INTRODUCTION

The Water Resources of the U.S. Geological Survey, in cooperation with state agencies, obtains a large amount of data pertaining to the water resources of Oregon each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Oregon."

This report includes records on both surface and ground water in the State and contains discharge records for 181 stream-gaging stations, stage only records for 6 gaging stations, 47 partial-record or miscellaneous streamflow stations, 8 crest-stage partial-record streamflow stations; stage and content records for 26 lakes and reservoirs; water-quality records for 127 streamflow-gaging stations; water-quality for 2 atmospheric disposition stations, and 11 ground-water sites.

This series of annual reports for Oregon began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one or two volumes, data on quantities of surface water, quality of surface and ground water, and ground-water levels. In 1981, the annual report was divided into two volumes: Volume 1 described the activities for Eastern Oregon, while Volume 2 described the activities for Western Oregon. In 1991, the annual report returned to a single volume report.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Oregon were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 10, 11, 13, and 14." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." These Water-Supply Papers may be consulted in the libraries of the principal cities of the United States, or if not out of print, may be purchased from the U.S. Geological Survey, Books and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, CO 80225. For further ordering information, telephone (303) 236-7476.

Publications similar to this report are published annually by the Geological Survey for all states. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report OR-02-1". For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. For further ordering information, the Customer Inquiries telephone number is (703) 487-4650.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at The address given on back of title page or by telephone (503) 251-3201.

The USGS is continually updating the availability of its information on the internet. Current streamflow conditions (via satellite) for Oregon and other water resource information can be found at the following Universal Resource Locator (URL): http://oregon.usgs.gov. Nationwide information on water resources, including real-time and historic streamflow data, water-use data, publications and USGS program activities, can be found at URL: http://water.usgs.gov.

COOPERATION

The U.S. Geological Survey and organizations of the State of Oregon have had cooperative agreements for the systematic collection of surface-water records since 1905. Organizations that supplied data are acknowledged in station descriptions. Organizations that assisted in collecting data through cooperative agreements with the Survey are:

State of Oregon Water Resources Department
Clackamas County
Coos Bay-North Bend Water Board
Coos County, Board of Commissioners

Douglas County, Natural Resources
Multnomah County
Division of Public Works
Eugene Water and Electric Board
City of Albany
City of Ashland, Department of Public Works
City of Brookings
City of Gresham
City of Lake Oswego
City of McMinnville
City of Milwaukie
City of Newberg
City of Portland, Bureau of Environmental Services
City of Portland, Bureau of Water Works
City of Salem
City of Troutdale, Public Works
City of West Linn
City of Woodburn
Nez Perce Tribe
Siuslaw Soil and Water Conservation District
The Confederated Tribes of the Umatilla Indian Reservation
The Confederated Tribes of the Warm Springs Indian Reservation
Tillamook County Performance Partnership
Clear Water Services
Wallowa Soil and Water Conservation

Assistance in the form of funds or services was provided by the Forest Service, U.S. Department of Agriculture; Corps of Engineers, U.S. Army; Bonneville Power Administration, U.S. Department of Energy; Bureau of Land Management, Bureau of Reclamation, Fish and Wildlife Service, National Park Service, U.S. Department of the Interior in collection of records for stage and discharge stations and water-quality stations published in this report.

The following organizations aided in collecting records for stations under Federal Energy Regulatory Commission licenses: Eugene Water & Electric Board; Grayco Resources, Inc.; Idaho Power, PacifiCorp; Portland General Electric Co.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

The hydrology of Oregon is influenced by five mountain ranges with the Cascade Range providing a natural division between western and eastern Oregon. These ranges divide the state into drainage basins and greatly affect the distribution of precipitation. Hydrologic patterns are generally uniform from drainage basin to drainage basin throughout western Oregon; whereas in eastern Oregon, hydrologic patterns vary widely between drainage basins.

Western Oregon, which composes about one-third of the total area of the state, has a climate characterized by moderate temperatures, wet winters, and dry summers. About 80 percent of the precipitation occurs between October and March. Annual precipitation ranges from about 20 inches per year in the lower elevations in the southern part of the area to about 200 inches per year in the Coast and Cascade Ranges. In general, streamflow characteristics are similar, with most of the runoff and flooding on both large and small streams being caused by winter rains. Major floods have occurred when winter rains combine with melting snow.

Eastern Oregon has more complex hydrologic patterns than western Oregon. Precipitation is less than 10 inches per year in the semiarid regions, such as parts of the north-central area, the closed basin in south-central Oregon, and southeastern Oregon. The northeastern part of the state receives as much as 80 inches of precipitation per year, much of it occurring as snowfall. On large streams, flooding can result from winter rains and (or) seasonal snowmelt; in smaller drainage basins, flooding can result from winter rains, seasonal snowmelt, and convection storms. Monthly and annual mean discharges for four representative gages are compared with the 30-year median in figures 3 and 4.

Surface-water Conditions

Basins throughout Oregon had a mixed recovery in 2002 from the record drought of 2001. By the end of March, as reported by the Natural Resources Conservation Service, the snow water equivalent of the snowpack ranged from a high of 164 percent of average for the Lower Deschutes and Hood River Basins in north-central Oregon to a low of 86 percent of average for the Upper John Day and Malheur Basins located in eastern Oregon. Precipitation across Oregon for the water year, as reported by the State Climatologist, ranged from a high of 101 percent of normal in the North Coast Basins of northwest Oregon to a low of 62 percent of normal in the Harney Basin of south-central Oregon.

The water year began with above average precipitation for the northern 2/3 of Oregon but was dry in the southern part of the state. November was wetter than normal for most of Oregon but streamflow remained below normal for most of the state due to the lingering affects of the 2001 drought.

December and January brought above or near normal precipitation in Oregon except for the Umatilla Basin, which was dryer than normal. The

Umpqua basin received much higher than normal precipitation in December which helped to temporarily boost the streamflow in the basin to above normal levels for the first time in over a year.

February was dry for most of Oregon and the snowpack remained stable through the month. March brought some relief with wetter conditions for some parts of the state, but the lower level snowpack began to melt off in the latter part of the month. Streamflow failed to significantly respond to this low level melt off due to antecedent dry conditions. In April, higher than normal precipitation and additional snowmelt increased the streamflow to above normal levels in many basins in Oregon. Annual peak flows for most rivers occurred in mid-April.

May through September were much dryer than normal for most of Oregon. Basins that had higher than average snowpack maintained normal levels of streamflow through June but in general streamflow remained below normal through the summer.

Table 1

Table 1. Maximum stage, discharge and recurrence interval for the 2002 water year at selected gaging stations.

[mi^2, square miles; ft, feet; ft^3/s, cubic feet per second; ND, not determined; >, greater than; <, less than.

Station Number	Stream and Location	Drainage Area (mi^2)	Period of Record	Maximum for Period of Record			Maximum during Water Year			
				Date	Stage (ft)	Discharge (ft^3/s)	Date	Stage (ft)	Discharge (ft^3/s)	Estimate of Recurrence interval (years)
10396000	Donner und Blitzen River near Frenchglenn	200	1911-2002	04/26/78	7.15	4,270	04/14/02	4.01	831	<2
11502500	Williamson River below Sprague River, near Chiloquin	3,000	1917-2002	01/05/97	10.27	17,100	4/18-19/02	5.23	2,000	<2
13181000	Owyhee River near Rome	8,000	1950-2002	03/18/93	20.11	55,700	04/02/02	9.61	11,300	regulated
13292000	Imnaha River at Imnaha	622	1928-2002	01/01/97	11.44	20,200	04/14/02	4.67	2,360	<2
13333000	Grande Ronde River at Troy	3,275	1944-2002	02/09/96	13.76	51,800	04/14/02	10.44	22,600	5
14033500	Umatilla River near Umatilla	2,290	1904-2002	01/30/65	10.75	19,800	04/15/02	6.21	5,900	regulated
14046500	John Day River at Service Creek	5,090	1925-2002	12/23/64	17.85	40,200	04/15/02	9.98	12,800	2
14120000	Hood River at Tucker Bridge, near Hood River	279	1898-2002	02/07/96	17.11	23,300	04/14/02	9.30	6,250	<2
14137000	Sandy River near Marmot	263	1911-2002	12/22/64	--	61,400	04/14/02	736.16	10,900	<2
14301000	Nehalem River near Foss	667	1940-2002	02/08/96	29.56	70,300	12/16/01	16.55	27,900	2
14305500	Siletz River at Siletz	202	1906-2002	11/26/99	28.62	53,800	01/08/02	15.64	18,200	<2
14316700	Steamboat Creek near Glide	227	1956-2002	12/22/64	25.60	51,000	12/14/01	11.87	12,700	<2
14321000	Umpqua River near Elkton	3,683	1906-2002	12/23/64	51.95	265,000	12/14/01	22.06	65,200	<2
14357500	Bear Creek at Medford	289	1915-2002	01/01/97	14.69	17,600	04/10/02	5.85	1,160	regulated
14361500	Rogue River at Grants Pass	2,459	1939-2002	12/23/64	35.15	152,000	01/08/02	8.92	4,680	regulated
14372300	Rogue River near Agness	3,939	1961-2002	12/23/64	68.03	290,000	12/14/01	11.69	26,800	regulated

NOTE.--The recurrence interval, or return period, of a flood of a given magnitude is the average interval of time within which the given flood will be exceeded once by the annual maximum discharge. The recurrence interval is inversely related to the chance of a specific flood discharge being exceeded by any one year. Thus, a flood with a 50-year recurrence interval would have 1 chance in 50 of being exceeded in any one year. Recurrence intervals are average figures based on historical data; because the occurrence of floods is erratic, the 50-year flood may not necessarily occur in any given 50-year period, or floods of this magnitude may occur several times during that period. A similar relation is true for a flood of any given recurrence interval.

Ground Water

The seasonal level of the water table reflects natural recharge and discharge, and indirectly reflects long-term climatic trends. Changes in the water table are represented by seasonal averages of measurements made in shallow-aquifer wells.

The relation of seasonal water-table levels during 2002, to the long-term means, or normals, was evaluated for the six wells that comprise the Oregon District portion of the U.S. Geological Survey's Office of Ground Water's Collection of Basic Records (CBR) network of wells. These are wells that show a high correlation to climatic variability.

The normal water level for a season is defined as being within one-half the standard deviation of the seasonal mean for the period of record. The seasons are defined as: FALL, October to December; WINTER, January to March; SPRING, April to June; and SUMMER, July to September.

Trends in ground-water levels in the Oregon Ground-water Climate Response network were mixed throughout the 2002 water year. The water level in the Clackamas County well was below normal during the early part of 2002 before returning to normal in Summer. The water level in the northern Deschutes County well was normal throughout the the entire water year, while the water level in the southern Deschutes County well was normal before declining to below normal in Summer. The Jackson County well was normal in Fall, above normal in Winter, normal again in Spring, and below normal in Summer. The water level in the Linn County well was above normal in Fall, normal in Winter, and below normal Spring and Summer. The water level in the Marion County well was above normal Fall and Winter then normal during Spring and Summer.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Benchmark Network is a network of 50 sites in small drainage basins around the country whose purpose is to provide consistent data on the streamflow representative of undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by human activities. At 10 of these sites, water-quality information is being gathered on major ions and nutrients, primarily to assess the effects of acid deposition on stream chemistry. Additional information on the Hydrologic Benchmark Program can be found at http://water.usgs.gov/hbn/.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within the Nation's largest river basins. From 1995 through 1999, a network of approximately 40 stations was operated in the Mississippi, Columbia, Colorado, and Rio Grande basins. For the period 2000 through 2004, sampling was reduced to a few index stations on the Colorado and Columbia so that a network of 5 stations could be implemented on the Yukon River. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals. Additional information about the NASQAN Program can be found at http://water.usgs.gov/nasqan/..

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical constituents in precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 225 precipitation chemistry monitoring sites. This long-term, nationally consistent monitoring program, coupled with ecosystem research, provides critical information toward a national scorecard to evaluate the effectiveness of ongoing and future regulations intended to reduce atmospheric emissions and subsequent impacts to the Nation's land and water resources. Reports and other information on the NADP/NTN Program, as well as all data from the individual sites, can be found at http://bqs.usgs.gov/acidrain/.

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved

understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 59 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for decision making by water-resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies. Additional information about the NAWQA Program can be found at http://water.usgs.gov/nawqa/.

EXPLANATION OF THE RECORDS

The surface-water records published in this report are for the 2002 water year that began October 1, 2001, and ended September 30, 2002. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, and water-quality data for surface water. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The two systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for surface-water stations where only miscellaneous measurements are made. Basin designation is based on the Hydrologic Unit Map for Oregon prepared in cooperation with the U.S. Water Resources Council (1974).

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 14105700, which appears just to the left of the station name, includes the two-digit Part number "14" plus the six-digit downstream-order number "105700." The Part number designates the major river basin; for example, part "14" refers to the Pacific slope basins in Oregon and lower Columbia River basin.

Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude (figure 1). The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a one-second grid. This site-identification number, once assigned, is a pure number, and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description.

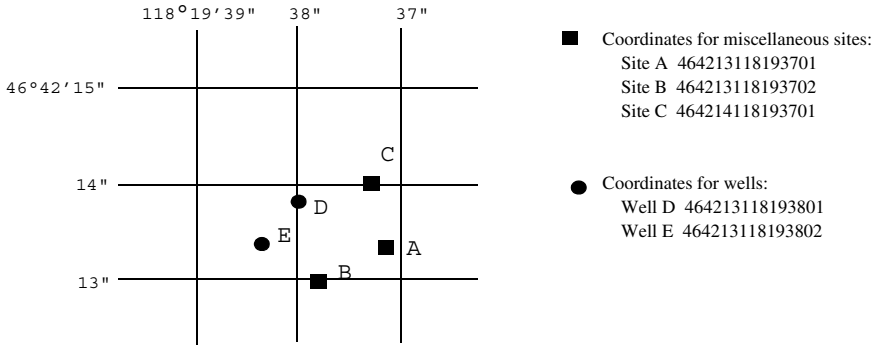

Figure 1. System for numbering wells and miscellaneous sites (latitude and longitude).

Local Identifier Well-Numbering System

In addition to the latitude-longitude based site identification number, wells in Oregon are assigned local well numbers (figure 2). The State is divided into 36 square mile townships numbered according to their location relative to the east-west Willamette baseline and a north-south Willamette meridian. The position of a township is given by its north-south "Township" position relative to the baseline and its east-west "Range" position relative to the meridian. Each township is divided into 36 sections approximately one-square-mile, (640-acre) in area and numbered from 1 to 36. For example, a well designated as 01S/03E-33DCA is located in Township 1 south, Range 3 east, section 33. The letters following the section number correspond to the location within the section; the first letter (D) identifies the quarter section (160 acres); the second letter (C) identifies the quarter-quarter section (40 acres); and the third letter (A) identifies the quarter-quarter-quarter section (10-acres). Thus, well 33DCA is located in the NE quarter of the SW quarter of the SE quarter of section 33 (figure 2). When more than one designated well occurs in the quarter-quarter-quarter section, a serial number is included.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for

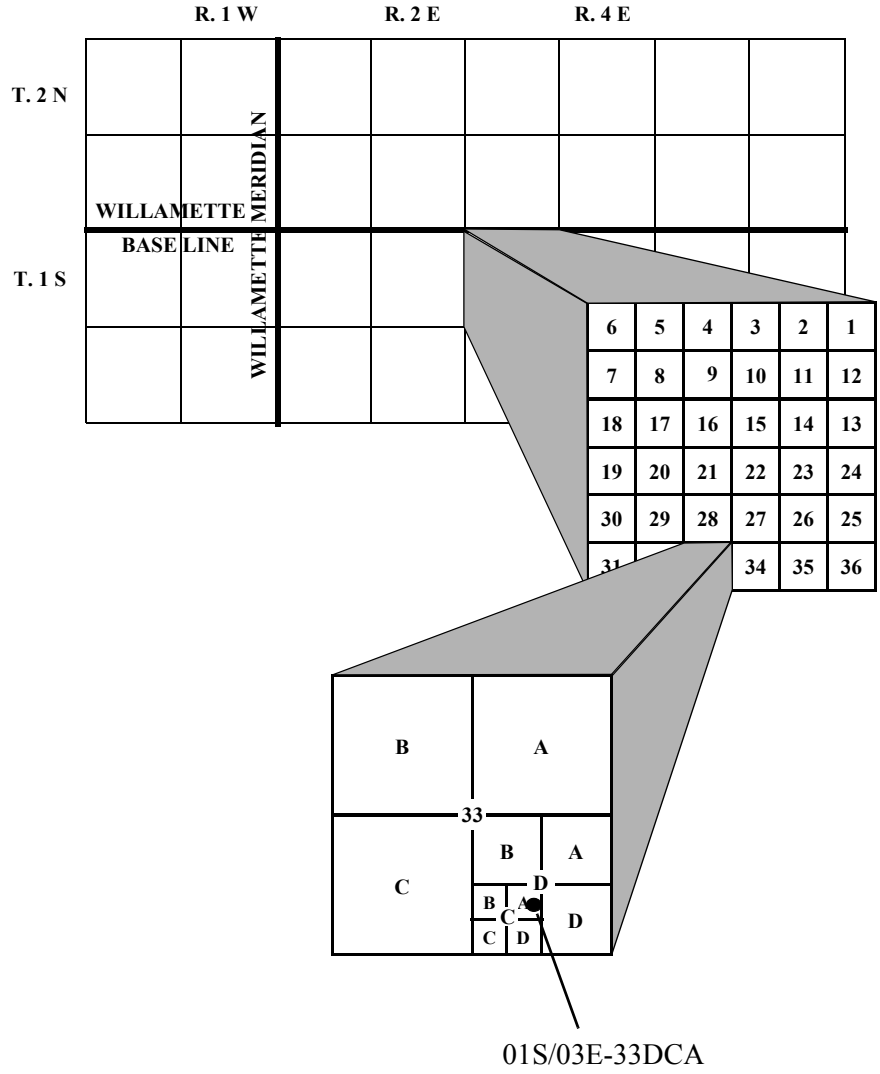

Figure 2. Local identifier well-numbering system.

any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relations between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relation between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adapted by the Geological Survey that are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations (TWRI), Book 3, Chapter A6. These methods are described in standard textbooks, Water-Supply Paper 2175, and the U.S. Geological Survey Techniques of Water Resources Investigations (TWRI's), Book 3, Chapter A1 through A19 and Book 8, Chapters A2 and B2. The methods are consistent with the American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. 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 the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations the stage-discharge relation is affected by the 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 computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some gaging stations, acoustic velocity meter (AVM) systems are used to compute discharge. The AVM system measures the stream's velocity at one or more paths in the cross section. Coefficients are developed to relate this path velocity to the mean velocity in the cross section. Because the AVM sensors are fixed in position, the adjustment coefficients generally vary with stage. Cross-sectional area curves are developed to relate stage, recorded as noted above, to cross section area. Discharge is computed by multiplying path velocity by the appropriate stage related coefficient and area.

In computing records of lake or reservoir contents, it is necessary to have information available from surveys, curves, or tables that define the relation of stage to content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Discharges over lake or reservoir spillways are computed from stage-discharge relations much as other stream discharges are computed.

For some gaging stations there are periods when no gage-height record is obtained, or the validity of the recorded gage height is so questionable that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

Streamflow data in this report are presented in a new format that is considerably different from the

format in data reports prior to the 1991 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of four parts, the manuscript or station description; the data table of daily mean values of discharges for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period by water year; and a summary statistics table that includes statistical data of annual, daily, and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration. Summary statistics were not included for certain sites where these data would be misleading. Contact the District Office for further information concerning summary statistics for these sites.

Station manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages are based on information developed by the Hydraulics and Hydrology Committee of the Pacific Northwest River Basins Commission.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means the instantaneous maximum discharge was revised; "(m)" the instantaneous minimum was revised; and "(P)" the peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to NGVDof 1929 (see "DEFINITION OF TERMS"), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, special methods of computation, conditions that affect natural flow at the station and, possibly, other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic average of the water-year mean discharges. Average discharge is computed only for stations having at least 2 water years of complete record; water years with incomplete record are not included in the computation. The mean-discharge value that uses all published data may differ from that given in the summary statistics data, which is based only on computer-stored data. The summary data does not

include values of monthly or yearly data that were determined by various methods for the series of Water-Supply Papers entitled "Compilation of Records of Surface Water of the United States". The average-discharge value is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water projects that significantly alter flow at a station are put into use after the station has been in operation for a period of years, the new average is computed as soon as 2 water years of record have accumulated after the project began.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the Oregon office (address given on the back of the title page of this report) to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

Data table of daily mean values

The daily table for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month; the line headed "MEAN" gives the average flow in cubic feet per second for the month; and the lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for the month. Discharge for the month also is usually 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"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEAR _____-_____, BY WATER YEAR (WY)," and will list

the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

Summary statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly and daily flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS_____-_____", will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (See line headings below), except for the "ANNUAL 7-DAY MINIMUM" statistic, are calculated for the designated period using computerized data for complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily extremes in the designated-period column may not be within the selected water years listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data are also given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily mean values of discharge for the year. At some stations the annual total discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes. At least 5 complete years of record must be available before this statistic is published for the designated period.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1 - March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

ANNUAL RUNOFF.--Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to

a depth of 1 foot and is equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

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

Inches (INCHES) indicates the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

10 PERCENT EXCEEDS.--The discharge that is exceeded 10 percent of the time for the designated period.

50 PERCENT EXCEEDS.--The discharge that is exceeded 50 percent of the time for the designated period.

90 PERCENT EXCEEDS.--The discharge that is exceeded 90 percent of the time for the designated period.

Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of annual maximum stage and discharge at crest-stage stations, and the second is a table of discharge measurements at low-flow partial-record stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual state data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records 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 measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under the "REMARKS" paragraph. "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record. Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s; the nearest tenth between 1.0 and 10 ft^3/s; whole numbers between 10 and 1,000 ft^3/s; and 3 significant figures for more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff because of the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation, or other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, changes in contents of reservoirs, or 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 if adjustments or losses are large in comparison with the observed discharge.

Other Records Available

Monthly records for several ungaged sites are given in a separate section following the gaged sites. The accuracy of records for ungaged sites is generally lower than that for gaged sites, depending on the precision of the computation method and the accuracy of data used in the computations. For most gaging stations, unpublished, detailed information, on file in the Oregon office, includes discharge measurements, gage-height records, and rating tables. Many gaging-station records in Oregon through 1987 have been analyzed to determine several statistical summaries: (1) The number of days in each year that the daily discharge was between selected limits (duration tables); (2) the lowest mean discharge for selected numbers of consecutive days in each year; and (3) the highest

mean discharge for selected numbers of consecutive days in each year.

Other Federal and State agencies have collected discharge data at other sites in Oregon during the current water year. Although these records have not been published by the U.S. Geological Survey, the National Water Data Exchange, NAWDEX, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA 22092, maintains an index of these sites and will furnish information about them.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be one or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-site Measurements and Sample Collection

In obtaining water-quality data, it is important that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, treating the samples to prevent changes in quality pending analysis, and shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations, "Book1, Chap. D2; Book 3, Chap. A1, A3, and A4; Book 9, Chap. A1-A9". These methods are consistent with ASTM standards and generally follow ISO standards. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey Oregon office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see "DEFINITION OF TERMS") are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species

(carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the U.S. Geological Survey office whose address is given on the back of the title page of this report.

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the Oregon office.

Sediment

Suspended-sediment concentrations are determined from samples collected by one of the standard sampling techniques discussed in TWRI, Book 3, Chapter C2, "Field methods for measurement of fluvial sediment." Samples are obtained using standard depth- or point-integrating samplers, or by means of an approved pumping sampler. Mean concentrations for the sampled cross section are in turn determined from these samples.

During periods of rapidly changing flow or rapidly changing suspended-sediment concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge. Methods used in the computation of sediment records are described in the TWRI Book 3, Chapters C1 and C3. These methods are consistent with ASTM standards and generally follow ISO standards.

At other stations, suspended-sediment samples were collected periodically. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, periodic measurements of particle-size distributions for the suspended-sediment, bed-load, and bed-material samples are included for stations where samples were obtained to measure this parameter.

Laboratory Measurements

Sediment samples, samples for biochemical-oxygen demand (BOD), samples for identification of biological populations, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Denver, Colorado. Methods used to analyze sediment samples and to compute sediment records are described in the TWRI Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, A4, and A5. These methods are consistent with ASTM standards and generally follow ISO standards.

In March 1989, the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values in this report have not been corrected for this bias.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record,

type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriat updates are made in the US. Geological Survey's distributed data system, NWIS, and subsequently to its web-based National data system, NWISWeb [http://water.usgs.gov/nwis/nwis]. Because the ususal volume of updates makes it impractiical to document individual changes in the State data-report series or elsewhere, potential users of U.S.Geological Survey water-quality data are encouraged to obtain all required data from NWIS or NWISWeb to ensure the most recent updates. Updates to NWISWeb are currently made on an annual basis.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
ND	Materials specifically analyzed for but not detected
V	Analyte was detected in both the environmental sample and the associated blanks.

Quality-Control Data

Data generated from quality-control (QC) samples are a requisite for evaluating the quality of the sampling and processing techniques as well as data from the actual samples themselves. Without QC data, environmental sample data cannot be adequately interpreted because the errors associated with the sample data are unknown. The various types of QC samples collected by this district are described in the following section. Procedures have been established for the storage of water-quality-control data within the USGS. These procedures allow for storage of all derived QC data and are identified so that they can be related to corresponding environmental samples.

Blank Sample

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated by the overall data-collection process. The blank solution used to develop specific types of blank samples is a solution that is free of the analytes of interest. Any measured value signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. There are many types of blank samples possible, each designed to segregate a different part of the overall data-collection process. The types of blank samples collected in this district are:

Field blank - a blank solution that is subjected to all aspects of sample collection, field processing preservation, transportation, and laboratory handling as an environmental sample.

Trip blank - a blank solution that is put in the same type of bottle used for an environmental sample and kept with the set of sample bottles before and after sample collection.

Equipment blank - a blank solution that is processed through all equipment used for collecting and processing all environmental sample (similar to a field blank but normally done in the more controlled conditions of the office).

Sampler blank - a blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample.

Filter blank - a blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

Splitter blank - a blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

Preservation blank - a blank solution that is treated with the sampler preservatives used for an environmental sample.

Reference Samples

Reference material is a solution or material prepared by a laboratory whose composition is certified for one or more properties so that it can be used to assess a measurement method. Samples of reference material are submitted for analysis to ensure that an analytical method is accurate for the known properties of the reference material. Generally, the selected reference material properties are similar to the environmental sample properties.

Replicate Samples

Replicate samples are a set of environmental samples collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which a duplicate is the special case consisting of two samples. Replicate samples are collected and analyzed to establish the amount of variability in the data contributed by some part of the collection and analytical process. There are many types of replicate samples possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples collected in this district are sequential samples. Sequential samples are a type of replicate sample in which the samples are collected one after the other, typically over a short time.

Split sample - a type of replicate sample in which a sample is split into subsamples contemporaneous in time and space.

Spike Samples

Spike samples are samples to which known quantities of a solution with one or more well-established analyte concentrations have been added. These samples are analyzed to determine the extent of matrix interference or degradation on the analyte concentration during sample processing and analysis.

Records of Ground-Water Levels

Water-level records for selected wells are included in this report. These wells are part of the U.S. Geological Survey's nationwide Collection of Basic Records (CBR) network of observation wells. The primary purpose of the network is to monitor the effect of climatic variability on the nation's regional aquifers. Well locations are shown in Figure 36.

Ground-water level records obtained through cooperative efforts of many Federal, State, and local agencies for many observation wells throughout Oregon are not included in this report. These records may be in computer storage, published in reports, or kept in files. Information about the availability of ground-water data may be obtained from the District Chief, Oregon District, U.S. Geological Survey, 10615 S.E. Cherry Blossom Drive, Portland, Oregon 97216.

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the

methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

The water-level data tables and hydrographs are published in alphabetical order by county and then in ascending order of latitude within the county. Each well is identified by means of (1) a 15-digit site identification number that is based on the grid system of latitude and longitude, and (2) a local designation based on the official system for the rectangular subdivision of public lands, referenced to the Willamette base line and meridian. Both of these identification number systems are described in the "Station Identification Numbers" section.

Water-level measurements are reported in feet below the land-surface datum (LSD). The land-surface datum is a horizontal plane coincident with land surface at each well. The altitude of the land-surface datum at each well has been estimated from U.S. Geological Survey 7.5 minute quadrangle topographic maps and is relative to the National Geodetic Vertical Datum (NGVD) of 1929.

The measuring point (MP) is reported in feet above the land-surface datum at each well and is the point at which measurements are taken.

Water levels are published to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth to water of several hundred feet, the error of determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water, the accuracy is greater.

Data Presentation

Each well record consists of three parts, a station description, a table of water levels for the entire period of record through the current water year, and a hydrograph of that record. Topical headings of the station description section are explained below.

WELL NUMBER.--This entry reports the 15-digit site identification number and the local well number previously mentioned and explained more completely in the section entitled, "Station Identification Numbers" under the headings, "Latitude-Longitude system" and Local identifier well numbering system".

LOCATION.--This paragraph reports the latitude and longitude (given in degrees, minutes, and seconds); the hydrologic unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER.--This entry designates by name and geologic age the aquifer open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and (or) screened interval, method of construction, use, and additional information such as casing breaks, collapsed screen, and other changes since construction.

INSTRUMENTATION.--This paragraph provides information on both the frequency of measurement (periodic or continuous) and the collection method used.

DATUM.--This entry describes both the land-surface elevation at the well and the measuring point. The elevation of the land-surface datum is described in feet above the National Geodetic Vertical Datum of 1929 or mean sea level and is reported with a precision respective to the method of determination. The measuring point's physical description and height, in feet, relative to the land-surface datum is also noted.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level. It may be used to acknowledge the assistance of local observers.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the record, with respect to the land-surface datum, and the dates of their occurrence.

EXTREMES FOR CURRENT YEAR.--For wells equipped with a recorder, this entry contains the highest and lowest water levels of the year measured by the recorder. Because all values are not published for wells withs recorders the extremes may be values not listed in the table following the station description.

A table of water levels follows the station description for each well. Water levels are reported in feet below the land-surface datum. For wells equipped with a recorder a table of the daily means is

given. Missing records are indicated with a triple hyphen (---) in place of the water level.

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean water levels for each month is provided below the mean values table.

Following the tabular summary of water levels is a hydrograph of the measurements. The water levels, in feet below land surface, are on the ordinate (y-axis) which has been reversed to imply depth. The dates, in calendar years, are on the abscissa (x-axis). The hydrograph is provided to aid the reader in better understanding the fluctuations of the water levels seasonally and over time. The first point on these hydrographs is usually the driller's reported static water level. A note on the hydrograph will state the driller's reported water level if it was drilled some years prior to development of the water level record. Also, breaks in the graph line correspond to extended breaks of time in collecting water level measurements at the site.

ACCESS TO USGS WATER DATA

The USGS provides near real-time stage and discharge data for many of the gaging stations equipped with the necessary telemetry and historic daily-mean and peak-flow discharge data for most current or discontinued gaging stations through the internet. These data may be accessed at:

http://water.usgs.gov

Some water-quality and ground-water data also are available through the internet. In addition, data can be provided in various machine-readable formats on magnetic tape or 3-1/2 inch floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division District Offices (see address on the back of the title page).

DEFINITION OF TERMS

Specialized technical terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. Terms such as algae, water level, precipitation are used in their common everyday meanings, definitions of which are given in standard dictionaries. Not all terms defined in this alphabetical list apply to every State. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acid neutralizing capacity (ANC) is the equivalent sum of all bases or base-producing materials, solutes plus particulates, in an aqueous system that can be titrated with acid to an equivalence point. This term designates titration of an "unfiltered" sample (formerly reported as alkalinity).

Acre-foot (AC-FT, acre-ft) is a unit of volume, commonly used to measure quantities of water used or stored, equivalent to the volume of water required to cover 1 acre to a depth of 1 foot and equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233 cubic meters. (See also "Annual runoff")

Adenosine triphosphate (ATP) is an organic, phosphate-rich compound important in the transfer of energy in organisms. Its central role in living cells makes ATP an excellent indicator of the presence of living material in water. A measurement of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample. (See also "Biomass" and "Dry weight")

Alkalinity is the capacity of solutes in an aqueous system to neutralize acid. This term designates titration of a "filtered" sample.

Annual runoff is the total quantity of water that is discharged ("runs off") from a drainage basin in a year. Data reports may present annual runoff data as volumes in acre-feet, as discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches.

Annual 7-day minimum is the lowest mean value for any 7-consecutive-day period in a year. Annual 7-day minimum values are reported herein for the calendar year and the water year (October 1 through September 30). Most low-flow frequency analyses use a climatic year (April 1-March 31), which tends to prevent the low-flow period from being artificially split between adjacent years. The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day, 10-year low-flow statistic.)

Aroclor is the registered trademark for a group of poly-chlorinated biphenyls that were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific 4-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type, and the last two digits represent the percentage weight of the hydrogen-substituted chlorine.

Artificial substrate is a device that is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is collected. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection. (See also "Substrate")

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500 ×C for 1 hour. Ash mass of zooplankton and phytoplankton is expressed in grams per cubic meter (g/m^3), and periphyton and benthic organisms in grams per square meter (g/m^2). (See also "Biomass" and "Dry mass")

Aspect is the direction toward which a slope faces with respect to the compass.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, whereas others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Bankfull stage, as used in this report, is the stage at which a stream first overflows its natural banks formed by floods with 1- to 3-year recurrence intervals.

Base discharge (for peak discharge) is a discharge value, determined for selected stations, above which peak discharge data are published. The base discharge at each station is selected so that an average of about three peak flows per year will be published. (See also "Peak flow")

Base flow is sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge.

Bedload is material in transport that is supported primarily by the streambed. In this report, bedload is considered to consist of particles in transit from the bed to an elevation equal to the top of the bedload sampler nozzle (ranging from 0.25 to 0.5 foot) that are retained in the bedload sampler. A sample collected with a pressure-differential bedload sampler also may contain a component of the suspended load.

Bedload discharge (tons per day) is the rate of sediment moving as bedload, reported as dry weight, that passes through a cross section in a given time. NOTE: Bedload discharge values in this report may include a component of the suspended-sediment discharge. A correction may be necessary when computing the total sediment discharge by summing the bedload discharge and the suspended-sediment discharge. (See also "Bedload," "Dry weight," "Sediment," and "Suspended-sediment discharge")

Bed material is the sediment mixture of which a stream-bed, lake, pond, reservoir, or estuary bottom is composed. (See also "Bedload" and "Sediment")

Benthic organisms are the group of organisms inhabiting the bottom of an aquatic environment. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish. They are useful as indicators of water quality.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as mass per unit area or volume of habitat.

Biomass pigment ratio is an indicator of the total proportion of periphyton that are autotrophic (plants). This is also called the Autotrophic Index.

Blue-green algae (*Cyanophyta*) are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample. (See also "Phytoplankton")

Bottom material (See "Bed material")

Bulk electrical conductivity is the combined electrical conductivity of all material within a doughnut-shaped volume surrounding an induction probe. Bulk conductivity is affected by different physical and chemical properties of the material including the dissolved solids content of the pore water and lithology and porosity of the rock.

Cells/volume refers to the number of cells of any organism that is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample volume, and are generally reported as cells or units per milliliter (mL) or liter (L).

Cells volume (biovolume) determination is one of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are frequently used in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume (mm^3) is determined by obtaining critical cell measurements or cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combinations of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows:

sphere $4/3\ \pi r^3$ cone $1/3\ \pi r^2 h$ cylinder $\pi r^2 h$.

pi (p) is the ratio of the circumference to the diameter of a circle; pi = 3.14159….

From cell volume, total algal biomass expressed as biovolume (mm^3/mL) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes for all species.

Cfs-day (See "Cubic foot per second-day")

Channel bars, as used in this report, are the lowest prominent geomorphic features higher than the channel bed.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with BOD or with carbonaceous organic pollution from sewage or industrial wastes. [See also "Biochemical oxygen demand (BOD)"]

Clostridium perfringens *(C. perfringens)* is a spore-forming bacterium that is common in the feces of human and other warmblooded animals. Clostridial spores are being used experimentally as an indicator of past fecal contamination and presence of microorganisms that are resistant to disinfection and environmental stresses. (See also "Bacteria")

Coliphages are viruses that infect and replicate in coliform bacteria. They are indicative of sewage contamination of water and of the survival and transport of viruses in the environment.

Color unit is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Confined aquifer is a term used to describe an aquifer containing water between two relatively impermeable bound-aries. The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases, the water level can rise above the ground surface, yielding a flowing well.

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

Continuous-record station is a site where data are collected with sufficient frequency to define daily mean values and variations within a day.

Control designates a feature in the channel that physically affects the water-surface elevation and thereby determines the stage-discharge relation at the gage. This feature may be a constriction of the channel, a bedrock outcrop, a gravel bar, an artifi-

cial structure, or a uniform cross section over a long reach of the channel.

Control structure, as used in this report, is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of saltwater.

Cubic foot per second (CFS, ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point in 1 second. It is equivalent to approximately 7.48 gallons per second or approximately 449 gallons per minute, or 0.02832 cubic meters per second. The term "second-foot" sometimes is used synonymously with "cubic foot per second" but is now obsolete.

Cubic foot per second-day (CFS-DAY, Cfs-day, [$(ft^3/s)/d$]) 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, 1.98347 acre-feet, 646,317 gallons, or 2,446.6 cubic meters. The daily mean discharges reported in the daily value data tables are numerically equal to the daily volumes in cfs-days, and the totals also represent volumes in cfs-days.

Cubic foot per second per square mile [CFSM, $(ft^3/s)/mi^2$] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area. (See also "Annual runoff")

Daily mean suspended-sediment concentration is the time-weighted concentration of suspended sediment passing a stream cross section during a 24-hour day. (See also "Sediment" and "Suspended-sediment concentration")

Daily-record station is a site where data are collected with sufficient frequency to develop a record of one or more data values per day. The frequency of data collection can range from continuous recording to periodic sample or data collection on a daily or near-daily basis.

Data collection platform (DCP) is an electronic instrument that collects, processes, and stores data from various sensors, and transmits the data by satellite data relay, line-of-sight radio, and/or landline telemetry.

Data logger is a microprocessor-based data acquisition system designed specifically to acquire, process, and store data. Data are usually downloaded from onsite data loggers for entry into office data systems.

Datum is a surface or point relative to which measurements of height and/or horizontal position are reported. A vertical datum is a horizontal surface used as the zero point for measurements of gage height, stage, or elevation; a horizontal datum is a reference for positions given in terms of latitude-longitude, State Plane coordinates, or UTM coordinates. (See also "Gage datum," "Land-surface datum," "National Geodetic Vertical Datum of 1929," and "North American Vertical Datum of 1988")

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample. (See also "Phytoplankton")

Diel is of or pertaining to a 24-hour period of time; a regular daily cycle.

Discharge, or **flow**, is the rate that matter passes through a cross section of a stream channel or other water body per unit of time. The term commonly refers to the volume of water (including, unless otherwise stated, any sediment or other constituents suspended or dissolved in the water) that passes a cross section in a stream channel, canal, pipeline, etc., within a given period of time (cubic feet per second). Discharge also can apply to the rate at which constituents, such as suspended sediment, bedload, and dissolved or suspended chemicals, pass through a cross section, in which cases the quantity is expressed as the mass of constituent that passes the cross section in a given period of time (tons per day).

Dissolved refers to that material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal and State agencies that collect water-quality data. Determinations of "dissolved" constituent concentrations are made on sample water that has been filtered.

Dissolved oxygen (DO) is the molecular oxygen (oxygen gas) dissolved in water. The concentration in water is a function of atmospheric pressure, temperature, and dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved-solids concentration. Photosynthesis and respiration by plants commonly cause diurnal vari-

ations in dissolved-oxygen concentration in water from some streams.

Dissolved-solids concentration in water is the quantity of dissolved material in a sample of water. It is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. In the mathematical calculation, the bicarbonate value, in milligrams per liter, is multiplied by 0.4926 to convert it to carbonate. Alternatively, alkalinity concentration (as mg/L $CaCO_3$) can be converted to carbonate concentration by multiplying by 0.60.

Diversity index (H) (Shannon index) is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = -\sum_{i\approx 1}^{s} \frac{n_i}{n} \log_2 \frac{n_i}{n} \ ,$$

where n_i is the number of individuals per taxon, n is the total number of individuals, and s is the total number of taxa in the sample of the community. Index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

Drainage area of a stream at a specific location is that area upstream from the location, measured in a horizontal plane, that has a common outlet at the site for its surface runoff from precipitation that normally drains by gravity into a stream. Drainage areas given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the Earth's surface that contains a drainage system with a common outlet for its surface runoff. (See "Drainage area")

Dry mass refers to the mass of residue present after drying in an oven at 105 ×C, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass. (See also "Ash mass," "Biomass," and "Wet mass")

Dry weight refers to the weight of animal tissue after it has been dried in an oven at 65 °C until a constant weight is achieved. Dry weight represents total organic and inorganic matter in the tissue. (See also "Wet weight")

Embeddedness is the degree to which gravel-sized and larger particles are surrounded or enclosed by finer-sized particles. (See also "Substrate embeddedness class")

Enterococcus bacteria are commonly found in the feces of humans and other warmblooded animals. Although some strains are ubiquitous and not related to fecal pollution, the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. Enterococcus bacteria are those bacteria that produce pink to red colonies with black or reddish-brown precipitate after incubation at 41 ×C on mE agar (nutrient medium for bacterial growth) and subsequent transfer to EIA medium. Enterococci include *Streptococcus feacalis, Streptococcus feacium, Streptococcus avium,* and their variants. (See also "Bacteria")

EPT Index is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This index summarizes the taxa richness within the aquatic insects that are generally considered pollution sensitive; the index usually decreases with pollution.

E**scherichia coli** *(E. coli)* are bacteria present in the intestine and feces of warmblooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory, they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5 °C on mTEC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Estimated (E) concentration value is reported when an analyte is detected and all criteria for a positive result are met. If the concentration is less than the method detection limit (MDL), an 'E' code will be reported with the value. If the analyte is qualitatively identified as present, but the quantitative determination is substantially more uncertain, the National Water Quality Laboratory will identify the result with an 'E' code even though the measured value is greater than the MDL. A value reported with an 'E' code should be used with caution. When no analyte is detected in a sample, the

default reporting value is the MDL preceded by a less than sign (<).

Euglenoids (*Euglenophyta*) are a group of algae that are usually free-swimming and rarely creeping. They have the ability to grow either photosynthetically in the light or heterotrophically in the dark. (See also "Phytoplankton")

Extractable organic halides (EOX) are organic compounds that contain halogen atoms such as chlorine. These organic compounds are semivolatile and extractable by ethyl acetate from air-dried streambed sediment. The ethyl acetate extract is combusted, and the concentration is determined by microcoulometric determination of the halides formed. The concentration is reported as micrograms of chlorine per gram of the dry weight of the streambed sediment.

Fecal coliform bacteria are present in the intestines or feces of warmblooded animals. They often are used as indicators of the sanitary quality of the water. In the laboratory, they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5 ×C plus or minus 0.2 ×C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Fecal streptococcal bacteria are present in the intestines of warmblooded animals and are ubiquitous in the environment. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that produce red or pink colonies within 48 hours at 35 ×C plus or minus 1.0 ×C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Fire algae (*Pyrrhophyta*) are free-swimming unicells characterized by a red pigment spot. (See also "Phytoplankton")

Flow-duration percentiles are values on a scale of 100 that indicate the percentage of time for which a flow is not exceeded. For example, the 90th percentile of river flow is greater than or equal to 90 percent of all recorded flow rates.

Gage datum is a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum itself is not an actual physical object, the datum usually is defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

Gage height (G.H.) is the water-surface elevation, in feet above the gage datum. If the water surface is below the gage datum, the gage height is negative. Gage height often is used interchangeably with the more general term "stage," although gage height is more appropriate when used in reference to a reading on a gage.

Gage values are values that are recorded, transmitted, and/or computed from a gaging station. Gage values typically are collected at 5-, 15-, or 30-minute intervals.

Gaging station is a site on a stream, canal, lake, or reservoir where systematic observations of stage, discharge, or other hydrologic data are obtained.

Gas chromatography/flame ionization detector (GC/FID) is a laboratory analytical method used as a screening technique for semivolatile organic compounds that are extractable from water in methylene chloride.

Geomorphic channel units, as used in this report, are fluvial geomorphic descriptors of channel shape and stream velocity. Pools, riffles, and runs are types of geomorphic channel units considered for National Water-Quality Assessment (NAWQA) Program habitat sampling.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample. (See also "Phytoplankton")

Habitat, as used in this report, includes all nonliving (physical) aspects of the aquatic ecosystem, although living components like aquatic macrophytes and riparian vegetation also are usually included. Measurements of habitat are typically made over a wider geographic scale than are measurements of species distribution.

Habitat quality index is the qualitative description (level 1) of instream habitat and riparian conditions surrounding the reach sampled. Scores range from 0 to 100 percent with higher scores indicative of desirable habitat conditions for aquatic life. Index only applicable to wadable streams.

Hardness of water is a physical-chemical characteristic that commonly is recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations (primarily calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate ($CaCO_3$).

High tide is the maximum height reached by each rising tide. The high-high and low-high tides are the higher and lower of the two high tides, respectively, of each tidal day. *See NOAA web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

Hilsenhoff's Biotic Index (HBI) is an indicator of organic pollution that uses tolerance values to weight taxa abundances; usually increases with pollution. It is calculated as follows:

$$HBI = sum\frac{(n)(a)}{N} \ ,$$

where n is the number of individuals of each taxon, a is the tolerance value of each taxon, and N is the total number of organisms in the sample.

Horizontal datum (See "Datum")

Hydrologic index stations referred to in this report are continuous-record gaging stations that have been selected as representative of streamflow patterns for their respective regions. Station locations are shown on index maps.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as defined by the former Office of Water Data Coordination and delineated on the State Hydrologic Unit Maps by the USGS. Each hydrologic unit is identified by an 8-digit number.

Inch (IN., in.), as used in this report, refers to the depth to which the drainage area would be covered with water if all of the runoff for a given time period were uniformly distributed on it. (See also "Annual runoff")

Instantaneous discharge is the discharge at a particular instant of time. (See also "Discharge")

Island, as used in this report, is a mid-channel bar that has permanent woody vegetation, is flooded once a year on average, and remains stable except during large flood events.

Laboratory reporting level (LRL) is generally equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a "less than" (<) remark code for samples in which the analyte was not detected. The National Water Quality Laboratory (NWQL) collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually on the basis of the most current quality-control data and, therefore, may change. [Note: In several previous NWQL documents (NWQL Technical Memorandum 98.07, 1998), the LRL was called the nondetection value or NDV—a term that is no longer used.]

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Latent heat flux (often used interchangeably with latent heat-flux density) is the amount of heat energy that converts water from liquid to vapor (evaporation) or from vapor to liquid (condensation) across a specified cross-sectional area per unit time. Usually expressed in watts per square meter.

Light-attenuation coefficient, also known as the extinction coefficient, is a measure of water clarity. Light is attenuated according to the Lambert-Beer equation:

$$I = I_o e^{-\lambda L} ,$$

where I_o is the source light intensity, I is the light intensity at length L (in meters) from the source, l is the light-attenuation coefficient, and e is the base of the natural logarithm. The light-attenuation coefficient is defined as

$$\lambda = -\frac{1}{L}\log_e \frac{I}{I_o} .$$

Lipid is any one of a family of compounds that are insoluble in water and that make up one of the principal components of living cells. Lipids include fats, oils, waxes, and steroids. Many environmental contaminants such as organochlorine pesticides are lipophilic.

Long-term method detection level (LT-MDL) is a detection level derived by determining the standard deviation of a minimum of 24 method detection limit (MDL) spike sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL. The LT-MDL controls false positive error. The chance of falsely reporting a concentration at or greater than the LT-MDL for a sample that did not contain the analyte is predicted to be less than or equal to 1 percent.

Low tide is the minimum height reached by each falling tide. The high-low and low-low tides are the higher and lower of the two low tides, respectively, of each tidal day. *See NOAA web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

Macrophytes are the macroscopic plants in the aquatic environment. The most common macrophytes are the rooted vascular plants that usually are arranged in zones in aquatic ecosystems and restricted in the area by the extent of illumination through the water and sediment deposition along the shoreline.

Mean concentration of suspended sediment (Daily mean suspended-sediment concentration) is the time-weighted concentration of suspended sediment passing a stream cross section during a given time period. (See also "Daily mean suspended-sediment concentration" and "Suspended-sediment concentration")

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period. (See also "Discharge")

Mean high or **low tide** is the average of all high or low tides, respectively, over a specific period.

Mean sea level is a local tidal datum. It is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name; for example, monthly mean sea level and yearly mean sea level. In order that they may be recovered when needed, such datums are referenced to fixed points known as benchmarks. (See also "Datum")

Measuring point (MP) is an arbitrary permanent reference point from which the distance to water surface in a well is measured to obtain water level.

Membrane filter is a thin microporous material of specific pore size used to filter bacteria, algae, and other very small particles from water.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given matrix containing the analyte. At the MDL concentration, the risk of a false positive is predicted to be less than or equal to 1 percent.

Methylene blue active substances (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram (UG/G, mg/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per kilogram (UG/KG, mg/kg) is a unit expressing the concentration of a chemical

constituent as the mass (micrograms) of the constituent per unit mass (kilogram) of the material analyzed. One microgram per kilogram is equivalent to 1 part per billion.

Micrograms per liter (UG/L, mg/L) is a unit expressing the concentration of chemical constituents in water as mass (micrograms) of constituent per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. One microgram per liter is equivalent to 1 part per billion.

Microsiemens per centimeter (US/CM, mS/cm) is a unit expressing the amount of electrical conductivity of a solution as measured between opposite faces of a centimeter cube of solution at a specified temperature. Siemens is the International System of Units nomenclature. It is synonymous with mhos and is the reciprocal of resistance in ohms.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in water as the mass (milligrams) of constituent per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter and is based on the mass of dry sediment per liter of water-sediment mixture.

Minimum reporting level (MRL) is the smallest measured concentration of a constituent that may be reliably reported by using a given analytical method.

Miscellaneous site, miscellaneous station, or miscellaneous sampling site is a site where streamflow, sediment, and/or water-quality data or water-quality or sediment samples are collected once, or more often on a random or discontinuous basis to provide better areal coverage for defining hydrologic and water-quality conditions over a broad area in a river basin.

Most probable number (MPN) is an index of the number of coliform bacteria that, more probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. MPN is determined from the distribution of gas-positive cultures among multiple inoculated tubes.

Multiple-plate samplers are artificial substrates of known surface area used for obtaining benthic invertebrate samples. They consist of a series of spaced, hardboard plates on an eyebolt.

Nanograms per liter (NG/L, ng/L) is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to 1 milligram per liter.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a fixed reference adopted as a standard geodetic datum for elevations determined by leveling. It was formerly called "Sea Level Datum of 1929" or "mean sea level." Although the datum was derived from the mean sea level at 26 tide stations**,** it does not necessarily represent local mean sea level at any particular place.

See NOAA website: http://www.ngs.noaa.gov/faq.shtml#WhatVD29VD88 (See "North American Vertical Datum of 1988")

Natural substrate refers to any naturally occurring immersed or submersed solid surface, such as a rock or tree, upon which an organism lives. (See also "Substrate")

Nekton are the consumers in the aquatic environment and consist of large free-swimming organisms that are capable of sustained, directed mobility.

Nephelometric turbidity unit (NTU) is the measurement for reporting turbidity that is based on use of a standard suspension of formazin. Turbidity measured in NTU uses nephelometric methods that depend on passing specific light of a specific wavelength through the sample.

North American Vertical Datum of 1988 (NAVD 1988) is a fixed reference adopted as the official civilian vertical datum for elevations determined by Federal surveying and mapping activities in the United States. This datum was established in 1991 by minimum-constraint adjustment of the Canadian**,** Mexican, and United States first-order terrestrial leveling networks.

Open or **screened interval** is the length of unscreened opening or of well screen through which water enters a well, in feet below land surface.

Organic carbon (OC) is a measure of organic matter present in aqueous solution, suspension, or bottom sediment. May be reported as dissolved organic carbon (DOC), particulate organic carbon (POC), or total organic carbon (TOC).

Organic mass or **volatile mass** of a living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass. (See also "Ash mass," "Biomass," and "Dry mass")

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m^2), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Organochlorine compounds are any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.

Parameter code is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property.

Partial-record station is a site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial-record station at which only peak stages and flows are recorded.

Particle size is the diameter, in millimeters (mm), of a particle determined by sieve or sedimentation methods. The sedimentation method utilizes the principle of Stokes law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, sedigraph) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification, as used in this report, agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	>0.00024 - 0.004	Sedimentation
Silt	>0.004 - 0.062	Sedimentation
Sand	>0.062 - 2.0	Sedimentation/sieve
Gravel	>2.0 - 64.0	Sieve
Cobble	>64 - 256	Manual measurement
Boulder	>256	Manual measurement

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. For the sedimentation method, most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native water analysis.

Peak flow (peak stage) is an instantaneous local maximum value in the continuous time series of streamflows or stages, preceded by a period of increasing values and followed by a period of decreasing values. Several peak values ordinarily occur in a year. The maximum peak value in a year is called the annual peak; peaks lower than the annual peak are called secondary peaks. Occasionally, the annual peak may not be the maximum value for the year; in such cases, the maximum value occurs at midnight at the beginning or end of the year, on the recession from or rise toward a higher peak in the adjoining year. If values are recorded at a discrete series of times, the peak recorded value may be taken as an approximation of the true peak, which may occur between the recording instants. If the values are recorded with finite precision, a sequence of equal recorded values may occur at the peak; in this case, the first value is taken as the peak.

Percent composition or **percent of total** is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, weight, mass, or volume.

Percent shading is a measure of the amount of sunlight potentially reaching the stream. A clinometer is used to measure left and right bank canopy angles. These values are added together, divided by 180, and multiplied by 100 to compute percentage of shade.

Periodic-record station is a site where stage, discharge, sediment, chemical, physical, or other

hydrologic measurements are made one or more times during a year but at a frequency insufficient to develop a daily record.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. Although primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

pH of water is the negative logarithm of the hydrogen-ion activity. Solutions with pH less than 7.0 standard units are termed "acidic," and solutions with a pH greater than 7.0 are termed "basic." Solutions with a pH of 7.0 are neutral. The presence and concentration of many dissolved chemical constituents found in water are affected, in part, by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms also are affected, in part, by the hydrogen-ion activity of water.

Phytoplankton is the plant part of the plankton. They are usually microscopic, and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment and commonly are known as algae. (See also "Plankton")

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactive nuclide represented by a curie (Ci). A curie is the quantity of radioactive nuclide that yields 3.7×10^{10} radioactive disintegrations per second (dps). A picocurie yields 0.037 dps, or 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample.

Polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

Polychlorinated naphthalenes (PCNs) are industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

Pool, as used in this report, is a small part of a stream reach with little velocity, commonly with water deeper than surrounding areas.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photo-synthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated (carbon method) by the plants.

Primary productivity (carbon method) is expressed as milligrams of carbon per area per unit time [mg C/(m^2/time)] for periphyton and macrophytes or per volume [mg C/(m^3/time)] for phytoplankton. The carbon method defines the amount of carbon dioxide consumed as measured by radioactive carbon (carbon-14). The carbon-14 method is of greater sensitivity than the oxygen light and dark bottle method and is preferred for use with unenriched water samples. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Primary productivity (oxygen method) is expressed as milligrams of oxygen per area per unit time [mg O/(m^2/time)] for periphyton and macrophytes or per volume [mg O/(m^3/time)] for phytoplankton. The oxygen method defines production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Radioisotopes are isotopic forms of elements that exhibit radioactivity. Isotopes are varieties of a

chemical element that differ in atomic weight but are very nearly alike in chemical properties. The difference arises because the atoms of the isotopic forms of an element differ in the number of neutrons in the nucleus; for example, ordinary chlorine is a mixture of isotopes having atomic weights of 35 and 37, and the natural mixture has an atomic weight of about 35.453. Many of the elements similarly exist as mixtures of isotopes, and a great many new isotopes have been produced in the operation of nuclear devices such as the cyclotron. There are 275 isotopes of the 81 stable elements, in addition to more than 800 radioactive isotopes.

Reach, as used in this report, is a length of stream that is chosen to represent a uniform set of physical, chemical, and biological conditions within a segment. It is the principal sampling unit for collecting physical, chemical, and biological data.

Recoverable from bed (bottom) material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. (See also "Bed material")

Recurrence interval, also referred to as return period, is the average time, usually expressed in years, between occurrences of hydrologic events of a specified type (such as exceedances of a specified high flow or nonexceedance of a specified low flow). The terms "return period" and "recurrence interval" do not imply regular cyclic occurrence. The actual times between occurrences vary randomly, with most of the times being less than the average and a few being substantially greater than the average. For example, the 100-year flood is the flow rate that is exceeded by the annual maximum peak flow at intervals whose average length is 100 years (that is, once in 100 years, on average); almost two-thirds of all exceedances of the 100-year flood occur less than 100 years after the previous exceedance, half occur less than 70 years after the previous exceedance, and about one-eighth occur more than 200 years after the previous exceedance. Similarly, the 7-day, 10-year low flow ($7Q_{10}$) is the flow rate below which the annual minimum 7-day-mean flow dips at intervals whose average length is 10 years (that is, once in 10 years, on average); almost two-thirds of the nonexceedances of the $7Q_{10}$ occur less than 10 years after the previous nonexceedance, half occur less than 7 years after, and about one-eighth occur more than 20 years after the previous nonexceedance. The recurrence interval for annual events is the reciprocal of the annual probability of occurrence. Thus, the 100-year flood has a 1-percent chance of being exceeded by the maximum peak flow in any year, and there is a 10-percent chance in any year that the annual minimum 7-day-mean flow will be less than the $7Q_{10}$.

Replicate samples are a group of samples collected in a manner such that the samples are thought to be essentially identical in composition.

Return period (See "Recurrence interval")

Riffle, as used in this report, is a shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

River mileage is the curvilinear distance, in miles, measured upstream from the mouth along the meandering path of a stream channel in accordance with Bulletin No. 14 (October 1968) of the Water Resources Council and typically is used to denote location along a river.

Run, as used in this report, is a relatively shallow part of a stream with moderate velocity and little or no surface turbulence.

Runoff is the quantity of water that is discharged ("runs off") from a drainage basin during a given time period. Runoff data may be presented as volumes in acre-feet, as mean discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches. (See also "Annual runoff")

Sea level, as used in this report, refers to one of the two commonly used national vertical datums (NGVD 1929 or NAVD 1988). See separate entries for definitions of these datums.

Sediment is solid material that originates mostly from disintegrated rocks; when transported by, suspended in, or deposited from water, it is referred to as "fluvial sediment." Sediment includes chemical

and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are affected by environmental and land-use factors. Some major factors are topography, soil characteristics, land cover, and depth and intensity of pre-cipitation.

Sensible heat flux (often used interchangeably with latent sensible heat-flux density) is the amount of heat energy that moves by turbulent transport through the air across a specified cross-sectional area per unit time and goes to heating (cooling) the air. Usually expressed in watts per square meter.

Seven-day, 10-year low flow ($7Q_{10}$) is the discharge below which the annual 7-day minimum flow falls in 1 year out of 10 on the long-term average. The recurrence interval of the $7Q_{10}$ is 10 years; the chance that the annual 7-day minimum flow will be less than the $7Q_{10}$ is 10 percent in any given year. (See also "Annual 7-day minimum" and "Recurrence interval")

Shelves, as used in this report, are streambank features extending nearly horizontally from the flood plain to the lower limit of persistent woody vegetation.

Sodium adsorption ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Sodium hazard in water is an index that can be used to evaluate the suitability of water for irrigating crops.

Soil heat flux (often used interchangeably with soil heat-flux density) is the amount of heat energy that moves by conduction across a specified cross-sectional area of soil per unit time and goes to heating (or cooling) the soil. Usually expressed in watts per square meter.

Soil-water content is the water lost from the soil upon drying to constant mass at 105 ×C; expressed either as mass of water per unit mass of dry soil or as the volume of water per unit bulk volume of soil.

Specific electrical conductance (conductivity) is a measure of the capacity of water (or other media) to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 ×C. Specific electrical conductance is a function of the types and quantity of dissolved substances in water and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is from 55 to 75 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stable isotope ratio (per MIL) is a unit expressing the ratio of the abundance of two radioactive isotopes. Isotope ratios are used in hydrologic studies to determine the age or source of specific water, to evaluate mixing of different water, as an aid in determining reaction rates, and other chemical or hydrologic processes.

Stage (See "Gage height")

Stage-discharge relation is the relation between the water-surface elevation, termed stage (gage height), and the volume of water flowing in a channel per unit time.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lives.

Substrate embeddedness class is a visual estimate of riffle streambed substrate larger than gravel that is surrounded or covered by fine sediment (<2mm, sand or finer). Below are the class categories expressed as the percentage covered by fine sediment:

0 no gravel or larger substrate	3 26-50 percent
1 > 75 percent	4 5-25 percent
2 51-75 percent	5 < 5 percent

Surface area of a lake is that area (acres) encompassed by the boundary of the lake as shown on USGS topographic maps, or other available maps or photographs. Because surface area changes with lake stage, surface areas listed in this report represent those determined for the stage at the time the maps or photographs were obtained.

Surficial bed material is the upper surface (0.1 to 0.2 foot) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is defined operationally as the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative suspended water-sediment sample that is retained on a 0.45-micrometer membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. Determinations of "suspended, recoverable" constituents are made either by directly analyzing the suspended mate-rial collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total recoverable concentrations of the constituent. (See also "Suspended")

Suspended sediment is the sediment maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid. (See also "Sediment")

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). The analytical technique uses the mass of all of the sediment and the net weight of the water-sediment mixture in a sample to compute the suspended-sediment concentration. (See also "Sediment" and "Suspended sediment")

Suspended-sediment discharge (tons/d) is the rate of sediment transport, as measured by dry mass or volume, that passes a cross section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft^3/s) x 0.0027. (See also "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Suspended-sediment load is a general term that refers to a given characteristic of the material in suspension that passes a point during a specified period of time. The term needs to be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It is not synonymous with either suspended-sediment discharge or concentration. (See also "Sediment")

Suspended, total is the total amount of a given constituent in the part of a water-sediment sample that is retained on a 0.45-micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. Knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total." Determinations of "suspended, total" constituents are made either by directly analyzing portions of the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total concentrations of the constituent. (See also "Suspended")

Suspended solids, total residue at 105 °C concentration is the concentration of inorganic and organic material retained on a filter, expressed as milligrams of dry material per liter of water (mg/L). An aliquot of the sample is used for this analysis.

Synoptic studies are short-term investigations of specific water-quality conditions during selected seasonal or hydro-logic periods to provide improved spatial resolution for critical water-quality conditions. For the period and conditions sampled, they assess the spatial distribution of selected water-quality conditions in relation to causative factors, such as land use and contaminant sources.

Taxa (Species) richness is the number of species (taxa) present in a defined area or sampling unit.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchial scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, *Hexagenia limbata,* is the following:

Kingdom:	Animal
Phylum:	Arthropoda

Class:	Insecta
Order:	Ephemeroptera
Family:	Ephemeridae
Genus:	*Hexagenia*
Species:	*Hexagenia limbata*

Thalweg is the line formed by connecting points of minimum streambed elevation (deepest part of the channel).

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table descriptions and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water resulting from the mixing of flow proportionally to the duration of the concentration.

Tons per acre-foot (T/acre-ft) is the dry mass (tons) of a constituent per unit volume (acre-foot) of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY, tons/d) is a common chemical or sediment discharge unit. It is the quantity of a substance in solution, in suspension, or as bedload that passes a stream section during a 24-hour period. It is equivalent to 2,000 pounds per day, or 0.9072 metric tons per day.

Total is the amount of a given constituent in a representative whole-water (unfiltered) sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined at least 95 percent of the constituent in the sample.)

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. This group includes coliforms that inhabit the intestine of warmblooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35 ×C. In the laboratory, these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 ×C plus or minus 1.0 ×C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample. (See also "Bacteria")

Total discharge is the quantity of a given constituent, measured as dry mass or volume, that passes a stream cross section per unit of time. When referring to constituents other than water, this term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total in bottom material is the amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total in bottom material."

Total length (fish) is the straight-line distance from the anterior point of a fish specimen's snout, with the mouth closed, to the posterior end of the caudal (tail) fin, with the lobes of the caudal fin squeezed together.

Total load refers to all of a constituent in transport. When referring to sediment, it includes suspended load plus bed load.

Total organism count is the number of organisms collected and enumerated in any particular sample. (See also "Organism count/volume")

Total recoverable is the amount of a given constituent in a whole-water sample after a sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that

is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data for whole-water samples, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures may produce different analytical results.

Total sediment discharge is the mass of suspended-sediment plus bed-load transport, measured as dry weight, that passes a cross section in a given time. It is a rate and is reported as tons per day. (See also "Bedload," "Bedload discharge," "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Total sediment load or **total load** is the sediment in transport as bedload and suspended-sediment load. The term may be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It differs from total sediment discharge in that load refers to the material, whereas discharge refers to the quantity of material, expressed in units of mass per unit time. (See also "Sediment," "Suspended-sediment load," and "Total load")

Transect, as used in this report, is a line across a stream perpendicular to the flow and along which measurements are taken, so that morphological and flow characteristics along the line are described from bank to bank. Unlike a cross section, no attempt is made to determine known elevation points along the line.

Turbidity is the reduction in the transparency of a solution due to the presence of suspended and some dissolved substances. The measurement technique records the collective optical properties of the solution that cause light to be scattered and attenuated rather than transmitted in straight lines; the higher the intensity of scattered or attenuated light, the higher the value of the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU). Depending on the method used, the turbidity units as NTU can be defined as the intensity of light of a specified wavelength scattered or attenuated by suspended particles or absorbed at a method specified angle, usually 90 degrees, from the path of the incident light. Currently approved methods for the measurement of turbidity in the USGS include those that conform to U.S. EPA Method 180.1, ASTM D1889-00, and ISO 7027. Measurements of turbidity by these different methods and different instruments are unlikely to yield equivalent values.

Ultraviolet (UV) absorbance (absorption) at 254 or 280 nanometers is a measure of the aggregate concentration of the mixture of UV absorbing organic materials dissolved in the analyzed water, such as lignin, tannin, humic substances, and various aromatic compounds. UV absorbance (absorption) at 254 or 280 nanometers is measured in UV absorption units per centimeter of pathlength of UV light through a sample.

Unconfined aquifer is an aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure. (See "Water-table aquifer")

Vertical datum (See "Datum")

Volatile organic compounds (VOCs) are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and subsequently analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They are often components of fuels, solvents, hydraulic fluids, paint thinners, and dry cleaning agents commonly used in urban settings. VOC contamination of drinking-water supplies is a human health concern because many are toxic and are known or suspected human carcinogens.

