	168	352	236	470	66	38	17.5	9.4	7.1	6.0
16	41	218	174	378	192	420	62	39	17	9.1	*7.1	6.0
17	40	275	179	472	176	300	60	37	16	9.1	6.5	5.7
18	72	132	168	375	170	250	56	36	16	9.1	6.3	6.0
19	86	190	158	305	164	220	53	30	15.5	8.6	6.0	6.3
20	79	213	174	275	211	210	50	30	15	9.1	5.7	6.0
21	66	296	218	429	187	220	48	28	14	8.5	5.7	5.2
22	58	487	578	372	170	200	46	27	13.5	8.5	6.0	*5.2
23	50	464	1,010	336	148	185	44	*30	13.5	8.5	6.5	6.0
24	46	506	546	388	156	175	43	31	14	8.5	6.5	7.1
25	49	405	378	468	126	165	42	31	13.5	8.8	6.5	21
26	51	333	314	*502	114	160	39	28	13	8.8	6.5	12
27	*124	296	278	368	104	157	50	26	13	8.2	*7.1	9.4
28	183	255	324	321	95	150	61	28	11.5	8.2	10.5	19
29	181	218	308	250	-	170	46	26	11	8.2	8.5	35
30	181	261	314	220	-	200	42	25	10.5	7.9	7.1	75
31	176	-	281	190	-	170	-	24	-	7.9	6.5	-
Total	2,574.5	6,270	9,348	9,966	7,702	5,557	2,288	1,079	530.5	306.7	227.4	335.0
Mean	83.0	209	301	321	275	179	76.3	34.8	17.7	9.89	7.34	11.2
Cfsm	4.09	10.3	14.8	15.8	13.5	8.82	3.76	1.71	0.872	0.487	0.362	0.552
In.	4.72	11.49	17.12	18.26	14.11	10.18	4.19	1.98	0.97	0.56	0.42	0.61
Ac-ft	5,110	12,440	18,540	19,770	15,280	11,020	4,540	2,140	1,050	608	451	664

Calendar year 1950: Max 1,750 Min 6.0 Mean 143 Cfsm 7.04 In. 95.79 Ac-ft 103,700  
Water year 1950-51: Max 1,010 Min 5.2 Mean 127 Cfsm 6.26 In. 84.61 Ac-ft 91,610

Peak discharge (base, 1,100 cfs).--Dec. 22 (9:30 p.m.) 1,350 cfs (5.19 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 29 to Feb. 10, Mar. 9 to Apr. 10; discharge estimated on basis of 1 discharge measurement, recorded range in stage, and records for stations on nearby streams. Shifting-control method used Oct. 1 to Nov. 24, June 22 to July 28.

## Clatskanie River near Clatskanie, Oreg.

Location.--Lat 46°02'55", long. 123°07'05", in sec. 36, T. 7 N., R. 4 W., on left bank 2 miles downstream from Carcus Creek and 5½ miles southeast of Clatskanie. Prior to Apr. 25, 1951, at site 700 ft downstream.

Drainage area.--52.0 sq mi.

Records available.--August 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 240 ft (by barometer). Prior to Apr. 25, 1951, at site 700 ft downstream at different datum.

Extremes.--Maximum discharge during year, 970 cfs Mar. 15 (gage height, 3.82 ft); minimum, 4.8 cfs Aug. 21, 22.

1949-51: Maximum discharge, 2,000 cfs Feb. 24, 1950 (gage height, 5.29 ft, site and datum then in use); minimum, that of Aug. 21, 22, 1951.

Remarks.--Records good except those for periods of doubtful or no gage-height record, which are fair. No diversion above station; occasional slight regulation by log ponds.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

(Shifting-control method used Oct. 1-27, Mar. 16 to Apr. 21)

Oct. 1 to Apr. 24

Apr. 25 to Sept. 30

0.4	6.4	2.0	260	0.4	2.3	0.7	16
.6	18	3.0	610	.5	5.4	.8	24
.9	47	3.6	900	.6	10	1.1	68
1.4	121						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.4	119	486	d270	185	96	195	34	19	8.9	6.4	6.4
2	6.4	116	478	a460	218	*90	178	34	18	9.4	6.4	6.4
3	8.0	107	472	a440	230	88	160	31	18	9.9	6.4	5.9
4	9.0	101	490	347	228	107	144	48	19	10	6.4	5.9
5	21	98	448	235	228	114	127	52	21	12	5.4	5.4
6	24	85	*448	160	284	106	109	48	21	12	*5.9	5.9
7	20	85	444	114	428	96	94	56	21	11	5.4	6.4
8	19	88	402	85	518	90	50	19		9.9	5.9	8.4
9	23	84	347	76	630	85	73	48	17	9.4	6.4	7.4
10	38	80	287	72	558	76	66	47	15	9.4	6.9	6.9
11	29	79	245	70	578	72	63	52	15	8.4	6.9	6.4
12	19	73	202	70	546	150	60	48	16	7.9	7.4	6.4
13	16	68	170	85	462	317	57	47	16	7.9	6.9	6.4
14	14	65	152	162	568	374	54	45	16	7.9	6.4	5.9
15	13	225	182	a350	311	750	51	39	14	7.9	5.9	5.4
16	13	*690	275	a700	242	840	*47	35	13	7.9	5.4	5.4
17	14	*890	305	a800	212	818	48	33	13	7.9	5.4	5.9
18	30	685	281	344	208	490	48	33	12	7.9	5.4	5.9
19	32	490	242	235	182	430	45	32	12	8.4	5.1	5.9
20	28	402	195	154	220	410	45	30	12	7.9	5.1	*5.9
21	24	338	156	a250	225	406	43	28	11	7.9	4.8	5.4
22	20	296	195	a440	215	388	a40	27	*10	7.4	4.8	5.4
23	18	272	399	*650	195	341	a38	*28	10	7.4	5.1	5.9
24	*18	347	388	680	175	305	a34	27	11	7.4	5.4	6.4
25	18	392	302	*735	156	284	33	26	11	7.9	5.4	8.9
26	20	357	232	665	132	260	*32	24	10	7.9	5.4	8.9
27	58	347	182	522	118	238	34	25	9.9	7.9	5.4	7.4
28	140	287	d270	402	104	215	45	24	9.4	7.4	8.4	9.4
29	146	250	d260	311	-	205	40	23	8.9	7.4	7.9	12
30	*123	323	d300	255	-	225	34	22	8.9	6.9	7.4	15
31	*118	-	d280	218	-	208	-	21	-	6.4	6.9	-
Total	1,085.8	7,839	9,513	10,357	8,164	8,474	2,121	1,113	427.1	263.8	189.3	211.2
Mean	35.0	261	307	334	292	273	70.7	35.9	14.2	8.51	6.11	7.04
Cfsm	0.673	5.02	5.80	6.42	5.62	5.25	1.36	0.690	0.273	0.164	0.117	0.135
In.	0.78	5.61	6.80	7.41	5.84	6.06	1.52	0.80	0.31	0.19	0.14	0.15
Ac-ft	2,150	15,550	18,870	20,540	16,190	16,810	4,210	2,210	847	523	375	419

Calendar year 1950: Max 1,790 Min 5.7 Mean 169 Cfsm 3.25 In. 44.18 Ac-ft 122,500  
 Water year 1950-51: Max 890 Min 4.8 Mean 136 Cfsm 2.62 In. 35.61 Ac-ft 98,690

Peak discharge (base, 700 cfs).--Nov. 17 (6:30 a.m.) 935 cfs (3.67 ft); Jan. 16 (time and discharge unknown); Jan. 25 (9 p.m.) 750 cfs (3.30 ft); Mar. 15 (9:30 p.m.) 970 cfs (3.82 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Big Creek near Knappa and North Fork Klaskanine River near Olney.

d Doubtful gage-height record because of clogged intakes; discharge estimated as in footnote "a."

## MILL CREEK BASIN

Mill Creek near Cathlamet, Wash.

Location.--Lat 46°11'40", long. 123°11'25", in NW $\frac{1}{4}$  sec. 9, T. 8 N., R. 4 W., on left bank 50 ft downstream from bridge, three-quarters of a mile upstream from mouth, and 9 $\frac{1}{2}$  miles east of Cathlamet.

Drainage area.--27.6 sq mi.

Records available.--June 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is about 75 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,230 cfs Dec. 23 (gage height, 4.5 ft); minimum, 4.6 cfs Aug. 21, 22 (gage height, 1.19 ft).  
1949-51: Maximum discharge, 4,460 cfs Feb. 24, 1950 (gage height, 6.23 ft); minimum, that of Aug. 21, 22, 1951.

Remarks.--Records good except those for periods of shifting control, which are fair. No diversion or regulation.

Rating table, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge in cubic feet per second)

1.2	4.8	2.0	52	3.2	335
1.4	10.5	2.3	93	3.5	475
1.6	20	2.6	153	3.9	720
1.8	34	2.9	235	4.3	1,030

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	8.9	172	375	307	170	105	202	40	22	11.5	7.1	6.5
2	8.6	158	339	584	197	96	180	39	22	12.5	6.8	6.5
3	10.5	151	355	664	202	95	163	38	22	12.5	6.8	6.5
4	14	135	380	519	194	114	146	46	22	14.5	6.8	6.0
5	32	132	355	398	172	98	132	46	24	14.5	6.8	6.0
6	56	116	431	321	214	93	118	41	25	17	6.5	6.2
7	54	110	406	276	293	90	108	44	24	14	6.5	12
8	40	102	359	238	420	*86	100	39	23	12.5	6.2	12.5
9	35	90	310	208	685	81	92	36	21	12	6.5	8.9
10	184	84	265	188	*572	77	86	36	20	*11	6.5	6.8
11	102	78	238	167	536	75	84	38	19.5	10.5	6.8	6.5
12	62	74	211	146	411	137	*75	40	21	9	8.0	6.2
13	46	68	185	232	332	276	74	52	21	9	7.7	6.0
14	48	88	165	296	282	256	70	40	19.5	9.9	6.5	5.8
15	41	122	194	442	247	536	65	37	17.5	9.9	5.8	6.0
16	36	244	205	486	211	497	62	36	17	9.6	*5.8	5.8
17	34	351	205	684	194	355	59	35	16.5	9.6	5.5	5.8
18	62	300	191	497	191	304	57	32	16	9.2	5.5	6.2
19	64	244	185	380	185	258	54	32	15.5	9.2	5.2	6.2
20	60	241	177	332	235	256	51	30	15	8.6	5.2	6.0
21	50	272	194	596	211	265	48	29	14.5	8.6	5.0	5.5
22	44	453	416	514	191	272	47	28	14	8.3	5.0	*5.2
23	40	431	985	458	170	250	45	30	14.5	8.3	5.2	5.8
24	38	464	578	480	158	232	44	*30	14.5	8.3	5.5	6.5
25	39	402	411	502	148	226	42	30	14	8.6	6.0	17.5
26	*43	332	332	514	132	229	41	28	13	8.3	6.0	12
27	90	296	307	398	122	220	49	26	13	8.3	*6.2	9.9
28	148	247	355	307	112	202	64	26	12.5	8.0	11.5	14
29	137	220	328	256	-	199	48	25	11	7.7	8.9	22
30	158	304	347	*220	-	262	42	24	10.5	7.1	7.4	40
31	158	-	335	194	-	232	-	24	-	7.1	6.5	-
Total	1,943	6,461	10,119	11,784	7,187	6,544	2,448	1,077	535.0	316.9	201.7	276.8
Mean	62.7	215	326	380	257	211	81.6	34.7	17.8	10.2	6.51	9.23
Cfsm	2.27	7.79	11.8	13.8	9.31	7.64	2.96	1.26	0.645	0.370	0.236	0.334
In.	2.62	8.71	13.63	15.88	9.68	8.82	3.30	1.45	0.72	0.43	0.27	0.37
Ac-ft	3,850	12,820	20,070	23,370	14,260	12,980	4,860	2,140	1,060	629	400	549

Calendar year 1950: Max 3,070 Min 5.8 Cfsm 5.80 In. 78.58 Ac-ft 115,700  
Water year 1950-51: Max 985 Min 5.0 Cfsm 4.86 In. 65.88 Ac-ft 96,990

Peak discharge (base, 1,000 cfs).--Dec. 23 (5:30 a.m.) 1,230 cfs (4.5 ft).

\* Discharge measurement made on this day.

Note.--Shifting-control method used June 6 to Aug. 7, Sept. 3-30.



## Elokomin River near Cathlamet, Wash.

Location.--Lat 46°13'10", long. 123°20'30", in SE $\frac{1}{4}$  sec. 31, T. 9 N., R. 5 W., on right bank 125 ft upstream from railroad bridge, 2 miles northeast of Cathlamet, and 4 miles upstream from mouth.

Drainage area.--65.8 sq mi (revised).

Records available.--October 1940 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 29.60 ft above mean sea level, datum of 1929. Prior to June 25, 1941, staff gage at same site and datum.

Average discharge.--11 years, 364 cfs.

Extremes.--Maximum discharge during year, 6,030 cfs probably Feb. 9 (gage height, 11.2 ft, from recorded range in stage), from rating curve extended above 1,700 cfs on basis of slope-area determination at gage height, 12.66 ft; minimum, 19 cfs probably Sept. 20-22 during period of no gage-height record (gage height, 1.82 ft, from recorded range in stage).

1940-51: Maximum discharge, 7,300 cfs Feb. 17, 1949 (gage height, 12.66 ft), from rating curve extended above 2,000 cfs on basis of slope-area determination of peak flow; minimum, that of probably Sept. 20-22, 1951.

Maximum stage known, 17.2 ft in December 1933, from information by local residents.

Remarks.--Records good except those for period of shifting control, which are fair, and those for periods of no gage-height record, which are poor. Some diversions for irrigation. No regulation.

Revisions (water years).--W 1154: 1948.

Rating table, water year 1950-51, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

1.8	17.5	3.4	396	6.0	1,820
2.0	36	3.7	515	7.0	2,520
2.2	61	4.0	655	8.0	3,280
2.5	122	4.5	910	9.0	4,080
2.8	197	5.0	1,190	10.0	4,950
3.1	288	5.5	1,490	11.0	5,850

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	27	910	910	805	443	310	480	145	72	39	28	24
2	24	830	780	2,090	630	280	450	140	68	40	27	23
3	31	730	855	2,100	705	290	420	131	68	41	27	22
4	41	630	1,080	1,480	740	400	160	75	43	27	22	21
5	158	578	1,020	1,080	660	350	360	148	75	42	26	21
6	266	499	*1,520	855	620	310	340	143	77	49	26	25
7	366	455	1,490	730	2,900	290	320	148	72	43	25	40
8	266	404	1,280	615	2,500	*266	300	129	68	41	25	65
9	184	354	1,020	533	5,400	247	290	120	63	40	26	35
10	1,600	319	805	487	5,000	232	270	115	60	*40	26	28
11	755	291	655	463	3,000	238	260	122	60	36	26	26
12	435	269	551	423	2,000	872	250	124	63	35	28	25
13	308	250	467	855	1,700	992	*247	138	60	36	27	22
14	278	250	408	965	900	855	235	118	58	36	25	21
15	220	541	483	1,250	750	1,500	217	111	54	35	24	21
16	194	910	528	1,430	600	1,100	203	104	52	34	*23	21
17	189	1,050	605	1,680	530	800	192	102	52	33	23	21
18	336	830	533	1,190	530	600	181	98	52	33	22	21
19	499	655	499	965	700	550	173	94	50	32	22	21
20	479	910	645	855	1,400	600	162	92	49	33	21	19
21	392	1,280	965	1,460	1,000	650	152	87	46	32	20	19
22	333	2,050	2,430	1,120	800	600	148	83	46	31	20	19
23	285	1,610	3,440	1,050	650	500	140	94	46	31	21	*20
24	256	1,750	1,820	1,250	450	450	136	*96	46	30	22	20
25	262	1,550	1,120	1,550	500	440	129	107	45	31	22	58
26	*288	1,280	938	*1,640	450	440	127	87	43	31	22	37
27	877	1,020	855	1,130	380	400	182	83	43	30	*23	29
28	965	855	1,100	855	340	380	272	85	41	29	32	74
29	882	705	992	680	-	660	181	83	39	29	32	115
30	882	805	992	574	-	600	158	77	38	29	26	398
31	855	-	910	491	-	540	-	75	-	28	24	-
Total	12,733	24,550	31,696	32,631	36,378	16,742	7,355	3,439	1,681	1,092	768	1,310
Mean	411	818	1,022	1,053	1,299	540	245	111	56.0	35.2	24.8	43.7
Cfs	6.25	12.4	15.5	16.0	19.7	8.21	3.72	1.69	0.851	0.535	0.377	0.664
In.	7.20	13.88	17.91	18.44	20.56	9.46	4.16	1.94	0.95	0.62	0.43	0.74
Ac-ft	25,260	48,690	62,870	64,720	72,150	33,210	14,590	6,820	3,330	2,170	1,520	2,600

Peak discharge (base, 3,600 cfs).--Dec. 22 (9:30 p.m.) 5,310 cfs (10.38 ft); probably Feb. 9 (time unknown) 6,030 cfs (11.2 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Feb. 4 to Mar. 7, Mar. 15 to Apr. 12, Aug. 30 to Sept. 22; discharge estimated on basis of recorded range in stage and records for stations on nearby streams. Shifting-control method used Oct. 1 to Dec. 1.

## Big Creek near Knappa, Oreg.

Location--Lat 46°09'00", long. 123°35'05", in NW¼ sec. 29, T. 8 N., R. 7 W., on left bank 0.3 mile downstream from fish hatchery and 2½ miles south of Knappa.

Drainage area--31.9 sq mi.

Records available--August 1949 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 100 ft (by barometer).

Extremes--Maximum discharge during year, 1,420 cfs Jan. 16 (gage height, 3.06 ft); minimum, 8.9 cfs Sept. 1 (gage height, 0.14 ft).

1949-51: Maximum discharge, 2,130 cfs Feb. 24, 1950 (gage height, 4.01 ft); minimum, that of Sept. 1, 1951.

Remarks--Records good. Occasional slight regulation from fish hatchery above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Jan. 16)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

0.3	17	0.9	119	0.2	14	1.2	235
.4	27	1.4	275	.5	51	1.9	570
.6	56	2.4	790	.7	87	2.6	1,060

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		22	264	405	374	263	185	346	115	57	35	24
2		25	230	346	714	375	*176	311	107	56	36	24
3		25	212	364	694	425	300	295	102	56	36	23
4		31	183	369	544	400	263	275	110	56	37	23
5		63	170	338	445	328	224	251	102	56	37	23
6		67	147	*440	382	400	207	232	102	57	38	*22
7		87	139	425	333	648	197	218	104	56	36	22
8		69	129	430	287	780	185	200	97	54	33	23
9		61	117	387	264	916	173	188	92	51	33	24
10		158	107	328	258	726	164	179	90	50	33	24
11		95	100	295	250	732	158	*167	87	50	32	24
12		63	95	261	233	588	328	164	85	51	31	25
13		51	89	233	379	475	435	155	85	51	30	24
14		54	97	216	465	400	385	149	83	50	30	23
15		51	225	307	676	356	772	140	81	47	30	22
16		43	400	333	772	311	600	134	79	47	30	22
17		43	*435	338	1,020	299	450	132	79	44	29	21
18		91	346	299	672	307	380	126	75	44	29	21
19		100	264	275	540	320	356	120	73	44	29	20
20		89	342	250	495	425	346	118	71	43	29	*18
21		70	387	247	802	365	370	110	69	41	27	18
22		61	415	456	672	311	365	107	67	*40	27	17
23		56	378	632	*576	279	328	107	*71	40	27	20
24		*51	435	435	570	263	307	102	69	40	27	20
25		70	400	351	600	243	299	100	69	40	27	20
26		97	356	307	576	221	303	94	65	40	27	20
27		302	320	303	475	207	295	138	64	40	27	20
28		346	279	430	405	197	271	161	65	37	26	24
29		261	250	378	346	-	291	120	64	36	26	24
30		*244	380	425	311	-	495	120	61	35	26	22
31		*230	-	415	283	-	405	-	59	-	24	21
Total	3,070	7,671	11,018	15,413	11,560	9,911	5,059	2,542	1,409	944	681	650
Mean	99.0	256	355	497	413	320	169	82.0	47.0	30.5	22.0	21.7
Cfs/m	3.10	8.75	11.1	15.6	12.9	10.0	5.30	2.57	1.47	0.956	0.690	0.680
In.	3.58	8.94	12.85	17.97	13.48	11.55	5.90	2.96	1.64	1.10	0.79	0.76
Ac-ft	6,090	15,220	21,850	30,570	22,930	19,660	10,030	5,040	2,790	1,870	1,350	1,290

Calendar year 1950: Max 1,550 Min 22 Mean 208 Cfs/m 6.52 In. 88.32 Ac-ft 150,200  
Water year 1950-51: Max 1,020 Min 17 Mean 192 Cfs/m 6.02 In. 81.52 Ac-ft 138,700

Peak discharge (base, 900 cfs)--Jan. 2 (11:30 a.m.) 941 cfs (2.63 ft); Jan. 16 (9:30 p.m.) 1,420 cfs (3.06 ft); Jan. 21 (8:30 a.m.) 932 cfs (2.44 ft); Feb. 9 (1:30 a.m.) 1,080 cfs (2.63 ft); Mar. 15 (11:30 a.m.) 1,040 cfs (2.58 ft).

\* Discharge measurement made on this day.

## Grays River near Grays River, Wash.

Location.--Lat 46°22'40", long. 123°31'50", near center of sec. 3, T. 10 N., R. 7 W., on right bank 1½ miles upstream from West Branch Grays River and 4¼ miles northeast of Grays River.

Drainage area.--64.2 sq mi (revised).

Records available.--March 1949 to February 1951 (discontinued).

Gage.--Water-stage recorder. Altitude of gage was 97 ft (by altimeter).

Extremes.--Maximum discharge during period October 1950 to February 1951, 13,600 cfs Feb. 9 (gage height, 12.1 ft, from recorded range in stage), from rating curve extended above 2,000 cfs on basis of slope-area determination at gage height, 12.2 ft; minimum, 81 cfs Oct. 2, 3 (gage height, 1.74 ft).  
1949-51: Maximum discharge, that of Feb. 9, 1951; minimum, 27 cfs Sept. 13, 14, 1949 (gage height, 1.01 ft).

Flood of Feb. 22, 1949, reached a stage of 12.2 ft, from floodmarks (discharge, 13,900 cfs, by slope-area determination of peak flow).

Remarks.--Records good except those for period of shifting control, which are fair. No diversion or regulation.

Discharge, in cubic feet per second, October 1950 to February 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1												
2	88	*1,580	1,230	1,230	575							
3	82	1,400	1,080	2,290	1,130							
4	95	1,180	1,180	2,210	1,320							
5	110	1,020	1,490	1,610	1,230							
6	352	925	*1,370	1,290	1,000							
7												
8	500	832	1,680	1,080	1,090							
9	675	742	1,610	900	2,340							
10	675	655	1,460	788	2,670							
11	536	595	1,320	698	5,670							
12	1,890	536	1,100	675	-							
13												
14	1,420	500	975	698	-							
15	975	464	855	675	-							
16	742	430	765	1,280	-							
17	635	416	698	1,460	-							
18	536	558	930	1,860	-							
19												
20	464	950	1,100	1,720	-							
21	447	1,080	1,430	1,860	-							
22	836	1,000	1,180	1,400	-							
23	1,050	875	1,080	1,100	-							
24	975	1,460	1,180	975	-							
25												
26	788	1,780	1,820	1,490	-							
27	655	2,300	2,620	1,290	-							
28	575	1,860	3,020	1,150	-							
29	518	1,890	2,010	1,430	-							
30	575	2,130	1,520	*1,860	-							
31												
1												
2												
3												
4												
5												
6												
7												
8												
9												
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27												
28												
29												
30												
31												
Total	23,997	34,608	42,863	39,579	-							
Mean	774	1,154	1,383	1,277	-							
Cfsm	12.1	18.0	21.5	19.9	-							
In.	13.90	20.05	24.83	22.93	-							
Ac-ft	47,600	66,640	85,020	78,500	-							

Calendar year 1950: Max 3,780 Min 48 Mean 669 Cfsm 10.4 In. 141.76 Ac-ft 484,500

Water year 1950-51: Max - Min - Mean - Cfsm - In. - Ac-ft -

Peak discharge (base, 4,500 cfs).--Dec. 22 (8:30 p.m.) 4,380 cfs (1.96 ft); Feb. 9 (time unknown) 13,600 cfs (12.1 ft).

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 1 to Dec. 22.

West Branch Grays River near Grays River, Wash.

Location.--Lat 46°23'10", long. 123°33'30", on line between sec. 33, T. 11 N., R. 7 W., and sec. 4, T. 10 N., R. 7 W., on right bank 1 mile upstream from mouth and 3 1/4 miles northeast of Grays River.

Drainage area.--16.3 sq mi.

Records available.--April 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 71 ft (by altimeter).

Extremes.--Maximum discharge during year, 2,970 cfs Feb. 9 (gage height, 6.45 ft), from rating curve extended above 370 cfs on basis of slope-area determination at gage height 6.89 ft; minimum, 4.2 cfs Sept. 5 (gage height, 1.78 ft).

1949-51: Maximum discharge, that of Feb. 9, 1951; minimum, that of Sept. 5, 1951.

Flood of Feb. 22, 1949, reached a stage of 6.89 ft, from floodmarks (discharge, 3,700 cfs, from rating curve extended above 370 cfs on basis of slope-area determination of peak flow.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No regulation or diversion.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.8	4.7	2.9	137	5.0	1,210
2.0	12.5	3.2	217	5.5	1,710
2.2	27	3.5	317	6.0	2,320
2.4	49	4.0	540		
2.6	78	4.5	830		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	23	*353	288	278	98	68	135	38	19	9.8	7.4	5.3
2	21	*288	251	723	251	62	117	34	18.5	9.8	7.4	5.3
3	21	251	274	590	261	63	109	32	17.5	10.5	7.0	5.0
4	25	214	353	390	239	70	100	37	19	11	6.7	4.7
5	40	194	*299	295	185	63	85	34	18.5	11.5	6.7	4.7
6	80	162	398	229	194	59	75	33	18.5	13.5	6.7	5.0
7	140	137	353	183	753	56	69	34	18.5	10.5	6.7	5.8
8	130	119	310	150	772	53	63	31	17.5	9.8	6.4	30
9	120	104	288	130	2,190	*49	57	29	17	9.8	6.4	13
10	300	91	239	122	1,500	48	53	28	15.5	9.3	6.4	8.1
11	200	83	205	124	1,010	50	50	29	15.5	*8.9	6.1	6.7
12	120	75	175	117	466	157	*48	31	17	9.3	6.4	6.4
13	190	69	150	345	281	236	47	32	17	9.3	6.1	5.8
14	70	70	130	349	200	194	43	29	16	9.3	5.5	5.5
15	60	113	239	505	162	369	41	26	15.5	9.3	5.5	5.5
16	50	217	299	442	126	274	37	25	14	9.3	5.3	5.5
17	45	274	398	505	115	200	35	23	13.5	8.9	*5.3	5.3
18	60	232	271	325	115	154	34	22	13.5	8.9	5.0	5.3
19	100	185	251	236	178	154	32	21	13	8.9	5.0	5.3
20	90	313	420	220	329	165	30	21	12.5	8.5	5.0	5.2
21	75	337	490	452	236	205	29	20	12	8.1	5.0	5.0
22	65	590	753	349	178	197	28	19	12	8.1	4.7	5.0
23	55	442	1,090	288	142	157	26	25	12	7.7	4.7	*5.0
24	45	466	575	369	119	135	25	28	12	8.1	5.0	5.3
25	40	634	407	*453	104	137	24	*35	11.5	8.5	5.0	5.7
26	100	570	281	424	92	142	23	29	11.5	8.1	5.0	21
27	250	429	245	264	82	133	54	25	11	7.7	5.3	16
28	300	345	329	197	72	109	104	25	10.5	7.7	8.1	115
29	280	268	310	154	-	117	57	23	9.8	7.7	7.0	193
30	260	285	416	128	-	229	45	21	9.8	7.4	5.8	442
31	250	-	341	111	-	172	-	20	-	7.4	5.5	-
Total	3,525	7,908	10,928	9,427	10,448	4,277	1,673	859	439.1	282.6	184.1	1,007.7
Mean	114	264	349	304	373	138	55.8	27.7	14.6	9.12	5.94	33.6
Cfs/m	6.99	16.2	21.4	18.7	22.9	8.47	3.42	1.70	0.896	0.560	0.364	2.06
In.	8.04	18.04	24.71	21.51	23.84	9.76	3.82	1.96	1.00	0.64	0.42	2.30
Ac-ft	6,990	15,690	21,480	18,700	20,720	8,480	3,320	1,700	871	561	365	2,000

Calendar year 1950: Max 1,220 Min 8.1 Mean 168 Cfs/m 10.3 In. 139.64 Ac-ft 121,400

Water year 1950-51: Max 2,190 Min 4.7 Mean 139 Cfs/m 8.53 In. 116.04 Ac-ft 100,900

Peak discharge (base, 1,500 cfs).--Dec. 22 (7:30 p.m.) 1,500 cfs (5.29 ft); Feb. 9 (11:30 a.m.) 2,970 cfs (6.45 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Oct. 4-31, Sept. 19-22; discharge estimated on basis of recorded range in stage and records for stations on nearby streams.

## Youngs River near Astoria, Oreg.

Location.--Lat 46°04'00", long. 123°47'20", in NW $\frac{1}{4}$  sec. 27, T. 7 N., R. 9 W., on left bank 50 ft upstream from crest of Youngs River Falls, 2 $\frac{1}{2}$  miles southwest of Olney, and 9 miles southeast of Astoria.

Drainage area.--40.1 sq mi (revised); 38.7 sq mi (revised) at former site.

Records available.--August 1927 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 63.27 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Mar. 12, 1934, water-stage recorder at site 1 mile upstream at different datum.

Average discharge.--24 years, 172 cfs.

Extremes.--Maximum discharge during year, 2,030 cfs Jan. 2 (gage height, 9.22 ft); minimum, 3.3 cfs Sept. 22.

1927-51: Maximum discharge, 6,300 cfs Nov. 24, 1927 (gage height, 6.52 ft, site and datum then in use), from rating curve extended above 2,000 cfs; minimum, that of Sept. 22, 1951.

Remarks.--Records good, except those for periods of no gage-height record, which are fair. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 16				Jan. 17 to Aug. 29				Aug. 29 to Sept. 30	
1.2	9.2	3.5	140	0.6	4.6	3.0	103	0.7	3.4
1.5	15	4.0	215	.8	7.6	3.5	157	1.0	7.6
2.0	30	5.0	418	1.0	12	4.0	232	1.5	19
2.5	51	6.0	690	1.5	23	5.0	450	2.0	38
3.0	85	8.0	1,450	2.0	38	6.0	720	2.5	65
				2.5	64	8.0	1,450	3.0	103

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	10	500	612	442	152	130	245	63	23	8.6	a5.5	4.0
2	9.6	390	442	1,210	360	*116	199	61	22	9.0	a5.5	3.9
3	11	318	447	914	364	160	173	57	21	10	a5	3.9
4	13	239	442	615	385	303	149	54	21	12	a5	3.6
5	72	206	361	492	299	245	132	51	21	11	a5	3.5
6	81	156	*654	376	382	204	120	51	22	12	a5	3.5
7	89	141	609	310	1,200	181	111	59	22	11	*a5	7.1
8	90	123	594	261	1,040	158	98	50	21	10	4.9	8.0
9	77	102	523	212	1,480	143	92	46	19	10	5.6	6.0
10	336	88	404	212	1,190	128	86	43	19	10	5.9	5.0
11	160	80	348	263	1,190	123	*80	43	18	9.2	6.0	4.6
12	90	72	280	234	720	619	77	43	19	7.6	6.0	4.5
13	68	68	217	558	500	744	74	50	19	7.3	5.7	4.1
14	67	79	179	675	373	550	69	43	18	7.3	5.4	3.6
15	60	452	419	1,190	343	1,040	63	41	16	7.1	5.2	3.6
16	49	1,030	495	1,240	258	699	60	38	15	7.1	5.2	3.6
17	46	894	523	1,210	248	475	56	36	15	7.1	5.0	3.5
18	148	536	383	717	293	348	53	36	14	7.3	4.9	3.4
19	192	370	314	565	354	293	52	34	14	7.3	4.7	*3.4
20	145	456	318	542	590	260	48	32	13	7.1	a4.4	3.4
21	106	385	346	1,340	430	275	46	31	12	a6.5	a4.2	3.4
22	84	365	908	813	319	271	43	*30	a12	a6.5	a4.4	3.4
23	72	354	1,160	*633	252	227	42	*30	12	a4.5	a4.4	3.4
24	*62	621	600	568	215	194	40	31	12	a7	a4.4	3.8
25	137	550	406	545	194	180	39	38	12	a7	a4.4	6.0
26	213	489	320	535	167	177	38	33	11	a7	a4.6	5.7
27	799	452	328	402	146	158	61	30	11	a6.5	a5	6.5
28	836	350	786	301	135	140	137	30	10	a6.5	5.6	14
29	552	272	526	236	-	356	80	28	9.6	a6.5	*5.5	37
30	521	531	609	198	-	443	69	28	8.6	a6	4.2	89
31	459	-	518	167	-	317	-	24	-	a5.5	4.1	-
Total	5,654.6	10,669	15,006	17,956	13,580	9,457	2,632	1,262	482.2	249.5	155.7	258.4
Mean	182	356	484	579	485	305	87.7	40.7	16.1	8.04	5.02	8.61
Cfs	4.54	8.88	12.1	14.4	12.1	7.61	2.19	1.01	0.401	0.200	0.125	0.215
In.	5.24	9.89	13.92	16.65	12.59	8.77	2.44	1.17	0.45	0.23	0.14	0.24
Ac-ft	11,220	21,160	29,760	35,620	26,940	18,760	5,220	2,500	956	495	309	513
Calendar year 1950:	Max	2,540	Min	5.2	Mean	251	Cfs	6.26	In.	85.07	Ac-ft	182,000
Water year 1950-51:	Max	1,480	Min	3.4	Mean	212	Cfs	5.29	In.	71.73	Ac-ft	153,500

Peak discharge (base, 2,100 cfs).--No peaks above base.

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated by comparison with records for nearby stations, particularly North Fork Klaskanine River near Olney.

## North Fork Klaskanine River near Olney, Oreg.

Location.--Lat 46°04'10", long. 123°41'50", in NE $\frac{1}{4}$  sec. 29, T. 7 N., R. 8 W., on right bank half a mile downstream from Barth Falls, 2 miles upstream from North Fork of North Fork, and 4 miles southeast of Olney.

Drainage area.--14.0 sq mi.

Records available.--August 1949 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 213.40 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 624 cfs Feb. 9 (gage height, 4.17 ft); maximum gage height, 4.32 ft Mar. 15; minimum discharge, 1.6 cfs Sept. 22 (gage height, 1.15 ft). 1949-51: Maximum discharge, 806 cfs Jan. 20, 1950 (gage height, 4.59 ft); minimum, that of Sept. 22, 1951.

Remarks.--Records good.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Mar. 15)

Oct. 1 to Mar. 15

Mar. 16 to Sept. 30

1.2	2.2	1.8	34	1.1	1.1	1.8	31
1.3	3.9	2.0	56	1.2	2.3	2.0	53
1.4	6.4	2.5	131	1.3	4.4	2.5	121
1.5	10	3.0	238	1.4	7.2	3.0	205
1.6	16	4.0	555	1.5	11	3.5	307
				1.6	16		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.2	140	191	164	68	*58	105	25	9.3	4.7	2.9	2.5
2	3.0	117	158	385	120	52	88	23	9.3	5.2	2.7	2.7
3	3.9	110	150	305	168	67	78	21	9.6	5.5	2.9	2.5
4	4.9	92	140	226	160	113	69	21	10	7.2	2.7	2.2
5	18	82	126	180	126	97	61	20	9.6	6.6	2.7	2.2
6	19	68	*189	144	146	86	54	21	10	6.6	2.5	2.7
7	26	66	196	122	313	76	48	25	10	5.2	*2.5	5.8
8	25	60	198	103	305	69	43	21	9.6	5.0	2.7	6.1
9	20	50	166	90	486	62	40	19	8.6	5.5	3.6	3.6
10	64	45	133	86	336	56	37	19	7.9	5.2	3.6	3.1
11	35	41	113	86	334	55	*34	19	7.9	4.2	3.4	3.1
12	21	38	94	79	238	190	32	17	8.6	3.8	3.8	2.9
13	16	37	81	147	178	248	30	18	8.6	3.8	3.8	2.5
14	21	42	74	198	139	219	28	17	7.9	3.8	2.9	2.2
15	17	184	118	375	126	372	26	16	7.2	3.8	2.9	2.3
16	13	319	139	397	99	247	25	15	6.6	4.0	2.9	2.3
17	13	*305	144	413	92	173	23	15	6.4	3.8	2.5	2.3
18	37	202	120	264	108	143	22	15	6.4	3.8	2.3	2.3
19	45	150	105	198	117	129	21	14	6.1	4.0	2.3	2.3
20	40	162	96	193	170	120	20	13	6.1	3.6	2.2	*2.2
21	31	137	90	407	140	124	19	13	5.8	3.4	2.0	1.9
22	25	127	235	291	117	124	19	12	*5.8	3.4	2.2	1.6
23	22	126	325	*231	99	109	18	*13	5.8	3.4	2.2	1.9
24	*19	170	202	196	90	98	17	13	6.4	3.6	2.2	2.3
25	37	160	146	185	81	91	17	14	5.8	3.8	2.2	4.0
26	55	144	122	168	72	93	16	12	5.5	3.8	2.3	3.4
27	208	133	117	137	66	86	25	12	5.2	3.4	2.5	2.9
28	226	115	176	110	60	78	37	12	5.0	3.4	4.0	6.4
29	160	99	154	94	-	80	25	12	4.4	3.4	3.8	9.6
30	144	152	193	82	-	148	24	11	4.4	2.9	2.9	17
31	*133	-	187	72	-	126	-	9.6	-	2.9	2.5	-
Total	1,505.0	3,673	4,678	6,128	4,554	3,789	1,101	507.6	219.5	132.7	86.6	108.8
Mean	48.5	122	151	198	163	122	36.7	16.4	7.32	4.28	2.79	3.63
Cfsm	3.46	8.71	10.8	14.1	11.6	8.71	2.62	1.17	0.523	0.306	0.199	0.259
In.	4.00	9.76	12.43	16.28	12.10	10.07	2.92	1.35	0.58	0.35	0.23	0.29
Ac-ft	2,990	7,290	9,280	12,150	9,030	7,520	2,180	1,010	435	263	172	216

Calendar year 1950: Max 665 Min 2.2 Mean 81.5 Cfsm 5.82 In. 79.05 Ac-ft 59,040  
Water year 1950-51: Max 496 Min 1.6 Mean 72.6 Cfsm 5.19 In. 70.36 Ac-ft 52,540

Peak discharge (base, 500 cfs).--Jan. 2 (11 a.m.) 571 cfs (4.04 ft); Jan. 16 (11:30 p.m.) 559 cfs (4.01 ft); Feb. 9 (2 a.m.) 624 cfs (4.17 ft); Mar. 15 (10 a.m.) 505 cfs (4.32 ft).

\* Discharge measurement made on this day.

## NEHALEM RIVER BASIN

Nehalem River near Foss, Oreg.

Location.--Lat 45°42'15", long. 123°45'20", in NW $\frac{1}{4}$  sec. 35, T. 3 N., R. 9 W., on right bank a quarter of a mile upstream from Cook Creek and 2.2 miles northeast of Foss.

Drainage area.--667 sq mi.

Records available.--October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 32.60 ft above mean sea level, datum of 1929 (Oregon State Highway Department benchmark). Prior to Nov. 11, 1939, staff gage at same site and datum.

Average discharge.--12 years, 2,630 cfs.

Extremes.--Maximum discharge during year, 22,400 cfs Jan. 17 (gage height, 14.33 ft); minimum, 54 cfs Sept. 22-24.  
1939-51: Maximum discharge, 36,900 cfs Feb. 17, 1949 (gage height, 19.04 ft); minimum, that of Sept. 22-24, 1951.

Remarks.--Records good. No known diversion or regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 15

Mar. 16 to Sept. 30

1.6	130	5.0	2,600	1.2	48	3.0	980
2.0	280	7.0	5,130	1.4	91	1.0	1,600
2.5	560	9.0	9,710	1.7	189	6.0	3,950
3.0	890	12.0	16,000	2.0	325	8.0	6,950
4.0	1,660	14.0	21,400	2.5	625	11.1	13,500

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	144	5,520	7,640	7,490	3,270	*2,220	4,610	1,090	489	182	99	75
2	130	5,550	8,360	11,100	4,540	1,940	4,110	1,020	465	178	97	77
3	130	4,780	7,660	15,700	6,580	1,910	3,780	980	441	174	97	75
4	172	3,920	8,440	13,700	6,440	2,390	3,480	942	435	189	97	75
5	494	3,220	*7,860	9,620	5,610	2,600	3,130	935	430	189	94	73
6	883	2,660	9,390	7,150	5,480	2,450	2,840	972	430	189	89	70
7	904	2,290	9,730	5,740	11,300	2,300	2,640	980	424	189	86	84
8	890	2,060	9,780	4,830	13,400	2,150	2,580	972	424	189	86	94
9	806	1,830	8,690	4,040	20,100	2,010	2,140	928	402	185	86	102
10	1,540	1,620	7,260	3,650	18,700	1,900	*1,950	875	586	178	86	102
11	1,650	1,470	6,030	3,670	18,400	1,750	1,790	860	364	167	86	97
12	1,090	1,390	5,020	3,430	14,500	3,420	1,750	875	352	152	89	91
13	820	1,270	4,200	4,290	10,400	6,080	1,660	958	352	149	89	91
14	668	1,250	3,640	6,760	7,430	6,650	1,540	905	352	142	89	82
15	584	2,240	4,400	11,800	5,880	10,500	1,440	868	347	136	*89	75
16	500	7,270	8,250	15,600	4,770	13,200	1,330	809	320	132	89	73
17	476	12,300	7,820	20,700	4,120	10,600	1,260	767	305	129	84	70
18	1,090	11,400	6,920	17,100	3,850	7,580	1,190	732	290	126	80	68
19	1,490	8,180	5,880	12,100	3,900	6,320	1,120	697	275	126	75	*64
20	1,640	7,880	5,140	8,630	5,300	5,880	1,040	670	270	126	70	60
21	1,170	10,800	4,600	12,600	5,380	5,840	980	844	*257	122	68	56
22	974	9,220	6,810	*15,000	4,820	5,920	920	*612	248	122	64	54
23	*827	7,960	13,700	12,800	4,130	5,510	890	806	239	112	64	54
24	729	9,800	12,000	10,800	3,580	4,910	845	599	230	113	68	56
25	764	9,330	8,600	11,400	3,220	4,460	823	612	218	113	62	80
26	932	8,560	6,510	11,500	2,850	4,220	802	592	222	116	60	80
27	3,790	7,620	5,550	9,440	2,540	4,000	890	554	218	113	58	80
28	6,560	6,330	7,150	7,280	2,290	3,780	1,430	547	205	108	66	94
29	6,260	5,200	7,800	5,600	-	3,630	1,370	540	197	106	75	149
30	5,580	5,710	7,720	4,540	-	4,700	1,200	521	189	105	75	471
31	5,100	-	7,940	3,770	-	5,080	-	502	-	102	73	-
Total	49,107	168,630	228,710	291,630	202,780	145,880	55,330	24,164	9,776	4,462	2,488	2,772
Mean	1,584	5,621	7,378	9,407	7,242	4,706	1,844	779	326	144	80.3	92.4
Cfs/m	2.37	8.43	11.1	14.1	10.9	7.06	2.76	1.17	0.489	0.216	0.120	0.139
In.	2.74	9.40	12.75	16.28	11.31	8.13	3.09	1.35	0.55	0.25	0.14	0.15
Ac-ft	97,400	334,500	453,600	578,400	402,200	289,300	109,700	47,930	19,390	8,850	4,930	5,500

Calendar year 1950: Max 29,900 Min 80 Mean 3,891 Cfs/m 5.83 In. 79.18 Ac-ft 2,617,000  
Water year 1950-51: Max 20,700 Min 54 Mean 3,249 Cfs/m 4.67 In. 68.12 Ac-ft 2,352,000

Peak discharge (base, 17,000 cfs).--Jan. 17 (3:30 a.m.) 22,400 cfs (14.33 ft); Feb. 9 (7 a.m.) 21,400 cfs (14.00 ft).

\* Discharge measurement made on this day.

## Wilson River near Tillamook, Oreg.

Location.--Lat 45°29'10", long. 123°43'30", in NW¼ sec. 18, T. 1 S., R. 8 W., on right bank 1 mile upstream from North Fork and 6½ miles east of Tillamook.

Drainage area.--159 sq mi.

Records available.--December 1914 to November 1916 (incomplete), July 1931 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 42.13 ft above mean sea level, datum of 1929. Dec. 18, 1914, to Nov. 4, 1916, staff gage at site three-quarters of a mile downstream at different datum. July 30, 1931, to Sept. 30, 1938, staff gage at site 100 ft downstream at datum 0.93 ft higher.

Average discharge.--20 years (1931-51), 1,215 cfs.

Extremes.--Maximum discharge during year, 10,900 cfs Dec. 23 (gage height, 10.43 ft); minimum, 48 cfs Sept. 21, 22.

1914-16, 1931-51: Maximum discharge, 30,000 cfs Dec. 21, 1933 (gage height, 19.28 ft, site and datum then in use), from rating curve extended above 15,000 cfs; minimum, that of Sept. 21, 22, 1951.

Remarks.--Records good except those for periods of shifting control, which are fair. No diversion or regulation above station.

Revisions.--W 1014: Drainage area.

Rating tables, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 22

Dec. 23 to Sept. 30

0.7	76	0.4	45	2.5	770
1.0	141	.6	81	3.0	1,080
1.5	286	1.0	177	4.0	1,910
2.0	510	1.5	335	6.0	4,300
2.5	770	2.0	530	10.0	10,200

Note.--Same as following table above 2.5 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	97	3,550	2,840	2,430	1,180	770	1,540	593	277	125	75	66
2	93	4,120	2,410	5,790	2,290	710	1,460	566	267	125	75	62
3	115	3,000	2,470	6,390	5,500	765	1,560	548	261	128	75	60
4	163	2,250	3,780	3,990	2,810	932	1,650	530	255	130	73	59
5	898	1,720	*3,380	2,810	2,180	848	1,470	502	255	132	72	57
6	1,360	1,390	5,490	2,160	2,230	765	1,350	510	258	140	70	57
7	1,400	1,210	4,660	1,750	5,840	720	1,280	530	258	132	70	77
8	1,140	1,080	3,620	1,470	6,150	690	1,150	494	249	125	70	92
9	902	938	3,030	1,290	8,840	640	998	470	234	120	70	77
10	2,590	836	2,420	<u>1,260</u>	7,020	611	*908	450	228	118	70	70
11	2,200	752	2,030	1,410	8,560	580	866	450	219	109	68	64
12	1,230	685	1,660	1,350	5,660	1,810	902	470	222	102	70	60
13	848	620	1,420	2,920	3,640	3,460	884	635	219	102	*75	57
14	645	620	<u>1,280</u>	4,390	2,580	2,680	806	552	213	102	73	55
15	540	1,250	2,000	5,410	2,030	<u>4,900</u>	730	514	201	102	73	55
16	465	2,520	3,080	5,320	1,570	4,220	675	482	192	102	72	55
17	424	3,740	2,980	<u>8,210</u>	1,400	2,720	625	468	186	100	70	55
18	986	3,340	2,350	4,960	1,360	2,080	575	434	177	98	68	55
19	1,240	2,300	1,950	3,290	1,390	1,880	526	418	174	98	66	*54
20	1,090	3,410	1,740	2,500	2,260	1,890	482	390	172	96	64	54
21	878	5,490	1,690	5,380	1,890	2,010	454	378	*166	92	62	48
22	716	4,050	4,920	*4,400	1,570	1,990	426	*360	158	92	60	48
23	*605	3,690	<u>9,060</u>	3,390	1,340	1,650	410	378	155	89	59	50
24	540	<u>6,920</u>	4,850	4,600	1,210	1,450	394	378	153	87	59	52
25	585	4,820	3,090	5,600	1,100	1,430	382	398	150	87	59	89
26	695	3,780	2,270	5,320	962	1,460	<u>366</u>	349	145	87	59	75
27	2,610	3,290	2,030	3,440	890	1,410	484	328	142	87	59	62
28	<u>4,920</u>	2,550	4,080	2,410	*806	1,350	920	324	140	85	72	140
29	4,250	1,970	3,510	1,940	-	1,470	695	310	132	83	75	224
30	2,980	2,410	3,100	1,560	-	1,930	611	297	<u>128</u>	81	73	<u>1,300</u>
31	2,630	-	2,850	1,300	-	1,750	-	<u>290</u>	-	79	70	-
Total	39,825	78,301	96,010	108,440	82,428	51,571	25,559	13,786	5,986	3,235	2,128	3,329
Mean	1,285	2,610	3,097	3,498	2,644	1,664	852	445	200	104	68.6	111
Cfsm	8.08	16.4	19.5	22.0	18.5	10.5	5.36	2.80	1.26	0.654	0.431	0.698
In.	9.32	18.31	22.48	25.36	19.28	12.06	5.98	3.22	1.40	0.76	0.50	0.78
Ac-ft	78,990	155,300	190,400	215,100	163,500	102,500	50,700	27,340	11,870	6,420	4,220	6,500

Calendar year 1950: Max 12,700 Min 68 Mean 1,645 Cfsm 10.35 In. 140.44 Ac-ft 1,191,000  
 Water year 1950-51: Max 9,060 Min 48 Mean 1,399 Cfsm 8.80 In. 119.43 Ac-ft 1,013,000

Peak discharge (base, 12,000 cfs).--No peaks above base.

\* Discharge measurement made on this day.

Note.--Shifting-control method used Oct. 12-27, Nov. 7-15.



## Trask River near Tillamook, Oreg.

Location.--Lat 45°26'30" (revised), long. 123°43'00" (revised), in NW $\frac{1}{4}$  sec. 31, T. 1 S., R. 8 W., on right bank, half a mile upstream from Gold Creek and 6 miles east of Tillamook.

Drainage area.--143 sq mi.

Records available.--July 1931 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 70 ft (by barometer).

Average discharge.--20 years, 981 cfs.

Extremes.--Maximum discharge during year, 10,400 cfs Jan. 17 (gage height, 8.56 ft); minimum, 44 cfs Sept. 22.

1931-51: Maximum discharge, 20,000 cfs Dec. 22, 1933 (gage height, 13.00 ft); minimum, that of Sept. 22, 1951.

Maximum stage known, about 17 ft, probably occurred during flood of November 1921 or Mar. 31, 1931 (discharge, 30,000 cfs, from rating curve extended above 12,000 cfs).

Remarks.--Records excellent except those for periods of shifting control, which are good, and those for period of no gage-height record, which are fair. No diversion or regulation above station.

Revisions.--W 1044: Drainage area.