Water table is that surface in a ground-water body at which the water pressure is equal to the atmospheric pressure.

Water-table aquifer is an unconfined aquifer within which the water table is found.

Water year in USGS reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2002, is called the "2002 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports. (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976.)

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by

the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

Wet mass is the mass of living matter plus contained water. (See also "Biomass" and "Dry mass")

Wet weight refers to the weight of animal tissue or other substance including its contained water. (See also "Dry weight")

WSP is used as an acronym for "Water-Supply Paper" in reference to previously published reports.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and often are large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers. (See also "Plankton")

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The USGS publishes a series of manuals titled the "Techniques of Water-Resources Investigations" (TWRI) that describe procedures for planning and conducting specialized work in water-resources investigations. The material in these manuals is grouped under major subject headings called books and is further divided into sections and chapters. For example, section A of book 3 (Applications of Hydraulics) pertains to surface water. Each chapter then is limited to a narrow field of the section subject matter. This publication format permits flexibility when revision or printing is required.

Manuals in the TWRI series, which are listed below, are available online at http://water.usgs.gov/pubs/twri/. Printed copies are available for sale from the USGS, Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (an authorized agent of the Superintendent of Documents, Government Printing Office). Please telephone "1-888-ASK-USGS" for current prices, and refer to the title, book number, section number, chapter number, and mention the "U.S. Geological Survey Techniques of Water-Resources Investigations." Other products can be viewed online at http://www.usgs.gov/sales.html, or ordered by telephone or by FAX to (303)236-4693. Order forms for FAX requests are available online at http://mac.usgs.gov/isb/pubs/forms/. Prepayment by major credit card or by a check or money order payable to the "U.S. Geological Survey" is required.

Book 1. Collection of Water Data by Direct Measurement

Section D. Water Quality

1-D1. *Water temperature—influential factors, field measurement, and data presentation*, by H.H. Stevens, Jr., J.F. Ficke, and G. F. Smoot: USGS–TWRI book 1, chap. D1. 1975. 65 p.

1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W.W. Wood: USGS–TWRI book 1, chap. D2. 1976. 24 p.

Book 2. Collection of Environmental Data

Section D. Surface Geophysical Methods

2-D1. *Application of surface geophysics to ground-water investigations,* by A.A. R. Zohdy, G.P. Eaton, and D.R. Mabey: USGS–TWRI book 2, chap. D1. 1974. 116 p.

2-D2. *Application of seismic-refraction techniques to hydrologic studies,* by F.P. Haeni: USGS–TWRI book 2, chap. D2. 1988. 86 p.

Section E. Subsurface Geophysical Methods

2-E1. *Application of borehole geophysics to water-resources investigations,* by W.S. Keys and L.M. MacCary: USGS–TWRI book 2, chap. E1. 1971. 126 p.

2-E2. *Borehole geophysics applied to ground-water investigations,* by W.S. Keys: USGS–TWRI book 2, chap. E2. 1990. 150 p.

Section F. Drilling and Sampling Methods

2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and W.E. Teasdale: USGS–TWRI book 2, chap. F1. 1989. 97 p.

Book 3. Applications of Hydraulics

Section A. Surface-Water Techniques

3-A1. *General field and office procedures for indirect discharge measurements,* by M.A. Benson and Tate Dalrymple: USGS–TWRI book 3, chap. A1. 1967. 30 p.

3-A2. *Measurement of peak discharge by the slope-area method,* by Tate Dalrymple and M.A. Benson: USGS–TWRI book 3, chap. A2. 1967. 12 p.

3-A3. *Measurement of peak discharge at culverts by indirect methods,* by G.L. Bodhaine: USGS–TWRI book 3, chap. A3. 1968. 60 p.

3-A4. *Measurement of peak discharge at width contractions by indirect methods,* by H.F. Matthai: USGS-TWRI book 3, chap. A4. 1967. 44 p.

3-A5. *Measurement of peak discharge at dams by indirect methods,* by Harry Hulsing: USGS–TWRI book 3. chap. A5. 1967. 29 p.

3-A6. *General procedure for gaging streams,* by R.W. Carter and Jacob Davidian: USGS–TWRI book 3, chap. A6. 1968. 13 p.

3-A7. *Stage measurement at gaging stations,* by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A7. 1968. 28 p.

3-A8. *Discharge measurements at gaging stations,* by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A8. 1969. 65 p.

3-A9. *Measurement of time of travel in streams by dye tracing,* by F.A. Kilpatrick and J.F. Wilson, Jr.: USGS–TWRI book 3, chap. A9. 1989. 27 p.

3-Al0. *Discharge ratings at gaging stations,* by E.J. Kennedy: USGS–TWRI book 3, chap. A10. 1984. 59 p.

3-A11. *Measurement of discharge by the moving-boat method,* by G.F. Smoot and C.E. Novak: USGS–TWRI book 3, chap. A11. 1969. 22 p.

3-A12. *Fluorometric procedures for dye tracing*, Revised, by J.F. Wilson, Jr., E.D. Cobb, and F.A. Kilpatrick: USGS–TWRI book 3, chap. A12. 1986. 34 p.

3-A13. *Computation of continuous records of streamflow*, by E.J. Kennedy: USGS–TWRI book 3, chap. A13. 1983. 53 p.

3-A14. *Use of flumes in measuring discharge,* by F.A. Kilpatrick and V.R. Schneider: USGS–TWRI book 3, chap. A14. 1983. 46 p.

3-A15. *Computation of water-surface profiles in open channels,* by Jacob Davidian: USGS–TWRI book 3, chap. A15. 1984. 48 p.

3-A16. *Measurement of discharge using tracers*, by F.A. Kilpatrick and E.D. Cobb: USGS–TWRI book 3, chap. A16. 1985. 52 p.

3-A17. *Acoustic velocity meter systems,* by Antonius Laenen: USGS–TWRI book 3, chap. A17. 1985. 38 p.

3-A18. *Determination of stream reaeration coefficients by use of tracers,* by F.A. Kilpatrick, R.E. Rathbun, Nobuhiro Yotsukura, G.W. Parker, and L.L. DeLong: USGS–TWRI book 3, chap. A18. 1989. 52 p.

3-A19. *Levels at streamflow gaging stations*, by E.J. Kennedy: USGS–TWRI book 3, chap. A19. 1990. 31 p.

3-A20. *Simulation of soluble waste transport and buildup in surface waters using tracers*, by F.A. Kilpatrick: USGS–TWRI book 3, chap. A20. 1993. 38 p.

3-A21 *Stream-gaging cableways,* by C. Russell Wagner: USGS–TWRI book 3, chap. A21. 1995. 56 p.

Section B. Ground-Water Techniques

3-B1. *Aquifer-test design, observation, and data analysis,* by R.W. Stallman: USGS–TWRI book 3, chap. B1. 1971. 26 p.

3-B2. *Introduction to ground-water hydraulics, a programed text for self-instruction*, by G.D. Bennett: USGS–TWRI book 3, chap. B2. 1976. 172 p.

3-B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J.E. Reed: USGS–TWRI book 3, chap. B3. 1980. 106 p.

3-B4. *Regression modeling of ground-water flow,* by R.L. Cooley and R.L. Naff: USGS–TWRI book 3, chap. B4. 1990. 232 p.

3-B4. *Supplement 1. Regression modeling of ground-water flow --Modifications to the computer code for nonlinear regression solution of steady-state ground-water flow problems,* by R.L. Cooley: USGS–TWRI book 3, chap. B4. 1993. 8 p.

3-B5. *Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems—An introduction*, by O.L. Franke, T.E. Reilly, and G.D. Bennett: USGS–TWRI book 3, chap. B5. 1987. 15 p.

3-B6. *The principle of superposition and its application in ground-water hydraulics,* by T.E. Reilly, O.L. Franke, and G.D. Bennett: USGS–TWRI book 3, chap. B6. 1987. 28 p.

3-B7. *Analytical solutions for one-, two-, and three-dimensional solute transport in ground-water systems with uniform flow,* by E.J. Wexler: USGS–TWRI book 3, chap. B7. 1992. 190 p.

3-B8. *System and boundary conceptualization in ground-water systems with uniform flow*, by T.E. Reilly: USGS-TWRI book 3, chap. B8. 2001. 29p.

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3-C1. *Fluvial sediment concepts,* by H.P. Guy: USGS–TWRI book 3, chap. C1. 1970. 55 p.

3-C2. *Field methods for measurement of fluvial sediment*, by T.K. Edwards and G.D. Glysson: USGS–TWRI book 3, chap. C2. 1999. 89 p.3-C3.*Computation of fluvial-sediment discharge,* by George Porterfield: USGS–TWRI book 3, chap. C3. 1972. 66 p.

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Section A. Statistical Analysis

4-A1. *Some statistical tools in hydrology*, by H.C. Riggs: USGS–TWRI book 4, chap. A1. 1968. 39 p.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS-cont.

4-A2. *Frequency curves,* by H.C. Riggs: USGS–TWRI book 4, chap. A2. 1968. 15 p.

4-A3. Statistical methods in water resources, by D.R. Helsel and R.M Hirsch: USGS-TWRI book 4, chap. A3. 1991. Available only online at http://water.usgs.gov/pubs/twri/twri4a3/. (Accessed August 30, 2002.)

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4-B1. *Low-flow investigations,* by H.C. Riggs: USGS–TWRI book 4, chap. B1. 1972. 18 p.

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4-B3. *Regional analyses of streamflow characteristics,* by H.C. Riggs: USGS–TWRI book 4, chap. B3. 1973. 15 p.

Section D. Interrelated Phases of the Hydrologic Cycle

4-D1. *Computation of rate and volume of stream depletion by wells*, by C.T. Jenkins: USGS–TWRI book 4, chap. D1. 1970. 17 p.

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5-A1. *Methods for determination of inorganic substances in water and fluvial sediments,* by M.J. Fishman and L.C. Friedman, editors: USGS–TWRI book 5, chap. A1. 1989. 545 p.

5-A2. *Determination of minor elements in water by emission spectroscopy,* by P.R. Barnett and E.C. Mallory, Jr.: USGS–TWRI book 5, chap. A2. 1971. 31 p.

5-A3. *Methods for the determination of organic substances in water and fluvial sediments*, edited by R.L. Wershaw, M.J. Fishman, R.R. Grabbe, and L.E. Lowe: USGS–TWRI book 5, chap. A3. 1987. 80 p.

5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples,* by L.J. Britton and P.E. Greeson, editors: USGS–TWRI book 5, chap. A4. 1989. 363 p.

5-A5. *Methods for determination of radioactive substances in water and fluvial sediments,* by L.L. Thatcher, V.J. Janzer, and K.W. Edwards: USGS–TWRI book 5, chap. A5. 1977. 95 p.

5-A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments,* by L.C. Friedman and D.E. Erdmann: USGS–TWRI book 5, chap. A6. 1982. 181 p.

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5-C1. *Laboratory theory and methods for sediment analysis*, by H.P. Guy: USGS–TWRI book 5, chap. C1. 1969. 58 p.

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6-A1. *A modular three-dimensional finite-difference ground-water flow model*, by M.G. McDonald and A.W. Harbaugh: USGS–TWRI book 6, chap. A1. 1988. 586 p.

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6-A3. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual,* by L.J. Torak: USGS–TWRI book 6, chap. A3. 1993. 136 p.

6-A4. ***A** modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions,* by R.L. Cooley: USGS–TWRI book 6, chap. A4. 1992. 108 p.

6-A5. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details,* by L.J. Torak: USGS–TWRI book 6, chap. A5, 1993. 243 p.

6-A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction*, by E.D. Swain and E.J. Wexler. 1996. 125 p.

6-A7. *User's guide to SEAWAT: A computer program for simulation of three-dimensional variable-density ground-water flow*, by Weixing Guo and C.D. Langevin: USGS-TWRI book 6, chap. A7, 2002, 77p.

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Section C. Computer Programs

7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments,* by P.C. Trescott, G.F. Pinder, and S.P. Larson: USGS–TWRI book 7, chap. C1. 1976. 116 p.

7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L.F. Konikow and J.D. Bredehoeft: USGS–TWRI book 7, chap. C2. 1978. 90 p.

7-C3. *A model for simulation of flow in singular and interconnected channels,* by R.W. Schaffranek, R.A. Baltzer, and D.E. Goldberg: USGS–TWRI book 7, chap. C3. 1981. 110 p.

Book 8. Instrumentation

Section A. Instruments for Measurement of Water Level

8-A1. *Methods of measuring water levels in deep wells,* by M.S. Garber and F.C. Koopman: USGS–TWRI book 8, chap. A1. 1968. 23 p.

8-A2. *Installation and service manual for U.S. Geological Survey manometers*, by J.D. Craig: USGS–TWRI book 8, chap. A2. 1983. 57 p.

Section B. Instruments for Measurement of Discharge

8-B2. *Calibration and maintenance of vertical-axis type current meters,* by G.F. Smoot and C.E. Novak: USGS–TWRI book 8, chap. B2. 1968. 15 p.

Book 9. Handbooks for Water-Resources Investigations

Section A. National Field Manual for the Collection of Water-Quality Data

9-A1. *National Field Manual for the Collection of Water-Quality Data: Preparations for Water Sampling*, by F.D. Wilde, D.B. Radtke, J. Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A1. 1998. 47 p.

9-A2. *National Field Manual for the Collection of Water-Quality Data: Selection of Equipment for Water Sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A2. 1998. 94 p.

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9-A6. *National Field Manual for the Collection of Water-Quality Data: Field Measurements*, edited by F.D. Wilde and D.B. Radtke: USGS-TWRI book 9, chap. A6. 1998. Variously paginated.

9-A7. *National Field Manual for the Collection of Water-Quality Data: Biological Indicators*, edited by D.N. Myers and F.D. Wilde: USGS-TWRI book 9, chap. A7. 1997 and 1999. Variously paginated.

9-A8. *National Field Manual for the Collection of Water-Quality Data: Bottom-material samples*, by D.B. Radtke: USGS-TWRI book 9, chap. A8. 1998. 48 pages.

9-A9. *National Field Manual for the Collection of Water-Quality Data: Safety in Field Activities*, by S.L. Lane and R.G. Fay: USGS-TWRI book 9, chap. A9. 1998. 60 p.

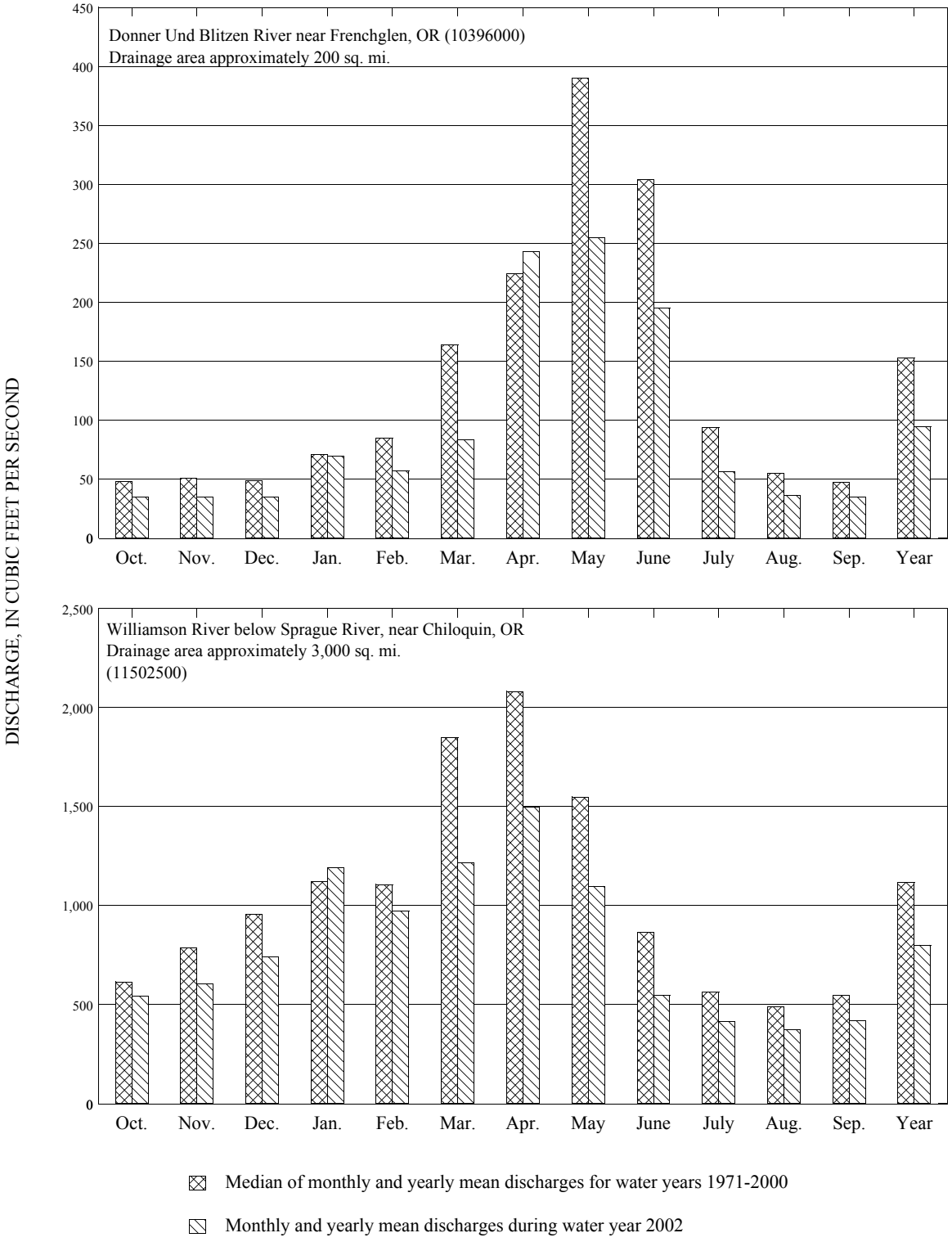


Figure 3. Discharge during 2002 water year compared with median discharge for period 1971-2000 for two representative gaging stations in Eastern Oregon.

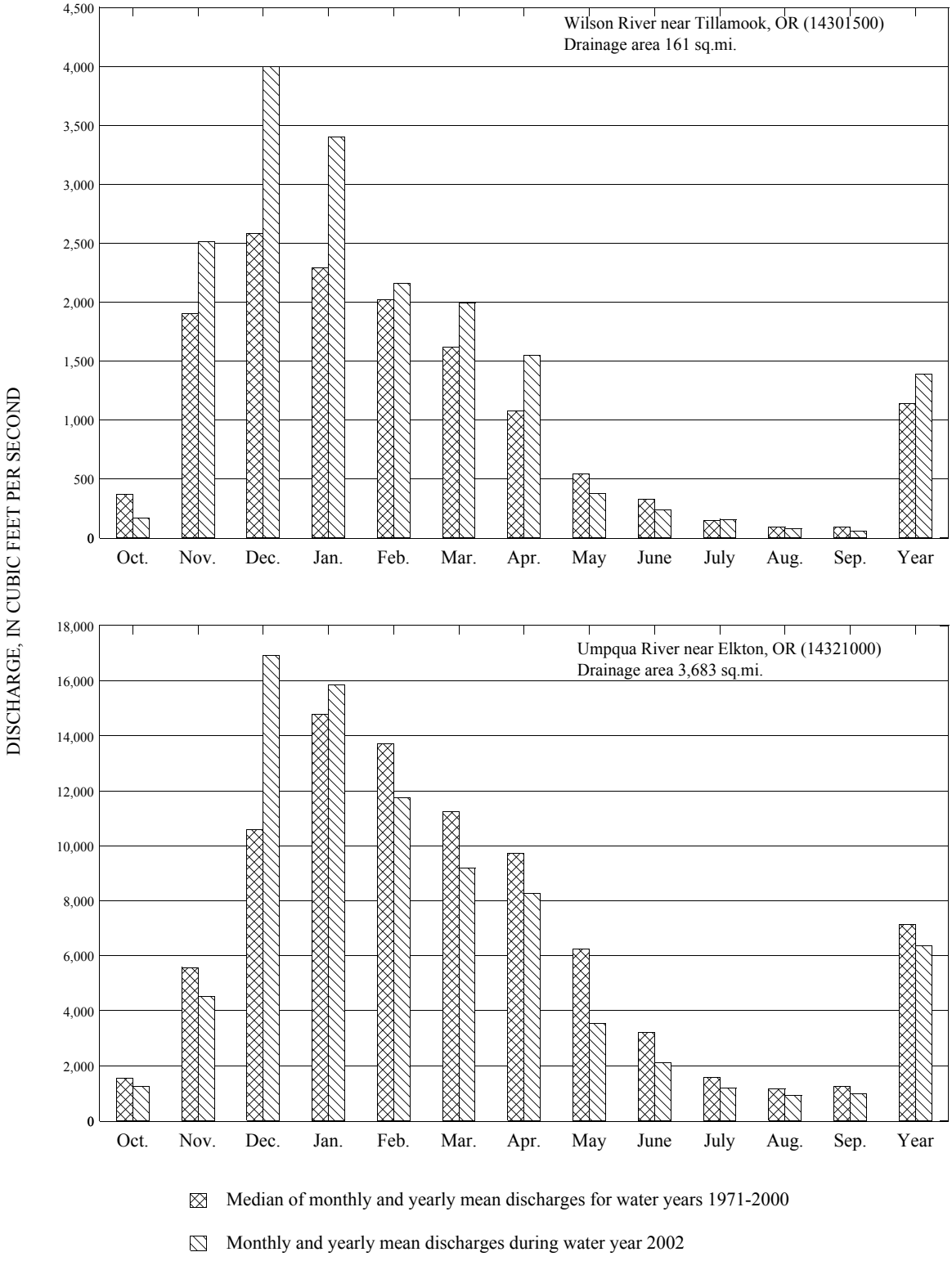


Figure 4. Discharge during 2002 water year compared with median discharge for period 1971-2000 for two representative gaging stations in Western Oregon.i

SURFACE-WATER-DISCHARGE AND SURFACE-WATER-QUALITY RECORDS

Remarks Codes

The following remark codes may appear with the water-quality data in this section:

PRINT OUTPUT	REMARK
E	Value is estimated.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
M	Presence of material verified, but not quantified.
N	Presumptive evidence of presence of material.
U	Material specifically analyzed for, but not detected.
A	Value is an average.
V	Analyte was detected in both the environmental sample and the associated blanks
S	Most probable value.

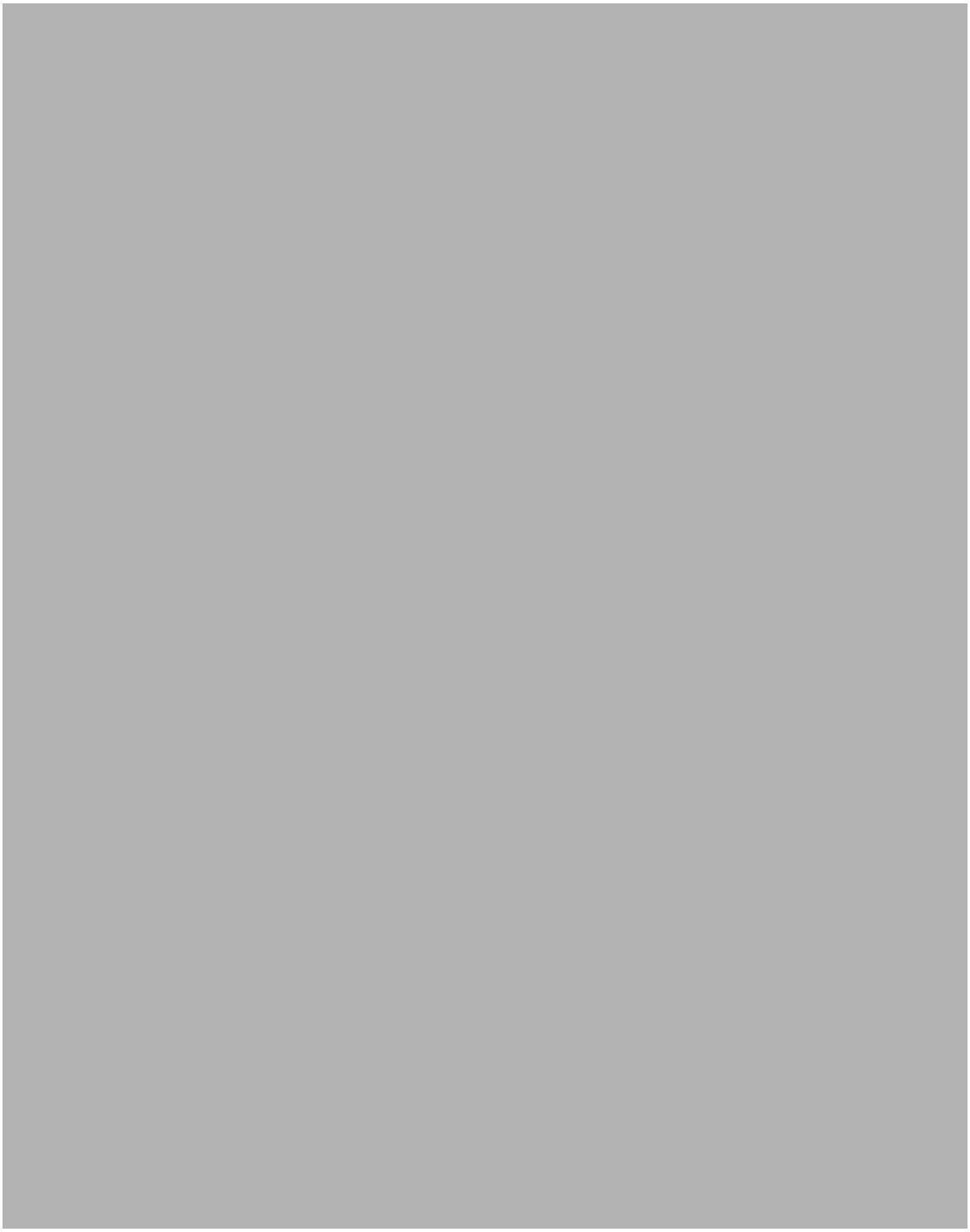


Figure 5. Location map of major drainage basins in Oregon.

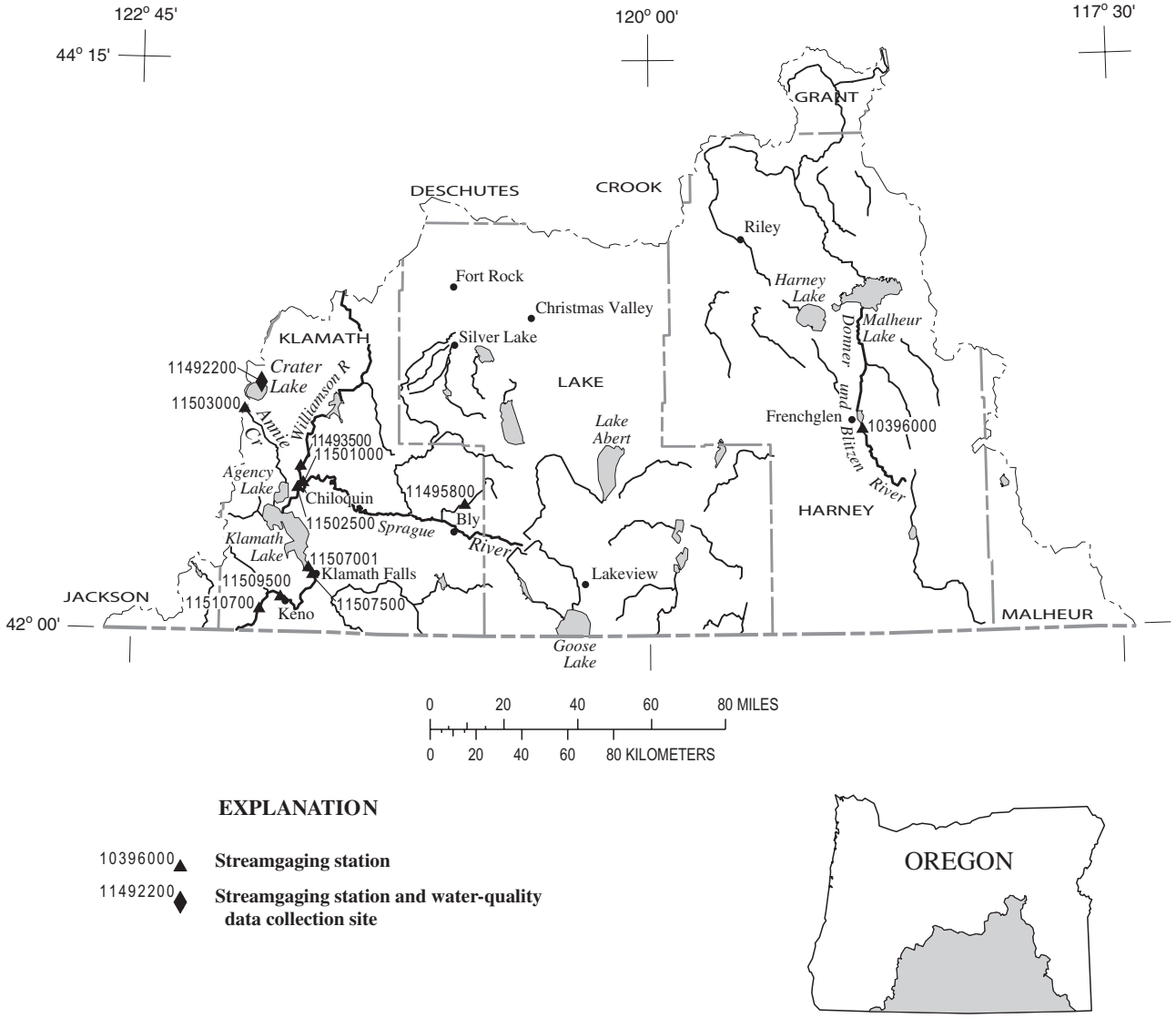


Figure 6. Location of surface-water and water-quality stations in The Great Basin and the Klamath River Basin.

THE GREAT BASIN

MALHEUR AND HARNEY LAKES BASIN

10396000 DONNER UND BLITZEN RIVER NEAR FRENCHGLEN, OR

LOCATION.--Lat 42°47'28", long 118°52'00", in NW 1/4 NW 1/4 sec.20, T.32 S., R.32-1/2 E., Harney County, Hydrologic Unit 17120003, Bureau of Land Management land, on left bank 1.5 mi upstream from upper diversions for Malheur National Wildlife Refuge, 2.0 mi downstream from Fish Creek, and 3.5 mi southeast of Frenchglen.

DRAINAGE AREA.--200 mi^2, approximately.

PERIOD OF RECORD.--March 1911 to September 1913, March 1914 to September 1916, April 1917 to September 1921, August to November 1929, April to September 1930, December 1937 to current year. Monthly discharge only for some periods, published in WSP 1314. Published as "near Diamond" 1911-21. Records of discharge for January 1909 to September 1910 (published in WSP 270, 290, and 370, for a nonequivalent site as "near Diamond") have been found to be unreliable and should not be used.

REVISED RECORDS.--WSP 330: Drainage area (former site). WSP 860: Drainage area (present site). WSP 1564: 1938-39(M), 1942-43(M), 1948(M), 1951(P), 1952-53. WSP 1714: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 4,254 ft above NGVD of 1929, (levels by Fish and Wildlife Service). Prior to December 1937, nonrecording gage at several sites within 2 mi downstream at different datums. Dec. 6, 1937, to Feb. 14, 1938, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station. Periodic water-quality records for the period March 1975 to September 1986 and continuous water-quality records for the period October 1975 to September 1981 have been collected at this location. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--72 years (water years 1912-13, 1915-16, 1918-21, 1939-2002), 127 ft^3/s, 91,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,270 ft^3/s Apr. 26, 1978, gage height, 7.15 ft, from floodmarks, from rating curve extended above 1,900 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 4.2 ft^3/s Dec. 9, 1972, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 650 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1900	*831	*4.01	No other peak greater than base discharge.			

Minimum discharge, 9.5 ft^3/s Dec. 25.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	36	38	46	45	35	161	213	434	93	39	36
2	33	35	36	158	40	41	208	217	365	85	38	35
3	33	35	35	132	39	40	194	215	293	82	38	34
4	33	34	37	56	43	42	214	213	263	80	38	34
5	33	34	38	46	40	41	252	223	270	75	38	34
6	33	34	34	191	42	42	258	221	284	71	39	35
7	33	34	35	280	39	54	262	227	239	69	38	37
8	33	31	32	191	38	39	246	202	203	68	38	36
9	33	34	38	121	34	42	252	199	178	64	37	36
10	34	34	28	66	36	45	248	194	178	59	37	35
11	35	34	38	56	37	68	245	181	168	57	36	34
12	37	34	38	55	34	211	270	188	163	56	36	34
13	35	36	37	45	36	113	285	210	163	56	36	34
14	35	36	37	47	35	84	545	232	194	56	35	33
15	34	35	35	42	34	57	502	242	201	59	35	33
16	34	34	35	32	38	53	335	247	194	53	35	37
17	34	34	35	48	37	50	285	256	193	50	35	37
18	34	33	34	44	37	39	251	298	226	49	34	40
19	34	33	35	42	39	52	228	337	184	50	35	37
20	34	34	35	42	63	137	212	342	148	52	35	35
21	34	36	30	43	158	184	192	277	146	48	36	35
22	34	44	26	28	180	132	186	244	144	46	36	34
23	34	36	39	47	154	120	193	215	140	46	36	34
24	34	34	33	43	110	141	170	204	140	44	36	34
25	34	32	20	40	60	91	176	208	142	42	36	34
26	34	36	38	39	50	83	189	224	136	42	35	34
27	34	31	40	36	47	94	188	255	128	42	35	34
28	34	34	38	20	46	91	173	298	120	41	36	34
29	35	37	36	26	---	111	173	371	112	40	37	35
30	36	39	35	38	---	124	210	466	104	40	36	35
31	46	---	42	55	---	134	---	479	---	39	41	---
TOTAL	1066	1043	1087	2155	1591	2590	7303	7898	5853	1754	1132	1049
MEAN	34.39	34.77	35.06	69.52	56.82	83.55	243.4	254.8	195.1	56.58	36.52	34.97
MAX	46	44	42	280	180	211	545	479	434	93	41	40
MIN	33	31	20	20	34	35	161	181	104	39	34	33
AC-FT	2110	2070	2160	4270	3160	5140	14490	15670	11610	3480	2250	2080

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	43.83	47.74	55.20	67.51	90.29	151.9	224.6	380.5	285.8	98.38	48.19	42.58
MAX	86.4	94.3	181	277	310	500	666	826	802	320	113	87.3
(WY)	1985	1985	1965	1997	1921	1993	1952	1998	1917	1984	1984	1984
MIN	24.2	25.3	25.2	25.0	27.8	40.5	61.2	105	44.7	28.9	21.1	22.2
(WY)	1993	1962	1960	1916	1964	1977	1968	1992	1992	1968	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	29958		34521			
ANNUAL MEAN	82.08		94.58		126.7	
HIGHEST ANNUAL MEAN					273	1984
LOWEST ANNUAL MEAN					49.1	1992
HIGHEST DAILY MEAN	710	May 16	545	Apr 14	2700	Mar 17 1993
LOWEST DAILY MEAN	16	Jan 17	20	Dec 25	11	Nov 16 1961
ANNUAL SEVEN-DAY MINIMUM	21	Feb 9	31	Dec 19	14	Jan 2 1974
ANNUAL RUNOFF (AC-FT)	59420		68470		91800	
10 PERCENT EXCEEDS	214		230		320	
50 PERCENT EXCEEDS	36		41		57	
90 PERCENT EXCEEDS	30		34		32	

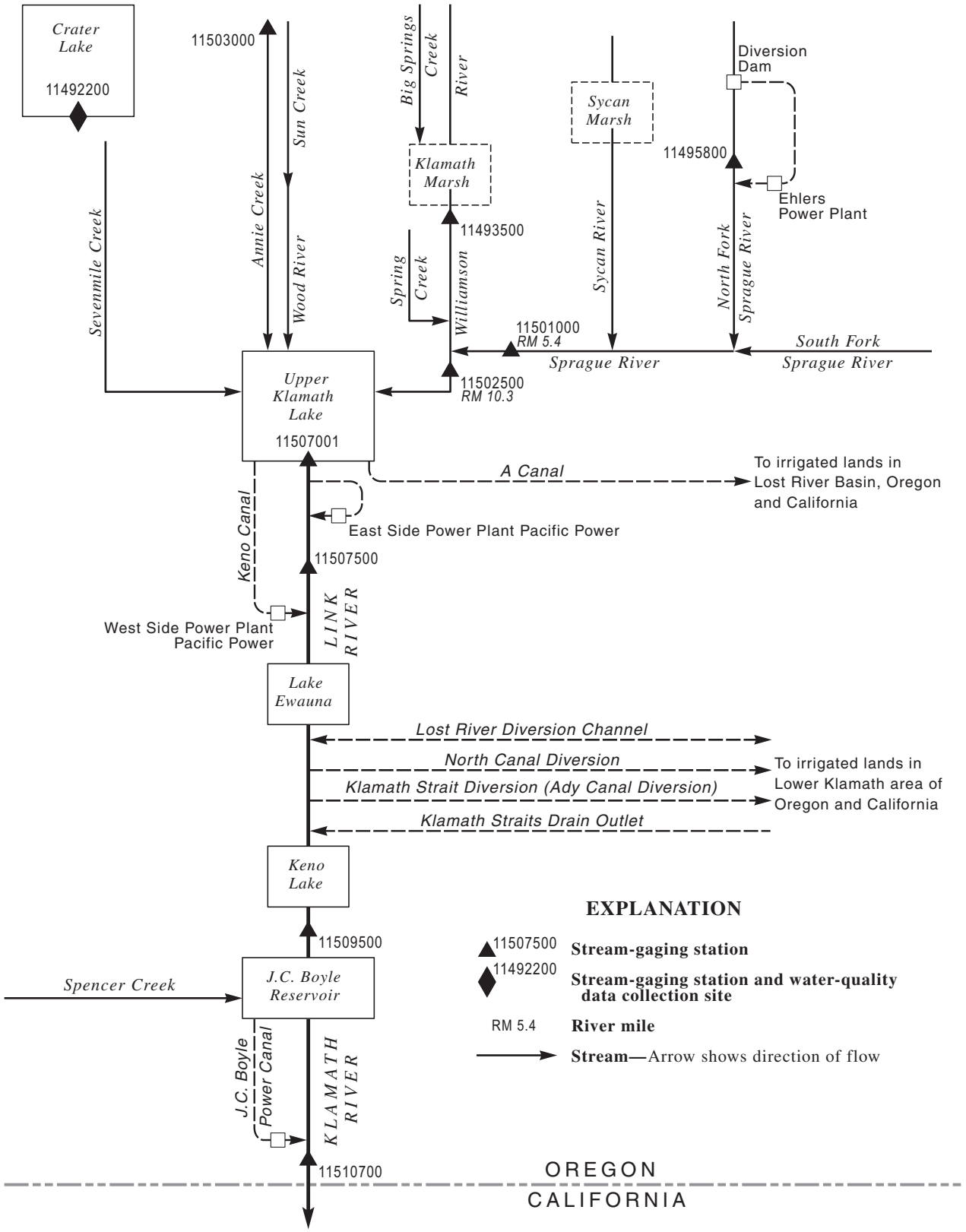


Figure 7. Schematic diagram showing gaging stations and major diversions in the Klamath Basin in Oregon.

KLAMATH RIVER BASIN

11492200 CRATER LAKE NEAR CRATER LAKE, OR
(Hydrologic bench-mark station)

LOCATION.--Lat 42°58'33", long 122°05'17", Crater Lake National Park and Vicinity Quadrangle, Klamath County, Hydrologic Unit 18010201, at boat harbor at end of trail in Cleetwood Cove and 6 mi northeast of Crater Lake post office.

DRAINAGE AREA.--26.2 mi^2, of which 20.5 mi^2 is lake area at elevation 6,176 ft.

WATER-ELEVATION RECORDS

PERIOD OF RECORD.--October 1961 to current year. 1878 to September 1961 (fragmentary records) available in files of U.S. Geological Survey.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to September 1961, nonrecording gage and various reference points used near old boat landing at abandoned trail (Eagle Cove) directly across Lake.

REMARKS.--Crater Lake occupies the caldera of prehistoric Mount Mazama. It has no visible inlet or outlet. Over a period of years precipitation and runoff from snowmelt on the walls of the crater are offset by seepage and evaporation. Records of accumulated annual precipitation, collected at the north rim of Crater Lake as part of the operation of this station, are published annually in reports of the National Weather Service. U.S.Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 6,179.34 ft Mar. 25, 1975; minimum elevation observed, 6,163.2 ft Sept. 10, 1942.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum elevation known, 6,180.5 ft, average of several observations of line of crustose lichens made between 1916 and 1960; that stage may have occurred near the close of the 19th century. The occurrence of living pine trees slightly higher suggests that the lake has not been materially higher for several centuries.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 6,173.0 ft Mar. 17; minimum elevation, 6,171.09 Sept. 30.

ELEVATION, in FT (NGVD), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6172.17	6171.88	6172.34	6172.71	6172.86	6172.86	6172.83	6172.71	6172.50	---	---	6171.64
2	6172.15	6171.87	6172.36	6172.76	6172.85	6172.83	6172.82	6172.70	6172.50	---	---	6171.63
3	6172.15	6171.86	6172.37	6172.75	6172.84	6172.83	6172.81	6172.68	6172.49	---	---	6171.60
4	6172.12	6171.84	6172.40	6172.73	6172.82	6172.82	6172.80	6172.67	6172.49	---	---	6171.56
5	6172.10	6171.82	6172.55	6172.75	6172.80	6172.83	6172.80	6172.66	6172.48	---	---	6171.52
6	6172.08	6171.80	6172.57	6172.80	6172.82	6172.86	6172.79	6172.63	6172.48	---	---	6171.51
7	6172.05	6171.77	6172.57	6172.79	6172.95	6172.86	6172.78	6172.62	6172.46	---	---	6171.48
8	6172.01	6171.76	6172.56	6172.83	6172.94	6172.84	6172.77	6172.61	6172.45	---	---	6171.46
9	6172.00	6171.74	6172.56	6172.82	6172.91	6172.83	6172.82	6172.59	6172.43	---	---	6171.44
10	6172.03	6171.71	6172.57	6172.81	6172.90	6172.84	6172.81	6172.57	6172.43	---	---	6171.43
11	6172.05	6171.69	6172.56	6172.80	6172.88	6172.88	6172.83	6172.56	6172.41	---	---	6171.42
12	6172.02	6171.76	6172.56	6172.79	6172.86	6172.93	6172.81	6172.55	6172.41	---	---	6171.40
13	6172.00	6171.78	6172.59	6172.77	6172.85	6172.96	6172.82	6172.55	6172.40	---	---	6171.39
14	6171.97	6171.75	6172.60	6172.75	6172.82	6172.94	6172.84	6172.54	6172.40	---	---	6171.36
15	6171.96	6171.79	6172.64	6172.73	6172.80	6172.94	6172.84	6172.52	6172.39	---	6172.00	6171.33
16	6171.94	6171.83	6172.66	6172.72	6172.80	6172.98	6172.86	6172.51	6172.39	---	6171.98	6171.31
17	6171.90	6171.81	6172.66	6172.70	6172.79	6172.98	6172.86	6172.50	6172.46	---	6171.95	6171.35
18	6171.89	6171.77	6172.71	6172.70	6172.80	6172.97	6172.85	6172.50	6172.50	---	6171.93	6171.31
19	6171.88	6171.81	6172.69	6172.71	6172.87	6172.94	6172.83	6172.50	6172.48	---	6171.90	6171.31
20	6171.86	6171.86	6172.70	6172.79	6172.94	6172.93	6172.82	6172.51	6172.48	---	6171.86	6171.28
21	6171.84	6171.99	6172.66	6172.88	6172.93	6172.91	6172.81	6172.51	6172.47	---	6171.84	6171.27
22	6171.99	6172.05	6172.70	6172.88	6172.95	6172.90	6172.80	6172.50	6172.46	---	6171.81	6171.26
23	6171.94	6172.01	6172.67	6172.87	6172.96	6172.94	6172.79	6172.49	6172.45	---	6171.81	6171.24
24	6171.93	6172.08	6172.65	6172.86	6172.94	6172.93	6172.77	6172.48	6172.44	---	6171.80	6171.22
25	6171.90	6172.12	6172.63	6172.90	6172.93	6172.92	6172.76	6172.47	6172.44	---	6171.77	6171.20
26	6171.88	6172.10	6172.61	6172.94	6172.91	6172.90	6172.76	6172.47	6172.43	---	6171.75	6171.18
27	6171.86	6172.07	6172.64	6172.92	6172.90	6172.90	6172.75	6172.48	6172.43	---	6171.72	6171.14
28	6171.84	6172.24	6172.62	6172.90	6172.88	6172.88	6172.74	6172.50	6172.44	---	6171.71	6171.13
29	6171.82	6172.23	6172.62	6172.88	---	6172.86	6172.74	6172.51	---	---	6171.69	6171.11
30	6171.93	6172.20	6172.65	6172.86	---	6172.85	6172.72	6172.51	---	---	6171.67	6171.09
31	6171.91	---	6172.64	6172.86	---	6172.84	---	6172.50	---	---	6171.65	---
MAX	6172.17	6172.24	6172.71	6172.94	6172.96	6172.98	6172.86	6172.71	---	---	---	6171.64
MIN	6171.82	6171.69	6172.34	6172.70	6172.79	6172.82	6172.72	6172.47	---	---	---	6171.09

CAL YR 2001 MAX 6174.56 MIN 6171.69

11492200 CRATER LAKE NEAR CRATER LAKE, OR

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 1963 to current year.

INSTRUMENTATION.--Temperature recorder from October 1963 to current year. Elevation of probe is approximately 6,140 ft above sea level.

REMARKS.--Records good. Records represent water temperature at the probe and are not necessarily representative of the entire lake.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum 18.5°C Aug. 9, 10, 1978, several days in July and August, 1994, Aug. 14-16, 1998, July 14, 2002; minimum recorded, 0.5°C on several days in 1969, but may have been as low or lower during period of missing record Oct. 29, 1985 to July 1, 1986.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 18.5°C July 14; minimum, 2.9°C Feb. 9.

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	13.3	13.1	13.2	9.1	9.0	9.1	5.8	5.6	5.7	4.2	4.1	4.2
2	13.2	12.9	13.1	9.1	8.9	9.0	5.7	5.5	5.6	4.2	4.1	4.2
3	13.4	13.1	13.2	9.1	8.9	9.0	5.5	5.4	5.5	4.2	4.1	4.1
4	13.6	13.1	13.3	9.1	8.9	9.0	5.4	5.3	5.4	4.2	4.0	4.1
5	13.5	13.2	13.3	9.0	8.8	8.9	5.3	5.2	5.2	4.2	4.1	4.1
6	13.3	13.0	13.1	8.9	8.7	8.8	5.2	5.0	5.1	4.1	4.1	4.1
7	13.3	12.9	13.1	8.7	8.5	8.7	---	---	---	4.1	4.1	4.1
8	12.9	12.6	12.8	8.7	8.6	8.6	---	---	---	4.2	4.1	4.1
9	12.7	12.4	12.6	8.6	8.5	8.6	5.0	4.9	5.0	4.2	4.1	4.1
10	12.6	12.1	12.3	8.6	8.4	8.5	4.9	4.7	4.8	4.1	4.1	4.1
11	12.1	11.8	12.0	8.5	8.4	8.5	4.8	4.6	4.7	4.1	4.0	4.1
12	12.0	11.7	11.9	8.4	8.3	8.4	4.8	4.6	4.7	4.1	4.0	4.1
13	11.9	11.6	11.8	8.3	8.2	8.2	4.7	4.5	4.7	4.0	4.0	4.0
14	11.9	11.5	11.7	8.2	8.1	8.2	4.6	4.5	4.6	4.0	3.7	3.8
15	11.7	11.4	11.6	8.1	8.0	8.1	4.7	4.6	4.6	3.8	3.7	3.7
16	11.5	11.2	11.4	8.0	7.9	8.0	4.7	4.5	4.6	4.0	3.7	3.8
17	11.3	11.0	11.2	8.0	7.8	7.9	4.6	4.4	4.5	3.9	3.7	3.8
18	11.2	11.0	11.1	7.8	7.7	7.7	4.6	4.4	4.5	3.9	3.6	3.7
19	11.2	11.0	11.1	7.7	7.5	7.6	4.5	4.4	4.4	4.0	3.7	3.9
20	11.2	11.0	11.1	7.5	7.3	7.4	4.5	4.3	4.4	4.1	4.0	4.0
21	11.1	10.9	11.0	7.3	7.1	7.2	4.5	4.3	4.4	4.0	3.8	3.9
22	10.9	10.7	10.8	7.1	6.8	6.9	4.3	4.2	4.3	3.9	3.8	3.9
23	10.7	10.3	10.5	6.9	6.7	6.8	4.3	4.2	4.3	3.9	3.8	3.9
24	10.3	10.0	10.2	6.7	6.5	6.6	4.3	4.1	4.2	3.9	3.6	3.7
25	10.3	10.0	10.1	6.5	6.3	6.4	4.2	4.1	4.2	3.8	3.7	3.7
26	10.2	10.0	10.1	6.5	6.3	6.4	4.3	4.1	4.2	3.8	3.6	3.8
27	10.1	9.9	10	6.3	6.2	6.3	4.3	4.2	4.2	3.9	3.6	3.7
28	9.9	9.8	9.9	6.2	6.0	6.1	4.2	4.1	4.2	3.9	3.6	3.7
29	9.9	9.7	9.7	6.1	5.9	6.0	4.3	4.1	4.2	3.6	3.4	3.5
30	9.7	9.4	9.6	5.9	5.8	5.9	4.3	4.1	4.2	3.6	3.1	3.4
31	9.4	9.1	9.3	---	---	---	4.4	4.1	4.2	3.7	3.5	3.6
MONTH	13.6	9.1	11.5	9.1	5.8	7.8	---	---	---	4.2	3.1	3.9

11492200 CRATER LAKE NEAR CRATER LAKE, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.9	3.5	3.7	3.7	3.1	3.4	4.4	3.8	4.1	4.5	4.2	4.3
2	3.5	3.1	3.2	3.8	3.3	3.5	4.4	3.7	4.1	4.6	4.3	4.4
3	3.4	3.0	3.2	3.9	3.3	3.6	4.4	3.8	4.1	4.6	4.2	4.4
4	3.7	3.2	3.4	4.0	3.4	3.6	4.4	3.9	4.1	4.7	4.4	4.6
5	3.4	3.2	3.3	3.6	3.4	3.5	4.2	3.8	4.0	4.6	4.2	4.4
6	3.4	3.1	3.3	3.6	3.5	3.5	4.3	3.7	4.0	4.8	4.3	4.5
7	3.3	3.2	3.2	3.5	3.4	3.5	4.3	3.7	4.0	4.7	4.2	4.4
8	3.4	3.1	3.3	3.9	3.4	3.6	4.4	3.9	4.2	4.8	4.4	4.6
9	3.4	2.9	3.2	3.5	3.3	3.4	4.1	3.8	3.9	4.8	4.6	4.7
10	3.4	3.1	3.2	3.4	3.3	3.3	4.2	3.8	3.9	4.7	4.5	4.6
11	3.5	3.2	3.3	3.4	3.3	3.3	3.9	3.8	3.9	4.7	4.4	4.5
12	3.4	3.1	3.2	3.4	3.3	3.3	4.2	3.8	4.0	4.8	4.6	4.7
13	3.8	3.2	3.5	3.4	3.3	3.4	4.0	3.8	3.9	4.8	4.5	4.7
14	3.6	3.3	3.4	3.5	3.3	3.4	4.1	3.8	3.9	4.9	4.5	4.7
15	3.5	3.3	3.4	3.8	3.4	3.5	4.0	3.7	3.9	5.1	4.9	4.9
16	3.5	3.4	3.4	3.4	3.3	3.4	4.0	3.9	3.9	5.0	4.7	4.9
17	3.5	3.4	3.4	3.6	3.2	3.3	4.1	3.8	4.0	5.0	4.7	4.8
18	3.7	3.4	3.5	3.5	3.1	3.2	3.9	3.8	3.9	5.4	5.0	5.1
19	3.5	3.4	3.4	3.5	3.1	3.3	4.4	3.7	4.0	5.7	5.3	5.5
20	3.6	3.3	3.4	3.4	3.2	3.3	4.5	4.0	4.3	5.7	5.4	5.5
21	3.6	3.4	3.5	3.2	3.1	3.2	4.5	4.2	4.4	5.4	5.0	5.2
22	3.6	3.4	3.4	3.3	3.1	3.2	4.5	4.2	4.4	5.1	4.9	5.0
23	3.4	3.4	3.4	3.6	3.2	3.4	4.5	4.3	4.4	5.4	5.0	5.2
24	3.7	3.3	3.5	3.7	3.3	3.5	4.4	4.2	4.3	5.5	5.1	5.3
25	3.9	3.4	3.7	3.7	3.4	3.5	4.6	4.2	4.4	5.7	5.3	5.5
26	4.2	3.5	3.8	3.9	3.4	3.6	4.5	4.1	4.4	6.2	5.4	5.8
27	4.1	3.6	3.8	4.1	3.4	3.7	4.5	4.0	4.2	6.9	5.4	6.2
28	3.8	3.1	3.5	3.9	3.3	3.6	4.4	3.9	4.2	7.3	6.8	7.1
29	---	---	---	4.2	3.6	3.9	4.4	4.1	4.3	7.5	6.5	6.9
30	---	---	---	4.4	3.7	4.0	4.5	4.2	4.3	6.5	6.3	6.4
31	---	---	---	4.4	3.7	4.0	---	---	---	7.0	6.4	6.7
MONTH	4.2	2.9	3.4	4.4	3.1	3.5	4.6	3.7	4.1	7.5	4.2	5.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.9	6.7	7.4	13.1	12.3	12.8	17.7	17.5	17.6	15.9	15.8	15.9
2	7.5	6.7	7.1	12.5	11.7	12.1	18.2	17.1	17.6	16.1	15.8	15.9
3	6.8	6.3	6.6	14.2	12.2	13.5	17.7	17.3	17.4	16.1	15.7	15.9
4	8.3	6.7	7.3	13.8	12.9	13.3	17.3	16.4	16.8	16.0	15.5	15.8
5	9.2	8.3	8.7	13.4	12.6	12.9	16.4	15.7	16.1	15.5	15.0	15.3
6	8.9	7.8	8.4	13.7	12.7	13.2	15.9	15.4	15.7	15.0	14.7	14.8
7	8.6	6.8	7.9	14.3	13.2	13.8	15.6	15.3	15.4	14.7	14.4	14.6
8	8.0	7.4	7.7	14.6	13.8	14.3	15.8	15.4	15.6	14.5	14.3	14.4
9	8.0	6.6	7.4	14.1	13.6	13.9	15.8	15.5	15.6	14.6	14.3	14.4
10	8.0	6.7	7.4	14.1	13.6	13.8	16.2	15.3	15.8	14.6	14.3	14.4
11	8.2	7.4	7.8	14.6	13.8	14.3	16.4	16.0	16.2	14.6	14.4	14.5
12	8.3	7.7	8.0	14.7	14.1	14.4	16.5	15.8	16.1	14.7	14.4	14.6
13	8.4	7.9	8.1	15.6	14.2	14.8	16.6	16.2	16.4	15.2	14.5	14.8
14	8.8	7.7	8.3	18.5	15.0	17.0	16.5	16.2	16.4	15.2	15.0	15.1
15	9.6	8.3	9.0	17.7	14.7	16.2	17.4	16.2	17.0	15.1	14.8	14.9
16	11.9	9.6	11.1	16.8	14.8	16.1	17.3	16.9	17.1	14.8	14.2	14.5
17	11.1	9.9	10.6	17.1	16.2	16.7	17.7	16.6	17.2	14.3	14.1	14.2
18	9.9	9.4	9.7	17.8	16.2	17.1	16.7	16.2	16.5	14.2	14.0	14.1
19	10.0	9.3	9.8	18.1	17.0	17.7	16.8	16.5	16.7	14.1	13.7	13.9
20	9.9	9.3	9.6	17.5	16.6	17.0	16.6	16.1	16.3	14.0	13.6	13.8
21	9.8	9.3	9.6	17.1	16.3	16.8	16.4	15.9	16.2	13.8	13.3	13.5
22	10.1	8.4	9.5	17.0	16.8	16.9	16.4	16.0	16.2	14.1	13.6	13.8
23	11.5	10.1	10.9	17.8	16.5	17.1	16.1	15.8	15.9	13.9	13.7	13.8
24	11.3	10.6	11.0	17.7	16.3	17.2	16.0	15.7	15.9	13.9	13.6	13.7
25	11.6	10.7	11.2	17.1	16.4	16.7	15.9	15.5	15.7	13.9	13.6	13.8
26	11.7	10.4	11.2	17.7	17.0	17.3	16.0	15.5	15.7	13.8	13.5	13.6
27	13.9	11.0	12.7	17.5	16.3	17.0	15.9	15.5	15.7	13.9	13.4	13.6
28	14.2	12.8	13.9	17.2	15.6	16.6	15.8	15.4	15.6	13.6	13.2	13.4
29	13.9	12.7	13.3	16.8	16.0	16.4	15.9	15.6	15.8	13.4	12.8	13.1
30	13.3	12.3	12.9	17.7	16.4	17.1	15.9	15.4	15.6	12.8	12.5	12.7
31	---	---	---	17.9	17.2	17.5	16.0	15.5	15.8	---	---	---
MONTH	14.2	6.3	9.5	18.5	11.7	15.5	18.2	15.3	16.2	16.1	12.5	14.4

11493500 WILLIAMSON RIVER NEAR KLAMATH AGENCY, OR

LOCATION.--Lat 42°44'25", long 121°50'00", in NW 1/4 SW 1/4 sec.1, T.33 S., R.7 E., Klamath County, Hydrologic Unit 18010201, on right bank 250 ft downstream from highway bridge, 0.6 mi southwest of railroad station at Kirk, 10 mi upstream from Spring Creek, and 10 mi northeast of Klamath Agency.

DRAINAGE AREA.--1,290 mi^2, approximately.

PERIOD OF RECORD.--March 1908 to January 1909, April 1909 to June 1910, October 1954 to September 1995, October 1998 to current year. Monthly discharge only June 1910, published in WSP 1315-B.

REVISED RECORDS.--WSP 1565: 1908-9.

GAGE.--Water-stage recorder. Datum of gage is 4,483.16 ft above NGVD of 1929. Mar. 25, 1908, to June 30, 1910, nonrecording gage or water-stage recorder at two sites about 0.5 mi upstream at different datums. Oct. 1, 1954, to Sept. 30, 1955, water-stage recorder at present site at datum 2.05 ft higher.

REMARKS.--Records fair. Flow affected by natural storage in Klamath Marsh. Small diversions upstream from station for irrigation in vicinity of marsh.

AVERAGE DISCHARGE.--45 years (water years 1955-95, 1999-2002), 183 ft^3/s, 132,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 1,590 ft^3/s Mar. 13, 1910, gage height, 3.7 ft, site and datum then in use, from rating curve extended above 800 ft^3/s; maximum gage height, 5.75 ft Mar. 3, 1958; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 426 ft^3/s Mar. 9, gage height, 4.65 ft; minimum discharge, no flow Oct. 1 to Nov. 23, July 12 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.0	0.0	e72	130	249	263	356	186	25	5.1	0.0	0.0
2	0.0	0.0	e75	143	247	286	347	177	26	4.5	0.0	0.0
3	0.0	0.0	e78	152	238	323	337	173	23	3.8	0.0	0.0
4	0.0	0.0	e80	163	236	355	326	165	22	3.6	0.0	0.0
5	0.0	0.0	e82	172	232	369	307	151	18	3.5	0.0	0.0
6	0.0	0.0	e85	190	231	390	301	146	19	2.9	0.0	0.0
7	0.0	0.0	e90	206	223	412	300	152	18	1.9	0.0	0.0
8	0.0	0.0	e95	223	219	416	293	145	19	1.6	0.0	0.0
9	0.0	0.0	e97	241	217	419	285	127	18	1.4	0.0	0.0
10	0.0	0.0	e97	261	214	406	281	115	17	0.51	0.0	0.0
11	0.0	0.0	e97	280	214	399	275	99	16	0.15	0.0	0.0
12	0.0	0.0	e97	293	213	397	271	85	14	0.0	0.0	0.0
13	0.0	0.0	e96	306	207	405	262	73	12	0.0	0.0	0.0
14	0.0	0.0	e96	315	203	418	251	69	11	0.0	0.0	0.0
15	0.0	0.0	e96	317	200	417	255	58	11	0.0	0.0	0.0
16	0.0	0.0	e98	320	192	398	246	47	9.3	0.0	0.0	0.0
17	0.0	0.0	e100	326	187	395	241	40	9.2	0.0	0.0	0.0
18	0.0	0.0	e102	324	183	380	246	36	7.9	0.0	0.0	0.0
19	0.0	0.0	e102	318	179	354	243	36	9.3	0.0	0.0	0.0
20	0.0	0.0	e102	315	176	360	235	34	8.8	0.0	0.0	0.0
21	0.0	0.0	e103	312	174	378	229	32	9.9	0.0	0.0	0.0
22	0.0	0.0	e102	303	168	376	226	33	8.3	0.0	0.0	0.0
23	0.0	0.0	e102	299	169	377	223	33	8.5	0.0	0.0	0.0
24	0.0	10	e102	299	176	383	217	31	8.4	0.0	0.0	0.0
25	0.0	24	e102	299	183	387	212	29	8.5	0.0	0.0	0.0
26	0.0	40	e103	296	195	385	203	27	7.2	0.0	0.0	0.0
27	0.0	51	e105	286	213	383	197	26	5.7	0.0	0.0	0.0
28	0.0	63	e107	288	236	382	194	26	4.9	0.0	0.0	0.0
29	0.0	65	e109	290	---	375	190	24	4.5	0.0	0.0	0.0
30	0.0	71	114	278	---	364	183	25	4.4	0.0	0.0	0.0
31	0.0	---	122	262	---	359	---	24	---	0.0	0.0	---
TOTAL	0.0	324.0	3008	8207	5774	11711	7732	2424	383.8	28.96	0.0	0.0
MEAN	0.000	10.8	97.0	265	206	378	258	78.2	12.8	0.93	0.000	0.000
MAX	0.00	71	122	326	249	419	356	186	26	5.1	0.00	0.00
MIN	0.00	0.00	72	130	168	263	183	24	4.4	0.00	0.00	0.00
AC-FT	0.00	643	5970	16280	11450	23230	15340	4810	761	57	0.00	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2002, BY WATER YEAR (WY)

MEAN	41.2	117	217	224	290	429	441	258	122	43.9	14.3	12.6
MAX	255	391	580	730	799	1039	1081	952	531	332	146	95.8
(WY)	1958	1957	1956	1956	1965	1986	1956	1956	1956	1958	1958	1958
MIN	0.000	0.000	0.000	0.000	0.000	58.6	22.3	7.35	0.000	0.000	0.000	0.000
(WY)	1962	1965	1991	1992	1993	1994	1992	1992	1992	1981	1961	1960

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1955 - 2002	
ANNUAL TOTAL	39364.35		39592.76			
ANNUAL MEAN	108		108		183	
HIGHEST ANNUAL MEAN					468	1956
LOWEST ANNUAL MEAN					7.84	1992
HIGHEST DAILY MEAN	409	Mar 23	419	Mar 9	1250	Mar 1 1958
LOWEST DAILY MEAN	0.00	Jul 21	0.00	Oct 1	0.00	Jul 23 1960
ANNUAL SEVEN-DAY MINIMUM	0.00	Jul 21	0.00	Oct 1	0.00	Jul 23 1960
ANNUAL RUNOFF (AC-FT)	78080		78530		132900	
10 PERCENT EXCEEDS	307		319		479	
50 PERCENT EXCEEDS	77		26		109	
90 PERCENT EXCEEDS	0.00		0.00		0.00	

e Estimated

11495800 NORTH FORK SPRAGUE RIVER AT POWERPLANT, NEAR BLY, OR

LOCATION.--Lat 42°30'06", long 120°59'13", in SW 1/4 SE 1/4 sec.30, T.35 S., R.15 E., Klamath County, Hydrologic Unit 18010202, at powerplant 0.1 mi upstream from Yaden Creek, and 7.6 mi northeast of Bly.

DRAINAGE AREA.--77.7 mi^2.

PERIOD OF RECORD.--May 1993 to current year.

GAGE.--Water-stage record. Elevation of gage is 4,750 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records fair. All records given herein do not include flow diverted through powerplant.

AVERAGE DISCHARGE.--9 years (water years 1994-2002), 71.7 ft^3/s, 51,970 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,180 ft^3/s Apr. 24, 1996, gage height, 7.12 ft; minimum discharge, 12 ft^3/s Dec. 10, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 737 ft^3/s Apr. 14, gage height, 6.84 ft; minimum discharge, 19 ft^3/s Jan. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	34	34	40	38	36	34	174	53	32	40	35
2	30	33	30	37	36	37	38	224	44	34	40	35
3	30	32	31	30	35	37	52	165	34	37	40	35
4	31	32	33	34	35	38	77	161	31	36	41	35
5	30	32	34	36	34	39	76	172	34	36	41	35
6	30	32	32	34	33	39	167	179	33	37	41	35
7	31	32	30	32	34	37	118	212	32	37	40	35
8	31	32	33	32	33	36	94	144	32	36	40	35
9	31	32	34	32	33	36	210	136	32	37	39	35
10	31	33	34	32	34	35	224	126	32	37	39	34
11	33	33	34	32	34	39	224	108	32	38	36	34
12	32	33	35	32	35	42	251	107	31	40	31	34
13	32	34	35	32	34	39	262	112	27	44	32	34
14	32	33	34	33	34	38	584	115	36	42	32	34
15	31	32	29	33	34	37	396	112	38	41	32	34
16	31	33	34	34	34	38	290	106	33	43	34	34
17	31	33	34	38	35	34	232	107	32	42	34	36
18	31	32	32	37	34	37	155	110	32	42	34	37
19	32	33	33	36	34	40	123	112	32	43	34	35
20	31	37	33	37	35	35	112	107	32	42	34	35
21	31	46	34	36	36	32	112	98	33	43	34	35
22	32	41	34	32	38	32	120	90	33	46	36	34
23	34	35	33	36	41	32	120	73	33	47	37	34
24	32	31	33	36	40	32	116	66	33	44	37	34
25	32	28	35	36	37	32	130	62	33	43	36	34
26	32	35	34	34	38	32	134	61	33	43	36	34
27	32	32	34	34	38	32	121	63	33	42	36	34
28	32	34	34	36	38	32	109	60	33	42	36	35
29	32	29	35	38	---	33	118	49	33	42	36	34
30	36	29	36	40	---	33	143	53	32	42	36	34
31	36	---	39	41	---	33	---	52	---	41	35	---
TOTAL	982	997	1039	1082	994	1104	4942	3516	1011	1251	1129	1038
MEAN	31.7	33.2	33.5	34.9	35.5	35.6	165	113	33.7	40.4	36.4	34.6
MAX	36	46	39	41	41	42	584	224	53	47	41	37
MIN	30	28	29	30	33	32	34	49	27	32	31	34
AC-FT	1950	1980	2060	2150	1970	2190	9800	6970	2010	2480	2240	2060

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2002, BY WATER YEAR (WY)

MEAN	36.4	40.4	42.9	54.9	42.7	52.4	149	225	110	42.5	32.2	31.4
MAX	51.2	75.7	81.4	211	83.1	91.4	271	425	253	67.2	38.3	43.8
(WY)	1997	1997	1996	1997	1996	1998	2000	1999	1998	1995	1998	1995
MIN	27.5	29.5	29.7	32.4	30.3	33.5	37.7	41.6	33.7	30.0	25.3	23.1
(WY)	2001	1995	2000	2000	1999	1999	2001	2001	2002	1999	2000	2000

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1994 - 2002	
ANNUAL TOTAL	13143		19085			
ANNUAL MEAN	36.0		52.3		71.7	
HIGHEST ANNUAL MEAN					93.4	1996
LOWEST ANNUAL MEAN					36.8	2001
HIGHEST DAILY MEAN	127	May 15	584	Apr 14	735	Jan 1 1997
LOWEST DAILY MEAN	26	Apr 3	27	Jun 13	16	Jan 11 1994
ANNUAL SEVEN-DAY MINIMUM	29	Aug 11	30	Oct 1	22	Sep 23 2000
ANNUAL RUNOFF (AC-FT)	26070		37860		51970	
10 PERCENT EXCEEDS	42		112		182	
50 PERCENT EXCEEDS	35		35		36	
90 PERCENT EXCEEDS	30		32		29	

11501000 SPRAGUE RIVER NEAR CHILOQUIN, OR

LOCATION.--Lat 42°35'05", long 121°50'55", in NE 1/4 NW 1/4 sec.35, T.34 S., R.7 E., Klamath County, Hydrologic Unit 18010202, on right bank 1.0 mi northeast of Chiloquin, 4.6 mi upstream from Modoc Point Canal intake, and at mile 5.4.

DRAINAGE AREA.--1,580 mi^2, approximately.

PERIOD OF RECORD.--July to October 1920, March 1921 to current year. Monthly discharge only July 1920, published in WSP 1315-B. Prior to October 1931, published as "at McCready Ranch, near Chiloquin."

REVISED RECORDS.--WSP 591: 1922(M). WSP 1011: 1943(M). WSP 1565: 1921-22.

GAGE.--Water-stage recorder. Datum of gage is 4,202.43 ft above NGVD of 1929. Prior to Oct. 1, 1931, nonrecording gage at site 12 mi upstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Minor regulation from irrigation diversions upstream from station.

AVERAGE DISCHARGE.--81 years (water years 1922-2002), 583 ft^3/s, 422,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,900 ft^3/s Dec. 26, 1964, gage height, 10.37 ft; minimum daily discharge, 50 ft^3/s May 26, 1926.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,470 ft^3/s Apr. 19, gage height, 3.56 ft; minimum discharge, 86 ft^3/s Aug. 23, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	234	287	308	520	337	550	627	844	446	203	110	99
2	226	281	306	759	288	511	631	997	443	210	108	98
3	208	273	316	1020	313	462	646	1190	429	216	95	102
4	194	266	317	1240	305	429	673	1330	423	227	94	101
5	191	265	323	1420	300	414	704	1370	399	217	94	93
6	191	265	335	1280	297	410	725	1260	378	197	97	92
7	194	264	338	896	302	430	751	1100	328	188	107	105
8	201	264	364	889	321	463	795	1000	318	188	108	111
9	220	264	379	1030	336	506	825	940	321	166	104	107
10	234	266	364	1040	328	470	846	883	318	157	97	120
11	246	273	339	898	309	440	868	832	330	146	96	138
12	254	278	349	721	311	442	937	788	331	143	95	145
13	256	283	352	615	318	448	1000	748	315	145	104	140
14	249	283	347	545	322	613	1050	708	309	144	105	134
15	252	286	329	478	325	659	1070	679	294	135	98	121
16	245	290	350	426	326	549	1110	656	299	140	96	118
17	243	284	332	386	328	502	1260	632	283	147	96	123
18	251	283	334	356	339	468	1430	581	249	143	92	124
19	252	283	343	354	354	441	1450	560	243	136	95	130
20	255	286	343	340	392	408	1380	565	237	140	101	155
21	256	296	344	346	470	419	1270	594	235	148	107	165
22	259	323	346	327	650	429	1130	610	226	147	103	160
23	256	346	337	337	711	477	1000	613	233	162	89	158
24	251	365	327	324	672	525	898	604	267	161	96	151
25	256	342	315	344	733	563	837	570	284	153	88	153
26	256	320	298	329	756	589	786	538	272	146	98	159
27	250	311	299	325	649	574	748	509	232	132	104	159
28	256	306	322	312	592	571	748	457	206	118	109	173
29	266	293	327	343	---	580	741	443	200	108	111	176
30	284	293	346	380	---	584	761	431	207	108	109	169
31	282	---	414	400	---	608	---	435	---	106	106	---
TOTAL	7468	8719	10443	18980	11684	15534	27697	23467	9055	4877	3112	3979
MEAN	241	291	337	612	417	501	923	757	302	157	100	133
MAX	284	365	414	1420	756	659	1450	1370	446	227	111	176
MIN	191	264	298	312	288	408	627	431	200	106	88	92
AC-FT	14810	17290	20710	37650	23180	30810	54940	46550	17960	9670	6170	7890

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 2002, BY WATER YEAR (WY)

MEAN	294	344	466	542	691	944	1268	1142	611	278	216	235
MAX	848	789	2853	3017	2877	2904	4250	3211	1762	560	405	374
(WY)	1963	1974	1965	1997	1996	1972	1956	1956	1983	1983	1956	1956
MIN	183	218	215	196	223	286	263	119	93.8	85.1	76.9	125
(WY)	1934	1995	1933	1937	1933	1992	1977	1992	1992	1994	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1921 - 2002	
ANNUAL TOTAL	102066		145015			
ANNUAL MEAN	280		397		583	
HIGHEST ANNUAL MEAN					1395	1956
LOWEST ANNUAL MEAN					199	1992
HIGHEST DAILY MEAN	586	Mar 28	1450	Apr 19	14500	Dec 26 1964
LOWEST DAILY MEAN	104	Sep 7	88	Aug 25	50	May 26 1926
ANNUAL SEVEN-DAY MINIMUM	116	Sep 5	97	Aug 19	65	Aug 5 1992
ANNUAL RUNOFF (AC-FT)	202400		287600		422600	
10 PERCENT EXCEEDS	406		828		1310	
50 PERCENT EXCEEDS	284		318		345	
90 PERCENT EXCEEDS	143		108		199	

11502500 WILLIAMSON RIVER BELOW SPRAGUE RIVER, NEAR CHILOQUIN, OR

LOCATION.--Lat 42°33'54", long 121°52'42", in NE 1/4 SE 1/4 sec.4, T.35 S., R.7 E., Klamath County, Hydrologic Unit 18010201, on right bank 0.8 mi downstream from Sprague River and 1.2 mi southwest of Chiloquin, and at mile 10.3.

DRAINAGE AREA.--3,000 mi^2, approximately.

PERIOD OF RECORD.--June 1917 to current year. Monthly discharge only for October 1922 to August 1923 published in WSP 1315-B.

REVISED RECORDS.--WSP 981: 1938(M). WSP 1565: 1920(M), 1927(M), 1938.

GAGE.--Water-stage recorder. Datum of gage is 4,148.50 ft above NGVD of 1929. September 1, 1923 to July 12, 1991 at site 0.6 mi upstream at datum 7.05 ft higher. Prior to Sept. 1, 1923, at different datum.

REMARKS.--No estimated daily discharges. Records good. Some regulation by diversion dams and logpond operations on Sprague River. Diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--84 years (water years 1918-22, 1924-2002), 1,046 ft^3/s, 757,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,100 ft^3/s Jan. 5, 1997, gage height, 10.27 ft; minimum discharge, 285 ft^3/s Aug. 6, 8, 9, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,000 ft^3/s Apr. 18, 19, gage height, 5.23 ft; minimum discharge, 354 ft^3/s Aug. 16-19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	524	592	688	949	925	1190	1320	1300	718	434	373	389
2	517	589	692	1200	886	1160	1320	1440	705	438	377	384
3	502	581	699	1460	891	1120	1330	1610	692	444	363	391
4	486	573	700	1680	872	1100	1350	1750	682	448	362	392
5	485	570	720	1870	859	1100	1360	1790	660	445	363	379
6	487	573	736	1810	850	1110	1370	1680	632	431	364	381
7	492	569	734	1450	860	1140	1380	1520	589	423	376	387
8	501	568	754	1440	873	1180	1420	1430	571	424	379	400
9	518	572	779	1590	876	1230	1450	1350	573	409	378	394
10	534	573	764	1630	870	1200	1460	1270	569	398	371	403
11	548	581	744	1520	845	1170	1470	1200	572	389	368	424
12	556	591	703	1370	842	1170	1520	1140	574	377	368	434
13	561	595	756	1270	849	1170	1580	1090	561	384	373	434
14	553	592	770	1210	845	1340	1620	1040	552	389	380	428
15	555	592	738	1140	848	1410	1630	1000	563	385	370	414
16	548	601	763	1090	846	1310	1660	968	557	390	364	407
17	540	592	749	1050	847	1250	1790	941	535	403	364	418
18	549	586	749	1010	854	1210	1950	892	504	403	359	416
19	551	590	760	1010	879	1170	1990	867	486	399	360	420
20	555	596	757	996	929	1130	1920	865	479	401	370	441
21	556	616	754	1010	999	1140	1800	881	471	415	379	454
22	562	637	757	972	1190	1150	1660	895	464	420	379	451
23	562	647	748	971	1300	1200	1530	900	467	440	364	447
24	554	677	733	945	1250	1250	1430	891	485	443	370	441
25	558	665	725	979	1310	1290	1370	859	498	460	368	439
26	563	649	707	959	1360	1320	1300	825	492	466	373	442
27	557	651	705	941	1270	1300	1250	802	467	408	383	443
28	560	674	733	855	1220	1290	1240	749	441	392	392	454
29	570	662	742	835	---	1300	1220	727	432	380	401	464
30	600	660	765	856	---	1300	1230	707	434	381	401	456
31	591	---	840	878	---	1310	---	702	---	375	395	---
TOTAL	16795	18214	22964	36946	27245	37710	44920	34081	16425	12794	11587	12627
MEAN	542	607	741	1192	973	1216	1497	1099	548	413	374	421
MAX	600	677	840	1870	1360	1410	1990	1790	718	466	401	464
MIN	485	568	688	835	842	1100	1220	702	432	375	359	379
AC-FT	33310	36130	45550	73280	54040	74800	89100	67600	32580	25380	22980	25050

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2002, BY WATER YEAR (WY)

MEAN	651	758	942	1021	1243	1617	1973	1657	1003	606	534	561
MAX	1237	1345	3682	4067	3846	4256	5488	4376	2658	1278	934	872
(WY)	1963	1974	1965	1997	1958	1972	1952	1956	1953	1958	1958	1958
MIN	488	530	545	524	547	619	583	391	338	311	304	382
(WY)	1993	1995	1993	1937	1933	1992	1992	1992	1992	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1918 - 2002	
ANNUAL TOTAL	243999		292308			
ANNUAL MEAN	668		801		1046	
HIGHEST ANNUAL MEAN					2187	1956
LOWEST ANNUAL MEAN					483	1992
HIGHEST DAILY MEAN	1280	Mar 28	1990	Apr 19	16000	Dec 26 1964
LOWEST DAILY MEAN	367	Aug 8	359	Aug 18	288	Aug 6 1994
ANNUAL SEVEN-DAY MINIMUM	372	Aug 18	367	Aug 15	294	Aug 4 1994
ANNUAL RUNOFF (AC-FT)	484000		579800		757400	
10 PERCENT EXCEEDS	985		1370		1990	
50 PERCENT EXCEEDS	637		692		750	
90 PERCENT EXCEEDS	405		386		503	

11503000 ANNIE SPRING NEAR CRATER LAKE, OR

LOCATION.--Lat 42°52'18", long 122°10'04", unsurveyed, Klamath County, Hydrologic Unit 18010203, in Crater Lake National Park, at highway bridge 0.1 mi downstream from source.

DRAINAGE AREA.--Indeterminate, normal flow is entirely from Annie Spring.

PERIOD OF RECORD.--June 1977 to current year. Discharge measurement and fragmentary gage-height record August to October 1913. Discharge measurements only Oct. 11, 1967, June 26, Sept. 13, 1968.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 5,982.65 ft above NGVD of 1929 (National Park Service bench mark).

REMARKS.--Records poor. Fluctuations caused by pumps 0.1 mi upstream. Diversion for domestic use by National Park Service 0.1 mi upstream.

COOPERATION.--Records of diversion by pumping furnished by National Park Service.

AVERAGE DISCHARGE.--25 years (water years 1978-2002), 2.85 ft^3/s, 2,060 acre-ft/yr, adjusted for diversion.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18 ft^3/s July 6, 1984, gage height, 1.56 ft; minimum daily discharge, 0.28 ft^3/s Mar. 2-5, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6.8 ft^3/s June 21-25, gage height, 3.34 ft; minimum daily discharge, 0.23 ft^3/s Mar. 14, 16-31, Apr. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.58	1.1	0.46	0.37	0.30	0.26	0.23	e1.6	4.8	6.5	2.9	1.7
2	0.57	1.1	0.46	0.35	0.30	0.26	0.25	e1.6	5.3	6.4	2.8	1.8
3	0.61	1.1	0.46	0.35	0.30	0.26	0.25	e1.7	5.8	6.3	2.8	1.8
4	0.56	1.1	0.46	0.35	0.30	0.26	0.27	e1.7	5.9	6.2	2.7	1.7
5	0.54	1.1	0.46	0.35	0.30	0.26	0.30	e1.8	6.0	6.2	2.7	1.8
6	0.56	1.0	0.46	0.35	0.30	0.26	0.30	e1.7	6.0	6.0	2.6	1.8
7	0.54	0.61	0.42	0.35	0.30	0.26	0.32	e1.8	6.1	5.6	2.6	1.7
8	0.56	0.38	0.46	0.35	0.29	0.25	0.33	e1.8	6.2	5.5	2.5	1.7
9	0.54	0.38	0.46	0.35	0.29	0.26	0.40	e1.8	6.2	5.2	2.5	1.7
10	0.53	0.38	0.42	0.35	0.29	0.26	0.42	e1.8	6.3	5.0	2.4	1.7
11	0.52	0.40	0.42	0.33	0.29	0.25	0.44	e1.8	6.3	4.9	2.4	1.6
12	0.52	0.40	0.42	0.33	0.29	0.26	0.44	e1.7	6.2	4.7	2.4	1.6
13	0.52	0.42	0.42	0.33	0.29	0.25	0.52	e1.9	6.2	4.5	2.3	1.6
14	0.50	0.42	0.42	0.33	0.27	0.23	1.3	e1.9	6.2	4.4	2.3	1.6
15	0.51	0.42	0.42	0.33	0.27	0.25	1.5	e2.0	6.2	4.3	2.2	1.6
16	0.50	0.42	0.38	0.33	0.27	0.23	1.7	e2.1	6.3	4.2	2.3	1.6
17	0.50	0.42	0.38	0.33	0.27	0.23	1.8	e2.2	6.3	4.0	2.2	1.6
18	0.50	0.42	0.38	0.33	0.27	0.23	1.9	e2.3	6.3	3.9	2.2	1.6
19	0.49	0.42	0.38	0.33	0.27	0.23	1.8	e2.5	6.3	3.8	2.1	1.5
20	0.50	0.42	0.38	0.32	0.27	0.23	1.8	e2.5	6.4	3.7	2.1	1.5
21	0.50	0.42	0.38	0.32	0.27	0.23	1.7	e2.7	6.5	3.6	2.1	1.5
22	0.50	0.44	0.40	0.32	0.27	0.23	1.7	e2.8	6.8	3.5	2.1	1.5
23	0.58	0.44	0.40	0.32	0.27	0.23	e1.5	e2.9	6.8	3.5	2.0	1.5
24	0.58	0.44	0.40	0.33	0.27	0.23	e1.5	e3.0	6.8	3.4	2.0	1.5
25	0.56	0.44	0.40	0.33	0.27	0.23	e1.6	e3.1	6.8	3.4	2.0	1.5
26	0.56	0.44	0.40	0.32	0.27	0.23	e1.6	3.1	6.6	3.2	2.0	1.5
27	0.56	0.44	0.37	0.33	0.26	0.23	e1.6	3.3	6.6	3.2	1.9	1.4
28	0.56	0.44	0.37	0.32	0.26	0.23	e1.6	3.4	6.6	3.1	1.9	1.4
29	0.56	0.44	0.37	0.30	---	0.23	e1.6	3.6	6.6	3.0	1.9	1.4
30	0.75	0.46	0.37	0.32	---	0.23	e1.6	4.0	6.6	3.0	1.9	1.4
31	1.2	---	0.37	0.30	---	0.23	---	4.4	---	2.9	1.8	---
TOTAL	17.56	16.81	12.75	10.32	7.87	7.51	32.27	74.5	188.0	137.1	70.6	47.8
MEAN	0.57	0.56	0.41	0.33	0.28	0.24	1.08	2.40	6.27	4.42	2.28	1.59
MAX	1.2	1.1	0.46	0.37	0.30	0.26	1.9	4.4	6.8	6.5	2.9	1.8
MIN	0.49	0.38	0.37	0.30	0.26	0.23	0.23	1.6	4.8	2.9	1.8	1.4
AC-FT	35	33	25	20	16	15	64	148	373	272	140	95
MEAN†	0.60	0.57	0.42	0.34	0.29	0.27	1.09	2.44	6.34	4.54	2.38	1.68
AC-FT†	37	34	26	21	16	16	65	150	377	279	146	100

CAL YR 2001 TOTAL 369.97 MEAN 1.01 MAX 3.1 MIN 0.37 AC-FT 734 MEAN† 1.06 AC-FT† 766
WTR YR 2002 TOTAL 623.09 MEAN 1.71 MAX 6.8 MIN 0.23 AC-FT 1240 MEAN† 1.75 AC-FT† 1268

e Estimated
† Adjusted for diversion by pumping.

11507001 UPPER KLAMATH LAKE NEAR KLAMATH FALLS, OR

LOCATION.--Lat 42°15'00", long 121°48'55", in NW 1/4 SW 1/4 sec.19, T.38 S., R.9 E., Klamath County, Hydrologic Unit 18010203, at southeast end of lake, 1.4 mi upstream from outlet and 2.5 mi northwest of Main Street Bridge at Klamath Falls.

DRAINAGE AREA.--3,810 mi^2, approximately, including 26.2 mi^2 in closed basin of Crater Lake.

PERIOD OF RECORD.--May 1904 to September 1922 (gage heights only), October 1922 to current year. Monthend contents only October 1923 to September 1927, published in WSP 1315-B.

GAGE.--Water-stage recorder. Datum of gage is 4,098.22 ft above NGVD of 1929, or 4,100.00 ft above Bureau of Reclamation datum. Gage readings have been reduced to elevations above Bureau of Reclamation datum. See WSP 1735 for history of changes prior to Nov. 10, 1923. Since Oct. 1, 1974, supplementary water-stage recorders at sites 7 mi north and 21 mi northwest at same datum (water-surface transfer by Pacific Power and Light Co.).

REMARKS.--Reservoir is formed by concrete dam at outlet of natural lake, completed in 1921, replacing a temporary dam built in 1919; controlled storage began Apr. 15, 1919. Capacity, 523,700 acre-ft between elevations 4,136.0 ft and 4,143.3 ft. Dead storage below elevation 4,136.0 ft is 211,300 acre-ft. Stored water may be diverted through "A" Canal for irrigation on land under Klamath project of Bureau of Reclamation, or released to Link River through dam or powerplants at Klamath Falls. Contents given herein represent those above elevation 4,136.0 ft. Prior to Oct. 1,1973, contents given represented those above elevation 4,135.0 ft. Prior to Sept. 30, 1974, contents at end of month obtained by averaging elevations for last 3 days of month and first 3 days of following month to compensate for wind effect. Since Oct. 1, 1974, daily elevations are weighted mean of elevations at base and supplementary gages; contents at end of month are obtained from weighted midnight elevations of base and supplementary gages.

COOPERATION.--Capacity table furnished by Bureau of Reclamation, Klamath Project.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 4,144.98 ft about Apr. 20, 1904, from high-water marks; minimum recorded, 4,135.55 ft Oct. 30, 1944.

EXTREMES FOR CURRENT YEAR.--Maximum weighted daily elevation, 4,143.17 ft May 7; minimum weighted daily, 4,138.58 ft Sept. 30.

Capacity table (elevation, in feet, and contents, in acre-feet)

4,136	0	4,139	193,700	4,142	414,400
4,137	61,300	4,140	262,600	4,143	498,300
4,138	127,000	4,141	335,400	4,143.3	523,700

ELEVATION, in FT (USBR DATUM), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4139.59	4139.63	4140.18	4141.20	4141.86	4142.39	4142.79	4143.06	4142.74	4141.58	4140.07	4139.03
2	4139.61	4139.65	4140.28	4141.27	4141.86	4142.39	4142.80	4143.08	4142.72	4141.54	4140.02	4139.01
3	4139.62	4139.66	4140.32	4141.34	4141.86	4142.38	4142.82	4143.10	4142.68	4141.47	4139.98	4138.97
4	4139.63	4139.67	4140.32	4141.41	4141.86	4142.36	4142.82	4143.12	4142.64	4141.42	4139.92	4138.95
5	4139.64	4139.69	4140.38	4141.43	4141.87	4142.35	4142.82	4143.13	4142.63	4141.37	4139.90	4138.94
6	4139.62	4139.70	4140.31	4141.48	4141.87	4142.37	4142.87	4143.14	4142.62	4141.31	4139.86	4138.92
7	4139.61	4139.70	4140.51	4141.54	4141.89	4142.45	4142.87	4143.17	4142.60	4141.25	4139.82	4138.88
8	4139.62	4139.69	4140.54	4141.60	4141.92	4142.43	4142.88	4143.14	4142.53	4141.19	4139.78	4138.85
9	4139.60	4139.70	4140.59	4141.65	4141.94	4142.39	4142.88	4143.14	4142.49	4141.15	4139.75	4138.84
10	4139.58	4139.70	4140.60	4141.69	4141.94	4142.42	4142.92	4143.13	4142.44	4141.09	4139.69	4138.83
11	4139.59	4139.67	4140.63	4141.71	4141.95	4142.43	4142.93	4143.09	4142.42	4141.03	4139.67	4138.82
12	4139.56	4139.68	4140.65	4141.73	4141.96	4142.50	4142.94	4143.06	4142.40	4140.97	4139.64	4138.80
13	4139.57	4139.73	4140.66	4141.75	4141.96	4142.51	4142.95	4143.06	4142.37	4140.93	4139.63	4138.78
14	4139.58	4139.76	4140.79	4141.78	4141.98	4142.53	4143.04	4143.04	4142.33	4140.87	4139.59	4138.76
15	4139.58	4139.78	4140.80	4141.79	4141.98	4142.52	4143.08	4143.02	4142.30	4140.82	4139.55	4138.76
16	4139.58	4139.80	4140.82	4141.77	4142.00	4142.52	4143.02	4142.98	4142.26	4140.76	4139.52	4138.75
17	4139.64	4139.84	4140.92	4141.79	4142.03	4142.58	4143.08	4142.96	4142.19	4140.70	4139.48	4138.73
18	4139.58	4139.86	4140.89	4141.77	4142.04	4142.54	4143.12	4142.90	4142.19	4140.65	4139.44	4138.74
19	4139.58	4139.79	4140.89	4141.79	4142.07	4142.56	4143.13	4142.83	4142.16	4140.60	4139.40	4138.72
20	4139.59	4139.86	4140.92	4141.76	4142.15	4142.57	4143.13	4142.84	4142.12	4140.54	4139.36	4138.72
21	4139.59	4139.92	4140.93	4141.81	4142.20	4142.59	4143.15	4142.87	4142.06	4140.50	4139.31	4138.73
22	4139.56	4139.92	4140.94	4141.83	4142.22	4142.58	4143.16	4142.87	4142.00	4140.45	4139.29	4138.70
23	4139.63	4140.03	4140.97	4141.84	4142.27	4142.63	4143.16	4142.85	4141.96	4140.40	4139.26	4138.69
24	4139.61	4140.09	4140.99	4141.84	4142.32	4142.68	4143.15	4142.83	4141.92	4140.37	4139.22	4138.68
25	4139.60	4140.12	4141.00	4141.85	4142.38	4142.70	4143.12	4142.82	4141.90	4140.33	4139.20	4138.68
26	4139.61	4140.16	4141.00	4141.87	4142.38	4142.72	4143.10	4142.82	4141.86	4140.29	4139.17	4138.66
27	4139.60	4140.18	4140.99	4141.87	4142.38	4142.74	4143.06	4142.77	4141.80	4140.26	4139.15	4138.66
28	4139.61	4140.12	4141.02	4141.87	4142.41	4142.74	4143.00	4142.76	4141.72	4140.22	4139.14	4138.62
29	4139.60	4140.24	4141.06	4141.86	---	4142.76	4143.01	4142.76	4141.66	4140.17	4139.10	4138.60
30	4139.61	4140.22	4141.09	4141.85	---	4142.77	4143.03	4142.77	4141.62	4140.14	4139.08	4138.58
31	4139.59	---	4141.16	4141.85	---	4142.78	---	4142.74	---	4140.10	4139.05	---
MEAN	4139.60	4139.85	4140.75	4141.70	4142.06	4142.54	4142.99	4142.96	4142.24	4140.79	4139.52	4138.78
MAX	4139.64	4140.24	4141.16	4141.87	4142.41	4142.78	4143.16	4143.17	4142.74	4141.58	4140.07	4139.03
MIN	4139.56	4139.63	4140.18	4141.20	4141.86	4142.35	4142.79	4142.74	4141.62	4140.10	4139.05	4138.58
(†)	235400	271800	348400	402100	446800	480400	505900	473700	382000	271100	204600	164200
(‡)	+1400	+36400	-76600	+53700	+44700	+33600	+25500	-32200	-91700	-110900	-66500	-40400

CAL YR 2001 MEAN 4141.22 MAX 4143.15 MIN 4139.53 AC-FT‡ +20500
WTR YR 2002 MEAN 4141.14 MAX 4143.17 MIN 4138.58 AC-FT‡ -40400

† Contents, in acre-feet, on last day of month.
‡ Change in contents, in acre-feet.

11507500 LINK RIVER AT KLAMATH FALLS, OR

LOCATION.--Lat 42°13'25", long 121°47'35", in SW 1/4 NW 1/4 sec.32, T.38 S., R.9 E., Klamath County, Hydrologic Unit 18010204, on right bank 600 ft upstream from outlet of Keno Canal and 0.4 mi upstream from Main Street Bridge at Klamath Falls.

DRAINAGE AREA.--3,810 mi^2, approximately, including 26.2 mi^2 in closed basin of Crater Lake.

PERIOD OF RECORD.--May 1904 to current year. Records since October 1983 equivalent to earlier records if flow in Keno Canal is added to flow past station.

GAGE.--Water-stage recorder. Datum of gage is 4,083.71 ft above NGVD of 1929, or 4,085.50 ft above Bureau of Reclamation datum. Prior to Sept. 14, 1912, water-stage recorder or nonrecording gages at several sites within 0.5 mi of present site at various datums. Sept. 14, 1912, to Nov. 23, 1923, at site 600 ft downstream at datum 5.42 ft lower. Nov. 24, 1923, to Nov. 15, 1961, at site on left bank at present datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1919 by Upper Klamath Lake (station 11507001). Large diurnal fluctuation caused by powerplant upstream from station. Water diverted upstream from station by main or "A" Canal of Klamath project. Many other diversions upstream from lake. All records presented herein do not include flow in Keno Canal which, since September 1908, has diverted from Upper Klamath Lake at Link River Dam for power generation, and returns flow to Link River downstream from station.

AVERAGE DISCHARGE.--79 years (water years 1905-83), 1,593 ft^3/s, 1,154,000 acre-ft/yr, not adjusted for "A" Canal.
19 years (water years 1984-2002), 1,262 ft^3/s, 914,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,400 ft^3/s May 12, 1904, gage height at Main Street Bridge, 7.30 ft, datum then in use, from floodmarks; minimum daily discharge, 17 ft^3/s Dec. 13, 1937.

EXTREMES FOR CURRENT YEAR.-- Maximum discharge, 1,940 ft^3/s Feb. 25, gage height, 2.51 ft; minimum, 303 ft^3/s Aug. 27-29, result of regulation from Upper Klamath Lake.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	640	776	727	528	1280	1720	1200	905	1170	1050	765	428
2	631	638	722	533	1270	1740	1050	590	1390	1400	854	411
3	615	494	887	536	1180	1730	1100	596	970	1250	748	408
4	611	496	1150	680	1200	1620	702	623	598	1370	769	530
5	738	543	1070	1120	1150	1320	531	855	845	1260	795	753
6	915	795	657	1190	1100	1150	592	833	879	1250	588	576
7	821	813	376	1300	1060	1390	535	1260	827	1210	638	426
8	944	785	361	1190	922	1150	583	1120	725	1390	724	430
9	1060	794	366	1230	957	1250	940	1040	877	1300	667	411
10	1060	613	522	1260	970	1320	1120	1310	670	1440	707	393
11	1130	511	443	1170	913	1270	998	1170	758	1350	604	533
12	1140	512	765	1070	922	1290	941	1250	722	1250	577	405
13	1250	592	854	1080	864	1300	843	1400	843	1100	569	408
14	1320	718	665	1170	755	1530	832	1570	735	1130	617	381
15	1060	802	885	1450	661	1530	897	1360	821	1050	589	373
16	807	756	1090	1450	686	1560	948	1070	790	1050	767	374
17	801	512	986	1570	643	1750	802	1090	996	1160	818	374
18	684	492	997	1460	562	1370	960	1650	892	887	670	374
19	608	490	768	1300	643	1170	939	1580	1160	1090	634	374
20	549	495	754	1400	649	1060	645	1070	1150	937	516	373
21	543	488	754	1490	530	1050	866	777	1250	808	627	372
22	535	400	723	1630	696	1140	1410	785	1290	704	529	367
23	553	644	763	881	787	708	1620	907	1100	1030	462	366
24	716	389	778	1060	945	542	1610	866	1120	847	453	365
25	782	530	821	1210	1370	781	1620	840	1300	947	454	367
26	742	663	794	1230	1690	1230	1730	944	1430	780	401	502
27	780	717	689	1180	1720	1290	1710	849	1570	705	326	769
28	767	747	797	1560	1650	1350	1590	883	1540	660	278	613
29	1080	615	654	1680	---	1230	1630	875	1370	659	324	562
30	1400	750	589	1380	---	1270	1190	959	1100	799	488	538
31	1180	---	530	1290	---	1250	---	1270	---	793	471	---
TOTAL	26462	18570	22937	37278	27775	40061	32134	32297	30888	32656	18429	13556
MEAN	854	619	740	1203	992	1292	1071	1042	1030	1053	594	452
MAX	1400	813	1150	1680	1720	1750	1730	1650	1570	1440	854	769
MIN	535	389	361	528	530	542	531	590	598	659	278	365
AC-FT	52490	36830	45500	73940	55090	79460	63740	64060	61270	64770	36550	26890

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	954	1108	1311	1475	1580	1995	1844	1421	1103	843	803	729
MAX	2125	3739	4075	5832	4797	5261	3801	3338	1998	1197	1264	1205
(WY)	1985	1985	1984	1997	1996	1986	1993	1998	1998	1999	2001	1996
MIN	606	434	451	372	214	119	342	286	648	543	551	268
(WY)	1990	1992	1995	1995	1994	1992	1991	1991	1990	1987	1991	2000

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	332691		333043			
ANNUAL MEAN	911		912		1262	
HIGHEST ANNUAL MEAN					2200	1984
LOWEST ANNUAL MEAN					547	1992
HIGHEST DAILY MEAN	1820	Aug 9	1750	Mar 17	6920	Jan 8 1997
LOWEST DAILY MEAN	361	Dec 8	278	Aug 28	95	Mar 1 1992
ANNUAL SEVEN-DAY MINIMUM	485	Nov 18	369	Sep 19	96	Feb 28 1992
ANNUAL RUNOFF (AC-FT)	659900		660600		914400	
10 PERCENT EXCEEDS	1480		1400		2630	
50 PERCENT EXCEEDS	785		843		920	
90 PERCENT EXCEEDS	543		488		419	

11509500 KLAMATH RIVER AT KENO, OR

LOCATION.--Lat 42°08'00", long 121°57'40", in NW 1/4 SE 1/4 sec.35, T.39 S., R.7 E., Klamath County, Hydrologic Unit 18010206, on left bank 1.7 mi northwest of Keno and 4.5 mi upstream from Spencer Creek, and at mile 231.9.

DRAINAGE AREA.--3,920 mi^2, approximately (not including Lost River or Lower Klamath Lake basins).

PERIOD OR RECORD.--June 1904 to December 1913, October 1929 to current year. Monthly discharge only October to December 1929, published in WSP 1315-B.

GAGE.--Water-stage recorder. Datum of gage is 3,961 ft above NGVD of 1929 (from river-profile survey). See WSP 1735 for history of changes prior to Nov. 6, 1954.

REMARKS.--Records good. Flow regulated since 1919 by Upper Klamath Lake (station 11507001). Fluctuation by Keno powerplant 0.9 mi upstream. Diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--82 years (water years 1905-13, 1930-2002), 1,638 ft^3/s, 1,186,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,300 ft^3/s Feb. 28, 1986, gage height, 12.82 ft, caused by regulation from Keno powerplant 0.9 mi upstream; minimum discharge, 26 ft^3/s Sept. 23, 1956; minimum daily, 60 ft^3/s May 19, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage, 15.3 ft, from floodmark (original datum), about May 10, 1904, discharge, 9,250 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,430 ft^3/s Mar. 4, gage height, 7.41 ft; minimum discharge, 255 ft^3/s Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	594	1020	1020	1370	1550	2380	1430	1190	903	549	473	358
2	593	867	1020	1400	1490	2380	1240	e831	902	561	477	401
3	584	727	1060	1780	1490	2380	1050	e883	634	559	399	419
4	580	727	1260	1220	1490	2240	868	e940	626	554	402	351
5	744	873	1370	1010	1490	1950	850	e902	616	562	404	349
6	779	1020	1180	1010	1360	1940	839	e947	573	572	405	351
7	832	1020	776	1010	1270	1920	836	e996	551	571	404	372
8	985	1020	758	1010	1240	1920	967	1040	551	573	405	493
9	1020	1010	758	1010	1220	1910	1210	1060	551	570	366	610
10	1070	824	741	e942	1210	1920	1220	1270	554	564	344	536
11	1080	745	733	e977	1200	1910	1180	1280	557	572	344	399
12	1080	738	733	e1010	1190	1910	1090	1310	557	569	344	448
13	1230	935	746	e1010	1190	1920	1060	1310	490	568	343	438
14	1180	1010	846	e978	1180	1930	1040	1310	449	555	344	454
15	996	1010	724	e955	1180	1930	1020	1090	464	482	345	450
16	785	1010	723	e955	1180	1930	1010	881	463	404	343	451
17	786	762	724	e920	1180	1930	1090	929	487	403	343	450
18	787	752	724	e1010	1180	1700	1000	1220	649	465	345	453
19	786	747	734	e1090	1170	1430	883	1110	684	559	345	454
20	784	747	738	e1050	1170	1360	805	897	716	559	348	454
21	784	755	742	e1010	1590	1360	974	900	713	507	346	456
22	784	771	742	e1110	1560	1360	1320	898	716	402	345	462
23	799	963	742	e1200	1570	917	1490	899	716	401	407	466
24	917	785	741	e1030	1560	789	1490	900	717	402	451	459
25	982	784	742	1150	1930	1160	1480	899	715	451	451	575
26	977	928	742	1200	2390	1290	1480	898	715	490	451	592
27	974	1030	741	1200	2390	1370	1510	899	715	489	423	602
28	975	1030	738	1520	2390	1420	1550	900	635	490	338	613
29	1310	1020	742	1630	---	1420	1550	897	497	488	336	623
30	1570	1020	742	1630	---	1420	1560	898	499	486	347	628
31	1420	---	976	1620	---	1420	---	900	---	488	354	---
TOTAL	28767	26650	25758	36017	41010	52816	35092	31284	18615	15865	11772	14167
MEAN	928	888	831	1162	1465	1704	1170	1009	620	512	380	472
MAX	1570	1030	1370	1780	2390	2380	1560	1310	903	573	477	628
MIN	580	727	723	920	1170	789	805	831	449	401	336	349
AC-FT	57060	52860	51090	71440	81340	104800	69600	62050	36920	31470	23350	28100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1905 - 2002, BY WATER YEAR (WY)

MEAN	1374	1621	1871	2022	2198	2588	2297	1760	1098	797	917	1145
MAX	3055	4673	5732	7702	7564	8197	6594	5258	3713	2748	1898	2214
(WY)	1957	1985	1984	1965	1965	1972	1956	1956	1906	1906	1958	1943
MIN	564	290	391	542	254	215	166	109	97.6	114	146	246
(WY)	1982	1935	1935	1935	1992	1992	1931	1931	1931	1931	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1905 - 2002	
ANNUAL TOTAL	354267		337813			
ANNUAL MEAN	971		926		1638	
HIGHEST ANNUAL MEAN					3582	1956
LOWEST ANNUAL MEAN					340	1992
HIGHEST DAILY MEAN	1840	Jun 6	2390	Feb 26	9780	Mar 5 1972
LOWEST DAILY MEAN	477	Jan 12	336	Aug 29	60	May 19 1934
ANNUAL SEVEN-DAY MINIMUM	594	Sep 28	344	Aug 11	78	Jun 4 1931
ANNUAL RUNOFF (AC-FT)	702700		670100		1186000	
10 PERCENT EXCEEDS	1480		1510		3200	
50 PERCENT EXCEEDS	846		883		1250	
90 PERCENT EXCEEDS	646		406		418	

e Estimated

11510700 KLAMATH RIVER BELOW JOHN C. BOYLE POWERPLANT, NEAR KENO, OR

LOCATION.--Lat 42°05'05", long 122°04'20", in SE 1/4 SE 1/4 sec.14, T.40 S., R.6 E., Klamath County, Hydrologic Unit 18010206, on right bank 0.7 mi downstream from John C. Boyle powerplant, 8 mi downstream from Spencer Creek, and 8.5 mi southwest of Keno, and at mile 219.7.

DRAINAGE AREA.--4,080 mi^2, approximately (not including Lost River or Lower Klamath Lake basins).

PERIOD OF RECORD.--January 1959 to current year. Prior to Oct. 1, 1961, published as "below Big Bend powerplant."

REVISED RECORDS.--WDR OR-87-1: 1967.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 3,274.82 ft above NGVD of 1929 (levels by Pacific Power & Light Co.).

REMARKS.--Records good. Flow regulated by Upper Klamath Lake (station 11507001). Large diurnal fluctuation caused by Keno and John C. Boyle powerplants. Diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--43 years(water years 1960-2002), 1,816 ft^3/s, 1,315,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,600 ft^3/s Feb. 21, 1996, gage height, 9.50 ft; minimum discharge, 283 ft^3/s Feb. 17, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,780 ft^3/s Nov. 29, gage height, 6.33 ft; minimum discharge, 350 ft^3/s Sept. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	839	1500	1320	1610	2870	e2730	1870	1530	1230	771	764	599
2	848	945	1290	1710	2870	e2730	1620	1100	1080	733	688	681
3	851	992	1720	2160	2870	e2720	1570	1270	906	781	641	680
4	1080	1050	1550	1570	2870	e2720	1360	1280	979	768	630	369
5	984	996	1770	1210	2860	e2700	1140	1030	841	773	685	669
6	1000	1250	1300	1250	2810	e2670	1160	1130	772	781	850	690
7	988	1340	819	1210	2110	e2630	1180	1370	675	778	371	657
8	1110	1160	982	1360	1410	e2570	1410	1290	734	782	685	705
9	1290	1290	981	1630	1380	e2470	1620	1490	724	898	610	716
10	1340	1040	1160	1130	1410	e2400	1420	1500	775	1030	635	939
11	1330	1040	1000	1230	1390	2230	1440	1350	775	709	637	370
12	1320	1040	1010	1150	1410	2220	1320	1610	780	737	627	625
13	1660	1140	1010	1370	1640	2250	1230	1610	706	737	672	849
14	1360	1300	1010	1350	1510	2240	1500	1500	749	764	367	765
15	1110	1280	998	1390	1360	2750	1580	1460	727	688	609	708
16	1120	1210	1010	1460	1430	2090	995	1300	675	747	629	570
17	1100	1010	1010	1450	1530	2160	1480	1300	677	758	622	617
18	945	995	1010	1540	e1580	1900	1440	1650	945	821	659	703
19	949	1080	939	1460	1550	1750	998	1600	931	720	608	761
20	1030	996	957	1470	1490	1660	1260	1100	1020	738	604	832
21	989	960	955	1800	2030	1640	1300	1150	1030	734	367	762
22	1200	1100	976	1970	1600	1660	1590	1170	888	729	625	709
23	1020	1270	962	790	1720	1500	1800	1150	890	720	626	739
24	1180	1040	949	1320	1870	1130	1790	1170	927	372	624	808
25	1160	996	957	1350	2230	1440	1790	1220	920	728	731	803
26	1320	1180	953	1410	2670	1470	1800	1110	934	702	735	810
27	1200	1250	950	1520	e2720	1660	1810	1160	932	677	739	818
28	1320	1610	957	2250	e2730	1400	1810	1250	822	681	363	829
29	1520	1350	977	2870	---	1720	1800	928	688	717	691	837
30	1740	904	977	2870	---	1550	1880	1280	735	726	601	844
31	1750	---	1010	2870	---	1750	---	1110	---	705	629	---
TOTAL	36653	34314	33469	49730	55920	64510	44963	40168	25467	23005	19324	21464
MEAN	1182	1144	1080	1604	1997	2081	1499	1296	849	742	623	715
MAX	1750	1610	1770	2870	2870	2750	1880	1650	1230	1030	850	939
MIN	839	904	819	790	1360	1130	995	928	675	372	363	369
AC-FT	72700	68060	66390	98640	110900	128000	89180	79670	50510	45630	38330	42570

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2002, BY WATER YEAR (WY)

MEAN	1516	1871	2289	2481	2586	3035	2500	1805	996	688	892	1177
MAX	3157	4506	5733	7905	7780	8755	5645	5156	2995	1339	1102	1876
(WY)	1985	1985	1984	1965	1965	1972	1974	1998	1998	1982	1998	1965
MIN	786	735	792	771	489	450	537	418	391	349	349	457
(WY)	1982	1992	1995	1993	1992	1992	1994	1992	1992	1992	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1960 - 2002	
ANNUAL TOTAL	447956		448987			
ANNUAL MEAN	1227		1230		1816	
HIGHEST ANNUAL MEAN					3024	1984
LOWEST ANNUAL MEAN					564	1992
HIGHEST DAILY MEAN	2200	Jun 6	2870	Jan 29	10800	Mar 5 1972
LOWEST DAILY MEAN	521	Mar 1	363	Aug 28	302	Aug 30 1995
ANNUAL SEVEN-DAY MINIMUM	843	Sep 27	585	Aug 14	338	Aug 30 1992
ANNUAL RUNOFF (AC-FT)	888500		890600		1315000	
10 PERCENT EXCEEDS	1760		1890		3430	
50 PERCENT EXCEEDS	1140		1110		1320	
90 PERCENT EXCEEDS	898		681		620	

e Estimated

11516530 KLAMATH RIVER BELOW IRON GATE DAM, CA

LOCATION.--Lat 41°55'41", long 122°26'35", in SE 1/4 NE 1/4 sec.17, T.47 N., R.5 W., Siskiyou County, Hydrologic Unit 18010206, on left bank 0.1 mi downstream from Bogus Creek, 0.6 mi downstream from Iron Gate Dam, and 5.9 mi northeast of Hornbrook.

DRAINAGE AREA.--4,630 mi^2, approximately (not including Lost River, Butte Creek, or Lower Klamath Lake basins).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1960 to current year. Chemical data available October 1961 to September 1981. Water temperature data available October 1962 to September 1980.

GAGE.--Water-stage recorder. Datum of gage is 2,162.44 ft above NGVD of 1929 (levels by PacifiCorp, formerly Pacific Power and Light Co.).

REMARKS.--Records excellent. Flow regulated by Upper Klamath Lake (station 11507001), capacity, 523,700 acre-ft, Iron Gate Reservoir, other smaller reservoirs, and diversions upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,400 ft^3/s Dec. 22, 1964, gage height, 13.63 ft, from rating curve extended above 15,000 ft^3/s, on basis of slope-area measurement of peak flow; minimum daily discharge, 389 ft^3/s Aug. 25-28, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 4,180 ft^3/s Mar. 28, gage height, 6.14 ft; minimum daily discharge, 730 ft^3/s July 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1350	884	886	2190	1730	1030	3190	2580	1710	1010	960	1170
2	1350	887	885	1890	1590	908	3110	2650	1640	1010	996	1190
3	1350	888	882	1810	1450	907	3020	2970	1640	1010	999	1190
4	1350	890	885	1720	1340	902	2820	3050	1640	1010	998	1190
5	1350	890	886	1600	1220	910	2650	3120	1640	1010	994	1190
6	1350	890	886	1460	1150	871	2580	3160	1530	1010	992	1190
7	1340	889	886	1350	1060	868	2620	3090	1500	1010	995	1190
8	1320	895	887	1230	1020	870	2820	3140	1500	1010	995	1190
9	1330	882	889	1100	1010	869	2830	3110	1510	1010	996	1190
10	1310	881	891	978	957	869	2910	3040	1510	969	996	1190
11	1200	880	891	881	878	869	3100	3030	1400	843	1000	1190
12	1060	886	890	894	763	872	3090	3020	1350	755	1000	1190
13	912	887	888	993	775	873	3150	2750	1340	747	1000	1190
14	880	886	892	1510	778	1040	3180	2490	1360	746	995	1190
15	880	886	888	1820	772	1720	3010	2440	1370	734	995	1190
16	883	886	922	1810	809	1750	2830	2300	1260	723	995	1190
17	889	887	894	1810	779	1600	2720	2040	1220	731	995	1190
18	885	888	887	1730	773	1440	2690	1840	1220	731	995	1190
19	884	890	886	1580	772	1370	2690	1800	1220	731	995	1190
20	886	891	892	1440	923	1420	2670	1790	1210	731	997	1350
21	889	891	893	1300	1030	1470	2660	1790	1110	731	1000	1360
22	884	887	891	1160	1030	1480	2660	1790	1050	731	1000	1380
23	882	886	891	1030	1030	1490	2620	1790	1050	736	1000	1390
24	881	886	891	1020	1020	1480	2490	1790	1050	739	1000	1380
25	880	886	891	1120	1080	1610	2440	1780	1050	749	1000	1370
26	876	886	891	1120	1160	1910	2390	1780	1000	735	995	1370
27	875	886	965	1460	1160	2750	2360	1780	1010	735	996	1360
28	876	886	1740	1810	1120	4180	2350	1780	1010	734	999	1360
29	879	886	2480	1790	---	4040	2310	1780	1010	736	1000	1360
30	881	886	2280	1780	---	3670	2420	1780	1010	737	1000	1360
31	881	---	2380	1780	---	3310	---	1780	---	736	1000	---
TOTAL	32443	26609	32986	45166	29179	49348	82380	73030	39120	25630	30878	37630
MEAN	1047	887	1064	1457	1042	1592	2746	2356	1304	827	996	1254
MAX	1350	895	2480	2190	1730	4180	3190	3160	1710	1010	1000	1390
MIN	875	880	882	881	763	868	2310	1780	1000	723	960	1170
AC-FT	64350	52780	65430	89590	57880	97880	163400	144900	77590	50840	61250	74640

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	1611	2042	2623	2923	3067	3572	2985	2147	1158	798	976	1280
MAX	3353	5254	6735	9553	9150	10780	6922	5559	3289	1429	1208	2052
(WY)	1985	1985	1984	1997	1965	1972	1971	1998	1998	1982	1965	1965
MIN	852	873	889	888	525	511	572	512	506	428	398	538
(WY)	1982	1992	1992	1992	1992	1992	1994	1992	1992	1992	1992	1992

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	473055		504399			
ANNUAL MEAN	1296		1382		2094	
HIGHEST ANNUAL MEAN					3657	1965
LOWEST ANNUAL MEAN					641	1992
HIGHEST DAILY MEAN	3070	Feb 28	4180	Mar 28	25000	Dec 22 1964
LOWEST DAILY MEAN	659	Aug 4	723	Jul 16	389	Aug 25 1992
ANNUAL SEVEN-DAY MINIMUM	660	Aug 2	730	Jul 16	390	Aug 24 1992
MAXIMUM PEAK FLOW			4410	Mar 28	29400	Dec 22 1964
MAXIMUM PEAK STAGE			6.14	Mar 28	13.63	Dec 22 1964
ANNUAL RUNOFF (AC-FT)	938300		1000000		1517000	
10 PERCENT EXCEEDS	2070		2650		4060	
50 PERCENT EXCEEDS	988		1050		1390	
90 PERCENT EXCEEDS	758		873		735	

12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA

LOCATION.--Lat 46°37'44", long 119°51'49", in SE 1/4 NW 1/4 sec.7, T.13 N., R.24 E., Grant County, Hydrologic Unit 17020016, on left bank 2.6 mi downstream from Priest Rapids Dam, 14.7 mi south of Beverly, and at mile 394.5.

DRAINAGE AREA.--96,000 mi^2, approximately.

PERIOD OF RECORD.--January 1917 to current year. January 1917 to September 1930, at site 3.4 mi downstream, published as "at Vernita." October 1930 to July 27, 1959, at site 46.5 mi upstream, published as "at Trinidad."

REVISED RECORDS.--WSP 1933: Drainage area. WDR WA-82-2: 1965(m), 1971(m).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to Oct. 1, 1930, nonrecording gages at site 3.4 mi downstream at datum 388.7 ft above sea level. Oct. 1, 1930, to July 27, 1959, water-stage recorder at site 46.5 mi upstream at datum 499.3 ft above sea level (river-profile survey).

REMARKS.--No estimated daily discharges. Records good. Diversions for irrigation of about 600,000 acres upstream from station. Flow regulated by 10 major reservoirs and numerous smaller reservoirs and powerplants. U.S. Geological Survey satellite telemeter at station. Water temperatures March 1980 to April 1993. Temperature records for site "at Vernita Bridge, near Priest Rapids Dam" (station 12472900) for period July 1974 to September 1980 are equivalent.

AVERAGE DISCHARGE.--85 years (water years 1918-2002), 119,400 ft^3/s, 86,490,000 acre-ft/yr, unadjusted.
43 years (water years 1960-2002), 119,600 ft^3/s, 86,660,000 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 692,600 ft^3/s June 12, 1948, gage height, 59.35 ft, site and datum then in use; minimum discharge, 4,120 ft^3/s Feb. 10, 1932, due to construction at Rock Island Dam, site and datum then in use; minimum daily discharge prior to construction of Rock Island Dam (1932), 22,000 ft^3/s Feb. 1-7, 1930, site and datum then in use; minimum daily discharge after completion of Rock Island Dam (1932), 20,000 ft^3/s Jan. 31 to Feb. 10, 1937, site and datum then in use; minimum discharge since completion of Priest Rapids Dam (1959), 16,300 ft^3/s Nov. 7. 1998, due to emergency flow reduction at Priest Rapids Dam.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 7, 1894, reached a discharge of about 740,000 ft^3/s, based on a rating extension for a Weather Bureau gage at Wenatchee.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 318,000 ft^3/s July 1, elevation, 418.11 ft; minimum discharge, 36,400 ft^3/s Nov. 18, elevation, 396.40 ft; minimum daily discharge, 39,900 ft^3/s Oct. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79600	61900	75500	92800	128000	85100	53300	140000	191000	249000	113000	59200
2	63100	53500	54700	87700	94300	88800	50300	137000	138000	270000	129000	67100
3	55000	47600	68800	119000	86800	74800	55100	134000	191000	258000	108000	88000
4	59000	43700	110000	121000	108000	64000	62300	148000	249000	235000	89700	77700
5	61300	70400	95900	101000	113000	75800	62600	101000	252000	195000	103000	83200
6	39900	75800	88700	92000	106000	80300	52000	163000	236000	197000	94400	67700
7	42700	89300	75100	78800	109000	88900	50000	168000	245000	208000	118000	63500
8	60100	86500	68800	76500	112000	113000	50600	143000	254000	185000	128000	47000
9	66700	85800	53100	87500	101000	76200	56700	139000	208000	135000	114000	79600
10	80000	48200	87100	76300	88000	73000	80200	148000	230000	178000	110000	84400
11	61100	44300	114000	72100	109000	72000	74300	122000	224000	226000	103000	66700
12	70200	68400	93900	85100	125000	95600	133000	114000	231000	195000	94000	68400
13	48400	86700	107000	70500	132000	91000	112000	157000	200000	218000	114000	69700
14	51100	70600	90100	93500	97500	73800	104000	139000	197000	207000	113000	79900
15	69200	71200	75400	129000	111000	69600	144000	119000	208000	150000	120000	52500
16	71400	86900	72600	116000	107000	80400	181000	137000	192000	195000	110000	59600
17	101000	74400	79200	104000	81200	74700	194000	139000	200000	219000	78300	79600
18	69700	68900	95000	121000	93600	88800	211000	121000	219000	165000	81900	67500
19	49500	68300	102000	97000	109000	84300	175000	131000	250000	192000	117000	99400
20	43800	91100	119000	103000	93400	95100	189000	140000	267000	184000	122000	94300
21	43300	88500	106000	89100	97900	78000	170000	143000	252000	188000	114000	97800
22	69200	80800	92700	121000	83200	88400	196000	135000	216000	152000	122000	84400
23	84500	67900	87100	128000	80700	54500	185000	163000	210000	179000	130000	89800
24	66900	87300	75900	105000	83600	50800	164000	154000	189000	151000	109000	97000
25	60200	68600	75300	94900	92200	50600	166000	144000	191000	159000	81400	107000
26	71300	94900	90100	100000	88900	50400	160000	135000	218000	125000	96000	98500
27	62700	112000	114000	80000	99400	51300	115000	171000	244000	104000	122000	67600
28	47800	115000	96100	102000	95800	51200	117000	179000	261000	110000	113000	55900
29	63000	106000	86600	124000	---	53800	149000	156000	242000	133000	117000	55700
30	56400	94400	73300	125000	---	54100	169000	179000	200000	128000	89100	67100
31	71700	---	70900	138000	---	53600	---	165000	---	139000	112000	---
TOTAL	1939800	2308900	2693900	3130800	2826500	2281900	3681400	4464000	6605000	5629000	3365800	2275800
MEAN	62570	76960	86900	101000	100900	73610	122700	144000	220200	181600	108600	75860
MAX	101000	115000	119000	138000	132000	113000	211000	179000	267000	270000	130000	107000
MIN	39900	43700	53100	70500	80700	50400	50000	101000	138000	104000	78300	47000
AC-FT	3848000	4580000	5343000	6210000	5606000	4526000	7302000	8854000	13100000	11170000	6676000	4514000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2002, BY WATER YEAR (WY)

MEAN	72040	73200	77420	80310	81570	82390	104200	192300	266800	197900	120400	82300
MAX	119800	121200	163800	168400	195000	201800	196500	348500	590700	385400	192000	131700
(WY)	1928	1991	1996	1996	1996	1983	1934	1934	1948	1950	1920	1927
MIN	45950	32290	26840	21710	20900	26500	37160	61840	78810	56650	66740	60050
(WY)	1932	1937	1937	1937	1937	1937	1944	2001	1977	2001	1985	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1918 - 2002	
ANNUAL TOTAL	27625500		41202800			
ANNUAL MEAN	75690		112900		119400	
HIGHEST ANNUAL MEAN					165600	1997
LOWEST ANNUAL MEAN					78070	1944
HIGHEST DAILY MEAN	135000	Jan 3	270000	Jul 2	690000	Jun 12 1948
LOWEST DAILY MEAN	36800	Jul 29	39900	Oct 6	20000	Jan 31 1937
ANNUAL SEVEN-DAY MINIMUM	44600	May 14	51700	Mar 24	20100	Jan 30 1937
ANNUAL RUNOFF (AC-FT)	54800000		81730000		86490000	
10 PERCENT EXCEEDS	106000		195000		231000	
50 PERCENT EXCEEDS	70500		97000		93800	
90 PERCENT EXCEEDS	50400		56600		46500	

Figure 8. Location of surface-water stations in the Owyhee and Malheur River Basins.

13181000 OWYHEE RIVER NEAR ROME, OR

LOCATION.--Lat 42°52'02", long 117°38'52", in SE 1/4 NE 1/4 sec.14, T.31 S., R.41 E., Malheur County, Hydrologic Unit 17050107, on right bank 0.5 mi downstream from Jordan Creek, 2.6 mi north of Rome, and at mile 122.4.

DRAINAGE AREA.--About 8,000 mi^2.

PERIOD OF RECORD.--October 1949 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,344.20 ft above NGVD of 1929. Prior to Feb 10, 1960, at datum 0.24 ft lower.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Antelope Reservoir, capacity, 70,000 acre-ft, increased in 1970, and Wild Horse Reservoir, capacity, 32,690 acre-ft, and numerous small reservoirs. Diversions upstream from station for irrigation. Continuous water-quality records for the period October 1972 to June 1977 have been collected at this location. U. S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--53 years (water years 1950-2002), 944 ft^3/s, 683,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,700 ft^3/s Mar. 18, 1993, gage height, 20.11 ft; minimum discharge, 42 ft^3/s Aug. 12, 1954, July 28, Aug. 5, 1961, July 31, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,300 ft^3/s Apr. 2, gage height, 9.61 ft; minimum daily discharge, 69 ft^3/s Aug. 23.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	105	161	179	184	533	6870	871	371	190	139	80
2	86	105	143	191	197	450	8150	868	357	186	136	79
3	91	103	146	207	197	382	7560	897	404	180	132	82
4	90	103	159	282	188	351	6510	1110	400	179	134	81
5	84	104	154	301	177	315	6390	1060	387	171	130	77
6	81	106	156	305	175	306	6520	929	470	160	130	75
7	81	110	165	539	178	365	5940	869	440	159	126	75
8	81	108	165	826	184	1350	4540	812	393	159	126	78
9	82	107	160	775	191	1120	3400	779	351	136	125	78
10	82	105	170	881	183	800	2930	747	362	127	132	82
11	77	105	163	838	185	682	2980	715	355	119	136	83
12	79	108	165	704	188	889	2770	676	331	110	120	85
13	80	111	164	603	182	1610	2380	650	322	105	107	90
14	83	112	167	514	183	2280	2280	624	326	112	100	92
15	98	112	174	438	189	1680	2460	584	327	120	94	90
16	90	113	146	384	182	1230	2760	551	307	123	86	87
17	85	117	164	312	193	966	2250	489	290	115	83	90
18	86	119	175	302	192	776	1920	458	274	109	83	92
19	93	118	168	282	202	662	1760	442	251	113	81	89
20	93	114	174	226	216	595	1640	422	236	125	75	91
21	92	111	175	241	410	598	1550	428	227	134	72	94
22	94	110	173	252	745	1210	1380	504	213	166	71	94
23	97	117	161	224	1130	2730	1240	490	205	160	69	94
24	101	130	193	215	1390	3770	1070	524	204	157	77	97
25	101	142	175	215	1460	3870	1010	628	194	159	95	108
26	101	142	136	222	1160	3440	888	621	189	148	86	109
27	101	142	132	234	849	3950	783	554	192	143	84	110
28	102	149	147	221	653	4730	766	488	192	138	83	113
29	103	148	174	193	---	5530	748	450	190	135	85	110
30	104	118	171	153	---	6140	806	415	188	135	86	106
31	105	---	168	181	---	6480	---	395	---	145	89	---
TOTAL	2810	3494	5044	11440	11563	59790	92251	20050	8948	4418	3172	2711
MEAN	90.65	116.5	162.7	369.0	413.0	1929	3075	646.8	298.3	142.5	102.3	90.37
MAX	105	149	193	881	1460	6480	8150	1110	470	190	139	113
MIN	77	103	132	153	175	306	748	395	188	105	69	75
AC-FT	5570	6930	10000	22690	22940	118600	183000	39770	17750	8760	6290	5380

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2002, BY WATER YEAR (WY)

MEAN	162.0	213.1	378.6	674.5	1222	2494	2876	1964	878.5	254.2	151.5	137.5
MAX	442	593	2898	4461	8820	9404	16960	10470	4870	1035	452	361
(WY)	1976	1971	1965	1971	1986	1972	1952	1984	1984	1984	1984	1984
MIN	85.3	107	104	114	129	233	144	86.5	89.6	61.2	56.0	62.5
(WY)	1955	1955	1955	1955	1955	1977	1992	1992	1992	1968	1992	1955

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1950 - 2002	
ANNUAL TOTAL	147957		225691			
ANNUAL MEAN	405.4		618.3		944.1	
HIGHEST ANNUAL MEAN					3400	1984
LOWEST ANNUAL MEAN					162	1992
HIGHEST DAILY MEAN	7050	Mar 22	8150	Apr 2	46900	Mar 18 1993
LOWEST DAILY MEAN	57	Aug 30	69	Aug 23	44	Aug 1 1968
ANNUAL SEVEN-DAY MINIMUM	60	Aug 25	75	Aug 18	47	Jul 26 1968
ANNUAL RUNOFF (AC-FT)	293500		447700		683900	
10 PERCENT EXCEEDS	1120		1360		2500	
50 PERCENT EXCEEDS	165		178		232	
90 PERCENT EXCEEDS	77		86		107	

13183000 OWYHEE RIVER BELOW OWYHEE DAM, OR

LOCATION.--Lat 43°39'17", long 117°15'16", in SE 1/4 sec.18, T.22 S., R.45 E.,Malheur County, Hydrologic Unit 17050110, on left bank 0.8 mi downstream from Owyhee Dam, 20 mi southwest of Nyssa, and at mile 27.3.

DRAINAGE AREA.--11,160 mi^2, approximately.

PERIOD OF RECORD.--February 1929 to current year.

REVISED RECORDS.--WSP 983: 1941-42. WSP 1397: 1930, 1933, 1946.

GAGE.--Water-stage recorder. Datum of gage is 2,343.67 ft above NGVD of 1929 (levels by Bureau of Reclamation).

REMARKS.--Records good. Flow regulated since October 1932 by Lake Owyhee (station 13182500), and by many smaller reservoirs. Diversion of up to 457,000 acre-ft from Lake Owyhee during the year for irrigation of lands downstream from station and outside the basin. Many smaller diversions upstream from Lake Owyhee for irrigation upstream from station. Computation of monthly and annual adjusted flows discontinued in 1991.

AVERAGE DISCHARGE.--70 years (water years 1933-2002), 412 ft^3/s, 298,700 acre-ft/yr, not adjusted for storage or diversion.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,900 ft^3/s Apr. 15, 1952, gage height, 15.70 ft; no flow for part of Aug. 8, 9, 1932, when temporary diversion tunnel at Owyhee Dam was closed.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 211 ft^3/s Apr. 9; minimum daily discharge, 7.7 ft^3/s Oct. 20.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	192	8.2	11	13	13	13	10	198	188	191	198	197
2	191	8.4	11	12	12	13	10	198	188	191	199	194
3	189	8.6	11	12	13	13	11	195	188	192	198	189
4	188	8.8	11	12	12	13	11	195	188	192	198	192
5	187	9.3	11	13	12	13	11	197	188	192	198	193
6	186	9.7	11	13	12	14	12	197	188	192	197	194
7	186	9.0	11	12	12	14	13	197	188	192	197	183
8	186	8.2	11	13	12	13	160	193	188	192	197	191
9	186	8.6	11	13	12	13	211	194	188	192	196	190
10	186	9.1	11	13	12	13	208	194	188	192	197	189
11	187	9.4	11	13	12	11	206	194	188	192	198	189
12	186	9.2	11	13	11	11	206	195	188	192	198	190
13	186	8.2	12	11	11	11	206	194	188	192	197	189
14	186	8.8	12	13	11	11	204	194	188	193	197	189
15	185	8.8	12	14	11	11	204	195	188	192	198	189
16	185	9.1	12	14	11	11	202	197	189	192	199	188
17	186	9.4	12	14	11	11	201	194	189	192	200	189
18	183	9.4	13	14	11	11	200	194	188	192	201	189
19	74	9.6	12	14	e11	11	199	193	189	192	200	188
20	7.7	9.6	12	14	e11	11	199	192	189	192	199	188
21	8.2	9.8	12	14	e11	12	199	192	190	192	199	188
22	8.7	9.6	12	14	e11	12	199	191	189	187	198	188
23	8.5	9.5	12	14	e12	12	200	191	190	192	197	184
24	8.5	9.8	12	15	e12	11	199	192	190	192	197	188
25	8.7	9.1	12	15	12	11	199	192	190	193	197	188
26	8.8	9.2	13	15	12	11	198	192	190	196	197	188
27	8.9	9.6	14	14	13	11	199	192	190	197	197	188
28	8.6	10	14	15	13	10	198	192	190	199	197	188
29	8.4	10	13	14	---	11	198	192	190	198	197	188
30	8.5	10	13	13	---	11	197	191	191	198	197	188
31	8.1	---	13	13	---	11	---	189	---	198	197	---
TOTAL	3536.6	276.0	369	416	329	365	4670	6006	5664	5981	6132	5676
MEAN	114.1	9.200	11.90	13.42	11.75	11.77	155.7	193.7	188.8	192.9	197.8	189.2
MAX	192	10	14	15	13	14	211	198	191	199	201	197
MIN	7.7	8.2	11	11	11	10	10	189	188	187	196	183
AC-FT	7010	547	732	825	653	724	9260	11910	11230	11860	12160	11260

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 2002, BY WATER YEAR (WY)

MEAN	69.51	9.785	24.07	144.2	389.2	1038	1645	847.2	332.4	174.2	156.2	130.8
MAX	242	196	703	2751	5198	7799	12790	8565	3246	618	312	248
(WY)	1986	1933	1985	1971	1986	1972	1984	1984	1984	1933	1933	1933
MIN	2.80	1.00	1.31	1.17	1.13	1.66	28.2	39.5	45.8	44.3	22.4	8.00
(WY)	1955	1953	1993	1993	1993	1992	1955	1955	1948	1948	1948	1948

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1933 - 2002	
ANNUAL TOTAL	39400.6		39420.6			
ANNUAL MEAN	107.9		108.0		412.3	
HIGHEST ANNUAL MEAN					2991	1984
LOWEST ANNUAL MEAN					22.3	1948
HIGHEST DAILY MEAN	204	Jun 11	211	Apr 9	21800	Apr 16 1952
LOWEST DAILY MEAN	7.7	Oct 20	7.7	Oct 20	1.0	Oct 18 1952
ANNUAL SEVEN-DAY MINIMUM	8.4	Oct 28	8.4	Oct 28	1.0	Oct 18 1952
ANNUAL RUNOFF (AC-FT)	78150		78190		298700	
10 PERCENT EXCEEDS	201		198		618	
50 PERCENT EXCEEDS	186		186		85	
90 PERCENT EXCEEDS	9.7		9.7		2.7	

e Estimated

13213100 SNAKE RIVER AT NYSSA, OR

LOCATION.--Lat 43°52'34", long 116°58'53", in NW 1/4 SW 1/4 NE 1/4 sec.7, T.6 N., R.5 W., Canyon County, Hydrologic Unit 17050115, on right bank, 300 upstream from U.S. Highway 20-26 bridge at Nyssa, 2.3 mi downstream from Boise River and at mile 385.2.