Rating table, water year 1950-51, except periods of shifting control (gage height, in feet, and discharge, in cubic feet per second)

0.6	44	3.0	1,480
1.0	105	4.0	2,640
1.5	220	5.0	5,710
1.5	420	8.0	9,340
2.0	690		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	82	2,480	2,310	2,000	1,050	a650	al,200	520	286	136	94	70
2	80	3,340	1,980	4,670	1,670	a600	al,100	510	276	138	91	70
3	115	2,410	1,950	5,150	2,460	a600	al,100	495	269	139	91	70
4	173	1,770	2,770	3,440	2,060	a850	al,100	480	262	147	89	66
5	580	1,400	*2,600	2,480	1,680	a800	al,000	460	262	147	89	64
6	864	1,140	3,590	1,940	1,740	a800	al,000	480	269	161	89	66
7	878	1,000	3,470	1,590	3,290	a750	a950	500	266	150	89	82
8	642	930	2,700	1,360	3,640	a700	a900	460	252	138	89	96
9	531	815	2,200	1,200	4,410	a700	a850	435	244	133	89	82
10	984	738	1,740	1,190	4,150	a650	*763	425	238	133	87	68
11	1,020	684	1,510	1,220	5,560	a650	720	430	230	122	84	64
12	690	636	1,250	1,130	4,070	al,300	714	465	230	118	89	64
13	531	592	1,020	2,240	2,790	al,700	690	642	227	118	89	62
14	435	586	1,010	3,710	2,070	al,700	636	542	224	118	*87	58
15	375	1,210	1,480	4,600	1,700	a3,000	586	505	210	115	87	57
16	330	2,270	2,020	4,930	1,380	a3,800	558	480	201	112	82	57
17	314	3,230	1,990	5,480	1,240	a3,000	526	450	198	110	82	55
18	542	3,030	1,710	4,630	1,200	a2,300	490	440	194	112	76	*53
19	619	2,080	1,480	2,990	1,180	a2,000	455	420	191	112	76	51
20	608	2,510	1,260	2,300	1,590	al,800	425	402	188	110	74	49
21	531	3,640	1,170	4,910	1,360	al,800	411	380	*182	108	74	48
22	480	2,840	2,510	*4,080	1,210	al,800	388	*366	173	108	72	46
23	*425	2,580	5,370	3,170	1,070	al,600	370	375	170	105	72	48
24	368	2,840	3,190	3,600	992	al,600	357	366	167	103	72	53
25	435	2,960	2,200	4,180	950	al,400	348	384	164	105	72	80
26	570	2,330	1,730	4,040	843	al,400	348	348	158	105	72	84
27	1,900	2,080	1,560	2,860	770	al,300	470	330	155	103	72	66
28	3,280	1,700	2,890	2,090	*714	al,200	756	326	150	100	89	91
29	2,910	1,430	2,680	1,640	-	al,200	580	314	141	98	81	150
30	2,210	1,890	2,470	1,350	-	a3,300	526	306	136	96	84	558
31	2,040	-	2,260	1,170	-	al,400	-	298	-	94	78	-
Total	25,562	57,941	68,070	94,340	56,799	44,250	20,317	13,334	6,315	3,693	2,571	2,528
Mean	825	1,931	2,196	3,043	2,029	1,427	677	430	210	119	82.9	84.3
Cfs/m	5.77	13.5	15.4	21.3	14.2	9.96	4.73	3.01	1.47	0.832	0.580	0.590
In.	6.65	15.07	17.70	24.54	14.77	11.51	5.28	3.47	1.64	0.96	0.67	0.66
Ac-ft	50,700	114,900	135,000	187,100	112,700	87,770	40,300	26,450	12,530	7,320	5,100	5,010

Calendar year 1950: Max 9,780 Min 64 Mean 1,255 Cfs/m 8.78 In. 119.15 Ac-ft 908,600  
 Water year 1950-51: Max 8,480 Min 46 Mean 1,084 Cfs/m 7.58 In. 102.92 Ac-ft 784,900

Peak discharge (base, 9,300 cfs).--Jan. 17 (5:30 a.m.) 10,400 cfs (8.56 ft).

\* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of records for Nehalem River near Foss, North Yamhill River at Pike, Siletz River at Siletz and recorded range in stage.

Note.--Shifting-control method used Oct. 1-27, Apr. 10 to July 15, Aug. 18 to Sept. 30.

## SILETZ RIVER BASIN

Siletz River at Siletz, Oreg.

Location.--Lat 44°42'55", long. 123°53'10", in NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 11, T. 10 S., R. 10 W., on right bank  $\frac{1}{2}$  miles east of Siletz.

Drainage area.--102 sq mi.

Records available.--November 1905 to May 1912, January 1924 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 102.32 ft above mean sea level, datum of 1929. Prior to May 4, 1912, staff gage, Jan. 3 to Nov. 6, 1924, chain gage, Nov. 7, 1924, to Sept. 5, 1930, staff gage, and Sept. 6, 1930, to Sept. 30, 1938, wire-weight gage, all at sites about 2 miles downstream at different datums.

Average discharge.--31 years (1906-11, 1925-51), 1,599 cfs.

Extremes.--Maximum discharge during year, 16,600 cfs Jan. 17 (gage height, 16.85 ft); minimum, 72 cfs Sept. 21, 22 (gage height, 2.20 ft).

1905-12, 1924-51: Maximum discharge, 37,000 cfs Feb. 17, 1949 (gage height, 25.17 ft), from rating curve extended above 15,000 cfs by logarithmic plotting; minimum observed, 51 cfs Dec. 6, 7, 1929.

Maximum discharge known, 40,800 cfs Nov. 20, 1921 (gage height, 31.6 ft, site and datum then in use), from rating curve extended about 19,000 cfs.

Remarks.--Records excellent. No diversion above station.

Revisions (water years).--W 814: 1935. W 754: 1922 (maximum gage height).

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.2	72	5.0	1,240
2.4	96	6.0	1,950
2.7	182	8.0	3,700
3.0	255	12.0	8,400
3.5	470	15.5	14,000
4.0	670		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	127	5,560	3,570	3,470	1,550	1,050	1,590	1,040	440	173	101	82
2	121	9,540	3,190	7,360	2,170	870	1,490	964	420	173	101	81
3	196	5,340	3,340	7,830	3,020	1,010	*1,460	946	412	176	100	80
4	392	3,610	5,180	5,010	2,910	1,770	1,490	866	396	193	98	80
5	1,120	2,730	4,890	3,840	2,670	2,050	1,400	815	384	199	96	*79
6	1,440	2,140	8,200	2,980	3,110	1,707	1,310	810	380	280	95	79
7	2,270	1,820	7,060	2,480	6,480	1,470	1,250	790	372	208	93	100
8	1,710	1,650	5,030	*2,130	5,800	1,420	1,170	715	353	184	93	152
9	1,320	1,430	3,930	1,830	5,380	1,280	1,100	670	339	173	93	86
10	1,300	1,280	3,040	1,860	5,360	1,160	1,040	630	325	165	93	85
11	1,540	1,160	2,660	2,290	7,710	1,110	1,000	680	314	154	93	81
12	1,180	1,060	2,220	2,210	5,800	2,000	1,020	1,190	311	146	93	80
13	928	970	1,910	3,150	4,100	4,570	1,040	2,260	308	146	92	79
14	775	958	1,810	6,890	5,080	3,730	1,010	1,920	294	146	90	77
15	680	2,540	2,630	7,920	2,530	5,540	940	*1,530	280	141	89	77
16	615	5,650	5,110	7,220	2,050	5,620	880	1,280	266	139	88	77
17	605	8,880	4,540	14,000	1,960	3,670	826	1,110	255	136	86	77
18	874	7,450	3,440	8,120	1,940	2,980	760	988	248	134	85	76
19	*1,470	1,460	2,900	5,210	1,790	2,530	690	880	*241	132	85	76
20	1,650	5,010	2,410	3,950	2,720	2,370	630	795	230	127	82	75
21	1,310	4,820	2,110	8,940	*2,450	2,350	585	735	227	125	81	73
22	1,050	3,680	6,160	8,010	2,120	2,370	552	680	217	123	80	73
23	886	3,170	11,000	7,030	1,810	2,120	525	775	211	125	80	73
24	770	5,270	5,570	9,400	1,610	1,920	498	720	205	118	80	74
25	904	4,940	3,830	7,840	1,500	1,790	476	700	202	*116	80	101
26	1,350	3,990	2,970	6,530	1,340	1,730	464	620	193	116	79	127
27	3,560	3,890	2,560	4,620	1,200	1,630	644	570	187	114	79	89
28	6,710	*3,170	4,890	3,410	1,100	1,510	1,700	538	184	110	90	140
29	5,930	2,610	5,060	2,640	-	1,550	1,300	512	176	109	114	259
30	4,190	3,360	4,450	2,170	-	1,760	1,080	464	170	107	98	2,020
31	3,550	-	4,050	1,800	-	1,750	-	460	-	105	86	-
Total	50,523	112,338	129,710	162,130	85,270	68,680	29,920	27,713	8,540	4,593	2,791	4,717
Mean	1,630	3,745	4,184	5,230	3,045	2,215	997	894	285	148	90.0	157
Cfsm	8.07	18.5	20.7	25.9	15.1	11.0	4.94	4.43	1.41	0.733	0.448	0.777
In.	9.30	20.68	23.88	29.85	15.70	12.64	5.51	5.10	1.57	0.85	0.51	0.87
Ac-ft	100,200	222,600	257,300	321,600	169,100	136,200	59,350	54,970	16,940	9,110	5,540	9,360

Calendar year 1950: Max 13,700 Min 79 Mean 2,127 Cfsm 10.5 In. 142.90 Ac-ft 1,540,000  
 Water year 1950-51: Max 14,000 Min 73 Mean 1,882 Cfsm 9.32 In. 126.46 Ac-ft 1,362,000

Peak discharge (base, 12,000 cfs).--Nov. 2 (1:30 a.m.) 12,100 cfs (14.36 ft); Dec. 22 (12 p.m.) 15,500 cfs (16.30 ft); Jan. 17 (8 a.m.) 16,600 cfs (16.85 ft).

\* Discharge measurement made on this day.

Alsea River near Tidewater, Oreg.

Location.--Lat 44°23'10", long. 123°49'50", in NW¼NW¼ sec. 6, T. 14 S., R. 9 W., on right bank three-quarters of a mile downstream from Grass Creek, 2.3 miles upstream from Scott Creek, and 3.8 miles southeast of Tidewater.

Drainage area.--334 sq mi.

Records available.--October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 48.16 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 1,455 cfs.

Extremes.--Maximum discharge during year, 19,300 cfs Jan. 21 (gage height, 17.89 ft); minimum, 57 cfs Sept. 22, 23 (gage height, 1.42 ft).  
1939-51: Maximum discharge, 27,800 cfs Jan. 7, 1948 (gage height, 22.43 ft); minimum, that of Sept. 22, 23, 1951.  
Maximum stage known, 29.5 ft on or about Feb. 3, 1890, from floodmark shown by old resident.

Remarks.--Records good except those for period of no gage-height record, which are fair. No regulation. Few small diversions above station for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 16

Jan. 17 to Sept. 30

1.6	86	1.4	54	4.0	1,130
2.0	187	1.6	90	6.0	2,500
		2.0	187	9.0	5,440
Note.--Same as following table above 2.0 ft.		2.5	370	13.0	10,900
		3.0	595	17.0	17,700

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	101	4,120	4,600	3,390	2,200	1,500	1,880	822	478	197	111	84
2	95	6,430	4,360	6,330	2,600	1,420	1,710	778	450	197	111	79
3	145	4,310	4,320	7,300	4,100	1,450	1,620	806	442	200	111	73
4	460	3,030	7,120	5,220	4,000	3,100	1,570	800	428	219	*109	*75
5	1,140	2,320	6,030	4,120	3,700	3,960	1,460	740	432	229	107	73
6	1,030	1,860	6,630	3,470	4,400	2,980	1,360	715	432	314	107	73
7	998	1,580	7,220	2,840	7,600	2,500	1,270	690	410	253	105	86
8	745	1,410	5,750	2,470	7,400	2,640	1,190	650	398	216	98	111
9	665	1,260	4,430	2,230	7,100	2,800	1,120	610	374	200	98	107
10	464	1,120	3,520	2,200	7,500	2,360	1,050	590	358	190	100	92
11	370	1,030	3,150	2,710	8,600	2,150	1,000	615	346	182	103	81
12	298	965	2,690	2,770	7,000	2,450	965	970	342	171	100	79
13	257	899	2,370	2,700	5,500	4,860	926	2,220	338	171	98	75
14	253	882	2,290	5,330	4,200	5,220	898	1,820	322	165	94	71
15	314	3,010	3,420	7,530	3,400	6,950	844	1,390	306	160	92	69
16	279	15,200	8,000	7,410	2,900	7,450	800	1,160	294	158	86	69
17	314	15,400	5,880	16,100	2,700	5,160	772	1,010	283	158	84	69
18	*822	13,300	4,380	11,700	2,700	4,120	735	916	279	158	82	68
19	1,290	7,050	3,630	8,200	2,500	3,680	720	850	*268	152	82	66
20	1,230	5,610	3,080	6,340	3,200	3,600	695	784	264	145	81	64
21	855	4,530	2,600	14,600	3,060	3,430	665	740	257	145	77	59
22	655	3,690	2,640	12,900	2,630	3,250	635	695	253	140	71	57
23	527	3,100	3,090	10,200	2,310	2,880	615	700	250	135	69	57
24	450	3,380	2,630	9,900	2,060	2,520	595	720	243	*133	71	59
25	522	3,350	2,280	7,700	1,960	2,410	580	650	239	133	71	75
26	976	2,910	2,090	6,390	1,810	2,300	555	610	229	133	71	86
27	3,370	3,300	1,940	5,020	1,640	2,120	600	580	226	130	71	79
28	7,750	*2,910	2,780	4,020	1,550	1,970	1,240	550	219	125	82	84
29	8,050	2,550	3,160	3,400	-	1,940	954	532	209	125	98	118
30	5,220	3,520	3,410	2,800	-	2,120	811	504	203	123	100	260
31	4,350	-	3,760	2,400	-	2,060	-	496	-	116	94	-
Total	43,995	124,026	123,250	189,690	110,320	97,350	29,825	25,713	9,572	5,273	2,834	2,496
Mean	1,419	4,134	3,976	6,119	3,940	3,140	994	829	319	170	91.4	85.2
Cfsm	4.25	12.38	11.90	18.32	11.80	9.40	2.98	2.48	0.955	0.509	0.274	0.249
In.	4.90	13.81	13.72	21.12	12.28	10.84	3.32	2.86	1.07	0.59	0.32	0.28
Ac-ft	87,260	246,000	244,500	376,200	218,800	193,100	59,160	51,000	18,990	10,460	5,620	4,950
Calendar year 1950:	Max 15,400	Min 69	Mean 2,243	Cfsm 6.72	In. 91.16	Ac-ft 1,624,000						
Water year 1950-51:	Max 16,100	Min 57	Mean 2,094	Cfsm 6.27	In. 85.11	Ac-ft 1,516,000						

Peak discharge (base, 13,000 cfs).--Nov. 16 (9:30 a.m.) 19,200 cfs (17.86 ft); Jan. 17 (2 p.m.) 18,400 cfs (17.42 ft); Jan. 21 (4:30 to 5 p.m.) 19,300 cfs (17.89 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 29 to Feb. 20; discharge estimated on basis of recorded range stage and records for Siletz River at Siletz, Marys River near Philomath, and Luckiamute River at Pedee.

## Lake Creek at Triangle Lake, Oreg.

Location.--Lat 44°09'40", long. 123°34'10", in SW<sup>1</sup>/<sub>4</sub> sec. 20, T. 16, S., R. 7 W., on right bank 500 ft downstream from outlet of Triangle Lake.

Drainage area.--50 sq mi, approximately.

Records available.--August 1931 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 672.75 ft above mean sea level, datum of 1929, supplementary adjustment of 1947.

Average discharge.--20 years, 206 cfs.

Extremes.--Maximum discharge during year, 2,070 cfs Nov. 18 (gage height, 5.80 ft); minimum, 7.8 cfs Sept. 24, 25 (gage height, 0.56 ft).

1931-51: Maximum discharge, 4,180 cfs Feb. 18, 1949, from rating curve extended above 2,400 cfs by logarithmic plotting; maximum gage height, 8.68 ft Feb. 18, 1949 (backwater from debris); minimum discharge, 2.7 cfs Aug. 1, 1944; minimum daily, 5.5 cfs Sept. 30 to Oct. 3, 1939.

Remarks.--Records good. No diversion above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.5	5.9	2.0	185
.7	13	2.5	316
1.0	32	3.0	485
1.2	52	4.0	950
1.5	91	6.0	2,210

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	13	632	*459	388	322	212	260	109	69	24	14	11.	
2	13	541	541	419	316	199	242	104	67	23	13	11	
3	15	489	585	419	362	*197	224	104	65	23	13	11	
4	20	430	655	740	402	265	219	109	62	23	13	10	
5	35	356	740	628	448	405	209	107	60	24	13	10	
6	64	290	810	501	529	416	199	104	59	27	12	9.9	
7	96	247	900	419	592	352	190	101	58	28	12	11	
8	105	216	855	362	735	328	178	96	57	27	12	11	
9	94	190	686	325	770	322	170	90	56	26	12	12	
10	81	170	557	307	660	290	158	85	54	*24	12	12	
11	69	155	478	325	710	263	149	83	53	23	*12	12	
12	*58	145	419	343	845	250	143	94	50	23	11	11	
13	50	135	362	352	770	290	*139	181	49	21	11	11	
14	44	130	337	419	610	416	135	284	48	21	11	10	
15	41	176	346	610	497	583	130	252	46	20	11	10	
16	38	596	466	765	412	835	122	204	44	20	11	10	
17	39	1,310	624	1,130	372	805	117	167	42	20	11	10	
18	49	1,970	588	1,660	365	619	114	147	40	19	10	9.9	
19	73	1,440	497	1,370	356	509	110	130	38	18	10	9.5	
20	102	990	430	1,000	365	463	107	119	36	18	9.9	9.1	
21	116	730	368	1,140	381	455	110	110	35	18	9.9	*8.5	
22	107	588	331	1,820	375	452	114	101	33	17	9.5	8.1	
23	91	489	304	*1,550	340	426	101	97	32	17	9.1	8.1	
24	80	452	282	1,300	304	381	81	101	30	17	8.8	8.1	
25	77	434	260	1,150	284	349	80	*97	30	16	8.5	8.1	
26	81	409	247	1,020	268	331	81	90	29	16	8.1	8.1	
27	137	388	242	840	244	322	85	85	28	15	8.1	8.1	
28	359	359	255	668	224	296	104	80	28	15	8.5	8.8	
29	850	325	310	545	-	282	116	77	27	15	9.5	9.5	
30	1,000	340	362	426	-	287	112	73	26	15	9.9	12	
31	815	-	388	368	-	276	-	72	-	14	10	-	
Total	4,883	15,122	14,662	23,509	12,858	11,866	4,297	3,653	1,351	627	333.8	298.8	
Mean	158	504	473	758	459	383	143	118	45.0	20.2	10.8	9.96	
Cfsm	3.16	10.1	9.46	15.2	9.18	7.66	2.86	2.36	0.900	0.404	0.216	0.199	
In.	3.63	11.25	10.91	17.49	9.56	8.83	3.20	2.72	1.00	0.47	0.25	0.22	
Ac-ft	9,680	29,990	29,080	46,630	25,500	23,540	8,520	7,250	2,680	1,240	662	533	
Calendar year 1950:	Max	2,150		Min	84	Mean	301	Cfsm	6.02	In.	81.75	Ac-ft	218,000
Water year 1950-51:	Max	1,970		Min	8.1	Mean	256	Cfsm	5.12	In.	69.53	Ac-ft	185,400

Peak discharge (base, 1,200 cfs).--Nov. 18 (10 to 11 a.m.) 2,070 cfs (5.80 ft); Jan. 18 (10 a.m.) 1,710 cfs (5.29 ft); Jan. 22 (10 a.m.) 1,910 cfs (5.57 ft).

\* Discharge measurement made on this day.

## South Umpqua River at Tiller, Oreg.

Location.--Lat 42°55'50", long. 122°56'50", in NE $\frac{1}{4}$  sec. 33, T. 30 S., R. 2 W., on right bank 0.3 mile upstream from Elk Creek, 0.4 mile downstream from Salt Creek, and 0.4 mile east of Tiller.

Drainage area.--454 sq mi.

Records available.--November 1910 to November 1911, October 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 991.8 ft above mean sea level, datum of 1929 (from river-profile survey). Nov. 9, 1910, to Nov. 30, 1911, staff gage at site 0.2 mile downstream at different datum. Oct. 1 to Nov. 26, 1939, staff gage at present site and datum.

Average discharge.--12 years, 973 cfs.

Extremes.--Maximum discharge during year, 37,400 cfs Oct. 29 (gage height, 22.35 ft, referred to outside gage), from rating curve extended above 12,000 cfs on basis of slope-area determination of peak flow; minimum, 32 cfs Sept. 24.  
1910-11, 1939-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 20 cfs Sept. 3, 4, 1911.

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

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 31, Nov. 1, 3-16, Nov. 21 to Dec. 2)

Oct. 1 to Dec. 3				Dec. 4 to Sept. 30			
1.0	59	4.0	1,490	0.9	27	3.5	1,060
1.4	145	8.0	5,480	1.1	56	5.0	2,220
2.0	340	12.0	12,000	1.5	138	8.0	5,450
3.0	820	18.0	25,700	2.0	285	12.0	12,000
				2.5	485		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	3,130	2,040	1,570	1,440	684	1,010	864	332	110	63	51
2	59	5,720	1,950	1,910	1,330	646	969	912	313	108	61	46
3	75	4,160	10,300	3,240	1,360	612	1,120	943	296	108	61	45
4	162	2,750	11,600	2,750	7,170	690	1,350	924	285	108	60	45
5	556	1,940	6,320	2,560	10,800	876	1,360	876	282	108	58	43
6	400	1,460	8,190	1,890	7,950	834	1,330	852	268	108	56	40
7	274	1,160	9,800	1,600	7,140	786	1,350	912	257	106	56	40
8	206	1,010	5,720	1,430	5,680	804	1,320	858	241	101	54	40
9	252	876	3,880	1,480	4,130	1,010	1,300	798	232	99	54	40
10	179	743	2,930	1,740	3,660	918	*1,340	774	229	97	53	40
11	138	650	2,510	1,820	4,130	852	1,300	1,080	220	*93	53	40
12	115	635	2,180	1,730	3,880	962	1,360	1,140	220	91	53	40
13	102	580	1,870	1,650	3,020	1,600	1,470	1,740	214	89	53	39
14	95	*560	2,310	2,950	2,470	2,870	1,490	1,670	211	87	53	39
15	95	560	2,190	3,120	2,080	4,120	1,430	1,360	205	87	51	37
16	95	3,420	1,820	2,730	1,810	4,000	1,350	1,200	199	85	50	36
17	118	3,690	1,490	6,900	1,610	2,620	1,250	1,110	190	84	50	36
18	298	9,040	1,360	5,020	1,460	2,040	1,110	995	182	82	48	37
19	188	5,290	1,220	3,130	1,290	2,090	976	888	174	82	48	36
20	145	3,680	1,080	2,330	1,210	2,560	858	804	166	80	46	36
21	151	2,920	976	3,370	1,180	2,600	750	750	160	80	45	36
22	142	2,210	882	4,120	1,150	2,130	673	700	153	78	45	35
23	122	1,750	792	8,780	1,070	1,740	634	*668	148	76	45	34
24	111	1,560	722	10,600	988	1,550	607	607	143	74	*43	34
25	111	1,500	668	6,340	918	1,650	575	555	138	74	40	35
26	*239	1,340	618	5,150	*852	1,560	555	520	133	72	40	36
27	1,380	1,420	*575	4,010	786	1,410	550	490	128	70	40	36
28	11,700	1,250	862	3,060	722	1,290	995	454	124	69	42	40
29	*25,200	1,190	1,780	2,390	-	1,360	1,000	408	119	69	54	45
30	9,056	1,850	1,760	1,840	-	1,300	894	384	114	67	57	50
31	3,890	-	1,850	1,650	-	1,140	-	360	-	62	56	-
Total	55,507	68,024	92,245	102,740	81,286	49,284	32,276	26,596	6,076	2,705	1,598	1,191
Mean	1,791	2,267	2,976	3,314	2,903	1,590	1,076	858	203	87.3	51.5	39.7
Cfs/m	3.94	4.99	6.56	7.30	6.39	3.50	2.37	1.89	0.447	0.192	0.113	0.087
In.	4.55	5.57	7.56	8.42	6.66	4.04	2.64	2.18	0.50	0.22	0.13	0.10
Ac-ft	110,100	134,900	183,000	203,800	161,200	97,750	64,020	52,750	12,050	5,370	3,170	2,360

Calendar year 1950: Max 25,200 Min 46 Mean 1,580 Cfs/m 3.48 In. 47.24 Ac-ft 1,144,000  
Water year 1950-51: Max 25,200 Min 34 Mean 1,423 Cfs/m 3.13 In. 42.57 Ac-ft 1,030,000

Peak discharge (base, 7,000 cfs).--Oct. 29 (2:30 a.m.) 37,400 cfs (22.35 ft); Nov. 18 (11:30 a.m.) 11,600 cfs (11.80 ft); Dec. 3 (9:50 p.m.) 17,300 cfs (14.56 ft); Dec. 7 (4 a.m.) 12,000 cfs (12.02 ft); Jan. 17 (3:30 p.m.) 10,700 cfs (11.35 ft); Jan. 23 (9:30 p.m.) 15,200 cfs (13.61 ft); Feb. 4 (11:30 p.m.) 14,600 cfs (13.31 ft).

\* Discharge measurement made on this day.

## Cow Creek near Azalea, Oreg.

Location.--Lat 42°49'30", long. 123°10'40", in sec. 4, T. 32 S., R. 4 W., on right bank 4 miles northeast of Azalea.

Drainage area.--76 sq mi, approximately.

Records available.--April 1926 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,685 ft (by barometer). Prior to July 19, 1949, staff gage at same site and datum.

Average discharge.--21 years (1929-31, 1932-51), 96.1 cfs.

Extremes.--Maximum discharge during year, 5,920 cfs Oct. 29 (gage height, 14.37 ft), from rating curve extended above 2,500 cfs on basis of slope-area determination of peak flow; minimum, 7.8 cfs Sept. 22-24.

1926-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 4 cfs Sept. 9-19, 1929, Aug. 26-28, 1931, Aug. 21 to Sept. 6, 1934.

Remarks.--Records good except those for periods of backwater from leaves and debris, which are fair. Diversions for irrigation of about 400 acres above station.

Revisions (water years).--W 984: 1933-36. W 1154: 1946(M), 1948(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Sept. 30			
1.8	10	3.0	222	1.6	6	3.0	305
1.9	17	4.0	520	1.7	15	4.0	624
2.0	26	5.0	935	1.8	28	6.0	1,550
2.2	55	7.0	2,000	2.0	60	9.0	3,300
2.5	109	8.0	2,600	2.5	163	12.0	4,800

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	327	179	146	216	126	121	74	38	20	9.6	9.6
2	13	234	176	179	216	119	115	*67	38	19	8.7	9.6
3	16	183	1,070	268	222	115	117	73	37	19	8.7	9.6
4	29	148	1,020	317	774	139	124	69	36	19	9.6	9.6
5	49	121	505	280	1,040	158	124	73	36	22	9.6	9.6
6	42	102	540	224	646	149	121	73	34	22	8.7	9.6
7	23	*89	698	194	679	144	115	80	32	20	8.7	9.6
8	20	84	498	179	597	186	113	74	31	20	9.6	9.6
9	22	80	386	176	473	233	107	69	30	18	9.6	9.6
10	17	74	308	256	463	176	103	64	28	*18	9.6	9.6
11	15	69	283	271	638	163	*97	67	28	18	9.6	9.6
12	14	69	244	256	524	176	89	69	28	18	9.6	9.6
13	14	67	213	222	426	262	88	86	28	16	9.6	9.6
14	13	67	271	247	364	364	84	78	27	15	9.6	*9.6
15	13	96	250	432	324	404	80	71	28	15	9.6	9.6
16	14	972	213	373	286	364	74	65	27	15	10	9.6
17	18	868	194	1,440	262	277	71	62	25	15	9.6	9.6
18	23	*1,480	176	1,020	241	236	69	58	27	14	9.6	8.7
19	16	776	171	544	216	222	65	55	27	14	9.6	9.6
20	15	649	158	417	205	230	62	53	24	13	9.6	8.7
21	20	367	146	1,150	200	224	60	50	23	13	*10	8.7
22	18	286	137	778	184	202	60	45	23	13	10	7.8
23	16	241	128	649	173	181	58	42	23	13	10	7.8
24	14	211	121	649	163	171	58	*40	23	12	11	7.8
25	*19	194	115	550	161	168	57	40	23	12	10	8.7
26	32	176	109	492	151	163	53	42	22	11	10	9.6
27	208	168	101	420	139	156	52	40	22	11	10	10
28	2,140	146	105	361	*130	146	89	40	20	11	10	10
29	*4,400	144	*107	308	-	146	97	38	20	11	10	10
30	1,360	173	132	268	-	139	86	40	20	11	11	11
31	495	-	151	258	-	128	-	40	-	10	10	-
Total	9,120	8,661	8,905	13,301	10,113	6,067	2,609	1,837	828	478	300.8	281.6
Mean	294	289	287	429	361	196	87.0	59.3	27.6	15.4	9.70	9.39
Cfsm	3.87	3.80	3.78	5.64	4.75	2.58	1.14	0.78	0.36	0.20	0.13	0.12
In.	4.46	4.24	4.36	6.51	4.95	2.97	1.28	0.90	0.41	0.23	0.15	0.14
Ac-ft	18,090	17,180	17,660	26,380	20,060	12,030	5,170	3,640	1,640	948	597	559

Peak discharge (base, 800 cfs).--Oct. 29 (5 a.m.) 5,920 cfs (14.37 ft); Nov. 18 (11 a.m.) 2,130 cfs (6.98 ft); Dec. 3 (10 p.m.) 2,070 cfs (6.88 ft); Jan. 17 (5 p.m.) 2,460 cfs (7.53 ft); Jan. 21 (3 p.m.) 1,520 cfs (5.94 ft); Feb. 4 (11 p.m.) 1,820 cfs (6.47 ft).

\* Discharge measurements made on this day.

Note.--Backwater from leaves or debris Oct. 9-27, Aug. 28 to Sept. 30.

## South Umpqua River near Brockway, Oreg.

Location--Lat 43°08'00", long. 123°23'50", in SW $\frac{1}{4}$  sec. 15, T. 28 S., R. 6 W., on downstream side of right pier of Winston Bridge on U. S. Highway 99, 2 $\frac{1}{2}$  miles northeast of Brockway, and 4 miles downstream from Lookingglass Creek.

Drainage area--1,640 sq mi, approximately.

Records available--December 1906 to June 1912, October 1923 to September 1926, January 1942 to September 1951.

Gage--Water-stage recorder. Datum of gage is 461.84 ft above mean sea level, datum of 1923 (Oregon State Highway benchmark). Prior to June 23, 1949, staff, chain and wire-weight gages at several sites within 400 ft of present site at various datums.

Average discharge--17 years (1906-11, 1923-26, 1942-51), 2,601 cfs.

Extremes--Maximum discharge during year, 118,000 cfs Oct. 29 (gage height, 32.4 ft), from rating curve extended above 50,000 cfs on basis of slope-area determination of peak flow; minimum, 0.3 cfs Sept. 23.

1905-12, 1923-26, 1942-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 36 cfs Aug. 12, 13, 1926.

Flood of Feb. 21, 1927, reached a stage of about 31.2 ft, present site and datum (discharge, 101,000 cfs). Flood in February 1890 reached a stage 1.9 ft higher, according to local resident who lived nearby at the time of both floods (discharge, about 130,000 cfs).

Remarks--Records good. Many small diversions above station for irrigation. No regulation.

Revisions (water years)--W 1184: 1946(M), 1948(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3

Dec. 4 to Sept. 30

3.2	103	5.0	800	12.0	7,300	2.8	57	6.5	2,140
3.5	180	6.0	1,580	16.0	24,500	3.3	125	8.0	4,400
3.8	235	7.0	2,770	19.0	33,600	3.8	243	10.0	8,700
4.0	300	8.0	4,260	26.0	58,700	4.5	520	14.0	19,500
4.5	520	10.0	8,340	31.0	98,600	5.5	1,160	20.0	37,900

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	108	9,240	5,210	5,640	4,380	2,380	2,520	1,680	625	190	101	111
2	107	9,020	8,550	5,400	3,990	2,300	2,320	1,620	598	181	99	105
3	142	8,710	15,800	9,350	3,860	2,150	2,280	1,650	565	181	98	96
4	180	6,140	32,100	10,700	8,890	2,860	2,520	1,670	545	184	95	91
5	335	4,580	19,000	10,000	25,900	4,420	2,700	1,650	535	190	92	87
6	849	3,610	15,500	7,670	19,000	5,160	2,590	1,570	520	188	92	85
7	758	2,950	21,600	6,080	16,700	6,020	2,520	1,600	490	186	92	82
8	530	2,510	16,300	5,100	16,600	6,080	2,460	1,620	470	184	88	81
9	415	2,250	11,800	4,520	12,100	9,760	2,340	1,510	452	177	85	78
10	443	1,970	8,800	4,740	9,950	7,150	*2,320	1,420	438	164	83	78
11	360	1,740	7,280	5,980	11,900	5,600	2,280	1,460	417	*164	85	73
12	290	1,590	6,400	7,170	14,200	5,180	2,250	1,790	397	158	85	74
13	244	1,560	5,580	6,300	10,600	6,620	2,310	2,180	389	149	85	72
14	225	1,470	5,800	7,040	8,170	10,500	2,380	2,760	381	145	85	72
15	211	2,020	6,200	10,300	6,800	11,700	2,320	2,560	369	143	85	72
16	205	26,900	5,800	12,800	5,760	13,100	2,220	2,000	349	139	85	72
17	229	19,600	5,140	24,400	5,060	8,960	2,120	1,600	331	133	83	72
18	272	32,100	4,500	34,900	4,880	6,620	1,940	1,640	317	131	81	70
19	510	24,000	4,090	17,600	4,330	5,740	1,760	1,490	303	131	79	70
20	412	13,100	3,650	12,000	4,040	6,000	1,610	1,360	289	129	81	69
21	380	9,740	3,220	19,800	4,020	6,080	1,470	1,260	278	129	*78	68
22	470	7,120	2,970	23,800	3,850	5,380	1,360	1,190	272	125	*73	64
23	442	5,640	2,670	23,600	3,590	4,460	1,260	*1,120	259	124	79	63
24	353	4,660	2,420	27,900	3,250	3,680	1,190	1,050	253	120	73	63
25	306	4,160	2,270	16,800	3,110	3,680	1,150	982	246	115	69	63
26	*416	3,710	2,120	14,000	*2,900	3,640	1,100	919	237	119	70	67
27	2,200	3,500	*1,980	11,400	2,730	3,360	1,070	853	228	117	70	73
28	16,900	3,320	2,850	9,060	2,520	3,110	1,260	821	216	114	70	74
29	*90,200	2,980	3,500	7,150	-	2,970	2,040	758	210	112	70	81
30	53,000	3,590	3,880	5,900	-	3,040	1,840	698	203	108	83	96
31	15,900	-	5,960	5,000	-	2,790	-	664	-	105	95	-
Total	187,395	223,460	239,420	569,980	223,080	170,660	59,480	45,155	11,182	4,536	2,584	2,325
Mean	6,045	7,449	7,723	11,930	7,967	5,505	1,983	1,457	373	146	83.4	77.5
Cfs/m	3.69	4.54	4.71	7.27	4.86	3.36	1.21	0.888	0.227	0.089	0.051	0.047
ft.	4.25	5.07	5.42	8.39	5.06	3.87	1.35	1.02	0.25	0.10	0.06	0.05
Ac-ft	371,700	445,700	474,900	733,800	442,500	338,500	118,000	89,560	22,180	9,000	5,130	4,610
Calendar year 1950-51	Max	20,200	Min	81	Mean	4,342	Cfs/m	2.65	In.	35.95	Ac-ft	3,143,000
Water year 1950-51	Max	90,200	Min	65	Mean	4,217	Cfs/m	2.57	In.	34.90	Ac-ft	3,053,000

Peak discharge (base, 15,000 cfs)--Oct. 29 (9 p.m.) 118,000 cfs (32.4 ft); Nov. 16 (12 m.) 38,600 cfs (20.57 ft); Nov. 18 (6:30 p.m.) 40,200 cfs (21.06 ft); Dec. 4 (5 a.m.) 36,000 cfs (20.02 ft); Dec. 7 (12 m.) 23,000 cfs (15.18 ft); Jan. 18 (1 a.m.) 46,400 cfs (23.18 ft); Jan. 21 (11 p.m.) 30,400 cfs (17.55 ft); Jan. 24 (5 a.m.) 31,800 cfs (18.03 ft); Feb. 5 (9 a.m.) 29,700 cfs (17.34 ft); Feb. 12 (5 a.m.) 15,400 cfs (12.59 ft).

\* Discharge measurement made on this day.

## UMPQUA RIVER BASIN

Lake Creek at Diamond Lake, near Fort Klamath, Oreg.

Location--Lat 43°11'10", long. 122°09'50", in SW 1/4 sec. 30, T. 27 S., R. 6 E., on right bank 260 ft downstream from outlet of Diamond Lake and 35 miles north of Fort Klamath.

Drainage area--57 sq mi, approximately.

Records available--May 1922 to September 1925 (incomplete), October 1926 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 5,180 ft (from river-profile map). Prior to May 26, 1931, staff gage at site 300 ft downstream at different datum. May 26, 1931, to Oct. 6, 1933, staff gage at present site and datum.

Average discharge--24 years (1926-29, 1930-51), 51.5 cfs.

Extremes--Maximum discharge during year, 143 cfs Jan. 23, Feb. 6, 7 (gage height, 1.63 ft); minimum, 1 cfs Oct. 2, 3; minimum daily, 2 cfs Oct. 1-4. 1922-25, 1926-51: Maximum discharge observed, 336 cfs Jan. 1, 1943 (gage height, 2.8 ft), from rating curve extended above 120 cfs; no flow Aug. 25-27, 1931.

Remarks--Records fair. Flow regulated by gates and fish racks at lake outlet, and at times by collection of moss on racks. No diversion above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 27 to Nov. 12, Apr. 11 to May 10)

0.3	2	1.0	30
.4	3	1.3	67
.6	8	1.7	150
.8	17		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2	128	88	94	119	105	88	94	101	74	35	34
2	2	128	97	67	119	103	88	94	99	74	34	35
3	2	128	110	88	119	103	86	92	97	70	35	36
4	2	124	103	105	128	103	84	90	95	69	35	36
5	3	119	101	105	138	103	84	94	95	67	32	35
6	4	117	105	105	140	103	84	82	116	66	33	34
7	4	112	110	103	140	103	82	77	117	64	35	33
8	4	110	108	99	140	108	81	70	105	64	37	33
9	38	110	103	97	138	119	81	76	101	64	38	33
10	117	103	103	99	136	119	79	*72	101	*61	38	33
11	114	99	99	103	138	121	84	79	101	61	37	33
12	110	*96	99	101	136	119	86	88	97	60	37	*33
13	108	94	99	101	133	114	82	92	97	59	37	34
14	105	92	105	101	129	112	81	90	97	59	37	32
15	103	92	105	103	124	108	82	92	97	57	37	31
16	99	94	103	105	121	110	81	94	97	57	37	32
17	103	136	103	119	119	110	79	92	95	59	37	33
18	103	126	101	128	119	110	79	92	95	57	37	33
19	99	105	99	128	119	108	81	95	94	56	37	33
20	95	101	99	128	114	103	81	94	94	54	37	33
21	94	97	99	131	112	99	81	95	90	53	37	34
22	92	95	97	131	112	97	79	86	90	53	37	33
23	90	95	95	138	112	97	79	99	88	53	36	32
24	88	92	94	140	110	97	79	101	86	50	36	32
25	90	92	92	*136	110	95	81	97	84	50	36	33
26	95	92	90	133	108	94	70	97	84	50	35	34
27	119	90	90	128	108	92	70	97	84	50	35	35
28	131	88	90	126	105	92	90	101	82	39	35	35
29	140	88	92	126	-	90	92	103	82	38	35	35
30	138	88	90	126	-	90	94	103	77	41	35	56
31	131	-	90	121	-	90	-	101	-	41	35	-
Total	2,425	3,131	3,059	3,515	3,445	3,217	2,468	2,829	2,838	1,770	1,114	1,028
Mean	78.2	104	98.7	113	123	104	82.5	91.3	94.6	57.1	35.9	34.3
Cfs/m	1.37	1.82	1.73	1.98	2.18	1.82	1.44	1.60	1.66	1.00	0.630	0.602
In.	1.58	2.04	2.00	2.29	2.25	2.10	1.61	1.85	1.85	1.15	0.73	0.67
Ac-ft	4,810	6,210	6,070	6,970	6,830	6,380	4,900	5,610	5,630	3,510	2,210	2,040
Calendar year 1950: Max	141			Min 2		Mean 79.8	Cfs/m 1.40	In. 18.99	Ac-ft 57,770			
Water year 1950-51: Max	140			Min 2		Mean 84.5	Cfs/m 1.48	In. 20.12	Ac-ft 61,170			

\* Discharge measurement made on this day.



## North Umpqua River below Lake Creek, Oreg.

Location--Lat 43°19', long. 122°11', in NW $\frac{1}{4}$  sec. 13, T. 26 S., R. 5 E., on right bank 600 ft downstream from Lake Creek and 30 miles southwest of Crescent.

Drainage area--175 sq mi.

Records available--October 1927 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 4,090 ft (from river-profile map).

Average discharge--23 years (1927-45, 1946-51), 383 cfs.

Extremes--Maximum discharge during year, 758 cfs May 24 (gage height, 1.83 ft); minimum, 367 cfs Oct. 2 (gage height, 1.04 ft).

1927-51: Maximum discharge, 1,190 cfs June 9, 1933 (gage height, 2.34 ft), from rating curve extended above 700 cfs; minimum, 206 cfs Dec. 9, 1931.

Remarks--Records good except those for periods of no gage-height record, which are fair. Flow slightly regulated by Diamond Lake.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.0	351
1.5	565
1.9	810

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	370	563	497	530	480	500	488	654	648	520	446	434
2	367	610	492	520	480	500	492	642	632	520	442	434
3	378	587	555	510	460	500	497	637	626	515	442	434
4	382	564	575	555	520	520	502	637	626	515	442	434
5	418	548	555	550	600	520	510	632	620	510	442	434
6	398	528	632	540	580	520	515	642	626	506	438	430
7	390	522	702	535	600	500	525	632	632	497	438	430
8	386	525	656	530	560	500	530	632	610	497	438	426
9	382	*522	683	530	540	490	540	*642	605	497	438	426
10	462	515	654	530	580	480	555	659	600	*492	442	422
11	462	506	648	530	560	480	580	716	605	492	442	422
12	458	502	632	525	550	480	605	709	605	488	442	422
13	450	502	626	530	540	480	615	696	600	488	442	418
14	450	497	648	540	540	520	637	676	600	484	442	418
15	450	492	626	535	540	540	664	659	600	484	442	418
16	450	497	605	530	530	540	690	670	605	484	442	*418
17	470	502	600	530	530	520	716	683	600	479	438	418
18	462	525	590	545	540	520	722	702	590	479	442	418
19	450	510	585	550	520	520	716	709	585	474	442	418
20	446	520	575	545	520	520	709	709	575	474	442	418
21	442	502	565	550	520	520	690	722	575	470	442	414
22	442	497	560	550	520	520	676	728	570	470	442	414
23	438	492	555	575	520	510	664	750	560	470	438	414
24	438	492	550	595	510	500	659	735	550	470	438	414
25	445	488	545	570	510	500	659	728	545	466	438	414
26	446	488	540	*565	500	490	654	735	545	462	438	414
27	468	502	535	560	500	*488	654	728	540	462	438	414
28	545	488	545	515	500	488	690	716	540	458	442	410
29	649	492	550	500	-	488	670	696	535	450	442	414
30	569	502	540	480	-	488	654	676	530	450	438	434
31	527	-	530	460	-	484	-	659	-	454	438	-
Total	13,890	15,480	18,191	16,610	14,800	15,626	18,478	21,211	17,680	14,977	13,658	12,648
Mean	448	516	587	536	529	504	616	684	589	483	441	422
Cfs/m	2.56	2.95	3.35	3.06	3.02	2.88	3.52	3.91	3.37	2.76	2.52	2.41
In.	2.95	3.29	3.87	3.53	3.15	3.32	3.93	4.51	3.76	3.16	2.90	2.69
Ac-ft	27,550	30,708	36,080	32,950	29,360	30,890	36,650	42,070	35,070	29,710	27,090	25,090

Calendar year 1950: Max 878 Min 351 Mean 490 Cfs/m 2.80 In. 37.99 Ac-ft 354,500  
 Water year 1950-51: Max 750 Min 367 Mean 529 Cfs/m 3.02 In. 41.08 Ac-ft 383,300

Peak discharge (base, 480 cfs)--Oct. 29 (2 to 4 a.m.) 702 cfs (1.75 ft); Dec. 7 (3 a.m.) 735 cfs (1.80 ft); Feb. 5 or 7 (time unknown) 626 cfs (1.62 ft); May 24 (1 a.m.) 758 cfs (1.83 ft).

\* Discharge measurement made on this day.

Note.--No gage-height record Nov. 7, 8, Jan. 29 to Mar. 26; discharge estimated on basis of recorded range in stage and records for stations above Clearwater River and above Copeland Creek and Lake Creek at Diamond Lake near Port Klamath.

## North Umpqua River above Clearwater River, Oreg.

Location--Lat 43°17', long. 122°24', in NE  $\frac{1}{4}$  sec. 25, T. 26 S., R. 3 E., on right bank  $\frac{1}{2}$  miles upstream from Clearwater River.

Drainage area--258 sq mi.

Records available--September 1948 to September 1951.

Gage--Water-stage recorder. Datum of gage is 2,457.51 ft above mean sea level (levels by California Oregon Power Co.

Extremes--Maximum discharge during year, 2,590 cfs Dec. 7 (gage height, 4.57 ft), from rating curve extended above 1,100 cfs by logarithmic plotting; minimum, 487 cfs Oct. 2, 1948-51; Maximum discharge, that of Dec. 7, 1950; minimum daily, 470 cfs Nov. 22, 1949, Jan. 3, 1950.

Remarks--Records good except those for periods of no gage-height record, which are fair. No diversion above station. Flow slightly regulated by Diamond Lake.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28		Oct. 29 to Sept. 30	
2.3	480	2.3	520
2.7	770	3.0	1,110
3.2	1,140	3.5	1,560
		4.4	2,420

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	494	1,200	957	896	a830	845	862	1,150	1,030	a770	624	576
2	494	1,700	922	904	a790	828	870	1,110	1,010	780	616	568
3	515	1,480	1,420	879	a760	820	913	1,090	1,000	752	608	568
4	529	1,280	1,920	904	a1,400	856	1,000	1,100	993	744	608	568
5	613	1,130	1,650	879	a2,000	828	1,050	1,090	975	736	608	568
6	585	1,020	2,060	862	a1,950	a825	1,060	1,130	975	736	608	576
7	550	957	2,350	854	a1,980	a820	1,090	1,140	984	720	616	576
8	536	948	1,870	845	a1,750	a820	1,100	*1,130	957	712	616	576
9	522	897	1,610	836	a1,550	a815	1,130	1,160	948	712	616	576
10	599	854	1,440	836	a1,500	a810	1,160	1,230	948	712	616	576
11	606	*828	1,410	836	a1,600	a805	1,190	1,340	948	712	616	568
12	599	820	1,330	*811	a1,500	a800	1,260	a1,270	939	*704	616	568
13	592	802	1,250	856	a1,400	a800	1,340	a1,230	930	704	616	568
14	592	794	1,300	930	a1,300	a840	1,420	1,210	930	704	616	580
15	592	786	1,230	948	a1,250	*993	1,450	1,190	939	704	616	*560
16	585	828	1,160	930	a1,200	957	1,460	1,200	939	696	616	560
17	650	913	1,130	a1,010	a1,160	879	1,450	1,240	922	688	616	552
18	635	1,300	1,080	a950	a1,120	854	1,420	1,250	904	688	608	552
19	599	1,110	1,060	a950	a1,090	854	1,380	1,240	879	688	608	560
20	592	1,090	1,030	a850	a1,060	896	1,330	1,240	870	688	600	*552
21	592	1,030	984	a940	a1,030	922	1,270	1,240	845	688	600	552
22	578	948	957	a1,080	a1,000	904	1,220	1,260	828	688	600	544
23	571	904	939	a1,450	a970	879	1,180	1,280	811	690	600	544
24	566	904	913	a1,780	a940	870	1,160	1,250	a910	690	592	544
25	598	922	896	a1,580	904	879	1,160	1,240	a800	672	592	552
26	609	913	879	a1,400	879	879	1,140	1,230	a790	664	584	552
27	707	966	862	a1,250	854	879	1,150	1,220	a780	664	584	552
28	1,080	930	913	a1,120	862	879	1,280	1,180	a780	656	600	552
29	1,890	922	966	a1,030	-	904	1,230	1,140	a760	640	608	552
30	1,300	984	939	a970	-	896	1,160	1,100	a770	640	592	600
31	1,030	-	904	a870	-	879	-	1,060	-	622	576	-
Total	21,010	30,120	38,331	31,156	34,629	26,695	35,885	36,940	27,014	21,634	18,792	16,872
Mean	678	1,004	1,236	1,005	1,237	861	1,196	1,192	900	698	606	562
Cfs/m	2.63	3.89	4.79	3.90	4.79	3.34	4.64	4.62	3.49	2.71	2.35	2.18
In.	3.03	4.34	5.53	4.49	4.99	3.85	5.17	5.32	3.89	3.12	2.71	2.43
Ac-ft	41,670	59,740	76,030	61,800	68,690	52,950	71,180	73,270	53,580	42,910	37,270	33,470

Calendar year 1950: Max 2,350 Min 470 Mean 895 Cfs/m 3.47 In. 47.11 Ac-ft 648,100  
Water year 1950-51: Max 2,350 Min 494 Mean 929 Cfs/m 3.60 In. 48.67 Ac-ft 672,600

Peak discharge (base, 1,400 cfs)--Oct. 29 (4 a.m.) 2,210 cfs (4.18 ft); Nov. 2 (1 a.m.) 1,780 cfs (3.73 ft); Nov. 18 (6 a.m.) 1,420 cfs (3.34 ft); Dec. 7 (3 a.m.) 2,590 cfs (4.57 ft); Jan. 24 (time and discharge unknown); Feb. 5 (time and discharge unknown); Apr. 16 (8 to 12 p.m.) 1,470 cfs (3.44 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage when available and records for stations above Copeland Creek and below Lake Creek, Fish Creek at Big Camas ranger station and Clearwater River at mouth.

## 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., on right bank 450 ft upstream from Trap Creek and 40 miles east of Glide.

Drainage area.--41.6 sq mi.

Records available.--October 1927 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 3,760 ft (from river-profile map). Prior to Sept. 10, 1939, water-stage recorder at site 25 ft downstream at different datum.

Average discharge.--22 years (1928-45, 1946-51), 152 cfs.

Extremes.--Maximum discharge during year, 487 cfs Oct. 29 (gage height, 2.28 ft), from rating curve extended above 290 cfs by logarithmic plotting; minimum, 149 cfs Oct. 1-3, 13-16, 19, 20, 21-24.

1927-51: Maximum discharge, that of Oct. 29, 1950; maximum gage height, 2.40 ft Jan. 7, 1948 (backwater from log); minimum discharge, 91 cfs Nov. 4-6, 27, Dec. 12, 29, 1931, Jan. 3, 1932.

Remarks.--Records good. No diversion or regulation above station.

Revisions.--W 1124: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29		Oct. 30 to Sept. 30	
1.0	149	1.0	163
1.4	233	1.4	244
2.1	429	1.9	368

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	149	238	215	220	211	226	207	265	249	222	190	180
2	149	272	213	222	215	224	204	260	246	218	190	180
3	154	255	262	220	215	222	211	260	246	215	188	180
4	153	240	281	218	246	224	213	260	249	215	188	180
5	171	226	262	213	258	222	215	260	246	213	186	180
6	162	214	315	211	205	222	220	265	242	211	186	180
7	156	206	354	211	273	220	226	265	240	209	186	180
8	158	211	322	211	272	218	231	265	240	207	186	180
9	156	205	300	211	267	213	237	*267	240	207	186	180
10	153	200	290	211	272	211	253	272	242	207	184	180
11	153	*194	298	*209	285	209	249	292	244	207	184	180
12	151	192	283	207	278	209	256	285	244	204	184	180
13	149	190	274	207	269	209	267	276	242	202	184	180
14	149	188	281	207	267	207	281	272	246	200	184	180
15	149	188	267	11	265	*213	292	269	253	198	184	180
16	149	194	260	209	258	207	300	272	253	198	184	180
17	163	196	253	211	256	204	302	278	246	198	184	180
18	156	215	249	209	251	204	300	278	242	196	184	180
19	151	202	24	207	249	204	295	276	240	196	184	180
20	151	213	24	207	244	204	288	278	237	196	184	*180
21	151	207	237	211	242	207	281	281	237	196	182	178
22	149	200	233	207	240	204	276	283	235	194	182	178
23	149	200	231	222	237	204	272	285	235	194	182	178
24	149	200	229	224	235	204	269	278	231	194	182	178
25	154	204	226	220	235	204	269	278	229	194	180	180
26	156	207	224	222	231	204	267	278	226	194	180	180
27	170	224	222	220	229	204	272	278	224	194	180	180
28	251	213	233	215	229	207	285	269	224	192	184	180
29	412	213	231	211	-	209	278	262	224	192	182	180
30	278	222	226	213	-	207	269	258	224	192	182	186
31	232	-	222	213	-	207	-	251	-	192	180	-
Total	5,339	6,329	7,981	6,618	6,993	6,533	7,785	8,420	7,174	6,247	5,706	5,398
Mean	172	211	257	213	250	211	260	272	239	202	184	180
Cfs/m	4.13	5.07	6.18	5.12	6.01	5.07	6.25	6.54	5.75	4.86	4.42	4.33
In.	4.77	5.66	7.13	5.92	6.25	5.84	6.96	7.53	6.41	5.58	5.10	4.83
Ac-ft	10,580	12,550	15,830	13,130	13,870	12,960	15,440	16,700	14,230	12,390	11,320	10,710

Calendar year 1950: Max 412 Min 136 Mean 189 Cfs/m 4.54 In. 61.62 Ac-ft 136,700  
Water year 1950-51: Max 412 Min 149 Mean 221 Cfs/m 5.31 In. 71.98 Ac-ft 159,700

Peak discharge (base, 220 cfs).--Oct. 29 (6 a.m.) 487 cfs (2.28 ft); Dec. 6 (12 p.m.) 380 cfs (1.94 ft); Feb. 11 (6 p.m.) 288 cfs (1.59 ft); Apr. 16 (6 to 11 p.m.) 305 cfs (1.66 ft).