DRAINAGE AREA.--58,700 mi^2, approximately.

PERIOD OF RECORD.--November 1974 to September 1986, February 1989 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,170 ft above NGVD of 1929, from topographic map. Prior to 1989, station located on left bank, in Oregon.

REMARKS.--Records good. Station equipment includes satellite telemetry. Flow regulated by many reservoirs upstream from station.

AVERAGE DISCHARGE.--25 years (water years 1976-86, 1989-2002), 14,130 ft^3/s, 10,240,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,900 ft^3/s Apr. 19, 1984, gage height, 13.34 ft; minimum discharge, 4,110 ft^3/s June 7, 1992, gage height, 4.32 ft.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 10,100 ft^3/s Mar. 26; minimum daily discharge, 5,040 ft^3/s June 30.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8330	8700	8670	8380	8210	8010	8490	6770	7480	5200	6110	7320
2	8420	8780	8960	8360	8250	7940	8200	7190	7720	5260	6040	7610
3	8180	8620	8680	8650	8170	7990	8440	6830	7680	5320	6040	7780
4	8210	8700	8420	8570	8060	8170	8480	6740	7590	5420	6460	7690
5	8210	8820	8840	8460	7940	7930	8420	7060	7480	5340	6330	7550
6	8510	8950	9020	8630	8240	8210	8370	7840	7930	5470	6350	7300
7	8360	8620	9060	8730	8150	8000	7660	7580	7520	5520	6230	7690
8	8500	8600	8640	8750	8030	8090	7490	7370	7450	5610	6470	7770
9	8660	8650	9090	8710	7730	9310	8170	7450	7640	5460	6420	7830
10	8490	8950	8710	8530	7760	9950	8220	7690	7840	5420	6810	8330
11	8490	8890	8610	8740	8460	8490	8360	7550	7790	5440	6580	8590
12	9150	8780	8800	8860	8000	7970	7780	7960	7650	5320	6680	8510
13	8860	9060	8620	8630	8030	8380	8030	8090	7470	5390	6350	8470
14	9100	9240	9240	8380	8010	8140	7900	7400	7270	5610	6440	8010
15	9350	8820	8920	8180	8120	8780	8590	7340	7150	5800	6710	8090
16	9840	8950	8640	8760	8040	8810	8090	7350	6880	5720	6530	8530
17	9860	9260	8830	8340	7930	8640	7920	7090	6690	5710	6470	8380
18	9270	9140	8910	8430	8000	8170	8290	7090	6170	5840	6090	8530
19	9240	8360	8640	8080	7900	8570	7990	7360	5590	6030	6230	8670
20	9000	8970	8560	8250	8300	8240	8600	7230	5540	6460	6740	8720
21	8760	8860	8510	8540	8140	8390	8190	e7400	5530	6620	6550	8500
22	8730	9100	9000	8160	8540	8250	8160	e7600	5760	6580	6150	8560
23	8690	8790	8270	8050	8670	8520	7770	7770	6250	6760	6170	9000
24	8170	8740	8840	8400	8720	8800	7110	8160	6390	6900	6680	8660
25	8850	9650	8150	8400	8540	9490	6990	8120	e5800	6770	6960	8730
26	8910	8840	8690	8340	8420	10100	7210	8170	e5700	6490	7180	8940
27	8540	8600	8620	8340	9480	9510	7020	8140	e5700	6290	6740	8540
28	8690	8870	8620	8200	8100	8170	7040	8190	5570	6290	6940	8440
29	8600	9300	8230	8440	---	8480	7060	7710	5090	6420	7270	8480
30	8630	9040	8100	8200	---	8560	6910	7520	5040	6190	7550	8490
31	8850	---	8760	8530	---	8410	---	7460	---	5940	7300	---
TOTAL	271450	266650	269650	262020	229940	264470	236950	233220	201360	182590	203570	247710
MEAN	8756	8888	8698	8452	8212	8531	7898	7523	6712	5890	6567	8257
MAX	9860	9650	9240	8860	9480	10100	8600	8190	7930	6900	7550	9000
MIN	8170	8360	8100	8050	7730	7930	6910	6740	5040	5200	6040	7300
AC-FT	538400	528900	534900	519700	456100	524600	470000	462600	399400	362200	403800	491300

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2002, BY WATER YEAR (WY)

MEAN	12260	12790	13270	14460	15460	17960	20350	19200	16470	8808	8702	10630
MAX	21360	24660	24320	30290	38580	40010	43970	49060	41100	16480	12620	17110
(WY)	1985	1985	1984	1984	1997	1986	1984	1984	1984	1983	1997	1997
MIN	8102	8888	8698	8452	8212	8018	6033	5367	5223	5546	5075	6664
(WY)	1993	2002	2002	2002	2002	1991	1992	1992	1992	1992	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1976 - 2002	
ANNUAL TOTAL	2903000		2869580			
ANNUAL MEAN	7953		7862		14130	
HIGHEST ANNUAL MEAN					26260	1984
LOWEST ANNUAL MEAN					7365	1992
HIGHEST DAILY MEAN	10500	May 19	10100	Mar 26	57400	Apr 20 1984
LOWEST DAILY MEAN	5630	Jun 24	5040	Jun 30	4240	Jun 7 1992
ANNUAL SEVEN-DAY MINIMUM	5750	Jun 19	5240	Jun 29	4520	Jun 6 1992
ANNUAL RUNOFF (AC-FT)	5758000		5692000		10240000	
10 PERCENT EXCEEDS	9040		8910		26100	
50 PERCENT EXCEEDS	8310		8170		10900	
90 PERCENT EXCEEDS	6330		6170		7230	

e Estimated

13215000 MALHEUR RIVER BELOW WARMSPRINGS RESERVOIR, NEAR RIVERSIDE, OR

LOCATION.--Lat 43°34'29", long 118°12'31", on line between NW 1/4 SW 1/4 and SW 1/4 NW 1/4 sec.17, T.23 S., R.37 E., Malheur County, Hydrologic Unit 17050116, on left bank 0.9 mi downstream from Warmsprings Dam, 3.0 mi upstream from South Fork, 4.0 mi northwest of Riverside, and at mile 113.

DRAINAGE AREA.--1,100 mi^2, approximately.

PERIOD OF RECORD.--January 1906 to March 1907 and December 1908 (gage heights only), January 1909 to September 1910, December 1914 to July 1917, March 1919 to current year. Monthly discharge only for some periods, published in WSP 1317. Figures of discharge for January 1906 to March 1907, published in WSP 272 and 370, have been found to be unreliable and should not be used. Published as Middle Fork of Malheur River at Riverside 1906-7, as Middle Fork of Malheur River above South Fork, at Riverside 1909-10, as Malheur River above South Fork, at Riverside in WSP 370, 1906-10, and as Malheur River at Warmsprings reservoir site, near Riverside 1914-17.

REVISED RECORDS.--WSP 833: 1936. WSP 1063: 1942-45. WSP 1397: 1909-10, 1917. WSP 1447: 1955. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,305 ft above NGVD of 1929, by barometer. See WSP 1317 or 1737 for history of changes prior to Sept. 29, 1949.

REMARKS.--Records good except for those below 40 ft^3/s, which are poor. Flow completely regulated since November 1919 by Warmsprings Reservoir (station 13214500). Diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--83 years (water years 1920-2002), 190 ft^3/s, 137,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 7,200 ft^3/s Mar. 1, 1910, gage height, 10.7 ft, site and datum then in use, from rating curve extended above 820 ft^3/s; maximum discharge since storage began November 1919, 3,150 ft^3/s Mar. 22, 1984, gage height, 9.70 ft, from floodmark; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 657 ft^3/s Apr. 23, gage height, 5.31 ft; minimum discharge, no flow many days.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	0.00	0.04	0.09	0.09	0.08	0.04	482	281	395	402	2.2
2	14	0.00	0.05	0.10	0.09	0.08	0.03	504	284	395	391	2.3
3	11	0.00	0.04	0.09	0.09	0.08	0.03	502	280	393	403	2.1
4	13	0.00	0.04	0.09	0.08	0.08	0.02	512	304	394	397	1.9
5	14	0.00	0.05	0.09	0.07	0.08	0.02	517	306	381	355	1.6
6	7.1	0.00	0.05	0.10	0.06	0.08	0.02	516	310	382	277	1.6
7	0.13	0.00	0.05	0.10	0.06	0.09	0.01	500	315	383	200	1.8
8	0.07	0.00	0.05	0.10	0.06	0.09	0.00	490	314	372	99	2.3
9	0.05	0.00	0.05	0.10	0.06	0.09	0.00	488	311	383	41	2.6
10	0.04	0.00	0.05	0.10	0.06	0.09	0.02	487	313	397	18	3.3
11	0.05	0.00	0.06	0.10	0.06	0.09	0.02	471	315	398	9.5	3.8
12	0.04	0.00	0.06	0.10	0.06	0.09	0.02	461	314	395	5.5	4.1
13	0.03	0.00	0.06	0.10	0.06	0.08	0.02	457	311	403	3.7	4.7
14	0.02	0.00	0.06	0.10	0.07	0.08	0.02	457	307	405	2.7	4.1
15	0.02	0.00	0.06	0.10	0.09	0.08	0.02	390	318	405	2.0	3.6
16	0.00	0.00	0.07	0.09	0.09	0.08	0.02	355	323	401	1.5	3.6
17	0.00	0.00	0.07	0.09	0.09	0.08	0.02	351	325	397	1.3	4.0
18	0.00	0.01	0.07	0.09	0.09	0.08	0.02	351	324	395	2.2	4.3
19	0.00	0.01	0.07	0.10	0.09	0.08	0.02	351	323	393	3.5	3.9
20	0.00	0.02	0.07	0.09	0.09	0.08	0.02	350	323	391	4.4	4.9
21	0.00	0.02	0.07	0.10	0.09	0.08	0.02	334	336	388	4.2	7.5
22	0.00	0.03	0.07	0.09	0.09	0.07	0.02	322	346	397	3.6	9.1
23	0.00	0.02	0.07	0.09	0.09	0.07	261	312	347	399	3.1	9.6
24	0.00	0.03	0.07	0.09	0.08	0.07	416	302	347	400	2.9	10
25	0.00	0.04	0.07	0.10	0.07	0.06	414	296	347	396	2.4	10
26	0.00	0.02	0.08	0.10	0.08	0.06	410	298	363	397	2.4	12
27	0.00	0.03	0.07	0.09	0.08	0.05	408	300	386	393	1.7	13
28	0.00	0.04	0.08	0.09	0.08	0.04	407	300	390	386	1.5	15
29	0.00	0.04	0.08	0.09	---	0.04	406	285	396	388	1.5	14
30	0.00	0.04	0.09	0.09	---	0.04	420	283	397	398	1.6	15
31	0.00	---	0.09	0.09	---	0.04	---	272	---	401	1.6	---
TOTAL	78.55	0.35	1.96	2.94	2.17	2.28	3142.43	12296	9856	12201	2645.8	177.9
MEAN	2.534	0.012	0.063	0.095	0.077	0.074	104.7	396.6	328.5	393.6	85.35	5.930
MAX	19	0.04	0.09	0.10	0.09	0.09	420	517	397	405	403	15
MIN	0.00	0.00	0.04	0.09	0.06	0.04	0.00	272	280	372	1.3	1.6
AC-FT	156	0.7	3.9	5.8	4.3	4.5	6230	24390	19550	24200	5250	353

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1920 - 2002, BY WATER YEAR (WY)

MEAN	35.61	0.769	6.950	18.32	38.56	85.92	321.6	427.7	348.3	434.8	354.1	198.3
MAX	138	19.8	323	452	763	1440	1603	1162	570	677	575	398
(WY)	1953	1920	1984	1971	1983	1983	1984	1958	2000	1945	1946	1999
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.4	92.0	30.3	0.041	0.000
(WY)	1934	1933	1933	1933	1933	1933	1935	1932	1942	1992	1988	1988

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1920 - 2002	
ANNUAL TOTAL	45687.53		40407.38			
ANNUAL MEAN	125.2		110.7		190.1	
HIGHEST ANNUAL MEAN					566	1983
LOWEST ANNUAL MEAN					46.8	1930
HIGHEST DAILY MEAN	538	May 12	517	May 5	3030	Mar 22 1984
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 16	0.00	Oct 5 1932
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Oct 16	0.00	Oct 5 1932
ANNUAL RUNOFF (AC-FT)	90620		80150		137700	
10 PERCENT EXCEEDS	439		397		505	
50 PERCENT EXCEEDS	0.17		0.10		3.8	
90 PERCENT EXCEEDS	0.00		0.01		0.00	

13217500 NORTH FORK MALHEUR RIVER AT BEULAH, OR

LOCATION.--Lat 43°54'28", long 118'°09'08", in NW 1/4 NE 1/4 sec.22, T.19 S., R.37 E., Malheur County, Hydrologic Unit 17050116, on left bank at Beulah, 0.3 mi downstream from Agency Valley Dam, 12 mi northwest of Juntura, and at mile 14.5.

DRAINAGE AREA.--440 mi^2, approximately.

PERIOD OF RECORD.--June 1926 to current year. Published as "near Beulah" June 1926 to September 1935.

REVISED RECORDS.--WSP 1397: 1927-32, 1934, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 3,261.20 ft above NGVD of 1929. Prior to Apr. 25, 1926, water-stage recorder at site 1 mi downstream at different datum. Apr. 25, 1936, to Sept. 30, 1949, nonrecording gage at site 20 ft downstream at datum 1.0 ft higher. Oct. 1, 1949, to June 30, 1964, at present site at datum 1.0 ft higher.

REMARKS.--Records good except those below 20 ft^3/s and estimated daily discharges, which are poor. Flow regulated since 1935 by Beulah Reservoir (station 13217000). Diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--67 years (water years 1936-2002), 144 ft^3/s, 104,500 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,000 ft^3/s May 7, 1942, gage height, 9.4 ft, present datum, from floodmark, caused by failure of gates at Agency Valley Dam, from rating curve extended above 1,100 ft^3/s on basis of computation of peak flow over dam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 440 ft^3/s Aug. 7, gage height, 3.56 ft; minimum daily discharge, 0.02 Dec. 13, 14, 18-31, Jan. 1-7, 16-28.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	e0.09	e0.05	e0.02	e0.03	e0.05	e0.07	213	327	354	345	43
2	19	e0.08	e0.04	e0.02	e0.03	e0.05	e0.07	309	326	353	354	41
3	22	e0.08	e0.04	e0.02	e0.03	e0.05	0.49	346	318	351	376	40
4	23	e0.08	e0.04	e0.02	e0.03	e0.05	2.7	338	295	349	379	39
5	24	e0.08	e0.04	e0.02	e0.03	e0.05	3.3	322	273	347	396	37
6	24	e0.07	e0.03	e0.02	e0.03	e0.05	3.6	298	269	346	417	40
7	24	e0.07	e0.03	e0.02	e0.03	e0.06	7.2	302	285	344	431	43
8	19	e0.07	e0.04	e0.03	e0.03	e0.07	8.1	301	296	332	413	41
9	11	e0.07	e0.04	e0.05	e0.03	e0.07	4.2	311	296	321	375	40
10	11	e0.06	e0.03	e0.05	e0.03	e0.07	7.4	315	289	325	314	40
11	12	e0.06	e0.03	e0.05	e0.03	e0.07	10	315	284	354	100	39
12	13	e0.06	e0.03	e0.03	e0.03	e0.07	15	315	287	358	47	37
13	13	e0.06	e0.02	e0.03	e0.03	e0.07	24	308	299	361	36	37
14	13	e0.06	e0.02	e0.03	e0.03	e0.07	28	291	302	361	38	38
15	13	e0.05	e0.03	e0.03	e0.03	e0.07	23	351	302	351	34	40
16	7.4	e0.05	e0.03	e0.02	e0.03	e0.07	28	379	301	346	38	40
17	3.8	e0.05	e0.03	e0.02	e0.03	e0.07	32	374	299	336	39	41
18	4.3	e0.05	e0.02	e0.02	e0.03	e0.07	34	370	314	330	41	43
19	4.8	e0.04	e0.02	e0.02	e0.03	e0.07	32	369	321	329	40	41
20	4.6	e0.04	e0.02	e0.02	e0.04	e0.08	33	369	321	322	40	40
21	0.99	e0.04	e0.02	e0.02	e0.04	e0.08	42	369	347	318	41	40
22	0.15	e0.05	e0.02	e0.02	e0.05	e0.08	60	347	356	324	43	40
23	e0.10	e0.06	e0.02	e0.02	e0.05	e0.08	130	325	356	335	44	40
24	e0.10	e0.06	e0.02	e0.02	e0.05	e0.08	173	311	327	340	46	43
25	e0.10	e0.05	e0.02	e0.02	e0.05	e0.08	148	291	322	337	42	41
26	e0.10	e0.05	e0.02	e0.02	e0.05	e0.08	121	284	327	333	42	41
27	e0.10	e0.05	e0.02	e0.02	e0.06	e0.08	110	284	326	330	42	42
28	e0.10	e0.05	e0.02	e0.02	e0.05	e0.07	108	284	348	327	45	41
29	e0.10	e0.05	e0.02	e0.03	---	e0.07	115	283	357	344	43	41
30	e0.10	e0.05	e0.02	e0.03	---	e0.07	152	293	356	347	43	42
31	e0.09	---	e0.02	e0.03	---	e0.07	---	298	---	342	47	---
TOTAL	292.93	1.78	0.85	0.79	1.01	2.12	1455.13	9865	9426	10547	4731	1211
MEAN	9.449	0.059	0.027	0.025	0.036	0.068	48.50	318.2	314.2	340.2	152.6	40.37
MAX	25	0.09	0.05	0.05	0.06	0.08	173	379	357	361	431	43
MIN	0.09	0.04	0.02	0.02	0.03	0.05	0.07	213	269	318	34	37
AC-FT	581	3.5	1.7	1.6	2.0	4.2	2890	19570	18700	20920	9380	2400

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1936 - 2002, BY WATER YEAR (WY)

MEAN	36.51	0.974	1.633	10.38	29.29	87.24	297.0	354.8	284.5	276.3	215.5	134.3
MAX	134	35.5	62.7	287	478	936	856	810	510	402	399	341
(WY)	1954	1936	1943	1943	1965	1983	1958	1983	1974	1979	1980	1945
MIN	0.086	0.000	0.000	0.000	0.000	0.000	2.29	120	53.7	39.5	30.4	31.9
(WY)	1974	1938	1938	1936	1938	1938	1981	1977	1939	1992	1992	1961

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1936 - 2002	
ANNUAL TOTAL	29835.69		37534.61			
ANNUAL MEAN	81.74		102.8		144.3	
HIGHEST ANNUAL MEAN					335	1983
LOWEST ANNUAL MEAN					54.6	1936
HIGHEST DAILY MEAN	389	Aug 8	431	Aug 7	3700	May 7 1942
LOWEST DAILY MEAN	0.00	Jan 16	0.02	Dec 13	0.00	Dec 22 1935
ANNUAL SEVEN-DAY MINIMUM	0.02	Dec 18	0.02	Dec 18	0.00	Dec 22 1935
ANNUAL RUNOFF (AC-FT)	59180		74450		104500	
10 PERCENT EXCEEDS	274		345		365	
50 PERCENT EXCEEDS	4.3		13		46	
90 PERCENT EXCEEDS	0.04		0.03		0.10	

e Estimated

13233300 MALHEUR RIVER BELOW NEVADA DAM, NEAR VALE, OR

LOCATION.--Lat 43°59'20", long 117°13'10", in NE 1/4 SW 1/4 sec.21, T.18 S., R.45 E.,Malheur County, Hydrologic Unit 17050117, on right bank, 510 ft downstream from dam and headgates of Nevada Canal, and 1.5 mi northeast of Vale.

DRAINAGE AREA.--3,880 mi^2, approximately.

PERIOD OF RECORD.--June 1926 to September 1934, April 1936 to March 1942, March 1944 to September 1954, October 1993 to current year. Monthly discharge only for some periods, published in WSP 1317.

GAGE.--Water-stage recorder. Elevation of gage is 2,220 ft above NGVD of 1929, from topographic map. Prior to Nov. 17, 1930, at datum 1.00 ft higher.

REMARKS.--Records good except for the period Dec. 6 to Feb. 25 and estimated daily discharges, which are fair. Many diversions for irrigation upstream from station. Since March 1930, Vale-Oregon Canal has diverted in sec.31 T.20 S., R.41 E., for irrigation upstream from station and on Willow Creek, a tributary which enters partly above and partly below station. Gilleman-Frohman Canal diverts on left bank in sec.8 T.19 S., R.44 E., for irrigation above and below station. Nevada Canal diverts on right bank 300 ft above station for irrigation below station. Flow regulated by Warmsprings Reservoir and, since December 1935, by Beulah Reservoir.

AVERAGE DISCHARGE.--9 years (water years 1994-2002), 269 ft^3/s, 194,800 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,530 ft^3/s Feb. 28, 1940, gage height, 8.88 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Feb. 24, 1957 reached a stage of 14.6 ft, discharge 21,000 ft^3/s. Flood of Mar. 19, 1993 reached a stage of 13.31 ft, discharge 16,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 175 ft^3/s Mar. 14; minimum daily discharge, 2.8 ft^3/s Sept. 14.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.2	74	70	73	87	85	48	3.2	7.3	14	5.3	4.4
2	10	72	73	76	89	79	56	4.1	5.3	16	12	4.3
3	13	67	78	76	80	76	56	2.9	43	6.7	e9.6	5.2
4	14	65	78	76	79	76	31	30	50	11	e13	5.8
5	14	74	76	76	76	76	7.0	63	26	20	e17	6.2
6	15	83	77	77	77	76	7.6	57	20	19	e20	6.2
7	16	79	78	80	93	76	4.8	37	10	25	14	5.8
8	18	79	73	80	107	76	3.6	20	8.1	37	9.5	5.3
9	21	79	73	79	114	82	4.0	3.7	16	19	5.8	5.4
10	20	77	72	80	105	79	25	3.0	25	11	7.0	5.4
11	20	78	73	107	107	77	40	5.1	46	6.6	9.1	4.9
12	17	76	74	128	107	82	39	7.9	16	5.8	10	3.2
13	17	78	74	126	102	169	38	7.3	7.9	7.7	8.0	3.0
14	17	85	76	120	103	175	42	3.2	9.2	13	7.9	2.8
15	22	84	74	111	100	133	53	3.8	7.3	13	7.1	3.0
16	29	79	73	101	87	117	66	6.3	8.0	13	5.4	3.2
17	41	76	73	96	83	101	90	4.7	9.5	11	5.3	3.2
18	34	76	73	93	82	92	108	5.8	7.3	4.2	5.3	3.2
19	34	76	72	92	86	90	106	7.1	7.8	6.2	5.4	3.2
20	31	76	72	93	90	90	55	5.4	12	12	4.7	3.2
21	22	76	72	90	90	93	52	20	6.9	32	4.3	3.2
22	20	80	72	86	91	100	53	33	5.3	48	4.2	3.6
23	31	76	73	80	99	152	49	33	16	24	4.0	3.9
24	28	78	73	87	128	150	29	36	31	21	4.0	3.7
25	19	84	72	82	163	142	16	33	15	32	3.9	3.6
26	17	79	72	86	158	121	65	32	7.1	33	3.8	3.5
27	16	77	73	88	118	125	66	23	6.4	31	3.8	3.6
28	15	75	73	83	96	110	31	19	6.7	22	4.3	3.6
29	47	74	73	76	---	98	17	12	10	19	4.4	4.0
30	56	73	73	77	---	92	7.9	9.5	11	13	4.4	4.0
31	71	---	73	84	---	90	---	4.2	---	5.0	4.8	---
TOTAL	752.2	2305	2281	2759	2797	3180	1265.9	535.2	457.1	551.2	227.3	123.6
MEAN	24.26	76.83	73.58	89.00	99.89	102.6	42.20	17.26	15.24	17.78	7.332	4.120
MAX	71	85	78	128	163	175	108	63	50	48	20	6.2
MIN	7.2	65	70	73	76	76	3.6	2.9	5.3	4.2	3.8	2.8
AC-FT	1490	4570	4520	5470	5550	6310	2510	1060	907	1090	451	245

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2002, BY WATER YEAR (WY)

MEAN	164.0	143.1	145.7	318.0	483.7	596.3	592.4	288.9	161.6	104.7	102.2	144.8
MAX	228	175	314	1589	1322	1881	1695	988	541	179	220	300
(WY)	2000	2001	1997	1997	1997	1999	1999	1998	1998	1998	1999	1998
MIN	24.3	76.8	73.6	89.0	94.2	65.9	41.5	17.3	15.2	17.8	7.33	2.87
(WY)	2002	2002	2002	2002	1994	1994	1994	2002	2002	2002	2002	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1994 - 2002	
ANNUAL TOTAL	23346.98		17234.5			
ANNUAL MEAN	63.96		47.22		268.9	
HIGHEST ANNUAL MEAN					535	1999
LOWEST ANNUAL MEAN					47.2	2002
HIGHEST DAILY MEAN	476	Mar 20	175	Mar 14	6230	Jan 3 1997
LOWEST DAILY MEAN	0.53	Sep 13	2.8	Sep 14	0.53	Sep 13 2001
ANNUAL SEVEN-DAY MINIMUM	0.89	Sep 7	3.1	Sep 12	0.89	Sep 7 2001
ANNUAL RUNOFF (AC-FT)	46310		34180		194800	
10 PERCENT EXCEEDS	130		94		654	
50 PERCENT EXCEEDS	54		34		148	
90 PERCENT EXCEEDS	3.7		4.3		21	

e Estimated

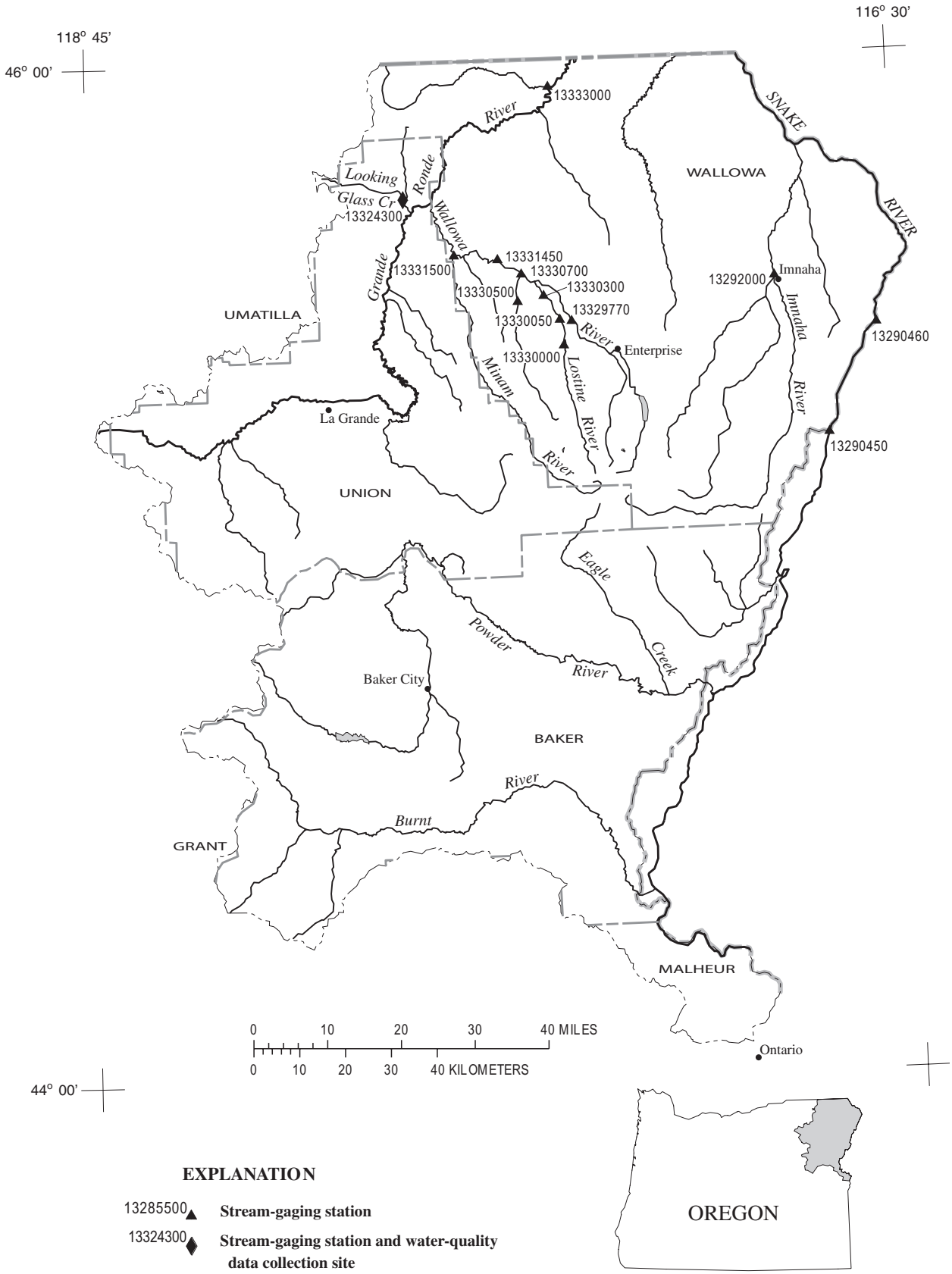


Figure 9. Location of surface-water and water-quality stations in the Powder River, Snake River Main Stem , Pine Creek, Imnaha River, and Grande Ronde River Basins.

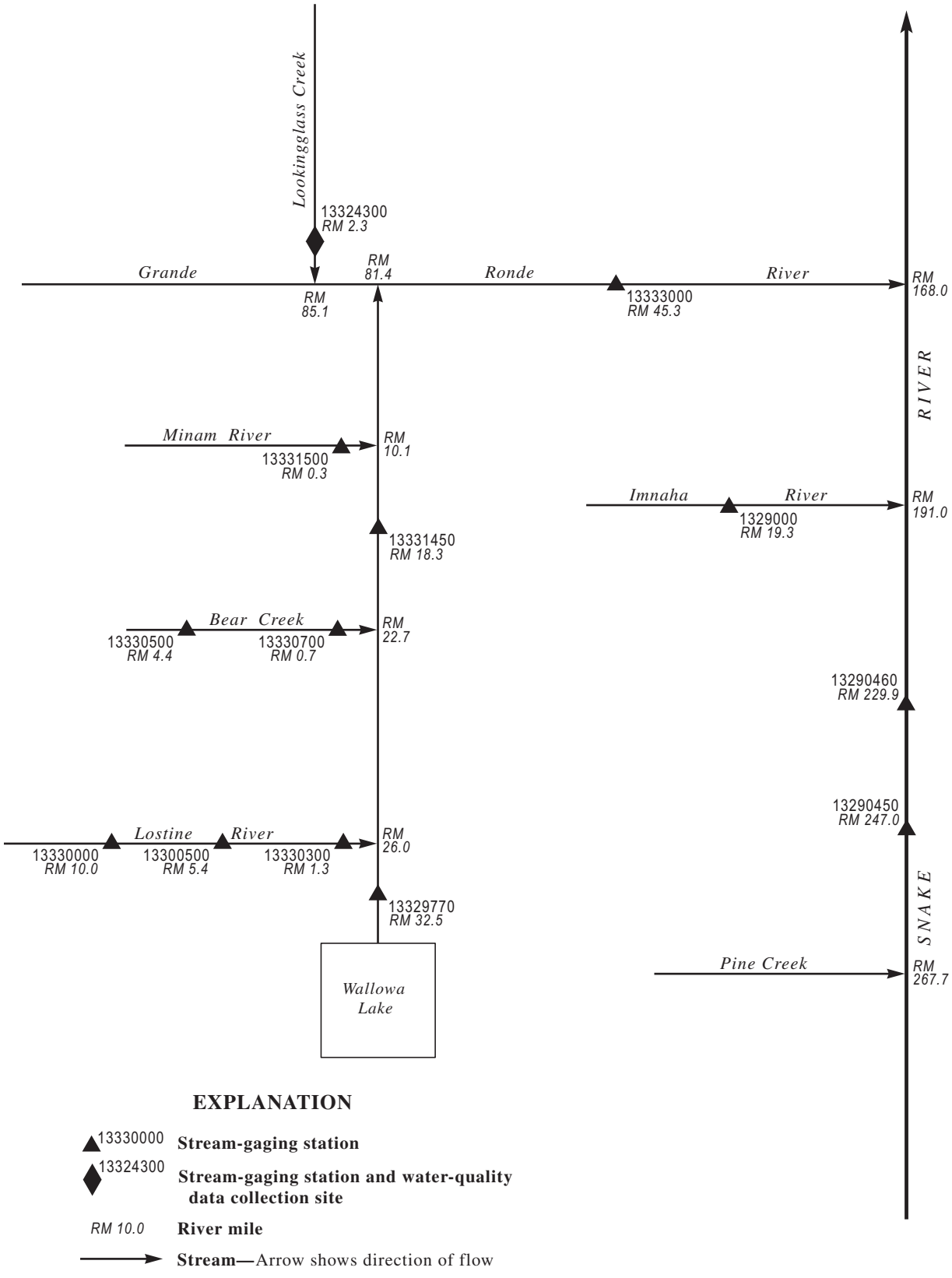


Figure 10. Schematic diagram showing gaging stations in the Imhaha and Grande Ronde River Basins, and Snake River Main Stem.

13290450 SNAKE RIVER AT HELLS CANYON DAM, IDAHO-OREGON STATE LINE

LOCATION.--Lat 45°15'05", long 116°41'50", in SE 1/4 SE 1/4 sec.33, T.3 S., R.49 E., unsurveyed (Willamette meridian), Wallowa County, Wallowa-Whitman National Forest, Hydrologic Unit 17050201, on left bank, 0.2 mi upstream from Hells Canyon Creek, 0.4 mi downstream from Deep Creek, 0.6 mi downstream from Hells Canyon Dam, 15.5 mi northeast of Homestead, Oregon, and at mile 247.0.

DRAINAGE AREA.--73,300 mi^2, approximately.

PERIOD OF RECORD.--July 1965 to current year.

REVISED RECORDS.--WDR ID-78-2: 1969-70, 1972-76, WDR ID-79-2: 1972-73(m).

GAGE.--Water-stage recorder. Datum of gage is 1,400 ft above NGVD of 1929 (levels by Idaho Power Company).

REMARKS.--Station equipment includes satellite telemetry. Flow regulated by many reservoirs upstream from station, with a total usable capacity of more than 10,000,000 acre-feet, the most effective of which is Brownlee Reservoir, 38 mi upstream. Diurnal fluctuations caused by Hells Canyon powerplant. Diversions upstream from station for irrigation of about 3,820,000 acres, of which 742,000 acres are irrigated by withdrawals from ground water (1966 determination).

AVERAGE DISCHARGE.--47 years (water years 1966-2002), 20,390 ft^3/s, 14,770,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 103,000 ft^3/s Jan. 2, 1997, gage height, 86.17 ft; minimum discharge, 1,580 ft^3/s Mar. 19, 1967, gage height, 59.9 ft; minimum daily discharge, 4,360 ft^3/s May 8, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 29,200 ft^3/s Apr. 19, gage height, 71.76 ft; minimum discharge, 5,060 ft^3/s Oct. 1, gage height, 62.72 ft.

COOPERATION.--Discharge records furnished by Idaho Power and reviewed by U.S. Geological Survey beginning April 2001.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10900	8980	9070	9150	20700	13300	24900	9250	17800	8540	7360	7560
2	12700	8980	9080	13800	19400	11000	22800	12500	19000	9630	7670	10600
3	10200	8960	9070	13200	16700	10300	11000	15800	18500	12900	7640	13500
4	12800	9010	9040	17400	23200	14900	9330	9300	20200	7790	7920	13400
5	9990	9000	9000	16500	21000	10800	17900	9320	18500	7840	9190	12900
6	8750	8940	9080	13200	18400	9300	19300	14400	16400	8240	7620	9040
7	11600	8900	9140	18900	17300	10200	15700	13000	16100	8540	8990	7500
8	8740	8890	9170	18300	9530	13200	19200	12100	16100	7470	7760	8210
9	8110	8910	9160	17800	9110	9460	18100	11300	14200	7420	10900	8670
10	8090	8980	9020	16800	10900	10900	16300	11800	16800	10100	13100	8580
11	8130	9030	9020	15600	15800	17000	10200	10200	14500	10900	10900	12500
12	8140	9010	11300	12700	21500	16800	9410	9200	13900	10600	12400	15600
13	8110	9030	15200	9180	21200	15500	9400	14100	13400	12600	15500	18100
14	8110	9000	11900	15000	16100	16700	9430	11700	12300	7850	17000	12400
15	8110	8960	12100	18000	15000	14800	16900	10200	12700	9160	16600	14700
16	8100	8950	11300	18600	9860	12900	20200	8800	12700	10400	16000	14500
17	8130	8970	17000	19100	10900	9450	24000	8650	12300	11800	15300	14200
18	8130	8950	18700	16600	11400	19600	23900	8570	13100	8190	10500	12100
19	8150	8950	14400	10600	10400	17200	22500	9930	12600	7310	15100	14000
20	8180	8980	11800	11600	9220	14200	20700	11000	11400	7600	11700	12500
21	8170	9050	12800	18100	9230	11500	14200	12300	11200	7240	11100	10800
22	8390	9040	11800	21300	9480	14900	24200	13600	11700	7500	13600	11100
23	8510	9040	9400	18800	9230	12800	23500	17900	12300	10300	14000	14200
24	8360	9100	14800	19800	9240	17700	18400	19300	15100	10800	11900	15600
25	8330	9100	9260	17300	14100	20300	14900	12800	14500	7660	9740	15400
26	8460	9010	12300	15100	15200	24200	9320	13400	13100	7220	14700	12300
27	8510	9020	12000	10700	13100	24700	9360	16500	12800	7390	11100	14600
28	8570	8980	9240	16900	10300	25800	9350	19000	16000	7640	13900	15800
29	8820	8990	9170	21100	---	26600	9340	16900	10900	7290	18100	13200
30	8920	9040	9160	19300	---	25500	9330	17800	8510	10400	12300	19700
31	8960	---	9150	17100	---	27500	---	20700	---	7510	8390	---
TOTAL	277170	269750	342630	497530	397500	499010	483070	401320	428610	275830	367980	383260
MEAN	8941	8992	11050	16050	14200	16100	16100	12950	14290	8898	11870	12780
MAX	12800	9100	18700	21300	23200	27500	24900	20700	20200	12900	18100	19700
MIN	8090	8890	9000	9150	9110	9300	9320	8570	8510	7220	7360	7500
AC-FT	549800	535000	679600	986900	788400	989800	958200	796000	850100	547100	729900	760200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2002, BY WATER YEAR (WY)

MEAN	15370	15340	17920	22320	24320	28770	30010	26940	24400	14160	11490	14040
MAX	24140	28630	30410	50150	58220	66340	61960	68840	59080	25550	19860	24960
(WY)	1972	1985	1984	1997	1997	1986	1984	1984	1984	1983	1997	1997
MIN	8941	8992	9391	11960	11300	10600	7371	6401	5868	6901	6583	6887
(WY)	2002	2002	1993	2001	2001	1991	1988	1977	1992	1977	1992	1977

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1966 - 2002	
ANNUAL TOTAL	3883110		4623660			
ANNUAL MEAN	10640		12670		20390	
HIGHEST ANNUAL MEAN					36560	1984
LOWEST ANNUAL MEAN					9746	1992
HIGHEST DAILY MEAN	21300	Jan 17	27500	Mar 31	98100	Jan 2 1997
LOWEST DAILY MEAN	6960	Jul 8	7220	Jul 26	4360	May 8 1977
ANNUAL SEVEN-DAY MINIMUM	7580	Jun 23	7830	Jul 26	5330	Jun 4 1992
ANNUAL RUNOFF (AC-FT)	7702000		9171000		14770000	
10 PERCENT EXCEEDS	14400		18900		38700	
50 PERCENT EXCEEDS	9240		11600		16500	
90 PERCENT EXCEEDS	7770		8190		9020	

13290460 SNAKE RIVER AT JOHNSON BAR, ID

LOCATION.--Lat 45°27'50", long 116°33'16", in SE 1/4 NE 1/4 sec.22, T.1 S., R.50 E., (Willamette meridian), Wallowa County, Hydrologic Unit 17060101, Hells Canyon National Recreation Area, on left bank opposite lower end of Johnson Bar, 0.5 mi upstream from mouth of Sheep Creek, and at mile 229.9.

DRAINAGE AREA.--73,400 mi^2, approximately.

PERIOD OF RECORD.--July 1959 to September 1992 (gage heights only), October 1992 to September 1995 (discharge), October 1995 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 1,226.341 ft above NGVD of 1929 (levels by Corps of Engineers.)

REMARKS.--Station equipment includes satellite telemetry. Diurnal fluctuations in stage are caused by Hells Canyon Powerplant. Records for years prior to the 1991 water year were not published, but are available from the Boise, Idaho Field Office.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 10.37 ft Apr. 18; minimum recorded gage height, 3.85 ft Oct. 1.

COOPERATION.--Gage-height records furnished by Idaho Power and reviewed by U.S. Geological Survey beginning April 2001.

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.58	5.32	5.35	5.35	8.25	6.50	9.72	5.40	7.82	5.10	4.73	4.89
2	6.35	5.32	5.36	6.51	8.15	5.75	8.71	6.19	8.01	5.40	4.83	5.49
3	5.77	5.31	5.34	6.54	7.52	5.81	6.28	7.23	7.84	6.38	4.82	6.67
4	6.33	5.33	5.34	7.44	8.83	6.81	5.43	5.51	8.31	5.06	4.92	6.52
5	5.79	5.33	5.32	7.40	8.63	5.94	7.46	5.43	7.92	4.91	5.28	6.38
6	5.26	5.30	5.35	6.59	7.99	5.39	8.08	6.72	7.46	5.04	4.86	5.47
7	5.88	5.29	5.36	7.88	7.47	5.49	7.29	6.49	7.33	5.12	5.24	4.79
8	5.38	5.29	5.39	7.87	5.69	6.59	8.03	6.22	7.11	4.84	4.85	5.02
9	5.07	5.30	5.38	7.76	5.33	5.52	7.85	5.96	6.83	4.76	5.67	5.14
10	5.07	5.31	5.34	7.42	5.69	5.82	7.41	6.15	7.53	5.36	6.33	5.17
11	5.08	5.34	5.33	7.14	7.16	7.35	5.80	5.67	6.85	5.81	5.89	6.25
12	5.08	5.33	5.87	6.45	8.40	7.44	5.47	5.38	6.76	5.71	6.21	6.98
13	5.08	5.33	7.02	5.48	8.65	7.11	5.48	6.60	6.61	6.34	6.93	7.63
14	5.07	5.33	6.15	6.89	7.36	7.38	5.54	6.20	6.26	5.11	7.49	6.30
15	5.07	5.32	6.20	7.56	7.00	7.09	7.40	5.67	6.27	5.25	7.32	6.90
16	5.07	5.31	5.95	7.83	5.64	6.33	8.09	5.33	6.39	5.53	7.33	6.85
17	5.09	5.31	7.47	8.03	5.73	5.56	9.17	5.21	6.30	6.00	6.93	6.88
18	5.07	5.31	7.87	7.54	6.10	7.88	9.25	5.20	6.57	5.28	5.84	6.11
19	5.05	5.31	6.95	5.86	5.74	7.61	8.99	5.49	6.40	4.72	6.87	6.60
20	5.06	5.32	6.07	5.96	5.37	6.90	8.40	6.00	5.90	4.81	6.20	6.34
21	5.05	5.34	6.45	7.48	5.38	6.04	6.81	6.34	6.04	4.69	5.92	5.72
22	5.11	5.34	6.07	8.61	5.45	6.89	9.05	6.62	6.04	4.78	6.48	5.92
23	5.18	5.34	5.52	8.01	5.37	6.45	9.19	7.60	6.25	5.44	6.60	6.56
24	5.12	5.35	6.83	8.09	5.37	7.51	8.01	8.19	6.75	5.71	6.10	7.12
25	5.11	5.36	5.48	7.81	6.69	8.19	7.03	6.58	7.02	5.10	5.60	7.07
26	5.15	5.32	6.06	6.96	6.91	9.20	5.48	6.56	6.40	4.70	6.78	6.34
27	5.17	5.34	6.21	5.80	6.58	9.39	5.44	7.28	6.29	4.74	5.93	6.70
28	5.18	5.33	5.53	7.38	5.68	9.68	5.43	8.23	7.34	4.75	6.73	7.16
29	5.25	5.32	5.36	8.40	---	9.82	5.42	7.42	5.91	4.78	7.56	6.57
30	5.31	5.34	5.35	8.04	---	9.52	5.42	7.71	5.16	5.40	6.55	7.98
31	5.32	---	5.34	7.58	---	10.07	---	8.47	---	4.99	5.06	---
MEAN	5.30	5.32	5.89	7.21	6.72	7.19	7.24	6.42	6.79	5.21	6.06	6.32
MAX	6.35	5.36	7.87	8.61	8.83	10.07	9.72	8.47	8.31	6.38	7.56	7.98
MIN	5.05	5.29	5.32	5.35	5.33	5.39	5.42	5.20	5.16	4.69	4.73	4.79

WTR YR 2002 MEAN 6.30 MAX 10.07 MIN 4.69

13292000 IMNAHA RIVER AT IMNAHA, OR

LOCATION.--Lat 45°33'45", long 116°50'00", in NW 1/4 SW 1/4 sec.16, T.1 N., R.48 E., Wallowa County, Hydrologic Unit 17060102, on left bank at Imnaha, 0.3 mi downstream from Big Sheep Creek, and at mile 19.3.

DRAINAGE AREA.--622 mi^2.

PERIOD OF RECORD.--June 1928 to current year.

REVISED RECORDS.--WSP 833: 1938. WSP 1397: 1929, 1932(M), 1949. WSP 1737: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,941.14 ft above NGVD of 1929. Prior to Aug. 6, 1934, nonrecording gage at site 0.25 mi upstream at different datum. Aug. 6-31, 1934, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation. Diversions for irrigation upstream from station. Water is diverted from Big Sheep Creek and tributaries upstream from station for irrigation in Wallowa River basin. National Weather Service satellite telemeter at station. Continuous water-quality records for the period August 1965 to September 1968 and from May 1976 to September 1977 have been collected at this location.

AVERAGE DISCHARGE.--74 years (water years 1929-2002), 511 ft^3/s, 370,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,200 ft^3/s Jan. 1, 1997, gage height, 11.44 ft, from floodmark,from rating curve extended above 7,900 ft^3/s, on basis of slope-area measurement of peak flow; minimum discharge observed, 16 ft^3/s Nov. 22, 1931, result of freezeup; minimum daily, 25 ft^3/s Nov. 22, 23, 1931.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1830	*2,360	*4.67	May 30	0300	2,120	4.47
May 20	1900	1,990	4.35				

Minimum daily discharge, 32 ft^3/s Jan. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	97	210	129	176	e115	158	599	1210	1670	845	216	145
2	95	171	120	176	152	145	655	1360	1540	751	216	142
3	95	152	126	178	137	142	613	1460	1440	693	210	141
4	95	141	125	155	117	164	634	1340	1400	663	207	140
5	96	135	129	153	131	168	734	1300	1420	618	205	137
6	97	129	124	159	135	161	877	1170	1480	574	203	136
7	97	126	126	187	150	169	908	1080	1370	570	200	138
8	100	119	119	240	163	136	803	958	1200	581	196	139
9	102	118	123	226	136	150	828	872	1050	524	189	135
10	103	118	106	206	135	158	959	799	966	484	182	131
11	131	116	122	206	140	150	990	755	896	465	175	128
12	133	115	128	196	117	168	1080	800	875	452	170	123
13	121	117	126	189	134	171	1300	946	905	438	167	121
14	124	121	133	177	133	169	1980	1150	1010	422	164	119
15	121	126	121	179	127	167	1950	1210	1120	405	162	118
16	117	122	125	165	142	177	1400	1150	1300	383	160	118
17	113	120	138	155	149	171	1120	1190	1380	358	158	137
18	112	121	105	161	150	157	934	1230	1340	337	156	146
19	111	118	130	158	154	174	807	1480	1190	341	154	131
20	110	117	142	164	156	169	745	1840	1050	345	154	126
21	110	139	137	167	151	168	727	1670	1020	314	168	124
22	113	150	125	138	161	184	742	1410	993	296	179	124
23	136	151	86	143	186	246	846	1230	1030	287	170	123
24	150	134	61	160	208	358	796	1110	1020	278	161	121
25	129	137	43	163	177	342	794	1100	1080	266	156	119
26	125	132	60	166	155	347	873	1160	1130	271	155	119
27	123	110	e80	133	174	403	978	1310	1140	258	151	119
28	124	79	e110	80	194	434	908	1490	1110	247	154	120
29	127	114	166	46	---	434	938	1740	1090	238	150	120
30	131	129	150	e63	---	432	1080	1960	972	230	153	128
31	260	---	166	e86	---	478	---	1800	---	222	150	---
TOTAL	3698	3887	3681	4951	4179	7050	28598	39280	35187	13156	5391	3868
MEAN	119	130	119	160	149	227	953	1267	1173	424	174	129
MAX	260	210	166	240	208	478	1980	1960	1670	845	216	146
MIN	95	79	43	46	115	136	599	755	875	222	150	118
AC-FT	7330	7710	7300	9820	8290	13980	56720	77910	69790	26090	10690	7670

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2002, BY WATER YEAR (WY)

MEAN	157	185	213	211	242	412	940	1555	1316	559	196	145
MAX	501	625	806	1343	570	1026	1760	2804	2612	1348	380	256
(WY)	1963	1974	1942	1997	1996	1995	1956	1948	1974	1975	1982	1978
MIN	81.5	80.0	88.6	69.3	82.4	114	345	445	361	123	78.8	82.8
(WY)	1937	1937	1936	1937	1937	1977	1977	1977	1992	1977	1931	1931

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1929 - 2002	
ANNUAL TOTAL	86195		152926			
ANNUAL MEAN	236		419		511	
HIGHEST ANNUAL MEAN					897	1974
LOWEST ANNUAL MEAN					184	1977
HIGHEST DAILY MEAN	1150	May 15	1980	Apr 14	12400	Jan 1 1997
LOWEST DAILY MEAN	43	Dec 25	43	Dec 25	25	Nov 22 1931
ANNUAL SEVEN-DAY MINIMUM	81	Dec 22	81	Dec 22	43	Jan 8 1993
ANNUAL RUNOFF (AC-FT)	171000		303300		370600	
10 PERCENT EXCEEDS	599		1150		1390	
50 PERCENT EXCEEDS	139		166		228	
90 PERCENT EXCEEDS	95		117		113	

e Estimated

13324300 LOOKINGGLASS CREEK NEAR LOOKING GLASS, OR

LOCATION.--Lat 45°43'55", long 117°51'50", in NW 1/4 NW 1/4 sec.19, T.3 N., R.40 E., Union County, Hydrologic Unit 17060104, on left bank at Oregon State Fish and Wildlife Service fish hatchery, 310 ft upstream from Jarboe Creek, 2.3 mi northwest of Looking Glass, and at mile 2.3.

DRAINAGE AREA.--78.3 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 2,530 ft above NGVD of 1929, from topographic map.

REMARKS.--Records fair except for discharges greater than 200 ft^3/s, which are poor. Records include a diversion by the fish hatchery 0.3 mi upstream from station of up to 50 ft^3/s that is returned through the fish ladder to the gage pool.

AVERAGE DISCHARGE.--20 years (water years 1983-2002), 139 ft^3/s, 100,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,120 ft^3/s Feb. 9, 1996, gage height, 7.41 ft, from rating curve extended above 1,000 ft^3/s; minimum discharge, 25 ft^3/s Oct. 11, 1983, result of regulation at fish hatchery upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 380 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0630	*955	*6.67	May 20	0230	689	6.08
May 2	unknown	unknown	unknown	May 29	1700	723	6.16

Minimum daily discharge, 45 ft^3/s Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	60	60	55	60	73	210	e560	500	119	52	46
2	58	58	59	58	59	69	188	e620	469	105	51	47
3	58	56	60	59	58	66	194	e580	427	96	51	46
4	57	55	59	58	57	65	211	e550	425	95	51	46
5	58	53	59	57	57	68	244	e520	413	94	53	47
6	58	52	60	62	57	79	292	e460	380	99	54	47
7	58	52	59	104	58	83	321	e400	328	95	54	48
8	60	52	58	159	59	78	313	e360	299	90	53	47
9	60	52	58	138	57	75	340	327	307	87	52	45
10	57	52	58	107	56	73	429	308	281	83	52	47
11	67	53	57	91	56	85	454	318	250	79	52	48
12	55	52	57	84	56	155	511	364	253	76	51	48
13	54	53	62	79	57	152	576	398	255	75	50	48
14	55	56	67	75	57	120	858	433	250	69	50	48
15	54	55	63	72	57	96	685	441	255	66	49	48
16	53	54	61	70	58	82	534	463	243	65	48	48
17	53	55	61	68	59	80	457	469	232	62	48	52
18	52	54	61	67	61	82	420	499	302	60	48	53
19	52	53	63	67	63	90	378	570	247	61	48	51
20	53	55	61	69	64	90	355	658	205	58	48	50
21	53	65	59	68	69	92	352	585	202	57	49	50
22	62	81	58	67	75	100	393	508	176	55	50	50
23	64	94	56	65	98	117	406	528	177	55	49	50
24	54	70	55	64	161	137	377	489	156	55	48	51
25	52	66	55	66	120	164	384	512	144	55	47	49
26	51	62	55	65	99	174	423	511	151	55	50	50
27	51	59	55	63	86	182	397	573	137	54	49	50
28	52	58	56	e63	79	174	395	617	123	54	48	50
29	51	62	55	e62	---	168	e460	662	125	54	48	51
30	56	61	55	62	---	178	e520	582	115	53	48	53
31	77	---	55	61	---	205	---	512	---	52	47	---
TOTAL	1751	1760	1817	2305	1953	3452	12077	15377	7827	2233	1548	1464
MEAN	56.5	58.7	58.6	74.4	69.8	111	403	496	261	72.0	49.9	48.8
MAX	77	94	67	159	161	205	858	662	500	119	54	53
MIN	51	52	55	55	56	65	188	308	115	52	47	45
AC-FT	3470	3490	3600	4570	3870	6850	23950	30500	15520	4430	3070	2900

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	53.6	71.6	82.0	87.0	132	193	333	371	166	68.1	53.5	52.2
MAX	66.7	167	288	213	483	431	564	608	425	117	65.3	61.9
(WY)	1986	1996	1996	1997	1996	1997	1997	1997	1984	1984	1985	1984
MIN	45.2	46.8	53.2	51.0	54.4	83.3	183	114	57.4	47.0	37.1	40.1
(WY)	1995	1988	1988	2001	2001	1985	2001	1992	1992	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	33939		53564			
ANNUAL MEAN	93.0		147		139	
HIGHEST ANNUAL MEAN					227	1997
LOWEST ANNUAL MEAN					93.0	2001
HIGHEST DAILY MEAN	466	May 15	858	Apr 14	1740	Feb 9 1996
LOWEST DAILY MEAN	44	Jan 28	45	Sep 9	35	Oct 11 1983
ANNUAL SEVEN-DAY MINIMUM	47	Jan 24	47	Aug 31	35	Aug 16 1994
ANNUAL RUNOFF (AC-FT)	67320		106200		100300	
10 PERCENT EXCEEDS	175		428		336	
50 PERCENT EXCEEDS	57		62		70	
90 PERCENT EXCEEDS	51		50		50	

e Estimated

13324300 LOOKINGGLASS CREEK NEAR LOOKING GLASS, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 1999 to current year.

PERIOD OF DAILY RECORD.--May 1999 to current year.

INSTRUMENTATION.--Temperature recorder since May 1999.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--Maximum recorded, 20.0°C Aug. 24, 1999; minimum recorded, 0.0°C Dec. 15, 2000, Jan. 27, Feb. 8, 2001, Nov. 28, Dec. 24, 2001, Jan. 28, 29, Feb. 5, 2002.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded, 19.2°C July 29; minimum, 0.0°C Nov. 28, Dec. 24, Jan. 28, 29, Feb. 5.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.7	5.0	7.7	6.5	5.1	5.9	4.1	2.0	3.2	4.8	3.8	4.2
2	10.3	5.2	7.6	7.3	4.8	6.2	3.6	2.4	3.1	4.5	4.0	4.2
3	9.5	4.5	6.9	6.3	4.1	5.0	3.8	2.3	3.3	4.7	3.0	3.8
4	9.3	4.2	6.6	6.4	3.6	4.7	3.6	1.4	2.5	4.8	3.2	3.9
5	8.5	3.5	5.9	6.5	3.6	4.9	3.2	1.0	2.2	4.2	2.8	3.5
6	9.0	3.7	6.3	4.4	2.6	3.5	4.0	0.7	2.6	4.5	3.2	3.9
7	7.6	4.2	6.1	4.0	1.5	2.7	3.6	2.1	3.2	4.6	4.0	4.3
8	8.3	5.3	6.5	4.5	1.2	2.8	3.9	2.0	3.0	4.4	3.6	4.0
9	8.0	4.3	6.2	4.9	2.3	3.4	3.9	2.7	3.5	4.1	3.1	3.7
10	6.8	3.0	5.0	4.7	1.9	3.2	3.5	1.8	2.6	4.3	2.7	3.4
11	7.9	5.0	6.3	5.1	2.2	3.6	3.4	2.3	2.9	4.8	3.7	4.1
12	7.0	4.7	5.9	6.2	3.3	4.7	3.5	1.4	2.8	4.4	3.6	4.0
13	8.9	5.9	7.3	6.9	4.3	5.6	3.9	0.7	1.7	3.9	2.8	3.4
14	9.0	5.2	7.1	7.2	5.2	6.2	3.4	1.9	2.8	3.5	2.4	2.9
15	7.9	3.9	5.7	7.2	4.4	5.8	3.5	2.0	2.6	3.2	2.1	2.7
16	8.6	4.5	6.4	7.2	5.9	6.5	3.4	2.4	2.8	3.3	1.2	2.4
17	7.4	3.7	5.9	6.5	4.4	5.8	3.9	1.1	3.0	3.6	1.8	2.6
18	6.9	2.8	4.8	6.0	3.6	4.9	2.6	0.3	1.4	3.4	1.6	2.5
19	8.9	4.7	6.4	6.3	3.2	4.8	3.0	1.6	2.3	3.7	0.9	2.5
20	8.0	4.5	6.5	6.4	4.4	5.6	4.1	2.3	3.2	2.7	0.5	1.9
21	6.9	3.6	5.3	6.3	5.1	5.7	4.3	2.3	3.3	3.9	1.4	2.6
22	7.1	6.0	6.5	6.0	4.8	5.3	3.2	1.6	2.4	2.3	1.6	1.9
23	6.3	4.5	5.5	5.2	3.2	4.4	2.6	0.4	1.7	3.4	1.6	2.5
24	6.2	3.6	4.7	4.0	2.4	3.3	2.4	0.0	1.2	3.5	2.4	3.0
25	6.3	3.9	4.9	4.1	3.2	3.6	2.7	1.5	2.1	4.1	2.3	3.1
26	7.0	2.8	4.7	4.9	3.1	3.9	2.9	0.6	1.8	3.8	1.9	3.2
27	6.5	3.2	5.0	3.6	1.6	2.8	2.7	0.3	1.5	3.0	0.3	1.7
28	6.6	5.0	5.8	1.9	0.0	0.8	3.8	0.6	2.3	1.6	0.0	0.4
29	6.7	4.8	5.8	3.6	1.7	3.0	3.8	3.0	3.3	0.9	0.0	0.3
30	7.3	6.0	6.6	3.6	1.9	2.8	4.2	2.8	3.5	2.4	0.6	1.4
31	6.9	6.0	6.4	---	---	---	4.5	3.5	4.0	3.1	1.8	2.3
MONTH	10.7	2.8	6.1	7.3	0.0	4.4	4.5	0.0	2.6	4.8	0.0	2.9

13324300 LOOKINGGLASS CREEK NEAR LOOKING GLASS, OR--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.2	1.9	2.4	5.0	1.0	2.7	5.5	3.7	4.6	---	---	---
2	3.4	1.2	2.4	4.7	0.8	2.6	7.5	3.9	5.3	---	---	---
3	3.3	0.3	1.8	4.8	0.8	2.6	8.5	3.1	5.1	---	---	---
4	2.5	0.7	1.4	5.8	1.5	3.4	8.9	3.2	5.3	---	---	---
5	3.1	0.0	1.5	5.1	2.4	3.8	6.8	3.5	4.8	---	---	---
6	4.1	0.7	2.4	5.3	3.5	4.2	7.1	4.3	5.2	---	---	---
7	4.5	3.1	3.7	4.8	2.0	3.5	6.1	3.9	4.7	---	---	---
8	4.4	2.7	3.5	4.8	1.8	2.9	8.1	3.2	5.1	7.6	---	---
9	4.4	1.4	2.8	5.1	2.3	3.5	5.5	3.9	4.7	7.1	3.9	5.4
10	4.6	1.3	2.8	7.0	2.9	4.6	6.2	3.6	4.6	7.2	4.0	5.5
11	4.6	1.7	3.4	5.8	4.1	4.7	6.6	3.7	4.9	9.6	3.7	6.3
12	3.8	0.2	1.8	6.5	3.5	4.5	6.3	4.0	4.8	10.2	4.1	6.7
13	4.0	0.9	2.3	5.7	2.4	4.1	6.1	3.8	4.6	9.2	4.6	6.5
14	3.9	0.7	2.2	6.2	2.6	4.2	4.5	2.9	3.7	9.4	4.8	6.5
15	3.8	0.4	2.0	5.6	2.8	3.9	4.9	3.2	3.8	8.7	4.5	6.2
16	5.1	1.5	3.1	5.3	2.8	3.7	5.0	3.7	4.2	9.9	4.0	6.4
17	5.0	1.7	3.3	5.7	2.0	3.4	6.9	3.5	4.6	8.6	4.9	6.3
18	5.8	3.0	4.2	4.6	1.4	2.7	5.3	3.5	4.4	10.1	5.1	7.1
19	4.9	3.0	4.0	4.1	2.3	3.2	7.8	3.4	5.0	9.4	5.2	7.1
20	5.8	3.0	4.3	6.4	3.5	4.7	6.4	3.1	4.6	6.6	5.1	5.8
21	4.8	2.6	3.8	8.1	3.5	5.2	7.8	3.4	5.2	6.6	4.8	5.6
22	6.0	3.8	4.6	7.5	3.5	5.2	8.5	3.9	5.6	6.6	5.2	5.8
23	5.5	3.7	4.5	5.4	3.7	4.4	6.0	3.2	4.3	7.8	5.3	6.2
24	4.2	1.8	3.4	6.0	4.0	4.8	7.5	2.4	4.5	9.4	4.6	6.8
25	4.0	0.9	2.2	6.7	3.9	5.0	8.1	3.3	5.2	9.0	5.4	7.2
26	4.2	1.2	2.5	7.4	3.3	4.9	7.7	3.0	5.0	8.9	6.1	7.3
27	4.7	0.9	2.6	6.6	3.9	4.9	7.0	4.0	5.1	9.9	6.1	7.7
28	4.6	1.8	3.2	6.2	4.2	4.7	8.0	3.3	5.2	10.1	6.8	8.1
29	---	---	---	7.7	4.2	5.4	---	3.3	---	10.5	7.1	8.6
30	---	---	---	8.6	4.0	5.6	---	---	---	9.1	7.4	8.2
31	---	---	---	8.5	3.4	5.3	---	---	---	10.8	6.1	8.3
MONTH	6.0	0.0	2.9	8.6	0.8	4.1	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.6	7.3	7.9	14.8	10.6	12.6	17.1	8.8	12.8	14.6	9.0	11.7
2	11.3	7.2	9.0	14.9	9.8	12.3	16.7	9.5	12.8	15.4	8.5	11.8
3	11.1	6.8	8.9	14.4	11.2	12.8	16.0	8.0	12.0	15.3	9.6	12.2
4	11.2	8.0	9.4	13.2	10.6	12.1	13.7	10.3	11.8	13.0	8.5	10.7
5	12.1	8.3	9.9	14.6	9.8	12.1	14.6	8.7	11.5	12.1	8.8	10.1
6	11.1	7.6	9.2	15.4	10.7	13.0	14.7	9.6	11.8	11.8	7.7	9.7
7	9.1	6.4	7.8	15.7	11.6	13.7	14.8	7.6	11.2	11.5	7.1	9.4
8	7.5	6.1	6.9	15.7	12.4	14.0	15.1	7.8	11.4	12.0	5.9	9.0
9	7.9	6.3	7.1	15.8	10.7	13.3	16.4	8.3	12.2	13.1	6.2	9.4
10	9.2	7.1	8.0	16.9	11.4	14.1	17.1	9.0	12.9	13.7	6.9	10.1
11	10.4	7.1	8.7	18.0	12.4	15.1	16.4	9.8	12.9	14.0	6.9	10.2
12	12.3	7.5	9.7	18.4	13.2	15.8	16.5	8.9	12.6	14.2	7.2	10.5
13	13.5	8.5	10.8	---	---	---	17.2	9.1	13.0	14.1	7.2	10.3
14	12.7	9.7	11.1	---	---	---	17.1	8.9	12.9	13.7	7.1	10.3
15	14.6	9.9	12.1	---	---	---	17.1	9.7	13.1	12.3	8.0	10.1
16	14.1	10.6	12.3	---	---	---	16.1	9.3	12.4	11.5	8.7	9.9
17	11.9	9.7	10.7	---	---	---	15.5	7.8	11.6	10.5	8.3	9.4
18	11.4	9.7	10.4	---	---	---	15.9	8.6	12.1	12.0	6.5	9.0
19	12.6	8.7	10.5	---	---	---	15.8	8.5	12.0	12.4	6.1	9.1
20	13.4	8.7	10.9	---	---	---	15.6	9.0	12.2	12.5	7.2	9.7
21	13.0	9.8	11.4	---	---	---	11.6	9.4	10.4	10.8	5.1	7.9
22	14.6	10.2	12.2	---	---	---	13.6	8.9	10.8	11.3	5.1	8.2
23	14.5	10.9	12.6	---	---	---	15.5	8.4	11.8	11.7	5.7	8.6
24	15.0	11.2	13.0	---	---	---	15.1	8.9	11.8	11.8	5.6	8.5
25	15.6	11.0	13.3	---	---	---	15.6	8.5	11.8	11.2	5.6	8.2
26	16.2	12.1	14.1	---	---	---	13.2	9.9	11.3	10.6	5.2	7.9
27	16.5	13.6	15.0	---	---	---	15.9	9.3	12.3	10.3	7.3	8.7
28	15.4	13.1	14.3	---	---	---	16.0	9.3	12.5	10.7	5.8	8.1
29	15.2	12.5	13.7	19.2	---	---	15.3	10.2	12.6	8.4	6.4	7.4
30	14.8	11.3	13.0	18.9	10.8	14.6	14.5	9.2	11.7	9.4	6.2	7.5
31	---	---	---	17.0	9.9	13.3	15.4	8.8	11.9	---	---	---
MONTH	16.5	6.1	10.8	---	---	---	17.2	7.6	12.1	15.4	5.1	9.5

13329770 WALLOWA RIVER ABOVE CROSS COUNTRY CANAL, NEAR ENTERPRISE, OR

LOCATION.--Lat 45°29'18", long 117°24'10", in SW 1/4 SE 1/4 sec.11, T.1 S., R.43 E., Wallowa County, Hydrologic Unit 17060105, on left bank 300 ft upstream from Cross Country canal, 6 mi northwest of Enterprise, and at mile 32.5.

DRAINAGE AREA.--272 mi^2.

PERIOD OF RECORD.--April 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,330 ft above NGVD of 1929, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Regulation by Wallowa Lake. Many diversions for irrigation upstream from gage. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 269 ft^3/s, 194,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,590 ft^3/s July 9, 1997, gage height, 4.17 ft; maximum gage height, 4.27 ft May 16, 1997; minimum discharge, 92 ft^3/s Sept. 5, 2001.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 30	0345	*525	*2.67				

Minimum discharge, 100 ft^3/s May 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	121	179	142	135	136	136	196	161	326	362	135	200
2	120	170	141	137	137	133	194	163	322	342	131	199
3	121	166	143	143	135	132	185	164	279	333	129	200
4	120	164	142	138	137	136	187	160	282	323	131	192
5	121	161	142	140	144	137	193	163	292	306	162	193
6	122	160	144	142	136	147	191	159	314	291	158	198
7	124	157	143	189	139	151	198	155	288	309	159	199
8	130	154	142	247	138	137	178	153	258	352	151	203
9	131	155	143	176	135	137	177	148	270	314	153	206
10	132	154	139	162	135	140	190	138	276	295	145	209
11	168	155	142	160	135	163	182	114	237	281	143	209
12	152	155	142	161	127	186	178	110	198	261	133	208
13	155	158	147	157	131	156	183	109	187	251	127	198
14	150	160	156	154	132	151	298	118	236	263	119	185
15	149	156	145	150	127	148	287	125	290	236	118	183
16	144	154	147	149	131	145	248	121	364	219	117	177
17	141	156	151	149	134	143	232	131	365	208	114	195
18	141	154	141	147	138	139	227	144	391	204	115	187
19	143	152	145	148	140	145	215	218	364	211	114	176
20	143	152	145	149	142	150	201	352	330	197	127	170
21	141	154	144	151	144	153	191	332	330	189	183	165
22	147	153	135	147	154	154	183	248	342	185	203	163
23	167	152	128	147	159	167	175	203	368	178	196	160
24	154	148	e118	149	156	209	170	183	393	176	190	145
25	152	150	120	154	141	221	164	164	387	177	195	145
26	151	150	120	156	138	207	161	164	380	170	198	144
27	151	144	e119	147	141	201	177	228	383	160	194	146
28	158	140	e125	e139	140	184	174	312	374	161	197	150
29	161	142	e132	e124	---	179	164	415	372	154	197	152
30	185	142	e129	e124	---	182	163	456	377	147	204	160
31	207	---	e131	129	---	189	---	370	---	139	205	---
TOTAL	4502	4647	4283	4700	3882	4958	5862	6181	9575	7394	4843	5417
MEAN	145	155	138	152	139	160	195	199	319	239	156	181
MAX	207	179	156	247	159	221	298	456	393	362	205	209
MIN	120	140	118	124	127	132	161	109	187	139	114	144
AC-FT	8930	9220	8500	9320	7700	9830	11630	12260	18990	14670	9610	10740

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	221	213	210	198	206	223	245	392	504	345	226	241
MAX	294	272	356	233	297	323	339	598	843	630	340	369
(WY)	1998	1996	1996	1997	1996	1996	1997	1997	1998	1997	1996	1996
MIN	145	155	138	152	139	160	186	199	179	174	124	107
(WY)	2002	2002	2002	2002	2002	2002	2001	2002	2001	2001	2001	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	60421		66244			
ANNUAL MEAN	166		181		269	
HIGHEST ANNUAL MEAN					358	1996
LOWEST ANNUAL MEAN					179	2001
HIGHEST DAILY MEAN	369	May 15	456	May 30	1140	May 16 1997
LOWEST DAILY MEAN	98	Sep 5	109	May 13	98	Sep 5 2001
ANNUAL SEVEN-DAY MINIMUM	103	Sep 3	118	Aug 13	103	Sep 3 2001
ANNUAL RUNOFF (AC-FT)	119800		131400		194700	
10 PERCENT EXCEEDS	202		290		449	
50 PERCENT EXCEEDS	166		156		217	
90 PERCENT EXCEEDS	112		131		154	

e Estimated

13330000 LOSTINE RIVER NEAR LOSTINE, OR

LOCATION.--Lat 45°26'20", long 117°25'35", in NW 1/4 sec.34, T.1 S., R.43 E., Wallowa County, Hydrologic Unit 17060105, on left bank, 3.5 mi south of Lostine, and at mile 10.0.

DRAINAGE AREA.--70.9 mi^2.

PERIOD OF RECORD.--August 1912 to March 1914, April to September 1915, July 1925 to September 1991, April 1995 to current year. Monthly discharge only for some periods, published in WSP 1317.

REVISED RECORDS.--WSP 1397: 1913, 1942. WSP 1737: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,650 ft above NGVD of 1929, by barometer. See WSP 1317 or 1737 for history of changes prior to Dec. 16, 1953. Dec. 16, 1953 to Aug. 23 1977, at datum 1.04 ft higher.

REMARKS.--Records good except those for the periods Dec. 17-25, Feb. 9 to Mar. 5, which are fair, and for estimated daily discharges, which are poor. Minam Lake, capacity 440 acre-ft, has stored and diverted flow from Minam River since 1917 for irrigation in Lostine River basin. Diversions for irrigation upstream from station. Continuous water-quality records for the period October 1957 to September 1958 have been collected at this location. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--73 years (water years 1913,1926-91, 1996-2002), 192 ft^3/s, 139,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,550 ft^3/s June 16, 1974, gage height, 8.59 ft, present datum; minimum discharge, 7.5 ft^3/s Mar. 2, 1966, result of freezeup; minimum daily, 10 ft^3/s Nov. 28-30, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29	2300	*1,660	*7.55	June 27	2130	1,450	7.08
June 16	2245	1,450	7.09				

Minimum discharge, 19 ft^3/s Jan. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	105	e51	35	38	e34	58	208	968	766	106	51
2	21	89	e51	36	34	35	63	245	907	645	100	49
3	21	80	e50	38	33	35	65	279	814	616	95	47
4	21	75	e48	36	33	37	70	271	826	576	93	49
5	21	71	e48	37	33	36	83	270	916	514	108	47
6	21	68	e48	40	34	e34	105	247	986	511	96	47
7	21	60	e48	91	36	e35	118	227	844	561	89	48
8	22	58	e47	91	37	35	113	209	668	617	84	46
9	24	57	e48	75	35	36	119	192	547	510	79	44
10	23	54	e47	67	36	36	134	179	464	468	75	42
11	44	52	e48	63	36	40	133	168	405	478	71	40
12	33	51	e46	61	31	46	145	173	396	475	69	38
13	49	52	e49	59	e30	41	202	209	452	459	66	37
14	47	65	e55	57	e31	38	544	266	624	442	63	36
15	49	64	e47	55	31	37	451	289	884	392	60	35
16	37	58	e47	54	35	37	339	282	1170	354	58	34
17	35	59	48	53	35	35	280	321	1160	322	57	46
18	32	56	36	50	34	35	240	381	1110	298	55	53
19	31	54	47	52	34	38	211	578	820	279	53	42
20	32	54	43	50	34	37	193	790	725	245	53	38
21	32	58	41	51	34	38	179	617	756	216	62	36
22	37	60	27	48	38	40	170	485	826	199	70	35
23	75	56	e25	47	43	46	170	405	905	185	65	34
24	49	55	e26	49	43	54	161	357	993	176	64	33
25	44	55	26	52	32	54	160	349	1090	166	63	32
26	41	52	31	50	e32	51	167	390	1180	155	63	31
27	41	41	31	42	e31	53	168	542	1290	145	59	30
28	45	44	34	25	e32	51	162	848	1170	134	57	31
29	46	52	33	32	---	50	167	1290	1240	126	56	31
30	111	e51	31	35	---	50	188	1410	968	121	55	36
31	157	---	34	41	---	53	---	1120	---	115	53	---
TOTAL	1284	1806	1291	1572	965	1277	5358	13597	26104	11266	2197	1198
MEAN	41.4	60.2	41.6	50.7	34.5	41.2	179	439	870	363	70.9	39.9
MAX	157	105	55	91	43	54	544	1410	1290	766	108	53
MIN	21	41	25	25	30	34	58	168	396	115	53	30
AC-FT	2550	3580	2560	3120	1910	2530	10630	26970	51780	22350	4360	2380

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2002, BY WATER YEAR (WY)

MEAN	56.4	64.6	59.2	50.2	48.0	55.5	160	511	783	384	86.1	49.7
MAX	291	226	212	158	191	169	393	909	1374	913	180	104
(WY)	1960	1928	1959	1974	1996	1986	1934	1928	1974	1975	1943	1978
MIN	18.0	14.7	15.3	15.0	14.8	16.3	35.7	203	332	59.7	30.6	23.0
(WY)	1937	1937	1937	1937	1937	1955	1975	1977	1926	1977	1931	1931

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1926 - 2002	
ANNUAL TOTAL	43023		67915			
ANNUAL MEAN	118		186		192	
HIGHEST ANNUAL MEAN					288	1974
LOWEST ANNUAL MEAN					90.9	1977
HIGHEST DAILY MEAN	939	May 25	1410	May 30	2290	Jun 17 1974
LOWEST DAILY MEAN	19	Jan 28	21	Oct 2	10	Nov 28 1936
ANNUAL SEVEN-DAY MINIMUM	21	Oct 1	21	Oct 1	11	Nov 26 1936
ANNUAL RUNOFF (AC-FT)	85340		134700		139400	
10 PERCENT EXCEEDS	340		577		596	
50 PERCENT EXCEEDS	49		54		63	
90 PERCENT EXCEEDS	24		33		28	

e Estimated

13330050 LOSTINE RIVER AT CAUDLE LANE, AT LOSTINE, OR

LOCATION.--Lat 45°29'22", long 117°26'08", in NW 1/4 SW 1/4 sec.10, T.1 S., R.43 E., Wallowa County, Hydrologic Unit 17060105, on left bank, 500 ft downstream from bridge at Caudle Lane, at Lostine, and at mile 5.4.

DRAINAGE AREA.--81.1 mi^2.

PERIOD OF RECORD.--April 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,360 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good except those for the periods Dec. 18 to Mar. 18, Apr. 24 to May 1, Aug. 19-26, which are fair, and estimated daily discharges, which are poor. Minam Lake, capacity 400 acre-ft, has stored and diverted flow from Minam River since 1917 for irrigation in Lostine River basin. Many diversions for irrigation upstream from station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 176 ft^3/s, 127,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,100 ft^3/s June 1, 1997, gage height, 6.73 ft; maximum gage height, 7.28 ft June 16, 1999, from high-water mark; minimum discharge, 5.2 ft^3/s Aug. 20, 2001.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 30	0045	*1,510	*7.08	June 27	2145	1,300	6.95

Minimum discharge, 6.1 ft^3/s Oct. 2-4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.5	81	47	36	e39	e32	44	194	895	762	43	20
2	6.3	68	46	37	e36	e33	48	231	829	663	40	19
3	6.3	63	45	39	e34	33	50	267	774	633	36	19
4	6.3	60	44	39	e34	35	54	260	774	598	36	20
5	6.5	58	44	38	e34	33	63	262	846	534	47	20
6	6.4	56	45	40	e36	e32	79	239	895	518	39	19
7	6.5	50	45	77	e38	e33	91	218	791	567	35	19
8	6.7	48	44	83	41	33	90	197	665	623	35	19
9	7.1	48	44	73	39	34	98	182	559	521	32	17
10	7.0	46	42	66	39	33	112	167	478	474	28	16
11	17	44	44	63	38	35	116	143	413	479	25	15
12	15	44	42	61	36	41	127	127	402	466	23	14
13	23	44	48	59	e33	37	177	155	474	436	21	14
14	22	53	54	58	e34	35	544	203	658	409	18	13
15	28	54	49	56	35	34	459	208	862	351	12	13
16	25	50	47	56	38	34	332	189	1090	296	10	12
17	25	50	47	54	35	33	274	219	1090	252	8.3	12
18	24	48	e35	54	35	34	230	290	1080	217	7.8	15
19	22	47	e46	53	35	35	200	508	845	195	9.6	12
20	20	47	43	52	34	35	181	726	751	149	11	11
21	20	50	42	52	34	35	164	597	783	110	20	11
22	25	52	e28	e50	36	36	158	461	838	87	23	11
23	53	50	e26	e49	39	39	156	376	901	75	22	11
24	37	48	e27	50	40	44	145	320	968	71	20	10
25	33	50	e27	52	e31	44	148	308	1040	69	19	11
26	32	48	e32	51	e31	41	158	355	1100	66	21	11
27	33	e39	e32	e44	e30	41	162	516	1160	61	21	13
28	37	e42	e35	e29	e31	40	154	785	1020	52	22	15
29	38	48	e34	e34	---	40	160	1080	1070	43	22	15
30	73	48	e32	e37	---	39	181	1210	923	39	23	19
31	121	---	e35	e42	---	41	---	1010	---	43	22	---
TOTAL	788.6	1534	1251	1584	995	1124	4955	12003	24974	9859	751.7	446
MEAN	25.4	51.1	40.4	51.1	35.5	36.3	165	387	832	318	24.2	14.9
MAX	121	81	54	83	41	44	544	1210	1160	762	47	20
MIN	6.3	39	26	29	30	32	44	127	402	39	7.8	10
AC-FT	1560	3040	2480	3140	1970	2230	9830	23810	49540	19560	1490	885

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	42.3	70.2	65.1	57.9	63.7	65.5	147	433	699	382	58.0	23.9
MAX	66.5	172	170	118	166	118	193	533	1000	784	149	40.7
(WY)	2001	1996	1996	1997	1996	1996	2000	1997	1997	1999	1999	2000
MIN	23.0	36.9	35.5	29.0	24.9	36.3	87.5	313	238	52.6	9.55	6.55
(WY)	2000	1999	2001	2001	2001	2002	2001	1996	2001	2001	2001	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	32053.1		60265.3			
ANNUAL MEAN	87.8		165		176	
HIGHEST ANNUAL MEAN					235	1997
LOWEST ANNUAL MEAN					90.7	2001
HIGHEST DAILY MEAN	826	May 25	1210	May 30	1600	Jun 16 1999
LOWEST DAILY MEAN	5.8	Sep 29	6.3	Oct 2	5.8	Sep 29 2001
ANNUAL SEVEN-DAY MINIMUM	6.0	Sep 24	6.4	Oct 1	6.0	Sep 24 2001
ANNUAL RUNOFF (AC-FT)	63580		119500		127400	
10 PERCENT EXCEEDS	242		579		550	
50 PERCENT EXCEEDS	35		44		57	
90 PERCENT EXCEEDS	7.1		16		24	

e Estimated

13330300 LOSTINE RIVER AT BAKER ROAD, NEAR LOSTINE, OR

LOCATION.--Lat 45°32'14", long 117°28'43", in NW 1/4 SW 1/4 sec.29, T.1 N., R.42 E., Wallowa County, Hydrologic Unit 17060105, on left bank, 300 ft upstream from bridge at Baker road, 4 mi northwest of Lostine, and at mile 1.3.

DRAINAGE AREA.--90.9 mi^2.

PERIOD OF RECORD.--June 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,050 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good except those for the period Feb. 1 to Mar. 19, which are fair and estimated daily discharges, which are poor. Minam Lake, capacity 440 acre-ft, has stored and diverted flow from Minam River since 1917 for irrigation in Lostine River basin. Many diversions for irrigation upstream from gage. U.S. Geological Survey satellite telemetry at station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 181 ft^3/s, 131,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,970 ft^3/s June 9, 1996, gage height, 6.88 ft; minimum discharge, 6.3 ft^3/s Aug. 22, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 30	0215	*1,670	*6.17	June 27	0215	1,470	5.97
June 16	2330	1,470	5.97				

Minimum discharge, 25 ft^3/s Aug. 1, 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	129	71	48	42	38	52	202	888	718	34	98
2	34	110	72	49	41	39	59	229	811	595	27	93
3	34	102	71	51	40	38	61	263	705	563	36	82
4	31	98	70	48	38	39	64	258	712	529	41	70
5	31	95	72	48	e38	38	76	260	783	458	46	56
6	32	92	74	49	e39	e37	94	239	884	435	52	57
7	32	e83	73	87	40	e36	109	219	776	483	52	60
8	35	e78	71	99	42	35	105	202	621	543	75	64
9	35	75	71	82	42	37	109	185	507	442	77	70
10	36	72	64	73	43	37	126	162	444	377	73	72
11	55	70	72	69	39	39	129	143	369	369	71	77
12	51	69	70	68	37	49	142	124	347	363	59	83
13	60	71	77	65	e36	43	177	129	387	345	56	76
14	60	82	89	63	e38	40	488	170	562	319	56	73
15	68	88	73	61	39	39	434	170	824	289	51	69
16	67	81	73	58	41	38	317	142	1130	260	54	66
17	67	81	76	58	36	37	257	159	1190	229	50	65
18	64	79	63	56	36	37	221	201	1160	185	48	50
19	65	77	70	57	36	40	195	380	868	126	41	36
20	63	77	68	55	36	39	179	621	719	96	41	33
21	62	81	68	57	35	39	166	493	742	68	60	33
22	66	83	54	54	38	41	157	373	778	55	72	31
23	106	82	50	52	43	45	156	298	866	50	76	32
24	85	77	e44	54	46	56	147	237	966	55	76	33
25	78	79	44	57	39	55	146	218	1080	52	97	35
26	78	76	47	57	e37	50	154	255	1200	39	90	38
27	78	67	49	e47	e36	50	159	386	1300	46	89	61
28	86	66	52	e34	e37	49	171	656	1190	44	94	51
29	89	71	52	e38	---	47	172	1150	1240	40	95	61
30	131	71	45	e40	---	46	190	1400	975	33	102	109
31	202	---	47	e45	---	47	---	1080	---	37	102	---
TOTAL	2025	2462	1992	1779	1090	1300	5012	11004	25024	8243	1993	1834
MEAN	65.3	82.1	64.3	57.4	38.9	41.9	167	355	834	266	64.3	61.1
MAX	202	129	89	99	46	56	488	1400	1300	718	102	109
MIN	31	66	44	34	35	35	52	124	347	33	27	31
AC-FT	4020	4880	3950	3530	2160	2580	9940	21830	49640	16350	3950	3640

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	73.8	95.4	82.2	65.8	71.8	64.7	168	452	674	308	66.0	53.0
MAX	103	243	218	148	198	96.1	254	586	887	479	107	97.2
(WY)	2001	1996	1996	1997	1996	1996	2000	1997	1997	1996	1999	2000
MIN	58.7	48.4	37.6	29.0	24.6	41.9	104	308	252	71.3	25.9	22.4
(WY)	1997	1999	2001	2001	2001	2002	2001	1999	2001	2001	2001	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	38964		63758			
ANNUAL MEAN	107		175		181	
HIGHEST ANNUAL MEAN					251	1996
LOWEST ANNUAL MEAN					107	2001
HIGHEST DAILY MEAN	915	May 25	1400	May 30	1620	Jun 8 1996
LOWEST DAILY MEAN	11	Sep 25	27	Aug 2	8.7	Sep 2 1998
ANNUAL SEVEN-DAY MINIMUM	14	Aug 10	33	Oct 2	11	Aug 31 1998
ANNUAL RUNOFF (AC-FT)	77290		126500		131300	
10 PERCENT EXCEEDS	266		499		510	
50 PERCENT EXCEEDS	55		71		76	
90 PERCENT EXCEEDS	23		37		34	

e Estimated

13330500 BEAR CREEK NEAR WALLOWA, OR

LOCATION.--Lat 45°31'37", long 117°33'05", in NW 1/4 NE 1/4 sec.34, T.1 N., R.42 E., Wallowa County, Hydrologic Unit 17060105, on left bank, at private road bridge, 3.0 mi southwest of Wallowa, and at mile 4.4.

DRAINAGE AREA.--68 mi^2, approximately.

PERIOD OF RECORD.--April to September 1915, April 1924 to September 1985, April 1995 to current year. Monthly discharge only for some periods, published in WSP 1317.

REVISED RECORDS.--WSP 1397: 1915, 1927, 1929-30, 1932, 1936-40, 1945, 1949.
sea level
GAGE.--Water-stage recorder. Elevation of gage is 3,250 ft above NGVD of 1929, by barometer. Apr. 13 to Sept. 16, 1915, nonrecording gage at site 1.0 mi upstream at different datum. Apr. 22, 1924 to Nov. 2, 1931, water-stage recorder at site 1.5 mi upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. No regulation. Diversions for irrigation upstream from station. Water for irrigation in Lostine River basin diverted from Little Bear Creek, a tributary upstream from station, in sec.32, T.1 S., R.43 E. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--68 years (water years 1925-85, 1996-2002), 114 ft^3/s, 82,890 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,730 ft^3/s June 15, 1974, gage height, 3.58 ft; maximum gage height, 5.38 ft Jan. 24, 1984 (result of ice jam); minimum daily discharge, 3 ft^3/s Jan. 20, Feb. 1, 1937.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1445	719	3.38	May 29	2300	*1,130	*3.77
May 20	1100	638	3.29	June 16	2100	758	3.42

Minimum discharge, 8.2 ft^3/s part or all of each day Oct. 2-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.5	53	24	e22	e38	e31	90	188	602	295	23	13
2	8.3	45	23	e21	e39	e33	100	224	580	257	22	12
3	8.2	41	23	e20	e38	e35	102	257	522	239	21	12
4	8.2	37	23	e20	e36	e37	106	246	521	214	21	12
5	8.3	35	23	e22	e33	36	124	236	560	185	25	12
6	8.4	33	24	23	e34	e34	153	209	571	178	24	12
7	8.3	29	22	68	e32	e32	162	185	483	182	21	12
8	8.8	27	e21	114	e33	e33	153	162	383	175	20	12
9	9.3	27	23	104	e32	37	155	146	305	146	20	11
10	8.9	25	24	91	e30	35	171	132	262	129	19	11
11	19	23	e23	81	e32	37	176	121	241	121	18	11
12	11	23	e22	74	e31	e35	194	125	244	114	17	10
13	11	23	e23	68	e29	e33	261	164	291	103	17	10
14	11	28	e23	63	e31	e31	597	223	417	92	16	10
15	11	e30	e21	58	e32	e31	582	246	541	81	16	9.9
16	10	e26	e23	54	e32	e32	407	237	639	72	15	9.8
17	10	e27	e22	50	e33	e36	302	263	569	65	15	13
18	10	e26	e21	47	e27	40	243	315	575	58	14	13
19	10	e25	e23	45	e27	40	204	472	464	54	14	11
20	10	24	e24	44	28	39	176	605	409	50	14	11
21	11	28	e20	42	29	40	156	476	414	45	18	11
22	13	30	e21	40	33	43	143	351	437	41	15	11
23	26	29	e16	39	e45	57	143	283	449	39	15	10
24	16	26	e16	37	e45	95	134	248	453	36	15	10
25	15	27	e17	38	e41	110	133	246	462	33	15	10
26	15	25	e16	38	e36	100	143	287	472	31	18	9.9
27	15	22	e19	e36	e31	96	143	403	499	30	15	9.9
28	17	24	e21	e34	e31	91	135	618	434	28	14	10
29	17	e22	e22	e35	---	84	139	806	434	26	15	10
30	31	e25	e21	e36	---	79	166	765	352	25	14	12
31	67	---	e23	e37	---	80	---	675	---	24	13	---
TOTAL	441.2	865	667	1501	938	1572	5893	9914	13585	3168	539	331.5
MEAN	14.2	28.8	21.5	48.4	33.5	50.7	196	320	453	102	17.4	11.1
MAX	67	53	24	114	45	110	597	806	639	295	25	13
MIN	8.2	22	16	20	27	31	90	121	241	24	13	9.8
AC-FT	875	1720	1320	2980	1860	3120	11690	19660	26950	6280	1070	658

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2002, BY WATER YEAR (WY)

MEAN	25.2	40.9	50.2	44.7	48.4	66.6	170	372	398	119	20.2	15.7
MAX	160	220	195	141	192	186	422	682	869	388	37.5	44.2
(WY)	1928	1928	1996	1984	1996	1972	1936	1928	1974	1943	1975	1941
MIN	7.58	8.20	7.29	5.16	4.46	11.1	49.6	138	112	18.6	8.10	6.33
(WY)	1936	1953	1937	1937	1937	1977	1975	1977	1926	1977	1940	1935

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1925 - 2002	
ANNUAL TOTAL	25504.1		39414.7			
ANNUAL MEAN	69.9		108		114	
HIGHEST ANNUAL MEAN					178	1974
LOWEST ANNUAL MEAN					46.2	1977
HIGHEST DAILY MEAN	699	May 15	806	May 29	1480	Jun 17 1974
LOWEST DAILY MEAN	8.0	Feb 14	8.2	Oct 3	3.0	Jan 20 1937
ANNUAL SEVEN-DAY MINIMUM	8.2	Sep 19	8.3	Oct 1	3.9	Jan 19 1937
ANNUAL RUNOFF (AC-FT)	50590		78180		82890	
10 PERCENT EXCEEDS	240		351		348	
50 PERCENT EXCEEDS	22		33		42	
90 PERCENT EXCEEDS	9.1		11		11	

e Estimated

13330700 BEAR CREEK AT WALLOWA, OR

LOCATION.--Lat 45°34'50", long 117°32'21", in NW 1/4 SW 1/4 sec.11, T.1 N., R.42 E., Wallowa County, Hydrologic Unit 17060105, on right bank, 5 ft upstream from bridge crossing, 0.5 mi northwest of Wallowa, and at mile 0.7.

DRAINAGE AREA.--72.8.

PERIOD OF RECORD.--May 1995 to curent year.

GAGE.--Water-stage recorder. Elevation of gage is 2,900 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are poor. No regulation. Many diversions for irrigation upstream from station. Water for irrigation in the Lostine River basin is diverted from Little Bear Creek, a tributary upstream from station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 111 ft^3/s, 80,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,410 ft^3/s May 16, 1997, June 15, 1999; maximum gage height, 6.53 ft, June 15, 1999; minimum discharge, 1.6 ft^3/s Aug. 19, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	unknown	unknown	unknown	June 16	1930	772	6.05
May 29	unknown	*unknown	*unknown				

Minimum discharge, 1.6 ft^3/s Aug. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	50	19	18	e29	e25	86	178	549	305	3.1	2.9
2	2.6	41	18	18	e30	e27	98	225	536	246	3.0	2.7
3	2.7	37	18	17	31	e29	99	264	503	226	3.1	2.8
4	3.2	34	19	15	e29	e31	102	249	515	192	3.1	2.5
5	3.3	32	19	15	e27	28	120	239	533	164	3.9	2.5
6	3.4	30	22	16	e28	e27	158	206	518	155	4.0	2.8
7	3.4	26	18	49	e27	e26	171	174	437	159	3.9	2.9
8	3.6	22	e17	100	e27	e27	160	146	360	158	4.0	2.8
9	4.2	20	20	94	e26	32	165	121	294	121	4.1	2.7
10	4.2	18	20	80	e25	29	187	107	251	101	2.8	2.6
11	10	17	20	68	25	32	195	92	228	91	2.2	2.6
12	5.6	17	19	61	e24	e30	222	95	237	82	2.2	2.6
13	5.2	16	e20	55	e23	e28	322	134	288	72	3.4	2.5
14	5.1	19	e20	50	e25	e25	e735	208	398	63	5.7	2.5
15	5.1	22	e18	46	e26	e25	e700	250	513	55	2.9	2.4
16	4.5	19	e20	44	e26	e26	494	241	608	51	2.5	2.4
17	4.3	19	e19	40	e27	e30	384	274	553	46	2.2	2.6
18	4.9	18	e18	38	e21	e35	303	346	575	39	1.8	2.7
19	4.1	17	e19	35	e21	35	239	524	465	36	1.8	2.4
20	4.5	17	e21	33	e22	35	200	721	408	31	1.8	2.3
21	5.4	21	e17	33	e23	35	172	542	425	28	2.2	2.4
22	8	23	19	35	25	39	147	410	460	26	2.3	2.6
23	17	23	14	33	41	52	135	314	471	26	2.2	2.5
24	10	19	e14	28	e46	99	124	257	488	27	4.5	2.3
25	9.0	20	e15	30	e38	122	123	251	505	22	5.0	2.0
26	8.6	18	e14	30	e30	107	133	305	514	19	4.0	1.9
27	8.2	16	16	30	e25	100	133	426	544	15	3.6	1.9
28	9.7	18	19	e27	e25	93	123	e680	461	11	3.7	1.9
29	9.5	e17	e20	e26	---	84	127	e920	471	9.8	3.6	1.9
30	19	e20	e18	e27	---	76	153	e860	375	8.5	4.0	2.4
31	64	---	19	e28	---	76	---	634	---	6.3	3.9	---
TOTAL	255.1	686	569	1219	772	1465	6510	10393	13483	2591.6	100.5	74.0
MEAN	8.23	22.9	18.4	39.3	27.6	47.3	217	335	449	83.6	3.24	2.47
MAX	64	50	22	100	46	122	735	920	608	305	5.7	2.9
MIN	2.6	16	14	15	21	25	86	92	228	6.3	1.8	1.9
AC-FT	506	1360	1130	2420	1530	2910	12910	20610	26740	5140	199	147
CFSM	0.11	0.31	0.25	0.54	0.38	0.65	2.98	4.61	6.17	1.15	0.04	0.03
IN.	0.13	0.35	0.29	0.62	0.39	0.75	3.33	5.31	6.89	1.32	0.05	0.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	16.4	52.3	63.5	49.3	63.8	73.2	178	368	353	96.5	8.78	6.65
MAX	33.0	164	202	114	224	100	254	494	528	182	19.5	9.45
(WY)	1996	1996	1996	1997	1996	1997	2000	1997	1999	1997	1999	1997
MIN	6.34	15.8	11.7	10.8	9.40	37.4	119	281	127	14.7	3.24	2.47
(WY)	1999	2001	2001	2001	2001	2001	1998	1996	2001	2001	2002	2002

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	23764.6		38118.2			
ANNUAL MEAN	65.1		104		111	
HIGHEST ANNUAL MEAN					149	1997
LOWEST ANNUAL MEAN					65.6	2001
HIGHEST DAILY MEAN	895	May 15	920	May 29	1080	Jun 15 1999
LOWEST DAILY MEAN	2.5	Sep 8	1.8	Aug 18	1.8	Aug 18 2002
ANNUAL SEVEN-DAY MINIMUM	2.7	Sep 7	2.0	Aug 17	2.0	Aug 17 2002
ANNUAL RUNOFF (AC-FT)	47140		75610		80200	
ANNUAL RUNOFF (CFSM)	0.89		1.43		1.52	
ANNUAL RUNOFF (INCHES)	12.14		19.48		20.66	
10 PERCENT EXCEEDS	225		379		334	
50 PERCENT EXCEEDS	15		27		38	
90 PERCENT EXCEEDS	3.6		2.7		6.3	

e Estimated

13331450 WALLOWA RIVER BELOW WATER CANYON, NEAR WALLOWA, OR

LOCATION.--Lat 45°36'30", long 117°36'55", in NW 1/4 SW 1/4 sec.31, T.2 N., R.42 E., Wallowa County, Hydrologic Unit 17060105, on left bank, 160 ft upstream from bridge, approximately 6 mi east of Wallowa, and at mile 18.3.

DRAINAGE AREA.--628 mi^2.

PERIOD OF RECORD.--August 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,760 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records fair. Flow regulated by Wallowa Lake. Many diversions for irrigation upstream from station.

COOPERATION.--Gage height record was collected and discharge measurements made by the Wallowa County Soil and Water Conservation District. Records were provided by the State of Oregon Water Resources Department. Discharge measurements and records were reviewed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 663 ft^3/s, 480,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,640 ft^3/s Feb 9, 1996, gage height, 4.76 ft; minimum discharge, 102 ft^3/s July 29, 1998.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 30	0145	*2,960	*3.62	No other peak greater than base discharge.			

Minimum discharge, 145 ft^3/s Aug. 20

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	233	401	292	245	324	340	789	583	1840	1400	208	279
2	224	353	292	250	322	328	742	643	1740	1190	160	277
3	213	335	291	262	303	320	719	726	1530	1090	169	267
4	203	334	282	253	295	330	732	708	1490	1050	192	246
5	214	336	284	253	286	326	769	697	1630	958	230	231
6	221	329	296	257	289	361	815	638	1750	907	248	251
7	209	319	293	344	301	424	854	590	1530	948	260	254
8	217	309	284	517	304	363	807	544	1260	1040	275	262
9	221	311	280	470	292	355	834	489	1070	896	276	274
10	226	307	266	423	287	355	991	448	996	790	263	273
11	307	304	271	406	287	411	967	404	862	782	249	278
12	272	301	266	401	271	608	988	369	815	769	225	276
13	266	298	284	395	275	494	1090	384	860	750	205	251
14	260	316	327	378	280	446	1970	467	1140	717	211	235
15	267	315	292	359	269	430	1710	478	1510	635	195	229
16	264	301	289	345	279	439	1280	433	1910	551	193	226
17	255	292	301	338	286	428	1070	461	1980	537	181	245
18	252	282	268	328	289	413	925	571	2010	494	155	230
19	251	295	282	325	300	442	820	923	1650	436	155	204
20	247	313	275	325	312	471	745	1410	1400	393	152	191
21	247	331	271	347	320	488	680	1230	1420	349	221	203
22	262	335	250	325	335	519	632	953	1470	339	256	190
23	316	338	233	312	415	601	604	770	1570	336	267	203
24	288	316	218	310	477	1010	567	635	1690	323	246	206
25	271	320	225	330	398	1110	548	583	1800	320	259	196
26	266	310	226	348	379	891	551	649	1890	284	252	199
27	263	294	224	313	369	827	561	893	2080	274	252	214
28	278	289	232	270	362	756	539	1410	1970	283	270	212
29	282	298	242	283	---	718	524	2170	2040	274	282	222
30	323	297	238	313	---	737	560	2590	1750	266	289	284
31	473	---	240	321	---	775	---	2080	---	244	288	---
TOTAL	8091	9479	8314	10346	8906	16516	25383	25929	46653	19625	7084	7108
MEAN	261	316	268	334	318	533	846	836	1555	633	229	237
MAX	473	401	327	517	477	1110	1970	2590	2080	1400	289	284
MIN	203	282	218	245	269	320	524	369	815	244	152	190
AC-FT	16050	18800	16490	20520	17670	32760	50350	51430	92540	38930	14050	14100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	354	428	447	420	509	596	781	1317	1633	828	315	329
MAX	436	743	864	747	1124	830	1122	1955	2508	1472	463	454
(WY)	1998	1996	1996	1997	1996	1997	1997	1997	1997	1997	1996	1997
MIN	261	316	268	239	227	409	552	836	526	285	157	166
(WY)	2002	2002	2002	2001	2001	2001	2001	2002	2001	2001	2001	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	137353		193434			
ANNUAL MEAN	376		530		663	
HIGHEST ANNUAL MEAN					952	1997
LOWEST ANNUAL MEAN					395	2001
HIGHEST DAILY MEAN	1840	May 15	2590	May 30	3900	Feb 9 1996
LOWEST DAILY MEAN	115	Aug 22	152	Aug 20	109	Jul 29 1998
ANNUAL SEVEN-DAY MINIMUM	123	Aug 21	177	Aug 14	123	Aug 21 2001
ANNUAL RUNOFF (AC-FT)	272400		383700		480300	
10 PERCENT EXCEEDS	684		1120		1520	
50 PERCENT EXCEEDS	271		323		436	
90 PERCENT EXCEEDS	166		226		249	

13331500 MINAM RIVER AT MINAM, OR
(Hydrologic bench-mark station)

LOCATION.--Lat 45°37'12", long 117°43'32", in SW 1/4 SW 1/4 sec.29, T.2 N., R.41 E., Wallowa County, Hydrologic Unit 17060105, on left bank 2.3 mi downstream from Squaw Creek, 0.3 mi west of Minam, and at mile 0.3.

DRAINAGE AREA.--240 mi^2, approximately.

PERIOD OF RECORD.--June 1912 to March 1914, September 1965 to current year. Monthly discharge only for some periods, published in WSP 1317.

GAGE.--Water-stage recorder. Datum of gage is 2,540.48 ft above NGVD of 1929. June 1912 to March 1914, nonrecording gage at approximately same site at different datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No regulation. Minam Lake, capacity 440 acre-ft, has stored and diverted flow from Minam River since 1917 for irrigation in Lostine River basin. Continuous water temperature October 1965 to September 1985. Chemical analysis water years 1966 to 1995.

AVERAGE DISCHARGE.--38 years (water years 1913, 1966-2002), 456 ft^3/s, 25.83 in/yr, 330,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,260 ft^3/s June 16, 1974, gage height, 6.89 ft; maximum gage height, 7.3 ft May 28, 1913, datum then in use; minimum discharge, 10 ft^3/s Dec. 6, 1972, Jan. 10, 1973, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,450 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1330	2,230	3.72	May 30	0130	*3,660	*4.84
May 20	0800	1,930	3.43	June 17	0000	3,040	4.39

Minimum discharge, 46 ft^3/s Oct. 5-11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	183	111	e80	e110	e155	363	711	2560	1370	e185	e135
2	48	150	106	e78	e105	e140	373	816	2430	1150	e180	e128
3	48	133	110	e84	e103	e130	354	917	2240	1050	e180	e125
4	48	121	100	e82	e100	159	360	861	2220	987	e175	e120
5	47	114	103	96	e95	151	414	842	2330	868	e175	e110
6	46	109	108	101	e95	157	506	751	2400	810	e180	e105
7	46	104	104	275	e100	168	507	681	2110	826	e190	e120
8	46	97	103	509	127	151	458	615	1750	867	e200	e135
9	46	e93	107	407	122	155	469	567	1470	763	e180	e120
10	46	e91	90	299	125	157	584	528	1280	662	e175	e110
11	70	e90	98	250	115	171	638	499	1140	629	e165	e100
12	81	89	102	217	110	215	700	532	1110	607	e160	e96
13	76	89	112	200	122	234	894	672	1220	574	e155	e93
14	87	114	148	182	134	234	1840	858	1550	551	e150	e90
15	94	147	138	170	124	218	1580	909	1990	501	e145	e87
16	73	117	137	156	131	206	1160	874	2570	452	e140	e85
17	65	113	143	157	136	194	948	973	2600	411	e135	e120
18	62	109	117	147	125	176	797	1090	2500	380	e132	e130
19	59	103	152	144	131	190	687	1450	2050	360	e130	e115
20	59	101	131	139	132	202	607	1900	1780	336	e130	e100
21	59	116	119	138	132	199	556	1630	1750	302	e155	e93
22	69	125	96	139	161	211	533	1370	1810	281	e195	e90
23	156	140	e82	133	288	267	556	1180	1930	265	e170	e100
24	105	118	e65	136	384	502	518	1060	1960	250	e150	e97
25	82	122	e69	146	292	609	511	1060	2070	237	e145	e92
26	76	114	e75	154	239	486	546	1160	2150	226	e142	e89
27	73	100	e83	133	e195	434	545	1430	2320	218	e125	e86
28	76	67	e90	e73	e170	391	517	1870	2080	206	e140	e86
29	76	112	e82	e90	---	345	537	2610	1990	198	e125	e86
30	87	119	e75	e101	---	316	630	3360	1660	192	e145	e100
31	262	---	e81	e108	---	322	---	2860	---	e190	e140	---
TOTAL	2316	3400	3237	5124	4203	7645	19688	36636	59020	16719	4894	3143
MEAN	74.7	113	104	165	150	247	656	1182	1967	539	158	105
MAX	262	183	152	509	384	609	1840	3360	2600	1370	200	135
MIN	46	67	65	73	95	130	354	499	1110	190	125	85
AC-FT	4590	6740	6420	10160	8340	15160	39050	72670	117100	33160	9710	6230
CFSM	0.31	0.47	0.44	0.69	0.63	1.03	2.73	4.92	8.20	2.25	0.66	0.44
IN.	0.36	0.53	0.50	0.79	0.65	1.18	3.05	5.68	9.15	2.59	0.76	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	95.2	151	190	202	257	318	545	1306	1555	614	152	95.8
MAX	173	508	765	470	977	697	888	2016	3125	1392	257	180
(WY)	1969	1996	1996	1997	1996	1986	1913	1971	1974	1975	1974	1978
MIN	38.1	56.1	62.4	59.6	56.9	66.7	235	484	494	125	72.6	45.9
(WY)	1988	1994	1979	1977	1977	1977	1967	1977	1992	1977	1966	1987

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	95190		166025			
ANNUAL MEAN	261		455		456	
HIGHEST ANNUAL MEAN					713	1974
LOWEST ANNUAL MEAN					189	1977
HIGHEST DAILY MEAN	2080	May 15	3360	May 30	5160	Jun 15 1974
LOWEST DAILY MEAN	46	Oct 6	46	Oct 6	11	Dec 6 1972
ANNUAL SEVEN-DAY MINIMUM	46	Oct 4	46	Oct 4	15	Dec 6 1972
ANNUAL RUNOFF (AC-FT)	188800		329300		330500	
ANNUAL RUNOFF (CFSM)	1.09		1.90		1.90	
ANNUAL RUNOFF (INCHES)	14.75		25.73		25.83	
10 PERCENT EXCEEDS	726		1390		1290	
50 PERCENT EXCEEDS	110		155		198	
90 PERCENT EXCEEDS	53		82		73	

e Estimated

13333000 GRANDE RONDE RIVER AT TROY, OR

LOCATION.--Lat 45°56'45", long 117°27'00", in NE 1/4 NW 1/4 sec.4, T.5 N., R.43 E., Wallowa County, Hydrologic Unit 17060106, on left bank, on upstream side of bridge at Troy, 100 ft downstream from Wenaha River, and at mile 45.3.

DRAINAGE AREA.--3,275 mi^2.

PERIOD OF RECORD.--August 1944 to current year. Monthly discharge only August 1944, published in WSP 1317.

REVISED RECORDS.--WSP 1397: 1946(M), 1948-50.

GAGE.--Water-stage recorder. Datum of gage is 1,585.98 ft above NGVD of 1929. Aug. 17, 1944, to Sept. 30, 1949, nonrecording gage at datum 10.85 ft lower. Oct. 1, 1949, to Sept. 5, 1963, water-stage recorder at datum 1.15 ft higher. Sept. 6, 1963 to Oct. 19, 1994, water-stage recorder at site 500 ft downstream, at present datum.

REMARKS.--No estimated daily discharges. Records fair. Flow slightly regulated by Wallowa Lake and small reservoirs. Diversions for irrigation upstream from station, chiefly in vicinity of LaGrande, Enterprise, and Wallowa; transbasin diversions for irrigation from Big Sheep Creek and tributaries in Imnaha River Basin to Wallowa River Basin, and from South Fork Catherine Creek to the Powder River Basin. U.S. Geological Survey satellite telemeter and National Weather Service telemeter at station.

AVERAGE DISCHARGE.--58 years (water years 1945-2002), 3,068 ft^3/s, 2,222,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,800 ft^3/s Feb. 9, 1996, gage height, 13.76 ft, from rating curve extended above 20,000 ft^3; minimum discharge, 321 ft^3/s Nov. 25, 1993; result of freezeup, but may have been less during period of ice effect that day.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1730	*22,600	*10.44	May 30	1030	11,200	8.01

Minimum discharge, 438 ft^3/s Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	443	1200	922	902	1300	2020	6390	6280	8530	4000	644	622
2	460	1020	894	903	1240	1820	6100	6770	8140	3340	619	614
3	480	971	923	991	1220	1670	5870	6970	7430	2950	591	615
4	481	900	922	1020	1180	1620	5950	6710	7010	2790	599	604
5	480	852	930	1010	1130	1600	6440	6340	7000	2550	626	585
6	489	824	939	1020	1130	1660	7150	5780	7070	2360	695	572
7	485	800	957	1470	1170	2150	7560	5260	6550	2300	685	580
8	492	773	939	3480	1210	2100	7320	4760	5660	2430	690	586
9	517	761	945	3960	1170	1940	7260	4210	4950	2330	691	589
10	524	750	911	3100	1160	1860	8390	3790	4610	2030	667	593
11	679	736	888	2570	1180	2030	9080	3500	4180	1860	646	595
12	714	740	888	2300	1150	4210	10300	3460	3910	1750	634	596
13	622	738	982	2190	1140	4310	11600	3730	3850	1680	613	585
14	638	833	1240	2040	1180	3670	19100	4370	4250	1640	593	557
15	636	907	1330	1880	1190	3170	17200	4660	5040	1530	590	540
16	638	866	1220	1730	1200	2850	13300	4620	6040	1410	572	536
17	607	843	1220	1620	1270	2610	10900	4740	6620	1290	568	554
18	591	834	1220	1540	1320	2370	9260	4930	6390	1210	549	596
19	586	805	1110	1510	1410	2340	8020	6050	6160	1090	526	584
20	584	796	1100	1460	1600	2730	7270	8130	5200	1040	535	537
21	578	883	1070	1510	1700	3020	6650	7960	4890	967	541	520
22	620	990	1050	1500	2010	3170	6540	6670	4810	895	621	525
23	784	1450	923	1430	2680	3480	6680	5860	4880	868	641	517
24	835	1230	880	1390	3900	4970	6030	5230	4970	844	631	524
25	705	1100	934	1480	3550	6640	5750	4920	5160	835	615	519
26	690	1020	1080	1600	2830	6330	5750	4970	5230	790	634	502
27	674	958	1040	1580	2420	6250	5730	5610	5540	745	631	503
28	692	976	1030	1400	2220	5810	5630	7200	5450	724	623	519
29	684	926	979	1240	---	5310	5670	8970	5160	714	627	514
30	712	876	918	1330	---	5250	5870	10700	4850	703	634	546
31	1120	---	888	1310	---	5710	---	9510	---	667	631	---
TOTAL	19240	27358	31272	52466	45860	104670	244760	182660	169530	50332	19162	16829
MEAN	621	912	1009	1692	1638	3376	8159	5892	5651	1624	618	561
MAX	1120	1450	1330	3960	3900	6640	19100	10700	8530	4000	695	622
MIN	443	736	880	902	1130	1600	5630	3460	3850	667	526	502
AC-FT	38160	54260	62030	104100	90960	207600	485500	362300	336300	99830	38010	33380

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2002, BY WATER YEAR (WY)

MEAN	877	1239	1984	2189	3193	4300	6333	7351	5652	2155	842	764
MAX	2559	3766	7212	6280	14390	11520	11390	13820	11610	4951	1385	1291
(WY)	1960	1996	1996	1974	1996	1972	1997	1948	1974	1975	1984	1984
MIN	528	618	685	702	769	888	2257	2368	1501	520	438	409
(WY)	1988	1988	1945	1979	1977	1977	1968	1977	1992	1977	1992	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1945 - 2002	
ANNUAL TOTAL	582663		964139			
ANNUAL MEAN	1596		2641		3068	
HIGHEST ANNUAL MEAN					5253	1996
LOWEST ANNUAL MEAN					1136	1977
HIGHEST DAILY MEAN	7460	May 15	19100	Apr 14	42200	Feb 9 1996
LOWEST DAILY MEAN	385	Sep 1	443	Oct 1	344	Aug 20 1977
ANNUAL SEVEN-DAY MINIMUM	389	Sep 7	474	Oct 1	361	Aug 18 1977
ANNUAL RUNOFF (AC-FT)	1156000		1912000		2222000	
10 PERCENT EXCEEDS	4180		6540		7440	
50 PERCENT EXCEEDS	894		1220		1630	
90 PERCENT EXCEEDS	434		585		694	

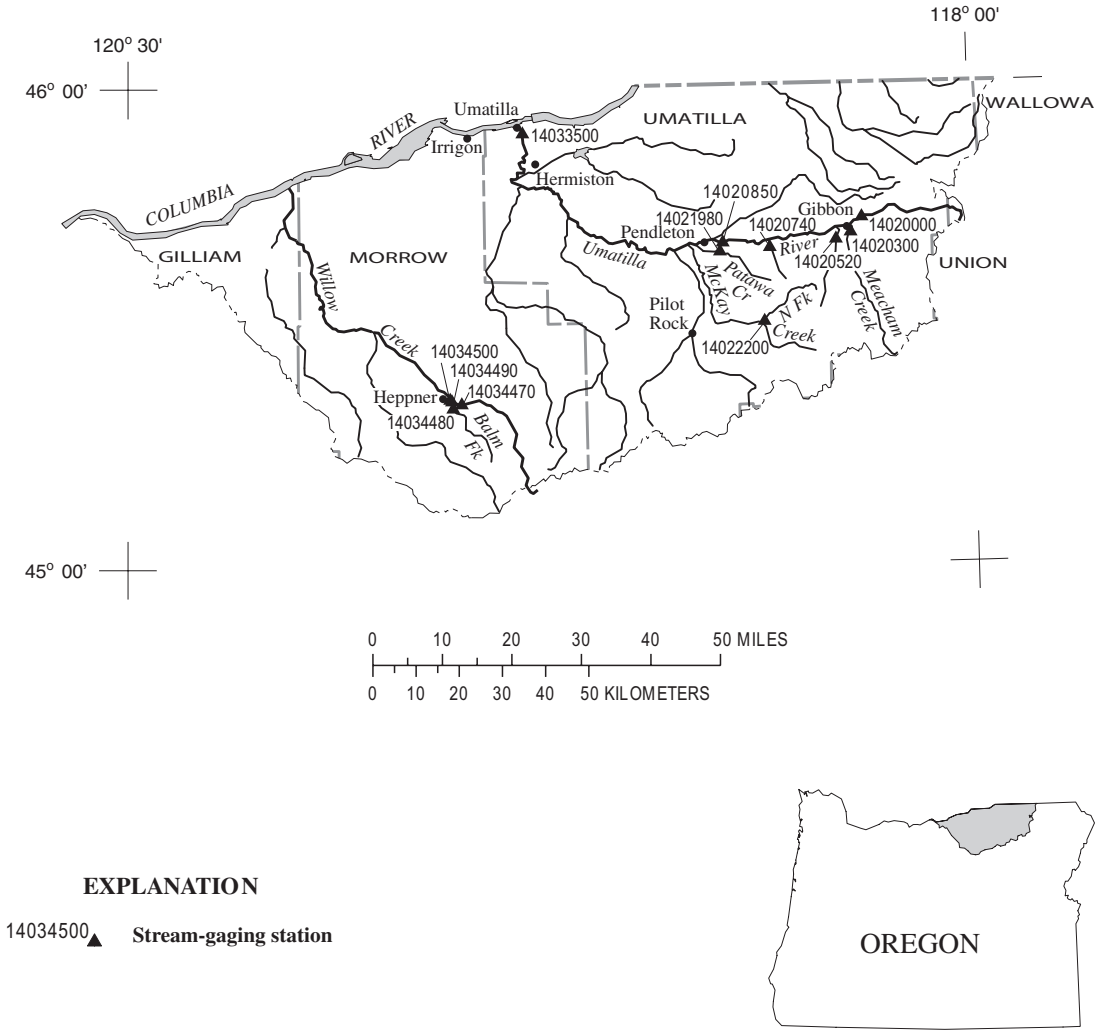


Figure 11. Location of surface-water stations in the Umatilla and Willow Creek Basins.

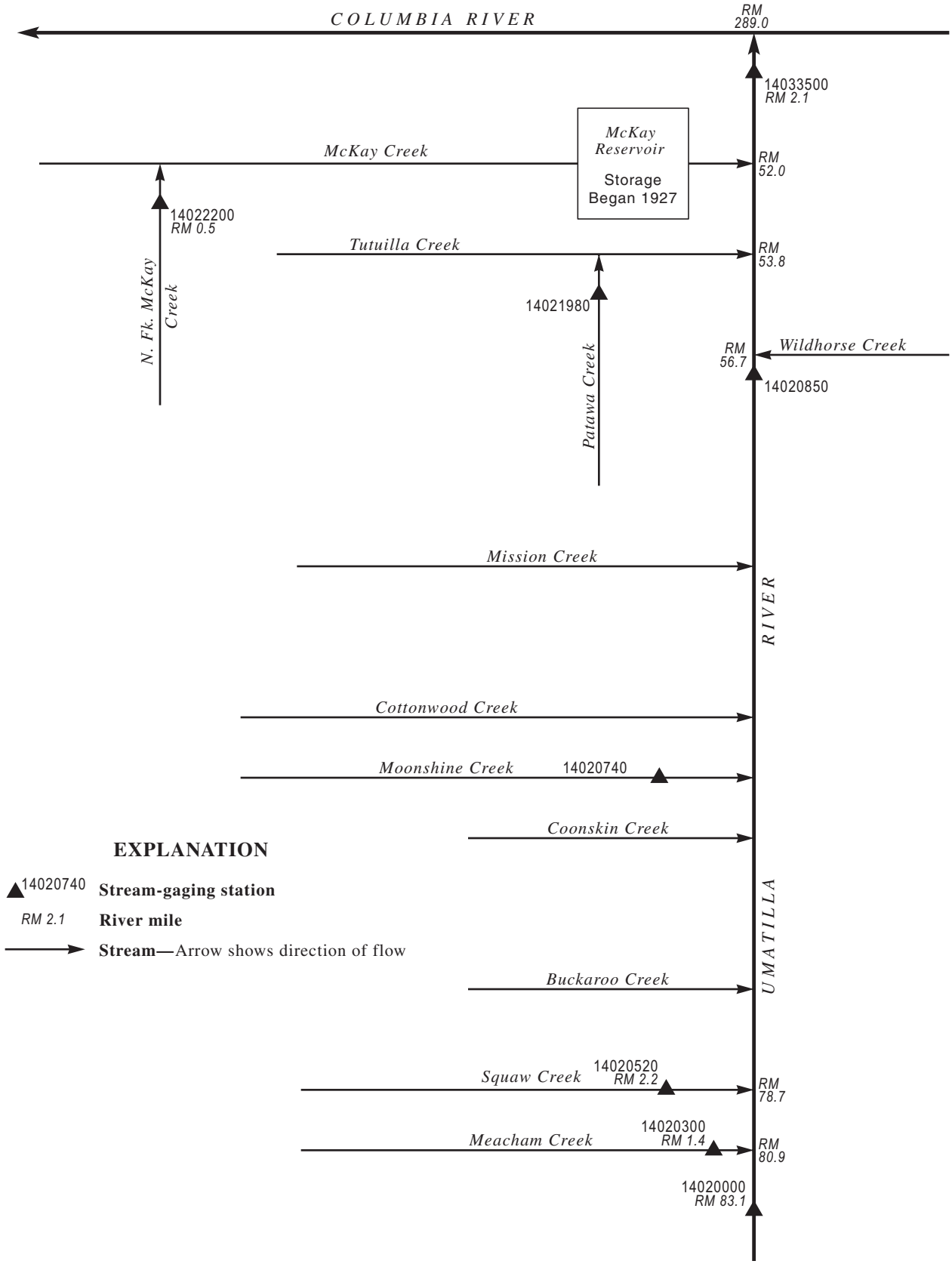


Figure 12. Schematic diagram showing gaging stations in the Umatilla River Basin.

14020000 UMATILLA RIVER ABOVE MEACHAM CREEK, NEAR GIBBON, OR

LOCATION.--Lat 45°43'11", long 118°19'20", in SE 1/4 SW 1/4 sec.21, T.3 N., R.36 E., Umatilla County, Hydrologic Unit 17070103, Umatilla Indian Reservation, on right bank 0.8 mi downstream from Ryan Creek, 2.2 mi upstream from Meacham Creek, 2.5 mi northeast of Gibbon, and at mile 83.1.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--April 1933 to current year.

REVISED RECORDS.--WSP 1935: 1946-48(M), 1950(M), 1953(M), 1956-59(M), drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,854.81 ft above NGVD of 1929. Prior to June 27, 1939, at site 1 mi downstream at datum 43.94 ft lower.

REMARKS.--Records good. No regulation or diversion upstream from station. Continuous water-quality records for the period June 1959 to September 1980 have been collected at this location. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--69 years (water years 1934-2002), 227 ft^3/s, 23.49 in/yr, 164,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,220 ft^3/s Nov. 28, 1995, gage height, 9.40 ft (high-water mark), from rating curve extended above 3,500 ft^3/s; maximum gage height, 9.50 ft Jan. 29, 1965; minimum discharge, 16 ft^3/s Nov. 9, 1965, momentary regulation from unknown source.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 24	0215	1,840	6.10	Apr. 14	0815	*3,500	*7.52

Minimum discharge, 38 ft^3/s Aug. 15, 17, 25, 26, Aug. 29 to Sept. 5, 9-16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	71	121	89	124	238	e600	628	327	77	45	39
2	44	64	131	103	115	206	481	677	294	75	45	39
3	44	60	145	153	111	182	424	677	268	72	45	40
4	44	58	142	177	107	170	438	570	246	70	45	40
5	44	57	132	169	106	165	556	500	230	69	46	40
6	45	55	129	175	107	175	735	425	211	67	46	40
7	45	55	148	464	113	184	722	381	193	67	45	41
8	46	54	155	884	131	184	638	335	183	70	44	40
9	46	52	148	664	132	177	659	318	178	65	44	40
10	46	52	135	435	131	172	986	304	190	62	43	40
11	66	52	128	320	131	181	1080	302	166	60	43	40
12	53	52	118	268	130	390	1400	338	153	58	42	40
13	49	53	205	237	131	456	1520	418	144	57	42	40
14	48	72	450	213	136	379	2690	462	137	58	42	39
15	48	68	304	188	141	320	1700	457	129	56	41	39
16	47	65	233	168	147	289	1030	e410	121	55	41	40
17	47	77	215	154	150	260	749	e390	115	54	41	46
18	48	78	198	143	161	232	584	e420	161	53	41	45
19	48	73	175	139	187	231	488	e460	141	53	41	42
20	48	73	159	132	217	257	448	e500	123	52	42	41
21	49	97	147	139	255	268	433	e460	114	51	43	41
22	62	148	136	137	382	258	483	e430	109	50	44	41
23	69	295	126	129	903	260	551	416	103	49	42	41
24	56	196	116	126	1430	646	464	395	98	49	41	41
25	52	160	111	179	702	1160	461	383	92	49	40	41
26	50	134	106	227	453	790	493	390	88	48	42	41
27	50	123	103	198	339	e660	501	413	86	47	43	41
28	54	121	102	174	282	e600	472	481	82	47	41	42
29	53	121	96	e155	---	e550	522	466	88	46	40	43
30	59	121	93	e140	---	e600	593	422	81	46	40	44
31	91	---	91	131	---	e660	---	363	---	45	40	---
TOTAL	1595	2757	4798	7010	7454	11300	22901	13591	4651	1777	1320	1227
MEAN	51.5	91.9	155	226	266	365	763	438	155	57.3	42.6	40.9
MAX	91	295	450	884	1430	1160	2690	677	327	77	46	46
MIN	44	52	91	89	106	165	424	302	81	45	40	39
AC-FT	3160	5470	9520	13900	14790	22410	45420	26960	9230	3520	2620	2430
CFSM	0.39	0.70	1.18	1.73	2.03	2.78	5.83	3.35	1.18	0.44	0.33	0.31
IN.	0.45	0.78	1.36	1.99	2.12	3.21	6.50	3.86	1.32	0.50	0.37	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2002, BY WATER YEAR (WY)

MEAN	57.4	129	236	263	328	392	539	442	184	64.1	47.0	46.7
MAX	169	405	716	656	1074	989	885	1135	591	110	63.4	81.6
(WY)	1952	1948	1976	1965	1996	1972	1974	1948	1974	1948	1975	1959
MIN	39.1	40.2	44.4	45.7	71.8	189	162	67.0	49.4	39.5	36.9	34.9
(WY)	1936	1936	1966	1937	1977	1955	1941	1934	1992	1934	1939	1935

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1934 - 2002	
ANNUAL TOTAL	57934		80381			
ANNUAL MEAN	159		220		227	
HIGHEST ANNUAL MEAN					415	1974
LOWEST ANNUAL MEAN					114	1977
HIGHEST DAILY MEAN	850	Apr 27	2690	Apr 14	5130	Dec 12 1946
LOWEST DAILY MEAN	39	Aug 17	39	Sep 1	28	Jan 9 1937
ANNUAL SEVEN-DAY MINIMUM	40	Aug 14	40	Aug 29	31	Sep 26 1935
ANNUAL RUNOFF (AC-FT)	114900		159400		164100	
ANNUAL RUNOFF (CFSM)	1.21		1.68		1.73	
ANNUAL RUNOFF (INCHES)	16.45		22.83		23.49	
10 PERCENT EXCEEDS	421		500		546	
50 PERCENT EXCEEDS	98		128		118	
90 PERCENT EXCEEDS	42		42		44	

e Estimated

14020300 MEACHAM CREEK AT GIBBON, OR

LOCATION.--Lat 45°41'20", long 118°21'20", in SE 1/4 SE 1/4 sec.31, T.3 N., R.36 E., Umatilla County, Hydrologic Unit 17070103, on left bank 250 ft downstream from Union Pacific railroad bridge, 0.9 mi southeast of Gibbon, and at mile 1.4.

DRAINAGE AREA.--176 mi^2.

PERIOD OF RECORD.--August 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,803.05 ft above NGVD of 1929.

REMARKS.--Records good. No regulation or diversion upstream from station. U.S. Geological Survery satellite telemeter at station.

AVERAGE DISCHARGE.--27 years (water years 1976-2002), 203 ft^3/s, 15.66 in/yr, 147,000 acre-ft.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,930 ft^3/s Nov. 28, 1995, gage height, 7.67 ft, from rating curve extended above 4,600 ft^3/s; maximum gage height, 8.16 ft, from floodmark; minimum discharge, 6.6 ft^3/s Aug. 29, 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 25, 1975, reached a stage of 7.21 ft, from floodmark, discharge, about 8,200 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1100	*2,700	*5.68	No other peak greater than base discharge.			

Minimum discharge, 7.2 ft^3/s Sept. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	22	75	64	114	314	1010	362	134	27	12	9.0
2	10	e20	78	66	105	265	853	383	121	26	12	9.1
3	10	e19	86	84	100	227	762	389	110	24	11	9.7
4	10	e18	91	110	93	205	823	307	101	22	11	9.8
5	10	e16	90	127	91	190	1020	265	92	22	11	9.4
6	10	e14	92	133	92	195	1230	229	84	21	11	9.6
7	10	e13	100	298	97	218	1140	206	77	21	11	9.7
8	11	e12	106	707	108	226	1070	186	72	21	10	9.7
9	11	e11	107	700	111	219	1070	172	74	20	10	9.4
10	11	e10	102	496	109	210	1420	163	90	20	10	8.7
11	15	e9.8	97	379	111	222	1510	160	80	19	9.8	8.4
12	13	e9.6	89	308	108	385	1620	160	71	18	9.2	8.3
13	12	e9.4	143	271	108	521	1630	189	65	17	9.0	8.2
14	13	e10	367	241	109	476	2250	214	60	18	8.6	8.1
15	13	e13	302	207	116	412	1720	207	55	17	8.3	8.1
16	13	19	231	176	126	364	1230	203	50	17	8.2	8.5
17	13	24	197	153	133	321	923	193	47	16	8.3	11
18	14	24	173	139	140	278	699	198	62	16	8.3	10
19	13	24	155	136	167	267	543	216	66	15	8.4	9.2
20	13	25	139	130	191	274	471	235	61	15	8.5	8.8
21	14	30	128	129	216	295	430	203	50	14	9.1	9.1
22	17	37	119	128	316	303	443	173	46	14	9.5	9.2
23	17	96	107	117	687	327	485	157	43	13	8.9	9.2
24	16	113	95	110	1430	542	408	147	39	13	8.5	9.2
25	16	100	87	174	901	1070	366	144	37	13	8.7	8.4
26	15	90	83	220	603	972	364	148	34	13	9.2	9.1
27	16	82	79	193	460	889	358	158	31	13	9.9	9.1
28	17	82	78	157	380	782	324	183	30	13	9.3	9.3
29	17	77	73	139	---	687	322	179	31	12	8.9	9.7
30	19	75	69	135	---	702	353	167	29	12	9.0	11
31	26	---	67	124	---	858	---	148	---	12	9.1	---
TOTAL	425	1104.8	3805	6551	7322	13216	26847	6444	1942	534	295.7	276.0
MEAN	13.7	36.8	123	211	262	426	895	208	64.7	17.2	9.54	9.20
MAX	26	113	367	707	1430	1070	2250	389	134	27	12	11
MIN	10	9.4	67	64	91	190	322	144	29	12	8.2	8.1
AC-FT	843	2190	7550	12990	14520	26210	53250	12780	3850	1060	587	547
CFSM	0.08	0.21	0.70	1.20	1.49	2.42	5.08	1.18	0.37	0.10	0.05	0.05
IN.	0.09	0.23	0.80	1.38	1.55	2.79	5.67	1.36	0.41	0.11	0.06	0.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1976 - 2002, BY WATER YEAR (WY)

MEAN	16.2	79.8	204	241	390	507	555	311	98.2	23.8	12.5	12.0
MAX	28.8	323	582	583	1074	1016	956	668	354	52.2	20.7	16.7
(WY)	2001	1996	1976	1997	1996	1997	1985	1991	1984	1984	1993	1978
MIN	8.48	11.2	18.0	22.2	27.1	134	228	58.3	21.7	13.2	8.48	8.95
(WY)	1988	1988	1977	1977	1977	1977	1986	1992	1992	1977	1986	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1976 - 2002	
ANNUAL TOTAL	47661.5		68762.5			
ANNUAL MEAN	131		188		203	
HIGHEST ANNUAL MEAN					352	1997
LOWEST ANNUAL MEAN					66.2	1977
HIGHEST DAILY MEAN	783	Mar 25	2250	Apr 14	4820	Feb 8 1996
LOWEST DAILY MEAN	8.3	Sep 5	8.1	Sep 14	7.5	Aug 11 1977
ANNUAL SEVEN-DAY MINIMUM	8.4	Sep 12	8.3	Sep 10	7.7	Aug 8 1977
ANNUAL RUNOFF (AC-FT)	94540		136400		147000	
ANNUAL RUNOFF (CFSM)	0.74		1.07		1.15	
ANNUAL RUNOFF (INCHES)	10.07		14.53		15.66	
10 PERCENT EXCEEDS	467		480		552	
50 PERCENT EXCEEDS	70		84		72	
90 PERCENT EXCEEDS	9.1		9.3		11	

e Estimated

14020520 SQUAW CREEK NEAR GIBBON, OR

LOCATION.--Lat 45°40'22", long 118°24'00", in NW 1/4 NE 1/4 sec.11, T.2 N., R.35 E., Umatilla County, Hydrologic Unit 17070103, on right bank, 2 mi southwest of townsite of Gibbon, and at mile 2.2.