\* Discharge measurement made on this day.

## UMPQUA RIVER BASIN

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., on right bank a quarter of a mile upstream from mouth and 3 miles northeast of Big Camas ranger station.

Drainage area.--75 sq mi, approximately.

Records available.--October 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,437.5 ft above mean sea level (levels by California Oregon Power Co.). Prior to Oct. 13, 1948, staff gage at same site and datum.

Extremes.--Maximum discharge during year, 1,250 cfs Oct. 29 (gage height, 4.82 ft); minimum, 244 cfs Oct. 1, 2.  
1947-51: Maximum discharge, 1,340 cfs Jan. 7, 1948 (gage height, 4.96 ft); minimum, 224 cfs Jan. 3, 1950.

Remarks.--Records good except those for period of no gage-height record, which are fair. No diversion or artificial regulation. Large springs above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

2.4	230
3.0	385
3.5	555
4.0	780
4.6	1,120

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a245	506	436	388	418	391	394	478	400	331	288	278
2	a245	672	422	400	418	385	394	468	394	328	285	278
3	a260	629	563	397	412	379	406	468	391	325	285	278
4	a255	547	780	394	524	352	429	468	391	325	285	278
5	a290	499	720	385	690	376	446	464	385	320	285	278
6	a260	446	835	376	760	376	457	478	379	315	282	275
7	a265	415	1,100	376	825	367	474	482	376	315	282	272
8	a260	408	922	373	790	370	485	*474	376	312	282	272
9	a255	391	780	370	730	361	496	474	373	312	282	272
10	a250	373	695	364	725	355	524	468	373	308	282	272
11	a250	*367	666	364	760	355	524	538	373	308	282	270
12	246	370	619	*358	725	355	541	516	373	*305	282	270
13	246	361	579	358	666	355	579	506	370	305	282	270
14	246	355	591	373	623	*364	611	492	370	302	280	270
15	248	349	544	382	591	394	627	482	379	302	280	*270
16	250	370	520	379	552	403	635	482	376	302	280	270
17	278	403	499	409	538	385	635	488	370	300	280	270
18	270	555	482	394	513	379	619	488	361	298	280	270
19	258	510	471	388	488	382	599	482	358	295	280	270
20	258	516	454	379	478	394	567	478	358	295	280	270
21	255	492	440	406	460	409	541	478	355	295	278	270
22	252	464	426	403	450	403	520	478	352	292	278	270
23	252	445	418	464	456	391	510	482	346	292	278	270
24	252	432	409	591	426	391	499	471	343	292	278	270
25	266	436	400	559	418	394	488	464	340	292	278	272
26	273	436	391	544	409	394	482	460	340	292	275	270
27	311	471	388	524	403	394	488	457	337	290	275	270
28	504	450	400	485	397	394	534	443	337	290	280	270
29	1,080	443	415	454	-	406	488	429	337	290	282	270
30	718	454	406	440	-	406	488	418	334	280	280	280
31	511	-	394	429	-	397	-	406	-	288	278	-
Total	9,807	13,553	17,165	12,906	15,625	11,881	15,488	14,680	10,947	9,404	8,704	8,165
Mean	316	452	554	416	558	383	516	474	365	303	281	272
Cfs/m	4.21	6.03	7.39	5.55	7.44	5.11	6.88	6.32	4.87	4.04	3.75	3.63
In.	4.86	6.72	8.51	6.40	7.75	5.89	7.68	7.28	5.43	4.66	4.32	4.05
Ac-ft	19,450	26,880	34,050	25,600	30,990	23,570	30,720	29,120	21,710	18,650	17,260	16,200
Calendar year 1950: Max	1,100	Min	226	Mean	380	Cfs/m	5.07	In.	68.74	Ac-ft	274,900	
Water year 1950-51: Max	1,100	Min	245	Mean	406	Cfs/m	5.41	In.	73.55	Ac-ft	294,200	

Peak discharge (base, 600 cfs).--Oct. 29 (8 a.m.) 1,250 cfs (4.82 ft); Nov. 2 (3 to 8 p.m.) 710 cfs (3.88 ft); Nov. 18 (6 a.m.) 607 cfs (3.63 ft); Dec. 7 (5 a.m.) 1,170 cfs (4.68 ft); Feb. 7 (5 p.m.) 850 cfs (4.14 ft); Apr. 16 (11 p.m.) 648 cfs (3.73 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for station above Trap Creek.

Fish Creek at Big Camas ranger station, Oreg.

Location.--Lat 43°14', long. 122°26', in SE $\frac{1}{4}$  sec. 10, T. 27 S., R. 3 E., on right bank half a mile upstream from Camas Creek and three-quarters of a mile east of Big Camas ranger station.

Drainage area.--67 sq mi, approximately.

Records available.--October 1947 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,872.24 ft above mean sea level, datum of 1929 (surveys by California Oregon Power Co.).

Extremes.--Maximum discharge during year, 3,750 cfs Oct. 29 (gage height, 7.24 ft), on basis of contracted-opening determination of peak flow; minimum, 48 cfs Sept. 21-24, 26-28.

1947-51: Maximum discharge, 4,270 cfs Jan. 7, 1948 (gage height, 7.62 ft), from rating curve extended above 900 cfs on basis of contracted-opening determination at gage height 7.24 ft; minimum, 39 cfs Nov. 3-8, 1949.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion or regulation above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Sept. 10						Sept. 11-30	
2.4	39	3.5	320	5.0	1,300	0.3	33
2.6	69	4.0	585	6.0	2,250	.4	50
3.0	151	4.5	890	6.6	2,940	.5	69

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	958	426	231	293	172	234	350	267	139	a98	a70
2	53	1,280	395	260	233	169	227	330	264	137	a97	a70
3	72	925	1,240	267	298	164	252	350	260	134	a92	a65
4	90	729	1,620	248	898	167	320	365	256	134	g90	a65
5	177	584	1,130	224	1,340	156	380	365	241	132	g88	a65
6	139	475	1,670	211	1,180	156	410	410	231	127	g88	a60
7	101	397	1,900	208	1,270	151	448	426	221	123	g88	a60
8	101	372	1,250	202	1,020	146	470	405	218	120	g88	a60
9	99	313	932	202	820	141	486	426	218	120	g88	a55
10	78	*275	766	208	808	137	514	*497	221	a118	g88	a55
11	71	248	802	202	918	134	530	618	227	*g116	a88	*g54
12	66	241	682	*194	790	134	590	508	227	g116	a85	g52
13	61	221	590	211	658	139	670	464	221	g116	a85	g54
14	61	208	712	340	558	*141	724	431	227	g114	a85	g52
15	66	202	607	345	492	197	730	415	237	a113	a80	g52
16	66	245	541	316	426	234	724	458	231	g112	a80	a53
17	150	390	492	415	390	208	688	502	215	a110	a80	g54
18	120	932	436	370	345	197	624	497	205	g107	a80	g54
19	90	688	415	311	306	197	552	475	197	a108	a80	g50
20	81	682	365	275	284	211	492	470	191	a110	a80	g50
21	83	580	340	320	264	245	431	475	188	g112	a75	g48
22	72	480	316	316	245	237	390	508	180	a108	a75	a48
23	68	410	293	569	227	224	370	502	174	a104	a75	a48
24	68	420	275	876	215	221	350	464	169	a102	a70	a48
25	110	442	260	706	205	227	350	448	164	a102	a70	g50
26	140	448	248	629	194	231	355	442	159	g101	a65	a48
27	321	563	234	546	188	231	390	431	156	a100	a65	a48
28	1,480	458	254	470	180	227	580	385	151	a100	a80	a48
29	*2,860	448	271	415	-	252	458	335	146	a100	a90	a50
30	1,350	486	256	375	-	256	380	302	141	a98	a80	a60
31	779	-	241	325	-	245	-	284	-	a98	a75	-
Total	9,126	15,100	200,189	10,787	15,105	5,947	14,119	13,358	6,203	3,531	2,548	1,646
Mean	294	503	651	348	539	192	471	430	207	114	82.2	54.9
Cfsm	4.39	7.51	9.72	5.19	8.04	2.87	7.03	6.42	3.09	1.70	1.23	0.819
In.	5.07	8.38	11.21	5.99	8.38	3.30	7.84	7.40	3.44	1.96	1.41	0.91
Ac-ft	18,100	29,950	40,040	21,400	29,950	11,800	28,000	26,460	12,300	7,000	5,050	3,260

Calendar year 1950: Max 2,860 Min 52 Mean 347 Cfsm 5.18 In. 70.22 Ac-ft 250,900  
 Water year 1950-51: Max 2,860 Min 48 Mean 322 Cfsm 4.81 In. 65.29 Ac-ft 233,300

Peak discharge (base, 900 cfs).--Oct. 29 (4 a.m.) 3,750 cfs (7.24 ft); Nov. 2 (5 a.m.) 1,410 cfs (5.06 ft); Nov. 18 (5 a.m.) 1,110 cfs (4.73 ft); Dec. 3 (8 p.m.) 1,860 cfs (5.58 ft); Dec. 6 (12 p.m.) 2,600 cfs (6.32 ft); Jan. 23 (11 p.m.) 953 cfs (4.53 ft); Feb. 5 (9 a.m.) 1,420 cfs (5.13 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Clearwater River at mouth.  
 g Computed from once-daily staff gage readings (temporary staff gage at site 1,200 ft downstream used after Sept. 10).

## North Umpqua River above Copeland Creek, Oreg.

Location.--Lat 43°18', long. 122°32', in NE¼ sec. 23, T. 26 S., R. 2 E., on right bank half a mile upstream from Copeland Creek and 40 miles east of Roseburg.

Drainage area.--471 sq mi.

Records available.--September 1949 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,580 ft (from river-profile map).

Extremes.--Maximum discharge during year, 12,200 cfs Oct. 29 (gage height, 11.30 ft), from rating curve extended above 3,200 cfs on basis of slope-area determination at gage height 11.30 ft; minimum daily, 804 cfs Oct. 2, 1949-51; Maximum discharge, that of Oct. 29, 1950; minimum daily, 768 cfs Oct. 2, 3, 1949.

Remarks.--Records good. No diversion above station. Regulation by powerplants upstream; slightly regulated by Diamond Lake.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29

Oct. 30 to Sept. 30

2.8	780	5.0	2,570	2.7	850	5.0	2,570
3.0	*900	7.0	4,900	3.0	1,030	7.0	4,900
4.0	1,660	10.0	9,700	4.0	1,720	10.0	9,700

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	876	3,030	2,100	1,740	1,930	1,630	1,730	2,090	1,880	1,080	1,080	976
2	804	4,580	1,980	1,850	1,800	1,560	1,740	2,080	1,820	1,370	1,050	982
3	948	3,640	4,010	1,940	1,610	1,520	1,850	2,110	1,810	1,370	1,040	970
4	936	2,880	5,890	1,880	3,860	1,440	2,040	2,120	1,740	1,220	1,070	970
5	1,250	2,440	4,370	1,730	5,360	1,690	2,190	2,100	1,650	1,290	1,020	964
6	1,140	2,220	5,860	1,700	5,220	1,430	2,230	2,160	1,640	1,280	1,070	958
7	1,040	2,000	7,070	1,660	5,460	1,590	2,300	2,190	1,700	1,250	1,050	970
8	974	1,970	4,810	1,650	4,580	1,490	2,280	*2,070	1,770	1,200	1,030	946
9	974	1,860	3,790	1,630	3,850	1,510	2,310	2,260	1,610	1,230	1,030	934
10	942	*1,710	3,290	1,660	3,690	1,500	2,330	2,300	1,460	1,240	1,040	952
11	1,040	1,640	3,120	*1,680	4,010	1,410	2,420	2,710	1,650	*1,210	1,040	934
12	954	1,620	2,870	1,630	3,650	1,480	2,610	2,570	1,640	1,250	1,040	952
13	1,010	1,860	2,620	1,650	3,170	*1,500	2,890	2,490	1,640	1,200	1,030	934
14	981	1,500	2,820	2,130	2,860	1,650	2,980	2,400	1,630	1,170	1,020	*946
15	995	1,510	2,650	2,170	2,640	1,990	3,060	2,290	1,640	1,170	1,010	934
16	988	1,730	2,380	2,060	2,430	2,180	3,050	2,300	1,690	1,160	1,020	934
17	1,200	2,130	2,280	2,350	2,320	1,880	2,790	2,370	1,370	1,150	1,010	946
18	1,190	3,910	2,150	2,170	2,200	1,750	2,770	2,360	1,590	1,170	1,020	952
19	1,050	2,900	2,090	1,970	2,100	1,780	2,610	2,320	1,520	1,150	1,010	952
20	1,020	2,750	2,020	1,820	2,010	1,970	2,470	2,300	1,520	1,120	982	940
21	1,040	2,500	1,940	2,020	1,940	2,110	2,290	2,300	1,540	1,140	994	934
22	1,000	2,240	1,860	2,170	1,830	1,920	2,210	2,350	1,520	1,120	1,010	946
23	963	2,020	1,820	3,260	1,860	1,850	2,140	2,360	1,480	1,120	1,010	916
24	909	2,060	1,750	4,550	1,810	1,760	2,080	2,290	1,170	1,120	994	946
25	1,060	2,090	1,720	3,670	1,650	1,780	2,070	2,250	1,490	1,100	988	928
26	1,050	2,030	1,670	3,310	1,690	1,860	2,060	2,230	1,450	1,090	970	922
27	1,720	2,220	1,620	2,970	1,640	1,790	2,060	2,200	1,400	1,100	988	922
28	4,370	2,060	1,710	2,570	1,590	1,770	2,560	2,100	1,400	1,170	1,010	868
29	*9,000	2,020	1,920	2,280	-	1,920	2,330	2,020	1,400	1,020	1,040	970
30	4,410	2,120	1,860	2,080	-	1,870	2,170	1,980	1,380	1,080	988	982
31	2,770	-	1,800	2,020	-	1,810	-	1,850	-	1,070	976	-
Total	48,614	68,940	87,840	67,970	78,760	53,400	70,620	69,520	47,200	36,390	31,630	28,380
Mean	1,568	2,298	2,834	2,193	2,813	1,723	2,354	2,243	1,573	1,174	1,020	948
Cfs/m	3.33	4.88	6.02	4.66	5.97	3.66	5.00	4.76	3.34	2.49	2.17	2.01
In.	3.84	5.44	6.94	5.37	6.22	4.22	5.58	5.49	3.73	2.87	2.50	2.24
Ac-ft	96,420	136,700	174,200	134,800	156,200	105,900	140,100	137,900	93,620	72,180	62,740	56,290

Calendar year 1950: Max 9,000 Min 798 Mean 1,959 Cfs/m 4.16 In. 56.45 Ac-ft 1,418,000  
 Water year 1950-51: Max 9,000 Min 804 Mean 1,888 Cfs/m 4.01 In. 54.44 Ac-ft 1,367,000

\* Discharge measurement made on this day.

## Umpqua River near Elkton, Oreg.

Location.--Lat 43°35', long. 123°33', in sec. 8, T. 23 S., R. 7 W., on right bank 4 miles south of Elkton.

Drainage area.--3,680 sq mi, approximately.

Records available.--October 1905 to September 1951 (incomplete prior to November 1908).

Gage.--Staff gage read twice daily. Datum of gage is 91.33 ft above mean sea level, datum of 1929. Prior to Jan. 1, 1910, at datum 1.48 ft higher and Jan. 1, 1910 to Sept. 30, 1929, at datum 0.96 ft higher.

Average discharge.--46 years, 7,177 cfs.

Extremes.--Maximum discharge during year, 208,000 cfs Oct. 30 (gage height, 44.2 ft), from rating curve extended above 68,000 cfs on basis of slope-area determination of peak flow; minimum, 1,000 cfs Sept. 19, 20.

1906-51: Maximum discharge, that of Oct. 30, 1950; minimum observed, 640 cfs July 18, 1926 (gage height, 0.71 ft).

Maximum stage known, 45.5 ft sometime in 1861.

Remarks.--Records good except those for periods of doubtful gage-height record of backwater from moss, which are fair. Some diversions for irrigation from streams in South Umpqua River basin, but low flow probably only slightly affected. Powerplant at Winchester and manipulation of gates and racks of fish hatchery at Diamond Lake ordinarily do not affect discharge at this station.

Revisions (water years).--W 1184: 1927(M), 1938(M), 1943(M), 1946(M).

Rating tables, water year 1950-51, except period of backwater from moss (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 30				Dec. 1 to Sept. 30			
1.2	950	9.0	16,500	5.0	6,320	9.0	17,000
2.0	1,780	14.0	34,600	7.0	11,100	14.0	34,600
3.0	3,020	20.0	61,500	Note.--Same as preceding table below 5.0 and above 14.0 ft.			
5.0	6,320	28.0	102,000				
7.0	10,700	38.0	164,000				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,280	25,500	15,000	13,100	10,900	6,180	7,430	6,440	3,440	d1,700	1,310	1,240
2	1,160	19,800	19,700	14,200	9,820	6,000	7,070	6,100	3,400	d1,700	1,300	1,300
3	1,260	19,200	27,500	23,600	9,380	5,600	6,750	6,080	3,310	d1,600	1,290	1,340
4	1,770	18,900	65,100	24,200	17,300	6,200	7,180	6,220	3,220	d1,700	1,280	1,260
5	2,000	17,000	55,700	21,700	62,300	12,300	7,850	6,360	3,120	d1,700	1,260	1,150
6	2,510	13,600	38,800	17,700	55,800	13,800	8,080	6,480	2,990	d1,700	1,250	1,100
7	3,980	9,080	53,400	14,700	47,000	15,700	7,780	6,460	2,900	d1,800	1,220	1,030
8	2,920	7,740	44,900	412,500	44,800	16,100	7,540	6,100	2,850	d1,800	1,190	1,070
9	*2,380	7,120	30,800	10,900	31,600	19,000	*7,360	5,770	2,770	d1,800	1,150	1,090
10	2,170	6,520	23,700	10,500	25,500	18,000	7,190	5,600	2,700	d1,800	1,120	1,110
11	1,960	5,920	18,900	14,000	27,900	13,900	7,210	6,280	2,630	1,810	*1,110	1,120
12	1,810	5,280	17,600	15,600	32,100	12,200	7,400	8,450	2,590	1,720	1,100	1,150
13	1,720	5,020	14,700	14,700	27,700	14,000	7,670	9,180	2,620	*1,690	1,080	1,130
14	1,650	4,860	12,700	17,500	20,400	18,900	7,890	9,280	d2,600	1,660	1,080	1,110
15	1,630	5,190	14,000	25,900	16,700	24,100	7,730	8,700	d2,500	1,610	1,080	1,100
16	1,670	33,000	14,000	30,200	14,600	35,900	7,560	7,890	d2,400	1,600	1,080	1,050
17	1,760	44,900	12,600	38,800	12,700	26,100	7,320	6,580	d2,300	1,580	1,060	1,030
18	1,720	71,500	11,500	89,200	12,100	16,100	7,070	5,770	d2,300	1,540	1,060	*1,010
19	1,800	62,300	10,300	50,200	11,500	14,000	6,790	5,460	d2,200	1,530	1,080	1,000
20	2,640	35,900	9,380	*30,600	10,700	14,700	6,400	5,260	d2,100	1,500	1,080	1,010
21	2,360	28,400	8,520	29,600	10,400	16,000	5,570	*5,070	d2,100	1,480	1,110	1,020
22	2,160	18,500	7,760	54,300	10,100	16,900	5,070	4,890	d2,000	1,470	1,110	1,020
23	2,020	14,000	7,070	43,100	9,120	12,800	d5,000	4,800	d2,000	1,450	1,100	1,020
24	1,930	12,300	6,540	66,600	8,500	11,000	4,650	4,680	d2,000	1,430	1,110	1,026
25	1,890	11,500	6,180	46,500	8,050	10,800	4,620	4,560	d1,900	1,430	1,130	1,030
26	1,980	10,400	5,840	35,100	7,450	10,000	4,560	4,380	d1,900	1,430	1,150	1,050
27	4,420	9,750	5,500	27,500	*7,110	9,540	4,560	4,240	d1,900	1,400	1,160	1,050
28	22,700	9,960	5,350	21,100	5,560	9,200	4,120	d1,800	1,390	1,590	1,080	1,040
29	152,000	9,050	6,710	17,500	-	8,900	5,460	3,680	d1,800	1,360	1,060	1,060
30	*160,000	9,380	10,400	14,400	-	8,720	6,420	3,650	d1,800	1,340	1,090	1,090
31	*49,100	-	13,500	12,100	-	8,380	-	3,500	-	1,320	1,160	-
Total	440,050	551,550	595,450	859,400	566,090	431,000	197,640	182,230	74,140	49,040	35,440	32,860
Mean	14,200	18,380	19,210	27,720	20,220	13,900	6,588	5,878	2,471	1,582	1,143	1,095
Cfs/m	3.86	4.99	5.22	7.53	5.49	3.78	1.79	1.60	0.671	0.430	0.311	0.298
In.	4.45	5.57	5.95	8.59	5.72	4.36	2.00	1.84	0.75	0.50	0.36	0.33
Ac-ft	872,800	*1,094	*1,191	*1,705	*1,123	854,900	392,000	361,400	147,100	97,270	70,290	65,180
Calendar year 1950:	Max 160,000	Min 1,150	Mean 11,710	Cfs/m 3.18	In. 43.14	Ac-ft 8,478,000						
Water year 1950-51:	Max 160,000	Min 1,000	Mean 11,000	Cfs/m 2.99	In. 40.42	Ac-ft 7,964,000						

Peak discharge (base, 52,000 cfs).--Oct. 30 (1 a.m.) 208,000 cfs (44.2 ft); Nov. 18 (about 6 p.m.) 86,100 cfs (25.0 ft); Dec. 4 (about 6 a.m.) 74,500 cfs (22.7 ft); Dec. 7 (5 p.m.) 57,600 cfs (19.2 ft); Jan. 18 (about 4 p.m.) 99,600 cfs (27.6 ft); Jan. 22 (about 8 a.m.) 61,800 cfs (20.1 ft); Jan. 24 (about 9 a.m.) 73,500 cfs (22.5 ft); Feb. 5 (2 p.m.) 73,500 cfs (22.5 ft).

\* Discharge measurement made on this day.

† Expressed in thousands.

‡ Doubtful gage-height record; discharge computed on basis of records for South Umpqua River near Brockway and North Umpqua River above Copeland Creek.

Note.--Backwater from moss July 11 to Sept. 30.

## Daniels Creek near Eastside, Oreg.

Location.--Lat 43°20'45", long. 124°05'25", near center sec. 2, T. 26 S., R. 12 W., on left bank at downstream side of highway bridge, 0.1 mile downstream from Morgan Creek and 5½ miles southeast of Eastside.

Drainage area.--14.5 sq mi.

Records available.--July 1950 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 6.32 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 1,170 cfs Oct. 28 (gage height, 9.96 ft); minimum, 1.6 cfs Sept. 21.

1950-51: Maximum discharge, that of Oct. 28, 1950; minimum, 1.6 cfs Sept. 22, 1950, Sept. 21, 1951.

Remarks.--Records good except those above 200 cfs, which are fair. Diversions for irrigation above station of about 30 acres. No regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 9				Mar. 10 to Sept. 30			
2.3	3.6	8.0	222	1.9	1.0	4.5	56
2.5	5.6	8.5	285	2.1	3.0	6.0	114
3.0	13	8.7	330	2.5	8.5	8.0	212
4.0	41	9.0	470	3.0	18		
6.0	114	9.5	790				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.9	177	146	115	62	57	36	32	13	6.6	3.2	2.3
2	3.7	176	145	149	60	52	35	28	12	6.6	2.9	2.4
3	20	152	188	176	56	63	34	25	12	6.8	*2.9	2.3
4	27	119	250	144	185	205	32	25	12	7.0	2.9	2.4
5	51	95	189	118	236	196	31	24	12	7.0	2.8	*2.5
6	22	75	242	98	190	262	30	22	12	6.6	2.7	2.3
7	13	62	234	87	228	240	28	21	12	6.0	2.6	2.7
8	26	57	176	75	189	328	27	19	11	5.8	2.7	2.5
9	19	51	143	68	144	288	26	18	11	5.6	2.8	2.1
10	12	45	116	103	146	192	*25	17	10	5.4	2.7	2.0
11	9.2	40	128	176	232	161	25	21	10	*5.2	2.6	1.9
12	7.6	38	109	160	195	151	24	53	10	5.0	2.5	1.7
13	6.7	36	92	127	150	176	23	118	9.7	4.7	2.4	1.7
14	6.3	39	96	223	121	152	22	78	9.2	4.6	2.3	1.9
15	6.4	236	95	185	106	162	22	47	9.1	4.5	2.7	2.1
16	7.9	615	138	188	86	146	22	38	8.6	4.3	2.2	2.0
17	56	356	132	731	96	118	21	33	8.5	4.3	2.1	1.8
18	46	446	110	458	104	99	20	30	8.2	4.3	2.0	1.8
19	92	243	101	325	88	84	19	27	8.2	4.2	2.1	1.8
20	94	187	84	251	128	72	19	24	8.2	4.2	2.0	2.0
21	47	144	72	304	137	68	18	23	8.0	4.1	2.1	1.8
22	31	115	63	344	109	60	18	22	7.8	4.0	2.1	1.8
23	23	96	57	308	88	54	17	*21	7.6	3.8	2.1	1.9
24	19	122	52	265	78	50	17	20	7.4	4.0	2.1	1.8
25	48	112	49	196	78	47	16	19	7.2	4.0	2.1	2.1
26	63	102	46	168	74	44	16	17	7.0	3.6	2.1	2.3
27	*194	170	44	136	*66	41	17	16	6.8	3.5	2.1	2.1
28	*582	130	*68	113	59	39	29	15	6.8	3.5	2.7	2.3
29	713	111	96	94	-	42	30	15	6.8	3.5	3.5	2.6
30	*433	120	124	80	-	42	26	14	6.6	3.4	2.8	14
31	273	-	144	70	-	39	-	13	-	3.2	2.4	-
Total	2,955.7	4,467	3,728	6,035	3,491	3,730	725	895	278.7	149.3	77.2	74.9
Mean	95.3	149	120	195	125	120	24.2	28.9	9.29	4.82	2.49	2.50
Cfs/m	6.57	10.3	8.28	13.4	8.62	8.28	1.67	1.99	0.641	0.332	0.172	0.172
In.	7.58	11.46	9.56	15.48	9.95	9.57	1.86	2.30	0.71	0.38	0.20	0.19
Ac-ft	5,860	8,860	7,390	11,970	6,920	7,400	1,440	1,780	553	296	153	149

Calendar year 1950: Max - Min - Mean - Cfs/m - In. - Ac-ft -  
 Water year 1950-51: Max 731 Min 1.7 Mean 72.9 Cfs/m 5.03 In. 68.24 Ac-ft 52,770

Peak discharge (base, 300 cfs).--Oct. 28 (4 p.m.) 1,170 cfs (9.96 ft); Nov. 16 (3 a.m.) 1,090 cfs (9.87 ft); Jan. 17 (12 m.) 1,060 cfs (9.83 ft); Jan. 21 (1 p.m.) 396 cfs (8.87 ft); Mar. 8 (5 p.m.) 458 cfs (8.98 ft).

\* Discharge measurement made on this day.

Note.--Figures of daily discharge for Nov. 15-17 supersede those published in W.S.P. 1137D.  
 "Floods of October-November 1950 in southwestern, Oreg."



## South Fork Coquille River at Powers, Oreg.

Location.--Lat 42°53'40", long. 124°04'10", in SE $\frac{1}{4}$  sec. 12, T. 31 S., R. 12 W., on left bank half a mile northeast of bridge at Powers and three-quarters of a mile upstream from Woodward Creek.

Drainage area.--169 sq mi.

Records available.--September 1916 to September 1926, October 1928 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 197.42 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Nov. 17, 1938, staff or wire-weight gages at various sites within 1 mile of present site at different datums.

Average discharge.--32 years (1916-26, 1929-51), 733 cfs.

Extremes.--Maximum discharge during year, 24,400 cfs Oct. 28 (gage height, 18.14 ft), from rating curve extended above 14,000 cfs on basis of contracted-opening determination of peak flow; minimum, 16 cfs Sept. 19, 20.

1916-26, 1928-51: Maximum discharge, 30,500 cfs Dec. 28, 1945 (gage height, 20.57 ft), from rating curve extended above 14,000 cfs on basis of contracted-opening computation at gage height 18.14 ft; minimum, 12 cfs Sept. 22-25, 27-30, 1939.

Remarks.--Records good. No regulation. Small diversion for irrigation above station.

Revisions (water years).--W 1184: 1946(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Nov. 3-5, 12-15, 23-30, Dec. 13, 14, Dec. 19 to Jan. 2, Jan. 7-9)

Oct. 1 to Jan. 17

Jan. 18 to Sept. 30

1.0	23	3.5	1,020	1.1	15	3.0	515
1.2	48	5.0	2,240	1.3	31	4.5	1,650
1.5	102	8.0	5,720	1.6	70	7.0	4,250
2.0	242	11.0	10,200	2.0	149	10.7	9,690
2.5	445	14.3	16,100	2.5	300		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	2,510	1,900	1,110	635	521	705	545	164	55	31	25
2	24	1,940	1,980	1,880	805	480	656	500	159	55	30	23
3	67	1,390	6,300	2,790	656	460	754	440	156	54	30	22
4	320	1,040	6,110	3,030	3,790	1,010	915	450	154	54	30	23
5	708	776	3,330	2,200	4,480	1,350	824	425	149	55	28	22
6	717	a621	3,330	1,540	2,730	1,830	761	465	149	55	26	22
7	307	a513	3,920	1,180	4,070	1,550	712	450	147	55	26	*23
8	249	a421	2,870	968	3,340	2,500	649	411	142	54	26	21
9	266	a366	2,170	870	2,150	2,370	611	371	138	51	26	21
10	206	a342	1,610	1,600	2,190	1,450	569	343	134	*48	25	20
11	135	a321	1,730	2,520	4,020	1,090	*533	379	129	50	25	20
12	109	304	1,530	2,210	3,400	990	495	789	125	48	24	20
13	94	281	1,260	1,640	2,210	1,200	440	1,280	119	46	24	20
14	86	285	1,410	2,330	1,600	1,560	407	1,030	113	45	24	19
15	90	1,910	1,690	3,830	1,240	2,140	363	775	105	42	23	19
16	104	7,110	1,690	3,770	990	2,450	324	599	99	42	23	18
17	548	6,620	1,770	12,700	990	1,700	296	490	93	41	22	19
18	807	11,200	1,490	6,780	1,110	1,300	276	415	89	41	21	18
19	783	4,420	1,340	3,620	1,010	1,250	254	371	85	41	21	18
20	936	3,420	1,190	2,690	1,160	1,380	237	332	82	40	21	18
21	1,080	2,490	974	9,680	1,220	1,410	224	304	80	39	21	18
22	717	1,720	807	5,530	1,020	1,290	209	279	77	38	21	19
23	486	1,280	700	4,560	852	1,080	200	258	75	38	20	19
24	362	994	617	4,230	754	982	192	*244	73	36	19	21
25	886	783	555	2,910	726	1,010	184	227	70	38	19	20
26	1,430	694	510	2,260	677	1,050	177	212	68	36	20	22
27	6,720	1,190	475	1,800	*611	982	192	200	66	35	20	22
28	*15,000	890	*480	1,450	*557	894	535	192	62	34	21	24
29	16,100	785	520	1,130	-	945	539	184	60	33	30	23
30	7,160	1,200	877	890	-	908	617	177	58	33	30	50
31	3,800	-	1,290	740	-	789	-	172	-	31	27	-
Total	60,303	57,796	56,425	94,442	48,793	39,921	13,848	13,309	3,220	1,363	754	650
Mean	1,945	1,927	1,820	3,047	1,743	1,288	462	429	107	44.0	24.3	21.7
Cfs/m	11.5	11.4	10.8	18.0	10.3	7.62	2.73	2.54	0.633	0.260	0.144	0.128
In.	13.27	12.72	12.42	20.78	10.74	8.79	3.05	2.93	0.71	0.30	0.17	0.14
Ac-ft	119,600	114,600	111,900	187,300	96,780	79,180	27,470	26,400	6,390	2,700	1,500	1,290

Calendar year 1950: Max 16,100 Min 18 Mean 1,166 Cfs/m 6.90 In. 93.65 Ac-ft 844,100  
Water year 1950-51: Max 16,100 Min 18 Mean 1,071 Cfs/m 6.34 In. 86.02 Ac-ft 775,100

Peak discharge (base, 8,000 cfs).--Oct. 28 (4:30 p.m.) 24,400 cfs (18.14 ft); Nov. 16 (3:30 a.m.) 10,500 cfs (11.20 ft); Nov. 18 (4 a.m.) 14,600 cfs (13.52 ft); Jan. 17 (2 p.m.) 16,200 cfs (14.35 ft); Jan. 21 (12 p.m.) 13,700 cfs (13.00 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records from Daniels Creek near Eastside.

## Rogue River above Bybee Creek, Oreg.

Location.--Lat 42°56', long. 122°26', in NE<sup>1</sup>/<sub>4</sub> sec. 26, T. 30 S., R. 3 E., on left bank 700 ft upstream from Bybee Creek, 2 miles northeast of Union Creek and at mile 186.1 (U.S.G.S. river-profile survey).

Drainage area.--155 sq mi.

Records available.--January 1930 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 3,465 ft (from river-profile map). Prior to Nov. 23, 1934, water-stage recorder at site 200 ft downstream at different datum.

Average discharge.--21 years, 489 cfs.

Extremes.--Maximum discharge during year, 3,330 cfs Oct. 29 (gage height, 6.53 ft), from rating curve extended above 1,600 cfs by logarithmic plotting; minimum, 341 cfs Oct. 1, 2, 1930-51: Maximum discharge, 4,430 cfs Nov. 29, 1942, Dec. 28, 1945 (gage height, 7.84 ft), from rating curve extended above 1,600 cfs by logarithmic plotting; minimum daily, 180 cfs Jan. 7, 1937.

Remarks.--Records good. No diversion or regulation above station.

Revisions (water years).--W 984: 1933(M). W 1044: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.4	320
2.0	530
4.0	1,550
5.9	2,830

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	341	1,100	790	624	651	542	592	910	790	510	418	390	
2	341	1,830	728	633	606	530	610	875	777	502	418	390	
3	374	1,380	1,180	610	602	510	669	890	777	498	415	387	
4	418	1,110	1,730	602	870	502	772	905	772	494	415	384	
5	550	950	1,390	570	1,100	494	850	895	746	490	412	384	
6	490	832	2,120	554	1,230	522	885	920	728	486	412	384	
7	446	761	2,360	546	1,230	518	935	925	710	478	412	384	
8	418	764	1,800	546	1,200	534	960	930	696	478	408	384	
9	408	700	1,350	546	1,040	518	1,000	970	692	474	408	380	
10	377	642	1,220	550	1,030	482	1,040	1,040	696	470	*408	380	
11	356	602	1,300	542	1,170	482	1,060	1,250	700	466	404	380	
12	359	592	1,200	518	1,100	466	1,120	1,170	696	458	404	384	
13	356	570	1,060	522	975	494	1,230	1,040	682	458	401	384	
14	356	554	1,160	579	895	494	1,320	1,000	682	454	401	384	
15	368	538	1,060	606	840	558	1,350	995	696	450	398	380	
16	365	562	965	566	795	610	1,350	*1,060	682	446	398	380	
17	446	579	930	466	764	554	1,330	1,140	656	446	394	380	
18	426	955	865	582	732	538	1,260	1,130	638	443	394	380	
19	384	850	845	550	696	542	1,180	1,100	620	440	394	377	
20	374	*800	826	550	678	558	1,110	1,110	610	440	394	377	
21	380	759	772	558	651	*592	1,040	1,120	602	436	398	374	
22	365	606	736	579	633	570	985	1,130	588	432	398	374	
23	360	660	714	669	615	558	965	1,140	574	432	394	374	
24	360	669	692	1,040	597	566	940	1,070	570	432	394	371	
25	426	700	669	910	588	584	940	1,060	*554	429	390	377	
26	444	705	646	*808	570	588	940	1,040	542	426	390	380	
27	675	845	628	759	558	588	970	1,040	538	422	390	*374	
28	1,230	764	660	700	554	592	1,250	965	530	422	408	374	
29	2,760	750	718	584	-	628	1,060	900	522	422	415	380	
30	1,570	870	692	651	-	615	950	855	514	418	401	446	
31	962	-	651	700	-	592	-	818	-	418	398	-	
Total	17,485	24,089	32,257	13,200	22,970	16,941	30,663	31,333	19,580	14,070	12,484	11,477	
Mean	564	803	1,041	619	820	546	1,022	1,011	653	454	403	363	
Cfs/m	3.64	5.16	6.72	3.99	5.29	3.52	6.59	6.52	4.21	2.93	2.60	2.47	
In.	4.20	5.78	7.74	4.61	5.51	4.06	7.36	7.52	4.70	3.38	3.00	2.75	
Ac-ft	34,680	47,780	63,980	38,080	45,560	33,600	60,820	62,150	38,840	27,910	24,760	22,760	
Calendar year 1950: Max	2,760			Min	200	Mean	678	Cfs/m	4.37	In.	59.41	Ac-ft	491,200
Water year 1950-51: Max	2,760			Min	341	Mean	692	Cfs/m	4.46	In.	60.61	Ac-ft	500,900

Peak discharge (base, 1,600 cfs).--Oct. 29 (8 a.m.) 3,330 cfs (6.53 ft); Nov. 2 (9 a.m.) 1,940 cfs (4.85 ft); Dec. 4 (2 p.m.) 1,830 cfs (4.47 ft); Dec. 7 (4:30 a.m.) 2,790 cfs (5.85 ft).

\* Discharge measurement made on this day.

## Rogue River above Prospect, Oreg.

Location.--Lat 42°47', long. 122°30', in NE¼ sec. 19, T. 32 S., R. 3 E., on left bank 1½ miles upstream from intake of diversion of California Oregon Power Co., 2 miles northwest of Prospect, 3 miles upstream from Mill Creek, and at mile 169.7 (U.S.G.S. river-profile survey).

Drainage area.--332 sq mi.

Records available.--July 1907 to February 1912 (incomplete), October 1923 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,620 ft (from river-profile map). Prior to Feb. 17, 1912, staff gage at several sites within a few hundred feet upstream at various datums.

Average discharge.--29 years (1910-11, 1923-51), 748 cfs.

Extremes.--Maximum discharge during year, 7,620 cfs Oct. 29 (gage height, 6.74 ft); minimum, 452 cfs Oct. 1-3.

1907-12, 1923-51: Maximum discharge, 11,900 cfs Dec. 28, 1945 (gage height, 8.4 ft, from floodmark), from rating curve extended above 4,900 cfs; minimum observed, 200 cfs Nov. 20, 1931 (gage height, 1.07 ft).

Remarks.--Records good. No diversion or regulation above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

1.6	430
2.0	655
3.0	1,510
5.0	4,340
6.2	6,480

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	452	1,860	1,350	968	1,100	806	995	1,370	1,080	688	556	529
2	452	3,300	1,240	995	1,040	783	1,010	1,310	1,070	681	551	524
3	480	2,810	2,480	986	1,050	741	1,160	1,350	1,060	674	551	518
4	562	2,110	4,260	968	2,410	741	1,380	1,330	1,080	674	551	518
5	748	1,720	3,140	902	3,150	734	1,540	1,310	1,020	662	551	512
6	694	1,440	4,070	870	2,970	755	1,590	1,340	995	662	551	507
7	607	1,270	4,920	862	2,970	734	1,690	1,350	968	649	546	507
8	556	1,210	3,300	846	2,780	748	1,730	1,330	950	649	546	512
9	568	1,140	2,610	846	2,260	755	1,790	1,370	942	645	540	512
10	512	1,000	2,200	886	2,140	700	1,870	1,490	950	637	*540	507
11	496	934	2,230	886	2,500	694	1,840	1,840	950	631	540	507
12	480	918	2,070	838	2,310	707	1,950	1,880	950	619	540	507
13	474	886	1,790	830	1,950	714	2,150	1,640	926	613	540	507
14	474	862	2,010	934	1,700	741	2,270	1,580	926	613	540	502
15	485	822	1,860	1,080	1,540	854	2,310	1,530	950	607	540	502
16	480	910	1,650	1,030	1,430	1,070	2,270	*1,590	950	607	534	507
17	584	1,000	1,530	995	1,340	934	2,200	1,710	910	601	534	507
18	607	2,360	1,410	1,000	1,250	902	2,060	1,690	886	595	534	507
19	518	1,970	1,350	977	1,170	902	1,890	1,620	854	584	534	502
20	496	*1,620	1,300	926	1,110	959	1,740	1,600	846	584	529	496
21	502	1,490	1,190	977	1,060	*1,060	1,600	1,610	830	584	529	496
22	480	1,290	1,120	*1,030	995	1,010	1,490	1,630	798	584	534	490
23	470	1,190	1,080	1,660	950	977	1,450	1,650	776	584	529	490
24	466	1,150	1,030	2,410	926	977	1,590	1,530	769	578	524	490
25	536	1,200	966	1,970	894	1,030	1,380	1,520	*748	573	524	496
26	599	1,210	942	1,730	854	1,040	1,390	1,490	741	575	518	507
27	971	1,360	918	1,560	822	1,050	1,410	1,480	734	568	518	*496
28	2,940	1,260	959	1,390	822	1,050	1,960	1,380	720	568	540	496
29	6,290	1,190	1,110	1,110	-	1,110	1,700	1,270	707	565	551	502
30	3,660	1,460	1,080	1,100	-	1,090	1,470	1,200	700	562	540	556
31	2,090	-	1,020	1,150	-	1,030	-	1,140	-	556	529	-
Total	29,669	42,942	58,205	34,712	45,493	27,398	50,675	45,910	26,766	18,971	16,684	15,209
Mean	957	1,431	1,878	1,120	1,625	884	1,689	1,481	892	612	538	507
Cfsm	2.88	4.31	5.66	3.37	4.89	2.66	5.09	4.46	2.69	1.84	1.62	1.53
In.	3.32	4.81	6.52	3.89	5.10	3.07	5.68	5.14	3.00	2.13	1.87	1.70
Ac-ft	58,850	85,170	115,400	68,850	90,230	54,340	100,500	91,060	53,090	37,630	33,090	30,170
Calendar year 1950:	Max 6,290	Min 290	Mean 1,118	Cfsm 3.57	In. 45.68	Ac-ft 809,000						
Water year 1950-51:	Max 6,290	Min 452	Mean 1,151	Cfsm 3.41	In. 46.23	Ac-ft 818,400						

Peak discharge (base, 2,700 cfs).--Oct. 29 (6 a.m.) 7,620 cfs (6.74 ft); Nov. 2 (3 p.m.) 3,570 cfs (4.52 ft); Nov. 18 (4 p.m.) 2,820 cfs (4.02 ft); Dec. 4 (1 a.m.) 4,480 cfs (5.09 ft); Dec. 7 (5 a.m.) 5,520 cfs (5.70 ft); Feb. 4 (10 p.m.) 3,810 cfs (4.67 ft).

\* Discharge measurement made on this day.

## South Fork power canal near Prospect, Oreg.

Location.--Lat 42°44', long. 122°24', in W $\frac{1}{2}$  sec. 1, T. 33 S., R. 3 E., in Prospect No. 3 powerplant, 5 miles southeast of Prospect.

Records available.--April 1932 to September 1951.

Gage.--Wattmeter in powerplant. Prior to Oct. 1, 1941, water-stage recorder at site 1 mile downstream from headgate at diversion dam and about 1 $\frac{1}{2}$  miles southeast of powerplant.

Average discharge.--19 years, 109 cfs.

Extremes.--1932-51: Maximum daily discharge, 170 cfs June 18, 1933, Feb. 22, 1936, May 14, 1938, Apr. 4, 5, June 16, 1939; no flow at times.

Remarks.--Records good. Daily discharge computed on basis of electrical output of powerplant below station, the relation between electrical output and discharge being based on discharge measurements. This canal, completed in March 1932, diverts water from South Fork Rogue River 200 ft below mouth of Imnaha Creek for use at powerplant from which water may be wasted into Middle Fork Rogue River or mingled with flow of other diversions in Main power canal.

Cooperation.--Record of electrical output furnished by California Oregon Power Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	84	153	150	153	153	154	156	155	154	144	113	96
2	83	151	151	154	154	154	156	155	156	144	111	95
3	87	151	151	154	154	154	156	155	156	142	110	94
4	106	152	150	153	154	154	156	155	156	142	82	92
5	128	152	151	154	154	155	155	156	155	140	110	92
6	117	151	149	153	154	155	156	156	156	138	110	92
7	104	149	149	154	154	155	156	156	156	138	107	92
8	95	151	150	154	153	155	156	155	155	137	106	91
9	102	147	150	154	154	155	156	156	156	134	*105	90
10	98	141	150	154	153	154	156	156	156	131	104	90
11	87	135	150	154	153	154	156	*157	156	134	102	90
12	83	135	148	154	154	154	156	156	156	132	104	90
13	84	134	149	154	153	155	156	156	156	130	103	87
14	82	134	149	154	153	155	156	156	156	116	102	86
15	88	130	149	154	153	155	156	155	156	127	101	86
16	84	138	150	154	154	155	156	156	156	124	100	86
17	94	145	156	154	153	155	157	156	156	125	99	86
18	102	150	157	153	154	154	156	156	156	125	99	87
19	88	150	156	153	153	154	156	156	156	125	98	86
20	86	151	156	154	153	*155	154	157	156	124	100	84
21	84	151	155	154	153	154	154	156	156	123	99	84
22	80	151	154	154	153	156	153	157	156	122	99	84
23	79	150	152	*155	153	155	153	156	154	121	98	84
24	79	150	154	154	153	156	154	157	*154	118	98	83
25	84	150	154	154	153	156	156	157	151	118	96	82
26	94	150	154	154	153	156	155	155	149	118	96	84
27	130	150	154	155	146	156	156	156	149	118	96	84
28	152	151	154	155	153	156	155	156	148	117	95	*82
29	150	150	153	154	-	156	154	157	146	115	101	83
30	151	*146	154	154	-	156	156	156	144	114	98	90
31	152	-	155	154	-	156	-	156	-	113	97	-
Total	3,117	4,399	4,714	4,772	4,287	4,804	4,664	4,835	4,623	3,949	3,139	2,632
Mean	101	147	152	154	153	155	155	156	154	127	101	87.7
Ac-ft	6,180	8,730	9,350	9,470	8,500	9,530	9,250	9,590	9,170	7,830	6,230	5,220

Calendar year 1950: Max 157 Min 62 Mean 132 Ac-ft 95,900  
 Water year 1950-51: Max 157 Min 79 Mean 137 Ac-ft 99,050

\* Discharge measurement made on this day.

## South Fork Rogue River near Prospect, Oreg.

Location--Lat 42°42', long. 122°23', in NE¼ sec. 18, T. 33 S., R. 4 E., on right bank 500 ft downstream from diversion dam and intake of South Fork power canal, an eighth of a mile downstream from Innaha Creek, and 6 miles southeast of Prospect. Records include flow of South Fork power canal.

Drainage area--79 sq mi, approximately.

Records available--April 1924 to September 1931, October 1949 to September 1951 (includes flow of South Fork power canal completed in March 1932). Equivalent records for period October 1931 to September 1949 may be obtained from combined flow of South Fork Rogue River above Innaha Creek near Prospect and Innaha Creek near Prospect.

Gage--Water-stage recorder. Altitude of gage is 3,350 ft (from river-profile map). Apr. 26, 1924, to Sept. 30, 1931, water-stage recorder at site about an eighth of a mile downstream at different datum.

Average discharge--9 years (1924-31, 1949-51), 157 cfs.

Extremes--Maximum combined discharge of river and canal during year, 1,480 cfs Dec. 7 (river gage height, 5.43 ft), from rating curve extended above 660 cfs by logarithmic plotting; minimum daily, 80 cfs Oct. 23, 24, 1924-31, 1949-51; Maximum discharge, 1,700 cfs Dec. 19, 1929 (gage height, 4.58 ft, site and datum then in use), from rating curve extended above 350 cfs by logarithmic plotting; maximum gage height, 4.99 ft Nov. 28, 1927, site and datum then in use (backwater from logs); minimum discharge, about 35 cfs in September 1931 during period of no gage-height record.

Remarks--Records good. Since March 1932 most of low flow diverted by South Fork power canal 500 ft above station (see p. 270). Practically no storage above diversion dam.

Revisions (water years)--W 1184: 1930(M).

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	85	244	245	233	292	229	210	319	247	148	115	99
2	84	343	224	241	288	219	214	313	243	148	113	98
3	88	288	588	248	290	213	232	321	239	145	112	97
4	107	227	958	236	576	214	259	323	236	145	115	95
5	151	196	706	223	685	210	286	307	228	143	112	95
6	118	175	883	215	633	208	314	334	224	141	112	95
7	105	158	1,240	213	669	201	336	346	217	140	109	95
8	96	158	689	211	636	200	356	329	212	139	108	94
9	103	151	758	208	577	193	379	334	208	136	*107	93
10	99	143	641	207	572	185	421	354	207	134	106	93
11	88	136	653	206	568	182	445	*455	205	136	109	93
12	84	136	627	198	537	180	466	388	201	134	107	93
13	85	135	516	198	490	180	496	365	197	132	106	90
14	83	135	588	213	463	179	524	352	192	136	105	89
15	89	131	488	215	442	183	543	339	191	133	104	89
16	85	139	436	207	413	186	547	342	188	130	103	89
17	95	154	411	219	388	184	556	379	182	129	102	89
18	103	116	582	213	365	180	531	376	178	128	102	90
19	89	328	354	208	341	180	490	370	174	128	101	89
20	87	346	330	207	325	*184	455	371	172	127	103	86
21	85	317	307	262	310	188	437	374	170	126	102	86
22	81	263	288	278	297	185	409	380	168	124	102	86
23	80	238	269	401	283	184	398	379	164	123	101	86
24	80	222	257	*565	272	188	374	361	*164	120	101	85
25	85	214	248	490	264	194	376	355	160	120	99	84
26	95	216	238	452	254	195	366	353	157	120	99	86
27	132	262	231	426	249	200	360	354	156	120	99	86
28	380	242	246	387	236	204	438	326	155	120	98	*84
29	*460	227	303	340	-	215	377	301	152	117	104	85
30	371	256	263	350	-	211	358	284	149	116	101	92
31	248	-	245	310	-	210	-	275	-	115	100	-
Total	4,001	6,566	14,792	8,559	11,715	6,074	11,913	10,759	5,736	4,053	3,257	2,711
Mean	129	219	477	276	418	196	397	347	191	131	105	90.4
Cfsm	1.63	2.77	6.04	3.49	5.29	2.48	5.03	4.39	2.42	1.66	1.33	1.14
In.	1.88	3.09	6.96	4.03	5.51	2.86	5.61	5.06	2.70	1.91	1.53	1.28
Ac-ft	7,940	13,020	29,340	16,980	23,240	12,050	23,630	21,340	11,580	8,040	6,460	5,380

Calendar year 1950: Max 1,240 Min 63 Mean 241 Cfsm 5.05 In. 41.44 Ac-ft 174,700  
 Water year 1950-51: Max 1,240 Min 80 Mean 247 Cfsm 5.13 In. 42.42 Ac-ft 178,800

\* Discharge measurement made on this day.