DRAINAGE AREA.--32.6 mi^2.

PERIOD OF RECORD.--October 1998 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,850 ft above NGVD of 1929, from topographic map.

REMARKS.--Records poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--4 years (water years 1999-2002), 28.9 ft^3/s, 12.04 in/yr, 20,930 acre-ft/yr

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 900 ft^3/s Dec. 30, 1998, gage height, 3.71 ft, from highwater mark, from rating curve extended above 300 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 0.55 ft^3/s Aug. 11, 2001, Aug. 13-18, Sept. 13-15, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 370 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 24	0230	*622	*3.19	Mar. 24	2000	479	2.85

Minimum discharge, 0.55 ft^3/s Aug. 13-18, Sept. 13-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	6.1	23	6.8	17	54	120	16	4.2	e1.3	0.80	0.77
2	1.4	5.2	23	8.7	15	46	101	15	3.3	e1.3	0.79	0.77
3	1.4	4.6	26	18	15	39	85	13	3.1	e1.3	0.81	0.84
4	1.4	4.3	27	30	13	35	82	13	3.0	e1.3	0.94	0.88
5	1.4	4.1	24	29	13	33	100	13	2.9	e1.2	1.0	0.88
6	1.4	3.9	26	38	14	34	113	12	2.6	e1.2	0.97	e0.90
7	1.5	3.7	37	172	15	36	100	11	2.5	e1.2	0.96	e0.90
8	1.7	3.6	38	187	18	36	89	11	2.6	e1.2	0.92	e0.89
9	1.7	3.5	32	126	18	35	96	10	3.9	e1.2	0.84	e0.86
10	1.9	3.4	27	80	18	34	153	9.5	5.0	e1.2	0.81	e0.82
11	2.9	3.3	24	56	17	40	148	8.3	4.0	e1.1	0.79	e0.79
12	2.3	3.1	19	44	16	107	147	7.6	3.3	e1.0	0.78	0.72
13	2.1	3.2	63	36	15	121	133	8.0	3.0	e1.0	0.75	0.71
14	2.1	5.2	142	30	15	103	208	7.2	2.6	e1.0	0.72	0.68
15	2.1	6.7	75	24	14	85	169	6.8	2.3	e1.0	0.70	0.64
16	2.0	6.5	48	20	14	71	125	6.5	2.1	e0.98	0.70	0.74
17	2.0	7.8	40	17	14	61	95	6.4	2.0	e0.98	0.69	1.1
18	2.2	8.2	36	14	15	53	76	6.5	5.0	e0.98	0.71	1.1
19	2.3	7.7	29	14	18	57	64	6.0	5.0	e0.96	0.77	0.98
20	2.2	7.8	24	14	21	73	54	6.5	3.7	e0.96	0.81	0.92
21	2.4	16	21	16	30	75	47	6.9	3.2	e0.96	0.96	0.91
22	3.7	41	18	17	76	68	42	6.7	2.5	e0.94	0.99	0.90
23	3.6	101	16	15	281	73	38	6.1	2.2	e0.94	0.87	0.87
24	3.0	47	14	15	371	242	32	5.2	2.0	e0.94	0.82	0.88
25	2.8	32	13	62	180	320	29	4.6	1.8	0.94	0.80	0.90
26	2.6	28	12	84	124	212	27	4.6	e1.6	0.90	0.83	0.80
27	2.7	27	10	55	88	176	24	4.7	e1.5	0.90	0.87	0.88
28	3.1	27	9.2	39	69	141	21	6.2	e1.5	0.88	0.82	0.90
29	3.2	24	8.3	29	---	119	18	5.2	e1.6	0.84	0.75	1.1
30	3.9	23	7.9	24	---	111	18	4.6	e1.4	0.82	0.76	1.4
31	7.7	---	7.3	20	---	117	---	4.2	---	0.81	0.77	---
TOTAL	76.1	467.9	919.7	1340.5	1534	2807	2554	252.3	85.4	32.23	25.50	26.43
MEAN	2.45	15.6	29.7	43.2	54.8	90.5	85.1	8.14	2.85	1.04	0.82	0.88
MAX	7.7	101	142	187	371	320	208	16	5.0	1.3	1.0	1.4
MIN	1.4	3.1	7.3	6.8	13	33	18	4.2	1.4	0.81	0.69	0.64
AC-FT	151	928	1820	2660	3040	5570	5070	500	169	64	51	52
CFSM	0.08	0.48	0.91	1.33	1.68	2.78	2.61	0.25	0.09	0.03	0.03	0.03
IN.	0.09	0.53	1.05	1.53	1.75	3.20	2.91	0.29	0.10	0.04	0.03	0.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2002, BY WATER YEAR (WY)

MEAN	3.39	17.2	52.3	44.0	60.8	94.1	54.5	13.4	5.01	1.34	0.98	1.21
MAX	7.55	20.5	88.9	76.7	98.1	144	85.1	20.7	11.2	1.67	1.09	1.91
(WY)	2001	1999	1999	1999	2000	2000	2002	1999	2000	2000	1999	2000
MIN	1.14	15.6	21.9	17.2	24.9	57.3	34.6	8.14	2.62	1.04	0.82	0.88
(WY)	2000	2002	2001	2001	2001	2001	2000	2002	2001	2002	2002	2002

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1999 - 2002	
ANNUAL TOTAL	6987.76		10121.06			
ANNUAL MEAN	19.1		27.7		28.9	
HIGHEST ANNUAL MEAN					35.5	2000
LOWEST ANNUAL MEAN					19.0	2001
HIGHEST DAILY MEAN	142	Dec 14	371	Feb 24	830	Dec 30 1998
LOWEST DAILY MEAN	0.86	Sep 4	0.64	Sep 15	0.64	Sep 15 2002
ANNUAL SEVEN-DAY MINIMUM	0.92	Aug 30	0.72	Aug 13	0.72	Aug 13 2002
ANNUAL RUNOFF (AC-FT)	13860		20080		20930	
ANNUAL RUNOFF (CFSM)	0.59		0.85		0.89	
ANNUAL RUNOFF (INCHES)	7.97		11.55		12.04	
10 PERCENT EXCEEDS	63		86		76	
50 PERCENT EXCEEDS	7.7		6.7		9.8	
90 PERCENT EXCEEDS	1.00		0.85		0.97	

e Estimated

14020740 MOONSHINE CREEK NEAR MISSION, OR

LOCATION.--Lat 45°39'36", long 118°33'55"(revised), in NW 1/4 NE 1/4 sec.16, T.2 N., R.34 E., Umatilla County, Hydrologic Unit 17070103, Umatilla Indian Reservation, on left bank, 60 ft upstream from county road crossing, 5.7 mi west of Mission, and at mile 1.1.

DRAINAGE AREA.--4.62 mi^2.

PERIOD OF RECORD.--October 1991 to current year.

REVISED RECORDS.--WDR OR-93-1: 1992(M); WDR OR-94-1: 1993.

GAGE.--Water-stage recorder. Elevation of gage is 1,600 ft above NGVD of 1929, from topographic map.

REMARKS.--Records poor. No known regulation.

AVERAGE DISCHARGE.--11 years (water years 1992-2002), 3.07 ft^3/s, 2,220 acre-ft per year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 247 ft^3/s Feb. 7, 1996, gage height, 6.67 ft, from rating curve extended above 75 ft^3/s; no flow part of or all of each day Oct. 1-14, 1992, Sept. 6-10, 1993, Oct. 2, 15-19, 1993.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 24	unknown	*83	a*6.00	Mar. 25	1615	36	5.62

Minimum discharge, 0.05 ft^3/s part or all of each day Sept. 13, 14, 28-30.
a From floodmark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.19	0.40	2.6	0.97	3.1	e7.0	7.2	1.7	0.48	0.17	0.07	0.06
2	0.19	0.40	2.6	1.2	3.0	e6.0	6.4	1.6	0.45	0.17	0.07	0.06
3	0.19	0.36	2.4	1.7	2.9	e5.5	5.4	1.5	0.43	0.17	0.07	0.06
4	0.19	0.39	2.0	2.2	2.7	e5.0	4.9	1.5	0.39	0.17	0.07	0.06
5	0.19	0.40	1.8	2.3	2.5	e4.8	4.6	1.5	0.36	0.15	0.07	0.06
6	0.18	0.40	1.8	2.4	2.4	e5.0	4.2	1.5	0.36	0.14	0.07	0.07
7	0.19	0.40	2.2	3.8	2.5	e5.2	3.7	1.4	0.34	0.14	0.07	0.07
8	0.19	0.40	2.3	6.4	2.9	e5.4	3.3	1.4	0.32	0.14	0.07	0.07
9	0.19	0.41	2.2	4.9	2.9	e5.1	3.4	1.3	0.33	0.14	0.07	0.07
10	0.21	0.45	2.1	4.1	2.9	e5.1	4.7	1.2	0.32	0.14	0.07	0.07
11	0.24	0.45	2.1	3.6	2.7	e5.5	4.7	1.2	0.31	0.13	0.07	0.07
12	0.22	0.45	2.0	3.3	2.5	e8.0	4.9	1.1	0.29	0.12	0.07	0.07
13	0.22	0.46	5.9	3.1	2.4	e10	4.8	1.0	0.29	0.12	0.07	0.06
14	0.22	0.50	7.0	2.8	2.1	e8.5	14	1.0	0.28	0.12	0.07	0.06
15	0.24	0.50	4.1	2.4	2.0	e7.7	12	e0.90	0.25	0.12	0.07	0.06
16	0.25	0.50	3.4	2.2	1.9	e7.0	9.5	e0.90	0.24	0.11	0.07	0.06
17	0.25	0.51	3.1	2.0	1.8	e6.2	8.1	e0.80	0.22	0.10	0.07	0.06
18	0.25	0.50	3.0	1.8	1.8	e6.2	6.9	e0.80	0.27	0.10	0.07	0.06
19	0.25	0.50	2.6	2.9	2.1	e6.5	6.0	e0.70	0.24	0.10	0.07	0.06
20	0.27	0.55	2.4	3.0	2.4	e6.7	5.1	e0.70	0.23	0.09	0.07	0.06
21	0.29	0.56	2.1	3.2	3.2	e7.0	4.6	e0.60	0.22	0.09	0.07	0.06
22	0.34	0.67	1.9	3.1	5.1	e8.0	3.8	0.61	0.22	0.09	0.07	0.06
23	0.34	2.3	1.7	2.7	e28	e13	3.3	0.61	0.22	0.09	0.07	0.06
24	0.35	2.1	1.6	2.6	e34	e24	2.8	0.58	0.21	0.09	0.06	0.06
25	0.36	2.7	1.4	3.8	e17	e29	2.6	0.55	0.20	0.09	0.06	0.06
26	0.36	2.8	1.3	4.7	e12	24	2.5	0.53	0.19	0.08	0.06	0.06
27	0.37	2.7	1.2	4.4	e10	17	2.4	0.50	0.18	0.09	0.06	0.06
28	0.36	2.7	1.1	4.0	e8.0	13	2.2	0.50	0.17	0.09	0.06	0.06
29	0.36	2.5	1.0	3.5	---	11	2.0	0.50	0.18	0.07	0.06	0.05
30	0.42	2.7	1.0	3.2	---	9.3	1.9	0.50	0.17	0.07	0.06	0.06
31	0.42	---	0.97	3.1	---	8.3	---	0.48	---	0.07	0.06	---
TOTAL	8.29	30.66	72.87	95.37	166.8	290.0	151.9	29.66	8.36	3.56	2.09	1.86
MEAN	0.27	1.02	2.35	3.08	5.96	9.35	5.06	0.96	0.28	0.11	0.067	0.062
MAX	0.42	2.8	7.0	6.4	34	29	14	1.7	0.48	0.17	0.07	0.07
MIN	0.18	0.36	0.97	0.97	1.8	4.8	1.9	0.48	0.17	0.07	0.06	0.05
AC-FT	16	61	145	189	331	575	301	59	17	7.1	4.1	3.7

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 2002, BY WATER YEAR (WY)

MEAN	0.18	1.88	5.09	5.94	7.43	8.15	4.31	3.21	0.54	0.13	0.094	0.072
MAX	0.58	4.46	14.2	9.67	25.1	15.4	9.35	12.6	1.39	0.23	0.19	0.15
(WY)	2001	1992	1997	1997	1996	2000	2001	1995	2000	2000	1995	2001
MIN	0.000	0.22	0.48	1.93	1.90	2.41	0.58	0.13	0.000	0.002	0.001	0.000
(WY)	1992	2000	1994	1992	1994	1992	1992	1992	1992	1992	1992	1992

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1992 - 2002	
ANNUAL TOTAL	854.99		861.42			
ANNUAL MEAN	2.34		2.36		3.07	
HIGHEST ANNUAL MEAN					4.95	1996
LOWEST ANNUAL MEAN					1.47	1992
HIGHEST DAILY MEAN	26	Apr 12	34	Feb 24	164	Feb 7 1996
LOWEST DAILY MEAN	0.12	Jul 23	0.05	Sep 29	0.00	Oct 1 1991
ANNUAL SEVEN-DAY MINIMUM	0.13	Jul 21	0.06	Sep 23	0.00	Oct 1 1991
ANNUAL RUNOFF (AC-FT)	1700		1710		2220	
10 PERCENT EXCEEDS	5.6		6.1		7.9	
50 PERCENT EXCEEDS	0.67		0.60		0.73	
90 PERCENT EXCEEDS	0.14		0.07		0.06	

e Estimated

14020850 UMATILLA RIVER AT WEST RESERVATION BOUNDARY, NEAR PENDLETON, OR

LOCATION.--Lat 45°40'18", long 118°44'08", in NE 1/4 NW 1/4 sec.7, T.2 N., R.33 E., Umatilla County, Hydrologic Unit 17070103, on left bank, 0.5 mi east of west line of boundary for Umatilla Indian Reservarion, 1.6 mi upstream from Wildhorse Creek, 2.5 mi east of Post Office in Pendleton, and at mile 58.3.

DRAINAGE AREA.--440 mi^2.

PERIOD OF RECORD.--October 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,130 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good. No known regulation. Many diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--7 years (water years 1996-2002), 556 ft^3/s, 403,000 acre-ft.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,700 ft^3/s Feb. 9, 1996, gage height, 11.64 ft; minimum discharge, 34 ft^3/s Aug. 16-18, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 24	0900	4,630	7.48	Apr. 14	1430	*7,520	*9.04
Mar. 25	0800	3,670	6.92				

Minimum discharge, 34 ft^3/s Aug. 16-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	85	308	223	339	685	1780	1090	525	105	42	38
2	42	76	316	231	315	608	1540	1160	472	100	41	38
3	42	70	338	294	302	526	1320	1210	423	93	42	38
4	42	67	357	384	288	480	1330	1050	381	89	42	41
5	43	65	350	415	281	445	1630	932	348	87	44	41
6	43	62	337	414	281	448	2100	801	322	84	43	41
7	44	62	375	775	289	481	2030	711	293	82	43	42
8	45	61	402	1730	323	493	1850	629	274	85	43	42
9	45	59	400	1750	341	478	1780	584	274	83	41	41
10	45	57	379	1220	335	456	2430	550	297	78	40	40
11	54	56	360	912	333	462	2930	527	267	75	39	39
12	56	56	336	741	326	773	3280	548	228	67	38	38
13	50	55	381	642	319	1170	3590	643	209	59	38	38
14	47	62	1070	571	320	1070	5610	749	196	58	36	39
15	48	70	902	508	324	943	4680	755	184	56	35	39
16	47	69	696	448	333	829	2830	736	172	53	35	40
17	47	83	601	408	345	726	2000	715	163	50	35	44
18	47	93	560	366	361	653	1570	717	195	49	35	47
19	47	96	500	358	402	623	1280	803	223	49	36	44
20	47	98	449	344	469	674	1150	939	191	49	37	40
21	47	120	411	346	521	690	1060	831	171	48	39	40
22	55	165	383	352	733	695	1070	701	157	46	42	40
23	65	468	354	335	1620	717	1180	637	147	46	41	40
24	61	467	329	318	3910	1450	1050	600	139	45	40	39
25	55	399	303	419	2330	3260	975	584	128	45	39	39
26	52	356	284	631	1470	2460	989	576	120	45	39	40
27	52	323	271	574	1050	2020	1000	621	114	43	42	41
28	55	320	268	494	839	1700	933	720	111	43	41	42
29	56	313	253	430	---	1410	946	732	119	43	38	42
30	59	311	240	399	---	1320	1040	686	117	42	37	43
31	80	---	231	361	---	1470	---	586	---	42	38	---
TOTAL	1561	4644	12744	17393	19099	30215	56953	23123	6960	1939	1221	1216
MEAN	50.4	155	411	561	682	975	1898	746	232	62.5	39.4	40.5
MAX	80	468	1070	1750	3910	3260	5610	1210	525	105	44	47
MIN	42	55	231	223	281	445	933	527	111	42	35	38
AC-FT	3100	9210	25280	34500	37880	59930	113000	45860	13810	3850	2420	2410

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	67.1	305	696	778	1081	1244	1347	792	245	68.6	43.4	46.4
MAX	101	717	1186	1360	2801	1971	1898	1030	416	81.9	47.6	54.4
(WY)	2001	1996	1997	1997	1996	1997	2002	1998	2000	1998	1997	1998
MIN	50.4	155	245	246	339	871	693	517	117	53.7	39.4	40.2
(WY)	2002	2002	2001	2001	2001	2001	1998	2000	2001	2001	2002	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	128269		177068			
ANNUAL MEAN	351		485		556	
HIGHEST ANNUAL MEAN					777	1997
LOWEST ANNUAL MEAN					343	2001
HIGHEST DAILY MEAN	1650	Apr 28	5610	Apr 14	11700	Feb 9 1996
LOWEST DAILY MEAN	39	Aug 20	35	Aug 15	35	Aug 15 2002
ANNUAL SEVEN-DAY MINIMUM	39	Sep 9	36	Aug 14	36	Aug 14 2002
ANNUAL RUNOFF (AC-FT)	254400		351200		403000	
10 PERCENT EXCEEDS	1080		1170		1360	
50 PERCENT EXCEEDS	218		302		279	
90 PERCENT EXCEEDS	40		41		45	

14021980 PATAWA CREEK AT WEST RESERVATION BOUNDARY, NEAR PENDLETON, OR

LOCATION.--Lat 45°39'11", long 118°44'39", in NW 1/4 SW 1/4 sec. 18, T.2 N., R.33 E., Umatilla County, Hydrologic Unit 17070103, Umatilla Indian Reservation, on right bank, at downstream side of county road crossing, 2 mi southwest of Pendleton City Hall, and at mile 2.9.

DRAINAGE AREA.--30 mi^2, excludes about 1 mi^2 in upper basin where water has been diverted directly to the Umatilla River.

PERIOD OF RECORD.--December 1973 to April 1975 (discharge measurements only), October 1991 to current year.

REVISED RECORDS.--WDR OR-94-1: 1993 (M).

GAGE.--Water-stage recorder. Elevation of gage is 1,220 ft above NGVD of 1929, from topographic map.

REMARKS.--Records poor. No known regulation.

AVERAGE DISCHARGE.--11 years (water years 1992-2002), 5.28 ft^3/s, 3,830 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 378 ft^3/s Feb. 7, 1996, gage height, 7.94 ft; minimum discharge, 0.01 ft^3/s July 22, 23, 27, 28, July 30 to Aug. 1, 1999.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 57 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 24	2100	*74	*5.33	No other peak greater than base discharge.			

Minimum daily discharge, 0.06 ft^3/s Oct. 2-8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.07	e0.12	e0.42	0.41	1.4	3.7	4.9	1.4	0.59	0.21	0.26	0.25
2	0.06	e0.12	e0.40	0.41	1.4	3.1	4.1	1.2	0.52	0.21	0.20	0.21
3	0.06	e0.12	e0.36	0.39	1.4	2.7	3.6	1.2	0.47	0.22	0.19	0.20
4	0.06	e0.12	e0.32	0.38	1.4	2.5	3.1	1.1	0.44	0.22	0.17	0.19
5	0.06	e0.12	e0.30	0.40	1.4	2.2	2.8	1.1	0.40	0.22	0.15	0.17
6	e0.06	e0.12	e0.28	0.41	1.4	2.4	2.5	1.1	0.40	0.22	0.16	0.14
7	e0.06	e0.12	0.27	0.40	1.3	2.5	2.3	1.0	0.40	0.23	0.16	0.19
8	e0.06	e0.12	0.28	0.40	2.2	2.2	2.1	0.95	0.39	0.22	0.13	0.25
9	e0.07	e0.13	0.28	0.42	2.6	2.3	2.0	0.93	0.45	0.21	0.12	0.22
10	e0.07	e0.14	0.30	0.40	2.5	2.2	2.9	0.93	0.44	0.23	0.14	0.21
11	e0.07	e0.14	0.31	0.40	2.2	2.1	2.8	0.87	0.41	0.22	0.15	0.19
12	e0.07	e0.14	0.33	0.39	2.1	3.3	3.3	0.84	0.41	0.23	0.17	0.18
13	e0.07	e0.14	0.33	0.39	2.0	5.5	3.4	0.82	0.39	0.22	0.22	0.17
14	e0.07	e0.15	0.33	0.44	1.7	5.4	6.9	0.79	0.39	0.21	0.21	0.15
15	e0.07	e0.15	0.41	0.41	1.6	5.4	6.6	0.76	0.37	0.21	0.24	0.15
16	e0.08	e0.16	0.29	0.41	1.4	5.7	6.0	0.75	0.36	0.22	0.28	0.15
17	e0.08	e0.16	0.28	0.40	1.3	6.1	5.6	0.81	0.35	0.21	0.25	0.22
18	e0.09	e0.16	0.27	0.40	1.3	6.0	5.2	0.77	0.38	e0.22	0.27	0.17
19	e0.09	e0.16	0.30	0.43	1.2	6.7	4.6	0.74	0.31	e0.21	0.29	0.16
20	e0.10	e0.17	0.35	0.41	1.3	12	4.2	0.74	0.27	0.23	0.34	0.15
21	e0.10	e0.18	0.35	0.40	1.4	13	3.8	0.73	0.26	0.23	0.38	0.14
22	e0.10	e0.24	0.38	0.39	2.2	13	3.3	0.73	0.26	0.26	0.38	0.16
23	e0.10	e0.38	0.40	0.40	5.6	13	3.0	0.71	0.26	0.30	0.41	0.17
24	e0.11	e0.36	0.42	0.41	13	26	2.6	0.71	0.26	0.32	0.42	0.16
25	e0.11	e0.46	0.41	0.46	8.5	40	2.3	0.73	0.25	0.33	0.41	0.16
26	e0.11	e0.47	0.34	1.9	6.4	20	2.2	0.73	0.25	0.34	0.39	0.15
27	e0.11	e0.46	0.36	2.3	5.2	14	2.0	0.73	0.24	0.25	0.36	0.14
28	e0.11	e0.44	0.36	2.1	4.4	10	1.9	0.76	0.23	0.26	0.34	0.12
29	e0.12	e0.42	0.34	1.8	---	8.1	1.7	0.69	0.25	0.27	0.31	0.11
30	e0.12	e0.44	0.37	1.8	---	6.6	1.5	0.66	0.22	0.24	0.30	0.11
31	e0.12	---	0.40	1.5	---	5.6	---	0.64	---	0.28	0.28	---
TOTAL	2.63	6.61	10.54	21.56	79.8	253.3	103.2	26.62	10.62	7.45	8.08	5.14
MEAN	0.085	0.22	0.34	0.70	2.85	8.17	3.44	0.86	0.35	0.24	0.26	0.17
MAX	0.12	0.47	0.42	2.3	13	40	6.9	1.4	0.59	0.34	0.42	0.25
MIN	0.06	0.12	0.27	0.38	1.2	2.1	1.5	0.64	0.22	0.21	0.12	0.11
AC-FT	5.2	13	21	43	158	502	205	53	21	15	16	10

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 2002, BY WATER YEAR (WY)

MEAN	0.52	1.94	4.67	9.37	11.2	14.2	9.77	8.72	1.68	0.71	0.51	0.43
MAX	1.10	5.88	14.5	21.8	34.6	26.7	24.2	37.0	3.67	1.45	0.98	0.89
(WY)	2001	1992	1997	1997	1996	1997	2001	1995	1998	1997	1997	1993
MIN	0.085	0.22	0.34	0.70	2.84	5.19	1.81	0.86	0.35	0.22	0.13	0.17
(WY)	2002	2002	2002	2002	1992	1992	1992	2002	2002	1992	1999	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1992 - 2002	
ANNUAL TOTAL	1536.03		535.55			
ANNUAL MEAN	4.21		1.47		5.28	
HIGHEST ANNUAL MEAN					10.6	1995
LOWEST ANNUAL MEAN					1.47	2002
HIGHEST DAILY MEAN	72	Apr 11	40	Mar 25	218	Feb 7 1996
LOWEST DAILY MEAN	0.06	Oct 2	0.06	Oct 2	0.03	Jul 22 1999
ANNUAL SEVEN-DAY MINIMUM	0.06	Oct 2	0.06	Oct 2	0.04	Jul 25 1999
ANNUAL RUNOFF (AC-FT)	3050		1060		3830	
10 PERCENT EXCEEDS	11		3.6		14	
50 PERCENT EXCEEDS	0.63		0.38		1.4	
90 PERCENT EXCEEDS	0.12		0.12		0.23	

e Estimated

14022200 NORTH FORK MCKAY CREEK NEAR PILOT ROCK, OR

LOCATION.--Lat 45°30'24", long 118°36'57", in NE 1/4 SE 1/4 sec.1, T.1 S., R.33 E., Umatilla County, Hydrologic Unit 17070103, Umatilla Indian Reservation, on left bank 10 mi northeast of Pilot Rock and at mile 0.5.

DRAINAGE AREA.--48.6 mi^2.

PERIOD OF RECORD.--May 1973 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,870 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good. No regulation. Minor diversion upstream from station.

AVERAGE DISCHARGE.--29 years (water years 1974-2002), 42.7 ft^3/s, 30,950 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,980 ft^3/s Jan. 25, 1975, gage height, 8.48 ft, from floodmark, from rating curve extended above 150 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 0.22 ft^3/s June 26, 1985 (result of temporary construction upstream).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 290 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 23	1730	*830	*5.02	Mar. 24	2000	705	4.58

Minimum discharge, 0.67 ft^3/s Aug. 14-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	9.2	28	11	35	80	151	21	5.9	3.2	0.82	0.81
2	1.3	7.9	31	12	32	67	128	19	5.7	2.8	0.81	0.82
3	1.3	7.1	29	17	32	57	114	17	5.2	2.5	0.82	0.85
4	1.3	6.4	25	22	31	50	110	15	5.0	2.4	0.87	0.89
5	1.4	6.1	22	24	32	47	115	17	4.7	2.2	0.95	0.91
6	1.4	5.7	21	29	33	50	117	16	4.5	2.0	0.96	0.93
7	1.4	5.2	22	91	36	52	109	15	4.3	2.0	0.95	0.93
8	1.5	4.9	22	139	50	48	99	14	4.3	2.0	0.89	1.0
9	1.6	4.6	22	107	47	45	108	13	6.0	1.8	0.88	0.99
10	1.7	4.5	21	79	45	42	162	12	7.4	1.7	0.81	0.91
11	2.5	4.3	20	64	41	47	154	11	5.5	1.7	0.81	0.80
12	2.1	4.1	19	56	38	91	166	10	4.7	1.6	0.80	0.80
13	1.9	4.3	43	48	36	98	145	9.4	4.2	1.5	0.79	0.79
14	1.9	20	99	42	33	90	193	8.8	3.9	1.5	0.74	0.79
15	1.9	22	64	36	32	82	162	7.9	3.7	1.4	0.73	0.80
16	1.8	18	47	32	32	77	133	7.2	3.5	1.3	0.73	0.86
17	1.9	31	41	29	32	73	114	6.9	3.5	1.3	0.72	1.4
18	2.0	33	35	27	33	68	97	6.8	13	1.3	0.73	1.4
19	2.0	27	30	27	38	81	84	6.6	9.7	1.3	0.75	1.1
20	2.0	23	27	27	42	108	74	7.8	6.9	1.2	0.80	1.0
21	2.3	33	24	33	59	108	65	9.4	5.9	1.2	0.91	0.95
22	3.5	38	22	33	114	96	57	8.7	5.1	1.1	0.96	0.92
23	3.4	55	20	30	444	96	49	7.6	4.7	1.1	0.93	0.91
24	3.0	39	18	30	486	337	43	6.8	4.5	1.0	0.89	0.91
25	2.8	35	e16	66	244	457	39	6.1	4.0	0.98	0.88	0.93
26	2.6	30	e15	97	172	311	35	5.9	3.7	0.98	0.87	0.94
27	2.6	29	e14	75	125	245	34	6.0	3.6	0.94	0.89	1.00
28	3.0	30	e13	e55	98	199	31	9.6	3.4	0.91	0.88	1.1
29	2.9	29	e12	e45	---	170	27	7.9	4.0	0.89	0.81	1.2
30	3.8	29	11	e40	---	158	24	6.8	3.8	0.87	0.81	1.4
31	12	---	11	38	---	158	---	6.1	---	0.84	0.80	---
TOTAL	76.1	595.3	844	1461	2472	3688	2939	322.3	154.3	47.51	25.99	29.04
MEAN	2.45	19.8	27.2	47.1	88.3	119	98.0	10.4	5.14	1.53	0.84	0.97
MAX	12	55	99	139	486	457	193	21	13	3.2	0.96	1.4
MIN	1.3	4.1	11	11	31	42	24	5.9	3.4	0.84	0.72	0.79
AC-FT	151	1180	1670	2900	4900	7320	5830	639	306	94	52	58

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2002, BY WATER YEAR (WY)

MEAN	3.12	22.9	55.6	74.9	94.2	117	83.6	46.3	14.0	2.25	1.09	1.22
MAX	22.6	74.6	197	170	225	223	200	154	60.4	4.97	2.77	2.74
(WY)	2001	1992	1974	1976	1996	1984	1974	1995	1984	1991	1993	1977
MIN	0.89	1.30	3.11	5.01	4.39	29.3	16.2	5.08	2.26	0.73	0.53	0.78
(WY)	1999	1988	1977	1977	1977	1992	1992	1992	1992	1985	1998	1987

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1974 - 2002	
ANNUAL TOTAL	12834.65		12654.54			
ANNUAL MEAN	35.2		34.7		42.7	
HIGHEST ANNUAL MEAN					72.5	1974
LOWEST ANNUAL MEAN					10.7	1977
HIGHEST DAILY MEAN	233	Apr 12	486	Feb 24	1070	Feb 23 1986
LOWEST DAILY MEAN	0.74	Aug 15	0.72	Aug 17	0.34	Aug 15 1998
ANNUAL SEVEN-DAY MINIMUM	0.76	Aug 12	0.74	Aug 13	0.41	Aug 11 1998
ANNUAL RUNOFF (AC-FT)	25460		25100		30950	
10 PERCENT EXCEEDS	112		98		121	
50 PERCENT EXCEEDS	14		9.7		12	
90 PERCENT EXCEEDS	0.89		0.89		1.0	

e Estimated

14033500 UMATILLA RIVER NEAR UMATILLA, OR

LOCATION.--Lat 45°54'11", long 119°19'33", in SW 1/4 NW 1/4 sec.21, T.5 N., R.28 E., Umatilla County, Hydrologic Unit 17070103, on left bank, 1.2 mi southeast of Umatilla, 1.6 mi downstream from West Extension main canal of Umatilla project, and at mile 2.1.

DRAINAGE AREA.--2,290 mi^2, approximately.

PERIOD OF RECORD.--October 1903 to current year.

REVISED RECORDS.--WSP 794: Drainage area. WSP 1398: 1909, 1911, 1914, 1928, 1935.

GAGE.--Water-stage recorder. Datum of gage is 330.47 ft above NGVD of 1929. Oct. 21, 1903, to Jan. 25, 1931, nonrecording gage.

REMARKS.--No estimated daily discharges. Records fair. Some regulation since 1927 by McKay Reservoir. Many diversions upstream from station for irrigation of lands upstream and downstream from station; Brownell Canal diverts downstream from station. Diversions since 1908 to Cold Springs Reservoir, an off-channel reservoir, capacity, 52,380 acre-ft. Continuous water-quality records for the period October 1962 to September 1969 have been collected at this location. U.S. Bureau of Reclamation satellite telemeter at station.

AVERAGE DISCHARGE.--75 years (water years 1928-2002), 476 ft^3/s, 344,800 acre-ft/yr. Water years prior to 1928 not included in computation of average discharge owing to increased regulation and diversion since 1927.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,800 ft^3/s Jan. 30, 1965, gage height, 10.75 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 24	2045	3,860	5.43	Apr, 15	0415	*5,900	*6.21
Mar. 25	1815	3,150	5.08				

Minimum discharge, 1.2 ft^3/s part or all of each day July 13, 14, 16, 18-20, 22-27, Aug. 1-3, 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	155	310	303	248	307	663	1370	640	283	172	1.5	98
2	174	320	299	245	303	546	1420	676	277	138	1.2	96
3	195	304	303	249	280	448	1110	728	261	132	1.6	93
4	194	297	326	308	282	372	962	696	221	137	1.6	99
5	197	290	342	404	342	319	1040	578	178	127	1.5	105
6	198	286	342	424	335	313	1390	512	190	105	1.4	98
7	205	283	328	404	342	311	1710	376	194	89	3.4	105
8	207	277	367	854	350	311	1530	301	202	72	1.5	114
9	206	284	393	1740	390	307	1380	285	227	63	1.4	107
10	211	286	401	1360	408	293	1620	313	255	28	1.5	104
11	224	282	368	943	403	281	2280	293	233	2.9	1.6	101
12	231	282	361	694	397	309	2420	294	196	2.3	1.5	99
13	229	280	338	583	388	781	2800	310	184	1.4	1.4	97
14	224	281	457	492	382	933	3250	362	181	1.4	2.5	101
15	222	284	929	418	380	798	4990	406	192	1.5	1.4	114
16	219	298	668	352	383	675	3030	342	191	1.3	30	110
17	218	310	503	344	394	590	2060	324	202	2.5	48	106
18	212	289	386	338	409	507	1500	339	203	1.6	47	105
19	211	268	316	428	407	480	1080	381	225	1.3	49	105
20	220	242	303	425	321	551	847	512	204	1.5	43	116
21	222	217	293	405	353	530	697	593	190	1.5	43	132
22	229	203	399	413	336	541	622	516	183	1.4	43	148
23	235	208	383	412	641	520	652	379	193	1.2	42	153
24	239	481	355	392	2650	600	660	316	194	2.9	84	151
25	258	461	330	381	2850	2340	543	261	192	1.4	95	151
26	270	397	306	553	1730	2540	639	251	193	1.3	85	153
27	266	354	290	557	1150	2000	648	268	197	1.3	82	153
28	266	330	287	413	835	1640	640	337	193	4.5	98	156
29	266	323	278	313	---	1320	567	438	222	2.6	107	157
30	271	308	264	330	---	1130	583	434	207	2.9	99	153
31	279	---	254	316	---	1130	---	366	---	3.1	97	---
TOTAL	6953	9035	11472	15738	17748	24079	44040	12827	6263	1104.8	1117.0	3580
MEAN	224	301	370	508	634	777	1468	414	209	35.6	36.0	119
MAX	279	481	929	1740	2850	2540	4990	728	283	172	107	157
MIN	155	203	254	245	280	281	543	251	178	1.2	1.2	93
AC-FT	13790	17920	22750	31220	35200	47760	87350	25440	12420	2190	2220	7100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 2002, BY WATER YEAR (WY)

MEAN	109	272	545	719	957	1155	1162	606	129	21.9	23.7	45.2
MAX	481	1302	1948	2366	3786	3678	3056	3362	805	149	95.0	153
(WY)	1928	1928	1974	1965	1996	1972	1958	1948	1950	1942	1993	1998
MIN	4.18	40.2	70.8	89.3	86.7	154	4.56	1.55	1.33	0.81	1.04	0.59
(WY)	1978	1932	1988	1930	1977	1977	1968	1977	1979	1985	1985	1987

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1928 - 2002	
ANNUAL TOTAL	134164.4		153956.8			
ANNUAL MEAN	368		422		476	
HIGHEST ANNUAL MEAN					1026	1997
LOWEST ANNUAL MEAN					77.5	1977
HIGHEST DAILY MEAN	1580	May 2	4990	Apr 15	15600	Jan 30 1965
LOWEST DAILY MEAN	2.8	Jul 19	1.2	Jul 23	0.00	Apr 20 1930
ANNUAL SEVEN-DAY MINIMUM	3.2	Jul 15	1.6	Jul 13	0.00	Oct 18 1931
ANNUAL RUNOFF (AC-FT)	266100		305400		344800	
10 PERCENT EXCEEDS	1000		850		1320	
50 PERCENT EXCEEDS	286		289		156	
90 PERCENT EXCEEDS	22		19		6.1	

14034470 WILLOW CREEK ABOVE WILLOW CREEK LAKE, NEAR HEPPNER, OR

LOCATION.--Lat 45°20'27", long 119°30'53", in NE 1/4 NE 1/4 sec.1, T.3 S., R.26 E., Morrow County, Hydrologic Unit 17070104, on right bank 1.5 mi southeast of Heppner, 1.7 mi upstream from Willow Creek dam, and at mile 54.1.

DRAINAGE AREA.--67.6 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 2,085.41 ft above NGVD of 1929 (levels by Corps of Engineers).

REMARKS.--No estimated daily discharges. Records fair. Many diversions for irrigation upstream from station. Part of flow of Ditch Creek (John Day River basin) is diverted to Willow Creek upstream from station. Chemical analysis May 1985 to September 1987.

AVERAGE DISCHARGE.--20 years (water years 1983-2002), 21.3 ft^3/s, 15,470 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 544 ft^3/s Feb. 1, 1997, gage height, 9.60 ft, from crest-stage gage; minimum discharge, no flow several days in August 2000, Aug. 27 to Oct. 7, 2001, and may have been no flow during period of no gage-height record July 31 to Sept. 14, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 140 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0345	*58	*6.05				

Minimum discharge, no flow part of or all of each day Oct. 1-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	6.9	2.8	2.9	5.9	9.6	24	2.6	4.8	2.3	0.19	0.57
2	0.00	5.8	2.9	4.1	5.3	9.3	24	1.5	5.2	2.4	0.16	0.48
3	0.00	5.1	2.8	6.9	5.1	8.9	21	1.3	4.9	2.4	0.16	0.44
4	0.00	4.1	2.5	6.2	4.6	9.4	21	1.8	4.6	2.4	0.53	0.42
5	0.00	3.6	2.7	5.6	4.9	8.9	25	1.9	5.0	2.3	0.31	0.43
6	0.00	3.7	2.6	6.0	4.8	9.5	34	3.3	4.7	2.1	0.20	0.62
7	0.19	3.8	3.3	12	5.3	11	34	7.8	4.4	1.9	0.17	0.88
8	0.56	3.4	2.9	18	8.5	9.3	31	8.7	3.2	1.7	0.48	1.0
9	0.94	3.6	2.8	15	7.1	9.3	28	6.1	5.7	1.6	0.45	1.0
10	2.2	2.7	2.5	11	6.8	9.1	36	6.9	8.3	1.4	1.1	1.2
11	7.1	1.5	3.1	9.7	6.4	9.3	40	6.5	8.2	1.3	0.95	1.1
12	6.0	1.7	2.9	9.0	4.9	12	44	5.9	7.1	0.98	0.95	1.1
13	3.0	1.5	3.2	8.7	6.6	12	43	5.3	9.3	0.25	0.90	1.1
14	2.1	1.9	5.6	8.0	5.5	12	55	5.0	7.2	0.23	0.74	1.1
15	0.83	2.6	4.3	5.9	5.4	12	50	5.1	6.5	0.29	0.65	1.3
16	0.30	2.9	4.1	7.1	6.1	11	43	4.4	5.7	0.30	0.62	1.6
17	0.29	3.3	4.4	6.9	5.8	11	36	4.9	5.7	0.30	0.55	1.8
18	0.39	3.0	4.1	6.4	5.8	11	29	5.4	8.3	0.31	0.52	2.0
19	0.83	2.7	3.9	6.4	6.0	11	23	5.4	7.4	0.30	0.61	1.5
20	1.1	2.5	3.6	6.0	6.2	11	19	8.1	6.0	0.31	0.60	1.2
21	1.7	2.7	3.1	5.9	6.1	13	17	7.9	5.8	0.32	0.61	1.0
22	2.0	3.0	2.2	5.4	9.6	12	15	7.6	5.1	0.31	0.63	0.98
23	3.1	2.8	3.5	5.2	22	13	14	7.2	5.1	0.29	0.59	0.99
24	2.0	2.6	2.8	5.4	25	13	13	6.8	4.5	0.28	0.59	0.56
25	0.72	3.0	2.1	5.8	14	13	10	6.2	3.5	0.28	0.67	0.31
26	0.76	3.0	2.4	6.6	16	14	6.1	5.0	3.0	0.28	0.57	0.32
27	0.81	2.3	2.9	3.5	13	15	8.0	5.3	2.9	0.29	0.63	0.35
28	0.86	2.3	3.0	3.0	13	16	9.4	8.5	2.6	0.30	0.62	0.41
29	1.4	3.0	2.9	3.6	---	17	8.0	7.7	2.8	0.29	0.61	0.50
30	4.1	3.0	2.9	5.3	---	18	4.7	6.7	2.6	0.25	0.60	0.52
31	7.2	---	2.9	6.2	---	20	---	4.8	---	0.22	0.75	---
TOTAL	50.48	94.0	97.7	217.7	235.7	370.6	765.2	171.6	160.1	28.18	17.71	26.78
MEAN	1.63	3.13	3.15	7.02	8.42	12.0	25.5	5.54	5.34	0.91	0.57	0.89
MAX	7.2	6.9	5.6	18	25	20	55	8.7	9.3	2.4	1.1	2.0
MIN	0.00	1.5	2.1	2.9	4.6	8.9	4.7	1.3	2.6	0.22	0.16	0.31
AC-FT	100	186	194	432	468	735	1520	340	318	56	35	53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	3.26	7.92	15.4	21.4	36.0	58.3	49.9	41.1	16.9	4.10	1.42	1.47
MAX	7.10	21.2	72.8	78.2	109	128	116	110	55.4	11.2	3.99	6.13
(WY)	1983	1987	1997	1997	1996	1993	1984	1995	1984	1993	1997	1984
MIN	0.20	2.79	3.15	6.68	7.52	9.81	11.9	2.73	1.60	0.88	0.010	0.000
(WY)	1989	1988	2002	1990	1994	1988	1992	1992	1992	1985	1988	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	3965.61		2235.75			
ANNUAL MEAN	10.9		6.13		21.3	
HIGHEST ANNUAL MEAN					44.3	1984
LOWEST ANNUAL MEAN					6.13	2002
HIGHEST DAILY MEAN	83	Apr 19	55	Apr 14	450	Feb 1 1997
LOWEST DAILY MEAN	0.00	Aug 28	0.00	Oct 1	0.00	Aug 11 2000
ANNUAL SEVEN-DAY MINIMUM	0.00	Aug 28	0.03	Oct 1	0.00	Aug 11 2000
ANNUAL RUNOFF (AC-FT)	7870		4430		15470	
10 PERCENT EXCEEDS	39		13		59	
50 PERCENT EXCEEDS	4.4		3.6		8.2	
90 PERCENT EXCEEDS	0.00		0.34		0.67	

14034480 BALM FORK NEAR HEPPNER, OR

LOCATION.--Lat 45°19'56", long 119°32'24", in NW 1/4 SE 1/4 sec.2, T.3 S., R.26 E., Morrow County, Hydrologic Unit 17070104, on right bank, 0.7 mi upstream from bridge on Willow Creek Road, 1.0 mi southeast of Heppner, 1.2 mi upstream from Willow Creek dam, and at mile 1.1.

DRAINAGE AREA.--26.3 mi^2.

PERIOD OF RECORD.--May 1982 to current year.

REVISED RECORDS.--WDR OR-83-1: Drainage area. WDR OR-88-1: 1987(M).

GAGE.--Water-stage recorder. Concrete control since Aug. 24, 1982. Datum of gage is 2,101.52 ft above NGVD of 1929 (Corps of Engineers bench mark).

REMARKS.--Records poor. Diversion for irrigation of about 170 acres upstream from station. Chemical analysis May 1985 to September 1987.

AVERAGE DISCHARGE.--20 years (water years 1983-2002), 2.62 ft^3/s, 1,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 190 ft^3/s Mar. 4, 1983, gage height, 4.90 ft, from rating curve extended above 82 ft^3/s on basis of slope-area measurement of peak flow; maximum gage height, 5.12 ft Dec. 29, 1996; no flow for part or all of several days in 1982, 1990, 1991, 1992, 2001, part of or all of each day Oct. 9, 2001 to Jan. 28, 2002, July 21 to Sept. 30, 2002.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, about 36,000 ft^3/s June 14, 1903, by computation of slope-area measurement (see WSP 96).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 60 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 3	0700	*0.81	*2.88				

Minimum discharge, no flow part of or all of each day Oct. 9 to Jan. 28, July 21 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.03	0.00	0.00	0.00	0.04	0.39	0.54	0.35	0.09	0.07	e0.00	0.00
2	0.03	0.00	0.00	0.00	0.04	0.31	0.65	0.33	0.09	0.07	e0.00	0.00
3	0.02	0.00	0.00	0.00	0.05	0.21	0.59	0.29	0.08	0.06	e0.00	0.00
4	0.02	0.00	0.00	0.00	0.05	0.24	0.35	0.27	0.07	0.06	e0.00	0.00
5	0.01	0.00	0.00	0.00	0.07	0.27	0.26	0.27	0.07	0.05	e0.00	0.00
6	0.01	0.00	0.00	0.00	0.08	0.31	0.21	0.29	0.06	0.05	e0.00	0.00
7	0.01	0.00	0.00	0.00	0.09	0.30	0.18	0.28	0.06	0.05	0.00	0.00
8	0.01	0.00	0.00	0.00	0.09	0.31	0.16	0.24	0.07	0.04	0.00	0.00
9	0.00	0.00	0.00	0.00	0.09	0.32	0.17	0.22	0.09	0.04	0.00	0.00
10	0.00	0.00	0.00	0.00	0.11	0.29	0.17	0.23	0.09	0.04	0.00	0.00
11	0.01	0.00	0.00	0.00	0.11	0.27	0.21	0.21	0.12	0.04	0.00	0.00
12	0.00	0.00	0.00	0.00	0.12	0.31	0.26	0.21	0.11	0.04	0.00	0.00
13	0.00	0.00	0.00	0.00	0.11	0.31	0.25	0.19	0.11	0.03	0.00	0.00
14	0.00	0.00	0.00	0.00	0.11	0.31	0.32	0.19	0.11	0.03	0.00	0.00
15	0.00	0.00	0.00	0.00	0.13	0.33	0.26	0.19	0.11	0.03	0.00	0.00
16	0.00	0.00	0.00	0.00	0.14	0.35	0.25	0.18	0.11	0.02	0.00	0.00
17	0.00	0.00	0.00	0.00	0.15	0.35	0.25	0.16	0.12	0.02	0.00	0.00
18	0.00	0.00	0.00	0.00	0.16	0.36	0.25	0.15	0.17	0.01	0.00	0.00
19	0.00	0.00	0.00	0.00	0.16	0.36	0.22	0.14	0.17	0.01	0.00	0.00
20	0.00	0.00	0.00	0.00	0.25	0.36	0.19	0.14	0.22	0.01	0.00	0.00
21	0.00	0.00	0.00	0.00	0.30	0.36	0.18	0.13	0.28	0.01	0.00	0.00
22	0.00	0.00	0.00	0.00	0.30	0.37	0.17	0.13	0.21	0.01	0.00	0.00
23	0.00	0.00	0.00	0.00	0.38	0.32	0.21	0.13	0.17	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.33	0.27	0.23	0.12	0.14	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.34	0.26	0.23	0.11	0.12	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.37	0.28	0.25	0.11	0.12	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.39	0.30	0.27	0.12	0.11	0.00	0.00	0.00
28	0.00	0.00	0.00	0.01	0.41	0.35	0.30	0.12	0.11	0.00	0.00	0.00
29	0.00	0.00	0.00	0.01	---	0.40	0.33	0.10	0.10	0.00	0.00	0.00
30	0.00	0.00	0.00	0.02	---	0.42	0.33	0.10	0.09	e0.00	0.00	0.00
31	0.00	---	0.00	0.03	---	0.44	---	0.09	---	e0.00	0.00	---
TOTAL	0.15	0.00	0.00	0.07	4.97	10.03	8.24	5.79	3.57	0.79	0.00	0.00
MEAN	0.005	0.000	0.000	0.002	0.18	0.32	0.27	0.19	0.12	0.025	0.000	0.000
MAX	0.03	0.00	0.00	0.03	0.41	0.44	0.65	0.35	0.28	0.07	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.04	0.21	0.16	0.09	0.06	0.00	0.00	0.00
AC-FT	0.3	0.00	0.00	0.1	9.9	20	16	11	7.1	1.6	0.00	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	0.32	0.87	2.44	3.32	5.69	8.37	4.39	3.93	1.57	0.37	0.14	0.18
MAX	1.53	3.97	20.1	12.3	19.2	21.0	16.4	13.0	5.95	1.24	0.51	1.02
(WY)	1985	1997	1997	1997	1996	1993	1984	1995	1998	1993	1984	1984
MIN	0.000	0.000	0.000	0.002	0.18	0.32	0.27	0.19	0.077	0.025	0.000	0.000
(WY)	1992	2002	2002	2002	2002	2002	2002	2002	1992	2002	2002	2002

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	243.34		33.61			
ANNUAL MEAN	0.67		0.092		2.62	
HIGHEST ANNUAL MEAN					6.23	1997
LOWEST ANNUAL MEAN					0.092	2002
HIGHEST DAILY MEAN	6.3	Apr 21	0.65	Apr 2	80	Feb 22 1986
LOWEST DAILY MEAN	0.00	Aug 17	0.00	Oct 9	0.00	Dec 25 1990
ANNUAL SEVEN-DAY MINIMUM	0.00	Sep 3	0.00	Oct 12	0.00	Sep 18 1991
ANNUAL RUNOFF (AC-FT)	483		67		1900	
10 PERCENT EXCEEDS	1.9		0.30		7.3	
50 PERCENT EXCEEDS	0.08		0.01		0.72	
90 PERCENT EXCEEDS	0.00		0.00		0.03	

e Estimated

14034490 WILLOW CREEK LAKE AT HEPPNER, OR

LOCATION.--Lat 45°20'50", long 119°32'37", in NW 1/4 SE 1/4 sec.35, T.2 S., R.26 E., Morrow County, Hydrologic Unit 17070104, U.S. Corps of Engineers land, on top left side of spillway on dam on Willow Creek, 2,000 ft upstream from Court Street bridge and at mile 52.4.

DRAINAGE AREA.--96.6 mi^2.

PERIOD OF RECORD.--February 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Corps of Engineers). Prior to Dec. 22, 1983, nonrecording gage at nearby site at present datum. U.S. Geological Survey satellite telemeter at station.

REMARKS.--Lake is formed behind roller-compacted, concrete dam; storage began Feb. 16, 1983. Capacity, 14,020 acre-ft between elevations 2,000.0 ft, sill of outlet gates, and 2,113.5 ft, crest of spillway. Average minimum lake elevation 2,047.0 ft, storing 2,540 acre-ft. Dead storage, 73 acre-ft below elevation 2,000.0 ft. Reservoir used for flood control. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Capacity table furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 7,340 acre-ft May 8, 1995, elevation, 2,083.06 ft; no usable contents at times.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 5,450 acre-ft Oct. 1, elevation, 2,071.21 ft; minimum contents, 4,240 acre-ft Dec. 26-31, elevation, 2,062.33 ft.

Capacity table (elevation, in feet, and total contents, in acre-feet)

2,050	2,840	2,060	3,950	2,070	5,280	2,080	6,820
2,055	3,370	2,065	4,590	2,075	6,020		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2071.15	2070.24	2062.72	2062.35	2063.31	2064.23	2068.59	2069.61	2070.60	2070.43	2068.91	2067.17
2	2071.10	2070.24	2062.60	2062.38	2063.33	2064.12	2068.77	2069.58	2070.59	2070.40	2068.83	2067.11
3	2071.05	2070.24	2062.48	2062.45	2063.27	2064.01	2068.93	2069.54	2070.58	2070.36	2068.77	2067.06
4	2071.00	2070.23	2062.44	2062.50	2063.25	2064.04	2069.08	2069.53	2070.56	2070.34	2068.70	2067.00
5	2070.95	2070.21	2062.41	2062.59	2063.23	2064.16	2069.21	2069.51	2070.53	2070.32	2068.64	2066.93
6	2070.90	2070.19	2062.39	2062.64	2063.22	2064.30	2069.39	2069.51	2070.50	2070.30	2068.57	2066.88
7	2070.85	2070.17	2062.40	2062.73	2063.22	2064.46	2069.55	2069.56	2070.46	2070.28	2068.52	2066.82
8	2070.80	2069.89	2062.37	2062.95	2063.25	2064.58	2069.71	2069.64	2070.44	2070.24	2068.48	2066.78
9	2070.75	2069.54	2062.34	2063.10	2063.26	2064.71	2069.87	2069.67	2070.48	2070.21	2068.44	2066.74
10	2070.73	2069.18	2062.35	2063.22	2063.28	2064.83	2069.99	2069.73	2070.51	2070.19	2068.38	2066.68
11	2070.69	2068.83	2062.35	2063.31	2063.27	2064.95	2070.14	2069.78	2070.55	2070.15	2068.34	2066.60
12	2070.68	2068.47	2062.36	2063.39	2063.26	2065.13	2070.21	2069.82	2070.58	2070.12	2068.29	2066.53
13	2070.64	2068.14	2062.36	2063.46	2063.26	2065.29	2070.18	2069.84	2070.64	2070.05	2068.23	2066.45
14	2070.61	2067.78	2062.38	2063.49	2063.26	2065.46	2070.27	2069.87	2070.66	2069.99	2068.17	2066.37
15	2070.58	2067.42	2062.40	2063.48	2063.25	2065.60	2070.34	2069.89	2070.67	2069.93	2068.11	2066.28
16	2070.54	2067.09	2062.42	2063.49	2063.25	2065.77	2070.34	2069.91	2070.65	2069.88	2068.05	2066.20
17	2070.50	2066.75	2062.40	2063.50	2063.26	2065.91	2070.29	2069.94	2070.67	2069.82	2067.97	2066.13
18	2070.46	2066.42	2062.41	2063.52	2063.26	2066.06	2070.23	2069.97	2070.74	2069.76	2067.92	2066.07
19	2070.43	2066.09	2062.42	2063.51	2063.25	2066.21	2070.19	2070.03	2070.77	2069.69	2067.86	2066.02
20	2070.40	2065.76	2062.43	2063.50	2063.27	2066.34	2070.10	2070.10	2070.78	2069.64	2067.80	2065.95
21	2070.38	2065.45	2062.41	2063.49	2063.27	2066.52	2069.96	2070.15	2070.78	2069.60	2067.75	2065.89
22	2070.37	2065.09	2062.40	2063.47	2063.33	2066.70	2069.87	2070.19	2070.77	2069.55	2067.70	2065.84
23	2070.36	2064.75	2062.40	2063.47	2063.59	2066.88	2069.80	2070.24	2070.77	2069.49	2067.65	2065.78
24	2070.33	2064.41	2062.38	2063.47	2063.87	2067.06	2069.76	2070.30	2070.75	2069.44	2067.60	2065.73
25	2070.30	2064.07	2062.35	2063.46	2064.02	2067.23	2069.69	2070.34	2070.72	2069.38	2067.54	2065.68
26	2070.27	2063.73	2062.33	2063.48	2064.18	2067.43	2069.62	2070.37	2070.68	2069.29	2067.49	2065.62
27	2070.24	2063.39	2062.33	2063.42	2064.32	2067.61	2069.67	2070.45	2070.63	2069.23	2067.45	2065.57
28	2070.21	2063.19	2062.33	2063.36	2064.34	2067.77	2069.68	2070.55	2070.59	2069.17	2067.39	2065.53
29	2070.20	2062.99	2062.33	2063.33	---	2067.95	2069.65	2070.60	2070.54	2069.10	2067.33	2065.46
30	2070.21	2062.89	2062.33	2063.32	---	2068.14	2069.62	2070.63	2070.49	2069.03	2067.27	2065.41
31	2070.23	---	2062.34	2063.32	---	2068.36	---	2070.62	---	2068.97	2067.22	---
MAX	2071.15	2070.24	2062.72	2063.52	2064.34	2068.36	2070.34	2070.63	2070.78	2070.43	2068.91	2067.17
MIN	2070.20	2062.89	2062.33	2062.35	2063.22	2064.01	2068.59	2069.51	2070.44	2068.97	2067.22	2065.41
(†)	5310	4310	4240	4370	4500	5040	5220	5360	5340	5130	4880	4640
(‡)	-140	-1000	-70	+130	+130	+540	+180	+140	-20	-210	-250	-240

CAL YR 2001 MAX 2077.71 MIN 2062.33 AC-FT‡ 4370
WTR YR 2002 MAX 2071.15 MIN 2062.33 AC-FT‡ 5450

† Contents, in acre-feet, at 2400, on last day of month.
‡ Change in contents, in acre-feet.

14034500 WILLOW CREEK AT HEPPNER, OR

LOCATION.--Lat 45°21'02", long 119°32'56", in SE 1/4 NW 1/4 sec.35, T.2 S., R.26 E., Morrow County, Hydrologic Unit 17070104, on right bank at Heppner, 100 ft upstream from Court Street bridge, 800 ft southeast of Morrow County courthouse, 0.2 mi downstream from Willow Creek Dam and at mile 52.2.

DRAINAGE AREA.--96.8 mi^2.

PERIOD OF RECORD.--May 1951 to current year.

REVISED RECORDS.--WDR OR-83-1: Drainage area.

GAGE.--Water-stage recorder. Concrete control since September 1985. Datum of gage is 1,952.73 ft above NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Willow Creek Lake, 0.2 mi upstream, since Feb. 16, 1983. Many diversions for irrigation upstream from station. Part of flow of Ditch Creek (John Day River basin) is diverted to Willow Creek upstream from station. Continuous water-quality records for the period February 1963 to June 1968 and March 1972 to September 1973 have been collected at this location. Chemical analysis Oct. 1984 to September 1987.

AVERAGE DISCHARGE.--31 years (water years 1952-82), 19.1 ft^3/s, 13,840 acre-ft/yr.
20 years (water years 1983-2002), 22.3 ft^3/s, 16,120 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 812 ft^3/s May 10, 1957, gage height, 6.15 ft, from rating curve extended above 230 ft^3/s; maximum gage height, 6.46 ft May 25, 1971, backwater from Shobe Canyon; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, about 36,000 ft^3/s June 14, 1903, result of slope-area measurement (see WSP 96). Discharge for flood of Feb. 22, 1949, was 1,700 ft^3/s, result of slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34 ft^3/s Apr. 12-14, gage height, 3.61 ft; minimum discharge, 1.5 ft^3/s July 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	2.6	9.2	3.6	5.5	15	7.6	3.2	4.6	4.8	3.0	2.6
2	2.5	2.6	9.2	3.7	5.5	15	9.7	2.5	4.6	3.4	3.0	2.6
3	2.5	2.6	9.2	3.6	5.5	15	9.7	2.7	4.7	2.2	2.9	2.6
4	2.5	2.6	6.0	3.5	5.5	8.5	10	2.7	4.9	2.7	2.9	2.6
5	2.5	2.6	4.1	3.5	5.5	2.7	13	2.8	4.9	2.7	2.9	2.6
6	2.6	2.6	4.1	3.5	5.5	2.7	15	2.8	4.9	2.7	3.0	2.6
7	2.6	2.6	4.1	3.4	5.5	2.7	15	2.8	4.9	2.7	2.8	2.2
8	2.6	16	4.1	3.4	5.5	2.6	15	2.8	4.9	2.7	4.6	2.1
9	2.6	22	4.1	3.4	5.5	2.6	15	2.8	5.0	2.7	5.9	2.1
10	2.6	22	4.1	3.4	5.5	2.6	18	2.8	5.0	2.9	5.6	3.1
11	2.6	22	4.2	3.4	5.5	2.6	21	2.8	5.0	2.7	3.6	4.2
12	2.6	22	4.2	3.4	5.6	2.7	27	2.8	5.0	2.7	2.4	4.3
13	2.6	22	4.1	3.4	5.7	2.7	34	2.7	4.8	2.7	2.6	4.3
14	2.5	22	4.2	4.5	5.7	2.7	33	2.7	4.8	2.7	2.5	4.3
15	2.5	22	4.2	5.4	5.7	2.7	31	2.7	4.8	2.7	2.5	4.3
16	2.6	22	4.1	5.4	5.7	2.7	30	2.7	4.8	2.8	2.5	4.3
17	2.5	22	4.1	5.4	5.7	2.6	31	2.6	4.9	2.9	2.4	4.0
18	2.5	22	4.2	5.4	5.7	2.7	27	2.6	5.0	2.7	2.5	3.3
19	2.6	22	4.2	5.4	5.7	2.7	23	2.6	4.9	2.7	2.5	3.1
20	2.5	22	4.2	5.4	5.7	2.7	23	2.7	4.9	2.7	2.5	3.0
21	2.6	22	4.2	5.4	5.7	2.7	23	2.7	4.9	3.0	2.5	2.9
22	2.6	22	4.2	5.4	5.7	2.5	18	2.7	4.9	2.8	2.7	2.8
23	2.6	22	4.2	5.4	5.7	2.3	16	2.7	4.9	2.8	2.5	2.8
24	2.6	22	4.2	5.4	5.7	2.4	15	2.7	4.9	2.9	2.4	2.8
25	2.6	21	4.2	5.4	5.7	2.4	14	2.7	4.9	2.8	2.4	2.7
26	2.6	21	4.2	5.5	5.7	2.4	9.7	2.7	4.9	3.3	2.5	2.8
27	2.6	21	4.2	5.5	5.7	3.4	4.9	2.7	4.9	3.0	2.6	2.7
28	2.6	15	3.9	5.5	11	5.5	7.4	2.8	4.9	3.0	2.6	2.7
29	2.7	11	3.6	5.5	---	5.5	8.6	2.6	4.9	3.0	2.6	2.7
30	2.7	9.8	3.6	5.5	---	5.5	6.3	3.7	4.9	3.0	2.6	2.7
31	2.6	---	3.6	5.5	---	5.5	---	4.6	---	3.0	2.5	---
TOTAL	79.8	485.0	144.0	142.1	162.6	136.3	530.9	87.4	146.3	89.4	90.5	91.8
MEAN	2.57	16.2	4.65	4.58	5.81	4.40	17.7	2.82	4.88	2.88	2.92	3.06
MAX	2.7	22	9.2	5.5	11	15	34	4.6	5.0	4.8	5.9	4.3
MIN	2.5	2.6	3.6	3.4	5.5	2.3	4.9	2.5	4.6	2.2	2.4	2.1
AC-FT	158	962	286	282	323	270	1050	173	290	177	180	182

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	7.21	13.0	14.7	25.1	32.2	51.3	47.4	43.7	18.8	5.97	4.40	3.98
MAX	15.6	26.3	48.3	110	110	115	152	127	54.2	10.5	14.3	12.4
(WY)	1994	1997	1997	1996	1983	1984	1995	1984	1993	1992	1988
MIN	1.93	1.69	2.65	3.40	5.81	4.40	10.4	2.15	2.17	2.39	2.34	2.56
(WY)	1992	1992	1993	1991	2002	2002	1994	1992	1992	1987	1983	1991

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	3755.3		2186.1			
ANNUAL MEAN	10.3		5.99		22.3	
HIGHEST ANNUAL MEAN					45.5	1984
LOWEST ANNUAL MEAN					5.99	2002
HIGHEST DAILY MEAN	68	Apr 29	34	Apr 13	306	May 6 1983
LOWEST DAILY MEAN	2.5	Oct 1	2.1	Sep 8	0.48	Aug 4 1983
ANNUAL SEVEN-DAY MINIMUM	2.5	Oct 1	2.4	Sep 3	1.3	Aug 1 1983
ANNUAL RUNOFF (AC-FT)	7450		4340		16120	
10 PERCENT EXCEEDS	22		15		55	
50 PERCENT EXCEEDS	4.7		3.6		9.4	
90 PERCENT EXCEEDS	2.7		2.6		2.8	

Figure 13. Location of surface-water and water-quality stations in the John Day River Basin.