## Middle Fork power canal near Prospect, Oreg.

Location.--Lat 42°44', long. 122°24', in NE<sup>1</sup> sec. 1, T. 33 S., R. 3 E., on left bank 1,000 ft downstream from headgate at diversion dam and 4½ miles southeast of Prospect.

Records available.--November 1931 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gage is about 2,632 ft above mean sea level (levels by California Oregon Power Co.).

Average discharge.--20 years, 104 cfs.

Extremes.--1931-51: Maximum daily discharge, 191 cfs Feb. 2, 1935; no flow at times.

Remarks.--Records excellent except those for periods of no gage-height record, which are fair. This canal, completed in November 1931, diverts water from Middle Fork Rogue River into Main power canal to supplement flow of Rogue River above Prospect diversion dam.

Cooperation.--Water-stage recorder graph furnished by California Oregon Power Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	125	70	87	a1	83	91	55	11	83	114	128	134
2	125	71	86	a1	83	91	55	3	83	114	128	134
3	125	70	83	a1	81	91	56	3	83	114	128	134
4	125	70	38	1	79	92	22	18	83	114	128	134
5	125	69	4	1	26	91	1	27	87	114	128	134
6	125	68	7	1	1	91	1	26	91	114	128	134
7	125	69	6	1	1	91	1	26	91	114	128	134
8	125	70	6	1	1	91	1	22	91	114	129	134
9	125	69	5	1	1	92	1	66	91	114	*129	133
10	125	91	4	1	1	92	1	81	91	116	128	133
11	124	112	3	1	1	91	1	82	91	120	127	133
12	124	112	3	1	.9	90	.9	84	95	120	128	133
13	124	111	3	37	.9	90	.9	83	103	120	128	133
14	124	110	2	78	.9	90	.9	83	105	120	129	132
15	123	110	2	74	.9	90	.9	*83	106	120	130	132
16	122	102	2	72	.8	76	.9	83	106	124	129	133
17	122	39	2	70	.8	70	.9	83	106	126	129	132
18	124	.7	2	78	.8	67	.9	83	106	126	129	132
19	124	.5	4	106	.8	65	.9	83	106	126	130	132
20	123	.4	5	a110	.8	*64	20	83	109	126	131	132
21	124	38	5	a110	18	63	30	83	112	126	132	134
22	124	90	5	a45	40	61	30	82	110	126	134	137
23	124	90	5	a1	62	60	30	81	110	126	134	137
24	124	89	28	a1	62	58	26	81	*110	125	134	137
25	124	88	57	*1	62	58	20	83	110	126	134	138
26	124	88	23	.6	62	58	19	83	108	126	134	138
27	124	88	3	.3	80	58	19	83	110	126	134	138
28	108	88	3	49	91	58	19	83	114	126	134	*138
29	61	88	3	72	-	57	19	83	114	126	134	138
30	62	*88	2	77	-	56	19	83	114	127	134	139
31	70	-	a2	83	-	56	-	83	-	127	134	-
Total	3,653	2,249.6	490	1,076.9	842.6	2,349	453.2	2,021	3,019	3,757	4,044	4,036
Mean	118	75.0	15.8	34.7	30.1	75.8	15.1	65.2	101	121	130	135
Ac-ft	7,250	4,460	972	2,140	1,670	4,660	899	4,010	5,990	7,450	8,020	8,010

Calendar year 1950: Max 131 Min 0.4 Mean 79.8 Ac-ft 57,770  
 Water year 1950-51: Max 139 Min 0.3 Mean 76.7 Ac-ft 55,530

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of complementary record for Middle Fork Rogue River.

## Middle Fork Rogue River near Prospect, Oreg.

Location.--Lat 42°44', long. 122°24', in NE¼ sec. 1, T. 33 S., R. 3 E., on right bank 850 ft downstream from diversion dam and intake of Middle Fork power canal and 4½ miles southeast of Prospect. Records include flow of Middle Fork power canal.

Drainage area.--57 sq mi, approximately.

Records available.--May 1925 to September 1951 (includes flow of Middle Fork power canal).

Gage.--Water-stage recorder. Datum of gage is 2,619 ft above mean sea level (levels by California Oregon Power Co.). Prior to Nov. 10, 1949, water-stage recorder and staff gage at various sites and datums within 150 ft of present gage.

Average discharge.--26 years, 178 cfs.

Extremes.--Maximum combined discharge of river and canal during year, 1,100 cfs Dec. 7 (river gage height, 3.70 ft), from rating curve extended above 580 cfs by logarithmic plotting; minimum daily, 129 cfs Oct. 12-14, 22-24.  
1925-51: Maximum combined discharge, 2,760 cfs Nov. 29, 1942, from rating curve extended above 1,100 cfs; maximum gage height, 5.2 ft Nov. 29, 1942, Dec. 28, 1945, site and datum then in use; minimum discharge, 72 cfs Aug. 24 to Sept. 5, 1931.

Remarks.--Records fair except those for February, which are poor. Since November 1931 most of low flow diverted by Middle Fork power canal 850 ft above station (see p. 272). Practically no storage above diversion dam.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	130	385	203	176	242	193	214	241	250	187	158	152
2	130	651	191	189	230	189	214	233	254	184	158	152
3	145	410	670	193	236	186	223	238	258	182	158	152
4	146	310	768	203	4730	190	247	243	263	180	158	150
5	178	249	615	199	d880	186	261	238	246	178	156	150
6	162	207	765	185	d800	186	276	237	242	174	155	149
7	151	185	939	185	d850	181	291	237	238	172	154	148
8	151	201	666	185	d800	183	301	224	242	170	156	148
9	145	174	553	189	d700	176	316	250	238	170	*155	147
10	137	167	440	194	d700	168	326	279	242	168	154	147
11	131	170	456	194	d650	167	321	327	250	170	154	146
12	129	172	403	189	d600	168	321	290	250	168	155	145
13	129	167	343	184	d550	177	336	285	238	167	155	144
14	129	166	367	194	d500	182	341	276	240	167	154	143
15	134	164	317	194	d460	210	358	*271	257	167	154	142
16	134	168	292	192	d420	219	346	299	257	168	153	143
17	158	190	277	276	d380	198	331	328	245	168	153	142
18	151	361	252	266	d360	198	326	328	237	166	152	142
19	136	376	249	241	d320	196	306	318	234	164	155	141
20	132	340	230	238	d300	*211	300	323	233	164	155	141
21	131	303	211	281	d280	222	280	348	232	162	154	139
22	129	249	207	290	d280	220	275	372	234	162	156	140
23	129	218	207	533	d260	215	275	366	223	161	156	141
24	129	205	191	752	d240	217	266	371	*212	160	154	140
25	140	197	173	*598	d230	221	270	393	205	160	154	142
26	150	193	166	493	d220	221	269	398	206	160	153	143
27	184	231	170	415	d210	221	274	383	197	158	153	141
28	443	204	191	379	d200	225	269	328	190	158	*141	140
29	*695	201	238	322	-	232	269	294	187	157	157	142
30	504	231	204	288	-	223	249	271	187	158	156	152
31	330	-	190	267	-	219	-	263	-	157	154	-
Total	5,802	7,455	11,144	8,690	12,638	6,200	8,639	9,272	6,987	5,185	4,805	4,345
Mean	187	248	359	280	451	200	288	299	233	167	155	145
Cfsm	3.28	4.35	6.30	4.91	7.91	3.51	5.05	5.25	4.09	2.93	2.72	2.54
In.	3.79	4.86	7.27	5.67	8.25	4.05	5.64	6.05	4.56	3.38	3.14	2.85
Ac-ft	11,510	14,790	22,100	17,240	25,070	12,300	17,140	18,390	13,960	10,280	9,530	8,620

Calendar year 1950: Max 939 Min 110 Mean 233 Cfsm 4.09 In. 55.52 Ac-ft 168,700  
Water year 1950-51: Max 939 Min 129 Mean 250 Cfsm 4.39 In. 59.49 Ac-ft 180,800

\* Discharge measurement made on this day.

d Doubtful gage-height record; discharge computed on basis of records for Red Blanket Creek and South Fork Rogue River near Prospect.

## ROGUE RIVER BASIN

Red Blanket Creek near Prospect, Oreg.

Location.--Lat 42°47', long. 122°26', in NE $\frac{1}{4}$  sec. 23, T. 32 S., R. 3 E., on right bank 3 miles northeast of Prospect.

Drainage area.--40 sq mi, approximately.

Records available.--May 1925 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,780 ft (from river-profile map). Prior to Sept. 7, 1949, staff gages at various sites and datums within 3 miles of present gage.

Average discharge.--26 years, 108 cfs.

Extremes.--Maximum discharge during year, 835 cfs Oct. 29 (gage height, 4.70 ft), from rating curve extended above 360 cfs by logarithmic plotting; minimum, 67 cfs Oct. 1, 1925-51. Maximum discharge observed, 1,880 cfs Nov. 29, 1942 (gage height, 5.1 ft, site and datum then in use, from floodmark), from rating curve extended above 350 cfs; minimum observed, 34 cfs Sept. 3, 4, 25, Oct. 9, 16, 1931.

Remarks.--Records good. One diversion above station for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28		Oct. 29 to Sept. 30	
2.6	68	2.6	69
2.8	97	2.8	102
3.0	135	3.0	147
3.3	208	4.4	665
3.6	298		

Discharge, in cubic feet per second, water year october 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	69	313	172	150	180	129	147	167	167	124	91	82
2	72	438	164	154	180	126	150	160	170	124	91	82
3	84	297	412	154	184	124	154	160	170	122	89	81
4	84	248	550	152	334	126	164	160	172	122	89	80
5	117	212	583	147	394	124	174	157	167	120	89	75
6	102	184	515	142	376	126	167	160	164	115	88	75
7	89	172	630	142	383	124	177	157	160	113	88	75
8	86	187	470	140	355	124	194	157	157	113	88	75
9	83	154	348	142	320	122	197	162	157	113	*66	74
10	78	142	294	142	307	120	203	174	160	111	84	74
11	77	136	297	140	297	120	206	200	162	109	84	74
12	76	138	272	131	275	120	218	184	162	106	84	74
13	73	131	242	136	251	122	236	184	160	106	84	72
14	74	129	263	154	236	124	248	180	164	104	82	72
15	74	126	236	160	221	142	245	*180	172	104	82	72
16	74	136	215	154	206	152	242	187	167	102	81	72
17	92	152	200	180	197	140	236	203	162	102	81	72
18	89	287	190	170	187	138	227	203	157	102	81	72
19	78	272	184	162	180	140	212	200	154	100	81	70
20	76	230	180	154	177	145	200	206	152	100	81	70
21	74	206	172	180	167	*152	192	206	150	98	80	69
22	73	184	167	182	162	152	184	215	147	97	80	69
23	72	172	162	294	157	152	180	218	142	97	80	69
24	72	167	160	362	152	152	174	212	140	95	80	69
25	78	162	154	*313	147	154	172	215	*136	95	80	69
26	81	160	152	278	142	154	172	224	136	95	78	69
27	110	180	147	251	136	154	180	224	131	93	78	*69
28	286	164	157	227	131	154	212	206	131	93	81	69
29	595	164	164	203	-	157	190	192	129	93	84	69
30	*338	184	157	192	-	150	174	184	126	93	84	82
31	218	-	152	184	-	147	-	174	-	91	84	-
Total	3,644	5,827	7,881	5,672	6,434	4,266	5,827	5,811	4,624	3,252	2,593	2,196
Mean	118	194	254	183	230	139	194	187	154	105	83.6	73.2
Cfs/m	2.95	4.85	6.35	4.58	5.75	3.45	4.85	4.68	3.85	2.62	2.09	1.83
In.	3.39	5.42	7.33	5.27	5.98	3.97	5.42	5.40	4.30	3.02	2.41	2.04
Ac-ft	7,230	11,560	15,630	11,250	12,760	8,460	11,560	11,530	9,170	6,450	5,140	4,360

Calendar year 1950: Max 630 Min 46 Mean 154 Cfs/m 3.85 In. 52.24 Ac-ft 111,400  
 Water year 1950-51: Max 630 Min 69 Mean 159 Cfs/m 3.98 In. 53.95 Ac-ft 115,100

Peak discharge (base, 300 cfs).--Oct. 29 (7:30 a.m.) 835 cfs (4.70 ft); Nov. 2 (9 a.m.) 497 cfs (4.06 ft); Nov. 18 (1 p.m. to 10 p.m.) 334 cfs (3.64 ft); Dec. 3 (8:30 p.m.) 665 cfs (4.40 ft); Dec. 7 (5 a.m.) 817 cfs (4.67 ft); Jan. 24 (1 a.m.) 426 cfs (3.89 ft); Feb. 4 (9 p.m.) 414 cfs (3.86 ft).  
 \* Discharge measurement made on this day.



Red Blanket power canal near Prospect, Oreg.

Location.--Lat 42°45', long. 122°27', in SE $\frac{1}{4}$  sec. 27, T. 32 S., R. 3 E., on right bank 600 ft downstream from headgate and diversion dam and 2 miles east of Prospect.

Records available.--November 1931 to September 1951.

Gage.--Water-stage recorder and concrete control. Datum of gage is 2,612 ft above mean sea level (levels by California Oregon Power Co.).

Average discharge.--19 years, 69.6 cfs.

Extremes.--1931-51: Maximum daily discharge, 106 cfs July 7-13, 1932; no flow for part of each day Sept. 24, 25, 1932.

Remarks.--Records good. This canal, completed in October 1931, diverts water from Red Blanket Creek into Main power canal to supplement flow of Rogue River above Prospect diversion dam.

Cooperation.--Water-stage recorder graph furnished by California Oregon Power Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	89	37	55	96	97	97	4.9	20	95	86	81
2	74	89	36	56	96	97	97	5.0	67	95	86	82
3	79	82	40	56	96	97	98	5.4	88	95	85	81
4	91	80	47	56	96	97	98	5.4	88	95	85	80
5	92	75	50	65	96	97	98	5.4	88	95	84	76
6	96	68	64	84	96	97	98	5.5	88	95	83	73
7	95	67	67	87	96	97	98	5.4	93	95	83	72
8	90	66	63	87	97	97	98	5.4	97	95	85	72
9	89	63	63	87	97	97	98	5.4	97	95	*83	71
10	81	60	62	87	97	97	98	5.5	97	96	83	70
11	80	58	61	90	97	97	98	5.8	97	95	83	70
12	78	57	61	98	97	97	98	5.8	97	94	82	69
13	77	55	60	97	97	97	98	5.6	97	94	81	69
14	76	54	60	97	97	97	98	5.4	97	95	80	69
15	80	51	58	96	97	97	98	5.4	97	95	79	69
16	79	49	56	96	97	97	98	5.4	97	97	79	68
17	98	47	56	97	97	96	98	*5.4	97	95	78	68
18	91	48	56	98	97	96	98	5.4	96	96	78	69
19	86	48	57	97	97	96	98	5.5	96	95	78	67
20	82	42	57	95	97	96	98	5.5	96	95	79	66
21	82	40	56	95	97	*96	99	5.5	96	95	78	66
22	80	38	57	*95	97	96	99	5.4	96	95	78	66
23	79	37	56	95	97	97	100	5.2	95	94	76	67
24	78	35	56	95	97	97	52	5.2	95	92	74	66
25	79	41	56	96	97	97	5.5	5.2	*95	92	76	67
26	87	40	56	96	97	97	5.4	5.2	95	92	76	67
27	88	40	56	96	97	97	5.4	5.2	95	90	77	*67
28	92	38	56	96	97	97	5.5	5.0	95	90	78	67
29	92	37	56	96	-	97	5.0	5.5	95	89	83	67
30	91	*37	55	96	-	97	5.0	7.8	95	88	84	76
31	88	-	55	96	-	97	-	7.8	-	88	82	-
Total	2,612	1,634	1,726	2,733	2,708	3,001	2,339.8	171.3	2,742	2,907	2,502	2,118
Mean	84.3	54.5	55.7	88.2	96.8	96.8	78.0	5.53	91.4	93.8	80.7	70.6
Ac-ft	5,180	3,240	3,420	5,420	5,370	5,950	4,640	340	5,440	5,770	4,960	4,200

Calendar year 1950: Max 103 Min 7.6 Mean 79.0 Ac-ft 57,190  
 Water year 1950-51: Max 100 Min 4.9 Mean 74.5 Ac-ft 53,930

\* Discharge measurement made on this day.

Main power canal below all feeders, near Prospect, Oreg.

Location.--Lat 42°45', long. 122°28', in SW<sup>1</sup> sec. 28, T. 32 S., R. 3 E., on left bank 0.8 mile downstream from outlet of Red Blanket power canal, 1 mile east of Prospect, and 1.6 miles upstream from diversion dam on Rogue River.

Records available.--November 1931 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,599.0 ft above mean sea level, datum of 1929.

Average discharge.--19 years (1932-51), 263 cfs.

Extremes.--1931-51: Maximum daily discharge, 423 cfs June 23-28, 1936; no flow at times.

Remarks.--Records good except those for May and June, which are fair. This canal, completed in November 1931, carries water diverted from South and Middle Forks Rogue River and Red Blanket Creek into Rogue River above Prospect diversion dam.

Cooperation.--Water-stage recorder graph furnished by California Oregon Power Co.

Discharge, in cubic feet per second, water year October 1950 to September 1951.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	286	193	175	216	324	237	206	2	194	356	324	313
2	286	195	175	217	294	241	206	9	246	356	324	311
3	300	190	186	216	294	241	206	19	271	354	324	310
4	321	185	126	217	282	240	143	32	271	354	291	310
5	315	177	80	226	150	258	93	44	274	352	323	305
6	274	170	100	247	100	283	94	44	278	349	323	303
7	294	167	101	250	100	284	94	44	286	347	319	302
8	311	167	96	250	99	284	94	46	289	347	319	302
9	315	159	94	248	98	284	94	64	289	347	*318	300
10	299	235	92	248	98	305	95	76	289	351	321	300
11	292	305	89	253	98	340	94	77	289	351	316	300
12	288	305	88	259	97	342	95	79	292	351	319	302
13	284	302	87	299	96	342	95	80	294	349	319	291
14	283	302	86	334	96	344	95	129	313	347	316	291
15	295	302	85	332	96	346	95	177	315	346	318	289
16	291	302	84	331	96	318	95	*177	315	346	316	291
17	300	248	86	332	95	289	95	178	315	349	318	291
18	295	204	86	334	95	286	95	178	315	352	318	292
19	302	203	87	349	94	283	104	178	316	351	311	291
20	294	200	89	349	94	282	123	178	340	346	315	288
21	291	227	88	349	113	*282	129	177	357	344	315	289
22	288	282	87	300	134	280	129	175	356	340	316	291
23	283	280	86	*272	146	280	128	175	354	359	315	291
24	282	280	168	265	148	278	63	173	*354	359	315	291
25	292	284	277	259	148	244	9	176	354	337	313	294
26	310	283	247	256	146	219	8	176	351	334	313	295
27	280	*284	220	254	196	219	7	176	361	331	315	*295
28	274	283	223	297	240	223	5	177	362	331	310	291
29	194	236	220	329	-	246	4	178	359	329	319	292
30	187	175	217	334	-	229	3	180	354	329	319	311
31	194	-	216	342	-	206	-	180	-	326	313	-
Total	8,800	7,126	4,141	8,764	4,037	8,535	2,796	3,752	9,353	10,680	9,815	8,922
Mean	284	238	134	283	144	275	93.2	121	312	345	317	297
Ac-ft	17,450	14,130	8,210	17,380	8,010	16,930	5,550	7,440	18,550	21,180	19,470	17,700

Calendar year 1950: Max 344 Min 25 Mean 237 Ac-ft 171,500  
 Water year 1950-51: Max 362 Min 2 Mean 259 Ac-ft 172,000

\* Discharge measurement made on this day.

Rogue River below South Fork Rogue River, near Prospect, Oreg.

Location.--Lat 42°42', long. 122°36', in NW<sup>1</sup> sec. 16, T. 33 S., R. 2 E., on right bank at downstream side of highway bridge 6 miles southwest of Prospect and at mile 160.4 (U.S.G.S. river-profile survey).

Drainage area.--643 sq mi.

Records available.--April 1929 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,708 ft (from river-profile map).

Average discharge.--22 years, 1,665 cfs.

Extremes.--Maximum discharge during year, 11,900 cfs Oct. 29 (gage height, 8.6 ft), from rating curve extended above 5,000 cfs on basis of slope-area determination of peak flow; minimum, 673 cfs Oct. 16, 23; minimum daily, 1,100 cfs Oct. 2.  
1929-51. Maximum discharge, 19,800 cfs Dec. 28, 1945 (gage height, 12.2 ft), from rating curve extended above 5,000 cfs on basis of slope-area determination at gage height 8.6 ft; minimum since intake was lowered Aug. 18, 1934, 493 cfs Sept. 1, 1934 (prior to Aug. 18, 1934, minimum discharge not determined).

Remarks.--Records good. Small diversions above station for irrigation. Considerable diurnal fluctuation caused by powerplant 4 miles above station.

Rating tables, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1-27)

Oct. 1 to Feb. 4		Feb. 5 to Sept. 30	
1.0	1,030	1.1	1,160
2.0	1,870	3.0	2,970
5.0	5,500	6.0	7,140
8.0	10,800		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,110	3,470	2,600	2,480	2,780	2,170	2,380	2,800	2,390	1,620	1,340	1,240
2	1,100	5,350	2,400	2,550	2,720	2,110	2,380	2,720	2,360	1,600	1,340	1,260
3	1,176	4,320	4,940	*2,420	2,810	2,050	2,550	2,750	2,350	1,590	1,340	1,240
4	1,310	3,460	8,560	2,440	5,160	2,050	2,850	2,750	2,340	1,600	1,320	1,240
5	1,490	2,920	5,890	2,290	5,830	2,060	3,080	2,720	2,260	1,590	1,320	1,220
6	1,540	2,580	7,310	2,190	6,240	*2,070	3,150	2,780	2,210	1,570	1,310	1,220
7	1,380	2,330	9,470	2,160	6,120	2,040	3,260	2,800	2,180	1,550	1,300	1,220
8	1,290	2,280	6,460	2,130	5,800	2,050	3,310	2,740	2,120	1,540	1,300	1,220
9	1,310	2,160	5,380	2,130	4,930	2,050	3,390	2,780	*2,100	1,540	1,300	1,200
10	1,220	1,980	4,660	2,180	4,720	1,940	3,520	2,940	2,090	1,510	1,300	1,210
11	1,180	1,890	4,620	2,210	5,000	1,930	3,530	3,630	2,090	1,500	1,300	1,190
12	1,170	1,860	4,430	2,120	4,680	1,950	3,660	3,260	2,070	1,490	1,300	1,210
13	1,150	1,820	3,960	2,090	4,180	2,050	3,900	3,270	2,040	1,480	1,290	1,220
14	1,130	1,780	4,420	2,230	3,790	2,130	4,050	3,140	2,040	1,470	1,280	1,210
15	1,170	1,730	4,140	2,490	3,570	2,350	4,090	3,060	2,080	1,460	1,280	1,210
16	1,160	*1,960	3,770	2,400	3,360	2,620	4,050	3,110	2,080	1,440	1,280	1,230
17	1,290	2,160	3,540	3,550	3,210	2,420	3,970	3,260	2,010	1,420	1,260	1,230
18	1,380	4,230	3,320	3,160	3,070	2,340	3,790	3,300	1,960	1,390	1,260	1,220
19	1,250	4,100	3,180	2,770	2,900	2,360	3,570	3,210	1,910	1,360	1,260	1,190
20	1,200	3,400	3,080	2,520	2,800	2,430	3,380	3,200	1,900	1,390	1,260	1,180
21	1,210	3,120	2,920	2,930	2,710	2,570	3,210	3,240	1,870	1,380	1,260	1,180
22	1,180	2,740	2,780	3,100	2,630	2,530	3,050	3,230	1,850	1,370	1,260	1,170
23	1,180	2,550	2,680	4,300	2,530	2,440	2,980	3,290	1,830	1,370	1,260	1,180
24	1,170	2,430	2,580	5,800	2,460	2,420	2,880	3,140	1,800	1,360	1,240	1,180
25	1,240	2,450	2,490	4,870	2,370	2,490	2,680	3,070	1,770	1,350	1,240	1,170
26	1,380	2,390	2,420	4,540	2,310	2,490	2,680	3,040	1,740	1,360	1,220	1,190
27	1,860	2,620	2,340	3,890	2,250	2,490	2,880	3,050	1,720	1,380	1,240	1,180
28	4,870	2,450	2,390	3,530	2,210	2,480	*3,600	2,870	1,700	1,370	1,260	1,160
29	*10,000	2,320	2,730	3,040	-	2,580	3,270	2,710	1,660	1,350	1,300	1,170
30	6,150	2,730	2,640	2,880	-	2,550	2,970	2,600	1,650	1,340	1,290	1,220
31	3,600	-	2,560	2,900	-	2,440	-	2,490	-	*1,340	1,260	-
Total	58,820	81,580	124,560	89,690	104,140	70,660	98,440	92,950	60,170	45,100	39,750	36,160
Mean	1,897	2,719	4,018	2,900	3,719	2,279	3,281	2,998	2,006	1,455	1,282	1,205
Cfsm	2.95	4.23	6.25	4.51	5.78	3.54	5.10	4.66	3.12	2.26	1.99	1.87
In.	5.40	4.72	7.20	5.20	6.02	4.09	5.69	5.38	3.48	2.61	2.30	2.09
Ac-ft	116,700	161,800	247,100	178,300	206,600	140,200	195,300	184,400	119,300	89,450	78,840	71,720

Calendar year 1950: Max 10,000 Min 800 Mean 2,373 Cfsm 3.69 In. 50.08 Ac-ft 1,718,000  
Water year 1950-51: Max 10,000 Min 1,100 Mean 2,472 Cfsm 3.84 In. 52.18 Ac-ft 1,790,000

Peak discharge (base, 5,300).--Oct. 29 (6 a.m.) 11,900 cfs (8.6 ft); Nov. 2 (2 p.m. to 4 p.m.) 5,720 cfs (5.15 ft); Dec. 3 (1 p.m.) 9,090 cfs (7.1 ft); Dec. 7 (6 a.m.) 10,800 cfs (8.0 ft); Jan. 24 (3 a.m.) 6,150 cfs (5.42 ft); Feb. 4 (11 p.m.) 7,890 cfs (6.44 ft).

\* Discharge measurement made on this day.

## ROGUE RIVER BASIN

South Fork Big Butte Creek near Butte Falls, Oreg.

Location.--Lat 42°32', long. 122°33', in SW $\frac{1}{4}$  sec. 11, T. 35 S., R. 2 E., on right bank just downstream from Ginger Creek and 1 mile east of Butte Falls.

Drainage area.--135 sq mi.

Records available.--September 1910 to October 1911, August to October 1915, October 1917 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 2,360 ft (from river-profile map). Sept. 20, 1910, to Sept. 30, 1922, staff gage at site 300 ft upstream at different datum. Aug. 23, 1922, to Mar. 31, 1925, water-stage recorder at site 1 mile downstream at different datum.

Average discharge.--35 years (1910-11, 1917-51), 159 cfs.

Extremes.--Maximum discharge during year, 1,460 cfs Jan. 17 (gage height, 3.06 ft); maximum gage height, 3.22 ft Jan. 17 (backwater from debris); minimum discharge, 48 cfs Sept. 12 (gage height, 0.46 ft).

1910-11, 1915, 1917-51: Maximum discharge, 2,470 cfs Feb. 20, 1927 (gage height, 4.05 ft), from rating curve extended above 1,600 cfs; minimum, 39 cfs Oct. 14, 1931 (gage height, 0.32 ft).

Remarks.--Records fair except those above 400 cfs and those for period of no gage-height record, which are poor. Diversions for irrigation of about 1,000 acres above station and since 1927 for Medford municipal supply. No regulation.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.6	72
1.0	172
1.4	334
2.0	695
2.4	970

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	89	169	163	198	324	220	300	216	158	105	95	93
2	89	155	172	235	329	213	288	213	130	103	*95	93
3	91	146	606	286	382	198	282	213	127	105	95	93
4	95	135	907	339	935	216	291	205	125	110	95	91
5	112	130	624	300	956	216	296	198	125	105	95	93
6	103	122	604	273	781	209	296	216	122	105	95	91
7	95	117	900	260	788	202	296	224	120	105	95	91
8	98	115	809	252	708	209	286	*213	122	107	95	91
9	98	110	850	239	635	232	282	198	120	110	95	91
10	95	*107	523	232	591	213	277	195	120	107	93	87
11	93	105	461	252	565	216	277	243	117	103	95	91
12	93	107	445	235	535	228	277	235	117	105	95	*93
13	93	107	*387	220	481	273	273	247	120	105	98	93
14	95	115	541	228	439	329	269	239	112	107	95	93
15	95	112	457	264	404	404	256	232	115	107	93	93
16	91	182	387	269	*376	481	252	220	112	110	*93	93
17	95	179	339	878	360	445	247	213	115	110	93	93
18	*95	228	310	879	345	410	235	209	115	*105	93	93
19	93	260	282	610	320	*399	*239	202	115	103	93	93
20	93	220	260	493	300	410	224	198	112	103	93	89
21	95	198	239	598	296	439	216	192	107	100	93	85
22	91	172	224	*565	291	428	205	185	100	100	93	87
23	89	160	213	617	273	393	202	179	98	100	93	89
24	89	152	202	676	260	371	195	169	100	100	93	93
25	95	143	195	630	260	366	195	163	98	100	91	91
26	105	138	185	617	252	355	192	158	91	100	91	91
27	138	152	182	553	232	345	195	158	91	100	91	a92
28	360	140	202	499	228	329	252	152	98	100	93	a92
29	416	138	228	416	-	350	260	*149	103	98	98	a95
30	350	155	232	366	-	334	228	143	105	98	98	a100
31	209	-	213	339	-	310	-	143	-	95	95	-
Total	3,934	4,469	12,162	12,818	12,647	9,743	7,581	6,120	3,390	3,211	2,918	2,753
Mean	127	149	392	413	452	314	253	197	113	104	94.1	91.8
Ac-ft	7,800	8,860	24,120	25,420	25,080	19,320	15,040	12,140	6,720	6,370	5,790	5,460

Calendar year 1950: Max 907 Min 80 Mean 210 Ac-ft 152,100  
 Water year 1950-51: Max 956 Min 85 Mean 224 Ac-ft 162,100

Peak discharge (base, 450 cfs).--Oct. 28 (10 to 11 a.m.) 499 cfs (1.69 ft); Dec. 3 (10 p.m.) 1,160 cfs (2.66 ft); Dec. 7 (10 a.m.) 949 cfs (2.37 ft); Dec. 14 (7 to 10 a.m.) 578 cfs (1.82 ft); Jan. 17 (6 p.m.) 1,460 cfs (3.06 ft); Feb. 4 (5 p.m.) 1,240 cfs (2.77 ft); Mar. 15 (8 to 9 p.m.) 511 cfs (1.71 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Big Butte Creek near McLeod.

Big Butte Creek near McLeod, Oreg.

Location--Lat 42°39'25", long. 122°41'20", in NW<sup>1</sup>/<sub>4</sub> sec. 3, T. 34 S., R. 1 E., on right bank 50 ft downstream from highway bridge, 1 mile upstream from mouth, and 1 mile south of McLeod.

Drainage area--249 sq mi.

Records available--October 1945 to September 1951.

Gage--Staff gage read twice daily. Datum of gage is 1,526.48 ft above mean sea level, datum of 1929, supplemental adjustment of 1947.

Average discharge--6 years, 311 cfs.

Extremes--Maximum discharge during year, 3,920 cfs Dec. 3 (gage height, 8.6 ft); minimum, 80 cfs many days in August and September.

1945-51: Maximum discharge, 4,680 cfs Jan. 7, 1948 (gage height, 9.4 ft, from floodmark), from rating curve extended above 2,700 cfs by logarithmic plotting; minimum observed, 70 cfs Sept. 23, 1947.

Remarks--Records good. 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.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3		Dec. 4 to Sept. 30	
1.6	103	1.4	67
1.8	146	1.8	146
3.0	540	2.8	470
5.0	1,380	4.5	1,220
6.8	2,480	6.6	2,580

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	111	466	368	404	646	404	506	270	154	113	83	87
2	111	388	435	570	658	390	486	254	146	111	81	87
3	137	344	2,440	606	726	379	482	264	139	109	80	85
4	164	299	2,260	1,010	2,340	407	482	250	139	109	80	81
5	198	270	1,360	694	2,080	449	490	238	139	113	80	80
6	171	249	1,400	606	1,670	*432	470	257	139	115	83	83
7	156	227	1,960	574	1,540	428	474	284	134	113	80	83
8	151	202	1,650	534	1,360	478	466	284	134	109	80	87
9	166	213	1,350	502	1,190	558	428	270	*130	109	80	87
10	154	201	1,070	490	1,080	470	396	225	130	107	80	83
11	148	195	1,030	554	1,060	420	376	298	134	105	80	83
12	151	196	894	522	980	486	362	292	130	97	80	83
13	125	198	759	478	862	562	333	372	128	97	80	83
14	123	213	1,270	470	818	598	390	340	128	97	80	80
15	132	201	952	*818	730	706	337	302	125	97	80	80
16	132	*596	804	702	678	822	326	278	123	97	80	80
17	146	508	710	2,360	646	759	306	260	121	97	80	83
18	*141	868	642	1,360	648	710	292	257	117	93	80	83
19	141	729	582	1,340	582	678	281	241	117	93	80	83
20	141	575	542	1,020	554	710	250	228	117	91	80	83
21	141	488	490	1,640	534	750	254	222	117	89	80	83
22	139	432	449	1,780	534	730	241	213	117	89	80	83
23	137	393	432	1,700	494	678	238	198	117	89	80	83
24	138	337	393	1,470	466	650	225	184	117	89	80	83
25	158	312	370	1,300	456	654	225	182	117	89	80	83
26	197	292	358	1,280	449	622	219	179	113	89	80	83
27	428	393	348	1,120	432	598	213	171	113	89	80	83
28	2,100	302	390	975	421	582	*340	168	113	89	80	83
29	2,160	288	460	826	-	594	344	161	113	89	85	85
30	1,120	351	490	722	-	578	284	158	113	85	84	97
31	602	-	452	678	-	542	-	154	-	*63	85	-
Total	10,219	10,728	27,110	29,805	24,632	17,824	10,576	7,454	3,774	3,041	2,499	2,510
Mean	330	358	875	961	880	575	353	240	126	98.1	80.6	83.7
Ac-ft	20,270	21,280	53,770	59,120	48,860	35,350	20,980	14,780	7,490	6,030	4,960	4,980
Calendar year 1950: Max	2,440			Min	72	Mean	386	Ac-ft	279,200			
Water year 1950-51: Max	2,440			Min	80	Mean	411	Ac-ft	297,900			

\* Discharge measurement made on this day.

## ROGUE RIVER BASIN

Elk Creek near Trail, Oreg.

Location.--Lat 42°40'00", long. 122°44'40", in SE $\frac{1}{4}$  sec. 30, T. 33 S., R. 1 E., on right bank 0.7 mile upstream from mouth and  $\frac{3}{4}$  miles northeast of Trail.

Drainage area.--133 sq mi.

Records available.--November 1945 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,468.70 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to July 5, 1946, staff gages at various sites within half a mile of present site at different datums. July 5, 1946, to June 28, 1950, staff gage at present site and datum.

Average discharge.--5 years (1946-51), 215 cfs.

Extremes.--Maximum discharge during year, 8,080 cfs Oct. 29 (gage height, 11.80 ft); minimum not determined.

1945-51: Maximum discharge, 9,880 cfs Dec. 28, 1945 (gage height, 13.2 ft, from floodmark, present site and datum), from rating curve extended above 6,600 cfs by logarithmic plotting; minimum observed, 0.9 cfs Aug. 29, 1946.

Remarks.--Records good except those for periods of no gage-height record or indefinite stage-discharge relation, which are poor. No regulation. Several small diversions above station for irrigation.

Rating tables, water year 1950-51, except periods of shifting-control or indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28			Oct. 29 to Sept. 30		
0.6	6.0		0.5	10	2.5
.8	15		.7	21	3.5
1.0	30		1.0	46	5.0
1.1	39		1.3	80	7.0
			1.6	179	

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.2	595	293	372	346	145	191	147	42	11	a2.9	a2.3
2	9.2	699	316	431	356	136	179	141	40	10	2.9	a2.1
3	10	715	2,450	690	456	128	196	147	36	10	a2.9	a2.0
4	14	503	2,660	745	2,850	145	240	138	34	11	e2.7	a1.9
5	29	357	1,400	622	2,940	179	251	128	35	12	e2.6	a1.9
6	41	268	1,510	480	2,070	*172	242	118	35	*12	e2.6	a1.8
7	25	206	2,090	389	1,680	165	240	112	34	12	e2.6	a1.8
8	19	177	1,300	343	1,560	172	234	105	31	12	e2.6	a1.8
9	20	152	851	340	1,110	248	224	94	*30	9.7	e2.6	a1.8
10	16	128	608	442	974	234	224	91	28	9.7	*2.5	a1.8
11	12	109	555	508	1,050	224	211	120	27	10	e2.5	a1.8
12	10	107	494	487	934	287	208	149	27	9.4	e2.5	a1.7
13	9.6	98	434	417	735	498	211	318	27	10	e2.5	a1.6
14	9.2	*93	750	459	591	939	208	284	25	9.7	e2.4	a1.5
15	9.6	90	725	*812	508	1,080	198	229	21	9.7	e2.4	a1.5
16	11	860	543	851	431	928	161	186	20	9.4	e2.3	a1.3
17	18	1,350	431	2,740	398	622	163	158	18	8.6	e2.3	a1.3
18	*35	2,770	353	1,900	346	487	145	130	18	a7.5	e2.3	e1.3
19	24	1,620	307	1,000	307	470	130	112	18	a7.0	e2.3	e1.2
20	17	873	273	676	261	535	116	98	18	a6.0	e2.3	e1.2
21	15	591	232	1,540	259	527	104	86	19	a5.5	e2.3	*1.2
22	14	442	206	1,620	237	434	93	77	18	a5.0	e2.3	e1.2
23	13	358	181	2,030	216	353	88	72	17	a5.0	a2.3	e1.2
24	12	298	168	2,400	201	313	62	67	17	a4.4	a2.3	e1.2
25	17	270	152	1,740	166	310	79	62	16	a4.0	a2.3	e1.2
26	35	240	138	1,590	172	298	75	58	15	a3.8	a2.3	e1.3
27	162	237	124	1,120	158	276	75	53	14	a3.4	a2.4	e1.2
28	3,340	201	195	802	154	251	*177	50	14	a3.2	a2.5	e1.2
29	5,490	189	424	604	-	253	196	47	13	a3.0	a2.6	e1.3
30	2,220	253	424	490	-	240	168	42	12	a3.0	a2.6	e1.5
31	864	-	434	403	-	211	-	42	-	*2.9	a2.5	-
Total	12,529.8	14,845	21,011	26,833	21,694	11,240	5,129	3,657	719	239.9	77.1	46.0
Mean	404	495	678	930	775	363	171	118	24.0	7.74	2.49	1.53
Ac-ft	24,850	29,440	41,670	57,190	43,030	22,290	10,170	7,250	1,430	476	153	91

Calendar year 1950: Max 5,490 Min 1.7 Mean 331 Ac-ft 239,600  
 Water year 1950-51: Max 5,490 Min 1.2 Mean 329 Ac-ft 238,000

Peak discharge (base, 2,700 cfs).--Oct. 29 (4 a.m.) 8,080 cfs (11.80 ft); Nov. 18 (12 m.) 3,520 cfs (7.52 ft); Dec. 3 (9:30 p.m.) 4,400 cfs (8.50 ft); Jan. 17 (4 p.m.) 4,670 cfs (8.77 ft); Jan. 23 (9:30 p.m.) 2,850 cfs (6.67 ft); Feb. 4 (9 p.m.) 4,950 cfs (9.03 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Big Butte Creek near McLeod and South Umpqua River at Tillier.

e Stage-discharge relation indefinite; discharge estimated as explained in footnote "a."

Note.--Shifting-control method used July 6-17, 31, Aug. 2, 10, Sept. 21.

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., on right bank at Dodge Bridge 0.6 mile downstream from Reese Creek,  $\frac{1}{2}$  miles northwest of Eagle Point, and at mile 134.8 (U.S.G.S. river-profile survey).

Drainage area.--1,210 sq mi.

Records available.--October 1938 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,273.66 ft above mean sea level, datum of 1929. Prior to Dec. 21, 1938, staff gage at same site and datum.

Average discharge.--13 years, 2,447 cfs.

Extremes.--Maximum discharge during year, 33,800 cfs Oct. 29 (gage height, 10.3 ft); minimum, 1,040 cfs Sept. 22, 23, 25, 27, 28; minimum daily, 1,210 cfs Oct. 2.

1938-51: Maximum discharge, 41,900 cfs Dec. 28, 1945 (gage height, 11.52 ft), from rating curve extended above 30,000 cfs; minimum, 611 cfs Aug. 6, 14, 29, Sept. 9, 1940 (gage height, 0.99 ft); minimum daily, 830 cfs Sept. 1, 1940.

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

Revisions (water years).--W 1094: 1942(M), 1943, 1945(M), 1946.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 5

Feb. 6 to Sept. 30

1.4	1,180	5.0	9,450	1.3	1,120	4.0	6,420
2.0	2,040	7.0	18,700	2.0	2,120	6.0	12,800
3.0	3,960	9.1	26,800				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,230	4,900	3,560	3,380	4,110	2,880	3,230	3,410	2,630	1,720	*1,380	1,330
2	1,210	6,660	3,480	3,690	4,110	2,800	3,110	3,270	2,560	1,710	1,340	1,330
3	1,300	6,040	14,500	4,400	4,520	2,710	*3,290	3,290	2,540	1,700	1,340	1,320
4	1,480	4,640	17,900	5,440	15,000	2,820	3,610	3,270	*2,520	1,680	1,330	1,320
5	1,660	3,770	10,600	4,400	15,200	3,090	3,900	3,230	2,460	1,650	1,370	1,290
6	1,910	3,290	11,200	3,810	11,600	2,970	3,990	3,230	2,410	1,650	1,340	1,290
7	1,580	2,980	16,300	3,520	10,900	2,990	4,080	3,510	2,370	1,620	1,330	1,270
8	1,500	2,770	11,200	3,380	10,100	3,090	4,170	3,230	2,300	1,610	1,330	1,300
9	1,510	2,600	8,620	3,340	8,770	3,900	4,170	3,230	2,260	1,580	1,330	1,290
10	1,440	2,370	7,150	3,500	7,630	3,050	4,260	3,350	2,260	1,580	1,330	1,250
11	1,350	2,230	6,900	3,860	7,960	2,920	4,260	4,040	2,260	1,580	1,330	1,280
12	1,310	2,190	6,500	3,710	7,510	3,110	4,320	3,900	2,260	1,570	1,360	1,250
13	1,280	2,140	5,620	3,460	6,500	3,590	4,590	4,170	2,250	1,550	1,320	1,250
14	1,270	2,090	7,510	3,500	*5,730	4,230	4,740	3,970	2,190	1,520	1,340	1,250
15	1,310	2,040	6,620	4,870	5,280	4,560	4,740	3,730	2,230	1,520	1,320	1,250
16	1,310	*4,390	5,590	4,700	4,920	4,870	4,700	3,710	2,250	1,510	1,320	1,250
17	1,410	4,870	4,990	14,300	4,650	4,210	4,610	3,820	2,170	1,500	1,300	1,250
18	1,610	9,810	4,560	10,100	4,480	3,820	4,430	3,800	2,090	1,480	1,300	1,240
19	1,430	8,240	4,270	6,700	4,120	3,730	4,230	3,710	2,060	1,500	1,330	1,240
20	1,380	5,570	4,070	5,360	3,950	3,860	3,950	3,650	2,020	1,480	1,320	1,240
21	1,360	4,700	3,790	8,650	3,800	4,040	3,730	3,650	1,990	1,480	1,330	*1,230
22	1,320	3,960	3,540	7,690	3,650	3,860	3,510	3,630	1,960	1,470	1,300	1,230
23	1,280	3,480	3,380	8,970	3,490	3,650	3,450	3,650	1,900	1,470	1,340	1,230
24	1,260	3,200	3,220	11,200	3,330	3,510	3,310	3,490	1,860	1,440	1,330	1,240
25	1,370	3,140	3,080	9,190	3,250	3,550	3,270	3,410	1,860	1,450	1,320	1,230
26	1,560	2,990	2,970	8,060	3,110	3,510	3,250	3,410	1,830	1,440	1,330	1,270
27	2,210	3,280	2,840	6,950	2,980	3,490	3,270	3,410	1,820	1,410	1,320	1,230
28	11,700	3,200	3,040	5,930	2,960	3,410	4,210	3,210	1,800	1,410	1,330	1,240
29	26,400	2,950	3,660	4,940	-	3,490	4,150	2,890	1,760	1,400	1,400	1,240
30	13,000	3,540	3,750	4,450	-	3,510	3,670	2,840	1,740	1,410	1,400	1,290
31	6,130	-	3,620	4,310	-	3,330	-	2,710	-	1,380	1,360	-
Total	96,070	117,930	198,230	179,760	173,120	108,140	118,200	107,720	84,610	47,470	41,420	37,920
Mean	3,093	3,831	6,395	5,799	6,183	3,488	3,940	3,475	2,154	1,531	1,336	1,264
Ac-ft	190,600	233,900	393,200	358,500	343,400	214,500	234,400	213,700	128,200	94,160	82,160	75,210

Calendar year 1950: Max 26,400 Min 1,150 Mean 3,438 Ac-ft 2,469,000  
 Water year 1950-51: Max 26,400 Min 1,210 Mean 3,536 Ac-ft 2,560,000

Peak discharge (base, 9,000 cfs).--Oct. 29 (6:30 a.m.) 33,800 cfs (10.3 ft); Nov. 18 (3 p.m.) 12,300 cfs (5.84 ft); Dec. 3 (12 p.m.) 24,700 cfs (8.70 ft); Dec. 7 (8 a.m.) 18,300 cfs (7.56 ft); Jan. 17 (6 p.m.) 24,500 cfs (8.66 ft); Jan. 21 (5 p.m.) 9,550 cfs (5.03 ft); Jan. 24 (2 a.m.) 12,000 cfs (5.75 ft); Feb. 4 (12 p.m.) 21,900 cfs (8.14 ft).

\* Discharge measurement made on this day.

## South Fork Little Butte Creek near Lake Creek, Oreg.

Location.--Lat 42°24'30", long. 122°36'00", in SE $\frac{1}{4}$  sec. 29, T. 36 S., R. 2 E., a quarter of a mile upstream from intake of Rogue River Valley Canal and  $\frac{1}{2}$  miles southeast of Lake Creek Post Office.

Drainage area.--138 sq mi.

Records available.--April 1921 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 1,720 ft (from topographic map). Prior to June 17, 1921, staff gage at same site and datum.

Average discharge.--30 years, 100 cfs.

Extremes.--Maximum discharge during year, 2,260 cfs Dec. 3 (gage height, 5.13 ft); from rating curve extended above 700 cfs by logarithmic plotting; minimum, 11 cfs Aug. 27. 1921-51: Maximum discharge, 3,920 cfs Jan. 7, 1948 (gage height, 6.48 ft), from rating curve extended above 350 cfs by logarithmic plotting; minimum, 2 cfs Aug. 10, 1931 (gage height, 0.97 ft).

Remarks.--Records good April to September, fair October to March, except those for periods of ice effect or no gage-height record, which are poor. Diversions for irrigation of about 1,000 acres above station.

Revisions (water years).--W 934: 1925(M).

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 30 to Dec. 3. Jan. 18 to Feb. 3)

Oct. 1 to Dec. 3

Dec. 4 to Sept. 30

1.4	15	2.0	145	1.4	10	2.0	112
1.5	24	2.5	370	1.5	16	2.5	310
1.6	38	3.0	680	1.6	26	3.0	570
1.8	81	4.0	1,420	1.8	60	4.0	1,240

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	20	142	153	166	*170	130	197	174	60	24	16	a16
2	20	124	192	174	162	112	201	166	56	24	16	a16
3	20	107	1,420	205	174	98	213	158	54	23	*16	a16
4	23	84	1,030	265	957	133	237	*155	*50	23	17	a16
5	34	71	612	213	738	147	265	144	50	23	17	a16
6	27	64	642	177	578	147	270	166	49	24	16	a15
7	22	*59	798	266	*600	140	288	177	47	24	15	a15
8	23	57	672	158	558	*201	288	174	45	23	14	a15
9	24	55	534	155	505	201	288	158	43	21	14	a15
10	22	51	455	151	490	155	*296	155	41	*20	14	a15
11	21	48	505	166	480	147	296	237	41	19	15	*15
12	20	49	*510	158	460	186	296	213	41	20	16	15
13	20	51	440	147	405	233	301	261	40	21	15	15
14	20	57	534	158	565	278	308	249	38	21	*15	15
15	22	55	425	189	355	325	310	217	36	21	15	15
16	*21	375	370	174	*301	315	306	201	35	21	15	15
17	22	169	325	712	278	245	296	189	34	19	15	14
18	23	153	292	445	257	225	283	177	34	19	15	15
19	21	189	265	270	233	229	270	158	34	19	15	15
20	21	165	249	*213	225	245	249	147	34	17	15	15
21	21	142	221	225	213	253	233	133	34	16	15	14
22	20	110	205	201	201	229	213	119	32	17	15	15
23	20	90	189	217	181	217	197	109	32	17	15	15
24	20	79	174	249	166	217	181	100	30	17	14	15
25	22	71	162	241	174	229	177	92	29	16	15	15
26	31	69	147	265	158	225	166	83	25	16	14	15
27	74	104	140	253	133	217	166	78	25	16	12	15
28	517	84	147	213	140	213	233	76	24	17	14	16
29	727	87	189	b175	-	233	213	72	25	15	15	16
30	527	138	193	b170	-	221	185	67	24	16	16	18
31	201	-	177	b170	-	205	-	65	-	16	a16	-
Total	2,626	3,099	12,367	6,841	9,655	6,331	7,415	4,670	1,142	605	467	458
Mean	84.7	103	399	221	345	204	247	151	38.1	19.5	15.1	15.3
Ac-ft	5,210	6,150	24,530	13,570	19,150	12,560	14,710	9,260	2,270	1,200	926	908

Calendar year 1950: Max 1,420 Min 15 Mean 157 Ac-ft 113,500

Water year 1950-51: Max 1,420 Min 12 Mean 153 Ac-ft 110,400

Peak discharge (base, 500 cfs).--Oct. 29 (7 p.m.), 1,370 cfs (3.94 ft); Nov. 16 (6 a.m.) 841 cfs (3.36 ft); Dec. 3 (8 p.m.) 2,260 cfs (5.13 ft); Jan. 17 (5 p.m.) 1,640 cfs (4.50 ft); Feb. 4 (1 p.m.) 1,320 cfs (4.10 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for South Fork Big Butte Creek near Butte Falls.

b Stage-discharge relation affected by ice.



North Fork Little Butte Creek at Fish Lake, near Lake Creek, Oreg.

Location.--Lat 42°23', long. 122°21', in SE $\frac{1}{4}$  (revised) sec. 4, T. 37 S., R. 4 E., on right bank half a mile downstream from outlet of Fish Lake and 14 miles east of Lake Creek Post Office.

Drainage area.--18 sq mi, approximately.

Records available.--October 1914 to September 1951.

Gage.--Water-stage recorder. Altitude of gage is 4,585 ft (by barometer). Oct. 21, 1914, to July 20, 1915, staff gage just above wasteway in temporary dam at different datum. June 11, 1916, to July 9, 1918, staff gage and July 10, 1918, to Oct. 28, 1932, water-stage recorder at site a quarter of a mile upstream at different datums.

Average discharge.--35 years (1916-51), 34.1 cfs.

Extremes.--Maximum discharge during year, 155 cfs July 25; minimum, 3.5 cfs Oct. 4, 5. 1914-51: Maximum discharge (revised), about 940 cfs June 5, 1917, computed from rate of change in contents of reservoir after break in dam occurred (occurred during period of no gage-height record); no flow at times.

Remarks.--Records fair. Flow regulated by Fish Lake. Since September 1923 water has been diverted by Cascade Canal from Fourmile Lake, in Klamath River basin, into Fish Lake basin. No diversion from creek above station.

Revisions (water years).--W 654: Drainage area.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.3	3.5	0.8	21
.4	5.0	1.0	37
.5	7.2	1.3	77
.6	11	1.7	162

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	16	13	19	26	25	27	30	39	66	41	146	61
2	16	13	19	25	25	27	31	39	69	45	*146	58
3	11	13	20	25	25	27	32	39	79	117	141	45
4	5.5	13	20	25	27	28	32	39	81	128	139	42
5	4	13	21	25	27	28	32	39	85	126	137	53
6	4	13	21	25	26	28	33	39	94	126	141	60
7	4	14	21	25	26	28	34	38	100	132	144	58
8	4.5	13	21	25	26	28	34	38	100	137	144	60
9	4.5	14	22	25	26	28	35	38	104	137	141	71
10	5	14	22	25	26	29	35	38	115	141	139	*72
11	5.5	14	23	25	26	28	37	38	115	141	137	69
12	5.5	14	22	25	26	29	37	38	117	*144	130	67
13	6	14	23	25	27	28	38	39	117	141	130	66
14	6.5	15	24	25	27	29	39	38	117	137	126	64
15	6.5	15	24	25	27	28	39	38	124	137	121	63
16	7	15	24	25	27	29	39	37	126	137	119	61
17	7	15	24	25	27	29	39	37	130	137	113	60
18	7	16	24	25	27	29	39	37	139	137	111	58
19	7.5	16	24	25	27	29	39	37	139	137	111	*58
20	8	17	24	25	27	29	39	38	139	139	109	57
21	8	17	24	25	27	29	39	38	139	141	109	54
22	8	17	24	25	27	29	39	*38	137	144	102	51
23	8	17	25	25	27	30	39	38	137	141	100	49
24	8.5	17	25	25	27	30	39	37	137	141	96	48
25	9	17	25	25	27	30	39	37	146	144	94	48
26	10	17	25	25	27	30	39	37	146	150	94	48
27	11	19	24	25	27	30	39	37	146	146	92	47
28	11	18	25	25	27	30	39	37	146	139	90	46
29	12	18	26	25	-	29	39	*37	146	139	86	37
30	12	18	26	25	-	30	39	51	117	141	89	34
31	12	-	26	25	-	30	-	57	-	144	53	-
Total	250.5	458	717	776	743	892	1,103	1,207	3,553	4,087	3,610	1,665
Mean	8.08	15.3	23.1	25.0	26.5	28.8	36.8	38.9	118	132	116	55.5
Ac-ft	497	908	1,420	1,540	1,470	1,770	2,190	2,390	7,050	8,110	7,160	3,300

Calendar year 1950: Max 144 Min 4 Mean 46.1 Ac-ft 33,400  
 Water year 1950-51: Max 150 Min 4 Mean 52.2 Ac-ft 37,800

\* Discharge measurement made on this day.

## North Fork Little Butte Creek near Lake Creek, Oreg.

Location.--Lat 42°24'10" (revised), long. 122°32'20" (revised), in SW $\frac{1}{4}$  sec. 25, T. 36 S., R. 2 E., on right bank a quarter of a mile upstream from Hanley South Canal diversion and 4 $\frac{1}{2}$  miles east of Lake Creek Post Office.

Drainage area.--38 sq mi, approximately.

Records available.--September 1911 to March 1913, May 1922 to September 1928 (incomplete), and October 1931 to September 1951 in reports of Geological Survey. September 1911 to March 1913 and May 1922 to September 1941 in reports of State engineer.

Gage.--Water-stage recorder. Datum of gage is 2,125.01 ft above mean sea level, datum of 1929. Sept. 10, 1911, to Mar. 31, 1913, staff gages near present site at different datums.

Average discharge.--25 years (1911-12, 1922-23, 1928-51), 69.2 cfs.

Extremes.--Maximum discharge during year, 350 cfs about Dec. 3, (gage height, 2.75 ft); minimum, 30 cfs for part of each day Oct. 7, 10-14.

1911-13, 1922-28, 1931-51: Maximum discharge, 680 cfs Dec. 30, 1924 (gage height, 3.30 ft), from rating curve extended above 170 cfs; minimum, 11 cfs (computed on basis of records for station at Fish Lake, near Lake Creek) Oct. 29 to Nov. 8, 1931.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Flow regulated by Fish Lake. Diversions for irrigation of about 100 acres above station; some water diverted into Fish Lake from Fourmile Lake, in Klamath River basin, since September 1923.

Rating tables, water year 1950-51, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to July 2				July 3 to Sept. 30			
1.7	30	2.2	102	1.9	53	2.2	125
1.8	37	2.5	207	2.0	72	2.4	210
2.0	60	2.6	255				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	38	42	a90	a80	73	65	73	74	92	57	157	86
2	38	44	a140	a65	71	64	73	74	92	54	*161	84
3	39	*43	a250	a70	74	64	73	74	102	141	145	68
4	34	42	a200	a80	195	69	73	*74	*102	157	145	62
5	36	42	a190	a75	129	74	73	74	111	149	145	70
6	31	41	a170	a70	111	71	73	78	120	145	153	79
7	31	41	a190	a66	*105	73	73	78	129	153	153	77
8	32	41	a160	a64	97	*80	73	74	132	165	170	74
9	31	a41	a120	a62	95	83	73	73	136	161	*157	79
10	31	a41	a100	a62	90	76	*73	74	139	165	165	86
11	31	a41	*92	a60	90	80	74	83	142	165	157	*88
12	31	a41	83	a60	90	90	74	80	136	165	149	88
13	31	a42	76	a60	83	111	74	85	132	165	145	88
14	31	a45	83	a70	80	111	74	85	132	165	141	88
15	33	a60	a80	a100	76	120	76	76	123	170	133	88
16	*33	a100	a76	a150	*74	108	76	74	114	170	125	86
17	34	a70	a74	a200	73	97	76	73	117	*170	119	84
18	33	a70	a70	a160	73	90	74	73	120	161	116	79
19	33	a80	a68	a140	71	90	74	71	120	161	113	79
20	33	a70	a66	a120	71	90	73	71	120	165	110	74
21	34	a65	a64	a100	71	92	73	69	126	165	110	72
22	34	a60	a62	a95	71	88	71	67	123	161	110	72
23	34	a56	a60	*92	69	83	71	65	126	170	107	70
24	a52	a60	90	67	80	71	65	129	165	107	68	
25	35	a50	a60	90	71	80	73	65	142	165	107	66
26	38	a70	a60	95	67	80	71	64	146	178	107	64
27	43	a65	a62	92	65	78	73	64	136	157	104	62
28	54	a60	a65	85	65	76	78	64	139	149	104	62
29	65	a60	a70	b80	-	78	78	62	136	141	104	59
30	57	a60	a65	b75	-	71	76	78	126	149	95	55
31	45	-	a62	73	-	74	-	83	-	161	70	-
Total	1,137	1,635	3,059	2,761	2,367	2,591	2,210	2,255	3,740	4,765	3,984	2,257
Mean	36.7	54.5	98.7	89.1	84.5	83.6	73.7	72.7	125	154	129	75.2
Ac-ft	2,260	3,240	6,070	5,480	4,690	5,140	4,380	4,470	7,420	9,450	7,900	4,480

Calendar year 1950: Max 250 Min 31 Mean 91.0 Ac-ft 65,910  
 Water year 1950-51: Max 250 Min 31 Mean 89.8 Ac-ft 64,990

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for South Fork Big Butte Creek near Butte Falls and South Fork Little Butte Creek near Lake Creek.

b Stage-discharge relation affected by ice.

Diversions from Little Butte Creek near Lake Creek, Oreg.

The following canals divert water from Little Butte Creek and its tributaries near Lake Creek Post Office:

Hanley South and Hanley North Canals, from North Fork in SE $\frac{1}{4}$  sec. 26, T. 36 S., R. 2 E. Water used for irrigation of land on both sides of Little Butte Creek near Lake Creek.

Rogue River Valley Canal, from South Fork in SE $\frac{1}{4}$  sec. 29, T. 36 S., R. 2 E., and from North Fork in NE $\frac{1}{4}$  sec. 20, T. 36 S., R. 2 E. Water used for irrigation of about 15,000 acres of land, chiefly in Bear Creek basin, on both sides of that creek below Phoenix.

Eagle Point Canal, from main stream in SE $\frac{1}{4}$  sec. 31, T. 35 S., R. 1 E. Water used for irrigation of lands near Eagle Point.

Records for Hanley South and North Canals and Eagle Point Canal are partly estimated.

Records for these canals, published as a group, are available from April 1929 to September 1951; records of some of the canals published separately prior to 1929.

Many smaller canals divert from Little Butte Creek and its tributaries.

Diversions, in acre-feet, water year October 1950 to September 1951

Month	Hanley South Canal	Hanley North Canal	Rogue River Valley Canal below junction of intakes	Eagle Point Canal
October.....	-	-	-	-
November.....	-	-	-	-
December.....	-	-	-	-
January.....	-	-	-	-
February.....	-	-	-	-
March.....	-	-	-	-
April.....	-	-	-	-
May.....	366	-	7,230	-
June.....	345	583	8,980	978
July.....	355	603	8,830	984
August.....	340	603	7,670	974
September.....	-	-	3,760	-
Water year 1950-51.....	-	-	-	-

## Emigrant Creek near Ashland, Oreg.

Location (revised).--Lat 42°09'50", long. 122°36'20", in NE $\frac{1}{4}$  sec. 20, T. 39 S., R. 2 E., on right bank 1,100 ft downstream from Emigrant Gap Reservoir Dam and 6 miles southeast of Ashland.

Drainage area.--64.3 sq mi.

Records available.--January 1920 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 2,053.73 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation). Prior to Oct. 1, 1926, water-stage recorders or staff gage at sites within 800 ft of present site at different datums.

Average discharge.--14 years (1924-28, 1929-30, 1933-35, 1940-47), 20.1 cfs.

Extremes.--Maximum discharge during year, 281 cfs Jan. 18 (gage height, 2.84 ft); no flow at times.  
1920-51: Maximum discharge, 5,260 cfs Feb. 20, 1927, by computation of peak flow over dam; no flow at times.

Remarks.--Records good except those for periods of no gage-height record and those below 1.0 cfs, which are poor. Flow regulated since December 1924 by Emigrant Gap Reservoir. Diversion above station for irrigation; principal canals are Ashland lateral and East lateral. Water diverted by Keene Creek Canal from Klamath River basin into Emigrant Creek above station.

Rating table, water year 1950-51 (gage height, in feet,  
and discharge, in cubic feet per second)

-0.1	0	0.5	4.4	1.5	62
.0	.1	.7	9.2	2.0	127
.1	.4	1.0	22	2.5	211
.3	1.8	1.3	43	2.9	295

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		-	a90	3.0	86	0.6	56	0.8	2.2	39	44	
2		-	a90	2.9	85	.6	54	.8	2.4	39	45	
3		-	a160	2.5	85	.6	54	.8	2.6	39	45	
4		-	a180	2.4	155	.5	56	.7	2.8	39	46	
5		-	198	2.4	248	.5	65	.6	2.9	37	46	
6		-	202	1.6	248	.5	69	.6	3.2	30	*46	
7		-	207	1.7	252	.6	68	.4	3.2	25	46	
8		-	242	1.3	252	.6	66	.5	2.9	22	46	
9		-	261	.6	250	.6	65	.5	2.8	*23	44	
10		-	254	.7	248	.6	65	.4	2.8	32	42	
11		-	246	.8	246	.6	52	.6	a3.0	28	41	
12		-	242	.8	246	.6	34	.6	a3.0	20	41	
13		-	232	1.0	244	4.2	32	10	a4.0	22	39	
14		-	206	1.2	240	83	26	*45	15	29	34	
15		21	173	16	*236	121	17	48	22	29	33	
16		65	173	28	228	118	7.8	37	24	29	33	
17		152	170	90	222	92	2.5	28	25	29	28	
18		197	128	*248	217	81	1.2	22	24	29	0	
19		a190	74	*277	209	78	1.1	15	32	38	0	
20		a180	*73	270	200	83	1.1	8.9	54	45	0	
21		a175	73	272	88	88	1.0	4.0	48	45	.1	
22		170	73	270	.8	83	.9	1.4	45	44	.8	
23		163	75	268	.8	72	.9	.8	38	44	.4	
24		153	72	259	.8	71	.9	.6	39	45	.3	
25		144	72	244	.6	70	.9	.7	39	45	.2	
26		134	72	242	.6	68	.9	.6	39	45	.2	
27		a130	72	236	.6	*64	.9	.5	39	45	.1	
28		a120	72	230	.6	65	.9	*.6	39	40	.1	
29		a110	71	154	-	63	.9	.6	39	11	a.1	
30		a100	30	88	-	63	.9	.6	39	43	a.1	
31		-	3.0	86	-	59	-	.9	-	43	a.1	
Total		-	4,284.0	3,500.9	4,289.8	1,433.1	801.8	232.5	637.8	1,073	701.5	
Mean		-	138	106	153	46.2	26.7	7.50	21.3	34.6	22.6	
Ac-ft		-	8,500	6,550	8,510	2,840	1,590	461	1,270	2,130	1,390	

Calendar year

: Max

Min

Mean

Ac-ft

Water year

: Max

Min

Mean

Ac-ft

\* Discharge measurements made on this day.

No gage-height record; discharge estimated on basis of records for station below Walker Creek near Ashland or extrapolated.

Note.--Probably no flow most of time Oct. 1 to Nov. 15 and during September.

## Emigrant Creek below Walker Creek, near Ashland, Oreg.

Location--Lat 42°11'35", long. 122°39'00", in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec. 12, T. 39 S., R. 1 E., on right bank 200 ft downstream from Walker Creek and 2 miles east of Ashland.

Drainage area--109 sq mi.

Records available--October 1945 to September 1951 in reports of Geological Survey (discontinued). October 1943 to September 1945 in files of State engineer.

Gage--Water-stage recorder. Datum of gage is 1,866.3 ft above mean sea level (Bureau of Reclamation benchmark). Prior to Mar. 5, 1947, water-stage recorder at site 160 ft upstream at datum 2.99 ft higher.

Average discharge--8 years, 40.0 cfs.

Extremes--Maximum discharge during year, 824 cfs Jan. 17 (gage height, 4.92 ft), from rating curve extended above 330 cfs on basis of shape of previous curve defined to 2,100 cfs; minimum, 0.2 cfs Sept. 21.

1943-51: Maximum discharge, 3,750 cfs Jan. 7, 1948 (gage height, 8.87 ft), from rating curve extended above 2,100 cfs by logarithmic plotting; minimum, 0.1 cfs Sept. 27-30, Oct. 18-20, 1947.

Remarks--Records good. Natural flow of stream is affected by trans-mountain diversion from Hyatt Prairie Reservoir, storage at Emigrant Gap Reservoir, and diversions for irrigation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 4

Feb. 5 to Sept. 30

1.1	0.2	1.9	19	1.35	0.2	2.1	28
1.2	.9	2.1	35	1.4	.5	2.4	54
1.3	1.9	2.4	70	1.5	1.9	2.8	106
1.5	5.0	3.0	184	1.6	4.4	3.4	230
1.7	10	3.8	384	1.8	12	4.2	440

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.7	5.4	90	15	138	24	78	14	6.6	36	42	1.5
2	.7	4.7	91	18	134	22	76	13	6.0	34	44	1.5
3	.7	4.5	337	22	138	19	76	13	6.0	34	44	1.3
4	.7	3.6	272	35	*434	28	79	12	6.3	34	44	1.2
5	.9	3.3	239	29	386	29	87	8.8	6.3	34	44	.9
6	.9	3.0	262	18	360	27	88	10	6.3	29	*44	.9
7	.8	2.6	279	16	372	26	86	12	6.0	26	44	.8
8	.8	2.6	294	16	338	29	84	13	6.0	23	44	.8
9	.8	2.5	304	16	322	33	82	10	5.7	26	44	.8
10	.8	2.3	282	16	318	24	81	8.4	5.4	32	40	.8
11	.8	1.8	302	18	312	26	68	23	5.7	29	40	.8
12	.7	2.3	299	16	302	34	51	18	5.7	23	40	.8
13	.7	2.5	*269	16	290	66	45	34	6.0	24	38	.8
14	.7	2.9	259	24	272	137	38	72	9.2	29	33	.8
15	.7	*16	208	43	*268	194	30	59	25	29	32	.6
16	.8	110	198	56	255	183	25	48	24	29	31	.8
17	.8	146	194	246	242	139	19	37	24	29	27	.8
18	.8	198	158	336	240	127	18	29	24	29	4.4	.8
19	.8	200	97	*324	222	127	15	24	30	37	2.9	.6
20	.8	190	95	312	225	136	14	18	52	44	2.4	.4
21	.8	180	91	375	125	137	13	13	47	44	1.8	*.4
22	.8	172	90	327	32	121	12	9.6	42	44	25	.4
23	.7	164	90	345	29	108	11	*7.6	36	44	26	.5
24	*.7	156	86	354	27	103	11	7.3	37	44	24	.5
25	.7	146	86	330	28	102	11	7.0	36	44	23	.5
26	1.1	138	84	333	25	*100	9.9	6.0	36	44	23	.4
27	2.3	130	83	312	23	96	10	5.7	36	43	21	.4
28	5.7	120	83	292	25	94	15	5.7	37	43	21	.5
29	57	108	88	200	-	94	15	5.7	37	21	14	.8
30	25	100	49	138	-	88	15	5.7	*36	42	2.6	.8
31	8.0	-	17	140	-	83	-	5.4	-	42	1.6	-
Total	118.2	2,318.0	5,376	4,738	5,882	2,556	1,260.9	554.9	846.2	1,065	887.7	22.9
Mean	3.81	77.3	173	153	210	82.5	42.0	17.9	21.5	34.4	28.0	0.76
Ac-ft	234	4,600	10,660	9,400	11,670	5,070	2,500	1,100	1,280	2,110	1,720	45

Calendar year 1950: Max 345 Min 0.7 Mean 55.2 Ac-ft 39,930  
 Water year 1950-51: Max 434 Min 0.4 Mean 69.6 Ac-ft 50,390

\* Discharge measurement made on this day.

## Wagner Creek near Talent, Oreg.

Location--Lat 42°11'40", long. 122°46'40", in NE $\frac{1}{4}$  sec. 11, T. 39 S., R. 1 W., on left bank half a mile upstream from upper intake of West and Fredericks laterals of Talent Irrigation District and 3 miles south of Talent.

Drainage area--13.6 sq mi.

Records available--July to October 1913, April to September 1951.

Gage--Staff gage and cippoletti weir. Altitude of gage is 2,200 ft (by barometer). Prior to Nov. 1, 1913, staff gage at site 3,000 ft downstream at different datum.

Extremes--Maximum discharge during period, 24 cfs about May 14 (gage height, 1.25 ft, from floodmark); minimum observed, 0.1 cfs several days in August and September. 1913, 1951: Maximum discharge, that of May 14, 1951; minimum observed, that of August and September 1951.

Remarks--Records good except those for period of no gage-height record, which are fair.

Rating table, Apr. 1 to Sept. 30, 1951 (gage height, in feet, and discharge, in cubic feet per second)

0.03	0.1	0.4	4.4
.1	.6	.7	9.8
.2	1.6	1.2	22

Discharge, in cubic feet per second, April to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							8.0	16	19	7.1	0.2	0.4
2							7.8	17	19	6.4	.2	.3
3							8.0	18	18	6.7	.2	.3
4							7.8	19	17	6.7	.2	.2
5							7.8	19	18	7.1	.2	.2
6							7.8	19	18	6.7	.2	.2
7							6.9	16	17	6.7	.1	.2
8							6.9	6.7	17	6.0	.1	.2
9							6.7	6.4	16	6.0	.1	.2
10							6.5	6.4	16	6.0	.4	.2
11							6.4	7.8	15	5.7	.4	.2
12							6.4	a21	*15	5.7	.3	.2
13							6.4	a22	15	5.0	.3	.2
14							6.4	a21	14	5.7	.4	.2
15							6.4	a20	14	5.7	.4	*.2
16							6.4	a20	14	5.0	.4	.1
17							6.2	a20	13	5.0	.4	.1
18							6.2	a19	12	5.0	.4	.1
19							6.2	a20	12	4.4	.4	.1
20							*6.6	a20	11	4.4	.4	.1
21							7.8	a20	10	4.4	.4	.1
22							7.8	a20	10	4.4	.4	.1
23							6.9	a20	9.4	4.4	.4	.1
24							6.9	19	9.8	*4.4	.4	.1
25							7.8	18	9.2	4.4	.4	.1
26							6.9	19	9.0	.8	.4	.1
27							6.9	19	8.6	1.0	.4	.1
28							6.9	*19	7.8	.8	.6	.1
29							16	19	7.1	.2	.8	.1
30							15	19	7.1	.2	.8	.1
31							-	19	-	.2	.6	-
Total							226.7	545.3	398.0	142.2	11.3	4.9
Mean							7.56	17.6	13.3	4.59	0.36	0.16
Ac-ft							450	1,080	789	282	22	9.7

Calendar year	: Max	Min	Mean	Ac-ft
Water year	: Max	Min	Mean	Ac-ft

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for McDonald Creek Canal near Talent.

Bear Creek at Medford, Oreg.

Location.--Lat 42°19'40" (revised), long. 122°52'00", in NW¼ sec. 30, T. 37 S., R. 1 W., on left bank just upstream from Main Street Bridge in Medford.

Drainage area.--279 sq mi.

Records available.--March 1915 to September 1951 (incomplete prior to April 1927).

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,343.47 ft above mean sea level, datum of 1929. Mar. 13, 1915, to June 30, 1918, staff gage and Sept. 20, 1918, to Oct. 19, 1943, water-stage recorder at site 40 ft upstream at datum 0.42 ft higher. Oct. 20, 1943, to Dec. 30, 1947, water-stage recorder at site 40 ft upstream at present datum.

Average discharge.--30 years (1920-26, 1927-51), 83.3 cfs.

Extremes.--Maximum discharge during year, 3,450 cfs Jan. 17 (gage height, 4.57 ft); minimum, 6.4 cfs Sept. 18.

1915-51: Maximum discharge, 10,200 cfs Feb. 20, 1927 (gage height, 10.57 ft, present datum, site then in use), from rating curve extended above 1,600 cfs; practically no flow at times.

Remarks.--Records good except those below 15 cfs, which are fair, and those for period of no gage-height record, which are poor. Diversions above station for irrigation. Flow partly regulated since December 1924 by Emigrant Gap Reservoir.

Revisions (water years).--W 1044: 1944.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 16					Jan. 17 to Sept. 30			
0.2	4.0	1.5	325		1.5	325	3.0	1,430
.5	10	2.0	590		2.0	600	3.6	2,090
.5	34	2.5	910		2.5	965		
.7	70	3.5	1,810		Note.--Same as preceding table below 1.5 ft.			
1.0	145							

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	13	233	217	139	281	176	170	90	39	11	8.2	13
2	13	187	228	139	285	167	167	85	39	8.8	9.4	10
3	16	162	1,730	154	517	160	160	90	42	7.6	9.4	10
4	25	137	1,080	234	*2,050	179	167	92	39	8.2	9.4	9.4
5	41	120	644	186	*1,100	207	173	88	36	10	11	9.4
6	41	109	740	148	862	183	176	97	42	12	11	7.6
7	34	99	854	137	848	160	173	112	36	11	8.2	8.8
8	34	92	722	134	775	157	170	107	31	11	7.6	8.2
9	41	82	674	131	691	190	167	98	26	10	8.2	8.6
10	42	72	590	134	663	151	157	74	25	12	8.2	8.8
11	42	72	602	183	677	142	142	97	20	18	7.6	9.4
12	42	70	584	164	642	148	128	110	21	13	9.4	*9.4
13	44	70	519	142	582	183	114	120	18	*14	11	8.8
14	44	79	602	157	546	245	112	160	18	8.8	10	8.8
15	37	72	470	286	516	309	90	a170	19	8.8	10	8.2
16	39	626	426	231	486	309	83	a150	21	8.8	9.4	8.8
17	46	361	400	1,310	462	253	62	a120	25	8.2	10	8.8
18	39	380	366	1,280	450	234	51	a95	25	8.8	13	8.2
19	41	375	277	818	420	224	44	a75	19	8.8	16	8.8
20	41	321	261	684	405	234	39	a60	19	9.4	14	8.8
21	42	305	249	1,020	343	234	39	a50	19	11	10	8.8
22	37	281	*238	754	214	220	42	a42	57	11	11	9.4
23	*34	265	231	719	200	200	46	*37	58	11	13	8.2
24	34	253	220	719	193	196	42	39	14	9.4	12	8.2
25	31	249	217	649	196	196	44	37	12	8.8	14	8.2
26	42	238	207	649	186	*190	39	37	11	8.8	14	8.2
27	100	238	209	594	176	186	44	34	11	8.2	14	8.8
28	659	220	203	546	176	183	88	12	8.8	13	8.2	
29	1,360	210	207	426	-	183	100	39	10	17	16	11
30	1,100	220	203	297	-	186	97	42	14	8.8	24	14
31	360	-	154	289	-	183	-	42	-	8.2	22	-
Total	4,514	6,198	14,515	13,453	14,742	6,168	3,126	2,518	778	319.2	364.0	275.0
Mean	146	207	462	434	526	199	104	81.2	25.9	10.3	11.7	9.17
Ac-ft	8,950	12,290	28,590	26,680	29,240	12,230	6,200	4,990	1,540	653	722	545
Calendar year 1950: Max 1,730 Min 7.0 Mean 135 Ac-ft 97,660												
Water year 1950-51: Max 2,050 Min 7.6 Mean 183 Ac-ft 132,400												

\* Discharge measurement made on this day.  
 A no gage-height record; discharge estimated on basis of recorded range in stage, and records for Emigrant Creek above Walker Creek near Ashland.

Note.--Figure of runoff in acre-feet for the month of October supersedes figure published in W.S.P. 1137E, "Floods of October-November 1950 in Southwestern Oregon."

## Diversions in Bear Creek basin, Oreg.

The following canals divert from streams in Bear Creek basin:

Ashland lateral of Talent Irrigation District, from Sampson Creek in SE $\frac{1}{4}$  sec. 27, T. 39 S., R. 2 E. Water used to irrigate lands near Ashland. Most of flow is received from Keene Creek, in Klamath River basin, through Keene Creek Canal.

East lateral of Talent Irrigation District, from Emigrant Gap Reservoir in SE $\frac{1}{4}$  sec. 20, T. 39 S., R. 2 E. Water used to irrigate lands mostly on east side of Bear Creek above Medford.

Talent lateral of Talent Irrigation District, from Bear Creek in SW $\frac{1}{4}$  sec. 33, T. 38 S., R. 1 E. Water used to irrigate lands near Talent.

Phoenix Canal, from Bear Creek in NW $\frac{1}{4}$  sec. 23, T. 38 S., R. 1 W. Water supplements flow of Medford Irrigation District Canal, used to irrigate lands west of Bear Creek.

Bear Creek Canal, from Bear Creek at Medford. Water used to irrigate lands west of Bear Creek near Central Point.

Records of these canals, published as a group, are available from April 1929 to September 1951; records for some of the canals published separately prior to 1929.

Many smaller canals also divert from Bear Creek and its tributaries.

Diversion, in acre-feet, water year October 1950 to September 1951

Month	Ashland lateral	East lateral	Talent lateral	Phoenix Canal	Bear Creek Canal
October.....	-	-	-	-	-
November.....	-	-	-	-	-
December.....	-	-	-	-	-
January.....	-	-	-	-	-
February.....	-	-	-	-	-
March.....	-	-	-	-	-
April.....	-	-	-	316	1,974
May.....	-	1,840	2,040	327	1,150
June.....	705	3,350	2,230	852	1,040
July.....	931	3,710	2,250	784	664
August.....	642	-	1,800	453	734
September.....	102	-	-	479	541
Water year 1950-51.....	-	-	-	-	-



Rogue River at Raygold, near Central Point, Oreg.

Location.--Lat 42°26'20", long. 122°59'10", in sec. 18, T. 36 S., R. 2 W., on right bank at Raygold, just downstream from dam and powerhouse of California Oregon Power Co., half a mile downstream from Bear Creek 6 miles northwest of Central Point, and at mile 121.9 (U.S.G.S. river-profile survey).

Drainage area.--2,020 sq mi, approximately.

Records available.--August 1905 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,121.78 ft above mean sea level, datum of 1929. Prior to Sept. 19, 1914, staff gage at same site and datum.

Average discharge.--46 years, 2,782 cfs.

Extremes.--Maximum discharge during year, 43,100 cfs Oct. 29 (gage height, 14.91 ft); minimum, 749 cfs Oct. 1 (gage height, 0.27 ft); minimum daily, 1,240 cfs Sept. 19-23, 25.

1905-51: Maximum discharge, 91,500 cfs Feb. 21, 1927 (gage height, 24.8 ft, from floodmark), from rating curve extended above 36,000 cfs; minimum not determined; minimum daily, 616 cfs Sept. 6, 1931.

Greatest flood known occurred during winter of 1861-62 and reached a stage of about 32 ft; flood of February 1890 reached a stage of about 27½ ft. (Information furnished by Corps of Engineers.)

Remarks.--Records excellent. Many diversions above station for irrigation. Diurnal fluctuation caused by powerplant just above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

0.9	1,240
2.0	2,460
4.0	5,900
7.0	13,300
13.0	35,100

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,270	5,870	4,370	4,140	4,940	3,630	3,880	3,930	2,800	1,830	1,410	1,380
2	1,330	6,940	4,390	4,190	4,880	3,470	*3,760	3,710	2,740	1,760	1,410	1,340
3	1,410	6,880	23,000	5,290	5,430	3,360	3,830	3,660	2,700	1,730	1,400	1,340
4	1,600	5,280	25,900	7,040	24,000	3,580	4,150	3,640	2,700	1,720	1,410	1,330
5	1,700	4,340	13,700	5,650	22,500	4,730	4,460	3,610	2,650	1,710	1,430	1,300
6	2,130	3,720	13,500	4,640	15,000	4,120	4,580	3,610	2,600	1,680	1,410	1,300
7	1,760	3,270	21,200	4,330	13,800	4,300	4,710	3,810	2,550	1,650	1,400	1,300
8	1,650	3,080	15,200	4,210	*13,000	4,190	4,800	3,710	2,490	1,630	1,380	1,310
9	1,680	2,960	11,000	4,080	10,300	5,410	4,790	3,610	2,450	1,610	1,370	1,300
10	1,550	2,700	9,040	4,170	9,230	4,280	4,880	3,640	2,420	1,600	1,360	1,290
11	1,450	2,550	8,450	4,770	9,520	3,980	4,820	4,330	2,410	1,580	1,360	1,280
12	1,420	2,510	8,520	4,770	9,350	4,050	4,840	4,490	2,400	1,560	1,380	1,280
13	1,360	2,490	7,170	4,310	8,060	4,460	5,090	4,710	2,370	1,570	1,360	1,270
14	1,370	2,460	9,500	4,370	7,240	5,330	5,250	4,640	2,330	1,580	1,370	1,260
15	1,410	*2,380	8,570	6,190	6,640	5,650	5,270	4,310	2,320	1,570	1,380	1,260
16	1,410	6,640	7,060	5,900	6,170	6,280	5,230	4,150	2,330	*1,550	1,360	1,250
17	1,480	6,320	6,300	17,700	5,840	5,310	5,090	4,210	2,290	1,520	1,360	1,250
18	1,720	10,300	5,690	18,500	5,610	4,840	4,880	4,170	2,210	1,500	1,360	1,250
19	1,540	10,500	5,230	*9,770	5,190	4,620	4,620	3,980	2,160	1,500	1,360	1,240
20	1,460	6,800	4,900	7,610	4,900	4,790	4,310	3,880	2,100	1,490	1,340	1,240
21	1,430	5,880	4,530	11,700	4,750	5,000	4,100	3,860	2,080	1,490	1,350	1,240
22	1,420	4,860	4,240	10,200	4,530	4,800	3,830	3,800	2,060	1,480	1,330	1,240
23	1,410	4,280	4,100	10,200	4,310	4,570	3,710	3,800	2,010	1,460	1,350	1,240
24	1,370	3,920	3,980	13,400	4,140	4,420	3,590	3,630	1,980	1,460	1,330	1,250
25	1,440	3,800	3,850	11,000	4,050	4,400	3,490	3,560	1,930	1,430	1,330	1,240
26	1,640	3,640	3,710	9,820	3,950	4,390	3,490	*3,460	1,870	1,430	1,340	1,270
27	2,290	3,970	3,630	8,730	3,800	4,200	3,430	3,460	1,870	1,430	1,300	1,250
28	12,300	4,000	3,580	7,480	3,680	4,200	4,440	3,300	1,850	1,430	1,320	1,250
29	34,200	3,580	4,490	6,300	-	4,200	4,840	3,110	1,830	1,430	1,380	1,270
30	21,500	4,210	4,510	5,410	-	4,200	4,110	2,980	1,800	1,430	1,430	1,320
31	6,100	-	4,370	5,190	-	4,000	-	2,900	-	1,430	1,430	-
Total	117,760	140,130	257,680	231,160	224,790	138,760	132,470	117,660	68,300	48,240	42,500	38,340
Mean	3,799	4,671	8,312	7,457	8,028	4,476	4,416	3,796	2,277	1,556	1,371	1,278
Ac-ft	235,600	277,900	511,100	458,500	445,900	275,200	262,600	233,400	135,500	95,680	84,300	76,050

Calendar year 1950: Max 34,200 Min 1,200 Mean 4,115 Ac-ft 2,979,000  
 Water year 1950-51: Max 34,200 Min 1,240 Mean 4,268 Ac-ft 3,090,000

Peak discharge (base, 11,000 cfs).--Oct. 29 (11 a.m.) 43,100 cfs (14.91 ft); Nov. 18 (8 p.m.) 13,900 cfs (7.2 ft); Dec. 3 (12 p.m.) 38,200 cfs (13.76 ft); Dec. 7 (10 a.m.) 23,300 cfs (9.95 ft); Dec. 14 (4 p.m.) 11,200 cfs (6.28 ft); Jan. 17 (10 p.m.) 37,500 cfs (13.58 ft); Jan. 21 (9 a.m.) 13,600 cfs (7.11 ft); Jan. 24 (8 a.m.) 14,000 cfs (7.23 ft); Feb. 4 (6 p.m.) 32,300 cfs (12.29 ft).

\* Discharge measurement made on this day.

## Rogue River at Grants Pass, Oreg.

Location.--Lat 42°25'50", long. 123°19'00", in NW¼ sec. 20, T. 36 S., R. 5 W., on right bank at city of Grants Pass filter plant, 0.6 mile upstream from U. S. Highway 99 bridge at Grants Pass, and at mile 98.0 (U.S.G.S. river-profile survey).

Drainage area.--2,420 sq mi, approximately.

Records available.--January 1939 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 888.28 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 3,149 cfs.

Extremes.--Maximum discharge during year, 65,400 cfs Oct. 29 (gage height, 21.25 ft), from rating curve extended above 28,000 cfs on basis of slope-area determination of peak flow; minimum, not determined; minimum daily, 1,020 cfs Sept. 22.

1939-51: Maximum discharge, 70,000 cfs Dec. 29, 1945 (gage height, 23.16 ft), from rating curve extended above 23,000 cfs; minimum, 560 cfs Aug. 8, 1940; minimum daily, 637 cfs Aug. 8, 1940.

Flood in winter of 1861-62 reached a stage of about 39 ft (information furnished by Corps of Engineers). Flood of February 1890 reached a stage of about 32 ft, and that of Feb. 21, 1927, about 28 ft, according to local resident.

Remarks.--Records good. Many diversions from Rogue River and tributaries above station, the largest of which are 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.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29		Oct. 29 to Dec. 3		Dec. 4 to Sept. 30	
0.8	1,170	1.7	2,600	0.3	1,000
2.0	2,800	3.0	4,950	1.5	2,420
5.0	8,200	7.0	13,800	3.0	4,950
7.4	13,500	14.0	35,800	7.0	13,800
		19.0	55,800	14.0	35,800

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1,240	7,640	6,290	4,760	5,960	3,880	4,180	3,880	2,540	1,580	1,140	1,210
2	1,180	7,960	5,270	4,660	5,710	3,700	4,040	3,700	2,550	*1,520	1,140	1,200
3	1,350	8,380	29,700	6,460	6,340	3,640	4,020	3,690	2,420	1,500	1,140	1,180
4	1,870	6,480	35,900	8,760	28,300	3,810	4,240	3,690	2,410	1,490	1,130	1,180
5	2,050	5,370	17,900	7,640	31,100	5,390	4,590	3,620	2,360	1,480	1,120	1,140
6	2,240	4,680	16,500	6,000	18,800	4,590	4,780	3,550	2,310	1,460	1,150	1,130
7	2,280	4,040	24,400	5,410	16,700	5,010	4,660	3,790	2,250	1,420	1,130	1,120
8	1,730	3,640	18,800	5,080	15,900	4,740	4,740	3,690	2,180	1,410	1,130	1,080
9	1,670	3,620	13,700	4,890	12,700	6,980	4,990	3,530	2,140	1,340	1,130	1,100
10	1,670	3,210	11,300	5,200	11,400	5,240	4,970	3,530	2,090	1,340	1,100	1,100
11	1,550	2,960	10,200	5,860	11,700	4,610	4,890	4,070	2,090	1,310	1,100	1,100
12	1,460	2,880	10,300	6,260	11,600	4,660	4,820	4,510	2,080	1,300	1,130	1,100
13	1,460	2,840	8,650	5,330	10,000	5,240	5,060	4,630	2,060	1,290	1,130	1,090
14	1,430	2,760	11,300	5,370	8,890	6,580	5,290	4,570	2,050	1,290	*1,130	1,080
15	1,450	2,740	10,700	7,680	7,990	6,960	5,290	4,240	2,020	1,300	1,120	1,070
16	1,470	8,360	8,670	8,010	7,420	7,590	5,270	3,910	2,060	1,300	1,130	1,060
17	1,520	9,240	7,660	23,800	6,900	6,440	5,120	3,970	2,020	1,300	1,120	1,070
18	1,840	14,200	6,940	*28,100	6,600	5,790	4,910	4,000	1,960	1,270	1,110	1,060
19	1,720	14,300	6,360	*13,900	6,140	5,500	4,610	3,760	1,890	1,270	1,110	1,050
20	1,450	9,130	5,000	10,400	5,800	5,540	4,510	3,670	1,840	1,260	1,120	1,050
21	1,500	7,570	5,500	17,600	5,620	5,850	4,000	3,650	1,810	1,250	1,100	1,060
22	1,520	6,180	5,120	15,300	5,200	5,560	3,640	3,550	1,750	1,250	1,100	1,020
23	1,470	4,940	4,910	13,700	4,910	5,160	3,530	3,550	1,720	1,230	1,090	1,050
24	1,460	4,910	4,550	16,800	4,610	4,910	3,470	*3,450	1,750	1,220	1,110	1,070
25	1,470	4,630	4,380	14,200	4,550	4,600	3,360	3,340	1,690	1,220	1,110	1,090
26	1,680	4,440	4,160	12,300	4,400	4,760	3,310	3,230	1,630	1,210	1,120	*1,100
27	2,420	4,610	3,970	10,900	4,160	*4,680	3,260	3,230	1,630	1,200	1,120	1,120
28	13,300	4,860	3,950	9,350	4,040	4,610	4,240	3,130	1,590	1,170	1,120	1,110
29	*54,100	*4,270	5,140	7,870	-	4,590	5,010	2,920	1,580	1,170	1,140	1,130
30	29,600	4,860	5,240	6,640	-	4,660	4,340	2,780	1,540	1,170	1,230	1,190
31	11,200	-	5,290	6,280	-	4,400	-	2,660	-	1,160	1,240	-
Total	152,950	176,160	317,580	304,510	273,440	159,670	133,140	113,490	60,010	40,680	34,980	33,090
Mean	4,934	5,672	10,240	9,823	9,766	5,151	4,438	3,661	2,000	1,312	1,128	1,103
Ac-ft	303,400	349,400	629,900	604,000	542,400	316,700	264,100	225,100	119,000	80,690	69,380	65,630
Calendar year 1950:	Max	54,700		Min	990		Mean	4,697	Ac-ft	3,400,000		
Water year 1950-51:	Max	54,700		Min	1,020		Mean	4,931	Ac-ft	3,570,000		

Peak discharge (base, 11,000 cfs).--Oct. 29 (1 p.m.) 65,400 cfs (21.25 ft); Nov. 16 (4 p.m.) 13,000 cfs (6.70 ft); Nov. 18 (9 p.m.) 18,600 cfs (8.72 ft); Dec. 4 (2 a.m.) 50,800 cfs (17.8 ft); Dec. 7 (12 m.) 26,300 cfs (11.25 ft); Dec. 14 (7 p.m.) 13,200 cfs (6.77 ft); Jan. 4 (4 p.m.) 11,500 cfs (6.08 ft); Jan. 18 (1 a.m.) 49,700 cfs (17.30 ft); Jan. 21 (12 m.) 20,500 cfs (9.37 ft); Jan. 24 (8 p.m.) 17,400 cfs (8.30 ft); Feb. 4 (10 p.m.) 44,700 cfs (16.30 ft).

\* Discharge measurement made on this day.

Applegate River near Copper, Oreg.

Location.--Lat 42°03'30", long. 123°06'50", in SE<sup>1</sup>/<sub>4</sub> sec. 25, T. 40 S., R. 4 W., on right bank a quarter of a mile downstream from French Gulch, 1<sup>1</sup>/<sub>2</sub> miles downstream from Squaw Creek, and 3 miles northeast of Copper store.

Drainage area.--220 sq mi.

Records available.--December 1938 to September 1951.

Gage.--Water-stage recorder. Datum of gage is 1,759.66 ft above mean sea level, datum of 1929.

Average discharge.--12 years (1939-51), 397 cfs.

Extremes.--Maximum discharge during year, 11,800 cfs Oct. 29 (gage height, 16.50 ft), from rating curve extended above 6,000 cfs by logarithmic plotting; minimum, 27 cfs Sept. 25 (gage height, 0.88 ft).

1938-51: Maximum discharge, 13,400 cfs Jan. 6, 1948 (gage height, 17.84 ft), from rating curve extended above 6,300 cfs by logarithmic plotting; minimum, 20 cfs Sept. 23-25, 1939.

Remarks.--Records good. About 11 cfs diverted for irrigation of 482 acres above station in Applegate River basin; Grand Applegate ditch diverts about 3.3 cfs around station on left bank. An average of about 8 cfs for irrigation is diverted into Thompson Creek basin. Several hundred acre-feet normally stored each winter in Squaw Lake for irrigation the following summer.

Revisions.--W 1064: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Nov. 30				Dec. 1 to Sept. 30			
1.0	32	3.0	461	2.6	325	0.8	21	2.5	320		
1.4	73	4.0	890	3.0	465	1.0	38	3.0	485		
1.8	134	6.0	2,250	3.5	700	1.4	86	3.5	700		
2.4	266	11.0	6,330	4.0	1,020	2.0	.192				
				8.0	4,090						
				15.0	10,200						

Note.--Same as preceding table above 3.5 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	39	1,590	942	520	806	522	474	513	326	105	52	41
2	39	1,510	948	556	780	568	468	513	312	103	52	40
3	61	1,280	5,620	564	910	544	513	536	300	103	50	40
4	102	1,070	4,580	564	5,410	548	840	560	298	103	50	38
5	144	887	2,720	536	4,150	532	748	576	286	103	49	36
6	110	735	*2,670	510	2,890	520	*799	656	264	100	49	35
7	78	*642	2,840	492	3,370	502	896	614	251	96	*49	34
8	66	592	2,310	478	2,790	513	922	580	238	87	49	34
9	66	530	2,250	468	2,230	513	955	600	233	86	49	34
10	60	481	1,890	520	2,270	485	1,070	632	231	86	50	33
11	56	445	1,980	524	2,570	471	1,060	632	224	86	47	34
12	53	418	1,750	502	*2,230	464	1,110	560	219	83	46	35
13	52	400	1,560	496	1,910	488	1,240	524	219	83	46	34
14	50	383	1,910	556	1,680	520	1,230	492	212	82	46	32
15	53	408	1,840	792	1,820	580	1,260	468	210	76	45	34
16	54	1,030	1,630	786	1,380	636	1,220	540	203	75	43	34
17	92	1,200	1,500	1,760	1,270	584	1,210	584	188	72	43	33
18	94	2,260	1,540	1,830	1,170	540	1,100	600	176	69	42	34
19	73	1,720	1,240	1,320	1,070	536	974	560	166	72	43	32
20	67	1,580	1,140	1,100	1,010	560	858	544	160	69	41	31
21	65	1,390	1,030	2,250	936	584	780	548	156	68	39	32
22	59	1,140	936	1,950	877	560	736	*548	150	67	38	32
23	*56	1,000	864	1,660	812	536	706	532	143	66	38	30
24	55	1,120	792	1,740	760	528	656	499	138	66	39	31
25	140	1,140	736	1,580	718	548	614	478	130	63	39	28
26	228	1,070	678	1,470	694	544	596	478	127	62	36	29
27	671	1,300	632	1,360	645	528	604	468	*121	58	38	28
28	5,860	1,040	614	1,220	614	520	792	429	120	56	40	29
29	10,200	922	600	1,100	-	532	604	390	113	55	41	31
30	4,270	1,050	588	974	-	510	540	365	108	55	44	38
31	1,880	-	552	890	-	488	-	344	-	54	40	-
Total	24,893	30,333	50,682	31,068	47,462	16,574	24,435	16,383	6,022	2,409	1,373	1,006
Mean	803	1,011	1,635	1,002	1,695	535	848	528	201	77.7	44.3	33.5
Ac-ft	49,380	60,160	100,500	61,620	94,140	32,870	50,450	32,500	11,940	4,780	2,720	2,000

Calendar year 1950: Max 10,200 Min 34 Mean 629 Ac-ft 455,500

Water year 1950-51: Max 10,200 Min 28 Mean 695 Ac-ft 503,100

Peak discharge (base, 1,700 cfs).--Oct. 29 (6 a.m.) 11,800 cfs (16.50 ft); Nov. 18 (7 a.m.) 2,610 cfs (6.15 ft); Dec. 3 (7:30 p.m.) 7,840 cfs (12.45 ft); Jan. 17 (6 p.m.) 2,990 cfs (6.62 ft); Jan. 21 (12 m.) 2,510 cfs (6.02 ft); Feb. 4 (2 p.m.) 8,020 cfs (12.65 ft); Feb. 7 (2 p.m.) 4,110 cfs (8.02 ft).

\* Discharge measurement made on this day.

Note.--Daily discharge for Nov. 19 superseded a figure (typographical error) published in W.S.P. 1137E, "Floods of 1950 in Southwestern Oregon and Northwestern California."

## Applegate River near Ruch, Oreg.

Location.--Lat 42°10'40", long. 123°02'50", in sec. 15, T. 39 S., R. 3 W., on downstream side of left pier of Cameron Bridge, 1½ miles upstream from Little Applegate River and 4½ miles south of Ruch.

Drainage area.--297 sq mi.

Records available.--June 1911 to September 1914, September 1925 to September 1951. Published as "near Buncom" 1911-14.

Gage.--Water-stage recorder. Datum of gage is 1,475.09 ft above mean sea level, datum of 1929 (levels by Corps of Engineers). June 18, 1911, to Sept. 30, 1914, staff gage at same site at datum 0.88 ft lower.

Average discharge.--28 years (1911-14, 1925-26, 1927-51), 360 cfs.

Extremes.--Maximum discharge during year, 12,000 cfs Oct. 29 (gage height, 11.4 ft); minimum, 25 cfs Sept. 14, 17.

1911-14, 1925-51: Maximum discharge, 20,000 cfs Feb. 20, 1927 (gage height, 16.0 ft), from rating curve extended above 8,000 cfs; minimum, 7 cfs Sept. 2, 1929.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Diversions for irrigation of about 1,500 acres above station; Cameron (Comstock) ditch diverts some water around station for irrigation.

Revisions (water years).--W 1064: Drainage area. W 1094: 1946(M).

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-29					Oct. 30 to Sept. 30				
-0.2	42	2.0	940		-0.2	22	1.0	308	
.0	70	3.0	1,690		.0	45	2.0	830	
.2	109	7.0	6,170		.2	78	3.0	1,700	
.5	195	11.0	11,500		.5	146	7.0	6,300	
1.0	385								

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	46	1,700	837	510	806	620	490	505	a340	107	45	41
2	45	1,560	794	540	782	590	485	505	a330	107	50	42
3	52	1,230	5,220	550	830	565	520	525	a320	*103	45	42
4	116	978	4,920	545	6,000	570	*644	540	a310	103	45	42
5	129	810	2,770	*520	4,740	560	740	*555	a290	103	50	44
6	137	695	2,610	495	3,160	540	758	632	a270	98	51	37
7	92	612	2,840	480	3,430	530	824	590	a250	96	*48	36
8	75	563	2,330	470	*3,000	540	851	565	*229	86	48	*30
9	70	518	2,280	470	2,430	550	865	590	223	82	46	31
10	66	465	1,890	515	2,430	515	956	602	220	82	46	36
11	*61	435	1,960	530	2,740	500	956	608	216	82	44	36
12	58	411	1,730	510	*2,390	495	994	540	213	80	42	36
13	56	398	1,470	505	2,030	*510	1,140	510	216	80	42	31
14	55	379	1,880	555	1,770	540	1,190	480	213	78	40	30
15	56	392	1,850	782	1,560	590	1,150	470	206	76	40	29
16	56	1,110	1,610	806	1,390	656	1,120	510	200	71	38	30
17	86	1,180	1,420	2,200	1,280	608	1,070	570	188	69	40	32
18	98	2,410	1,260	2,520	1,160	560	1,020	570	179	65	41	28
19	74	1,780	*1,140	1,520	1,050	555	886	535	170	67	40	28
20	64	1,550	1,030	1,180	978	575	800	510	165	67	40	28
21	62	1,330	921	2,900	928	596	734	510	165	67	37	27
22	55	*1,010	844	2,460	872	575	698	520	156	67	35	29
23	*54	879	782	1,980	824	555	668	510	144	64	33	28
24	54	963	734	2,020	776	545	638	475	144	60	33	29
25	106	986	692	1,800	746	560	596	460	a140	60	33	27
26	234	914	656	1,600	710	555	580	460	a135	57	35	29
27	724	1,150	602	1,420	686	545	570	450	128	54	35	*29
28	5,880	914	590	1,240	644	535	752	426	124	50	*33	30
29	10,800	800	575	1,070	-	545	596	a400	116	48	32	32
30	*4,850	886	560	849	-	525	535	a370	107	50	37	36
31	2,020	-	540	865	-	505	-	a350	-	*48	40	-
Total	26,331	28,998	49,337	34,507	50,142	17,210	23,826	15,843	6,107	2,325	1,264	985
Mean	849	967	1,592	1,113	1,791	555	794	511	204	75.0	40.8	32.8
Ac-ft	52,230	57,520	97,860	68,440	99,460	34,140	47,260	31,420	12,110	4,610	2,510	1,950

Calendar year 1950: Max 10,800 Min 34 Mean 646 Ac-ft 467,900  
Water year 1950-51: Max 10,800 Min 27 Mean 704 Ac-ft 509,500

Peak discharge (base, 1,800 cfs).--Oct. 29 (7 a.m.) 12,000 cfs (11.4 ft); Nov. 18 (10 a.m.) 2,760 cfs (4.00 ft); Dec. 3 (9 p.m.) 7,850 cfs (8.27 ft); Jan. 17 (7 p.m.) 4,330 cfs (5.36 ft); Jan. 21 (4:30 p.m.) 3,310 cfs (4.50 ft); Feb. 4 (3 p.m.) 8,780 cfs (9.00 ft).

\* Discharge measurement made on this day.  
a No gage-height record; discharge estimated on basis of records for stations near Applegate and Wilderville.

## Applegate River near Applegate, Oreg.

Location--Lat 42°14'30", long. 123°08'10", in NE $\frac{1}{4}$  sec. 26, T. 38 S., R. 4 W., on left bank 0.9 mile downstream from Keeler Creek and 2 miles southeast of Applegate.