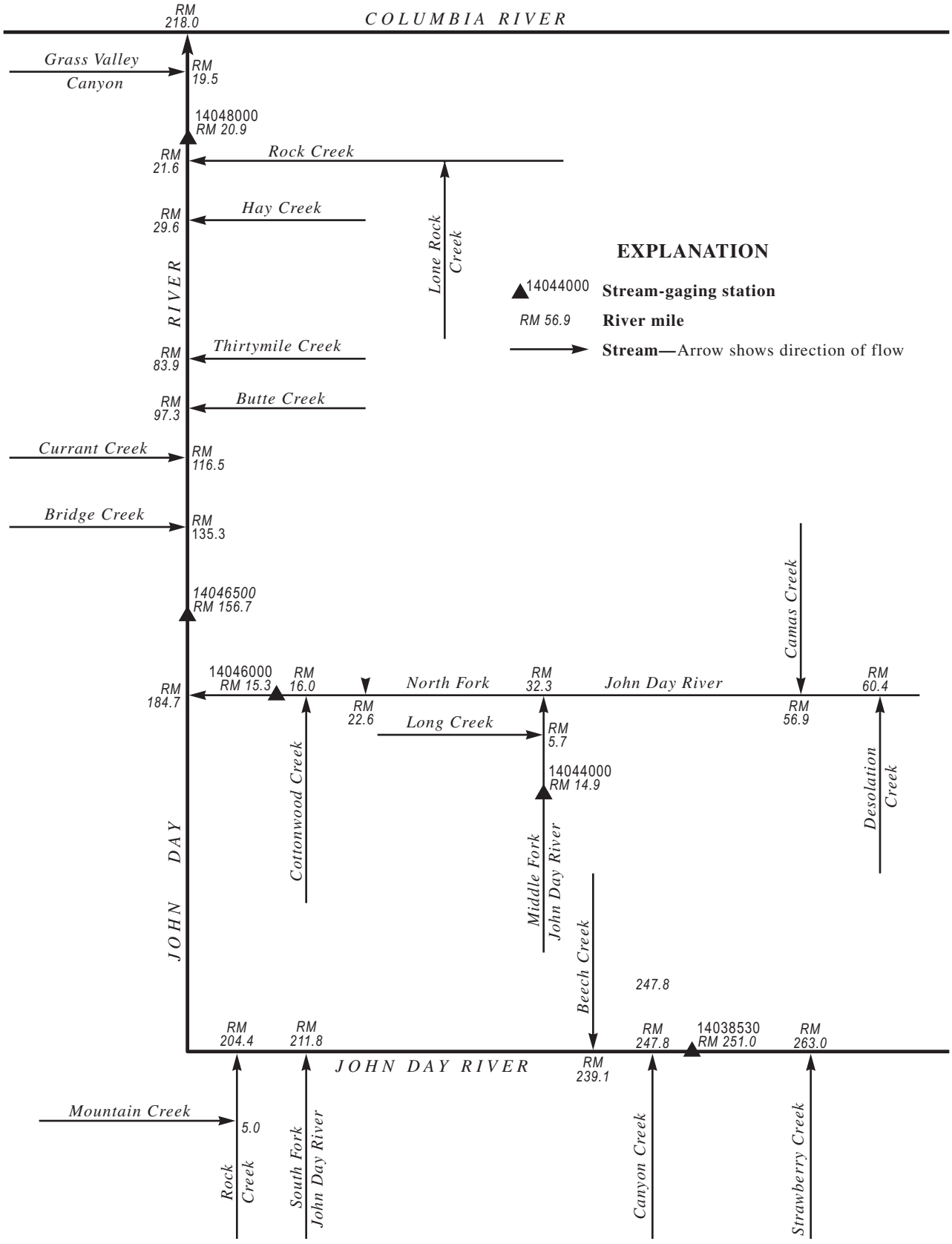


Figure 14. Schematic diagram showing gaging stations in the John Day River Basin.

14038530 JOHN DAY RIVER NEAR JOHN DAY, OR

LOCATION.--Lat 44°25'07", long 118°54'19", in SW 1/4 SE 1/4 sec.19, T.13 S., R.32 E., Grant County, Hydrologic Unit 17070101, on left bank 1,200 ft downstream from Dog Creek, 2.5 mi east of John Day, and at mile 250.8.

DRAINAGE AREA.--386 mi^2.

PERIOD OF RECORD.--October 1968 to September 1994, May 1996 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,130.56 ft above NGVD of 1929.

REMARKS.--No estimated daily discharges. Records good except those below 10 ft^3/s, which are poor. No regulation upstream. Many diversions upstream from station for irrigation.

AVERAGE DISCHARGE.--32 years (water years 1969-94, 1997-2002), 201 ft^3/s, 145,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,830 ft^3/s June 9, 1969, gage height, 10.80 ft, from floodmark; minimum discharge, 3.5 ft^3/s Aug. 26-28, 1969.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	2100	*773	*5.66				

Minimum discharge, 6.5 ft^3/s Aug. 20, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	102	111	110	119	121	233	201	335	54	29	23
2	86	100	112	134	109	119	250	207	330	52	29	25
3	87	97	111	170	108	118	247	228	267	51	27	26
4	87	94	106	148	104	121	253	229	233	52	24	26
5	86	94	109	135	106	122	281	224	212	54	28	23
6	85	94	121	164	111	133	322	215	201	53	28	24
7	87	94	131	250	118	146	317	202	195	49	28	28
8	90	93	116	240	153	132	295	195	188	47	28	31
9	91	92	115	201	127	127	330	171	217	48	28	34
10	90	92	110	173	119	127	393	155	235	45	24	34
11	113	92	114	159	121	129	391	141	194	42	23	29
12	99	92	111	150	116	138	399	117	164	39	22	27
13	93	94	116	141	117	140	429	110	142	32	23	26
14	90	111	148	136	116	137	685	117	121	31	19	28
15	90	108	126	129	113	134	711	118	120	30	14	28
16	89	100	123	122	114	133	573	119	117	33	13	29
17	88	103	142	125	121	134	482	110	107	35	12	38
18	87	100	130	120	133	126	406	125	151	35	11	45
19	87	98	125	123	144	147	355	154	133	36	11	44
20	86	98	123	121	150	166	321	226	118	41	9.7	43
21	86	125	117	126	148	172	292	240	116	38	9.0	43
22	90	129	108	118	168	173	266	213	106	36	11	44
23	111	120	114	117	186	211	259	175	90	39	14	44
24	95	112	101	115	176	211	245	148	82	36	14	43
25	93	113	93	126	144	193	234	148	68	34	13	41
26	91	109	112	136	143	190	232	173	57	34	12	42
27	90	103	112	118	136	196	232	203	61	31	15	42
28	92	105	111	84	136	194	219	234	57	32	19	48
29	91	110	107	86	---	198	208	299	58	32	21	63
30	99	108	107	126	---	201	203	332	56	31	19	74
31	112	---	108	127	---	217	---	329	---	29	22	---
TOTAL	2840	3082	3590	4330	3656	4806	10063	5858	4531	1231	599.7	1095
MEAN	91.6	103	116	140	131	155	335	189	151	39.7	19.3	36.5
MAX	113	129	148	250	186	217	711	332	335	54	29	74
MIN	79	92	93	84	104	118	203	110	56	29	9.0	23
AC-FT	5630	6110	7120	8590	7250	9530	19960	11620	8990	2440	1190	2170

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1969 - 2002, BY WATER YEAR (WY)

MEAN	95.8	126	160	205	226	310	340	427	316	107	42.1	55.1
MAX	156	244	435	613	689	746	718	845	810	314	116	145
(WY)	1983	1974	1997	1997	1982	1984	1984	1984	1982	1982	1984	1984
MIN	65.8	87.5	90.0	88.1	88.8	88.6	88.1	85.4	53.9	25.9	10.4	24.2
(WY)	1989	1979	1989	1977	1977	1977	1977	1992	1992	1973	1973	1990

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1969 - 2002	
ANNUAL TOTAL	40055.3		45681.7			
ANNUAL MEAN	110		125		201	
HIGHEST ANNUAL MEAN					393	1984
LOWEST ANNUAL MEAN					73.5	1977
HIGHEST DAILY MEAN	428	Apr 28	711	Apr 15	2640	May 19 1991
LOWEST DAILY MEAN	5.7	Aug 22	9.0	Aug 21	3.5	Aug 27 1969
ANNUAL SEVEN-DAY MINIMUM	7.3	Aug 21	11	Aug 16	4.3	Aug 24 1969
ANNUAL RUNOFF (AC-FT)	79450		90610		145500	
10 PERCENT EXCEEDS	206		233		450	
50 PERCENT EXCEEDS	104		112		129	
90 PERCENT EXCEEDS	30		28		39	

14044000 MIDDLE FORK JOHN DAY RIVER AT RITTER, OR

LOCATION.--Lat 44°53'20", long 119°08'25", in SW 1/4 NW 1/4 sec.8, T.8 S., R.30 E., Grant County, Hydrologic Unit 17070203, on left bank 0.2 mi south of Ritter, 0.8 mi downstream from Twelvemile Creek, and at mile 14.9.

DRAINAGE AREA.--515 mi^2.

PERIOD OF RECORD.--October 1929 to current year.

REVISED RECORDS.--WSP 739: 1931. WSP 1218: 1950. WSP 1448: 1930-32, 1937, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,544.56 ft above NGVD of 1929.

REMARKS.--Records good except those for the period Dec. 1 to Mar. 5 which are fair, and estimated daily discharges, which are poor. No regulation. Diversions for irrigation upstream from station. Continuous water-quality records for the period July 1966 to September 1968 have been collected at this location.

AVERAGE DISCHARGE.--73 years (water years 1930-2002), 256 ft^3/s, 185,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,730 ft^3/s Jan. 30, 1965, gage height, 8.39 ft, from rating curve extended above 2,200 ft^3/s; maximum gage height, 9.13 ft Feb. 1, 1963, ice jam; minimum discharge, 0.90 ft^3/s Aug. 19, 20, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1600	*2,440	*6.25				

Minimum daily discharge, 20 ft^3/s Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	58	53	e65	e76	119	812	624	410	77	30	30
2	28	52	45	66	e70	106	892	657	376	73	30	28
3	28	47	51	66	e68	105	776	687	336	69	30	28
4	27	44	41	62	e66	110	780	613	309	66	31	26
5	28	42	50	58	e64	113	875	583	293	64	33	26
6	28	41	52	63	e66	125	997	522	274	62	35	27
7	28	40	56	160	e70	204	913	494	245	60	34	29
8	29	39	48	233	e74	173	820	457	221	58	33	30
9	30	37	53	166	e74	141	867	420	224	55	32	30
10	30	39	45	116	e72	140	1330	380	245	52	30	29
11	39	39	50	106	e64	151	1310	362	234	50	30	27
12	53	39	52	96	e66	278	1240	368	199	47	28	26
13	40	40	54	90	e66	283	1330	412	180	47	27	26
14	36	43	70	79	e64	233	2220	431	167	48	27	23
15	34	55	67	71	e68	197	2200	438	162	46	26	23
16	33	49	64	66	74	181	1520	436	152	44	26	24
17	33	48	66	69	82	166	1140	442	143	44	26	28
18	33	49	52	72	98	138	890	454	191	42	25	37
19	33	45	48	73	118	163	754	468	181	41	25	36
20	33	44	e76	69	126	183	660	544	147	41	26	31
21	33	46	e40	73	130	216	594	483	132	40	27	29
22	38	56	e38	66	188	286	569	442	124	39	30	28
23	55	59	e36	67	335	465	586	388	115	40	31	28
24	55	54	e30	68	348	498	555	358	108	39	33	28
25	43	50	e28	72	200	447	553	349	100	37	33	28
26	40	49	e40	82	162	514	576	356	94	37	36	27
27	39	43	e50	e50	153	612	590	392	96	37	38	28
28	40	e20	e62	e46	153	575	559	430	88	35	33	29
29	40	e30	e60	e50	---	613	552	467	85	34	35	30
30	43	e50	e64	e70	---	652	589	497	81	32	31	32
31	53	---	63	e82	---	747	---	444	---	31	30	---
TOTAL	1132	1347	1604	2572	3195	8934	28049	14398	5712	1487	941	851
MEAN	36.5	44.9	51.7	83.0	114	288	935	464	190	48.0	30.4	28.4
MAX	55	59	76	233	348	747	2220	687	410	77	38	37
MIN	27	20	28	46	64	105	552	349	81	31	25	23
AC-FT	2250	2670	3180	5100	6340	17720	55640	28560	11330	2950	1870	1690

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2002, BY WATER YEAR (WY)

MEAN	44.4	73.5	129	164	247	471	750	705	346	80.2	32.5	32.3
MAX	99.5	231	482	727	1073	1214	1426	1457	1127	285	98.4	108
(WY)	1983	1974	1956	1997	1996	1972	1984	1984	1984	1984	1984	1984
MIN	17.4	20.2	29.0	23.4	31.3	69.8	175	79.2	56.6	17.4	3.75	10.0
(WY)	1937	1937	1933	1937	1937	1977	1968	1934	1992	1973	1966	1935

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1930 - 2002	
ANNUAL TOTAL	46206		70222			
ANNUAL MEAN	127		192		256	
HIGHEST ANNUAL MEAN					538	1984
LOWEST ANNUAL MEAN					85.1	1977
HIGHEST DAILY MEAN	895	Apr 28	2220	Apr 14	4360	Jan 30 1965
LOWEST DAILY MEAN	20	Aug 28	20	Nov 28	0.90	Aug 20 1966
ANNUAL SEVEN-DAY MINIMUM	20	Aug 30	25	Sep 11	1.1	Aug 19 1966
ANNUAL RUNOFF (AC-FT)	91650		139300		185300	
10 PERCENT EXCEEDS	386		563		724	
50 PERCENT EXCEEDS	56		64		90	
90 PERCENT EXCEEDS	26		29		26	

e Estimated

14046000 NORTH FORK JOHN DAY RIVER AT MONUMENT, OR

LOCATION.--Lat 44°48'50", long 119°25'50", in SE 1/4 sec.2, T.9 S., R.27 E., Grant County, Hydrologic Unit 17070202, on right bank just downstream from entrance to canyon, 0.7 mi downstream from Cottonwood Creek, 0.8 mi west of Monument, and at mile 15.3.

DRAINAGE AREA.--2,520 mi^2, approximately.

PERIOD OF RECORD.--March 1925 to current year. Monthly discharge only for some periods 1925-28, published in WSP 1318.

REVISED RECORDS.--WSP 754: 1932(M). WSP 1448: 1927, 1931(M), 1949.

GAGE.--Water-stage recorder. Datum of gage is 1,959.64 ft above NGVD of 1929. Prior to Nov. 24, 1925, nonrecording gage and Nov. 24, 1925, to Oct. 16, 1928, water-stage recorder at datum 1.10 ft higher. Oct. 17, 1928, to Sept. 30, 1930, water-stage recorder at datum 1.00 ft higher.

REMARKS.--No estimated daily discharges. Records good except those for the period Nov. 12 through Feb. 28, which are fair. Very slight regulation by small reservoirs upstream. Many small diversions for irrigation upstream from station. Continuous water-quality records for the period July 1966 to September 1968 have been collected at this location. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--74 years (water years 1929-2002), 1,295 ft^3/s, 938,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,400 ft^3/s Jan. 30, 1965, gage height, 18.45 ft, from rating curve extended above 17,000 ft^3/s; minimum discharge, 6 ft^3/s sometime during period Nov. 2-13, 1936 (result of freezeup); minimum daily, 17 ft^3/s Dec. 12, 1932.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	2330	*10,300	*10.14	No other peak greater than base discharge.			

Minimum discharge, 56 ft^3/s Aug. 18-20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	89	272	235	369	476	865	4040	3040	1900	372	92	82
2	84	251	229	393	461	774	4290	3240	1770	345	90	79
3	81	216	210	695	418	700	3830	3450	1570	319	86	75
4	80	191	222	705	399	688	3820	3140	1450	295	83	73
5	78	176	193	614	380	715	4320	2890	1370	281	87	71
6	78	166	234	609	374	732	4920	2600	1310	267	90	69
7	78	159	283	1540	414	1070	4690	2360	1210	250	99	71
8	80	147	263	2700	447	990	4240	2170	1090	240	96	75
9	82	128	254	2120	455	861	4250	1950	1050	232	92	78
10	85	134	256	1450	440	818	5380	1780	1190	219	86	79
11	108	141	244	1160	436	827	5730	1650	1290	203	80	77
12	131	139	260	1030	378	1460	5660	1640	1090	187	77	74
13	188	146	278	919	383	1800	6080	1800	965	175	72	70
14	141	154	606	805	386	1500	8600	2060	902	176	68	68
15	123	169	621	685	378	1300	9120	2150	889	174	63	63
16	116	210	542	593	392	1180	6600	2120	870	169	63	62
17	109	201	713	542	417	1090	5100	2130	832	159	61	70
18	105	196	788	553	454	974	4140	2160	881	156	58	78
19	102	193	551	538	530	968	3450	2250	1040	148	57	103
20	100	177	526	518	648	1030	3010	2570	842	142	58	106
21	101	201	518	521	670	1210	2710	2430	733	144	63	93
22	110	234	405	487	953	1260	2610	2170	674	134	65	86
23	140	248	301	441	1900	1560	2760	1850	628	127	75	82
24	252	244	279	447	2680	1910	2670	1650	581	125	92	81
25	219	222	249	458	1590	1940	2640	1580	537	124	86	78
26	167	201	209	534	1270	2240	2770	1590	494	119	94	77
27	150	200	269	497	1160	2650	2900	1780	471	117	94	76
28	148	173	322	315	1090	2660	2780	2050	458	115	114	77
29	154	113	378	266	---	2850	2620	2220	421	106	97	80
30	171	136	354	288	---	3060	2790	2400	402	101	98	87
31	188	---	379	429	---	3570	---	2140	---	96	90	---
TOTAL	3838	5538	11171	23221	19979	45252	128520	69010	28910	5817	2526	2340
MEAN	124	185	360	749	714	1460	4284	2226	964	188	81.5	78.0
MAX	252	272	788	2700	2680	3570	9120	3450	1900	372	114	106
MIN	78	113	193	266	374	688	2610	1580	402	96	57	62
AC-FT	7610	10980	22160	46060	39630	89760	254900	136900	57340	11540	5010	4640

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2002, BY WATER YEAR (WY)

MEAN	161	316	721	948	1455	2460	3641	3580	1657	379	133	121
MAX	420	1621	3374	4126	6103	6456	6695	8794	5227	1211	345	423
(WY)	1983	1974	1965	1965	1996	1983	1943	1948	1948	1982	1984	1984
MIN	58.5	64.5	96.6	75.8	134	345	822	378	259	97.4	36.6	45.2
(WY)	1937	1937	1937	1937	1929	1977	1968	1934	1992	1973	1931	1934

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1929 - 2002	
ANNUAL TOTAL	229175		346122			
ANNUAL MEAN	628		948		1295	
HIGHEST ANNUAL MEAN					2608	1984
LOWEST ANNUAL MEAN					441	1977
HIGHEST DAILY MEAN	5160	Apr 28	9120	Apr 15	31900	Jan 30 1965
LOWEST DAILY MEAN	41	Sep 2	57	Aug 19	17	Dec 12 1932
ANNUAL SEVEN-DAY MINIMUM	45	Aug 30	60	Aug 15	29	Aug 28 1931
ANNUAL RUNOFF (AC-FT)	454600		686500		938100	
10 PERCENT EXCEEDS	2080		2670		3720	
50 PERCENT EXCEEDS	239		380		422	
90 PERCENT EXCEEDS	71		80		98	

14046500 JOHN DAY RIVER AT SERVICE CREEK, OR

LOCATION.--Lat 44°47'38", long 120°00'20", in NW 1/4 NE 1/4 sec.18, T.9 S., R.23 E., Wheeler County, Hydrologic Unit 17070204, on left bank 0.2 mi downstream from bridge on State Highway 207, 0.8 mi downstream from Service Creek, 0.5 mi southwest of town of Service Creek, and at mile 156.7.

DRAINAGE AREA.--5,090 mi^2, approximately.

PERIOD OF RECORD.--March 1925 to September 1926, October 1929 to current year. Monthly discharge only March 1925 to September 1926, published in WSP 1318.

GAGE.--Water-stage recorder. Datum of gage is 1,632.42 ft above NGVD of 1929. See WSP 1738 for history of changes prior to Feb. 24, 1957.

REMARKS.--Records good. Slight regulation by several small reservoirs upstream from station. Many small diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--73 years (water years 1930-2002), 1,935 ft^3/s, 1,402,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,200 ft^3/s Dec. 23, 1964, gage height, 17.85 ft, from rating curve extended above 14,000 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 6.0 ft^3/s Aug. 23, 24, 1973.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 15	0630	*12,800	*9.98	No other peak greater than base discharge.			

Minimum discharge, 41 ft^3/s part or all of each day Aug. 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	123	413	388	689	829	1510	4920	3600	2440	454	82	86
2	134	491	476	715	851	1240	5330	3790	2300	418	79	85
3	138	454	477	1130	781	1170	5160	4000	2120	378	78	83
4	161	418	462	1440	739	1120	4910	3960	1880	348	77	79
5	188	393	470	1220	688	1150	5270	3560	1720	322	75	74
6	189	373	466	1120	685	1190	5930	3330	1620	304	75	76
7	194	362	534	1640	746	1310	6130	2980	1550	290	75	74
8	198	356	586	3840	798	1620	5650	2770	1410	276	76	71
9	202	344	542	3550	861	1400	5340	2510	1330	257	79	75
10	213	324	547	2510	835	1280	6140	2290	1420	241	e74	81
11	239	327	548	1920	808	1280	7100	2100	1620	224	e70	90
12	253	335	540	1670	801	1490	7000	1970	1530	199	e66	93
13	288	335	568	1530	735	2410	7230	2000	1320	179	e62	88
14	345	345	652	1380	758	2180	8790	2240	1190	167	e58	82
15	311	359	1080	1240	747	1900	12200	2410	1110	161	e54	81
16	290	391	941	1100	735	1740	9340	2410	1070	163	e52	79
17	278	431	927	1020	763	1630	7210	2380	1040	158	e50	74
18	269	413	1250	987	800	1500	5980	2420	1010	141	e52	81
19	266	412	1070	978	866	1380	5060	2470	1140	140	e48	90
20	265	407	912	956	981	1490	4420	2700	1140	134	e44	100
21	267	406	897	941	1100	1600	3970	3040	972	124	42	119
22	272	445	838	955	1180	1800	3630	2760	875	121	41	113
23	285	491	694	877	1970	1950	3560	2420	823	119	47	104
24	311	505	608	841	3460	2550	3630	2090	775	115	54	100
25	445	501	535	854	2750	2690	3410	1910	706	113	79	92
26	402	465	505	897	1910	2880	3450	1870	633	107	106	89
27	354	443	516	966	1750	3320	3630	1960	602	105	109	86
28	335	438	598	815	1590	3590	3650	2300	550	107	102	82
29	336	417	631	585	---	3670	3370	2510	529	102	100	83
30	360	356	669	569	---	3950	3350	2790	482	99	100	88
31	383	---	664	669	---	4330	---	2750	---	89	89	---
TOTAL	8294	12150	20591	39604	31517	62320	164760	82290	36907	6155	2195	2598
MEAN	268	405	664	1278	1126	2010	5492	2655	1230	199	70.8	86.6
MAX	445	505	1250	3840	3460	4330	12200	4000	2440	454	109	119
MIN	123	324	388	569	685	1120	3350	1870	482	89	41	71
AC-FT	16450	24100	40840	78550	62510	123600	326800	163200	73210	12210	4350	5150

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2002, BY WATER YEAR (WY)

MEAN	330	594	1202	1590	2359	3750	5232	4901	2391	565	181	183
MAX	811	2284	5540	6553	8239	9773	10280	12050	8327	1850	594	862
(WY)	1985	1974	1965	1997	1996	1983	1984	1948	1948	1982	1984	1984
MIN	70.5	152	216	195	358	597	1010	491	302	90.6	15.2	31.4
(WY)	1937	1937	1936	1937	1937	1977	1968	1934	1992	1973	1973	1935

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1930 - 2002	
ANNUAL TOTAL	323664		469381			
ANNUAL MEAN	887		1286		1935	
HIGHEST ANNUAL MEAN					4116	1984
LOWEST ANNUAL MEAN					619	1977
HIGHEST DAILY MEAN	6190	Apr 28	12200	Apr 15	36400	Jan 30 1965
LOWEST DAILY MEAN	50	Sep 1	41	Aug 22	6.2	Aug 23 1973
ANNUAL SEVEN-DAY MINIMUM	50	Aug 31	46	Aug 17	7.7	Aug 19 1973
ANNUAL RUNOFF (AC-FT)	642000		931000		1402000	
10 PERCENT EXCEEDS	2770		3550		5380	
50 PERCENT EXCEEDS	469		669		746	
90 PERCENT EXCEEDS	82		82		134	

e Estimated

14048000 JOHN DAY RIVER AT MCDONALD FERRY, OR

LOCATION.--Lat 45°35'16", long 120°24'30", in NE 1/4 NW 1/4 sec.11, T.1 N., R.19 E., Sherman County, Hydrologic Unit 17070204, on left bank at McDonald Ferry, 0.8 mi downstream from Rock Creek, 10 mi east of Klondike, and at mile 20.9.

GAGE AREA.--7,580 mi^2, approximately.

PERIOD OF RECORD.--December 1904 to September 1996, October 1997 to current year. Prior to Oct. 1, 1930, published as "at McDonald."

REVISED RECORDS.--WSP 1094: 1894(M), 1932(M). WSP 1448: 1908-9, 1912, 1916, 1920(M), 1922, 1932.

GAGE.--Water-stage recorder. Datum of gage is 392.27 ft above NGVD of 1929. Prior to Aug. 30, 1930, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good except those below 60 ft^3/s, which are fair. No regulation. Many diversions for irrigation upstream from station. Additional water-quality data available for this site. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--96 years (water years 1906-96, 1998-2002), 2,072 ft^3/s, 1,501,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,800 ft^3/s Dec. 24, 1964, gage height, 13.59 ft, from floodmark, from rating curve extended above 11,000 ft^3/s on basis of slope-area measurement of peak flow; no flow for part of Sept. 2, 1966, Aug. 15 to Sept. 16, 1973, Aug. 13, 14, 19-25, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1894 reached a stage of 12.8 ft, from floodmarks, discharge, 39,100 ft^3/s, from rating curve extended above 22,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,900 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 16	0545	*12,200	*8.27	No other peak greater than base discharge.			

Minimum discharge, 22 ft^3/s Aug. 25-27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	97	364	435	662	627	1800	4260	3360	2910	517	83	71
2	101	378	400	678	684	1690	4800	3560	2600	485	76	73
3	109	391	370	695	838	1500	5220	3710	2400	449	70	66
4	125	437	439	746	855	1340	5150	3910	2270	424	68	74
5	138	460	469	1330	792	1280	4880	3970	2020	394	62	73
6	148	430	466	1440	754	1270	5160	3640	1820	371	60	71
7	160	404	484	1360	723	1290	5740	3440	1700	347	59	69
8	187	386	492	1560	720	1330	6010	3100	1640	321	61	65
9	203	375	528	3460	768	1590	5600	2870	1590	308	59	62
10	210	364	566	3840	818	1610	5300	2630	1490	289	52	64
11	224	360	571	2940	892	1470	5960	2410	1440	262	47	66
12	224	345	563	2270	847	1390	6900	2210	1560	246	45	68
13	232	334	588	1920	825	1450	6830	2060	1640	225	41	63
14	250	344	570	1740	812	2150	7050	2010	1450	208	43	58
15	264	343	697	1590	753	2420	8640	2130	1290	194	53	57
16	299	354	704	1450	766	2130	11500	2350	1190	179	51	59
17	335	378	1070	1310	761	1930	8950	2420	1110	174	46	72
18	316	380	929	1200	751	1810	7170	2370	1070	153	42	73
19	298	418	976	1090	775	1700	6020	2400	1010	144	37	68
20	292	436	1280	1060	829	1580	5160	2510	968	151	32	67
21	287	422	1050	1030	886	1560	4550	2650	1180	148	28	71
22	291	426	905	1010	1050	1650	4100	3130	1080	133	29	72
23	289	414	892	989	1210	1860	3760	2890	909	123	34	67
24	280	419	829	982	1540	1950	3630	2630	823	125	33	65
25	284	470	710	901	3170	2390	3710	2300	771	137	28	77
26	292	485	634	875	3140	2770	3510	2090	716	106	25	99
27	338	489	576	903	2220	2880	3500	2000	664	104	28	92
28	422	502	551	944	1930	3290	3660	2090	615	100	29	85
29	383	474	522	979	---	3670	3710	2320	599	91	27	78
30	374	445	589	756	---	3710	3470	2540	555	82	29	74
31	366	---	628	669	---	3950	---	2750	---	86	60	---
TOTAL	7818	12227	20483	42379	30736	62410	163900	84450	41080	7076	1437	2119
MEAN	252	408	661	1367	1098	2013	5463	2724	1369	228	46.4	70.6
MAX	422	502	1280	3840	3170	3950	11500	3970	2910	517	83	99
MIN	97	334	370	662	627	1270	3470	2000	555	82	25	57
AC-FT	15510	24250	40630	84060	60960	123800	325100	167500	81480	14040	2850	4200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1906 - 2002, BY WATER YEAR (WY)

MEAN	331	607	1182	1652	2633	4010	5640	5172	2681	651	194	182
MAX	892	2310	7030	6402	9736	11450	11900	13180	9531	2131	700	923
(WY)	1985	1974	1965	1965	1996	1983	1984	1917	1948	1984	1984	1984
MIN	59.9	157	221	217	374	557	964	533	285	88.0	5.70	23.8
(WY)	1937	1937	1937	1937	1933	1977	1968	1934	1992	1926	1973	1934

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1906 - 2002	
ANNUAL TOTAL	334999		476115			
ANNUAL MEAN	918		1304		2072	
HIGHEST ANNUAL MEAN					4724	1984
LOWEST ANNUAL MEAN					603	1977
HIGHEST DAILY MEAN	6130	Apr 29	11500	Apr 16	39400	Dec 24 1964
LOWEST DAILY MEAN	34	Sep 12	25	Aug 26	0.00	Aug 15 1973
ANNUAL SEVEN-DAY MINIMUM	37	Sep 6	28	Aug 24	0.00	Aug 15 1973
ANNUAL RUNOFF (AC-FT)	664500		944400		1501000	
10 PERCENT EXCEEDS	2870		3530		5800	
50 PERCENT EXCEEDS	489		695		787	
90 PERCENT EXCEEDS	69		66		141	

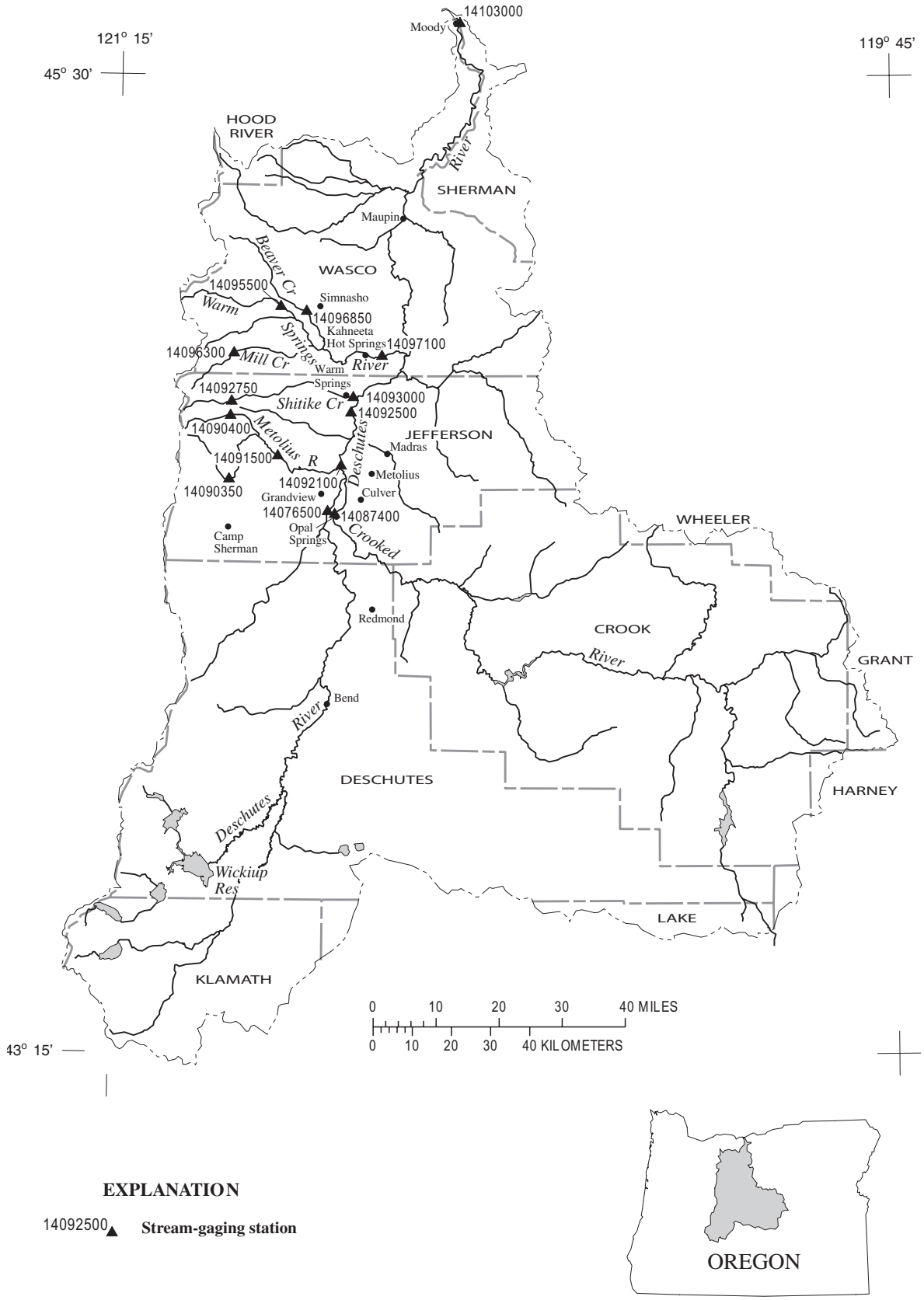


Figure 15. Locaton of surface-water and water-quality stations in the Deschutes River Basin.

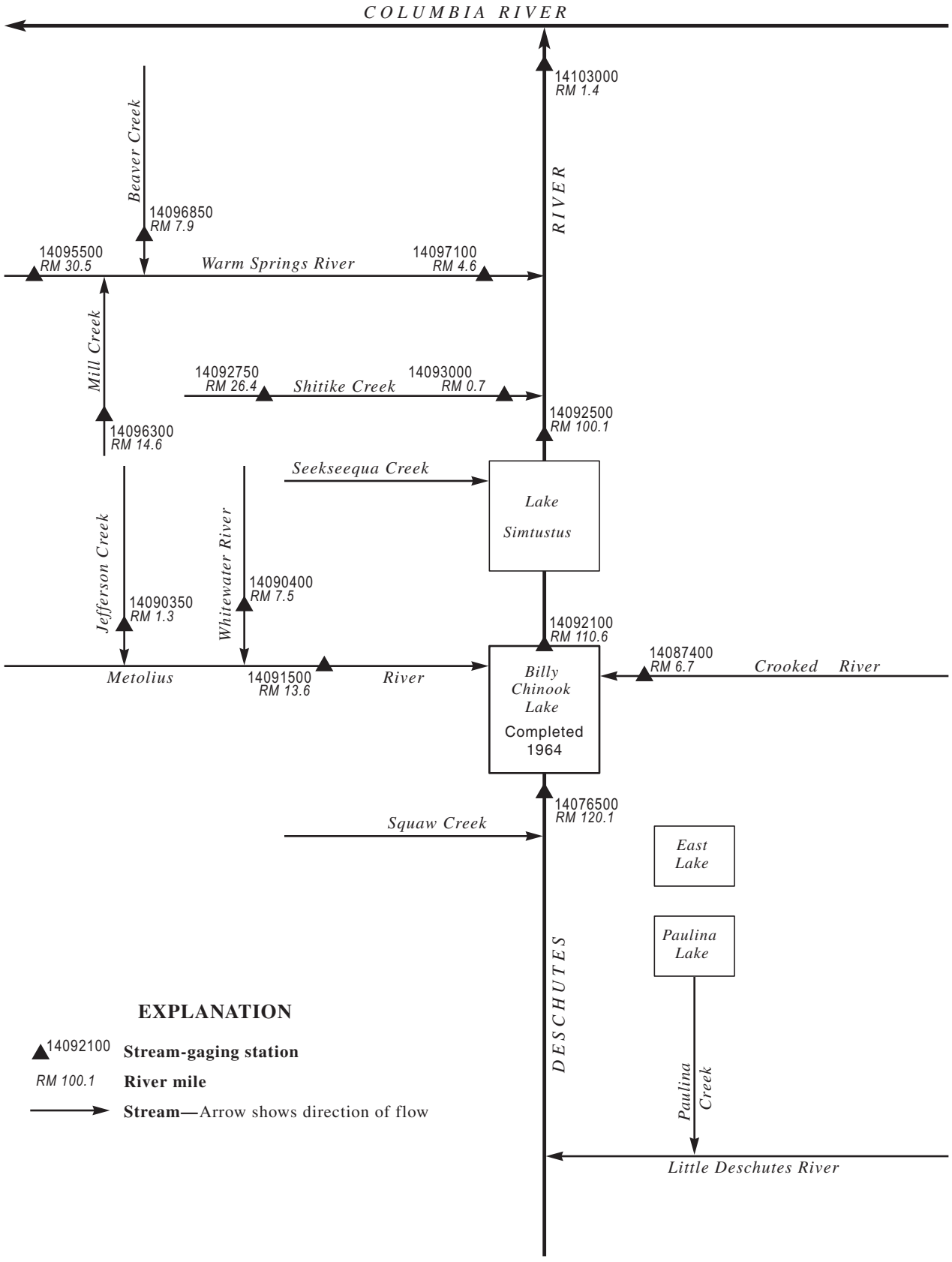


Figure 16. Schematic diagram showing gaging stations in the Deschutes River Basin.

14076500 DESCHUTES RIVER NEAR CULVER, OR

LOCATION.--Lat 44°29'56", long 121°19'12", in NW 1/4 SE 1/4 sec.29, T.12 S., R.12 E., Jefferson County, Hydrologic Unit 17070301, on right bank 2.5 mi downstream from Squaw Creek, 6.0 mi southwest of Culver, and at mile 120.1.

DRAINAGE AREA.--2,705 mi^2.

PERIOD OF RECORD.--July 1952 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,980 ft above NGVD of 1929 (river-profile survey). July 14, 1952, to Sept. 30, 1961, at site 4.1 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Crescent Lake and Crane Prairie and Wickiup Reservoirs. Many diversions for irrigation upstream from station. Continuous water-quality records for the period October 1954 to September 1957 and January 1959 to September 1974 have been collected at this location.

AVERAGE DISCHARGE.--50 years (water years 1953-2002), 924 ft^3/s, 669,400 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,680 ft^3/s Dec. 24, 1964, gage height, 10.00 ft, from rating curve extended above 3,000 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 418 ft^3/s July 7, 8, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,300 ft^3/s Apr. 8, gage height, 4.08 ft; minimum discharge, 459 ft^3/s July 28-30, Aug. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	504	1050	1010	1050	988	1050	1060	478	759	577	463	472
2	504	1030	1010	1080	978	1050	1080	479	686	526	464	472
3	502	1010	1030	1100	1010	1040	1060	480	647	503	465	470
4	503	1000	1040	1090	1010	1040	1010	480	596	499	469	469
5	504	998	1040	1080	968	990	1030	473	631	488	471	470
6	505	962	1050	1120	963	988	1100	471	717	485	472	470
7	507	949	1070	1180	973	1030	1200	469	651	480	472	470
8	509	945	1060	1230	983	1040	1260	465	591	480	471	471
9	508	949	1030	1200	1010	1050	824	465	545	476	469	472
10	509	978	1030	1170	1010	1050	930	465	513	470	472	473
11	520	986	835	1150	1020	1040	763	464	505	471	472	467
12	530	986	791	1140	834	1050	719	465	515	481	472	471
13	652	992	762	1170	771	1050	742	464	534	487	470	470
14	636	840	842	1150	763	1050	998	464	585	490	468	470
15	565	767	1050	783	779	1060	1090	461	678	489	469	470
16	692	766	1090	701	969	1060	874	462	694	474	467	471
17	755	862	1100	693	1010	1050	789	466	680	472	468	477
18	711	904	878	926	996	1040	693	475	843	471	470	483
19	767	815	856	1070	799	709	658	479	822	475	470	484
20	952	837	866	1070	800	614	625	476	649	473	470	509
21	958	861	964	1080	815	607	591	473	606	470	468	539
22	960	1060	1070	1070	833	631	632	469	608	466	470	530
23	1090	1050	1060	1060	1040	970	622	465	625	468	466	513
24	1000	1060	1050	1050	1070	1040	563	465	636	467	468	495
25	980	1070	1030	1050	1070	1030	522	464	604	466	480	493
26	961	1060	1030	1070	1070	1030	511	468	596	465	474	485
27	948	1020	1050	1040	1070	1030	505	500	629	465	476	475
28	945	1040	1040	1010	1070	1030	493	559	628	462	471	479
29	947	1020	1040	982	---	1040	486	724	649	463	474	505
30	982	960	1040	997	---	1050	478	1040	688	462	483	507
31	1050	---	1040	1020	---	1050	---	916	---	465	472	---
TOTAL	22656	28827	30854	32582	26672	30559	23908	15944	19110	14886	14586	14502
MEAN	731	961	995	1051	953	986	797	514	637	480	471	483
MAX	1090	1070	1100	1230	1070	1060	1260	1040	843	577	483	539
MIN	502	766	762	693	763	607	478	461	505	462	463	467
AC-FT	44940	57180	61200	64630	52900	60610	47420	31620	37900	29530	28930	28760

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2002, BY WATER YEAR (WY)

MEAN	751	1169	1281	1349	1410	1371	883	607	643	557	534	563
MAX	1598	1894	2130	2760	2679	2360	1799	1228	1053	960	852	997
(WY)	1998	1998	1985	1997	1997	1972	1984	1956	1999	1999	1999	1997
MIN	470	783	813	853	892	839	510	457	455	430	441	455
(WY)	1964	1995	1995	1995	1993	1964	1968	1964	1964	1964	1964	1963

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1953 - 2002	
ANNUAL TOTAL	292875		275086			
ANNUAL MEAN	802		754		924	
HIGHEST ANNUAL MEAN					1461	1997
LOWEST ANNUAL MEAN					677	1964
HIGHEST DAILY MEAN	1390	Apr 2	1260	Apr 8	4790	Dec 24 1964
LOWEST DAILY MEAN	499	Sep 12	461	May 15	425	Jul 7 1964
ANNUAL SEVEN-DAY MINIMUM	500	Sep 8	463	Jul 27	426	Jul 7 1964
ANNUAL RUNOFF (AC-FT)	580900		545600		669400	
10 PERCENT EXCEEDS	1250		1060		1640	
50 PERCENT EXCEEDS	652		717		779	
90 PERCENT EXCEEDS	504		469		490	

14087400 CROOKED RIVER BELOW OPAL SPRINGS, NEAR CULVER, OR

LOCATION.--Lat 44°29'33", long 121°17'50", in NW 1/4 NE 1/4 sec.33, T.12 S., R.12 E., Jefferson County, Hydrologic Unit 17070305, on right bank 0.2 mi downstream from Opal Springs, 4.8 mi southwest of Culver, and at mile 6.7.

DRAINAGE AREA.--4,300 mi^2, approximately, of which 500 mi^2 is probably noncontributing.

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,953.60 ft above NGVD of 1929 (Portland General Electric Co. bench mark).

REMARKS.--No estimated daily discharges. Records good. Flow regulated since December 1960 by Prineville Reservoir, active capacity of 152,800 acre-ft and Ochoco Reservoir, active capacity, 46,500 acre-ft. Dam and powerplant 0.3 mi upstream, completed in 1985, causes brief fluctuations in flow. Many diversions for irrigation upstream from station. Practically all of the summer flow comes from Opal Springs and other springs within 15 mi upstream from station. Simultaneous records (1961-63) at former gaging station 5.6 mi downstream indicated over 15 percent increase to summer flow from springs downstream from this station. Continuous water-quality records for the period October 1963 to September 1974 have been collected at this location.

AVERAGE DISCHARGE.--41 years (water years 1962-2002), 1,554 ft^3/s, 1,126,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,660 ft^3/s Dec. 24, 1964, gage height, 9.36 ft; minimum daily discharge, 1,090 ft^3/s May 11, 1981, minimum instantaneous discharge after October 1989, 656 ft^3/s many days in the 1990 water year, prior to that date minimum instantaneous discharge was not determined.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 2,210 ft^3/s July 16, gage height, 3.99 ft, due to powerplant operation; minimum discharge, 678 ft^3/s Aug. 23, due to powerplant operation.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1230	1300	1280	1280	1270	1280	1290	1170	1240	1200	1170	1260
2	1260	1290	1280	1280	1270	1270	1330	1160	1230	1190	1170	1260
3	1260	1290	1280	1300	1270	1270	1350	1160	1220	1170	1170	1260
4	1250	1290	1280	1300	1270	1280	1350	1170	1180	1170	1170	1230
5	1250	1290	1280	1300	1270	1280	1330	1170	1170	1170	1170	1210
6	1250	1290	1280	1300	1270	1280	1320	1180	1180	1170	1170	1200
7	1310	1280	1270	1320	1270	1280	1310	1180	1180	1170	1170	1200
8	1320	1290	1270	1420	1270	1270	1310	1160	1180	1180	1170	1200
9	1320	1280	1280	1400	1270	1270	1340	1170	1200	1190	1170	1200
10	1300	1280	1280	1360	1270	1270	1320	1170	1230	1170	1180	1240
11	1320	1280	1280	1330	1270	1270	1290	1160	1230	1170	1180	1240
12	1340	1280	1280	1320	1270	1270	1280	1170	1220	1170	1180	1260
13	1360	1280	1310	1310	1270	1270	1230	1170	1210	1170	1180	1270
14	1390	1290	1330	1310	1300	1270	1200	1170	1200	1180	1180	1270
15	1370	1280	1330	1300	1310	1270	1210	1160	1180	1180	1180	1270
16	1400	1300	1300	1320	1310	1270	1230	1160	1170	1190	1180	1280
17	1360	1310	1280	1350	1280	1270	1230	1170	1190	1180	1180	1290
18	1350	1300	1280	1330	1270	1270	1220	1170	1200	1180	1180	1320
19	1350	1310	1310	1310	1270	1270	1210	1170	1210	1170	1180	1330
20	1340	1310	1310	1290	1290	1290	1200	1190	1210	1170	1190	1340
21	1310	1320	1300	1290	1290	1290	1200	1200	1190	1170	1180	1330
22	1300	1300	1280	1290	1300	1300	1190	1210	1190	1170	1180	1320
23	1300	1290	1270	1280	1290	1300	1180	1200	1190	1170	1180	1340
24	1300	1300	1270	1280	1310	1280	1160	1180	1190	1170	1190	1330
25	1310	1290	1270	1280	1310	1270	1180	1180	1190	1170	1230	1310
26	1300	1280	1270	1280	1300	1270	1170	1180	1170	1170	1290	1310
27	1290	1280	1280	1280	1290	1270	1180	1190	1170	1180	1320	1310
28	1290	1290	1270	1270	1280	1270	1170	1200	1170	1180	1310	1330
29	1290	1290	1270	1270	---	1290	1190	1240	1180	1200	1320	1350
30	1300	1280	1270	1270	---	1280	1180	1290	1180	1190	1320	1350
31	1300	---	1270	1270	---	1280	---	1280	---	1170	1320	---
TOTAL	40620	38740	39810	40490	35910	39570	37350	36730	35850	36480	37360	38410
MEAN	1310	1291	1284	1306	1282	1276	1245	1185	1195	1177	1205	1280
MAX	1400	1320	1330	1420	1310	1300	1350	1290	1240	1200	1320	1350
MIN	1230	1280	1270	1270	1270	1270	1160	1160	1170	1170	1170	1200
AC-FT	80570	76840	78960	80310	71230	78490	74080	72850	71110	72360	74100	76190

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2002, BY WATER YEAR (WY)

MEAN	1423	1372	1500	1603	1783	1953	2092	1672	1347	1268	1296	1359
MAX	1650	2069	2686	3551	3490	4208	4793	3295	2614	1475	1593	1541
(WY)	1970	1985	1965	1965	1965	1972	1984	1984	1998	1983	1976	1965
MIN	1239	1232	1179	1182	1245	1232	1192	1173	1195	1122	1133	1187
(WY)	1969	1964	1964	1964	1989	1977	1977	1964	2002	1981	1980	1980

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1962 - 2002	
ANNUAL TOTAL	459100		457320			
ANNUAL MEAN	1258		1253		1554	
HIGHEST ANNUAL MEAN					2196	1984
LOWEST ANNUAL MEAN					1250	1992
HIGHEST DAILY MEAN	1440	Jan 7	1420	Jan 8	6130	Dec 24 1964
LOWEST DAILY MEAN	1170	May 26	1160	Apr 24	1090	May 11 1981
ANNUAL SEVEN-DAY MINIMUM	1180	Aug 10	1170	May 10	1100	May 10 1981
ANNUAL RUNOFF (AC-FT)	910600		907100		1126000	
10 PERCENT EXCEEDS	1320		1320		2190	
50 PERCENT EXCEEDS	1270		1270		1350	
90 PERCENT EXCEEDS	1190		1170		1200	

14090350 JEFFERSON CREEK NEAR CAMP SHERMAN, OR

LOCATION.--Lat 44°34'18", long 121°38'17", in SW 1/4 SE 1/4 sec.34, T.11 S., R.9 E., Jefferson County, Hydrologic Unit 17070301, Warm Springs Indian Reservation, on left bank 100 ft upstream from bridge, 7.6 mi north of Camp Sherman, and at mile 1.3.

DRAINAGE AREA.--27.8 mi^2.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,780 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--19 years (water years 1984-2002), 94.1 ft^3/s, 46.00 in/yr, 68,190 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 908 ft^3/s Nov. 25, 1999, gage height, 4.38 ft, from high-water mark, not including approximately 400 ft^3/s which flowed out of the channel 150 ft upstream of gage and flowed into Candle Creek; minimum daily discharge, 36 ft^3/s Dec. 22, 1990, but could have been lower during period of ice effect Dec. 19-25, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 220 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0600	*353	*2.85	June 18	0900	296	2.65
May 29	1930	246	2.48	June 29	0930	231	2.43

Minimum discharge, 51 ft^3/s Oct. 8, 20, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55	99	64	60	62	e60	59	91	155	160	117	93
2	55	79	63	62	61	e60	62	100	153	154	116	94
3	55	69	60	61	61	e55	62	103	146	152	115	93
4	55	64	59	59	60	57	64	96	157	148	113	e90
5	54	63	58	58	60	57	67	94	181	145	111	89
6	54	61	64	77	59	59	71	90	167	147	110	e90
7	53	59	62	111	60	58	71	87	145	151	109	e90
8	53	59	59	141	59	57	70	85	131	152	e110	e90
9	53	58	57	99	58	57	77	85	124	146	109	88
10	56	57	56	84	58	56	93	85	130	148	109	89
11	73	56	55	78	57	61	91	86	139	152	109	89
12	56	57	55	77	57	66	118	91	146	151	108	89
13	57	68	78	74	56	62	146	97	158	155	108	88
14	55	89	85	73	55	60	268	96	179	154	107	87
15	54	67	73	70	55	59	159	98	179	144	108	87
16	53	73	88	69	55	59	115	99	174	142	106	86
17	53	65	91	69	55	59	100	107	170	142	104	93
18	52	61	79	68	55	e60	92	112	236	141	104	87
19	52	65	73	68	56	59	87	109	168	137	102	87
20	52	72	69	68	55	58	85	108	160	133	101	85
21	52	76	67	69	60	57	85	105	163	131	100	e85
22	84	97	65	68	68	57	86	102	168	130	99	e85
23	79	78	64	68	69	57	88	101	177	129	100	e85
24	58	71	63	67	64	56	85	104	169	129	101	82
25	58	66	62	70	61	56	85	109	165	127	98	83
26	58	62	62	68	60	56	88	125	175	126	97	e85
27	58	60	62	66	59	56	87	136	184	123	97	82
28	55	72	62	65	59	56	83	158	175	122	99	e80
29	59	72	60	e65	---	56	84	219	211	125	97	83
30	92	64	59	63	---	56	88	197	176	122	95	88
31	149	---	59	63	---	58	---	168	---	119	93	---
TOTAL	1902	2059	2033	2258	1654	1800	2816	3443	4961	4337	3252	2622
MEAN	61.4	68.6	65.6	72.8	59.1	58.1	93.9	111	165	140	105	87.4
MAX	149	99	91	141	69	66	268	219	236	160	117	94
MIN	52	56	55	58	55	55	59	85	124	119	93	80
AC-FT	3770	4080	4030	4480	3280	3570	5590	6830	9840	8600	6450	5200
CFSM	2.21	2.47	2.36	2.62	2.12	2.09	3.38	4.00	5.95	5.03	3.77	3.14
IN.	2.55	2.76	2.72	3.02	2.21	2.41	3.77	4.61	6.64	5.80	4.35	3.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	77.3	84.6	80.6	82.8	87.7	83.2	93.8	118	131	113	95.0	81.6
MAX	124	131	155	160	244	148	135	179	191	189	169	124
(WY)	1998	1996	1996	1997	1996	1996	1996	1997	1999	1999	1999	1999
MIN	55.5	59.3	58.6	55.5	50.6	55.5	59.8	83.3	80.0	70.5	62.0	56.8
(WY)	1993	1988	1993	2001	1989	2001	2001	1991	1992	1992	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	24409		33137			
ANNUAL MEAN	66.9		90.8		94.1	
HIGHEST ANNUAL MEAN					137	1996
LOWEST ANNUAL MEAN					66.8	1994
HIGHEST DAILY MEAN	164	May 16	268	Apr 14	634	Feb 7 1996
LOWEST DAILY MEAN	47	Mar 10	52	Oct 18	36	Dec 22 1990
ANNUAL SEVEN-DAY MINIMUM	47	Mar 10	53	Oct 15	38	Feb 4 1989
ANNUAL RUNOFF (AC-FT)	48420		65730		68190	
ANNUAL RUNOFF (CFSM)	2.41		3.27		3.39	
ANNUAL RUNOFF (INCHES)	32.66		44.34		46.00	
10 PERCENT EXCEEDS	85		151		140	
50 PERCENT EXCEEDS	62		83		86	
90 PERCENT EXCEEDS	51		56		59	

e Estimated

14090400 WHITEWATER RIVER NEAR CAMP SHERMAN, OR

LOCATION.--Lat 44°43'09", long 121°38'21"(revised), in SW 1/4 NW 1/4 sec.11, T.10 S., R.9 E., Jefferson County, Hydrologic Unit 17070301, Warm Springs Indian Reservation, on left bank 300 ft upstream from road J-100 bridge, 18 mi north of Camp Sherman, and at mile 7.5.

DRAINAGE AREA.--22.8 mi^2.

PERIOD OF RECORD.--July 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,240 ft above NGVD of 1929, from topographic map. July 1982 to Feb. 7, 1996, at comparable site 1/4 mi downstream, at different datum. Feb. 8, 1996 to Sept. 30, 2001, at comparable site 300 ft downstream, at different datum.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--20 years (water years 1983-2002), 85.6 ft^3/s, 50.99 in/yr, 61,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,320 ft^3/s Feb. 7, 1996, from slope-area measurement of peak flow, gage height, unknown; maximum gage height, 8.30 ft Feb. 9, 1996, from outside highwater mark caused by debris, channel fill, and channel reconfiguration, datum then in use; minimum daily discharge, 28 ft^3/s Dec. 22, 1990, but could be less because of ice effect.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 220 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 8	0500	260	5.94	June 5	2030	234	5.87
Apr. 14	0600	*546	*6.48	June 18	0800	264	5.95
May 29	2030	264	5.95	June 29	0930	277	5.98

Minimum discharge, 35 ft^3/s Oct. 9, 10, 17-21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	67	66	58	61	58	59	102	163	146	91	76
2	46	55	61	63	60	57	62	111	161	135	89	82
3	47	49	58	59	58	56	63	115	153	130	84	73
4	45	46	57	56	57	56	65	109	156	124	79	64
5	43	46	56	56	56	56	70	107	183	119	74	60
6	42	44	71	88	56	62	75	102	177	120	71	56
7	39	42	65	153	57	58	77	98	148	126	69	53
8	38	41	59	207	55	56	77	93	132	130	71	52
9	36	41	55	146	53	55	88	90	123	124	75	55
10	45	40	54	126	53	55	107	87	120	131	80	59
11	65	40	53	115	52	71	105	85	125	135	81	62
12	41	40	51	112	51	76	119	86	131	134	83	64
13	48	57	92	104	51	65	168	92	141	147	84	65
14	44	70	93	99	50	61	384	93	156	149	90	64
15	41	56	72	93	50	60	246	94	161	128	91	62
16	41	60	93	89	49	60	203	95	159	124	86	60
17	37	52	97	86	49	58	176	102	159	126	80	71
18	36	48	83	82	49	57	157	107	219	124	76	60
19	37	58	78	80	51	58	143	107	164	120	74	61
20	37	63	75	79	50	57	134	107	150	110	71	57
21	36	63	71	77	53	55	128	104	152	107	68	53
22	78	98	68	74	62	55	122	99	154	106	68	53
23	61	72	66	70	68	55	120	97	164	110	70	54
24	41	63	64	71	65	54	114	98	158	111	72	54
25	41	59	63	85	62	54	111	103	152	110	72	53
26	41	55	61	75	62	54	111	116	163	112	71	50
27	41	53	60	69	61	53	106	127	180	104	74	49
28	38	76	59	67	59	54	101	153	178	106	79	49
29	42	75	57	65	---	54	99	210	235	117	78	48
30	81	64	56	63	---	55	100	201	172	108	73	50
31	96	---	55	62	---	56	---	177	---	98	68	---
TOTAL	1452	1693	2069	2729	1560	1791	3690	3467	4789	3771	2392	1769
MEAN	46.8	56.4	66.7	88.0	55.7	57.8	123	112	160	122	77.2	59.0
MAX	96	98	97	207	68	76	384	210	235	149	91	82
MIN	36	40	51	56	49	53	59	85	120	98	68	48
AC-FT	2880	3360	4100	5410	3090	3550	7320	6880	9500	7480	4740	3510
CFSM	2.05	2.48	2.93	3.86	2.44	2.53	5.39	4.91	7.00	5.34	3.38	2.59
IN.	2.37	2.76	3.38	4.45	2.55	2.92	6.02	5.66	7.81	6.15	3.90	2.89

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	53.3	68.7	74.1	79.3	88.5	79.7	94.5	113	124	105	83.9	62.6
MAX	93.4	124	174	220	329	147	148	188	206	155	163	96.6
(WY)	1998	2000	1996	1997	1996	1997	1997	1997	1999	1999	1999	1997
MIN	36.0	34.7	45.5	38.4	37.1	48.7	50.3	64.5	60.7	54.0	54.8	42.2
(WY)	1993	1994	1994	1993	1994	2001	1991	1991	1992	1992	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	21589		31172			
ANNUAL MEAN	59.1		85.4		85.6	
HIGHEST ANNUAL MEAN					142	1997
LOWEST ANNUAL MEAN					54.0	1994
HIGHEST DAILY MEAN	113	May 24	384	Apr 14	1400	Feb 7 1996
LOWEST DAILY MEAN	36	Oct 9	36	Oct 9	28	Dec 22 1990
ANNUAL SEVEN-DAY MINIMUM	38	Oct 15	38	Oct 15	31	Oct 19 1994
ANNUAL RUNOFF (AC-FT)	42820		61830		61990	
ANNUAL RUNOFF (CFSM)	2.59		3.75		3.75	
ANNUAL RUNOFF (INCHES)	35.22		50.86		50.99	
10 PERCENT EXCEEDS	78		148		139	
50 PERCENT EXCEEDS	56		71		74	
90 PERCENT EXCEEDS	41		48		44	

14091500 METOLIUS RIVER NEAR GRANDVIEW, OR

LOCATION.--Lat 44°37'33", long 121°28'55", in SE 1/4 SW 1/4 sec.12, T.11 S., R.10 E., Jefferson County, Hydrologic Unit 17070301, Deschutes National Forest, on right bank 1.0 mi upstream from maximum controlled pool of Lake Billy Chinook, 9 mi northwest of Grandview, and at mile 13.6.

DRAINAGE AREA.--316 mi^2, at cableway 1.0 mi downstream, where all discharge measurements are made. Hydrologic drainage boundary uncertain because of interbasin ground-water exchange.

PERIOD OF RECORD.--April 1910 to February 1912 (gage heights and discharge measurements only), March 1912 to December 1913, October 1921 to current year. Published as "at Hubbard's ranch, near Sisters" 1910, and as "at Hubbard's ranch, near Grandview" 1910-13.

REVISED RECORDS.--WSP 1448: 1913.

GAGE.--Water-stage recorder. Datum of gage is 1,974.36 ft above NGVD of 1929 (levels by Portland General Electric Co.). Prior to Dec. 31, 1913, nonrecording gage at site 2.3 mi upstream at different datum. Oct. 1, 1921, to May 3, 1949, nonrecording gage and May 4, 1949, to June 18, 1963, water-stage recorder at site 2.7 mi downstream at datum 64 ft lower.

REMARKS.--Records good. No regulation. Many small diversions for irrigation upstream from station. Stream is spring fed. Records herein are for measuring site. Continuous water-quality records for the period October 1954 to September 1974 have been collected at this location.

AVERAGE DISCHARGE.--82 years (water years 1913, 1922-2002), 1,498 ft^3/s, 1,085,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,430 ft^3/s Feb. 7, 1996, gage height, 7.38 ft; minimum discharge, 1,080 ft^3/s Feb. 17, 1932, Oct. 2-31, Nov. 6, 7, 10-14, 1942.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,810 ft^3/s Apr. 14, gage height, 2.74 ft; minimum discharge, 1,290 ft^3/s Oct. 7-10, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1320	1400	1430	1380	1400	1390	1420	1720	1860	1710	1500	1420
2	1310	1370	1430	1400	1380	1380	1440	1750	1840	1680	1500	1430
3	1310	1350	1390	1390	1360	1370	1450	1770	1820	1660	1490	1420
4	1310	1330	1390	1370	1350	1370	1470	1750	1820	1640	1480	1410
5	1300	1330	1390	1360	1340	1360	1480	1740	1890	1630	1470	1400
6	1300	1330	1470	1440	1350	1380	1510	1730	1890	1620	1460	1390
7	1300	1320	1460	1620	1390	1420	1530	1710	1790	1640	1460	1380
8	1300	1320	1410	e1800	1390	1390	1550	1690	1710	1640	1450	1380
9	1300	1320	1390	e1750	1360	1370	1570	1670	1670	1620	1460	1380
10	1300	1320	1380	1660	1340	1370	e1750	1660	1660	1620	1460	1380
11	1360	1320	1370	1620	1340	1380	e1750	1640	1660	1630	1460	1390
12	1310	1320	1360	1610	1330	e1550	1820	1640	1650	1630	1460	1390
13	1320	1340	1460	1570	1320	e1550	1930	1660	1670	1640	1460	1390
14	1310	1410	1640	1540	1320	e1500	2630	1660	1730	1660	1470	1390
15	1300	1350	1520	1500	1310	e1500	e2500	1660	1770	1610	1470	1390
16	1300	1370	1560	1480	1310	e1500	e2300	1660	1750	1600	1460	1390
17	1300	1350	1640	1470	1310	1470	e2200	1680	1740	1600	1450	1410
18	1310	1340	1580	1450	1310	1450	e2050	1710	1920	1600	1440	1390
19	1320	1360	1550	1440	1310	1450	e1950	1710	1780	1580	1440	1390
20	1320	1390	1540	1470	1320	1430	1890	1700	1720	1570	1440	1380
21	1320	1400	1500	1530	1320	1420	1860	1680	1720	1560	1430	1370
22	1370	1520	1470	1480	1370	1420	1830	1670	1720	1550	1430	1370
23	1440	1460	1450	1450	1430	1410	1810	1650	1750	1560	1430	1370
24	1340	1420	1420	1440	1450	1410	1780	1640	1740	1560	1440	1370
25	1330	1400	1410	1570	1440	1400	1770	1630	1710	1550	1430	1370
26	1330	1380	1400	1580	1420	1390	1770	1670	1730	1550	1420	1360
27	1330	1350	1400	1510	1410	1400	1760	1710	1780	1540	1420	1360
28	1320	1420	1390	1470	1410	1400	1730	1800	1780	1530	1430	1360
29	1330	1450	1380	1440	---	1400	1720	1960	1870	1550	1430	1360
30	1390	1400	1370	1420	---	1410	1720	2000	1790	1540	1420	1380
31	1490	---	1370	1410	---	1410	---	1920	---	1520	1410	---
TOTAL	41190	41140	44920	46620	38090	44050	53940	53240	52930	49590	44970	41570
MEAN	1329	1371	1449	1504	1360	1421	1798	1717	1764	1600	1451	1386
MAX	1490	1520	1640	1800	1450	1550	2630	2000	1920	1710	1500	1430
MIN	1300	1320	1360	1360	1310	1360	1420	1630	1650	1520	1410	1360
AC-FT	81700	81600	89100	92470	75550	87370	107000	105600	105000	98360	89200	82450

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	1351	1400	1489	1524	1571	1543	1559	1612	1632	1519	1420	1369
MAX	1690	1816	2454	2512	2997	2504	2040	2099	2163	1995	1854	1678
(WY)	1998	1922	1965	1997	1996	1972	1997	1997	1999	1999	1999	1999
MIN	1081	1140	1110	1154	1148	1157	1162	1244	1196	1173	1136	1103
(WY)	1943	1940	1945	1979	1941	1941	1941	1941	1941	1941	1931	1942

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	513670		552250			
ANNUAL MEAN	1407		1513		1498	
HIGHEST ANNUAL MEAN					1949	1997
LOWEST ANNUAL MEAN					1167	1941
HIGHEST DAILY MEAN	1850	May 16	2630	Apr 14	7100	Dec 24 1964
LOWEST DAILY MEAN	1300	Oct 5	1300	Oct 5	1080	Feb 17 1932
ANNUAL SEVEN-DAY MINIMUM	1300	Oct 4	1300	Oct 4	1080	Oct 2 1942
ANNUAL RUNOFF (AC-FT)	1019000		1095000		1085000	
10 PERCENT EXCEEDS	1510		1750		1810	
50 PERCENT EXCEEDS	1390		1450		1450	
90 PERCENT EXCEEDS	1330		1330		1230	

e Estimated

14092100 LAKE BILLY CHINOOK NEAR METOLIUS, OR

LOCATION.--Lat 44°36'14", long 121°16'40", in SW 1/4 NE 1/4 sec.22, T.11 S., R.12 E., Jefferson County, Hydrologic Unit 17070301, Warm Springs Indian Reservation, near left end of Round Butte Dam on Deschutes River, 5.0 mi west of Metolius, and at mile 110.6.

DRAINAGE AREA.--7,490 mi^2, approximately.

PERIOD OF RECORD.--January 1964 to current year.

GAGE.--Nonrecording gage. Datum of gage is NGVD of 1929 (levels by Portland General Electric Co.).

REMARKS.--Reservoir is formed by rock fill dam completed in June 1964 by Portland General Electric Co.; storage began Jan. 2, 1964. Total capacity is 534,700 acre-ft at elevation 1,945.0 ft proposed upper limit of operation, and usable capacity is 273,900 acre-ft between elevations 1,860.0 ft, proposed lower limit of operation, and 1,945.0 ft. Reservoir used for power generation under FERC license 2030. Figures given herein represent total contents.