Drainage area--480 sq mi.

Records available--October 1938 to September 1951.

Gage--Water-stage recorder. Datum of gage is 1,285.33 ft above mean sea level, datum of 1929. Prior to Dec. 23, 1938, staff gage at same site and datum.

Average discharge--13 years, 465 cfs.

Extremes--Maximum discharge during year, 18,600 cfs Oct. 29 (gage height, 13.20 ft), from rating curve extended above 5,100 cfs by logarithmic plotting; minimum, 7.0 cfs Aug. 28, 1938-51: Maximum discharge, 21,200 cfs Jan. 6, 1948 (gage height, 14.20 ft), from rating curve extended above 5,100 cfs by logarithmic plotting; minimum, 7 cfs Sept. 18, 1945, Aug. 28, 1951.

Remarks--Records good. Many diversions above station for irrigation of about 4,000 acres in Applegate River basin. About 10 cfs is diverted through Wagner Gap to Bear Creek basin for several months each year; Fowler-Keeler and Berryman ditches may divert 4.3 and 13.6 cfs, respectively, around station.

Revisions--W 1064: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Dec. 3		Dec. 4 to Sept. 30			
1.0	28	3.0	690	2.4	370	0.5	7.0	1.8	195
1.3	61	4.0	1,480	3.4	1,050	.6	11	2.2	325
1.6	115	5.0	2,580	4.0	1,560	.8	24	3.0	750
2.0	210	8.0	6,860	5.0	2,600	1.0	43	3.4	1,050
2.4	360			8.0	6,860	1.4	100		
				13.0	18,100				

Note.--Same as preceding table above 3.4 ft.

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	31	2,030	1,070	696	1,150	813	636	618	361	86	24	16
2	33	1,880	1,040	720	1,110	778	618	612	356	76	22	17
3	36	1,530	5,900	750	1,140	744	660	624	338	66	21	20
4	103	1,260	6,490	738	7,310	750	792	654	338	66	21	18
5	119	1,050	3,590	720	6,140	744	922	672	322	66	22	17
6	153	879	*3,230	678	4,120	720	*938	757	300	66	23	16
7	99	*757	3,560	654	4,260	696	1,030	732	283	65	23	14
8	82	689	2,940	636	3,900	708	1,070	714	266	62	23	12
9	75	612	2,850	630	3,150	757	1,050	720	255	55	22	14
10	67	533	2,410	696	3,000	702	1,170	744	252	55	23	16
11	63	491	2,460	726	3,400	678	1,170	764	246	58	23	16
12	60	455	2,170	720	*2,970	666	1,200	678	222	55	23	14
13	56	431	1,900	702	2,500	696	1,340	636	222	53	23	13
14	53	414	2,280	757	2,180	738	1,400	588	219	53	*20	11
15	54	408	2,250	1,110	1,950	820	1,360	559	213	47	19	9.8
16	57	1,550	2,060	1,190	1,750	898	1,310	594	204	47	16	10
17	69	*1,490	1,850	2,970	1,620	827	1,300	678	186	47	12	13
18	111	2,660	1,660	3,910	1,480	771	1,250	678	178	40	13	11
19	84	2,180	1,520	2,370	1,350	750	1,100	624	166	36	11	11
20	71	1,830	1,400	1,840	1,280	771	970	606	158	39	10	10
21	67	1,650	1,260	3,800	1,220	799	876	600	158	37	11	10
22	61	1,320	1,170	3,460	1,140	771	827	*588	154	38	9.8	11
23	*57	1,150	1,080	2,700	1,070	738	799	588	137	38	10	12
24	54	1,230	1,020	2,670	1,020	726	750	537	134	35	7.8	11
25	74	1,270	954	2,420	978	738	702	515	132	35	7.8	13
26	212	1,190	883	2,190	930	726	678	505	119	31	8.2	13
27	750	1,420	820	1,950	890	708	660	505	*110	31	9.4	13
28	6,490	1,180	799	1,710	848	696	890	480	98	30	9.0	14
29	*16,100	1,030	792	1,520	-	702	726	430	92	29	11	15
30	6,740	1,130	771	1,350	-	684	654	406	81	31	12	20
31	2,580	-	732	1,240	-	654	-	384	-	26	16	-
Total	34,661	35,699	62,911	48,223	63,856	22,969	28,849	18,790	6,300	1,499	506.0	410.8
Mean	1,118	1,190	2,029	1,556	2,281	741	962	606	210	48.4	16.3	13.7
Ac-ft	68,750	70,810	124,800	95,650	126,700	45,560	57,220	37,270	12,500	2,970	1,000	815

Calendar year 1950: Max 16,100 Min 14 Mean 769 Ac-ft 556,400  
Water year 1950-51: Max 16,100 Min 7.8 Mean 890 Ac-ft 644,000

Peak discharge (base, 1,400 cfs)--Oct. 29 (9 a.m.) 18,600 cfs (13.20 ft); Nov. 16 (8 a.m.) 2,270 cfs (4.70 ft); Nov. 18 (11 a.m.) 3,140 cfs (5.43 ft); Dec. 3 (11 p.m.) 11,100 cfs (10.1 ft); Jan. 17 (9 p.m.) 6,690 cfs (7.90 ft); Jan. 21 (12 m.) 4,360 cfs (6.33 ft); Feb. 4 (6 p.m.) 12,500 cfs (10.7 ft); Apr. 14 (2 a.m.) 1,500 cfs (3.93 ft).

\* Discharge measurement made on this day.

## ROGUE RIVER BASIN

West Fork Williams Creek near Williams, Oreg.

Location.--Lat 42°11'00", long. 123°20'20", in NW¼ sec. 18, T. 39 S., R. 5 W., on left bank three-quarters of a mile upstream from Lone Creek and 5½ miles southwest of Williams.

Drainage area.--12.8 sq mi.

Records available.--August 1946 to September 1951 (irrigation seasons only), discontinued.

Gage.--Staff gage read once daily. Altitude of gage is 1,800 ft (by barometer).

Extremes.--Maximum discharge observed during year, 40 cfs Apr. 14, 15 (gage height, 2.04 ft); minimum observed, 4.4 cfs Sept. 19-21.

1946-51: Maximum discharge, 205 cfs May 2, 1949 (gage height, 3.5 ft, from flood-mark), from rating curve extended above 50 cfs by logarithmic plotting; minimum observed, 3.7 cfs Sept. 23, 24, 1947.

Remarks.--Records good. One diversion above station for irrigation of 60 acres. No regulation.

Rating table, Apr. 1 to Sept. 30, 1951 (gage height, in feet, and discharge, in cubic feet per second)

1.2      4.4  
1.3      6.4  
1.5      12

1.7      21  
2.1      44

Discharge, in cubic feet per second, April to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							38	26	15	8.1	6.0	5.4
2							37	26	15	8.1	6.0	5.2
3							37	24	14	8.1	5.8	5.2
4							38	24	14	8.1	5.8	5.2
5							38	24	14	8.3	5.8	5.0
6							38	24	14	8.1	5.6	5.2
7							38	24	13	8.1	5.6	5.0
8							38	24	*13	8.1	5.8	5.0
9							38	23	12	7.8	5.6	5.0
10							38	22	12	7.8	5.6	4.8
11							38	26	12	7.5	5.6	5.0
12							38	27	12	7.2	5.6	4.8
13							39	27	12	7.2	5.6	4.6
14							40	25	11	7.0	*5.4	4.6
15							40	24	11	7.0	5.4	4.6
16							39	21	10	7.0	5.4	4.8
17							37	21	10	6.7	5.2	4.6
18							36	20	10	6.7	5.4	4.6
19							34	20	10	6.7	5.4	4.4
20							33	18	10	6.7	5.4	*4.4
21							32	18	9.9	6.7	5.6	4.4
22							31	18	9.5	6.4	5.2	4.6
23							28	18	9.2	6.4	5.2	4.6
24							27	16	9.2	6.4	5.2	4.6
25							27	16	9.2	6.4	5.4	4.8
26							*25	16	9.2	6.2	5.2	5.0
27							25	16	*9.2	6.2	5.2	4.8
28							38	16	8.6	6.2	5.2	4.6
29							32	16	8.6	6.2	6.4	4.8
30							28	15	8.3	6.2	5.6	5.0
31							-	15	-	6.2	5.6	-
Total							1,045	650	354.9	219.8	171.8	144.6
Mean							34.8	21.0	11.2	7.09	5.54	4.82
Ac-ft							2,070	1,290	664	436	341	287

Calendar year : Max Min Mean Ac-ft  
The season : Max - Min - Mean - Ac-ft 5,090

\* Discharge measurement made on this day.

## Powell Creek near Williams, Oreg.

Location--Lat 42°16'00", long. 123°17'40", near center of sec. 16, T. 38 S., R. 5 W., on left bank 0.1 mile upstream from Blodgett ditch intake and 2 miles northwest of Williams.

Drainage area--8.6 sq mi, approximately.

Records available--September 1946 to September 1951.

Gage--Water-stage recorder. Altitude of gage is 1,680 ft (by barometer).

Average discharge--5 years, 14.5 cfs.

Extremes--Maximum discharge during year, 938 cfs Oct. 28 (gage height, 5.14 ft), from rating curve extended above 550 cfs on basis of slope-area determination at gage height 4.92 ft; minimum, 1.0 cfs Sept. 20, 21, 22, 24.

1946-51: Maximum discharge, that of Oct. 28, 1950; minimum, 0.9 cfs Oct. 3, 4, 1950.

Remarks--Records good except those for periods of no gage-height record, which are poor. No diversions or regulation above station.

Rating table, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Apr. 30 to June 8)

0.9	0.9	2.0	25
1.0	1.6	2.3	42
1.2	3.5	3.0	108
1.4	6.2	3.5	190
1.6	10	4.0	322
1.8	16	4.5	540

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.8	51	17	12	a19	a13	a12	6.4	3.7	2.2	1.6	1.5
2	1.5	36	22	16	a18	a13	a12	6.0	3.6	2.2	1.6	1.4
3	3.4	*28	345	22	a24	a13	a11	5.9	3.6	2.2	1.6	1.4
4	2.9	23	218	40	a230	a15	a11	5.9	3.6	2.4	1.6	1.4
5	5.4	18	125	38	a150	a18	a10	5.8	3.6	2.5	1.6	1.4
6	3.1	15	100	31	a85	a28	a10	5.8	3.6	2.5	1.5	1.4
7	2.4	13	128	27	a80	a40	a9.5	5.8	3.6	2.4	1.5	1.3
8	2.0	11	104	22	a70	a55	a9.5	5.4	*3.6	2.2	1.5	1.4
9	2.1	9.6	77	16	a55	a70	a9.0	5.3	3.7	2.1	1.5	1.3
10	2.0	8.4	60	16	a46	a50	a8.5	5.2	3.7	2.0	1.5	1.2
11	2.0	7.6	51	27	a120	a42	a8.0	5.3	3.7	2.0	1.5	1.2
12	2.0	7.1	41	27	a100	a38	a8.0	5.2	3.7	1.8	1.5	1.3
13	1.9	6.7	38	a26	a70	a34	a8.0	5.2	3.6	1.8	1.5	1.2
14	1.8	6.6	44	a25	a44	a44	a7.5	5.2	3.4	1.8	1.4	1.2
15	2.0	7.8	42	a60	a36	a50	a7.5	5.0	3.3	1.7	1.3	1.2
16	2.0	61	37	a80	a30	a46	a7.5	4.8	3.3	1.7	1.3	1.2
17	3.1	125	32	*304	a26	a56	a7.0	4.7	3.3	1.7	1.3	1.2
18	2.5	213	29	179	a24	a30	a7.0	4.7	3.2	1.7	1.3	1.2
19	2.2	114	26	102	a22	a27	a7.0	4.7	3.3	1.8	1.2	1.1
20	2.0	71	22	a80	a21	a27	a6.5	4.6	3.2	*1.9	1.2	*1.1
21	2.0	51	20	a320	a21	a25	a6.5	4.5	3.2	1.9	1.2	1.0
22	2.0	40	18	a150	a20	a23	a6.5	4.3	3.1	1.9	1.3	1.0
23	2.0	33	16	a110	a19	*22	a6.5	4.3	3.0	1.9	1.3	1.1
24	2.0	28	15	a65	a18	a20	a6.5	4.3	2.9	1.9	1.3	1.0
25	3.3	24	13	a70	a17	a18	a6.5	4.2	2.9	1.9	1.3	1.1
26	4.8	21	12	a55	a16	a17	*6.2	4.1	2.8	1.7	1.3	1.2
27	26	19	11	a42	a15	a16	6.6	3.9	2.7	1.7	1.3	1.1
28	354	16	11	a34	a14	a15	8.2	3.9	2.6	1.7	1.4	1.1
29	535	15	10	a27	-	a14	6.9	3.9	2.5	1.7	2.0	1.2
30	162	16	13	a23	-	a14	6.7	3.9	2.4	1.6	1.7	1.6
31	79	-	12	a20	-	a15	-	3.9	-	1.6	1.5	-
Total	1,220	1,095.8	1,707	2,086	1,410	886	243.6	152.1	98.4	60.1	44.6	37.0
Cfsm	39.4	36.5	55.1	67.3	50.4	28.6	8.12	4.91	3.28	1.94	1.44	1.23
In.	4.58	4.24	6.41	7.83	5.86	3.33	0.944	0.571	0.381	0.226	0.167	0.143
Ac-ft	5.28	4.74	7.38	9.02	6.10	3.83	1.05	0.66	0.43	0.26	0.19	0.16
Ac-ft	2,420	2,170	3,390	4,140	2,800	1,760	483	302	195	119	88	73

Calendar year 1950: Max 535 Min 1.2 Mean 25.1 Cfsm 2.92 In. 39.62 Ac-ft 18,170

Water year 1950-51: Max 535 Min 1.0 Mean 24.8 Cfsm 2.88 In. 39.10 Ac-ft 17,940

Peak discharge (base, 150 cfs)--Oct. 28 (11:30 p.m.) 938 cfs (5.14 ft); Nov. 18 (6:30 a.m.) 262 cfs (3.80 ft); Dec. 3 (5 p.m.) 639 cfs (4.68 ft); Jan. 17 (4 p.m.) 568 cfs (4.52 ft); Jan. 21 (time unknown) 465 cfs (4.32 ft); Feb. 4 (time unknown) 271 cfs (3.8 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Deer Creek near Dryden and Slate Creek at Wonder.

## Applegate River near Wilderville, Oreg.

Location.--Lat 42°21'10", long. 123°24'10", in W½ sec. 15, T. 37 S., R. 6 W., on left bank 900 ft downstream from Jackson Creek and 4 miles southeast of Wilderville.

Drainage area.--694 sq mi.

Records available.--October 1938 to September 1951.

Gage.--Staff gage read once or twice daily. Datum of gage is 949.54 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).

Average discharge.--13 years, 664 cfs.

Extremes.--Maximum discharge during year, 25,800 cfs Oct. 29 (gage height, 17.5 ft, from floodmark), from rating curve extended above 9,500 cfs by logarithmic plotting; minimum, 4 cfs Aug. 19, 22, 23, 25, 27.

1938-51: Maximum discharge that of Oct. 29, 1950; minimum, 3.0 cfs Sept. 12-15, 18-25, 1939, Sept. 3, 1950.

Remarks.--Records good. Many diversions above station for irrigation and mining. Two irrigation ditches on left bank divert about 17 cfs around station. No regulation.

Revisions.--W 1064: Drainage area.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3				Dec. 4 to Sept. 30			
1.5	40	4.0	1,000	0.6	3	2.5	285
1.8	72	5.0	1,900	.7	5	3.0	490
2.0	102	9.0	7,350	.8	7	4.0	1,100
2.5	215	16.0	22,000	1.0	14	5.0	2,050
3.0	405			1.3	33	8.0	6,180
				1.6	66	12.0	13,500
				2.0	140		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	3,180	1,420	945	1,590	1,060	830	745	418	75	13	7
2	47	2,700	1,310	953	1,560	1,010	812	734	445	72	12	9
3	70	*2,260	11,400	1,120	1,550	967	830	745	400	56	11	14
4	92	1,870	12,700	1,450	9,600	1,010	932	770	392	54	10	10
5	215	1,500	5,620	1,320	9,520	1,030	1,030	782	368	64	11	21
6	241	1,280	4,880	1,180	5,750	1,020	1,070	878	360	61	10	24
7	182	1,100	5,860	1,090	5,490	1,060	1,120	854	320	56	9	28
8	158	998	4,620	1,030	5,320	1,060	1,160	830	313	50	7	12
9	136	906	4,200	981	4,270	1,420	1,130	794	292	45	12	10
10	132	776	3,680	1,120	3,690	1,170	1,240	830	285	47	7	18
11	122	712	3,480	1,280	4,490	1,090	1,260	854	271	45	6	9
12	116	664	3,200	1,290	4,070	1,040	1,230	770	250	*42	7	10
13	109	634	2,820	1,180	3,570	1,080	1,360	688	238	37	7	10
14	102	610	3,320	1,200	3,200	1,200	1,430	*686	247	39	6	7
15	99	594	3,190	2,180	2,770	1,300	1,410	638	244	31	9	5
16	109	3,910	2,840	2,160	2,480	1,460	1,380	626	232	26	10	9
17	120	*3,660	2,510	6,360	2,310	1,290	1,340	650	220	24	6	12
18	158	6,250	2,300	8,260	2,110	1,160	1,280	662	202	24	6	14
19	140	4,110	2,030	4,480	1,900	1,100	1,120	638	185	24	4	12
20	120	2,980	1,820	3,580	1,740	1,090	1,020	626	172	20	5	10
21	116	2,610	1,640	8,100	1,690	1,140	904	590	180	24	6	11
22	113	2,000	1,480	6,330	1,510	1,080	866	580	185	24	4	11
23	110	1,650	1,380	4,590	1,410	*1,020	850	570	131	23	4	10
24	107	1,580	1,290	4,290	1,320	981	806	560	127	25	5	13
25	121	1,640	1,210	3,830	1,280	995	734	540	131	28	4	15
26	330	1,560	1,160	3,450	1,240	974	710	530	127	24	10	16
27	1,110	1,710	1,090	2,990	1,180	939	698	520	127	19	4	16
28	7,680	1,490	1,030	2,590	1,120	918	1,060	500	114	23	5	18
29	*21,500	1,290	1,030	2,270	-	918	854	481	75	21	6	14
30	10,700	1,390	1,080	1,980	-	890	770	463	69	17	*6	17
31	4,430	-	1,040	*1,780	-	860	-	445	-	16	7	-
Total	48,830	57,614	96,630	85,160	87,930	33,332	31,236	20,591	7,115	1,135	229	392
Mean	1,575	1,910	3,120	2,747	3,140	1,075	1,041	664	237	36.6	7.4	13.1
Ac-ft	96,850	114,300	191,700	168,900	174,400	66,110	61,960	40,840	14,110	2,250	454	778

Calendar year 1950: Max 21,500 Min 3 Mean 1,153 Ac-ft 634,700  
 Water year 1950-51: Max 21,500 Min 4 Mean 1,288 Ac-ft 932,700

\* Discharge measurement made on this day.



Slate Creek at Wonder, Oreg.

Location.--Lat 42°21'40", long. 123°31'10", in SW $\frac{1}{4}$  sec. 10, T. 37 S., R. 7 W., on left bank half a mile upstream from Elliot Creek and 0.4 mile east of Wonder.

Drainage area.--30.9 sq mi.

Records available.--July to November 1913, October 1945 to September 1951 in reports of Geological Survey. October 1943 to September 1945 in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 1,034.85 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to Nov. 21, 1946, staff gages at several sites within half a mile of present site at various datums.

Average discharge.--7 years (1944-51), 74.3 cfs.

Extremes.--Maximum discharge during year, 4,020 cfs Oct. 29 (gage height, 9.72 ft), from rating curve extended above 2,100 cfs on basis of slope-area determinations at gage heights, 8.29 and 9.72 ft; minimum, 0.7 cfs Sept. 21-24, 1913, 1943-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 0.3 cfs July 16, 17, 1944.

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

Revisions (water years).--W 1184: 1948.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3					Dec. 4 to Sept. 30				
0.9	1.3	2.0	69		0.8	0.6	1.2	9.5	
1.0	2.6	2.5	133		.9	1.7	1.4	19	
1.1	4.5	3.0	238		1.0	3.5	1.8	48	
1.2	7.2	4.0	570		1.1	6.1	2.0	69	
1.4	16	6.0	1,500		Note.--Same as preceding table above 2.0 ft.				
1.6	29	9.0	3,470						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	2.5	240	83	89	91	60	41	22	8.1	2.6	1.5	2.4	
2	2.5	171	126	92	89	57	38	20	8.1	1.7	1.5	2.1	
3	16	*127	*1,690	158	117	56	37	20	7.8	1.7	1.4	1.6	
4	12	100	981	252	1,160	68	36	21	8.1	2.2	1.4	1.2	
5	39	84	494	220	619	83	35	22	8.1	3.3	1.3	1.0	
6	21	69	434	156	410	123	33	20	7.8	3.5	1.4	1.2	
7	13	58	430	122	396	158	32	20	8.1	3.3	1.5	1.3	
8	10	51	379	104	349	197	31	19	8.1	3.3	1.4	1.3	
9	8.0	44	304	98	249	257	30	18	7.1	3.0	1.2	1.3	
10	6.7	39	260	188	246	177	28	17	6.8	2.8	1.5	1.3	
11	6.1	35	230	277	598	135	*27	19	6.8	2.4	1.7	1.5	
12	5.8	33	195	268	502	114	26	19	6.8	2.1	2.1	1.4	
13	5.0	31	171	188	301	116	26	20	6.4	1.7	1.9	1.2	
14	5.0	29	233	163	208	147	26	20	5.6	1.7	2.1	1.2	
15	5.0	65	238	319	167	173	24	18	5.3	1.9	2.1	1.2	
16	6.1	734	197	385	136	158	23	*18	4.8	2.1	2.2	1.3	
17	12	*869	158	*1,560	128	120	22	16	4.8	2.2	2.1	*1.3	
18	12	*1,150	140	850	119	98	23	16	4.8	2.4	1.7	1.3	
19	10	570	128	455	106	89	22	14	*4.5	2.1	1.6	1.3	
20	8.3	301	113	361	107	89	21	13	4.5	1.6	1.3	1.2	
21	9.1	190	101	1,630	104	86	20	13	4.5	1.4	1.3	.9	
22	8.3	145	93	750	99	78	19	13	5.1	1.7	1.5	.7	
23	7.8	120	88	510	93	71	19	12	5.0	*1.9	1.5	.7	
24	7.3	101	78	424	87	64	18	12	4.5	1.6	1.5	1.0	
25	28	90	72	322	80	60	18	11	4.3	1.3	1.3	1.0	
26	52	82	67	241	74	58	18	11	4.0	1.0	1.2	1.2	
27	370	77	60	192	*70	54	19	10	4.0	1.0	1.4	1.2	
28	1,520	67	62	158	65	50	39	10	3.8	1.3	1.7	1.0	
29	*1,160	66	59	131	-	48	28	10	4.3	1.5	3.0	1.2	
30	863	71	68	113	-	45	23	9.2	4.0	1.5	3.5	3.0	
31	366	-	69	101	-	42	-	8.5	1-	1.6	3.0	-	
Total	6,597.5	5,809	7,801	10,837	6,971	3,131	802	491.7	176.2	63.4	53.8	39.5	
Mean	213	194	252	350	249	101	26.7	15.9	5.87	2.05	1.74	1.32	
Cfs/m	6.89	6.28	8.16	11.3	8.06	3.27	0.864	0.515	0.190	0.066	0.056	0.043	
In.	7.94	6.99	9.39	13.04	8.39	3.77	0.97	0.59	0.21	0.08	0.06	0.05	
Ac-ft	13,090	11,520	15,470	21,490	13,830	6,210	1,590	975	349	126	107	78	
Calendar year 1950: Max	3,160			Min	0.9	Mean	127	Cfs/m	4.11	In.	55.59	Ac-ft	91,610
Water year 1950-51: Max	3,160			Min	0.7	Mean	117	Cfs/m	3.79	In.	51.48	Ac-ft	84,840

Peak discharge (base, 900 cfs).--Oct. 29 (10:30 a.m.), 4,020 cfs (9.72 ft); Nov. 16 (5 a.m.), 1,080 cfs (5.18 ft); Nov. 18 (7:30 a.m.), 1,370 cfs (5.76 ft); Dec. 3 (5 p.m.), 2,320 cfs (7.42 ft); Jan. 17 (4 p.m.), 2,210 cfs (7.25 ft); Jan. 21 (7 a.m.), 2,120 cfs (7.11 ft); Feb. 4 (3 p.m.), 1,880 cfs (6.69 ft).

\* Discharge measurement made on this day.

## Grave Creek at Pease Bridge, near Placer, Oreg.

Location.--Lat 42°38'40", long. 123°12'20", in NW1SW1 sec. 5, T. 34 S., R. 4 W., on left bank 100 ft downstream from Pease Bridge, 1 mile upstream from Boulder Creek, and 5½ miles northeast of Placer.

Drainage area.--22 sq mi, approximately.

Records available.--October 1945 to September 1951 in reports of Geological Survey. September 1940 to September 1941 in reports of State engineer; October 1941 to September 1945 in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 2,384.1 ft above mean sea level, datum of 1929. Prior to Aug. 22, 1947, water-stage recorder at site 100 ft upstream at same datum.

Average discharge.--6 years (1945-51), 58.0 cfs.

Extremes.--Maximum discharge during year, 3,550 cfs Oct. 29 (gage height, 6.95 ft), from rating curve extended above 830 cfs on basis of slope-area determination at gage height. 5.73 ft; minimum, 0.4 cfs Sept. 18-21, 23, 24.  
1940-51: Maximum discharge, that of Oct. 29, 1950; minimum, 0.3 cfs Sept. 13, 1944, Aug. 16-27, 1946, Aug. 18, 21, 1950.

Remarks.--Records good. Prior to 1945 Columbia upper ditch diverted water about 2 miles above station; no diversion since that date. No regulation.

Rating tables, water year 1950-51 (gage height in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 5-28, Nov. 3-15)

Oct. 1-28				Oct. 29 to Jan. 17				Jan. 18 to Sept. 30			
0.5	3.0	1.6	93	1.8	22	1.0	0.3	2.0	65		
.6	5.9	2.0	171	2.0	46	1.1	1.3	2.3	127		
.8	14	2.5	355	2.2	81	1.2	3.5	2.7	240		
1.0	26	3.5	810	2.5	161	1.3	6.7	3.2	455		
1.2	43	4.0	1,100	3.0	355	1.5	15	3.7	770		
				4.0	980	1.7	29				
				6.0	2,640						

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	4.2	277	92	68	80	32	49	23	9.0	3.2	1.3	1.5
2	4.2	214	90	113	80	31	47	23	9.0	3.2	1.3	1.5
3	9.1	163	920	177	99	29	55	27	9.0	3.2	1.2	.9
4	13	117	668	193	*710	37	68	27	9.0	3.0	1.0	.8
5	22	80	375	140	694	39	65	26	9.0	3.5	1.0	.9
6	13	59	430	104	415	36	61	23	8.6	3.5	1.0	.9
7	7.7	47	477	79	425	33	58	24	8.2	3.2	1.0	.8
8	6.3	*41	355	68	343	37	54	23	7.3	3.0	1.0	.8
9	6.6	35	263	77	254	41	49	22	7.3	3.2	1.0	.7
10	5.3	31	190	155	247	38	46	20	7.3	3.0	1.0	.7
11	4.2	28	161	140	375	36	43	21	*7.0	3.0	.9	.7
12	3.6	26	128	107	303	38	41	23	6.4	2.7	.9	.7
13	3.0	25	115	88	207	54	40	29	6.4	2.5	.9	.7
14	3.0	23	155	171	156	120	37	27	6.4	2.5	.9	.7
15	3.0	63	143	301	130	216	34	27	6.4	2.2	.9	.5
16	3.3	370	115	232	101	216	31	23	6.0	2.2	.9	.5
17	6.6	673	104	693	88	148	27	21	5.0	2.2	.9	.5
18	7.7	1,050	88	*395	75	117	24	19	5.3	2.2	.8	.4
19	5.9	510	77	234	65	125	23	17	5.3	2.0	.7	.4
20	5.3	380	68	175	61	148	22	16	5.0	1.6	.8	.4
21	6.3	284	*82	420	55	148	20	15	5.0	1.5	.7	.4
22	5.2	55	*56	351	50	125	14	14	4.7	1.6	.7	.5
23	*4.8	155	49	380	47	97	17	12	4.1	1.3	.7	.4
24	4.2	140	43	445	43	88	17	12	4.1	1.3	.8	.4
25	10	128	37	347	41	92	16	12	3.8	1.3	.8	.5
26	18	107	36	299	38	90	16	12	3.2	*1.5	.7	*.7
27	145	99	36	244	36	*80	*17	11	3.5	1.5	.7	.7
28	1,070	79	49	189	34	72	34	11	3.5	1.5	.8	.9
29	2,420	75	145	145	-	72	31	11	3.5	1.6	1.0	1.2
30	835	90	70	110	-	62	27	11	3.5	1.5	1.2	1.8
31	396	-	72	95	-	54	-	10	-	1.3	1.5	-
Total	5,051.7	5,576	5,576	6,735	5,252	2,548	1,088	592	181.8	71.0	28.8	22.5
Mean	163	186	180	217	188	82.2	36.3	19.1	6.06	2.29	0.93	0.75
Cfs/m	7.41	8.45	8.18	9.86	8.55	3.74	1.65	0.868	0.275	0.104	0.042	0.034
In.	8.54	9.43	9.43	11.39	8.88	4.31	1.84	1.00	0.31	0.12	0.05	0.04
Ac-ft	10,020	11,060	11,060	13,360	10,420	5,050	2,160	1,170	361	141	57	45
Calendar year 1950: Max	2,420	Min	0.5	Mean	97.1	Cfs/m	4.41	In.	59.94	Ac-ft	70,320	
Water year 1950-51: Max	2,420	Min	0.4	Mean	89.7	Cfs/m	4.08	In.	55.34	Ac-ft	64,900	

Peak discharge (base, 300 cfs).--Oct. 29 (2:30 a.m.) 3,550 cfs (6.95 ft); Nov. 16 (12:30 a.m.) 570 cfs (5.40 ft); Nov. 18 (8 a.m.) 1,420 cfs (4.56 ft); Dec. 3 (5 p.m.) 1,710 cfs (4.93 ft); Jan. 17 (1:30 p.m.) 1,070 cfs (4.12 ft); Jan. 21 (1:30 p.m.) 534 cfs (3.34 ft); Jan. 24 (12:30 a.m.) 488 cfs (3.26 ft); Feb. 4 (7 p.m.) 1,250 cfs (4.35 ft); Feb. 11 (4 p.m.) 410 cfs (3.11 ft).

\* Discharge measurement made on this day.

## East Fork Illinois River near Takilma, Oreg.

Location.--Lat 42°00'40", long. 123°37'40", in SE $\frac{1}{4}$  sec. 10 T. 41 S., R. 8 W., on right bank 500 ft upstream from highway bridge, a quarter of a mile upstream from Long Gulch, and 3 miles south of Takilma.

Drainage area.--42.6 sq mi.

Records available.--October 1945 to September 1951 in reports of Geological Survey. October 1941 to September 1945 in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 1,746.6 ft above mean sea level (surveys by Bureau of Reclamation). Prior to Oct. 31, 1946, staff gages at nearby sites at different datums. Oct. 31, 1946, to May 13, 1949, staff gage at same site and datum.

Average discharge.--10 years (1941-51), 177 cfs.

Extremes.--Maximum discharge during year, 7,610 cfs Oct. 29 (gage height, 9.56 ft); minimum, 6.8 cfs Sept. 15, 16.

1941-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 5.2 cfs Sept. 24-29, 1944.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No regulation. Esterly Upper Canal and Osgood Canal diverted water around station prior to 1942.

Revisions (water years).--W 1184: 1948.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Nov. 19 to Dec. 3,  
Dec. 7, 8, Jan. 17)

Oct. 1 to Dec. 3

Dec. 4 to Sept. 30

0.6	8.2	3.0	299	0.5	6.3	3.2	330
.7	10	4.0	660	.7	12	4.0	610
1.0	20	5.0	1,220	1.0	22	5.0	1,080
1.4	44	6.0	2,060	1.4	43	6.0	1,850
2.0	108	7.0	3,200	1.9	89	6.8	2,740
2.5	188	8.5	5,540	2.5	170		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	9.6	*700	286	94	166	93	128	113	49	18	11	9.6
2	9.5		342	148	162	88	130	117	48	18	10	9.0
3	30	376	*3,850	220	310	a90	137	134	45	18	9.9	8.5
4	35	273	2,030	375	2,740	a105	182	152	43	17	10	8.5
5	100	209	905	315	1,170	a100	206	155	43	18	11	8.5
6	59	168	1,060	226	722	a95	212	168	42	18	11	8.5
7	32	140	1,520	180	900	a95	216	158	41	17	10	8.5
8	26	123	900	160	718	a200	210	144	38	17	10	8.5
9	26	106	678	152	518	a160	216	137	36	16	10	8.2
10	21	94	490	212	542	a140	240	138	36	16	10	7.9
11	19	85	578	226	734	a130	238	152	36	16	10	7.6
12	17	80	486	206	642	a120	*232	167	34	15	10	7.6
13	16	75	381	182	448	a180	240	188	34	15	9.9	7.4
14	15	75	622	230	345	a210	244	174	32	15	8.7	7.1
15	15	108	630	427	278	a460	226	162	32	15	7.6	7.1
16	17	760	455	402	234	369	206	160	30	15	7.6	7.1
17	34	975	366	2,250	212	a290	178	*160	29	14	8.2	7.9
18	36	1,990	292	1,100	188	a240	155	144	26	14	9.3	*7.4
19	28	*898	246	*558	167	214	132	125	26	14	9.3	7.4
20	24	628	214	402	158	242	118	115	*25	14	9.0	7.4
21	22	447	184	1,790	149	246	108	110	25	14	9.0	7.1
22	20	304	164	1,020	138	216	101	106	24	13	8.7	7.1
23	19	234	149	845	130	188	98	98	23	13	8.7	7.1
24	19	231	136	611	121	178	95	87	22	13	8.7	7.1
25	69	227	124	602	115	188	87	81	22	*13	8.5	7.4
26	18*	207	115	480	108	186	84	79	21	12	8.5	7.6
27	1,120	266	107	402	101	170	93	76	20	12	8.2	7.9
28	4,630	201	104	321	*97	162	190	67	20	12	8.5	8.2
29	*5,410	174	100	260	-	167	146	61	19	11	11	9.0
30	1,680	236	108	218	-	154	121	57	19	11	11	12
31	801	-	100	186	-	137	-	53	-	11	9.9	-
Total	14,542.1	10,931	17,722	15,000	12,313	5,613	4,967	3,838	939	455	293.2	240.2
Mean	469	364	572	484	440	181	166	124	31.3	14.7	9.46	8.01
Cfs/m	11.0	8.54	13.4	11.4	10.3	4.25	3.90	2.91	0.735	0.345	0.222	0.188
In.	12.70	9.54	15.47	13.10	10.75	4.90	4.34	3.35	0.82	0.40	0.26	0.21
Ac-ft	28,840	21,680	35,150	29,750	24,420	11,130	9,850	7,610	1,860	902	582	476

Calendar year 1950: Max 5,410 Min 8.9 Mean 281 Cfs/m 6.60 In. 89.44 Ac-ft 203,200  
Water year 1950-51: Max 5,410 Min 7.9 Mean 238 Cfs/m 5.59 In. 75.84 Ac-ft 172,200

Peak discharge (base, 2,500 cfs).--Oct. 29 (5 a.m.) 7,610 cfs (9.56 ft); Nov. 18 (7 a.m.) 2,540 cfs (6.50 ft); Dec. 3 (6 p.m.) 5,960 cfs (8.72 ft); Jan. 17 (4 p.m.) 3,580 cfs (7.4 ft); Jan. 21 (1 p.m.) 2,530 cfs (6.63 ft); Feb. 4 (1 p.m.) 3,600 cfs (7.43 ft).

\* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for West Fork Illinois River near O'Brien, Illinois River at Kerby, and Sucker Creek near Holland.

## Aithouse Creek near Holland, Oreg.

Location.--Lat 42°06'00", long. 123°31'30", in SE $\frac{1}{4}$  sec. 9, T. 40 S., R. 7 W., on right bank half a mile upstream from Carter Gulch and 2 miles southeast of Holland.

Drainage area.--23.8 sq mi.

Records available.--October 1946 to September 1951. October 1943 to July 1944 and August 1944 to January 1945 in files of State engineer (fragmentary).

Gage.--Water-stage recorder. Altitude of gage is 1,755 ft (by barometer).

Average discharge.--5 years (1946-51), 64.8 cfs.

Extremes.--Maximum discharge during year, 2,160 cfs Oct. 29 (gage height, 5.96 ft), from rating curve extended above 260 cfs on basis of slope-area determinations at gage heights, 5.14 and 5.96 ft; minimum, 3.9 cfs Sept. 19.  
1946-51: Maximum discharge, that of Oct. 29, 1950; minimum, 3.2 cfs Sept. 23-25, 1947.

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

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Nov. 16 to Dec. 3)

Oct. 1-29				Oct. 30 to Dec. 3		Dec. 4 to Sept. 30			
1.5	5.2	2.3	109	2.2	25	1.5	4.3	2.3	83
1.6	9.8	2.7	230	2.4	55	1.6	7.4	3.0	250
1.8	24	3.5	560	2.8	154	1.8	18	3.5	440
2.0	49	5.4	1,700	3.3	350	2.0	36	4.5	1,000
				4.0	730				
				5.0	1,430				

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.6	*230	80	85	105	62	66	56	28	12	7.1	6.2
2	6.6	194	110	96	101	59	66	58	27	12	7.4	5.8
3	22	146	1,320	99	141	56	70	56	26	12	7.4	5.8
4	15	116	808	143	814	61	81	59	26	12	7.4	5.5
5	39	95	*465	132	485	61	85	61	25	12	7.4	5.5
6	18	78	415	114	310	61	90	66	24	12	7.4	5.5
7	12	68	525	105	346	61	96	62	24	12	7.1	5.2
8	12	56	395	101	304	72	99	61	24	11	6.8	5.2
9	11	48	301	96	256	85	101	59	22	11	6.8	5.2
10	9.3	43	242	114	259	72	109	58	22	11	6.5	4.9
11	8.9	38	239	136	318	64	112	64	21	10	6.5	4.9
12	8.4	36	213	125	289	66	*116	62	20	10	6.8	4.9
13	8.0	34	190	109	234	79	125	62	20	9.7	6.5	4.9
14	8.0	33	242	120	200	96	127	59	19	9.2	6.5	4.6
15	8.4	69	242	218	176	132	120	56	18	9.2	6.5	4.6
16	10	280	213	208	155	136	112	54	17	9.2	6.5	4.6
17	18	*337	193	964	141	114	105	*54	17	8.8	6.2	4.9
18	14	*550	168	550	125	101	96	53	17	8.8	6.2	4.6
19	11	280	157	*259	112	98	87	48	16	8.8	5.8	*4.6
20	9.8	180	143	206	103	101	77	47	*16	8.8	5.8	4.6
21	9.8	132	132	689	96	101	72	46	16	8.3	5.8	4.6
22	8.9	98	120	378	90	94	68	43	15	8.3	5.5	4.6
23	8.9	78	112	283	92	87	62	42	15	8.3	5.5	4.6
24	8.9	78	103	268	81	83	59	40	15	8.3	5.5	4.6
25	30	75	98	234	77	85	56	38	14	*8.3	5.5	4.6
26	54	75	94	213	72	83	53	36	14	8.3	5.5	5.2
27	197	98	92	190	68	79	59	34	14	7.9	5.5	4.9
28	885	65	90	169	*54	85	33	13	13	7.9	5.5	4.9
29	*1,620	61	85	148	-	77	68	32	13	7.9	7.1	5.8
30	698	75	94	129	-	74	59	31	13	7.4	6.8	7.1
31	326	-	87	114	-	70	-	29	-	7.1	6.5	-
Total	4,102.5	3,726	7,768	6,792	5,614	2,547	2,580	1,559	571	237.5	199.3	152.9
Mean	132	124	251	219	200	82.2	86.0	50.3	19.0	9.60	6.43	5.10
Cfsm	5.55	5.21	10.5	9.20	8.40	3.45	3.61	2.11	0.798	0.403	0.270	0.214
In.	6.41	5.82	12.14	10.61	8.77	3.98	4.03	2.44	0.89	0.46	0.31	0.24
Ac-ft	8,140	7,390	15,410	13,470	11,140	5,050	5,120	3,080	1,130	590	395	303

Calendar year 1950: Max 1,620 Min 5.2 Mean 103 Cfsm 4.33 In. 58.60 Ac-ft 74,380  
Water year 1950-51: Max 1,620 Min 4.6 Mean 98.4 Cfsm 4.13 In. 56.10 Ac-ft 71,230

Peak discharge (base, 500 cfs).--Oct. 29 (9 a.m.) 2,160 cfs (5.96 ft); Nov. 18 (5:30 a.m.) 694 cfs (4.12 ft); Dec. 3 (1 p.m.) 1,710 cfs (5.45 ft); Dec. 7 (4 a.m.) 575 cfs (3.77 ft); Jan. 17 (12 m.) 1,400 cfs (5.02 ft); Jan. 21 (11 a.m.) 838 cfs (4.23 ft); Feb. 4 (2 p.m.) 1,060 cfs (4.58 ft).

\* Discharge made on this day.

Note.--Daily discharge for Nov. 17, 19, 22 supersede those shown in W.S.P. 1137E, "Floods of October-November 1950 in Southwestern Oregon."

Grayback Creek near Holland, Oreg.

Location.--Lat 42°08'30", long. 123°27'20", in NW $\frac{1}{4}$  sec. 31, T. 39 S., R. 6 W., on right bank 600 ft upstream from mouth and  $\frac{1}{2}$  miles northeast of Holland.

Drainage area.--24.1 sq mi.

Records available.--September 1946 to September 1951 (discontinued).

Gage.--Water-stage recorder. Datum of gage is 1,836.92 ft above mean sea level (Bureau of Reclamation benchmark).

Average discharge.--5 years, 60.6 cfs (adjusted for diversion).

Extremes (not adjusted for diversion).--Maximum discharge during year, 2,080 cfs Oct. 29 (gage height, 6.80 ft), from rating curve extended above 540 cfs on basis of slope-area determination at gage height 5.92 ft; minimum, 6.3 cfs Sept. 19, 20.

1946-51: Maximum discharge, that of Oct. 29, 1950; minimum, 5.0 cfs Sept. 23, 24, 1949.

Remarks.--Records good. Water diverted above station by Grayback Canal for irrigation. No regulation.

Revisions (water years).--W 1184: 1947, 1948, 1949.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 3					Dec. 4 to Sept. 30				
1.4	5.0	3.0	190		1.5	5.6	2.5	81	
1.6	11	4.0	500		1.6	8.0	3.0	165	
2.0	31	5.0	960		1.8	16	4.0	440	
2.5	88	6.0	1,540		2.0	28	5.0	880	
					2.2	44			

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	7.7	148	90	59	104	*81	75	61	40	16	8.6	8.0
2	7.4	*122	100	71	101	78	74	60	39	16	8.6	7.5
3	18	102	1,050	73	122	77	77	60	38	16	8.6	7.3
4	18	86	*630	107	660	81	81	59	37	17	8.3	7.5
5	35	72	389	99	401	80	82	61	34	17	8.3	7.5
6	20	60	565	86	290	78	84	71	34	17	8.3	7.5
7	16	52	472	78	332	77	87	63	34	16	8.3	7.8
8	16	48	344	71	269	84	87	61	33	16	8.3	8.0
9	16	44	275	70	238	86	88	59	32	15	8.3	8.0
10	13	40	220	74	240	78	94	61	32	14	8.3	7.8
11	13	37	212	77	252	75	96	67	32	15	8.3	7.8
12	13	36	179	71	220	77	*104	67	29	16	8.6	7.8
13	12	34	160	78	180	90	112	70	28	16	8.3	7.8
14	12	33	169	98	171	109	115	66	29	16	8.3	7.8
15	13	45	152	138	158	140	112	62	28	16	8.3	7.5
16	14	164	142	133	147	142	110	*62	27	14	7.5	7.5
17	22	203	133	581	140	120	107	63	25	14	7.5	7.5
18	16	428	122	*371	133	107	99	61	23	13	7.5	6.8
19	14	266	114	205	124	106	92	60	23	13	7.3	*6.8
20	13	185	102	160	120	110	86	60	*23	12	7.3	6.8
21	14	146	96	371	115	107	81	60	22	12	7.3	6.6
22	13	118	87	305	109	101	77	62	21	12	7.3	6.8
23	13	103	81	252	104	96	73	60	21	12	7.5	6.8
24	13	105	77	250	99	94	68	56	20	12	7.5	7.0
25	23	98	71	218	98	94	65	54	20	12	7.6	7.0
26	43	91	67	195	92	92	62	55	20	*11	7.3	7.3
27	114	109	63	173	88	88	63	53	18	10	7.8	7.3
28	581	84	65	154	84	86	90	48	19	9.8	7.5	7.5
29	1,350	78	62	138	-	88	73	46	18	8.9	9.2	8.0
30	426	91	68	122	-	82	63	43	17	8.6	8.6	8.9
31	189	-	62	112	-	77	-	41	-	8.6	8.3	-
Total	3,088.1	3,228	6,219	4,988	5,201	2,881	2,577	1,832	816	421.9	248.9	224.2
Mean	99.6	108	201	161	186	92.9	85.9	59.1	27.2	13.6	8.03	7.47
Ac-ft	6,130	6,400	12,340	9,890	10,320	5,710	5,110	3,630	1,620	837	494	445

Adjusted for Grayback Canal

Mean	102	109	203	163	187	93.2	88.4	61.2	29.6	16.8	11.7	10.1
Cfsm	4.23	4.52	8.42	6.76	7.76	3.87	3.67	2.54	1.23	0.697	0.485	0.419
In.	4.88	5.04	9.71	7.79	8.08	4.46	4.10	2.93	1.37	0.80	0.56	0.47
Ac-ft	6,270	6,470	12,460	10,050	10,390	5,730	5,260	3,760	1,760	1,030	719	602

Observed

Calendar year 1950: Max	1,350	Min	6.8	Mean	89.0	Ac-ft	64,410
Water year 1950-51: Max	1,350	Min	6.6	Mean	86.9	Ac-ft	62,930

Adjusted

Calendar year 1950: Mean	91.0	Cfsm	3.78	In.	51.31	Ac-ft	65,870
Water year 1950-51: Mean	89.1	Cfsm	3.70	In.	50.19	Ac-ft	64,500

Peak discharge (base, 300 cfs).--Oct. 29 (6 a.m.) 2,080 cfs (6.80 ft); Nov. 18 (8 a.m.) 500 cfs (4.00 ft); Dec. 3 (6:30 p.m.) 1,630 cfs (6.15 ft); Dec. 7 (7 a.m.) 518 cfs (4.22 ft); Jan. 17 (5 p.m.) 1,070 cfs (5.32 ft); Jan. 21 (4 p.m.) 458 cfs (4.05 ft); Feb. 4 (1 p.m.) 958 cfs (5.13 ft); Feb. 7 (11:30 a.m.) 389 cfs (3.83 ft).

\* Discharge measurement made on this day.

## Sucker Creek near Holland, Oreg.

Location--Lat 42°09'00", long. 123°27'50", in NE<sup>1</sup> sec. 25, T. 39 S., R. 7 W., on right bank 1 mile downstream from Grayback Creek and 4.3 miles northeast of Holland.

Drainage area--76 sq mi, approximately.

Records available--October 1945 to September 1951 in reports of Geological Survey. April 1940 to August 1941 in reports of Stage engineer and September 1941 to September 1945 in files of State engineer.

Gage--Staff gage read once daily, oftener during floods. Datum of gage is 1,777.84 ft above mean sea level (Bureau of Reclamation benchmark). Prior to Sept. 16, 1947, staff gages at several sites within half a mile of present gage at various datums.

Average discharge--10 years (1941-51), 194 cfs.

Extremes--Maximum discharge during year, 5,720 cfs Oct. 29 (gage height, 8.75 ft, from Floodmark), from rating curve extended above 1,300 cfs on basis of slope-area determination at gage height 8.3 ft; minimum, 22 cfs Sept. 20-25, 27.

1940-51: Maximum discharge, that of Oct. 29, 1950; minimum observed, 19 cfs Sept. 27, 28, 1947.

Remarks--Records good. Grayback Canal diverts water from Grayback Creek above station for domestic use and irrigation; most of return flow from this canal enters creek above station. No regulation.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 1-27)

Oct. 1 to Dec. 3

Dec. 4 to Sept. 30

1.3	29	3.5	665	0.8	19	2.5	350
1.6	62	5.0	1,580	1.1	45	3.5	800
2.0	134	7.5	4,100	1.4	80	5.5	2,300
2.5	270			1.9	175		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	31	568	356	220	329	*235	215	200	128	53	32	28
2	31	*489	394	315	315	225	210	200	128	53	32	26
3	91	425	2,880	250	385	215	225	215	121	53	32	26
4	49	351	*2,300	336	2,040	240	250	220	117	63	32	26
5	134	294	1,320	294	1,400	220	268	230	113	58	32	26
6	57	285	1,250	250	920	215	287	250	110	53	31	25
7	57	233	1,320	220	1,280	210	314	240	110	53	30	25
8	47	210	1,110	240	968	287	336	225	106	51	29	25
9	40	188	940	240	968	240	336	225	103	49	29	25
10	36	172	770	256	1,000	230	364	225	99	47	29	25
11	36	157	770	274	1,050	225	364	256	98	45	29	25
12	34	148	620	274	860	215	*413	274	96	45	29	24
13	33	140	620	287	700	240	449	240	93	45	28	23
14	33	148	680	315	620	301	474	215	93	43	28	23
15	35	182	670	492	555	*474	465	220	90	43	29	23
16	38	575	582	425	492	417	409	*222	86	45	28	23
17	77	670	528	1,420	457	343	385	250	83	41	27	23
18	49	1,220	465	*1,110	425	322	350	240	80	41	26	23
19	40	880	449	630	385	301	329	225	77	39	26	*23
20	38	638	410	492	378	315	308	215	*77	39	25	22
21	38	474	364	1,110	350	315	268	215	74	39	25	22
22	36	394	336	980	329	308	256	215	71	39	25	22
23	34	356	322	780	308	301	245	190	68	38	26	22
24	35	394	294	750	301	268	235	190	65	38	26	22
25	82	386	274	670	280	268	225	190	65	38	26	22
26	168	356	262	600	268	262	220	185	63	*38	26	23
27	349	410	245	548	258	250	230	166	60	37	31	22
28	1,780	321	262	492	240	240	274	157	60	36	26	25
29	4,010	314	215	457	-	250	230	149	55	34	36	26
30	1,430	386	250	385	-	235	210	140	53	32	29	31
31	713	-	235	350	-	220	-	132	-	32	28	-
Total	9,661	11,744	21,493	15,460	17,859	8,387	9,144	6,516	2,642	1,360	887	726
Mean	312	391	693	499	638	271	305	210	88.1	43.9	28.6	24.2
Cfs/m	4.11	5.14	9.12	6.57	8.39	3.57	4.01	2.76	1.16	0.578	0.376	0.318
In.	4.73	5.75	10.52	7.57	8.74	4.10	4.47	3.19	1.29	0.67	0.43	0.36
Ac-ft	19,160	23,290	42,630	30,660	35,420	16,840	18,140	12,920	5,240	2,700	1,760	1,440
Calendar year 1950:	Max 4,010			Min 24	Mean 296		Cfs/m 3.89	In. 52.82	Ac-ft 214,100			
Water year 1950-51:	Max 4,010			Min 22	Mean 290		Cfs/m 3.82	In. 51.82	Ac-ft 210,000			

\* Discharge measurement made on this day.

Note.--Figure of daily discharge for Nov. 13 superseded that published in W.S.P. 1137 E, "Floods of October-November 1950 in Southwestern Oregon and Northwestern California."

## West Fork Illinois River near O'Brien, Oreg.

Location.--Lat 42°03'50", long. 123°43'00", in NW $\frac{1}{4}$  sec. 25, T. 40 S., R. 9 W., on left bank 800 ft upstream from bridge on U. S. Highway 199 and half a mile southwest of O'Brien.

Drainage area.--46.6 sq mi.

Records available.--October 1945 to September 1951 in reports of Geological Survey. February to November 1930 and February 1943 to September 1945 in files of State engineer.

Gage.--Staff gage read once daily, oftener during periods of rapidly changing stage. Datum of gage is 1,404.37 ft above mean sea level, datum of 1929. Feb. 10 to Sept. 30, 1930, staff gage at site  $1\frac{1}{2}$  miles upstream at different datum. Feb. 2, 1943, to Oct. 31, 1946, staff gage at site 600 ft upstream from 1930 gage at different datum.

Average discharge.--8 years (1943-51), 219 cfs.

Extremes.-- Maximum discharge during year, 14,200 cfs Oct. 28 (gage height, 12.96 ft, from floodmark); from rating curve extended above 7,200 cfs on basis of slope-area determination of peak flow; minimum, 4.5 cfs Sept. 25. 1930, 1943-51: Maximum discharge, that of Oct. 28, 1950; minimum, 2.1 cfs Sept. 16, 17, 1945.

Remarks.--Records good. One small diversion above station.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-28				Oct. 29 to Dec. 3				Dec. 4 to Sept. 30	
0.6	6.8	3.0	680	0.7	75	3.0	980	0.7	80
.7	13	4.5	1,600	.8	95	5.0	2,350	.8	98
.9	31	6.0	2,830	1.2	200	8.0	5,480	1.2	200
1.1	57	8.0	5,070	2.0	495	10.5	9,140	Note.--Same as preceding table above 1.2 ft.	
1.5	139	11.0	10,000						
2.0	280								

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	6.8	*851	648	185	203	138	154	148	43	16	7.6	8.8
2	6.8	694	725	242	213	128	123	140	41	16	7.6	8.8
3	47	510	*5,870	504	375	118	123	118	40	15	7.6	8.4
4	60	371	2,610	980	3,560	208	133	114	39	15	8.0	8.0
5	192	288	1,080	580	1,520	439	133	118	37	15	7.6	8.0
6	134	228	1,500	403	815	463	123	123	36	15	7.6	7.6
7	69	188	1,650	300	910	463	114	118	35	15	7.1	7.6
8	51	158	1,190	265	695	580	110	114	34	15	7.6	7.6
9	43	133	840	242	531	662	98	102	33	14	7.1	7.1
10	38	116	626	590	531	447	87	91	32	12	6.3	6.7
11	31	111	905	900	1,350	337	80	110	31	12	6.3	6.7
12	27	97	725	630	980	300	*73	315	30	12	6.0	6.7
13	25	89	549	443	621	345	70	479	29	11	7.1	6.3
14	21	91	500	576	467	463	66	330	28	11	7.1	6.7
15	21	170	780	1,140	375	504	63	239	26	10	7.1	6.0
16	21	1,520	580	815	311	594	60	*170	24	10	7.1	8.0
17	31	2,520	483	5,010	307	415	53	148	23	9.2	6.7	6.7
18	67	3,160	399	2,020	279	307	56	123	22	11	6.3	*7.1
19	53	*1,260	348	930	258	300	54	110	*22	9.2	7.1	6.7
20	43	780	293	*675	268	315	50	98	22	8.8	6.3	6.0
21	43	558	258	3,920	282	300	50	87	22	8.4	6.3	6.0
22	38	427	226	1,650	248	272	46	80	23	9.7	6.3	4.8
23	36	348	197	1,330	226	239	45	72	21	9.7	6.0	5.4
24	56	286	176	980	203	213	45	68	20	*8.4	6.0	4.8
25	202	245	162	705	194	213	43	63	19	9.7	5.7	4.5
26	369	206	146	558	170	200	42	60	18	9.7	6.0	4.8
27	2,650	255	128	451	*156	194	41	56	18	9.2	6.0	4.8
28	*3,680	216	148	375	148	176	182	50	16	9.7	5.7	4.8
29	8,670	203	156	311	-	165	194	48	16	9.2	10	6.0
30	2,150	479	229	258	-	159	54	47	16	8.8	5.7	14
31	1,050	-	216	226	-	138	-	45	-	8.0	8.8	-
Total	25,911.6	16,558	24,745	28,194	16,196	9,793	2,665	3,984	816	352.7	217.7	203.4
Mean	836	552	798	909	578	316	88.8	129	27.2	11.4	7.02	6.78
Ac-ft	51,390	32,840	49,080	55,920	32,120	19,420	5,290	7,900	1,820	700	432	403

Calendar year 1950: Max 9,680 Min 3.2 Mean 405 Ac-ft 291,900  
 Water year 1950-51: Max 9,680 Min 4.5 Mean 355 Ac-ft 257,100

\* Discharge measurement made on this day.

## ROQUE RIVER BASIN

Illinois River at Kerby, Oreg.

Location.--Lat 42°12'00", long. 123°39'20", in NW¼ sec. 9, T. 39 S., R. 8 W., on right bank at Finch Bridge and half a mile west of Kerby.

Drainage area.--364 sq mi (revised); 369 sq mi (revised) at former site 1 mile downstream.

Records available.--March 1926 to September 1951.

Gage.--Staff gage read twice daily. Datum of gage is 1,234.00 ft above mean sea level, datum of 1929, supplementary adjustment of 1947. Prior to May 10, 1928, staff gage at site half a mile upstream at different datum. May 10, 1928, to Nov. 2, 1934, staff gage at present site at different datum. Nov. 3, 1934, to Sept. 30, 1950, water-stage recorder at site 1 mile downstream at datum 18.76 ft lower than present datum.

Average discharge.--25 years, 1,109 cfs.

Extremes.--Maximum discharge during year, 49,000 cfs Oct. 29 (gage height, 24.6 ft at recorder site and 13.7 ft at present site and datum, both from floodmarks), from rating curve extended above 14,000 and 7,500 cfs, respectively, at the two sites, on basis of slope-area determination of peak flow; minimum, 16 cfs Aug. 24, Sept. 24.  
1926-51: Maximum discharge, 52,000 cfs Feb. 20, 1927 (gage height, 19.6 ft, site and datum then in use), from rating curve extended above 26,000 cfs on basis of slope-area determination at gage height, 19.2 ft; minimum, 13 cfs Sept. 10-15, 1934.

Remarks.--Records fair except those for periods of no gage-height record, which are poor. Diversions above station for irrigation.

Revisions (water years).--W 864: 1936-37. W 1184: 1927(M), 1942(M), 1943, 1946(M), 1948.

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)

Feb. 13 to June 19				June 20 to Sept. 30			
1.4	130	3.0	1,170	0.2	14		
1.6	185	3.5	1,810	.5	28		
2.0	370	4.6	3,940	1.0	60		
2.5	700			1.6	126		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	50	4,600	2,700	1,100	1,700	970	933	816	370	73	25	23
2	50	*3,300	3,200	1,600	1,700	951	879	816	345	71	24	23
3	380	2,850	25,000	2,300	2,400	897	924	772	330	64	23	22
4	310	2,200	15,000	3,600	18,000	953	1,050	789	320	62	23	20
5	900	1,850	7,000	2,500	8,500	1,700	1,150	816	290	60	25	22
6	520	1,500	8,000	1,900	5,000	1,840	1,130	861	261	60	23	21
7	330	1,300	10,000	1,800	7,000	1,990	1,090	825	266	58	23	21
8	270	1,150	8,000	1,500	5,500	1,840	1,070	780	261	58	21	19
9	230	1,100	5,500	*1,420	4,500	2,750	1,040	740	234	54	20	20
10	200	1,050	4,000	2,200	4,500	1,890	1,060	708	221	51	22	20
11	190	970	4,800	3,000	7,000	1,570	*1,060	789	201	51	24	20
12	180	920	4,000	2,400	5,500	1,420	1,040	1,160	189	48	26	20
13	170	880	3,400	1,900	*3,940	1,530	1,050	1,590	179	46	22	20
14	160	850	4,800	2,400	3,200	1,950	1,060	1,250	173	47	*22	19
15	160	1,300	4,600	4,400	2,700	2,290	990	1,060	155	45	21	18
16	180	6,200	3,600	3,600	2,300	2,790	942	924	155	45	21	18
17	310	9,100	3,000	19,000	2,200	2,030	858	*852	150	40	21	18
18	320	13,700	2,500	9,000	2,000	1,680	843	772	140	40	20	*18
19	250	6,500	2,300	4,600	1,800	1,630	789	716	130	39	18	18
20	220	4,400	2,000	3,400	1,700	1,670	716	672	*116	40	21	20
21	210	3,100	1,800	14,000	1,600	1,640	679	616	113	39	20	18
22	210	2,400	1,680	7,500	1,600	1,540	637	574	109	39	18	20
23	200	2,100	1,500	6,000	1,500	1,370	602	539	100	39	17	18
24	200	1,900	1,400	2,000	1,400	1,310	581	504	99	*34	24	17
25	750	1,800	1,300	4,200	1,200	1,310	546	484	94	28	17	17
26	1,500	1,700	1,200	3,400	1,100	1,300	518	460	90	28	19	22
27	8,400	1,900	1,100	3,000	1,060	1,190	518	454	87	28	20	18
28	31,000	1,650	1,000	2,600	*1,040	1,140	1,020	430	81	28	20	19
29	*39,000	1,500	1,100	2,200	-	1,130	1,000	406	78	27	25	20
30	11,800	2,300	1,400	2,000	-	1,090	870	394	75	28	24	42
31	5,600	-	1,300	1,800	-	980	-	376	-	28	23	-
Total	104,250	86,070	138,180	124,320	101,640	48,321	26,675	22,945	5,412	1,396	665	611
Mean	3,363	2,869	4,457	4,010	3,630	1,559	889	740	180	45.0	21.5	20.4
Ac-ft	206,800	170,700	274,100	246,600	201,600	95,840	52,910	45,510	10,730	2,770	1,320	1,210
Calendar year 1950:	Max	39,000		Min	28	Mean	2,015	Ac-ft	1,459,000			
Water year 1950-51:	Max	39,000		Min	17	Mean	1,810	Ac-ft	1,310,000			

\* Discharge measurement made on this day.

Note.--No gage-height record Oct. 1 to Feb. 12, Feb. 14-26; discharge estimated on basis of summation of upstream tributaries, floodmarks, 3 discharge measurements and weather records.



Deer Creek near Dryden, Oreg.

Location.--Lat 42°15'50", long. 123°27'00", near center of sec. 18, T. 38 S., R. 6 W., on left bank 500 ft downstream from confluence of North and South Forks and 5 miles east of Dryden.

Drainage area.--23 sq mi, approximately.

Records available.--October 1945 to September 1951 in reports of Geological Survey. November 1941 to September 1945 in files of State engineer.

Gage.--Water-stage recorder. Datum of gage is 1,650.10 ft above mean sea level (surveys by Bureau of Reclamation). Prior to Sept. 12, 1946, staff gage at same site at datum 1.26 ft higher.

Average discharge.--9 years, 67.1 cfs.

Extremes.--Maximum discharge during year, 4,370 cfs Oct. 29 (gage height, 7.92 ft), from rating curve extended above 1,300 cfs on basis of slope-area determination of peak flow; minimum, 0.9 cfs part of each day Sept. 20-24.  
1941-51: Maximum discharge, that of Oct. 29, 1950; minimum, 1 cfs Sept. 3-7, 22-27, Oct. 2-7, 9, 1942, Sept. 23, 1949, and part of each day Sept. 20-24, 1951.

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

Rating tables, water year 1950-51 (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 27-29, Jan. 17)

Oct. 1-28

Oct. 29 to Sept. 30

1.5	1.3	2.2	38	1.0	0.5	1.9	28	5.0	1,050
1.6	1.0	2.5	69	1.1	1.2	2.2	59	6.0	1,780
1.8	11	3.0	144	1.2	2.3	2.5	106	7.0	2,880
2.0	23			1.4	6.5	3.0	217		
				1.6	13	4.0	560		

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	3.7	259	106	44	88	40	51	27	12	4.7	1.9	1.7
2	3.7	199	121	79	35	37	48	27	12	4.7	1.9	1.6
3	19	150	1,940	121	102	35	55	27	11	4.4	1.8	1.6
4	21	116	*1,110	245	1,240	45	70	27	11	4.7	1.8	1.6
5	69	89	500	197	681	54	73	27	10	4.7	1.8	1.5
6	43	72	496	142	405	53	73	33	10	4.9	1.8	1.5
7	20	58	663	114	394	52	73	32	10	4.4	1.7	1.5
8	15	51	408	99	346	69	72	29	9.7	4.2	1.7	1.5
9	16	44	278	86	265	104	70	27	9.0	4.0	1.7	1.5
10	12	38	204	104	239	82	72	26	8.7	3.8	1.6	1.4
11	9.2	34	225	121	326	69	*69	30	8.7	3.6	1.6	1.4
12	7.3	31	*220	121	314	65	73	32	8.5	3.4	1.7	1.3
13	6.6	28	185	110	237	93	74	39	8.2	3.4	1.6	1.3
14	6.0	28	212	157	185	155	72	40	7.9	3.0	1.6	1.2
15	6.3	42	204	237	153	197	63	38	7.3	3.0	1.6	1.1
16	6.3	302	173	225	129	192	58	*34	7.3	3.0	1.5	1.2
17	18	718	142	*1,310	114	140	54	32	7.1	3.0	1.5	*1.3
18	24	1,300	121	614	97	112	47	29	6.8	2.8	1.4	1.2
19	19	532	106	302	85	110	41	26	*6.5	2.6	1.4	1.2
20	16	342	92	242	79	125	36	24	6.3	2.6	1.4	1.1
21	15	260	80	1,260	70	119	32	23	6.3	2.6	1.3	1.1
22	13	197	70	614	66	102	30	21	6.0	2.6	1.3	1.1
23	11	161	63	433	62	86	27	20	6.0	2.4	1.3	1.1
24	11	142	57	405	55	79	26	18	5.8	*2.3	1.3	1.1
25	54	131	52	308	52	82	25	17	5.8	2.3	1.3	1.2
26	87	116	47	248	49	80	24	16	5.6	2.3	1.3	1.2
27	381	121	43	212	*45	73	26	16	5.6	2.1	1.3	1.2
28	2,100	107	41	178	42	67	49	15	5.1	2.1	1.3	1.2
29	*2,830	69	39	144	-	34	14	4.9	4.9	2.0	2.5	1.5
30	506	101	51	119	-	63	29	14	4.9	2.0	2.6	1.5
31	*346	-	47	101	-	55	-	13	-	1.9	1.9	1.2
Total	6,995.1	5,856	8,096	8,694	6,003	2,704	1,546	793	234.0	99.5	50.2	41.2
Mean	226	195	261	280	214	87.2	51.5	25.6	7.80	3.21	1.62	1.37
Cfs/m	9.85	8.48	11.3	12.2	9.30	3.79	2.24	1.11	0.339	0.140	0.070	0.060
In.	11.31	9.47	13.09	14.06	9.71	4.37	2.50	1.28	0.59	0.16	0.08	0.07
Ac-ft	13,870	11,620	16,060	17,240	11,910	5,360	3,070	1,570	464	197	100	82
Calendar year 1950: Max	2,830	Min	1.3	Mean	117	Cfs/m	5.09	In.	69.22	Ac-ft	84,920	
Water year 1950-51: Max	2,830	Min	1.1	Mean	113	Cfs/m	4.91	In.	66.48	Ac-ft	81,540	

Peak discharge (base, 500 cfs).--Oct. 29 (6 a.m.) 4,370 cfs (7.92 ft); Nov. 18 (6 a.m.) 1,750 cfs (5.97 ft); Dec. 3 (6 p.m.) 3,020 cfs (7.10 ft); Dec. 7 (2 a.m.) 775 cfs (4.48 ft); Jan. 17 (4 p.m.) 1,920 cfs (6.55 ft); Jan. 21 (9 a.m.) 1,750 cfs (5.97 ft); Feb. 4 (1 p.m.) 1,830 cfs (6.06 ft).

\* Discharge measurement made on this day.

## Reservoirs in Rogue River basin, Oreg.

Fish Lake.--Lat 42°23', long. 122°21', in SE $\frac{1}{4}$  sec. 3, T. 37 S., R. 4 E., at reservoir outlet, 14 miles east of Lake Creek Post Office. Drainage area, 17 sq mi. Records available, December 1915 to September 1951. Staff gage read daily. Datum of gage is at mean sea level (irrigation district datum). Prior to Oct. 1, 1921, staff gage on former gate tower with datum of gage at 4,799 ft above mean sea level. Maximum contents observed during year, 7,770 acre-ft May 29 to June 2 (elevation, 4,826.60 ft); minimum observed, 770 acre-ft Sept. 28 (elevation, 4,805.32 ft). Maximum contents observed during period 1915-51, 8,020 acre-ft June 1, 1943 (elevation, 4,827.19 ft); no usable contents at times.

Reservoir is formed by rock-faced earth dam, completed in fall of 1915; storage began in November 1915. Capacity, 7,530 acre-ft between elevations 4,799 ft (outlet tunnel) and 4,826 ft (spillway channel, incomplete). Water is diverted during summer from Fourmile Lake in Klamath River basin through Cascade Canal into Fish Lake.

Emigrant Gap Reservoir.--Lat 42°09'40", long. 122°36'20", in SE $\frac{1}{4}$  sec. 20, T. 39 S., R. 2 E., at Emigrant Gap Dam of Talent Irrigation District on Emigrant Creek, 6 miles south-east of Ashland. Drainage area, 64.3 sq mi. Records available, December 1924 to September 1951. Staff gage read one to fourteen times a month. Datum of gage is at mean sea level (levels by Talent Irrigation District). Maximum contents observed during year, 8,390 acre-ft May 13 (elevation, 2,173.7 ft); minimum observed, 141 acre-ft Aug. 29 (elevation, 2,089.8 ft). Maximum contents during period 1924-51, 8,850 acre-ft Jan. 7, 1948 (elevation, 2,175.6 ft); no usable contents at times.

Reservoir is formed by concrete arch dam, completed in 1924 by Talent Irrigation District; storage began in December 1924. Capacity, 8,340 acre-ft between elevations 2,070 ft (16-inch sluice pipe) and 2,173.5 ft (crest of spillway). Dead storage negligible. Water is used for irrigation of lands near Talent.

Revisions (water years).--W 834: 1936. W 1064: 1945.

Monthly elevation and contents, water year October 1950 to September 1951

Date	Fish Lake			Emigrant Gap Reservoir		
	Elevation (feet)	Contents (acre-feet)	Change in contents during month (acre-feet)	Elevation (feet)	Contents (acre-feet)	Change in contents during month (acre-feet)
Sept. 30.....	4,807.00	1,180	-	-	a210	-
Oct. 31.....	4,812.60	2,750	+1,570	2,155.3	4,830	+4,620
Nov. 30.....	4,815.50	3,670	+920	-	a4,730	-100
Dec. 31.....	4,818.50	4,690	+1,020	-	a5,680	+950
Calendar year 1950.....	-	-	+650	-	-	+4,780
Jan. 31.....	4,820.00	5,220	+530	-	a6,770	+1,090
Feb. 28.....	4,821.50	5,770	+550	-	a6,800	+30
Mar. 31.....	4,822.30	6,070	+300	-	a8,220	+1,420
Apr. 30.....	4,824.30	6,840	+770	2,170.8	7,720	-500
May 31.....	4,826.60	7,770	+930	2,170.4	7,640	-80
June 30.....	4,821.20	5,660	-2,110	-	a4,940	-2,700
July 31.....	4,813.10	2,910	-2,750	2,123.2	1,410	-3,530
Aug. 31.....	4,806.90	1,150	-1,760	-	a142	-1,268
Sept. 30.....	4,805.40	788	-362	-	a165	+23
Water year 1950-51.....	-	-	-392	-	-	-45

a Interpolated.

Note.--Time of reading gages not known.

## Springs in the Walla Walla River basin, Oreg.-Wash.

Ground-water overflow through many springs on the alluvial fan of the Walla Walla River near Milton and Freewater, Oreg., amounts to about 50,000 acre-ft a year. During the irrigation season practically all the overflow is used to water crops on land not served by diversion from the river. A survey made in 1933 listed 57 springs or spring groups in the area, arranged in "inner," "intermediate," and "outer" zones concentric about the apex of the alluvial fan.<sup>1</sup>

The inner zone is 3 to 3½ miles downstream from Milton and Freewater and extends from the vicinity of Nicholas Spring, which is about half a mile east of the Walla Walla River at McCoy Bridge, to springs in the vicinity of Dugger Creek. Within this zone are fully three-fourths of the springs in the Walla Walla basin. The intermediate and outer zones, each of which contains only a few springs, are about 2 miles and 4 miles, respectively, beyond the inner zone.

In order to bring about a more effective use of the available water supply through a better understanding of the relation between surface- and ground-water supplies in the basin, discharge measurements of each of the principal springs and measurements of ground-water levels in representative wells have been made and the results published periodically since 1932.

Discharge measurements in cubic feet per second, of springs in Walla Walla River basin, Oreg.-Wash., during water year October 1950 to September 1951†

## Springs of the inner zone

Date	Spring	Locality	Discharge (cfs)
May 23	Nicholas Spring, Oreg....	NE½NW¼ sec. 24, T. 6 N., R. 35 E., 150 ft above confluence of spring channel and Walla Walla River.	1.14
Jan. 26	Big Spring Branch (west prong), Oreg.	SE¼NW¼ sec. 24, T. 6 N., R. 35 E., at Ballou residence, 75 ft above bridge on county road.	8.46
May 23	.....do.....	.....do.....	14.1
Jan. 23	Big Spring Branch (east prong), Oreg.	NE½SW¼ sec. 24, T. 6 N., R. 35 E., above flow line of small reservoir supplying two diversion pumps.	2.97
May 23	.....do.....	.....do.....	3.37
24	Eagle Spring, Oreg.....	NW½SE¼ sec. 23, T. 6 N., R. 35 E., total flow at diversion dam.	3.60
23	Downing Spring, Oreg....	SE½SW¼ sec. 23, T. 6 N., R. 35 E., at weir, 200 ft below spring orifice.	2.32
Jan. 26	Haun Spring, Oreg.....	NW½SE¼ sec. 23, T. 6 N., R. 35 E., at Haun farm, 200 ft above highway crossing.	1.86
May 23	.....do.....	.....do.....	2.83

## Springs of the intermediate and outer zones

May 24	McEvoy Spring, Wash.....	SE¼NW¼ sec. 10, T. 6 N., R. 35 E., at McEvoy farm, 200 ft above Walla Walla Railway.	3.57
Jan. 26	Lewis Spring, Oreg.....	NW¼NW¼ sec. 23, T. 6 N., R. 35 E., below road crossing.	1.90
May 23	.....do.....	.....do.....	2.26
25	Unnamed Spring, Wash....	NW¼NE¼ sec. 16, T. 6 N., R. 35 E., at small diversion structure.	2.94
25	East Mud Creek (west prong), Oreg.	SW¼SW¼ sec. 22, T. 6 N., R. 35 E., at two weirs.....	3.29
25	East Mud Creek (east prong), Oreg.	SE¼SW¼ sec. 22, T. 6 N., R. 35 E., in diversion ditch 150 ft below diversion dam.	1.30
24	East Mud Creek (branch of), Oreg.	SW¼SW¼ sec. 16, T. 6 N., R. 35 E., near Lockwood dwelling.	4.56
25	South Mud Creek, Oreg...	SE¼NW¼ sec. 28, T. 6 N., R. 35 E., at Vonder Ahe farm.	3.89
25	Johnson Creek, Oreg.....	SE¼NW¼ sec. 29, T. 6 N., R. 35 E., at two weirs.....	3.78
25	Dugger Creek, Oreg.....	NW¼NW¼ sec. 32, T. 6 N., R. 35 E., at two weirs.....	7.36
25	Schwartz Spring Branch (south prong), Oreg.	SW¼SE¼ sec. 23, T. 6 N., R. 34 E., at weirs.....	4.88
25	Schwartz Spring Branch (north prong), Oreg.	NE¼SW¼ sec. 23, T. 6 N., R. 34 E., in ditch diverting from spring.	3.14
25	South Mud Creek, Oreg...	SW¼SE¼ sec. 13, T. 6 N., R. 34 E., at Krumbaugh farm	6.40

† Measurements by Umatilla County deputy watermaster.

<sup>1</sup>Piper, A. M., Robinson, T. W., and Thomas, H. E., Ground water in the Walla Walla basin, Oreg.-Wash.: Supreme Court of the United States, October term 1935, State of Washington vs. State of Oregon, transcript of record, p. 132A, Oct. 14, 1935.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

Measurements of streamflow in the Pacific slope basins in Oregon and lower Columbia River basin made at points other than gaging stations are given in the following table:

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951

## Walla Walla River basin, Wash.

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Aug. 15	Veterans Hospital ditch.	Right side of Garrison Creek.	NE $\frac{1}{4}$ sec. 31, T. 7 N., R. 36 E., 300 ft below head and 200 ft above boundary fence at Veterans Hospital at Walla Walla.	1.20
15	Garrison Creek...	Walla Walla River	NE $\frac{1}{4}$ sec. 31, T. 7 N., R. 36 E., 300 ft above Veterans Hospital boundary fence at Walla Walla.	.74
15	South Spring Creek.	Ground water.....	SE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 400 ft below source, at Veterans Hospital at Walla Walla.	.32
15	...do.....	...do.....	SE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 1,000 ft below source, at Veterans Hospital at Walla Walla.	.42
15	...do.....	...do.....	SE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 100 ft above Veterans Hospital boundary fence, at Walla Walla.	.54
15	North Spring.....	...do.....	NE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 15 ft below old dam and 100 ft below source at Veterans Hospital at Walla Walla.	.62
15	...do.....	...do.....	NE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 200 ft below source, at Veterans Hospital at Walla Walla.	.20
15	...do.....	...do.....	NE $\frac{1}{4}$ sec. 30, T. 7 N., R. 36 E., 20 ft above Veterans Hospital boundary fence, at Walla Walla.	.59

## Willow Creek basin, Oreg.

May 21	Willow Creek.....	Columbia River...	NE $\frac{1}{4}$ sec. 27, T. 1 N., R. 23 E., at former gaging station, $\frac{1}{2}$ miles south of Morgan.	55.6
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## John Day River basin, Oreg.

Aug. 23	Canyon Creek.....	John Day River...	SW $\frac{1}{4}$ sec. 25, T. 14 S., R. 31 E., 5 miles south of Canyon City.	4.38
May 22	Lake Creek.....	East Fork Beech Creek.	Sec. 7, T. 12 S., R. 32 E., 200 ft below outlet of Magone Lake and 12 miles northwest of Prairie City.	.9
Aug. 22	South Fork John Day River.	John Day River...	Sec. 24, T. 13 S., R. 26 E., 3 miles south of Dayville.	22.1
23	Rock Creek.....	...do.....	Mouth, in E $\frac{1}{2}$ sec. 18, T. 12 S., R. 26 E., $\frac{6}{8}$ miles north of Dayville.	.36
July 20	Big Creek.....	North Fork John Day River.	Mouth, in sec. 13, T. 7 S., R. 33 E., 13 miles east of Dale.	6.48

## Deschutes River basin, Oreg.

Aug. 30	Davis Creek.....	Deschutes River..	SW $\frac{1}{4}$ sec. 7, T. 22 S., R. 8 E., below springs at north head of creek.	94.0
Sept. 12	...do.....	...do.....	SE $\frac{1}{4}$ sec. 7, T. 22 S., R. 8 E., below north head of creek.	105
Oct. 5	...do.....	...do.....	NE $\frac{1}{4}$ sec. 18, T. 22 S., R. 8 E., below springs at south head of creek.	62.8
Sept. 12	...do.....	...do.....	SE $\frac{1}{4}$ sec. 7, T. 22 S., R. 8 E., at west head of creek.	72.4
12	...do.....	...do.....	...do.....	92.8
Oct. 5	...do.....	...do.....	NW $\frac{1}{4}$ sec. 8, T. 22 S., R. 8 E., above unnamed stream.	227
Sept. 11	...do.....	...do.....	...do.....	254
17	Unnamed stream...	Davis Creek.....	Mouth, in SW $\frac{1}{4}$ sec. 5, T. 22 S., R. 8 E., on left bank of Davis Creek.	19.3
Oct. 10	Davis Creek.....	Deschutes River..	SE $\frac{1}{4}$ sec. 5, T. 22 S., R. 8 E., 100 ft below unnamed stream.	244
Sept. 12	...do.....	...do.....	...do.....	280
17	...do.....	...do.....	...do.....	268
25	Unnamed stream...	...do.....	SW $\frac{1}{4}$ sec. 31, T. 21 S., R. 9 E., at two road culverts 1 mile north of Wickiup Dam.	18.8
May 31	...do.....	...do.....	Near center of sec. 4, T. 22 S., R. 9 E., at road crossing about 2 miles northeast of Wickiup Dam.	24.9
Sept. 25	...do.....	...do.....	...do.....	17.1
Oct. 19	Deschutes River..	Columbia River...	SE $\frac{1}{4}$ sec. 6, T. 18 S., R. 12 E., about 3,200 ft downstream from gaging station above Mill Pond and 1 mile south of Bend.	*662
31	...do.....	...do.....	...do.....	*745
Dec. 8	...do.....	...do.....	...do.....	*928
Jan. 12	...do.....	...do.....	...do.....	*914
Feb. 5	...do.....	...do.....	...do.....	*1,360
9	...do.....	...do.....	...do.....	*1,820
Apr. 13	...do.....	...do.....	...do.....	*1,320
May 25	...do.....	...do.....	...do.....	*1,650
June 29	...do.....	...do.....	...do.....	*1,870
July 24	...do.....	...do.....	...do.....	*1,900
Aug. 2	...do.....	...do.....	...do.....	*1,820
Sept. 5	...do.....	...do.....	...do.....	*2,070

\* Furnished by Bureau of Reclamation.

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year 1950 to September 1951--Continued

## Deschutes River basin, Oreg.,--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
June 21	Ochoco Canal.....	Diverting from Ochoco Creek.	SE $\frac{1}{4}$ sec. 36, T. 14 S., R. 16 E., 1 $\frac{1}{2}$ miles below Ochoco Dam and 5 miles east of Prineville.	141
Sept. 24	Crooked River....	Deschutes River...	SW $\frac{1}{4}$ sec. 11, T. 12 S., R. 12 E., leakage past Cove powerplant dam near Culver.	7.8
July 21	Clear Creek.....	White River.....	Outlet of Clear Lake, 9 miles southeast of Government Camp.	8.29

## Hood River basin, Oreg.

Oct. 9	Unnamed spring...	Middle Fork Hood River.	NE $\frac{1}{4}$ sec. 24, T. 1 N., R. 9 E., on left bank of Middle Fork Hood River, 2 miles south of Dec.	7.02
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## Little White Salmon River basin, Wash.†

1950 Dec. 10	Broughton Lumber Co. diversion.	Little White Salmon River.	SW $\frac{1}{4}$ sec. 36, T. 4 N., R. 9 E., at Willard.	20.5
1951 Mar. 23	...do.....	...do.....	...do.....	24.0
June 4	...do.....	...do.....	...do.....	23.2
Aug. 30	...do.....	...do.....	...do.....	20.7
1949 Feb. 17	Rock Creek.....	...do.....	NW $\frac{1}{4}$ sec. 14, T. 3 N., R. 9 E., at county road crossing, 2 miles south of Willard.	‡428
1950 Feb. 24	...do.....	...do.....	...do.....	‡323
1951 Feb. 9	...do.....	...do.....	...do.....	‡175

† Includes measurements made in 1949 and 1950 water years.

‡ Flow at crest stage; computed by contracted-opening method.

## Unnamed Creek basin, Wash.†

1950 Feb. 24	Unnamed creek....	Columbia River....	SE $\frac{1}{4}$ sec. 27, T. 3 N., R. 8 E., at crossing of U. S. Highway 830, half a mile east of Home Valley.	‡74.0
1951 Feb. 11	...do.....	...do.....	...do.....	‡32.3

† Includes measurements made in 1950 water year.

‡ Flow at crest flow; computed by contracted-opening method.

## Gibbons Creek basin, Wash.

Aug. 2	Gibbons Creek....	Columbia River....	NE $\frac{1}{4}$ sec. 16, T. 1 N., R. 4 E., 500 ft above U. S. Highway 830 crossing and 1 $\frac{1}{2}$ miles east of Washougal.	2.04
Sept. 7	...do.....	...do.....	...do.....	2.91
Aug. 2	Campan Creek....	Gibbons Creek....	NE $\frac{1}{4}$ sec. 16, T. 1 N., R. 4 E., at mouth 400 ft above U. S. Highway 830 crossing and 1 $\frac{1}{2}$ miles east of Washougal.	.20
Sept. 7	...do.....	...do.....	...do.....	.76

## Washougal River basin, Wash.†

1951 June 15	Washougal River..	Columbia River....	SW $\frac{1}{4}$ sec. 26, T. 2 N., R. 5 E., 3 $\frac{1}{2}$ miles north of Prindle.	94.7
July 3	...do.....	...do.....	...do.....	54.5
23	...do.....	...do.....	...do.....	33.4
Aug. 3	...do.....	...do.....	...do.....	32.9
15	...do.....	...do.....	...do.....	26.9
Sept. 7	...do.....	...do.....	...do.....	29.9
June 6	West Fork Washougal.	Washougal River...	Center sec. 32, T. 2 N., R. 5 E., 100 ft below road crossing, 1,000 ft above mouth, and 7 miles northeast of Washougal.	68.1
Sept. 7	Canyon Creek....	...do.....	W $\frac{1}{2}$ sec. 3, T. 1 N., R. 5 E., at road crossing 1 $\frac{1}{2}$ miles northwest of Prindle.	.79
1949 Feb. 17	...do.....	...do.....	SE $\frac{1}{4}$ sec. 4, T. 1 N., R. 5 E., at crossing of State Highway 8-B, 1 $\frac{1}{2}$ miles west of Prindle and 8 miles east of Washougal.	‡281
1950 Feb. 24	...do.....	...do.....	...do.....	‡210
Dec. 23	...do.....	...do.....	...do.....	‡90.6
1951 Aug. 2	...do.....	...do.....	NW $\frac{1}{4}$ sec. 5, T. 1 N., R. 5 E., at road crossing, 3 $\frac{1}{2}$ miles northwest of Prindle.	2.63
1951 Aug. 2	Unnamed creek....	...do.....	SE $\frac{1}{4}$ sec. 31, T. 2 N., R. 5 E., at road crossing, 4 $\frac{1}{2}$ miles northwest of Prindle.	** .02

† Includes measurements made in 1949 and 1950 water years.

‡ Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Washougal River basin, Wash.--Continued†

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
1951				
Aug. 2	Unnamed creek....	Washougal River...	NW $\frac{1}{4}$ sec. 31, T. 2 N., R. 5 E., at road crossing, 4 $\frac{1}{2}$ miles northwest of Prindle.	**0.03
2	...do.....	...do.....	NE $\frac{1}{4}$ sec. 36, T. 2 N., R. 4 E., at road crossing, 5.6 miles northeast of Washougal.	**0.02
2	...do.....	...do.....	NE $\frac{1}{4}$ sec. 36, T. 2 N., R. 4 E., at road crossing, 5.5 miles northeast of Washougal.	.72
Sept. 7	...do.....	...do.....	...do.....	.11
Aug. 2	...do.....	...do.....	...do.....	**0.03
2	...do.....	...do.....	NW $\frac{1}{4}$ sec. 36, T. 2 N., R. 4 E., at road crossing, 5 miles northeast of Washougal.	**0.02
2	...do.....	...do.....	SW $\frac{1}{4}$ sec. 25, T. 2 N., R. 4 E., at road crossing, 5 miles northeast of Washougal.	1.08
Sept. 7	...do.....	...do.....	...do.....	1.18
Aug. 2	...do.....	...do.....	SE $\frac{1}{4}$ sec. 26, T. 2 N., R. 4 E., at road crossing, 4.8 miles northeast of Washougal.	**1.10
2	...do.....	...do.....	SW $\frac{1}{4}$ sec. 26, T. 2 N., R. 4 E., at road crossing, 4.2 miles northeast of Washougal.	**0.02
2	Cougar Creek.....	...do.....	SW $\frac{1}{4}$ sec. 27, T. 2 N., R. 4 E., at road crossing, 3.8 miles northeast of Washougal.	2.86
Sept. 7	...do.....	...do.....	...do.....	2.37
Aug. 2	Unnamed creek....	...do.....	SE $\frac{1}{4}$ sec. 28, T. 2 N., R. 4 E., at road crossing, 3.8 miles northeast of Washougal.	**0.04
2	...do.....	...do.....	SW $\frac{1}{4}$ sec. 28, T. 2 N., R. 4 E., at road crossing, 3.2 miles northeast of Washougal.	**0.05
2	...do.....	...do.....	South line sec. 29, T. 2 N., R. 4 E., at road crossing, 3.0 miles north of Washougal.	**0.07
2	...do.....	...do.....	NE $\frac{1}{4}$ sec. 32, T. 2 N., R. 4 E., at road crossing, 2.7 miles north of Washougal.	**0.01
1	...do.....	Little Washougal River.	SW $\frac{1}{4}$ sec. 17, T. 2 N., R. 4 E., above road crossing, 5 miles north of Washougal.	**0.05
Sept. 7	...do.....	...do.....	...do.....	.08
Aug. 2	Little Washougal River.	Washougal River...	SW $\frac{1}{4}$ sec. 17, T. 2 N., R. 4 E., below road crossing, 5 miles north of Washougal.	6.22
Sept. 7	...do.....	...do.....	...do.....	5.49
6	Matney Creek....	Lacamas Creek....	Line between secs. 9 and 10, T. 2 N., R. 3 E., at road crossing, 2.4 miles east of Proebstel.	.07
Aug. 2	...do.....	...do.....	E $\frac{1}{2}$ sec. 9, T. 2 N., R. 3 E., at road crossing, 2.1 miles east of Proebstel.	.37
1	Fifth Plain Creek	...do.....	SW $\frac{1}{4}$ sec. 29, T. 3 N., R. 3 E., at road crossing, 2.9 miles north of Proebstel.	.10
Sept. 6	...do.....	...do.....	...do.....	.06
1950				
Jan. 6	Shanghai Creek...	Fifth Plain Creek.	SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 33, T. 3 N., R. 3 E., at crossing of county road, 3 $\frac{1}{2}$ miles southeast of Hockinson.	\$55
Dec. 23	...do.....	...do.....	...do.....	\$67.4
1951				
Aug. 2	...do.....	...do.....	East line sec. 5, T. 2 N., R. 3 E., at road crossing, 1.8 miles northeast of Proebstel.	.37
Sept. 6	...do.....	...do.....	...do.....	.30
Aug. 1	Unnamed creek....	China ditch.....	S $\frac{1}{2}$ sec. 19, T. 3 N., R. 3 E., at road crossing, 0.8 mile south of Hockinson.	**0.01
Sept. 6	China ditch.....	Fifth Plain Creek.	NW $\frac{1}{4}$ sec. 31, T. 3 N., R. 3 E., at road crossing, 2.1 miles south of Hockinson.	**0.03
June 15	Fifth Plain Creek	Lacamas Creek....	SW $\frac{1}{4}$ sec. 7, T. 2 N., R. 3 E., 150 ft above road crossing and 0.5 mile west of Proebstel.	5.28
July 2	...do.....	...do.....	...do.....	4.03
23	...do.....	...do.....	...do.....	3.20
Aug. 1	...do.....	...do.....	...do.....	3.54
14	...do.....	...do.....	...do.....	2.99
Sept. 6	...do.....	...do.....	...do.....	2.74
6	Unnamed creek....	...do.....	NW $\frac{1}{4}$ sec. 17, T. 2 N., R. 3 E., at road crossing, 0.9 mile southeast of Proebstel.	No flow
Aug. 2	Lacamas Creek....	Washougal River...	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T. 2 N., R. 3 E., at bridge 1 mile above Lacamas Lake and 4 $\frac{1}{2}$ miles northwest of Camas.	9.99
Sept. 6	...do.....	...do.....	...do.....	7.48
Aug. 2	Unnamed creek....	Lacamas Creek....	South line sec. 29, T. 2 N., R. 3 E., at road crossing, 3.6 miles northwest of Camas.	**0.02

† Includes measurements made in 1949 and 1950 water years.

\* Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

## Tributaries between Washougal River and Lake River, Wash.

Aug. 2	Unnamed creek....	Columbia River....	SE $\frac{1}{4}$ sec. 8, T. 1 N., R. 3 E., at U. S. Highway 830 crossing, 2.7 miles west of Camas.	**0.05
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Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

Tributaries between Washougal River and Lake River, Wash.--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Aug. 2	Unnamed creek....	Columbia River....	SW $\frac{1}{4}$ sec. 7, T. 1 N., R. 3 E., $\frac{1}{2}$ mile east of Fisher.	0.36
Sept. 7	....do.....	....do.....	....do.....	.31
Aug. 2	....do.....	....do.....	NE $\frac{1}{4}$ sec. 12, T. 1 N., R. 2 E., $\frac{1}{4}$ mile west of county road intersection at Fisher.	**02
2	....do.....	Unnamed pond tributary to Columbia River....	NE $\frac{1}{4}$ sec. 3, T. 1 N., R. 2 E., above fish hatchery diversion, $\frac{1}{4}$ mile east of Ellsworth.	**4.00
7	....do.....	Columbia River....	NW $\frac{1}{4}$ sec. 3, T. 1 N., R. 2 E., 50 ft below railroad crossing, $\frac{1}{4}$ mile east of Ellsworth.	11.4
Aug. 2	....do.....	....do.....	NW $\frac{1}{4}$ sec. 4, T. 1 N., R. 2 E., at road crossing, $\frac{1}{4}$ mile west of Ellsworth.	**10
Sept. 7	....do.....	....do.....	....do.....	1.03

\*\* Estimated.

Willamette River basin, Oreg.

Aug. 28	Salt Creek.....	Middle Fork Willamette River.	T. 23 S., R. 6 E. (unsurveyed), 700 ft above falls and 10 miles southeast of McCredie Springs.	††45.8
23	Waldo Lake tunnel	Black Creek.....	Outlet of unused tunnel from Kloydahl Bay.	7.99
Sept. 11	Duval Creek.....	Middle Fork Willamette River.	Sec. 20, T. 20 S., R. 2 E., at bridge, 9 miles northwest of Oakridge.	.51
11	Goodman Creek....	....do.....	SE $\frac{1}{4}$ sec. 2, T. 20 S., R. 1 E., at bridge, 7 miles southeast of Lowell.	1.08
11	Rolling Riffle Creek.	....do.....	NW $\frac{1}{4}$ sec. 33, T. 19 S., R. 1 E., at bridge, $\frac{1}{2}$ miles southeast of Lowell.	2.16
11	Minnow Creek.....	....do.....	SE $\frac{1}{4}$ sec. 19, T. 19 S., R. 1 E., at bridge, 5 miles southeast of Lowell.	.41
Oct. 17	Coast Fork Willamette River.	Willamette River..	Below Bennett Creek, at Cottage Grove.....	**437
26	....do.....	....do.....	....do.....	**547
Nov. 2	....do.....	....do.....	....do.....	††2,770
Dec. 19	....do.....	....do.....	....do.....	**564
Jan. 4	....do.....	....do.....	....do.....	††1,340
10	....do.....	....do.....	....do.....	††341
17	....do.....	....do.....	....do.....	††3,250
July 10	Berkshire Slough.	Coast Fork Willamette River (overflow channel).	NW $\frac{1}{4}$ sec. 19, T. 18 S., R. 2 W., at point of diversion from Willamette River, near Goshen.	0
10	East Branch Berkshire Slough.	....do.....	NE $\frac{1}{4}$ sec. 14, T. 18 S., R. 3 W., below Willoughby diversion dam, 1 mile north of Goshen.	**03
10	West Branch Berkshire Slough.	....do.....	NE $\frac{1}{4}$ sec. 14, T. 18 S., R. 3 W., 1 mile north of Goshen.	.08
Oct. 3	McKenzie River....	Willamette River..	N $\frac{1}{2}$ sec. 20, T. 14 S., R. 7 E., 500 ft below Middle Falls.	505
3	....do.....	....do.....	NW $\frac{1}{4}$ sec. 20, T. 14 S., R. 7 E., 1/3 mile below Middle Falls.	498
Jan. 12	....do.....	....do.....	....do.....	720
Mar. 21	....do.....	....do.....	....do.....	694
July 18	....do.....	....do.....	....do.....	624
Aug. 29	....do.....	....do.....	....do.....	491
Sept. 6	....do.....	....do.....	N $\frac{1}{2}$ sec. 30, T. 14 S., R. 7 E., 30 ft above Lower Falls (most of flow underground at this point).	††45.0
21	....do.....	....do.....	....do.....	††27.2
Oct. 3	....do.....	....do.....	NE $\frac{1}{4}$ sec. 1, T. 15 S., R. 6 E., 1 mile below Lower Falls.	737
July 18	....do.....	....do.....	....do.....	911
Aug. 29	....do.....	....do.....	....do.....	740
Sept. 7	Smith River....	McKenzie River....	Mouth, SW $\frac{1}{4}$ sec. 13, T. 15 S., R. 6 E.	††14.4
July 18	McKenzie River....	Willamette River..	Below Frissell Creek, 3 miles northwest of Belknap Springs.	1,220
Aug. 3	....do.....	....do.....	....do.....	1,140
Sept. 13	....do.....	....do.....	....do.....	1,050
June 1	Lost Creek.....	McKenzie River....	SW $\frac{1}{4}$ sec. 13, T. 16 S., R. 6 E., $\frac{1}{4}$ mile below forks	††273
25	....do.....	....do.....	....do.....	††308
July 10	....do.....	....do.....	....do.....	††303
Aug. 14	....do.....	....do.....	....do.....	††243
Sept. 7	....do.....	....do.....	....do.....	††212
Aug. 14	....do.....	....do.....	SE $\frac{1}{4}$ sec. 10, T. 16 S., R. 6 E., below road bridge.	††265
Sept. 7	....do.....	....do.....	....do.....	††240
July 13	McKenzie River...	Willamette River..	E $\frac{1}{2}$ sec. 10, T. 17 S., R. 1 E., below Leaburg power diversion, 0.4 mile east of Leaburg.	491
Sept. 24	....do.....	....do.....	....do.....	526
24	....do.....	....do.....	0.4 mile below power canal intake, $\frac{1}{2}$ miles east of Walterville	493
July 10	Allison Creek....	McGowan Creek....	Sec. 27, T. 16 S., R. 2 W., above Upper Jacobs Lake ditch, 4 miles north of Mohawk.	.19

\*\* Estimated.

†† Furnished by Eugene Water and Electric Board.

\*\* Furnished by Corps of Engineers.

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

Willamette River basin, Oreg.--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
July 10	Lower Jacob's Lake ditch.	Diverting from Allison Creek.	Sec. 27, T. 16 S., R. 2 W., 4 miles north of Mohawk.	0.05
10	McGowan Creek.....	Mohawk River.....	NW¼ sec. 34, T. 16 S., R. 2 W., at road crossing, 3 miles northeast of Mohawk.	1.6
10	Calapooya River...	Willamette River	Mouth, below powerplant tailrace, at Albany.	227
Aug. 14	....do.....	....do.....	....do.....	82.3
Sept. 25	....do.....	....do.....	....do.....	42.8
July 12	Teal Creek.....	Little Luckiamute River.	SW¼ sec. 26, T. 8 S., R. 6 W., 2½ miles southeast of Falls City.	5.2
May 17	Little Luckiamute River.	Luckiamute River	At bridge, 0.5 mile above mouth, near Suver.	197
June 21	....do.....	....do.....	....do.....	43.6
July 20	Claggett Creek....	Clear Lake.....	SE¼ sec. 2, T. 7 S., R. 3 W., 2 miles north of Salem.	.9
Aug. 9	Turner Creek.....	North Yamhill River.	Mouth, 4 miles northwest of Yamhill.....	.37
Sept. 24	Berry Creek.....	Baker Creek.....	SW¼ sec. 12, T. 4 S., R. 5 W., 3 miles northwest of McMinnville.	.98
Aug. 7	....do.....	....do.....	Mouth, 2 miles northwest of McMinnville...	.60
Sept. 24	....do.....	....do.....	....do.....	.77
Aug. 7	Baker Creek.....	Panther Creek...	SW¼SW¼ sec. 9, T. 4 S., R. 4 W., 1 mile north of McMinnville.	2.32
Sept. 24	....do.....	....do.....	....do.....	3.48
July 11	Unnamed stream....	Willamette River	NW¼SE¼ sec. 18, T. 4 S., R. 1 W., ½ mile west of Donald.	**0.02
11	....do.....	....do.....	SE¼ sec. 7, T. 4 S., R. 1 W., 1 mile northwest of Donald.	.45
11	....do.....	....do.....	SE¼ sec. 7, T. 4 S., R. 1 W., 1¼ miles northwest of Donald.	.68
11	....do.....	Unnamed stream..	NW¼ sec. 18, T. 4 S., R. 1 W., at road crossing, 1 mile west of Donald.	0
11	....do.....	Willamette River	NW¼SW¼ sec. 6, T. 4 S., R. 1 W., 2 miles northwest of Wilsonville.	1.6
Aug. 7	Corral Creek.....	....do.....	NW¼NW¼ sec. 20, T. 3 S., R. 1 W., about 1,000 ft above North Fork and 3½ miles west of Wilsonville.	**1
7	North Fork Corral Creek.	Corral Creek....	Mouth, in NW¼ sec. 20, T. 3 S., R. 1 W., 3 miles west of Wilsonville.	**0.03
7	Unnamed stream....	....do.....	Mouth, in NW¼SW¼ sec. 22, T. 3 S., R. 1 W., 1½ miles west of Wilsonville.	**2
7	Corral Creek.....	Willamette River	NW¼SW¼ sec. 22, T. 3 S., R. 1 W., below unnamed tributary, 1½ miles west of Wilsonville.	.50
8	Drift Creek.....	Pudding River...	Sec. 5 or 8, T. 8 S., R. 1 E., at falls, 8 miles southeast of Silverton.	**0.05
8	....do.....	....do.....	NE¼NW¼ sec. 36, T. 7 S., R. 1 W., 5 miles south of Silverton.	**2
8	....do.....	....do.....	NE¼ sec. 16, T. 7 S., R. 1 W., 2½ miles southwest of Silverton.	**57
8	....do.....	....do.....	SE¼ sec. 8, T. 7 S., R. 1 W., 3 miles southwest of Silverton.	**3
July 2	Alder Creek.....	Abiqua Creek....	SW¼ sec. 36, T. 6 S., R. 1 E., at road crossing, 3 miles southeast of Scotts Mills.	.3
2	Jones Spring.....	Alder Creek.....	SW¼ sec. 36, T. 6 S., R. 1 E., 3 miles southeast of Scotts Mills.	.03
19	Unnamed creek.....	Pudding River...	NE¼SE¼ sec. 31, T. 5 S., R. 1 W., 3½ miles south of Woodburn.	2.1
19	....do.....	Unnamed creek...	NW¼NE¼ sec. 31, T. 5 S., R. 1 W., 3 miles south of Woodburn.	.94
19	....do.....	Pudding River...	NW¼ sec. 32, T. 5 S., R. 1 W., 3 miles south of Woodburn.	3.5
19	....do.....	Unnamed creek...	SE¼ sec. 30, T. 5 S., R. 1 W., 2½ miles south of Woodburn.	.23
Aug. 2	Rook Creek.....	Pudding River...	SE¼ sec. 15, T. 6 S., R. 2 E., at road crossing, 7½ miles south of Molalla.	**1
2	....do.....	....do.....	SW¼ sec. 15, T. 6 S., R. 2 E., 7 miles south of Molalla.	**15
2	....do.....	....do.....	Above Teasel Creek, 3 miles south of Molalla.	**0.05
2	Teasel Creek.....	Rook Creek.....	N¼ sec. 29, T. 5 S., R. 2 E., at mouth, 2½ miles south of Molalla.	**0.05
2	Rook Creek.....	Pudding River...	NE¼ sec. 7, T. 5 S., R. 1 E., at road crossing, 7 miles west of Molalla.	0
June 28	Mill Creek.....	....do.....	SE¼ sec. 22, T. 4 S., R. 1 W., 100 ft above road bridge and 2 miles northeast of Hubbard.	3.1
July 18	Unnamed stream....	Senecal Creek...	NE¼ sec. 4, T. 4 S., R. 1 W., at road crossing, 3 miles northwest of Aurora.	0
18	....do.....	....do.....	SW¼SW¼ sec. 11, T. 4 S., R. 1 W., at road crossing, 1 mile west of Aurora.	1.1
June 28	Senecal Creek.....	Mill Creek.....	SW¼ sec. 14, T. 4 S., R. 1 W., ½ mile above mouth and 1 mile southwest of Aurora.	2.5
July 18	....do.....	....do.....	....do.....	2.4
Aug. 20	Mill Creek.....	Pudding River...	Half a mile above mouth, at Aurora.....	7.51
June 28	....do.....	....do.....	....do.....	7.8
July 24	McKay Creek.....	Dairy Creek.....	Mouth, at Hillsboro.....	.96
31	West Branch of unnamed stream.	Tualatin River..	NE¼ sec. 20, T. 1 S., R. 3 W., 3½ miles south of Cornelius.	**0.05
31	Unnamed stream....	....do.....	NE¼ sec. 21, T. 1 S., R. 3 W., below forks, 3 miles south of Cornelius.	**0.08

\*\* Estimated.



Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Willamette River basin, Oreg.--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
July 31	Unnamed stream...	Tualatin River...	NE $\frac{1}{4}$ sec. 15, T. 1 S., R. 3 W., 2 $\frac{1}{2}$ miles southeast of Cornelius.	**0.05
11	...do.....	...do.....	SW $\frac{1}{4}$ sec. 6, T. 2 S., R. 2 W., half a mile north of Laurel.	.20
11	...do.....	Unnamed stream...	SW $\frac{1}{4}$ sec. 6, T. 2 S., R. 2 W., below junction of forks at Laurel.	**0.02
11	...do.....	Tualatin River...	SW $\frac{1}{4}$ sec. 5, T. 2 S., R. 2 W., below Christensen diversion dam.	**0.02

\*\* Estimated.

## Lake River basin, Wash.†

1951				
Aug. 1	Burntbridge Creek.	Vancouver Lake...	SE $\frac{1}{4}$ sec. 20, T. 2 N., R. 2 E., at road crossing, 3.8 miles east of Vancouver.	1.90
Sept. 6	...do.....	...do.....	...do.....	1.72
1949				
Feb. 10	...do.....	...do.....	SW $\frac{1}{4}$ sec. 14, T. 2 N., R. 1 E., at county road crossing, $\frac{1}{2}$ mile east of U. S. Highway, at north city limits of Vancouver.	\$.99
1950				
Feb. 24	...do.....	...do.....	...do.....	\$.77
Dec. 23	...do.....	...do.....	...do.....	\$.83
1951				
June 15	...do.....	...do.....	NE $\frac{1}{4}$ sec. 15, T. 2 N., R. 1 E., 300 ft west of U. S. Highway 99, $\frac{1}{2}$ mile north of Vancouver city limits.	7.81
July 2	...do.....	...do.....	...do.....	4.66
23	...do.....	...do.....	...do.....	3.02
Aug. 1	...do.....	...do.....	...do.....	2.37
14	...do.....	...do.....	...do.....	2.62
Sept. 7	...do.....	...do.....	...do.....	3.50
6	Unnamed creek.....	Salmon Creek.....	South line sec. 1, T. 3 N., R. 2 E., at road crossing, 1.6 miles southeast of Battle Ground.	**0.03
Aug. 1	Morgan Creek.....	...do.....	N $\frac{1}{2}$ sec. 18, T. 3 N., R. 3 E., at road crossing, 0.6 mile north of Hockinson.	.72
Sept. 6	...do.....	...do.....	...do.....	.70
Aug. 1	Unnamed creek.....	Morgan Creek.....	N $\frac{1}{2}$ sec. 19, T. 3 N., R. 3 E., at road crossing, 0.2 mile south of Hockinson.	**0.01
Sept. 6	Salmon Creek.....	Lake River.....	N $\frac{1}{2}$ sec. 14, T. 3 N., R. 2 E., 300 ft below road crossing, 2.1 miles south of Battle Ground.	1.28
1951				
July 31	Weaver Creek.....	Salmon Creek.....	S $\frac{1}{2}$ sec. 35, T. 4 N., R. 2 E., at road crossing, 0.4 mile north of Battle Ground.	1.22
Sept. 6	...do.....	...do.....	...do.....	.95
Aug. 1	...do.....	...do.....	Center sec. 15, T. 3 N., R. 2 E., at road crossing at mouth, 3 miles southwest of Battle Ground.	.34
Sept. 6	...do.....	...do.....	...do.....	.36
June 15	Salmon Creek.....	Lake River.....	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, T. 3 N., R. 2 E., 800 ft above road crossing, 1 $\frac{1}{2}$ miles above Mill Creek and 2.4 miles west of Brush Prairie.	17.3
29	...do.....	...do.....	...do.....	11.4
July 20	...do.....	...do.....	...do.....	9.06
Aug. 14	...do.....	...do.....	...do.....	7.71
Sept. 5	...do.....	...do.....	...do.....	6.38
Aug. 1	Unnamed creek.....	Salmon Creek.....	Line between secs. 20 and 29, T. 3 N., R. 2 E., at road crossing, 2 $\frac{1}{2}$ miles southwest of Brush Prairie.	4.05
Sept. 5	...do.....	...do.....	SW $\frac{1}{4}$ sec. 20, T. 3 N., R. 2 E., 500 ft above mouth and 2.4 miles west of Brush Prairie.	4.86
Aug. 1	Salmon Creek.....	Lake River.....	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, T. 3 N., R. 2 E., at former gaging station, 2 $\frac{1}{2}$ miles west of Brush Prairie.	11.9
July 31	Mill Creek.....	Salmon Creek.....	NE $\frac{1}{4}$ sec. 24, T. 3 N., R. 1 E., 100 ft above road crossing and 4 miles west of Brush Prairie.	.59
Sept. 5	...do.....	...do.....	...do.....	.39
July 31	Unnamed creek.....	...do.....	SW $\frac{1}{4}$ sec. 25, T. 3 N., R. 1 E., at road crossing, 5 miles north of Vancouver.	.70
Aug. 1	...do.....	...do.....	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T. 3 N., R. 1 E., at road crossing, 5 miles north of Vancouver.	1.53
Sept. 5	...do.....	...do.....	...do.....	1.10
Aug. 3	...do.....	...do.....	NW $\frac{1}{4}$ sec. 35, T. 3 N., R. 1 E., at road crossing, 100 ft above mouth, 4 $\frac{1}{2}$ miles north of Vancouver.	1.74
Sept. 5	...do.....	...do.....	...do.....	1.84
5	...do.....	...do.....	NE $\frac{1}{4}$ sec. 34, T. 3 N., R. 1 E., at road crossing, 4 $\frac{1}{2}$ miles north of Vancouver.	**0.08
July 31	Cougar Canyon Creek.	...do.....	SE $\frac{1}{4}$ sec. 26, T. 3 N., R. 1 E., at road crossing, 4 $\frac{1}{2}$ miles north of Vancouver.	1.53
Sept. 6	...do.....	...do.....	...do.....	1.83
July 31	Unnamed creek.....	...do.....	S $\frac{1}{2}$ sec. 17, T. 3 N., R. 1 E., at road crossing, 7 miles north of Vancouver.	**0.05
Aug. 3	Whipple Creek.....	Lake River.....	NW $\frac{1}{4}$ sec. 23, T. 3 N., R. 1 E., at U. S. Highway 99 crossing, 6 miles north of Vancouver.	**0.05

† Includes measurements made in 1949 and 1950 water years.

\* Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Lake River basin, Wash.--Continued†

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
1951				
July 31	Whipple Creek.....	Lake River.....	N $\frac{1}{2}$ sec. 17, T. 3 N., R. 1 E., 300 ft below road crossing, 4.8 miles south of Ridgefield.	2.80
Sept. 6	....do.....	....do.....	....do.....	2.34
July 31	Unnamed creek.....	....do.....	E $\frac{1}{2}$ sec. 5, T. 3 N., R. 1 E., at road crossing, 3.7 miles southeast of Ridgefield.	**05

† Includes measurements made in 1949 and 1950 water years.

\*\* Estimated.

## Gee Creek basin, Wash.

Aug. 3	Gee Creek.....	Columbia River...	NW $\frac{1}{4}$ sec. 34, T. 4 N., R. 1 E., at U. S. Highway 99 crossing, 3.7 miles southeast of Ridgefield.	**0.03
3	Unnamed creek.....	Gee Creek.....	NW $\frac{1}{4}$ sec. 27, T. 4 N., R. 1 E., at U. S. Highway 99 crossing, 3.5 miles east of Ridgefield.	**02
July 3	Gee Creek.....	Columbia River...	Center sec. 19, T. 4 N., R. 1 E., at road crossing at Ridgefield.	.93
19	....do.....	....do.....	....do.....	.48
31	....do.....	....do.....	....do.....	.23
Aug. 14	....do.....	....do.....	....do.....	.43
Sept. 6	....do.....	....do.....	....do.....	.25

\*\* Estimated.

## Scappoose Creek basin, Oreg.

June 28	Little Creek.....	Scappoose Creek..	NW $\frac{1}{4}$ sec. 1, T. 3 N., R. 2 W., 1 mile north of Scappoose.	0.02
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## Lewis River basin, Wash.†

1951				
June 16	Cedar Creek.....	Lewis River.....	SW $\frac{1}{4}$ sec. 35, T. 5 N., R. 3 E., 50 ft above road crossing, $\frac{1}{2}$ mile north of Yacolt.	8.97
28	....do.....	....do.....	....do.....	6.40
July 20	....do.....	....do.....	....do.....	3.65
Aug. 2	....do.....	....do.....	....do.....	2.82
13	....do.....	....do.....	....do.....	2.74
Sept. 6	....do.....	....do.....	....do.....	1.75
Aug. 2	Unnamed creek.....	Cedar Creek.....	Line between secs. 26 and 35, T. 5 N., R. 3 E., at road crossing, 1 mile north of Yacolt.	a.03
Sept. 6	....do.....	....do.....	....do.....	**01
Aug. 2	....do.....	....do.....	SE $\frac{1}{4}$ sec. 27, T. 5 N., R. 3 E., at road crossing, 1.5 miles north of Yacolt.	**05
Sept. 6	....do.....	....do.....	....do.....	**02
Aug. 2	....do.....	....do.....	NW $\frac{1}{4}$ sec. 27, T. 5 N., R. 3 E., at road crossing, 2 miles northwest of Yacolt.	**04
Sept. 6	....do.....	....do.....	....do.....	**01
Aug. 2	....do.....	....do.....	SW $\frac{1}{4}$ sec. 22, T. 5 N., R. 3 E., at road crossing, 1.4 miles southeast of Amboy.	**01
1951				
Sept. 6	....do.....	....do.....	....do.....	No flow
June 14	Cedar Creek.....	Lewis River.....	SW $\frac{1}{4}$ sec. 16, T. 5 N., R. 3 E., 100 ft above Chelatchie Creek at Amboy.	15.0
29	....do.....	....do.....	....do.....	8.80
July 20	....do.....	....do.....	....do.....	5.39
Aug. 2	....do.....	....do.....	....do.....	4.37
14	....do.....	....do.....	....do.....	3.77
Sept. 5	....do.....	....do.....	....do.....	2.55
Aug. 1	Chelatchie Creek..	Cedar Creek.....	S $\frac{1}{2}$ sec. 12, T. 5 N., R. 3 E., at road crossing, 3 $\frac{1}{2}$ miles northeast of Amboy.	.29
Sept. 5	....do.....	....do.....	....do.....	No flow
Aug. 1	Unnamed creek.....	Chelatchie Creek.	E $\frac{1}{2}$ sec. 16, T. 5 N., R. 3 E., at road crossing, 0.8 mile northeast of Amboy.	2.10
Sept. 5	....do.....	....do.....	....do.....	1.52
Aug. 1	....do.....	Cedar Creek.....	W $\frac{1}{2}$ sec. 16, T. 5 N., R. 3 E., at road crossing, 0.3 mile north of Amboy.	**04
Sept. 5	....do.....	....do.....	....do.....	**02
Aug. 2	....do.....	....do.....	NE $\frac{1}{4}$ sec. 17, T. 5 N., R. 3 E., at road crossing, 1 mile northwest of Amboy.	No flow
Sept. 5	....do.....	....do.....	....do.....	No flow
Aug. 2	....do.....	....do.....	S $\frac{1}{2}$ sec. 8, T. 5 N., R. 3 E., at road crossing, 1.2 miles northwest of Amboy.	No flow
Sept. 5	....do.....	....do.....	....do.....	No flow
Aug. 1	Brush Creek.....	....do.....	SW $\frac{1}{4}$ sec. 8, T. 5 N., R. 3 E., 150 ft below road crossing, 1.6 miles northwest of Amboy.	.31
Sept. 5	....do.....	....do.....	....do.....	.20
Aug. 1	Unnamed stream....	....do.....	SE $\frac{1}{4}$ sec. 7, T. 5 N., R. 3 E., at road crossing, 2.1 miles northwest of Amboy.	**02
Sept. 5	....do.....	....do.....	....do.....	**01
Aug. 1	John Creek.....	....do.....	SE $\frac{1}{4}$ sec. 12, T. 5 N., R. 2 E., at road crossing, 1.6 miles east of Dayton.	.31
Sept. 5	....do.....	....do.....	....do.....	.13

† Includes measurements made in 1949 and 1950 water years.

\*\* Estimated.

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Lewis River basin, Wash.--Continued†

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
1951 Aug. 2	Unnamed creek....	Cedar Creek....	Center of sec. 12, T. 5 N., R. 2 E., at road crossing, 1.2 miles east of Dayton.	**0.05
Sept. 5	...do.....	...do.....	...do.....	**0.04
Sept. 5	...do.....	...do.....	W $\frac{1}{2}$ sec. 11, T. 5 N., R. 2 E., 200 ft above station on Cedar Creek near Ariel.	**0.04
Aug. 2	...do.....	...do.....	SE $\frac{1}{4}$ sec. 10, T. 5 N., R. 2 E., at road crossing, 0.7 miles southwest of Dayton.	.14
Sept. 5	...do.....	...do.....	...do.....	*.07
Aug. 2	...do.....	...do.....	SW $\frac{1}{4}$ sec. 10, T. 5 N., R. 2 E., at road crossing, 1.2 miles west of Dayton.	.24
Sept. 5	...do.....	...do.....	...do.....	.16
Aug. 1	Pup Creek.....	...do.....	SE $\frac{1}{4}$ sec. 3, T. 5 N., R. 2 E., at road crossing, 1.0 mile northwest of Dayton.	.82
Sept. 5	...do.....	...do.....	...do.....	.55
Sept. 5	Unnamed creek....	...do.....	SW $\frac{1}{4}$ sec. 8, T. 5 N., R. 2 E., at road crossing, 3.6 miles west of Dayton.	**0.01
5	...do.....	...do.....	SW $\frac{1}{4}$ sec. 8, T. 5 N., R. 2 E., at road crossing, 3.1 miles west of Dayton.	No flow
Aug. 2	...do.....	...do.....	Line between secs. 7 and 8, T. 5 N., R. 2 E., at road crossing, 3.4 miles west of Dayton.	**0.05
Sept. 5	...do.....	...do.....	SE $\frac{1}{4}$ sec. 7, T. 5 N., R. 2 E., at road crossing, 3.6 miles west of Dayton.	.05
Aug. 2	...do.....	Lewis River....	SE $\frac{1}{4}$ sec. 12, T. 5 N., R. 1 E., at road crossing, 4.6 miles west of Dayton.	**0.01
Sept. 5	...do.....	...do.....	...do.....	No flow
Aug. 2	Gaddis Creek....	...do.....	SW $\frac{1}{4}$ sec. 12, T. 5 N., R. 1 E., at road crossing, 5.2 miles west of Dayton.	**0.03
Sept. 5	...do.....	...do.....	...do.....	.01
Aug. 1	Unnamed creek....	...do.....	SE $\frac{1}{4}$ sec. 9, T. 5 N., R. 1 E., at road crossing, 3 miles northeast of Woodland.	**0.05
Sept. 5	...do.....	...do.....	...do.....	**0.04
Aug. 1	...do.....	...do.....	NW $\frac{1}{4}$ sec. 17, T. 5 N., R. 1 E., at road crossing, 1.9 miles northeast of Woodland.	**0.10
Sept. 5	...do.....	...do.....	...do.....	**0.15
Sept. 5	...do.....	...do.....	NW $\frac{1}{4}$ sec. 17, T. 5 N., R. 1 E., at road crossing, 1.8 miles northeast of Woodland.	**0.02
Aug. 2	...do.....	...do.....	W $\frac{1}{2}$ sec. 17, T. 5 N., R. 1 E., at road crossing, 1.3 miles northeast of Woodland.	**0.04
Sept. 5	...do.....	...do.....	...do.....	.15
Sept. 5	...do.....	...do.....	S $\frac{1}{2}$ sec. 18, T. 5 N., R. 1 E., at road crossing, 0.4 mile north of Woodland bridge.	No flow
5	...do.....	...do.....	N $\frac{1}{2}$ sec. 19, T. 5 N., R. 1 E., at road crossing, 0.2 mile north of Woodland bridge.	No flow
July 31	...do.....	...do.....	Center of sec. 19, T. 5 N., R. 1 E., at road crossing, 0.3 mile south of Woodland bridge.	**0.01
Sept. 5	...do.....	...do.....	...do.....	No flow
July 31	...do.....	...do.....	SE $\frac{1}{4}$ sec. 30, T. 5 N., R. 1 E., at road crossing, 1.5 miles south of Woodland bridge.	**0.05
Sept. 5	...do.....	...do.....	...do.....	**0.06
Aug. 3	Jack Mountain Creek.	East Fork Lewis River.	NW $\frac{1}{4}$ sec. 24, T. 4 N., R. 4 E., at road crossing at mouth, 0.4 mile west of Sunset guard station.	**0.34
Sept. 13	...do.....	...do.....	...do.....	**0.15
Aug. 3	Anaconda Creek....	...do.....	NW $\frac{1}{4}$ sec. 24, T. 4 N., R. 4 E., at mouth, 0.7 mile west of Sunset guard station.	.51
Sept. 13	...do.....	...do.....	...do.....	.23
June 28	Copper Creek....	...do.....	SE $\frac{1}{4}$ sec. 30, T. 4 N., R. 5 E., 60 ft below Forest Service road bridge and 1.8 miles south of Sunset guard station.	12.2
July 20	...do.....	...do.....	...do.....	9.93
Aug. 3	...do.....	...do.....	...do.....	7.71
Sept. 13	...do.....	...do.....	...do.....	7.84
Aug. 3	...do.....	...do.....	...do.....	4.75
Sept. 13	...do.....	...do.....	NW $\frac{1}{4}$ sec. 24, T. 4 N., R. 4 E., at mouth, 0.7 mile west of Sunset guard station.	11.4
Aug. 3	Unnamed creek....	...do.....	...do.....	7.13
Aug. 3	...do.....	...do.....	NE $\frac{1}{4}$ sec. 23, T. 4 N., R. 4 E., at road crossing, 0.8 mile west of Sunset guard station.	**0.04
2	Nichols Creek....	...do.....	SW $\frac{1}{4}$ sec. 22, T. 4 N., R. 4 E., at road crossing, 2.8 miles west of Sunset guard station.	1.16
Sept. 13	...do.....	...do.....	...do.....	.22
Aug. 3	King Creek....	...do.....	SE $\frac{1}{4}$ sec. 21, T. 4 N., R. 4 E., at mouth, 3 miles west of Sunset guard station.	3.13
Sept. 13	...do.....	...do.....	...do.....	1.80
Aug. 2	Unnamed creek....	...do.....	SE $\frac{1}{4}$ sec. 21, T. 4 N., R. 4 E., at road crossing, 3 miles west of Sunset guard station.	.45
Sept. 13	...do.....	...do.....	...do.....	.16

† Includes measurements made in 1949 and 1950 water years.

\*\* Estimated.

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year 1950 to September 1951--Continued

## Lewis River basin, Wash.--Continued†

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
1951 Aug. 2	Mrs. O Creek.....	East Fork Lewis River.	SW $\frac{1}{4}$ sec. 21, T. 4 N., R. 4 E., at road crossing, 3.5 miles west of Sunset guard station.	No flow
Sept. 13	...do.....	...do.....	...do.....	** .03
Aug. 2	Unnamed creek.....	...do.....	E $\frac{1}{2}$ sec. 20, T. 4 N., R. 4 E., at road crossing, 4.1 miles west of Sunset guard station.	** .05
Sept. 13	...do.....	...do.....	...do.....	** .02
Aug. 2	Roger Creek.....	...do.....	W $\frac{1}{2}$ sec. 20, T. 4 N., R. 4 E., at road crossing, 4.5 miles west of Sunset guard station.	.72
Sept. 6	...do.....	...do.....	...do.....	.39
June 16	Rock Creek.....	...do.....	NE $\frac{1}{4}$ sec. 31, T. 4 N., R. 4 E., 100 ft above swinging bridge and 1.4 miles northwest of Dole.	36.6
20	...do.....	...do.....	...do.....	21.3
July 20	...do.....	...do.....	...do.....	17.3
Aug. 3	...do.....	...do.....	...do.....	14.2
13	...do.....	...do.....	...do.....	12.9
Sept. 6	...do.....	...do.....	...do.....	9.74
Aug. 3	...do.....	...do.....	SW $\frac{1}{4}$ sec. 19, T. 4 N., R. 4 E., at mouth, 4.2 miles southeast of Yacolt.	16.1
Sept. 6	...do.....	...do.....	...do.....	11.2
Aug. 2	Yacolt Creek.....	Big Tree Creek...	SW $\frac{1}{4}$ sec. 12, T. 4 N., R. 3 E., at road crossing, 1.8 miles southeast of Yacolt.	2.10
Sept. 6	...do.....	...do.....	...do.....	1.67
Aug. 2	Big Tree Creek...	East Fork Lewis River.	NW $\frac{1}{4}$ sec. 13, T. 4 N., R. 3 E., at road crossing, 2.3 miles southeast of Yacolt.	4.28
Sept. 6	...do.....	...do.....	...do.....	2.85
Aug. 2	Unnamed creek.....	Big Tree Creek...	W $\frac{1}{2}$ sec. 13, T. 4 N., R. 3 E., 25 ft upstream from road crossing and 2.5 miles southeast of Yacolt.	.21
Sept. 6	...do.....	...do.....	...do.....	.11
Aug. 3	...do.....	East Fork Lewis River.	SW $\frac{1}{4}$ sec. 10, T. 4 N., R. 3 E., at road crossing, 2 miles southwest of Yacolt.	** .02
Sept. 6	...do.....	...do.....	...do.....	** .01
Aug. 3	...do.....	...do.....	SW $\frac{1}{4}$ sec. 9, T. 4 N., R. 3 E., at road crossing, 2.7 miles southwest of Yacolt.	** .04
Sept. 6	...do.....	...do.....	...do.....	No flow
Aug. 3	...do.....	...do.....	NE $\frac{1}{4}$ sec. 18, T. 4 N., R. 3 E., at road crossing, 0.8 mile northeast of Heisson.	No flow
Sept. 6	...do.....	...do.....	...do.....	No flow
Aug. 3	...do.....	...do.....	NW $\frac{1}{4}$ sec. 18, T. 4 N., R. 3 E., at road crossing, 0.7 mile north of Heisson.	** .06
Sept. 6	...do.....	...do.....	...do.....	** .01
July 31	Rock Creek.....	...do.....	SE $\frac{1}{4}$ sec. 2, T. 4 N., R. 2 E., at road crossing, 2 $\frac{1}{2}$ miles south of Fargher Lake.	No flow
Aug. 1	Unnamed creek.....	...do.....	North line sec. 29, T. 4 N., R. 2 E., at road crossing, 3.7 miles northwest of Battle Ground.	.65
Sept. 5	...do.....	...do.....	...do.....	.46
Aug. 1	...do.....	...do.....	NE $\frac{1}{4}$ sec. 13, T. 4 N., R. 1 E., at road crossing, 3 miles southeast of La Center.	.30
Sept. 5	...do.....	...do.....	...do.....	.31
Aug. 1	...do.....	...do.....	SE $\frac{1}{4}$ sec. 12, T. 4 N., R. 1 E., at road crossing, 2.9 miles southeast of La Center.	** .10
July 31	Lockwood Creek....	...do.....	SW $\frac{1}{4}$ sec. 1, T. 4 N., R. 1 E., at road crossing, 1.7 miles east of La Center.	.81
Sept. 5	...do.....	...do.....	...do.....	.56
July 31	Varzee Creek.....	...do.....	NE $\frac{1}{4}$ sec. 3, T. 4 N., R. 1 E., 400 ft above road crossing, 0.3 mile east of La Center.	.49
Sept. 5 1949	...do.....	...do.....	...do.....	.42
Dec. 28	Unnamed creek.....	...do.....	SE $\frac{1}{4}$ sec. 5, T. 4 N., R. 1 E., at crossing of U. S. Highway 99, 2 miles west of La Center and 3 $\frac{1}{2}$ miles southeast of Woodland.	#50.6
1950 Dec. 23 1951	...do.....	...do.....	...do.....	#36.2
July 31	Jennie Creek.....	...do.....	W $\frac{1}{2}$ sec. 33, T. 5 N., R. 1 E., at road crossing, 1.4 miles northwest of La Center.	.13
Sept. 5	...do.....	...do.....	...do.....	.17
5	Flaeger Creek.....	Jennie Creek.....	NW $\frac{1}{4}$ sec. 33, T. 5 N., R. 1 E., at road crossing, 1.5 miles northeast of La Center.	** .04
5	Unnamed creek.....	East Fork Lewis River.	NE $\frac{1}{4}$ sec. 32, T. 5 N., R. 1 E., at road crossing, 2.0 miles south of Woodland bridge.	No flow

† Includes measurements made in 1949 and 1950 water years.

# Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Third Creek basin, Wash.

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Aug. 1	Third Creek....	Columbia River..	NW $\frac{1}{4}$ sec. 28, T. 6 N., R. 1 W., below forks 60 ft west of railroad tracks and 2.0 miles south of Kalama.	0.35
Sept. 4	...do.....	...do.....	...do.....	.20

## Kalama River basin, Wash.

July 31	Kalama River....	Columbia River..	SW $\frac{1}{4}$ sec. 24, T. 7 N., R. 2 E., 100 ft above Elk Creek and 8 miles northwest of Yale.	213
31	Elk Creek.....	Kalama River....	W $\frac{1}{2}$ sec. 24, T. 7 N., R. 2 E., at mouth, 8 miles northwest of Yale.	7.75
June 13	Rock Creek.....	...do.....	N $\frac{1}{2}$ sec. 36, T. 7 N., R. 1 E., at Pigeon Springs ranger station, 100 ft below road crossing and 7 miles north of Ariel.	26.0
27	...do.....	...do.....	...do.....	21.0
July 12	...do.....	...do.....	...do.....	16.8
31	...do.....	...do.....	...do.....	14.7
Aug. 13	...do.....	...do.....	...do.....	15.6
27	...do.....	...do.....	...do.....	11.2
July 31	Wild Horse Creek	...do.....	NW $\frac{1}{4}$ sec. 36, T. 7 N., R. 1 E., at road crossing, 0.7 mile west of Pigeon Springs ranger station.	3.90
Aug. 2	...do.....	...do.....	...do.....	3.39
July 31	Little Kalama River.	...do.....	NE $\frac{1}{4}$ sec. 17, T. 6 N., R. 1 E., at mouth, 6.5 miles east of Kalama.	4.66
Aug. 27	...do.....	...do.....	...do.....	3.96
July 31	Italian Creek...	...do.....	SW $\frac{1}{4}$ sec. 6, T. 6 N., R. 1 E., at road crossing, 5.5 miles northeast of Kalama.	1.01
Aug. 27	...do.....	...do.....	...do.....	.86
July 31	Woolford Creek..	...do.....	E $\frac{1}{2}$ sec. 1, T. 6 N., R. 1 W., at road crossing, 4 $\frac{1}{2}$ miles northeast of Kalama.	.21
Aug. 27	...do.....	...do.....	...do.....	.16
July 31	Indian Creek....	...do.....	NE $\frac{1}{4}$ sec. 2, T. 6 N., R. 1 W., at road crossing, 4.3 miles northeast of Kalama.	.30
Aug. 27	...do.....	...do.....	...do.....	.30
27	Unnamed creek...	...do.....	SE $\frac{1}{4}$ sec. 35, T. 7 N., R. 1 W., at road crossing, 4.3 miles northeast of Kalama.	.07
27	...do.....	...do.....	W $\frac{1}{2}$ sec. 35, T. 7 N., R. 1 W., at road crossing, 4 miles northeast of Kalama.	No flow
27	...do.....	...do.....	...do.....	.07
27	...do.....	...do.....	...do.....	** .04
July 30	Fallert Creek...	...do.....	SW $\frac{1}{4}$ sec. 34, T. 7 N., R. 1 W., at State salmon hatchery, 50 ft above bridge and 3 miles northeast of Kalama.	1.08
Aug. 27	...do.....	...do.....	...do.....	.70
27	Unnamed creek...	...do.....	E $\frac{1}{2}$ sec. 33, T. 7 N., R. 1 W., at road crossing, 3 miles northeast of Kalama.	** .01
July 30	...do.....	...do.....	W $\frac{1}{2}$ sec. 33, T. 7 N., R. 1 W., at road crossing, 3 miles northeast of Kalama.	** .10
Aug. 27	...do.....	...do.....	SW $\frac{1}{4}$ sec. 33, T. 7 N., R. 1 W., at road crossing, 3 miles northeast of Kalama.	No flow

\*\* Estimated

## Streams between Kalama River and Cowlitz River basins, Wash.†

1949	Unnamed creek...	Columbia River..	SW $\frac{1}{4}$ sec. 19, T. 7 N., R. 1 W., at old highway crossing at Carrolls.	\$55.0
Dec. 28	...	...	...	...
1950	...	...	...	...
Dec. 23	...do.....	...do.....	...do.....	\$58.5
1951	...	...	...	...
Aug. 1	...do.....	...do.....	...do.....	** .10
Sept. 4	...do.....	...do.....	...do.....	** .08
Sept. 4	...do.....	...do.....	W $\frac{1}{2}$ sec. 19, T. 7 N., R. 1 W., at old U. S. Highway 99 crossing, 0.2 mile north of Carrolls.	.11
July 30	Owl Creek.....	...do.....	NW $\frac{1}{4}$ sec. 18, T. 7 N., R. 1 W., at road crossing, 4 miles south of Kelso.	.15
Aug. 27	...do.....	...do.....	...do.....	.15
1	...do.....	...do.....	E $\frac{1}{2}$ sec. 13, T. 7 N., R. 2 W., 20 ft below old U. S. Highway 99 crossing, 4 miles south of Kelso.	.24
Sept. 4	...do.....	...do.....	...do.....	.17

† Includes measurements made in the 1949 and 1950 water years.

\* Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

## Cowlitz River basin, Wash.†

1951	Skate Creek....	Cowlitz River...	NW $\frac{1}{4}$ sec. 16, T. 13 N., R. 9 E., 1 mile above mouth, 1 $\frac{1}{2}$ miles northeast of Packwood.	18.4
Aug. 17	...	...	...	...
14	Glacier Creek...	Johnson Creek...	SE $\frac{1}{4}$ sec. 12, T. 12 N., R. 9 E., 400 ft above mouth, 5 miles southeast of Packwood.	15.6
Sept. 28	...do.....	...do.....	...do.....	10.4
Aug. 31	Johnson Creek...	Cowlitz River...	NE $\frac{1}{4}$ sec. 32, T. 13 N., R. 9 E., $\frac{1}{2}$ mile above mouth and 2 $\frac{1}{2}$ miles southwest of Packwood.	45.6
Sept. 13	...do.....	...do.....	...do.....	34.9
28	...do.....	...do.....	...do.....	39.2

† Includes measurements made in the 1949 and 1950 water years.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Cowlitz River basin, Wash.--Continued†

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
1950				
Feb. 24	Mill Creek.....	Cowlitz River...	SE $\frac{1}{4}$ sec. 8, T. 12 N., R. 7 E., at crossing of State Highway 5, at Randle.	*89.4
1951				
Feb. 10	....do.....	....do.....	....do.....	*82.7
Aug. 16	Kiona Creek.....	....do.....	NW $\frac{1}{4}$ sec. 14, T. 12 N., R. 6 E., 3 miles above mouth, 3 miles west of Randle.	.21
17	Greenhorn Creek.	Cispus River....	SE $\frac{1}{4}$ sec. 15, T. 11 N., R. 7 E., at road crossing, 7 $\frac{1}{2}$ miles south of Randle.	4.98
1949				
Nov. 26	Unnamed Creek...	Tilton River....	N $\frac{1}{2}$ sec. 32, T. 14 N., R. 5 E., at crossing of State Highway 5, 4 miles south of Mineral.	*99
1951				
Feb. 10	....do.....	....do.....	....do.....	*88.8
Aug. 17	East Fork Tilton River.	....do.....	NW $\frac{1}{4}$ sec. 30, T. 13 N., R. 5 E., at highway crossing $\frac{1}{2}$ mile above mouth and 2 $\frac{1}{2}$ miles northeast of Morton.	8.85
16	Mill Creek.....	Cowlitz River...	SE $\frac{1}{4}$ sec. 12, T. 12 N., R. 1 E., at highway crossing, 3 miles northwest of Mayfield.	2.38
15	Lacamas Creek...	....do.....	NW $\frac{1}{4}$ sec. 27, T. 11 N., R. 2 W., $\frac{1}{2}$ mile upstream from mouth, $\frac{1}{2}$ miles west of Vader.	2.81
1949				
Nov. 22	Unnamed creek...	Olequa Creek....	NW $\frac{1}{4}$ sec. 8, T. 11 N., R. 2 W., at county road crossing, 2 $\frac{1}{2}$ miles south of Winlock.	*37
1951				
Feb. 9	....do.....	....do.....	....do.....	*28.5
Nov. 26	....do.....	Toutle River....	NW $\frac{1}{4}$ sec. 30, T. 10 N., R. 1 W., at Tower road crossing, 4 miles northeast of Castle Rock.	*58
1951				
Feb. 11	....do.....	....do.....	....do.....	*28.0
Aug. 15	Ostrander Creek.	Cowlitz River...	NW $\frac{1}{4}$ sec. 12, T. 8 N., R. 2 W., at former gaging station, 1 mile above mouth and 4 miles northeast of Kelso.	2.17
July 30	Coweman River...	....do.....	NW $\frac{1}{4}$ sec. 19, T. 8 N., R. 2 W., at Coweman Dam 50 ft above Baird Creek and 14.5 miles east of Kelso.	19.0
Aug. 27	....do.....	....do.....	....do.....	13.0
July 30	Baird Creek.....	Coweman River...	NW $\frac{1}{4}$ sec. 19, T. 8 N., R. 2 E., 50 ft above mouth and 14.5 miles east of Kelso.	3.83
Aug. 27	....do.....	....do.....	....do.....	3.41
June 13	Mulholland Creek	....do.....	SW $\frac{1}{4}$ sec. 17, T. 8 N., R. 1 E., 90 ft above road crossing near mouth, 9 $\frac{1}{2}$ miles east of Kelso.	10.7
26	....do.....	....do.....	....do.....	6.30
July 12	....do.....	....do.....	....do.....	3.26
Aug. 8	....do.....	....do.....	....do.....	2.64
15	....do.....	....do.....	....do.....	2.25
Sept. 12	....do.....	....do.....	....do.....	2.26
July 30	Backman Creek...	....do.....	SW $\frac{1}{4}$ sec. 18, T. 8 N., R. 1 E., at road crossing, 8.5 miles east of Kelso.	**03
Aug. 27	....do.....	....do.....	....do.....	**01
July 30	Unnamed creek...	....do.....	NE $\frac{1}{4}$ sec. 23, T. 8 N., R. 1 W., at road crossing, 7 miles east of Kelso.	**03
Aug. 27	....do.....	....do.....	....do.....	**01
July 30	....do.....	....do.....	N $\frac{1}{2}$ sec. 26, T. 8 N., R. 1 W., at road crossing, $\frac{1}{2}$ miles east of Kelso.	**02
Aug. 27	....do.....	....do.....	....do.....	**01
June 13	Goble Creek.....	....do.....	SE $\frac{1}{4}$ sec. 34, T. 8 N., R. 1 W., at road crossing, 5.5 miles east of Kelso.	15.2
26	....do.....	....do.....	....do.....	10.4
July 12	....do.....	....do.....	....do.....	8.02
Aug. 30	....do.....	....do.....	....do.....	4.74
Aug. 15	....do.....	....do.....	....do.....	4.99
Sept. 12	....do.....	....do.....	....do.....	4.13
July 30	Unnamed creek...	....do.....	SW $\frac{1}{4}$ sec. 25, T. 8 N., R. 2 W., at road crossing, 1.6 miles east of Kelso.	**02
Aug. 27	....do.....	....do.....	....do.....	**01
July 30	....do.....	....do.....	SW $\frac{1}{4}$ sec. 26, T. 8 N., R. 2 W., at road crossing, 0.5 mile east of Kelso.	**01
Aug. 27	....do.....	....do.....	....do.....	No flow

† Includes measurements made in 1950 water year.

\* Flow at crest stage; computed by contracted-opening method.

\*\* Estimated.

## Germany Creek basin, Wash.

Aug. 15	Germany Creek...	Columbia River...	NW $\frac{1}{4}$ sec. 12, T. 8 N., R. 4 W., $\frac{1}{2}$ mile above mouth 10 miles northwest of Longview.	3.29
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## Brooks Slough basin, Wash.†

1949				
Feb. 17	Risk Creek.....	Brooks Slough...	NW $\frac{1}{4}$ sec. 23, T. 9 N., R. 6 W., at crossing of U. S. Highway 830, 3 miles southeast of Skamokawa.	94
1950				
Feb. 24	....do.....	....do.....	....do.....	103
Dec. 22	....do.....	....do.....	....do.....	*102

† Includes measurements made in 1949 and 1950 water years.

\* Flow at crest stage; computed by contracted-opening method.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

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Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Skamokawa Creek basin, Wash.

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Aug. 15	Skamokawa Creek.	Columbia River...	Line between sec. 32, T. 10 N., R. 6 W., and sec. 5, T. 9 N., R. 6 W., $\frac{1}{2}$ mile above Wilson Creek and 2 miles north of Skamokawa.	4.74

## Grays River basin, Wash.

Aug. 15	Hull Creek.....	Grays River.....	NE $\frac{1}{4}$ sec. 13, T. 10 N., R. 8 W., $\frac{1}{2}$ mile east of town of Grays River and $\frac{1}{2}$ mile above mouth.	1.74
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## Coastal streams between Columbia River and Umpqua River, Oreg.

Aug. 21	Bergsvik Creek..	Necanicum River..	Sec. 26 or 35, T. 5 N., R. 9 W., at highway bridge at Necanicum.	0.19
21	Joe Creek.....	Bergsvik Creek...	Mouth, at Necanicum.....	.44
20	Necanicum River.	Pacific Ocean.....	Below Bergsvik Creek at Necanicum.....	1.88
20	Little Humbug Creek.	Necanicum River..	Mouth, 1.2 miles west of Necanicum.....	.82
20	North Fork Necanicum River.	....do.....	Mouth, below fish hatchery, 2 miles west of Necanicum.	1.36
July 18	South Fork Necanicum River.	....do.....	Sec. 29 or 30, T. 5 N., R. 9 W., above seaside diversion, 6 miles east of Cannon Beach.	5.10
Aug. 21	....do.....	....do.....	....do.....	3.42
July 18	Necanicum River.	Pacific Ocean....	NW $\frac{1}{4}$ sec. 4, T. 5 N., R. 10 W., at highway bridge, 2 $\frac{1}{2}$ miles south of Seaside.	16.2
Aug. 20	....do.....	....do.....	....do.....	7.56
21	Salmonberry River.	Nehalem River....	Mouth, SE $\frac{1}{4}$ sec. 10, T. 3 N., R. 8 W.	26.5
21	Jack Horner Creek.	Soapstone Creek..	Mouth, sec. 15, T. 4 N., R. 9 W., at highway crossing 5 miles south of Necanicum.	.16
21	North Fork Nehalem River.	Nehalem River....	Above Tillamook-Clatsop county line, 6 miles northeast of Mohler.	15.5
21	Big Rack Heap Creek.	North Fork Nehalem River.	Near center sec. 7, T. 3 N., R. 9 W., at highway bridge above Rack Heap Creek, 4 miles northwest of Mohler.	.34
21	Rack Heap Creek.	Big Rack Heap Creek.	Near center sec. 7, T. 3 N., R. 9 W., at highway bridge near Mohler.	0
22	Hettmiller Creek	Pacific Ocean....	Sec. 8, T. 1 N., R. 10 W., above Twin Rocks diversion, 1 mile south of Rockaway.	.86
22	....do.....	....do.....	Below Twin Rocks diversion, 1 mile south of Rockaway.	.22
22	Watseco (Cedar) Creek.	....do.....	Sec. 8, T. 1 N., R. 10 W., above Shand diversion, $\frac{1}{2}$ mile above highway bridge and $\frac{1}{4}$ miles south of Rockaway.	.80
22	....do.....	....do.....	Below Shand diversion, $\frac{1}{2}$ miles south of Rockaway.	.45
22	North Fork (Little North Fork) Wilson River.	Wilson River....	Mouth, 5 miles east of Tillamook.....	11.7
22	Tillamook River.	Pacific Ocean....	SW $\frac{1}{4}$ sec. 8, T. 2 S., R. 9 W., above Bewley Creek, 3 miles south of Tillamook.	2.94
23	Nestucca River..	....do.....	SW $\frac{1}{4}$ sec. 29, T. 3 S., R. 8 W., above East Creek at Blaine.	31.3
23	East Creek.....	Nestucca River...	Mouth, at Blaine.....	7.83
23	Beaver Creek....	....do.....	Mouth, at Beaver.....	8.12
23	Three Rivers....	....do.....	Below highway bridge at Hebo.....	21.4
Jan. 5	Nestucca River..	Pacific Ocean....	At bridge at Cloverdale.....	**4,270
17	....do.....	....do.....	....do.....	**12,300
Aug. 23	Little Nestucca River.	....do.....	Above Fall Creek, 3 miles southeast of Oretown.	14.3
Jan. 4	....do.....	....do.....	Sec. 9, T. 5 S., R. 10 W., at road crossing 2 miles east of Oretown.	**1,170
Aug. 23	Salmon River....	....do.....	Above highway bridge at Otis.....	30.2
23	Schooner Creek.	....do.....	Sec. 25, T. 7 S., R. 11 W., above bridge 2 miles east of Otis.	9.26
24	Yaquina River...	....do.....	Sec. 35 or 36, T. 10 S., R. 9 W., 2 miles northeast of Eddyville.	3.85
24	Elk Creek.....	Yaquina River...	Sec. 24, T. 11 S., R. 10 W., 2 miles southeast of Elk City.	8.96
24	Yachats River...	Pacific Ocean....	Sec. 36, T. 14 S., R. 12 W., 1.8 miles east of Yachats.	21.7
Sept. 6	Tenmile Creek...	....do.....	Mouth, 6 miles south of Yachats.....	8.97
6	Big Creek.....	....do.....	Mouth, 9 miles south of Yachats.....	6.93
Aug. 24	Wildcat Creek...	Siusslaw River...	0.7 mile above mouth, at Austa.....	10.5
24	Siusslaw River...	Pacific Ocean....	Sec. 30, T. 17 S., R. 9 W., 1.2 miles west of Swisshome.	126
24	North Fork Siusslaw River	Siusslaw River...	Above McLeod Creek, at Minerva.....	9.37
Sept. 6	Woahink Lake outlet.	Siltcoos Lake....	At lake outlet, 1 mile north of Westlake....	8.72

\*\* Furnished by Corps of Engineers.

## Umpqua River basin, Oreg.

Aug. 24	Jackson Creek...	South Umpqua River.	SE $\frac{1}{4}$ sec. 18, T. 30 S., R. 1 W., 1 mile above mouth and 5 miles northeast of Tiller.	17.6
Oct. 29	Elk Creek.....	....do.....	Mouth, at Tiller.....	all, 400
29	Canyon Creek....	....do.....	At wooden dam, 4.1 miles south of Canyonville.	2715

a Flow at crest stage; computed by slope-area determination.

## MISCELLANEOUS DISCHARGE MEASUREMENTS

Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

## Umpqua River basin, Oreg.--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Oct. 29	Canyon Creek....	South Umpqua River	At dam, 0.7 mile south of Canyonville....	a3,700
29	Cow Creek.....	....do.....	Former gaging station at Riddle.....	a41,100
Sept. 9	....do.....	....do.....	....do.....	22.4
9	South Umpqua River	Umpqua River.....	Below Cow Creek, 2 miles northeast of Riddle.....	75.7
Aug. 23	Myrtle Creek....	South Umpqua River	Below North Fork, at Myrtle Creek.....	4.71
Oct. 29	Olalla Creek....	Lookingglass Creek	At highway bridge, $\frac{1}{2}$ mile east of Tenmile.....	a14,400
Sept. 8	Lookingglass Creek	South Umpqua River	Mouth, at Brookway.....	0
Oct. 29	Deer Creek.....	....do.....	SW $\frac{1}{4}$ sec. 16, T. 27 S., R. 5 W., just 1 mile upstream from De Monty Branch.....	a6,040
Sept. 10	Spring River....	North Umpqua River	SE $\frac{1}{4}$ sec. 18, T. 26 S., R. 6 E., at ford below junction of springs.....	242
10	Silent Creek....	Diamond Lake.....	NW $\frac{1}{4}$ sec. 19, T. 28 S., R. 6 E., at road crossing, 0.7 mile above mouth.....	33.0
12	Short Creek.....	....do.....	Mouth, southeast shore of Diamond Lake....	12.8
Nov. 11	Trap Creek.....	Clearwater River..	Mouth, 8 miles northwest of Diamond Lake..	6.77
Jan. 11	....do.....	....do.....	....do.....	5.64
Mar. 15	....do.....	....do.....	....do.....	2.88
May 9	....do.....	....do.....	....do.....	11.4
July 13	....do.....	....do.....	....do.....	2.56
Sept. 10	....do.....	....do.....	....do.....	1.71
July 12	North Umpqua River	Umpqua River.....	Below power diversion, at former gaging station site near Toketee Falls.....	52.9
Sept. 19	....do.....	....do.....	....do.....	55.0
Nov. 10	Camas Creek....	Fish Creek.....	Mouth, SW $\frac{1}{4}$ sec. 10, T. 27 S., R. 3 E.....	12.8
Jan. 12	....do.....	....do.....	....do.....	9.85
May 10	....do.....	....do.....	....do.....	21.4
July 11	....do.....	....do.....	....do.....	1.69
Sept. 11	....do.....	....do.....	....do.....	.69
17	Steamboat Creek	North Umpqua River	Mouth, 19 miles northeast of Glide.....	31.8
8	Rock Creek.....	....do.....	Mouth, 5 miles northeast of Glide.....	17.3
8	Little River....	....do.....	Mouth, at Glide.....	22.8
Oct. 29	Calapooya Creek	Umpqua River....	At former gaging station near Sutherlin....	a7,000
Sept. 9	....do.....	....do.....	Highway bridge at Oakland.....	10.3
Oct. 10	Elk Creek.....	....do.....	Sec. 6, T. 23 S., R. 4 W., above Adams Creek, $\frac{3}{4}$ miles east of Yoncalla.....	14.1
10	Adams Creek....	Elk Creek.....	Sec. 6, T. 23 S., R. 4 W., below McDonald diversion (no flow), $\frac{3}{4}$ miles east of Yoncalla.....	2.77
10	Theft Creek....	....do.....	Mouth, 4 miles northeast of Yoncalla.....	5.31
28	Yoncalla Creek..	....do.....	S $\frac{1}{2}$ sec. 10, T. 23 S., R. 5 W., at railroad crestle, 1.1 miles south of Yoncalla.....	a1,250
10	Elk Creek.....	Umpqua River.....	Above Boswell Springs $\frac{1}{2}$ miles south of Drain.....	30.0
29	....do.....	....do.....	Highway bridge at Drain.....	a9,200
Sept. 6	Smith River....	....do.....	Sec. 31, T. 20 S., R. 9 W., below falls, 15 miles northeast of Gardiner.....	9.13

a Flow at crest stage; computed by slope-area determination.

## Coastal streams between Umpqua River and Rogue River, Oreg.

Aug. 4	Eel Creek.....	Tenmile Creek....	Highway bridge, 1.4 miles northwest of Lakeside.....	2.72
4	....do.....	....do.....	Mouth, a mile west of Lakeside.....	6.03
Sept. 5	South Fork Coos River	Coos River.....	Sec. 28, T. 25 S., R. 11 W., 2 miles east of Dellwood.....	17.4
6	East Fork Millicoma River	Millicoma River..	Sec. 4, T. 25 S., R. 11 W., 1 mile north-east of Allegany.....	12.3
6	Marlow Creek....	East Fork Millicoma River	Mouth, at Allegany.....	.11
6	West Fork Millicoma River	Millicoma River..	Sec. 6, T. 25 S., R. 11 W., at head of tide, a mile northwest of Allegany.....	2.60
8	Middle Fork Coquille River	South Fork Coquille River	Former gaging station near Myrtle Point....	11.7
8	North Fork Coquille River	Coquille River....	Former gaging station below East Fork, near Myrtle Point.....	27.0
5	Floras Creek....	Pacific Ocean.....	Highway bridge at Langlois.....	2.82
5	Sixes River.....	....do.....	Above Crystal Creek, at Sixes.....	13.5
5	Crystal Creek....	Sixes River.....	Mouth, at Sixes.....	1.52
5	Elk River.....	Pacific Ocean.....	Highway bridge, 2 miles south of Sixes.....	37.0
5	Brush Creek....	....do.....	SE $\frac{1}{4}$ sec. 25, T. 33 S., R. 15 W., at former fish hatchery, 6 miles southeast of Port Orford.....	9.70
5	Euchre Creek....	....do.....	Highway bridge, 9 miles north of Wedderburn.....	10.1

## Rogue River basin, Oreg.

Jan. 26	Bybee Creek....	Rogue River.....	Mouth, 13 miles northeast of Prospect.....	56.6
May 16	....do.....	....do.....	....do.....	80.6
Sept. 12	....do.....	....do.....	....do.....	29.8
Jan. 26	Castle Creek....	....do.....	....do.....	45.7
May 16	....do.....	....do.....	....do.....	50.5
Sept. 12	....do.....	....do.....	....do.....	20.2
May 17	Cool Creek.....	Mill Creek.....	Below county road at Prospect.....	13.8
17	Sheep Creek.....	....do.....	Above main power canal $\frac{1}{2}$ mile north of Prospect.....	12.2
17	....do.....	....do.....	Above Crater Lake highway crossing at Prospect.....	5.65
17	....do.....	....do.....	600 ft below Crater Lake highway crossing at Prospect.....	1.04

b Intermittent stream; short periods of flow in 1917, 1938, 1943, 1949, 1950, and 1951. Flow sinks into ground just below measuring sections.



Miscellaneous discharge measurements in Pacific slope basins in Oregon and lower Columbia River basin during water year October 1950 to September 1951--Continued

Rogue River basin, Oreg.--Continued

Date	Stream	Tributary to or diverting from--	Locality	Discharge (cfs)
Dec. 13	Dead Indian Creek	South Fork Little Butte Creek.	Sec. 15, T. 38 S., R. 3 E., 14 miles north-east of Ashland.	36.9
May 25	.....do.....	.....do.....	.....do.....	4.34
Sept. 19	Cold Spring Creek	North Fork Little Butte Creek.	Mouth, 2 miles below Fish Lake dam.....	14.2
12	Little Butte Creek.	Rogue River.....	At former gaging station below Eagle Point.	21.1
7	Rogue River.....	Pacific Ocean....	Above Illinois River at Agness.....	1,300
7	Illinois River...	Rogue River.....	Mouth, at Agness.....	176

b Intermittent stream; short periods of flow in 1917, 1938, 1943, 1949, 1950, and 1951. Flow sinks into ground just below measuring sections.

Coastal streams south of Rogue River, Oreg.

Sept. 4	Pistol River.....	Pacific Ocean....	Above head of tide, 10 miles south of Gold Beach.	8.94
4	Chetco River.....	.....do.....	Above Jack Creek, below North Fork, 3 miles northeast of Harbor.	85.9
4	Winchuck River...	.....do.....	Half a mile above South Fork, 5 miles south-east of Harbor.	12.5



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