COOPERATION.--Gage readings and capacity tables furnished by Portland General Electric Co.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 538,700 acre-ft July 15, 16, 1972, elevation, 1,946.00 ft; minimum contents observed since first filling, 431,100 acre-ft Feb. 13, 1972, elevation, 1,917.13 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 534,700 acre-ft June 4, elevation, 1,944.98 ft; minimum contents observed, 503,100 acre-ft Feb. 15, elevation, 1,936.80 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30	1,944.14	531,300	--
Oct. 31	1,944.39	532,300	+1,000
Nov. 30	1,943.61	529,200	-3,100
Dec. 31	1,942.49	524,900	-4,300
CAL YR 2001	--	--	+4,100
Jan. 31	1,939.47	513,300	-11,600
Feb. 28	1,938.29	508,800	-4,500
Mar. 31	1,940.32	516,500	+7,700
Apr. 30	1,943.34	528,200	+11,700
May 31	1,944.56	533,000	+4,800
June 30	1,944.55	533,000	0
July 31	1,944.39	532,300	-700
Aug. 31	1,944.24	531,700	-600
Sept.30	1,944.33	532,100	+400
WTR YR 2002	--	--	+800

14092500 DESCHUTES RIVER NEAR MADRAS, OR

LOCATION.--Lat 44°43'34", long 121°14'45", in SE 1/4 SW 1/4 sec.1, T.10 S., R.12 E., Jefferson County, Hydrologic Unit 17070306, on right bank 400 ft downstream from reregulating dam, 2.7 mi downstream from Pelton Dam, 8.5 mi northwest of Madras, and at mile 100.1.

DRAINAGE AREA.--7,820 mi^2, approximately.

PERIOD OF RECORD.--December 1923 to current year.

REVISED RECORDS.--WSP 1398: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,390.25 ft above NGVD of 1929 (levels by Portland General Electric Co.). See WSP 1738 for history of changes prior to Nov. 23, 1957.

REMARKS.--No estimated daily discharges. Records good. Diurnal fluctuation caused by Lake Simtustus and reregulating reservoir since 1957, combined capacity for normal operation, 6,500 acre-ft. Some winter and spring runoff stored in Ochoco Reservoir, capacity, 47,500 acre-ft, in Crescent Lake, Crane Prairie and Wickiup Reservoirs, combined capacity, 354,600 acre-ft, and since 1960, in Prineville Reservoir, capacity, 152,800 acre-ft, and since 1964, in Lake Billy Chinook, capacity, 534,700 acre-ft. Large diversions in upper basin for irrigation. Continuous water-quality records for the period October 1978 to September 1988 have been collected at this location.

AVERAGE DISCHARGE.--19 years (water years 1924-1942), 4,112 ft^3/s, 2,979,000 acre-ft/yr.
60 years (water years 1943-2002), 4,699 ft^3/s, 3,404,000 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft^3/s July 16, 1983, accidental release from Pelton Dam, gage height, 7.70 ft, from floodmarks; minimum discharge, 916 ft^3/s July 4, 1982, caused by power company testing control gates on dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,430 ft^3/s Jan. 9, 10, Apr. 16, gage height, 3.43 ft; minimum discharge, 3,460 ft^3/s Oct. 8

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3580	4310	4580	4690	4970	4570	4200	3950	4720	4310	3690	3930
2	3580	4310	4570	4830	4970	4570	4190	3970	4570	4190	3700	3930
3	3580	4310	4570	4830	4960	4450	4200	3970	4330	4190	3700	3940
4	3590	4430	4440	4840	4970	4640	4200	3960	4310	3950	3700	3940
5	3580	4440	4320	4830	4970	4710	4200	3970	4310	3940	3710	3820
6	3600	4440	4300	4840	4980	4710	4200	3970	4320	3930	3700	3820
7	3610	4320	4310	5110	4970	4700	4200	3960	4320	3940	3690	3820
8	3610	4190	4430	5120	4970	4510	4190	3970	4310	3940	3700	3700
9	3600	4180	4440	5370	4630	4200	4190	3980	4200	3820	3690	3690
10	3720	4180	4430	5390	4570	4200	4190	3980	4060	3800	3810	3690
11	3700	4180	4320	5260	4450	4200	4200	3850	4060	3800	3820	3690
12	3940	4190	4320	5250	4440	4200	4190	3840	4060	3810	3820	3690
13	3960	4190	4200	4900	4440	4200	4200	3830	3940	3920	3810	3690
14	3950	4190	4190	4830	4190	4200	4190	3820	3940	3940	3810	3690
15	3950	4190	4190	4840	4070	4200	4560	3820	4050	3930	3810	3690
16	3960	4190	4430	4590	4070	4190	5290	3810	4060	3930	3810	3700
17	3940	4190	4500	4230	4060	4190	4920	3820	4200	3930	3810	3690
18	3920	4180	4960	4190	4310	4190	4710	3820	4420	3930	3820	3800
19	3940	4180	4840	4420	4320	4190	4570	3820	4570	3930	3820	3800
20	4070	4190	4580	4450	4320	4190	4320	3820	4550	3930	3830	3820
21	4190	4190	4440	4440	4200	4200	4190	3820	4300	3930	3820	3810
22	4200	4360	4440	4560	4190	4190	4190	3820	4190	3810	3810	3930
23	4190	4560	4440	4570	4200	4190	4200	3820	4060	3810	3820	3940
24	4310	4560	4440	4570	4190	4200	4070	3820	4060	3810	3690	3940
25	4310	4560	4320	4640	4200	4190	4060	3820	4180	3810	3700	3940
26	4320	4570	4310	5100	4190	4190	4070	3820	4180	3820	3930	3940
27	4320	4600	4560	5100	4190	4200	4070	3820	4190	3810	3940	3940
28	4190	4760	4710	5110	4440	4190	4060	3820	4190	3820	3930	3940
29	4200	5030	4700	5120	---	4200	4070	4050	4190	3690	3940	3940
30	4180	5090	4690	5100	---	4190	3940	4500	4310	3690	3930	3940
31	4200	---	4700	4980	---	4200	---	4920	---	3700	3930	---
TOTAL	121990	131260	138670	150100	125430	133350	128030	121960	127150	120760	117690	114800
MEAN	3935	4375	4473	4842	4480	4302	4268	3934	4238	3895	3796	3827
MAX	4320	5090	4960	5390	4980	4710	5290	4920	4720	4310	3940	3940
MIN	3580	4180	4190	4190	4060	4190	3940	3810	3940	3690	3690	3690
AC-FT	242000	260400	275100	297700	248800	264500	253900	241900	252200	239500	233400	227700

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2002, BY WATER YEAR (WY)

MEAN	4158	4633	5041	5262	5501	5608	5387	4582	4366	4021	3927	3961
MAX	5410	6124	7253	9600	8974	9590	8988	6949	5899	4863	4718	4911
(WY)	1998	1985	1997	1997	1996	1972	1984	1956	1998	1999	1976	1997
MIN	3085	3521	3818	3305	3094	3455	3602	3503	3492	3059	3064	3081
(WY)	1965	1965	1945	1964	1964	1964	1968	1944	1964	1964	1964	1964

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1943 - 2002	
ANNUAL TOTAL	1490970		1531190			
ANNUAL MEAN	4085		4195		4699	
HIGHEST ANNUAL MEAN					5980	1997
LOWEST ANNUAL MEAN					3558	1964
HIGHEST DAILY MEAN	5090	Nov 30	5390	Jan 10	17800	Feb 8 1996
LOWEST DAILY MEAN	3550	Jul 11	3580	Oct 1	2440	Dec 3 1957
ANNUAL SEVEN-DAY MINIMUM	3560	Jul 8	3590	Oct 1	2590	Nov 30 1957
ANNUAL RUNOFF (AC-FT)	2957000		3037000		3404000	
10 PERCENT EXCEEDS	4660		4740		6140	
50 PERCENT EXCEEDS	3970		4190		4360	
90 PERCENT EXCEEDS	3600		3800		3660	

14092750 SHITIKE CREEK AT PETERS PASTURE, NEAR WARM SPRINGS, OR

LOCATION.--Lat 44°45'02", long 121°37'56", in NW 1/4 NE 1/4 sec.35, T.9 S., R.9 E., Jefferson County, Hydrologic Unit 17070306, Warm Springs Indian Reservation, on left bank 0.5 mi downstream from Peters Pasture, and 18 mi west of town of Warm Springs, and at mile 26.4.

DRAINAGE AREA.--22.9 mi^2.

PERIOD OF RECORD.--July 1982 to current year.

REVISED RECORDS.--WDR OR-96-1: 1983, 1985, 1986, 1988, 1990, 1995.

GAGE.--Water-stage recorder. Elevation of gage is 3,580 ft, from topographic map.

REMARKS.--Records good. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--20 years (water years 1983-2002), 78.9 ft^3/s, 46.79 in/yr, 57,140 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,430 ft^3/s Feb. 7, 1996, gage height, 6.66 ft, from rating curve extended above 800 ft^3/s on basis of slope area measurement of peak flow; minimum discharge, 17 ft^3/s Dec. 22, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1000	*845	*3.49				

Minimum discharge, 20 ft^3/s, Oct. 2-10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	87	71	47	48	54	57	90	193	122	53	34
2	21	68	64	51	46	52	63	107	179	109	52	33
3	21	52	59	52	45	50	65	127	164	103	51	33
4	21	44	55	51	44	49	67	114	164	95	50	33
5	21	42	53	51	43	48	73	107	207	90	50	33
6	21	39	65	63	43	51	83	99	198	89	49	33
7	21	36	66	144	e45	51	92	90	153	96	48	33
8	21	34	59	337	42	49	93	83	123	100	47	32
9	21	33	55	256	40	47	102	77	107	89	46	32
10	21	32	52	178	40	47	167	73	100	90	45	31
11	33	31	50	140	39	57	176	70	112	95	44	31
12	29	31	48	121	38	81	220	70	121	94	43	30
13	27	34	71	104	38	71	307	77	138	97	43	30
14	25	62	127	94	38	66	720	84	167	94	42	29
15	25	49	106	85	37	63	462	88	177	78	42	29
16	24	55	125	78	37	61	294	89	165	74	41	29
17	23	49	161	73	37	58	210	96	154	75	40	32
18	23	45	131	68	37	55	161	111	254	e75	40	32
19	23	48	108	66	39	54	135	112	171	e70	40	30
20	22	59	93	65	38	52	119	113	140	e70	40	29
21	22	66	82	62	40	50	110	108	135	e65	40	29
22	46	105	74	60	e55	49	104	101	139	64	39	28
23	74	95	68	58	66	47	102	94	155	64	39	28
24	40	77	63	59	69	47	96	94	142	64	39	27
25	35	66	59	67	65	46	93	99	130	62	38	27
26	33	58	56	62	62	46	92	123	139	61	37	27
27	33	53	54	58	59	47	92	145	161	59	36	26
28	33	67	52	55	57	47	87	186	144	57	36	26
29	32	82	50	52	---	48	84	298	197	57	35	27
30	66	72	48	50	---	50	85	295	148	55	35	33
31	131	---	47	49	---	53	---	231	---	54	34	---
TOTAL	1010	1671	2272	2756	1287	1646	4611	3651	4677	2467	1314	906
MEAN	32.6	55.7	73.3	88.9	46.0	53.1	154	118	156	79.6	42.4	30.2
MAX	131	105	161	337	69	81	720	298	254	122	53	34
MIN	21	31	47	47	37	46	57	70	100	54	34	26
AC-FT	2000	3310	4510	5470	2550	3260	9150	7240	9280	4890	2610	1800
CFSM	1.42	2.43	3.20	3.88	2.01	2.32	6.71	5.14	6.81	3.48	1.85	1.32
IN.	1.64	2.71	3.69	4.48	2.09	2.67	7.49	5.93	7.60	4.01	2.13	1.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	39.9	71.2	78.0	82.1	95.3	84.8	103	124	115	72.9	46.4	35.2
MAX	98.8	175	205	218	363	166	154	207	217	142	96.3	59.7
(WY)	1998	1996	1996	1997	1996	1986	2002	1997	1999	1999	1999	1999
MIN	20.3	23.4	34.0	33.5	28.2	41.4	50.4	69.4	41.7	33.4	24.5	20.1
(WY)	1988	1994	2001	2001	1994	1985	1991	1991	1992	1992	1992	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	18073		28268			
ANNUAL MEAN	49.5		77.4		78.9	
HIGHEST ANNUAL MEAN					136	1997
LOWEST ANNUAL MEAN					43.2	1994
HIGHEST DAILY MEAN	241	May 16	720	Apr 14	2020	Feb 7 1996
LOWEST DAILY MEAN	21	Sep 17	21	Oct 2	17	Dec 22 1990
ANNUAL SEVEN-DAY MINIMUM	21	Sep 17	21	Oct 2	18	Oct 2 1994
ANNUAL RUNOFF (AC-FT)	35850		56070		57140	
ANNUAL RUNOFF (CFSM)	2.16		3.38		3.44	
ANNUAL RUNOFF (INCHES)	29.36		45.92		46.79	
10 PERCENT EXCEEDS	85		144		144	
50 PERCENT EXCEEDS	38		58		60	
90 PERCENT EXCEEDS	23		31		29	

e Estimated

14093000 SHITIKE CREEK NEAR WARM SPRINGS, OR

LOCATION.--Lat 44°45'41", long 121°14'25", in NE 1/4 NE 1/4, sec.25, T.9 S., R.12 E., Jefferson County, Hydrologic Unit 17070306, Warm Springs Indian Reservation on left bank 1.5 mi east of Warm Springs, and at mile 0.7.

DRAINAGE AREA.--104 mi^2.

PERIOD OF RECORD.--July 1911 to October 1916, April 1923 to September 1928, October 1972 to September 1974. October 1996 to current year. Records for October 1974 to September 1996 (see station 14092885) at site upstream not equivalent owing to difference in drainage area.

REVISED RECORDS.--WSP 1318: 1911-12, 1916, 1927.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,380 ft above NGVD of 1929, from topographic map. Prior to September 1928 non-recording gage 1.3 mi upstream, October 1972 to September 1974 water-stage recorder 0.4 mi downstream.

REMARKS.--Records fair. No regulation. Some diversions for irrigation and municipal use.

AVERAGE DISCHARGE.--18 years (water years 1912-16, 1924-28, 1973-74, 1997-2002), 114 ft^3/s, 14.89 in/yr, 82,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,000 ft^3/s Jan. 15, 1974, gage height, 4.36 ft; minimum daily discharge, 20 ft^3/s Dec. 8-15, 1972.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Feb. 7, 1996 reached a stage of 12.4 ft, information supplied by local resident, discharge about 4,400 ft^3/s, from rating curve extended above 900 ft^3/s on basis of runoff comparisons with nearby stations.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 31	0830	416	4.88	Apr. 14	1530	*1,140	*7.20

Minimum discharge, 33 ft^3/s Oct. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	157	95	72	81	95	105	118	239	162	66	46
2	35	131	e95	77	79	92	113	130	225	145	64	46
3	34	e100	e85	79	77	89	116	156	205	133	64	47
4	34	e85	78	78	75	87	119	151	191	124	63	47
5	34	e75	75	76	74	87	122	138	217	114	64	46
6	34	e70	86	102	73	89	128	136	230	107	64	47
7	35	e65	96	153	76	95	139	130	194	114	63	46
8	36	e62	85	260	75	92	145	119	167	125	60	46
9	36	e60	80	251	72	90	148	113	145	115	58	45
10	37	e58	76	201	71	89	202	105	130	111	57	43
11	45	57	73	170	71	91	218	100	139	114	56	43
12	46	57	70	153	69	134	238	98	149	117	55	42
13	42	58	73	139	69	128	289	104	163	114	55	41
14	41	89	133	128	68	121	797	114	184	120	54	41
15	40	92	124	119	67	115	e700	119	197	106	53	41
16	41	84	124	112	67	112	e430	121	192	95	51	42
17	e40	77	159	108	67	108	e280	123	184	95	51	43
18	e40	e70	146	101	67	105	e220	137	242	94	51	45
19	e40	70	128	98	68	104	e195	143	220	89	51	44
20	40	80	119	96	70	101	e180	150	178	86	52	43
21	e40	86	108	99	70	99	e165	146	164	80	54	42
22	42	103	100	93	79	95	e140	138	164	80	52	41
23	118	e120	94	90	104	93	139	130	175	80	51	41
24	e70	101	89	89	116	91	135	123	173	83	52	40
25	59	e90	85	102	113	92	128	125	159	78	52	40
26	55	e80	81	102	108	91	125	146	161	75	51	40
27	54	e75	79	94	103	92	123	171	182	74	51	40
28	58	82	78	91	100	93	119	196	176	71	50	40
29	59	e100	75	91	---	95	114	260	197	70	49	40
30	67	e95	73	85	---	96	114	315	194	69	47	45
31	210	---	72	83	---	99	---	271	---	68	46	---
TOTAL	1597	2529	2934	3592	2229	3060	6186	4526	5536	3108	1707	1293
MEAN	51.5	84.3	94.6	116	79.6	98.7	206	146	185	100	55.1	43.1
MAX	210	157	159	260	116	134	797	315	242	162	66	47
MIN	34	57	70	72	67	87	105	98	130	68	46	40
AC-FT	3170	5020	5820	7120	4420	6070	12270	8980	10980	6160	3390	2560
CFSM	0.50	0.81	0.91	1.11	0.77	0.95	1.98	1.40	1.77	0.96	0.53	0.41
IN.	0.57	0.90	1.05	1.28	0.80	1.09	2.21	1.62	1.98	1.11	0.61	0.46

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	65.1	97.3	116	141	132	124	140	164	155	105	69.1	59.7
MAX	109	167	283	432	261	222	206	238	315	213	127	87.7
(WY)	1998	1928	1997	1974	1916	1997	2002	1974	1974	1916	1999	1997
MIN	41.5	50.1	49.8	48.8	51.6	64.7	66.4	86.2	68.9	46.7	36.2	35.3
(WY)	1916	1926	2001	2001	2001	1973	1973	1973	1924	1924	1924	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	24802		38297			
ANNUAL MEAN	68.0		105		114	
HIGHEST ANNUAL MEAN					187	1997
LOWEST ANNUAL MEAN					62.0	2001
HIGHEST DAILY MEAN	281	May 1	797	Apr 14	2300	Jan 15 1974
LOWEST DAILY MEAN	34	Sep 13	34	Oct 3	20	Dec 8 1972
ANNUAL SEVEN-DAY MINIMUM	34	Sep 17	34	Oct 1	20	Dec 8 1972
ANNUAL RUNOFF (AC-FT)	49190		75960		82550	
ANNUAL RUNOFF (CFSM)	0.65		1.01		1.10	
ANNUAL RUNOFF (INCHES)	8.87		13.70		14.89	
10 PERCENT EXCEEDS	112		177		197	
50 PERCENT EXCEEDS	55		91		91	
90 PERCENT EXCEEDS	37		43		50	

e Estimated

14095500 WARM SPRINGS RIVER NEAR SIMNASHO, OR

LOCATION.--Lat 44°58'10", long 121°28'35", in SE 1/4 SW 1/4 sec.7, T.7 S., R.11 E., Wasco County, Hydrologic Unit 17070306, Warm Springs Indian Reservation, on right bank abutment of log bridge at Hehe Butte rodeo grounds, 3.3 mi upstream from Badger Creek, and 6.2 mi west of Simnasho, and at mile 30.5.

DRAINAGE AREA.--107 mi^2.

PERIOD OF RECORD.--June to September 1915, August 1949 to September 1954, October 1983 to current year. Prior to October 1983, published as "at Hehe Mill near Warm Springs."

GAGE.--Water-stage recorder. Datum of gage is 2,533.78 ft above NGVD of 1929. June to September 1915 1.0 mi downstream at different datum. August 1949 to September 1954 0.5 mi downstream at datum 7.12 ft lower.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--24 years (water years 1950-54, 1984-2002), 166 ft^3/s, 21.01 in/yr, 119,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,670 ft^3/s Feb. 7, 1996, gage height, 6.98 ft, from rating curve extended above 1,300 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 89 ft^3/s Aug. 14, 1994, due to temporary diversion.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 350 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	1200	*598	*4.20	No other peak greater than base discharge.			

Minimum discharge, 108 ft^3/s Sept. 9-29.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	109	115	127	115	135	150	182	257	218	127	116	109
2	109	112	135	116	132	148	194	271	213	126	116	109
3	109	111	118	115	130	142	198	281	208	125	115	109
4	109	110	111	115	127	140	200	269	201	125	115	109
5	109	110	111	113	126	140	208	262	196	124	116	109
6	109	110	128	126	125	161	218	257	192	123	116	109
7	109	109	135	150	128	167	233	246	186	124	116	109
8	109	109	122	185	129	154	239	234	182	125	115	109
9	109	109	117	191	126	150	247	226	178	124	115	109
10	109	110	114	176	123	149	275	219	173	123	115	109
11	114	110	112	167	123	167	291	214	167	123	115	109
12	110	110	111	167	122	271	308	213	164	123	115	109
13	109	111	132	165	121	250	343	218	160	122	115	108
14	109	113	212	155	120	227	552	217	158	120	113	108
15	109	110	152	149	120	214	529	218	155	120	113	108
16	109	111	148	145	120	204	450	215	152	120	113	108
17	109	111	169	142	120	191	386	217	151	120	113	109
18	109	109	157	138	120	179	338	223	156	119	113	109
19	109	111	144	137	126	178	308	223	150	119	113	108
20	109	115	137	142	130	175	292	225	145	119	113	108
21	109	121	131	156	130	166	283	227	141	119	113	108
22	113	143	127	143	139	159	277	221	138	118	112	108
23	125	140	123	136	159	157	286	216	135	120	112	108
24	115	121	121	136	176	155	275	214	133	119	112	108
25	112	119	119	172	174	155	268	212	131	118	112	108
26	110	116	118	173	168	154	268	213	130	118	112	108
27	110	113	117	154	161	157	265	216	129	117	112	108
28	111	120	119	147	157	158	256	219	128	116	112	108
29	110	129	116	143	---	164	250	226	129	116	112	108
30	115	122	115	137	---	167	253	229	129	116	110	109
31	117	---	117	135	---	174	---	223	---	116	110	---
TOTAL	3433	3460	4015	4541	3767	5323	8672	7121	4828	3744	3520	3255
MEAN	110.7	115.3	129.5	146.5	134.5	171.7	289.1	229.7	160.9	120.8	113.5	108.5
MAX	125	143	212	191	176	271	552	281	218	127	116	109
MIN	109	109	111	113	120	140	182	212	128	116	110	108
AC-FT	6810	6860	7960	9010	7470	10560	17200	14120	9580	7430	6980	6460
CFSM	1.03	1.08	1.21	1.37	1.26	1.60	2.70	2.15	1.50	1.13	1.06	1.01
IN.	1.19	1.20	1.40	1.58	1.31	1.85	3.01	2.48	1.68	1.30	1.22	1.13

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2002, BY WATER YEAR (WY)

MEAN	118.9	130.3	151.5	170.1	233.7	212.2	228.8	212.3	162.7	130.3	121.6	118.6
MAX	144	197	286	351	784	374	351	325	310	169	154	144
(WY)	1998	1951	1997	1997	1996	1986	1997	1997	1950	1999	1999	1999
MIN	102	106	104	107	106	112	120	106	102	97.9	95.6	96.9
(WY)	1993	1953	1953	1993	1993	1994	1994	1994	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1950 - 2002	
ANNUAL TOTAL	43590		55679			
ANNUAL MEAN	119.4		152.5		165.5	
HIGHEST ANNUAL MEAN					242	1997
LOWEST ANNUAL MEAN					107	1994
HIGHEST DAILY MEAN	212	Dec 14	552	Apr 14	3000	Feb 8 1996
LOWEST DAILY MEAN	105	Aug 8	108	Sep 13	93	Dec 14 1992
ANNUAL SEVEN-DAY MINIMUM	105	Aug 8	108	Sep 19	95	Jul 25 1994
ANNUAL RUNOFF (AC-FT)	86460		110400		119900	
ANNUAL RUNOFF (CFSM)	1.12		1.43		1.55	
ANNUAL RUNOFF (INCHES)	15.15		19.36		21.01	
10 PERCENT EXCEEDS	135		227		259	
50 PERCENT EXCEEDS	119		126		135	
90 PERCENT EXCEEDS	106		109		107	

14096300 MILL CREEK NEAR BADGER BUTTE, NEAR WARM SPRINGS, OR

LOCATION.--Lat 44°51'42", long 121°37'35", in SW 1/4 sec.23, T.8 S., R.9 E., Wasco County, Hydrologic Unit 17070306, Warm Springs Indian Reservation, on right bank 200 ft upstream from bridge on road B241, 3.4 mi upstream from headworks of Mill Creek Canal, 19.3 mi northwest of Warm Springs, and at mile 14.6.

DRAINAGE AREA.--26.8 mi^2.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 3,380 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records poor except those for the period Aug. 28 to Sept. 30, which are good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--19 years (water years 1984-2002), 69.5 ft^3/s, 35.23 in/yr, 50,350 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,300 ft^3/s Feb. 7, 1996, from rating curve extended above 800 ft^3/s on basis of slope-area measurement of peak flow, gage height, 8.42; maximum gage height, 9.49 ft, Feb. 7, 1996, from high-water mark on crest-stage gage; minimum discharge recorded, 23 ft^3/s Feb. 15, 25, 1993, but may have been lower during period of estimated record.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 13	2330	215	5.78	Apr. 14	0630	*537	*6.52
Jan. 8	1300	321	5.99				

Minimum discharge, 31 ft^3/s Oct. 1-5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	82	88	44	59	60	71	101	129	71	44	40
2	33	76	82	46	57	59	77	114	119	68	44	39
3	33	64	73	48	56	56	76	124	110	65	43	40
4	33	57	68	46	53	56	79	113	104	61	44	40
5	34	53	68	47	52	56	86	107	104	58	43	40
6	35	50	92	67	50	67	96	103	105	56	43	40
7	34	48	88	110	52	71	104	94	101	56	43	41
8	35	47	73	264	53	64	103	87	94	55	44	41
9	35	46	64	203	49	61	115	84	88	53	44	40
10	36	45	58	155	53	61	176	81	83	52	44	40
11	52	46	56	131	52	89	161	81	78	51	43	40
12	42	48	52	120	50	132	174	85	77	49	43	40
13	39	56	100	107	49	100	217	96	78	49	43	39
14	38	74	149	95	48	89	439	98	82	47	42	39
15	38	62	107	85	48	80	284	98	87	48	41	39
16	37	65	128	78	47	75	200	100	87	47	41	40
17	38	65	149	75	47	70	160	101	88	46	42	42
18	37	62	115	71	48	65	135	111	99	45	41	42
19	37	65	99	69	53	64	119	110	104	45	42	40
20	38	72	88	69	53	59	108	109	97	45	43	40
21	38	93	77	70	57	58	102	106	89	45	43	40
22	53	151	67	82	73	56	103	102	84	45	42	40
23	73	134	61	88	88	54	104	97	80	45	43	40
24	52	104	56	80	89	53	100	96	77	46	43	40
25	46	86	53	99	78	54	98	97	75	45	43	40
26	43	72	50	91	70	54	101	102	73	45	42	40
27	43	59	48	83	66	55	100	108	70	44	42	40
28	44	75	50	74	64	55	93	111	69	43	40	40
29	44	101	47	70	---	58	90	128	72	43	40	41
30	57	83	45	64	---	61	95	151	73	43	40	48
31	74	---	45	60	---	65	---	144	---	43	40	---
TOTAL	1305	2141	2396	2791	1614	2057	3966	3239	2676	1554	1315	1211
MEAN	42.1	71.4	77.3	90.0	57.6	66.4	132	104	89.2	50.1	42.4	40.4
MAX	74	151	149	264	89	132	439	151	129	71	44	48
MIN	33	45	45	44	47	53	71	81	69	43	40	39
AC-FT	2590	4250	4750	5540	3200	4080	7870	6420	5310	3080	2610	2400
CFSM	1.57	2.66	2.88	3.36	2.15	2.48	4.93	3.90	3.33	1.87	1.58	1.51
IN.	1.81	2.97	3.33	3.87	2.24	2.86	5.51	4.50	3.71	2.16	1.83	1.68

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	45.6	71.0	79.0	80.6	87.4	78.0	90.5	95.4	75.3	49.2	42.3	41.2
MAX	84.6	136	203	162	275	123	132	141	151	87.9	63.3	64.9
(WY)	1998	1996	1996	1996	1996	1997	2002	1997	1999	1999	1997	1997
MIN	30.0	38.2	44.1	43.8	40.0	58.1	62.4	43.7	33.3	34.2	31.1	28.2
(WY)	1993	1988	1994	1992	1993	1994	1991	1992	1992	1994	1992	1995

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	20495		26265			
ANNUAL MEAN	56.2		72.0		69.5	
HIGHEST ANNUAL MEAN					114	1996
LOWEST ANNUAL MEAN					46.5	1994
HIGHEST DAILY MEAN	226	May 16	439	Apr 14	1060	Feb 7 1996
LOWEST DAILY MEAN	32	Sep 18	33	Oct 2	25	Sep 21 1995
ANNUAL SEVEN-DAY MINIMUM	33	Sep 8	34	Oct 1	25	Sep 20 1995
ANNUAL RUNOFF (AC-FT)	40650		52100		50350	
ANNUAL RUNOFF (CFSM)	2.10		2.69		2.59	
ANNUAL RUNOFF (INCHES)	28.45		36.46		35.23	
10 PERCENT EXCEEDS	91		109		110	
50 PERCENT EXCEEDS	47		61		59	
90 PERCENT EXCEEDS	35		40		36	

14096850 BEAVER CREEK BELOW QUARTZ CREEK, NEAR SIMNASHO, OR

LOCATION.--Lat 44°57'32", long 121°23'35", in NE 1/4 SW 1/4 sec.14, T.7 S., R.11 E., Wasco County, Hydrologic Unit 17070306, Warm Springs Indian Reservation, on right bank 600 ft downstream from culvert on Warm Springs Reservation Highway 9, 200 ft downstream from Quartz Creek, and 2.4 mi west of Simnasho, and at mile 7.92.

DRAINAGE AREA.--145 mi^2.

PERIOD OF RECORD.--October 1983 to current year.

REVISED RECORDS.--WDR OR-96-1: 1986.

GAGE.--Water-stage recorder. Elevation of gage is 2,260 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good . No regulation or diversions upstream from station.

AVERAGE DISCHARGE.--19 years (water years 1984-2002), 86.0 ft^3/s, 8.06 in/yr, 62,320 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,760 ft^3/s, Feb. 7, 1996, gage height, 10.57 ft; minimum discharge, 4.5 ft^3/s Jan. 7, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 7	0300	*483	*3.93				

Minimum discharge, 35 ft^3/s Sept. 11-30.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	41	61	55	91	103	116	117	91	46	37	36
2	37	41	73	59	88	95	126	125	87	45	37	36
3	37	40	53	67	84	90	127	137	85	44	37	36
4	37	40	48	66	78	87	125	133	81	44	37	36
5	37	39	46	62	75	86	125	126	80	44	37	36
6	37	39	81	195	73	96	132	123	77	43	37	36
7	37	39	93	442	83	112	141	117	74	43	37	36
8	37	39	73	334	98	101	144	109	71	43	37	36
9	37	39	63	228	94	95	146	104	69	43	37	36
10	37	39	56	171	87	92	163	100	67	42	37	36
11	38	39	53	144	92	95	177	96	65	42	37	36
12	40	39	51	131	78	174	187	95	63	42	37	35
13	39	39	75	128	73	180	204	95	61	41	37	35
14	39	40	244	116	72	158	304	95	60	40	37	35
15	39	40	141	100	70	144	339	95	59	40	36	35
16	39	39	122	92	69	136	273	95	57	40	36	35
17	38	39	158	87	69	126	226	95	56	40	36	35
18	37	39	130	84	70	117	191	98	58	40	36	35
19	37	39	105	81	80	116	169	99	58	40	36	35
20	37	39	93	86	89	115	155	99	55	40	36	35
21	37	41	82	133	90	106	146	99	52	40	36	35
22	38	51	75	123	119	100	141	98	52	40	36	35
23	44	66	70	106	154	99	137	94	50	40	36	35
24	42	50	65	113	167	97	132	92	49	39	36	35
25	40	45	63	273	151	95	127	92	48	39	36	35
26	40	42	60	215	133	95	124	92	47	39	36	35
27	40	40	59	142	121	95	124	92	47	39	36	35
28	40	41	56	120	115	97	120	95	47	39	36	35
29	40	48	57	98	---	100	116	98	47	39	36	35
30	40	51	55	97	---	103	114	98	47	39	36	36
31	41	---	55	91	---	109	---	94	---	38	36	---
TOTAL	1195	1263	2516	4239	2663	3414	4851	3197	1860	1273	1130	1062
MEAN	38.55	42.10	81.16	136.7	95.11	110.1	161.7	103.1	62.00	41.06	36.45	35.40
MAX	44	66	244	442	167	180	339	137	91	46	37	36
MIN	37	39	46	55	69	86	114	92	47	38	36	35
AC-FT	2370	2510	4990	8410	5280	6770	9620	6340	3690	2520	2240	2110
CFSM	0.27	0.29	0.56	0.94	0.66	0.76	1.12	0.71	0.43	0.28	0.25	0.24
IN.	0.31	0.32	0.65	1.09	0.68	0.88	1.24	0.82	0.48	0.33	0.29	0.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	38.88	50.29	80.15	126.3	201.3	157.3	122.4	87.17	58.19	42.40	38.34	37.36
MAX	47.7	104	315	479	646	305	188	132	95.5	54.1	47.4	44.4
(WY)	1998	1985	1997	1997	1996	1986	2000	1999	1993	1999	1999	1999
MIN	33.1	35.6	40.0	42.3	42.7	53.0	60.8	44.6	36.6	32.3	30.5	30.4
(WY)	1995	1988	1986	2001	1994	2001	1994	1994	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	17697		28663			
ANNUAL MEAN	48.48		78.53		86.02	
HIGHEST ANNUAL MEAN					166	1997
LOWEST ANNUAL MEAN					41.6	1994
HIGHEST DAILY MEAN	244	Dec 14	442	Jan 7	3600	Feb 7 1996
LOWEST DAILY MEAN	37	Sep 10	35	Sep 12	5.8	Jan 7 1991
ANNUAL SEVEN-DAY MINIMUM	37	Sep 10	35	Sep 12	8.3	Jan 2 1991
ANNUAL RUNOFF (AC-FT)	35100		56850		62320	
ANNUAL RUNOFF (CFSM)	0.33		0.54		0.59	
ANNUAL RUNOFF (INCHES)	4.54		7.35		8.06	
10 PERCENT EXCEEDS	65		137		166	
50 PERCENT EXCEEDS	43		60		49	
90 PERCENT EXCEEDS	38		36		36	

14097100 WARM SPRINGS RIVER NEAR KAHNEETA HOT SPRINGS, OR

LOCATION.--Lat 44°51'24", long 121°08'55", in SE 1/4 SW 1/4 sec.23, T.8 S., R.13 E., Wasco County, Hydrologic Unit 17070306, Warm Springs Indian Reservation, on right bank 25 ft upstream from bridge, 2.5 mi east of Kahneeta Hot Springs, and at mile 4.6.

DRAINAGE AREA.--526 mi^2.

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,394.96 ft above NGVD 1929.

REMARKS.--Records good. No regulation. Small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--30 years (water years 1973-2002), 447 ft^3/s, 11.54 in/yr, 323,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft^3/s Feb. 7, 1996, gage height, 14.32 ft, from inside highwater mark and slope-area computation; minimum discharge, 149 ft^3/s Dec. 20, 1990, but may have been less during period of ice effect Dec. 20, 1990 to Jan. 10, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	2200	*1,960	*4.76	No other peak greater than base discharge.			

Minimum discharge, 223 ft^3/s Oct. 3-5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	283	375	323	423	465	520	657	636	324	262	246
2	231	283	443	341	412	443	554	689	604	316	261	246
3	229	267	355	364	400	425	573	740	578	311	262	246
4	229	256	321	361	382	417	575	733	554	309	263	247
5	229	250	315	343	371	413	589	701	535	305	264	247
6	229	241	417	480	369	431	619	688	529	301	266	248
7	231	238	598	1160	383	504	662	660	515	300	265	250
8	232	237	423	1010	405	467	686	622	498	300	261	249
9	233	237	368	960	417	444	693	594	480	293	255	248
10	234	238	338	774	390	435	822	574	461	291	255	246
11	254	237	324	678	404	437	903	558	440	288	253	246
12	259	238	314	617	375	718	932	550	426	285	252	245
13	244	241	328	603	357	784	1010	564	414	282	252	244
14	239	262	797	552	356	703	1580	584	410	278	250	244
15	238	263	653	505	346	647	1750	581	408	277	249	244
16	237	263	567	463	348	610	1380	581	402	276	247	244
17	235	263	672	461	345	581	1170	583	392	275	247	248
18	230	255	631	435	347	543	1000	605	409	274	248	249
19	232	259	543	426	360	527	890	617	428	273	249	246
20	232	273	496	421	394	520	818	619	405	273	249	244
21	232	293	451	609	388	493	763	617	384	271	251	242
22	237	340	416	547	436	475	740	606	371	270	252	242
23	287	464	392	500	526	466	739	587	357	271	252	244
24	281	366	371	485	597	458	724	574	348	280	253	243
25	247	330	356	724	578	454	700	570	340	274	252	243
26	240	307	344	742	539	451	692	575	333	269	250	242
27	239	280	335	572	512	456	694	591	328	267	250	244
28	238	300	322	509	494	459	675	613	325	265	249	243
29	239	360	330	440	---	470	646	633	328	265	248	243
30	249	368	321	455	---	482	643	675	330	264	246	250
31	271	---	322	427	---	500	---	665	---	263	246	---
TOTAL	7469	8492	13238	17287	11654	15678	24742	19206	12968	8790	7859	7363
MEAN	241	283	427	558	416	506	825	620	432	284	254	245
MAX	287	464	797	1160	597	784	1750	740	636	324	266	250
MIN	229	237	314	323	345	413	520	550	325	263	246	242
AC-FT	14810	16840	26260	34290	23120	31100	49080	38100	25720	17430	15590	14600
CFSM	0.46	0.54	0.81	1.06	0.79	0.96	1.57	1.18	0.82	0.54	0.48	0.47
IN.	0.53	0.60	0.94	1.22	0.82	1.11	1.75	1.36	0.92	0.62	0.56	0.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 2002, BY WATER YEAR (WY)

MEAN	263	324	493	589	760	647	590	527	390	285	260	254
MAX	358	570	1216	1773	2894	1285	956	848	803	407	344	334
(WY)	1998	1985	1997	1997	1996	1986	1997	1997	1974	1999	1999	1997
MIN	211	229	242	201	239	274	278	278	235	198	196	197
(WY)	1993	1994	1994	1979	1994	1977	1977	1977	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1973 - 2002	
ANNUAL TOTAL	109335		154746			
ANNUAL MEAN	300		424		447	
HIGHEST ANNUAL MEAN					786	1997
LOWEST ANNUAL MEAN					246	1994
HIGHEST DAILY MEAN	797	Dec 14	1750	Apr 15	15800	Feb 7 1996
LOWEST DAILY MEAN	228	Sep 18	229	Oct 3	160	Jan 1 1979
ANNUAL SEVEN-DAY MINIMUM	229	Sep 17	230	Oct 1	174	Dec 31 1978
ANNUAL RUNOFF (AC-FT)	216900		306900		323600	
ANNUAL RUNOFF (CFSM)	0.57		0.81		0.85	
ANNUAL RUNOFF (INCHES)	7.73		10.94		11.54	
10 PERCENT EXCEEDS	393		676		749	
50 PERCENT EXCEEDS	283		361		323	
90 PERCENT EXCEEDS	233		243		230	

14103000 DESCHUTES RIVER AT MOODY, NEAR BIGGS, OR

LOCATION.--Lat 45°37'20", long 120°54'05", in SW 1/4 SE 1/4 sec.26, T.2 N., R.15 E., Sherman County, Hydrologic Unit 17070306, on right bank at Moody, 4.0 mi southwest of Biggs, and at mile 1.4.

DRAINAGE AREA.--10,500 mi^2, approximately.

PERIOD OF RECORD.--October 1897 to December 1899 (published as "near Moro"), July 1906 to current year. Monthly discharge only for some periods, published in WSP 1318.

REVISED RECORDS.--WSP 754: Drainage area. WDR OR-96-1: 1965(M).

GAGE.--Water-stage recorder. Datum of gage is 167.54 ft above NGVD of 1929. Oct. 19, 1897, to Dec. 31, 1899, nonrecording gage at site 10 mi upstream at different datum. July 22, 1906, to July 18, 1930, nonrecording gage at site 300 ft downstream at datum 0.50 ft lower.

REMARKS.--Records good. Some fluctuation caused by regulation at Lake Simtustus since 1957. Some winter and spring runoff stored in Ochoco Reservoir, capacity, 46,420 acre-ft, in Crescent Lake, Crane Prairie, and Wickiup Reservoirs, combined capacity, 323,390 acre-ft, and since 1960, in Prineville Reservoir, and since 1964 in Lake Billy Chinook (station 14092100). Large diversions in upper river basin for irrigation. Water-quality records for periods 1911-12, 1953-58, 1962-90, have been collected at this location. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--52 years (water years 1898, 1899, 1907-1956), 5,851 ft^3/s, 4,239,000 acre-ft/yr.
46 years (water years 1957-2002), 5,815 ft^3/s, 4,213,000 acre-ft/yr, regulated.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,300 ft^3/s Feb. 8, 1996, gage height, 12.08 ft, from rating curve extended above 47,000 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 2,400 ft^3/s Dec. 5, 1957.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,460 ft^3/s Apr. 15, gage height, 3.96 ft; minimum discharge, 4,010 ft^3/s Oct. 2-6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4050	4840	5830	5250	5790	5390	5130	5490	6830	5270	4240	4380
2	4050	4890	5590	5410	5740	5420	5210	5590	6490	5180	4230	4380
3	4040	4850	5560	5600	5690	5340	5290	5740	6240	5030	4230	4380
4	4030	4840	5370	5600	5660	5220	5300	5760	5970	4950	4230	4380
5	4040	4900	5210	5570	5620	5450	5330	5680	5940	4750	4240	4350
6	4040	4890	5100	5650	5610	5480	5410	5630	5980	4740	4240	4270
7	4070	4820	5610	7690	5630	5550	5510	5550	5890	4710	4230	4280
8	4080	4670	5470	7890	5720	5550	5620	5450	5750	4740	4220	4270
9	4100	4560	5310	8000	5680	5200	5640	5350	5650	4700	4210	4170
10	4130	4550	5170	7600	5280	4970	5760	5310	5460	4570	4220	4190
11	4260	4550	5070	7130	5220	4960	6130	5220	5300	4540	4300	4170
12	4350	4540	4900	6780	5120	5210	6300	5100	5250	4520	4320	4170
13	4520	4550	4820	6620	5070	5690	6500	5120	5240	4520	4310	4170
14	4480	4570	5450	6160	4990	5560	7710	5170	5200	4640	4280	4160
15	4470	4650	5940	6020	4770	5430	9180	5190	5260	4640	4270	4170
16	4460	4630	5480	5820	4650	5350	8830	5190	5330	4600	4270	4170
17	4440	4660	5840	5490	4640	5270	8320	5220	5330	4590	4260	4190
18	4400	4600	6130	5110	4680	5200	7480	5270	5500	4600	4270	4210
19	4400	4580	6200	5110	4920	5150	6960	5330	5820	4570	4260	4300
20	4400	4600	5900	5290	4950	5140	6560	5400	5780	4580	4270	4290
21	4530	4630	5540	5480	4950	5090	6200	5440	5610	4580	4280	4280
22	4640	4750	5330	5640	4900	5060	6010	5390	5330	4550	4270	4300
23	4740	5190	5260	5540	5140	5040	5960	5350	5220	4460	4270	4400
24	4870	e5300	5200	5480	5360	5010	5890	5300	5120	4440	4260	4420
25	4850	e5300	5110	5600	5430	5000	5720	5270	5110	4440	4150	4410
26	4780	e5300	4980	6230	5320	4990	5680	5330	5150	4420	4200	4410
27	4780	5310	5000	6320	5230	4980	5670	5440	5130	4410	4390	4420
28	4740	5470	5230	6130	5220	5010	5660	5560	5170	4400	4390	4430
29	4650	5640	5270	6000	---	5030	5610	5790	5180	4380	4380	4430
30	4700	6040	5260	5930	---	5060	5550	6290	5220	4280	4370	4440
31	4730	---	5250	5880	---	5090	---	6740	---	4260	4370	---
TOTAL	136820	146670	167380	188020	146980	161890	186120	169660	166450	143060	132430	128990
MEAN	4414	4889	5399	6065	5249	5222	6204	5473	5548	4615	4272	4300
MAX	4870	6040	6200	8000	5790	5690	9180	6740	6830	5270	4390	4440
MIN	4030	4540	4820	5110	4640	4960	5130	5100	5110	4260	4150	4160
AC-FT	271400	290900	332000	372900	291500	321100	369200	336500	330200	283800	262700	255900

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2002, BY WATER YEAR (WY)

MEAN	4753	5458	6422	6951	7541	7251	6791	5929	5301	4622	4422	4458
MAX	5860	7814	13150	14980	16980	13580	10930	8267	7643	5917	5359	5285
(WY)	1998	1985	1965	1997	1996	1972	1984	1984	1974	1974	1976	1997
MIN	3385	3910	4446	4378	4021	4192	4467	4141	3988	3597	3411	3394
(WY)	1965	1965	1994	1964	1964	1964	1977	1977	1994	1964	1964	1964

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1957 - 2002	
ANNUAL TOTAL	1727470		1874470			
ANNUAL MEAN	4733		5136		5815	
HIGHEST ANNUAL MEAN					7969	1997
LOWEST ANNUAL MEAN					4290	1994
HIGHEST DAILY MEAN	6200	Dec 19	9180	Apr 15	63400	Feb 8 1996
LOWEST DAILY MEAN	3990	Sep 9	4030	Oct 4	2880	Dec 4 1957
ANNUAL SEVEN-DAY MINIMUM	3990	Sep 9	4050	Oct 1	3180	Dec 1 1957
ANNUAL RUNOFF (AC-FT)	3426000		3718000		4213000	
10 PERCENT EXCEEDS	5310		5950		8110	
50 PERCENT EXCEEDS	4720		5140		5190	
90 PERCENT EXCEEDS	4060		4260		4210	

e Estimated

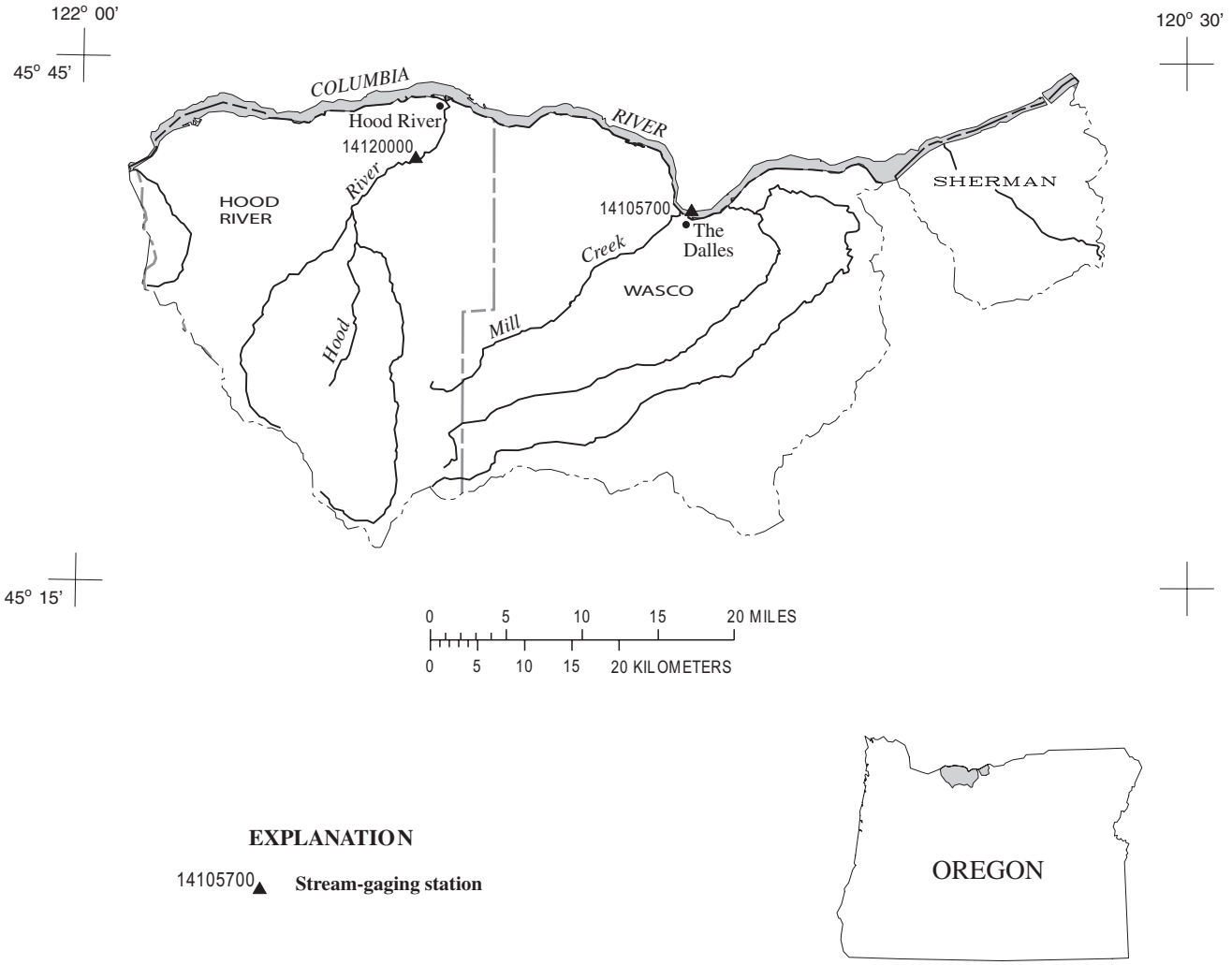
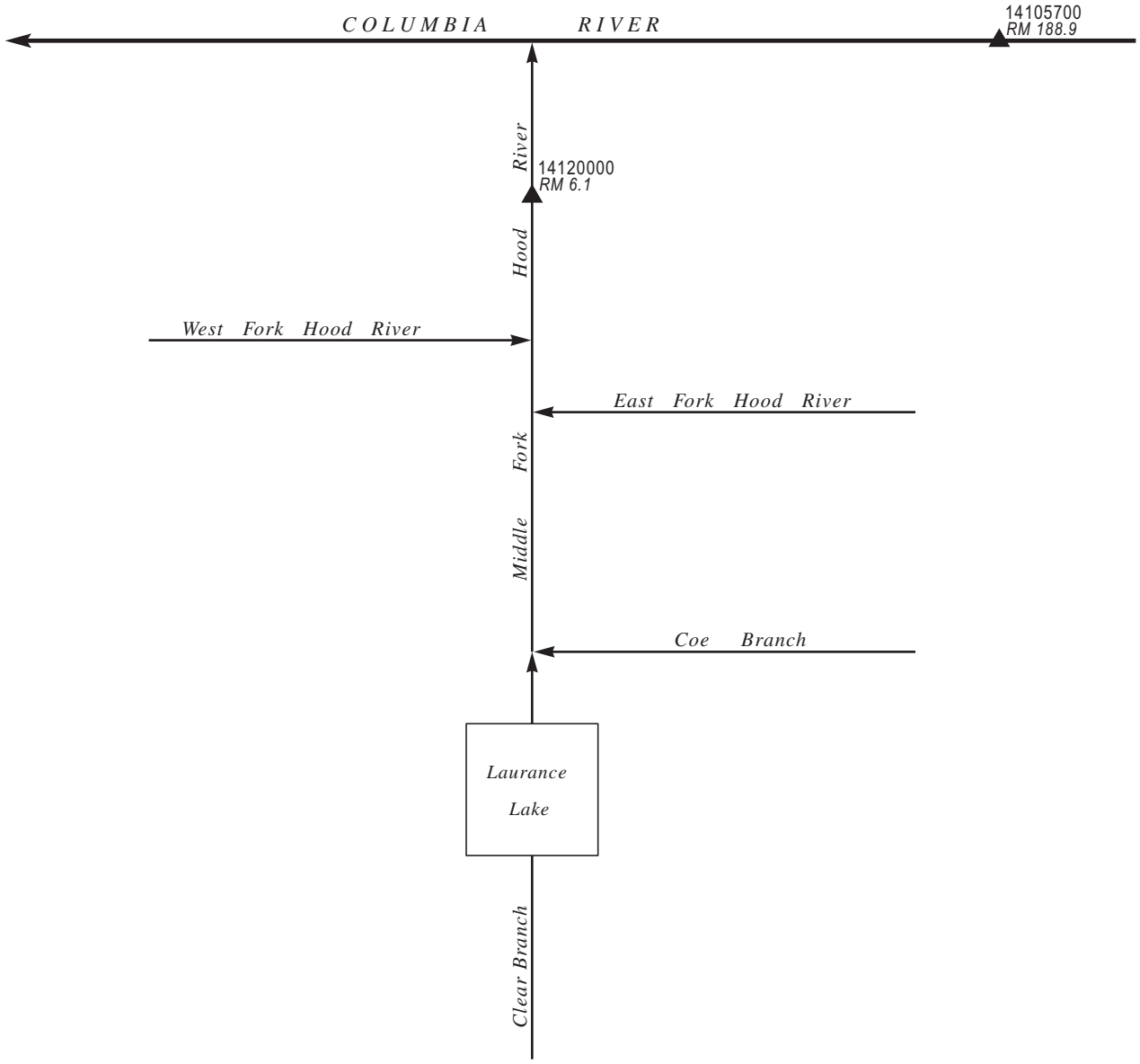


Figure 17. Location of surface-water stations in the Columbia River between the Deschutes River and Bonneville Dam and in the Hood River Basin.



EXPLANATION

▲14105700 **Stream-gaging station**

RM 6.1 **River mile**

Stream—Arrow shows direction of flow

Figure 18. Schematic diagram showing gaging stations in the Columbia River between the Deschutes River and Bonneville Dam and in the Hood River Basin.

14105700 COLUMBIA RIVER AT THE DALLES, OR

LOCATION.--Lat 45°36'27", long 121°10'20", in SW 1/4 SW 1/4 sec.34, T.2 N., R.13 E., Wasco County, Hydrologic Unit 17070105, Corps of Engineers land, on left bank 0.3 mi downstream from Mill Creek, 2.6 mi downstream from The Dalles Dam, and at mile 188.9.

DRAINAGE AREA.--237,000 mi^2, approximately.

PERIOD OF RECORD.--October 1857 to September 1877 (annual maximum only, at Lower Cascades Landing, published in WSP 1318), June 1878 to current year. Published as "near The Dalles" 1936-56.

REVISED RECORDS.--WSP 534: 1920(m). SP 1094: 1894. WSP 1248: 1866, 1888, 1899, 1909. WSP 1518: 1876(M).

GAGE.--Ultrasonic velocity meter (UVM) with water-stage and velocity-index recorder. Datum of gage is NGVD of 1929. See WSP 1738 for history of changes prior to Mar. 16, 1957. Mar. 16, 1957, to Sept 30, 1968, water-stage recorder at site 0.4 mi upstream at same datum.

REMARKS.--Records good. Considerable regulation by many large reservoirs. Diurnal fluctuations caused by powerplant and gates at The Dalles Dam. Many diversions for irrigation upstream from station. Continuous water-quality records for the period October 1957 to February 1985 have been collected at this location.

AVERAGE DISCHARGE.--124 years (water years 1879-2002), 191,200 ft^3/s, 138,500,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge (since 1858), 1,240,000 ft^3/s June 6, 1894, elevation, 106.5 ft; minimum discharge (since 1878), 12,100 ft^3/s Apr. 16, 1968 (due to closure of John Day dam, recorded by UVM).

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 377,000 ft^3/s June 6; maximum elevation, 82.95 ft June 5; minimum daily discharge, 64,800 ft^3/s Oct. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	94000	97700	110000	120000	173000	143000	158000	215000	351000	315000	169000	117000
2	107000	93400	106000	116000	147000	133000	177000	200000	320000	318000	159000	103000
3	86100	87100	96500	115000	125000	104000	147000	249000	306000	307000	172000	103000
4	72400	86000	116000	e125000	161000	125000	139000	235000	331000	319000	144000	126000
5	85600	82400	124000	e140000	154000	116000	135000	221000	367000	266000	164000	113000
6	74800	116000	111000	e135000	157000	124000	120000	219000	377000	264000	160000	118000
7	69500	115000	106000	e130000	161000	131000	114000	240000	340000	239000	155000	95100
8	72100	124000	116000	e105000	165000	115000	170000	257000	371000	228000	172000	79400
9	79500	114000	96700	151000	168000	128000	e155000	215000	334000	216000	174000	89000
10	97200	100000	117000	157000	124000	91300	178000	191000	293000	211000	143000	114000
11	81100	79500	127000	135000	145000	113000	190000	209000	351000	238000	153000	115000
12	84100	96200	132000	115000	168000	132000	184000	183000	298000	257000	155000	83100
13	64800	105000	e125000	115000	144000	169000	216000	211000	314000	249000	163000	84700
14	68800	98400	119000	130000	184000	141000	212000	e205000	274000	240000	152000	112000
15	101000	90000	118000	165000	159000	152000	269000	212000	290000	249000	163000	86700
16	87000	98000	101000	190000	126000	140000	346000	191000	256000	191000	162000	74300
17	114000	111000	110000	161000	114000	118000	350000	229000	303000	252000	133000	105000
18	113000	93400	151000	158000	130000	131000	322000	206000	305000	243000	127000	114000
19	85800	109000	136000	112000	134000	129000	296000	220000	348000	220000	140000	113000
20	76800	112000	148000	135000	151000	e115000	277000	224000	368000	212000	151000	123000
21	75400	119000	154000	136000	144000	e145000	287000	260000	358000	222000	163000	116000
22	79100	99900	137000	135000	132000	132000	255000	278000	319000	241000	159000	104000
23	88200	98300	131000	174000	105000	114000	e280000	265000	295000	195000	139000	139000
24	110000	120000	119000	171000	124000	83300	267000	283000	327000	202000	150000	110000
25	84400	112000	127000	128000	155000	143000	244000	251000	284000	185000	123000	124000
26	89800	116000	125000	152000	165000	125000	225000	238000	283000	154000	138000	127000
27	89400	132000	140000	122000	149000	125000	235000	237000	313000	156000	145000	126000
28	90500	150000	127000	144000	159000	122000	179000	283000	329000	147000	147000	86200
29	91400	123000	117000	164000	---	135000	215000	309000	361000	179000	130000	75600
30	91500	133000	118000	167000	---	140000	234000	294000	297000	188000	133000	102000
31	91600	---	119000	171000	---	121000	---	303000	---	165000	145000	---
TOTAL	2695900	3211300	3780200	4374000	4123000	3935600	6576000	7333000	9663000	7068000	4683000	3178100
MEAN	86960	107000	121900	141100	147200	127000	219200	236500	322100	228000	151100	105900
MAX	114000	150000	154000	190000	184000	169000	350000	309000	377000	319000	174000	139000
MIN	64800	79500	96500	105000	105000	83300	114000	183000	256000	147000	123000	74300
AC-FT	5347000	6370000	7498000	8676000	8178000	7806000	13040000	14550000	19170000	14020000	9289000	6304000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1879 - 2002, BY WATER YEAR (WY)

MEAN	104500	108200	116100	119200	129100	147000	204300	338300	435900	297800	172200	119900
MAX	174800	200800	258300	275000	340400	345000	386400	624400	1002000	793300	385700	198200
(WY)	1960	1928	1996	1997	1996	1983	1881	1897	1894	1880	1880	1880
MIN	69430	57830	52380	42430	51420	69820	98350	136100	123700	86780	91970	75760
(WY)	1930	1937	1937	1937	1937	1937	1944	1977	1977	2001	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1879 - 2002	
ANNUAL TOTAL	40919600		60621100			
ANNUAL MEAN	112100		166100		191200	
HIGHEST ANNUAL MEAN					313600	1894
LOWEST ANNUAL MEAN					117600	2001
HIGHEST DAILY MEAN	173000	May 17	377000	Jun 6	1230000	Jun 6 1894
LOWEST DAILY MEAN	62800	Sep 16	64800	Oct 13	36000	Jan 12 1937
ANNUAL SEVEN-DAY MINIMUM	76000	Sep 15	77100	Oct 3	38200	Jan 7 1937
ANNUAL RUNOFF (AC-FT)	81160000		120200000		138500000	
10 PERCENT EXCEEDS	140000		291000		381000	
50 PERCENT EXCEEDS	115000		141000		142000	
90 PERCENT EXCEEDS	80000		91400		80600	

e Estimated

14120000 HOOD RIVER AT TUCKER BRIDGE, NEAR HOOD RIVER, OR

LOCATION.--Lat 45°39'20", long 121°32'50", in SE 1/4 sec.15, T.2 N., R.10 E., Hood River County, Hydrologic Unit 17070105, on right bank 25 ft downstream from Tucker Bridge, 0.5 mi upstream from Odell Creek, 4.0 mi, southwest of town of Hood River, and at mile 6.1.

DRAINAGE AREA.--279 mi^2.

PERIOD OF RECORD.--October 1897 to December 1899, September 1913 to September 1914, August 1915 to September 1917, January 1965 to current year. Monthly discharge only for some periods, published in WSP 1318.

REVISED RECORDS.--WSP 1318: 1899. WSP 1935: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 383.2 ft above NGVD of 1929 (Oregon State Highway Department bench mark). Prior to July 23, 1915, nonrecording gage at bridge at various datums. July 23 to Dec. 21, 1915, water-stage recorder at site 0.8 mi upstream at different datum. January 1916 to September 1917, nonrecording gage at bridge at different datum. Jan. 16 to July 23, 1965, nonrecording gage at bridge.

REMARKS.--No estimated daily discharges. Records good except for the periods Oct. 23-25, Nov. 3, which are poor. Some daily fluctuation possibly caused by diversion dam upstream from station and sawmill at Dee. Diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--42 years (water years 1898-99, 1914, 1916-17, 1966-2002), 1,015 ft^3/s, 735,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,300 ft^3/s Feb. 7, 1996, gage height, 17.11 ft, from rating curve extended above 8,700 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge recorded, 136 ft^3/s Sept. 16, 1915, caused by temporary storage behind dam at Dee.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Dec. 22, 1964, reached a stage of 20.6 ft, present datum, discharge, 33,200 ft^3/s, from rating curve extended above 1,500 ft^3/s on basis of slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 13	2330	4,950	8.36	Apr. 14	0530	*6,250	*9.30

Minimum discharge, 213 ft^3/s Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	236	971	1310	662	957	914	918	1140	1460	861	370	304
2	245	964	1490	730	894	855	932	1250	1360	771	368	340
3	241	728	1080	699	871	813	912	1250	1270	726	347	331
4	250	545	904	684	831	785	913	1140	1240	665	342	276
5	236	502	815	655	804	791	966	1130	1400	616	323	250
6	241	449	1250	919	799	941	1080	1120	1360	615	305	245
7	240	403	1510	2330	972	886	1210	1030	1130	655	293	232
8	244	373	1120	3410	1080	809	1210	952	999	725	294	223
9	254	362	964	2500	994	766	1240	914	910	636	307	225
10	252	345	847	1870	922	786	1860	872	908	657	342	242
11	472	331	799	1540	885	1690	2000	861	930	688	350	275
12	325	330	743	1740	833	2760	2280	918	979	672	334	285
13	366	456	2360	1660	798	1900	2530	1020	1090	701	368	278
14	377	1250	3410	1400	760	1510	4860	1080	1200	705	367	286
15	393	777	2010	1230	726	1310	2940	1070	1210	590	363	276
16	377	714	2860	1110	700	1190	2250	1040	1150	547	342	268
17	358	639	2920	1030	680	1070	1820	1090	1060	570	307	342
18	338	555	2090	962	672	995	1530	1140	1410	568	297	288
19	342	625	1660	983	786	1230	1360	1150	1110	554	290	284
20	323	692	1420	1250	833	1230	1270	1170	986	496	284	285
21	256	768	1210	1580	1040	1090	1210	1160	957	475	270	264
22	528	1490	1080	1250	1620	1010	1180	1220	974	492	284	259
23	1050	1710	965	1120	2070	956	1150	1170	958	544	280	267
24	606	1160	887	1260	2010	923	1080	1120	904	541	285	275
25	451	894	827	2550	1480	905	1060	1120	858	527	286	273
26	394	756	778	2020	1230	903	1060	1220	900	522	296	269
27	372	652	744	1550	1090	930	1040	1310	946	494	308	265
28	344	698	734	1290	995	901	1000	1570	945	457	339	265
29	333	1030	692	1140	---	890	1010	2130	1440	551	347	274
30	658	927	664	1040	---	871	1060	1960	1060	507	320	407
31	1280	---	649	1000	---	890	---	1660	---	435	274	---
TOTAL	12382	22096	40792	43164	28332	33500	44931	36977	33104	18563	9882	8353
MEAN	399	737	1316	1392	1012	1081	1498	1193	1103	599	319	278
MAX	1280	1710	3410	3410	2070	2760	4860	2130	1460	861	370	407
MIN	236	330	649	655	672	766	912	861	858	435	270	223
AC-FT	24560	43830	80910	85620	56200	66450	89120	73340	65660	36820	19600	16570

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1898 - 2002, BY WATER YEAR (WY)

MEAN	484	1041	1450	1559	1575	1342	1318	1215	934	586	397	369
MAX	996	2546	4109	3313	4217	2915	2358	2418	2439	1687	1088	804
(WY)	1998	1996	1978	1974	1996	1972	1916	1969	1899	1899	1899	1899
MIN	218	282	438	363	430	681	704	532	278	229	209	188
(WY)	1988	1988	1977	1979	1977	1977	1973	1992	1992	1992	1992	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1898 - 2002	
ANNUAL TOTAL	222947		332076			
ANNUAL MEAN	611		910		1015	
HIGHEST ANNUAL MEAN					1664	1899
LOWEST ANNUAL MEAN					465	1977
HIGHEST DAILY MEAN	3410	Dec 14	4860	Apr 14	19200	Feb 7 1996
LOWEST DAILY MEAN	180	Sep 10	223	Sep 8	144	Sep 13 1994
ANNUAL SEVEN-DAY MINIMUM	189	Sep 6	241	Oct 1	155	Sep 10 1994
ANNUAL RUNOFF (AC-FT)	442200		658700		735500	
10 PERCENT EXCEEDS	1120		1540		1900	
50 PERCENT EXCEEDS	491		885		780	
90 PERCENT EXCEEDS	241		284		311	

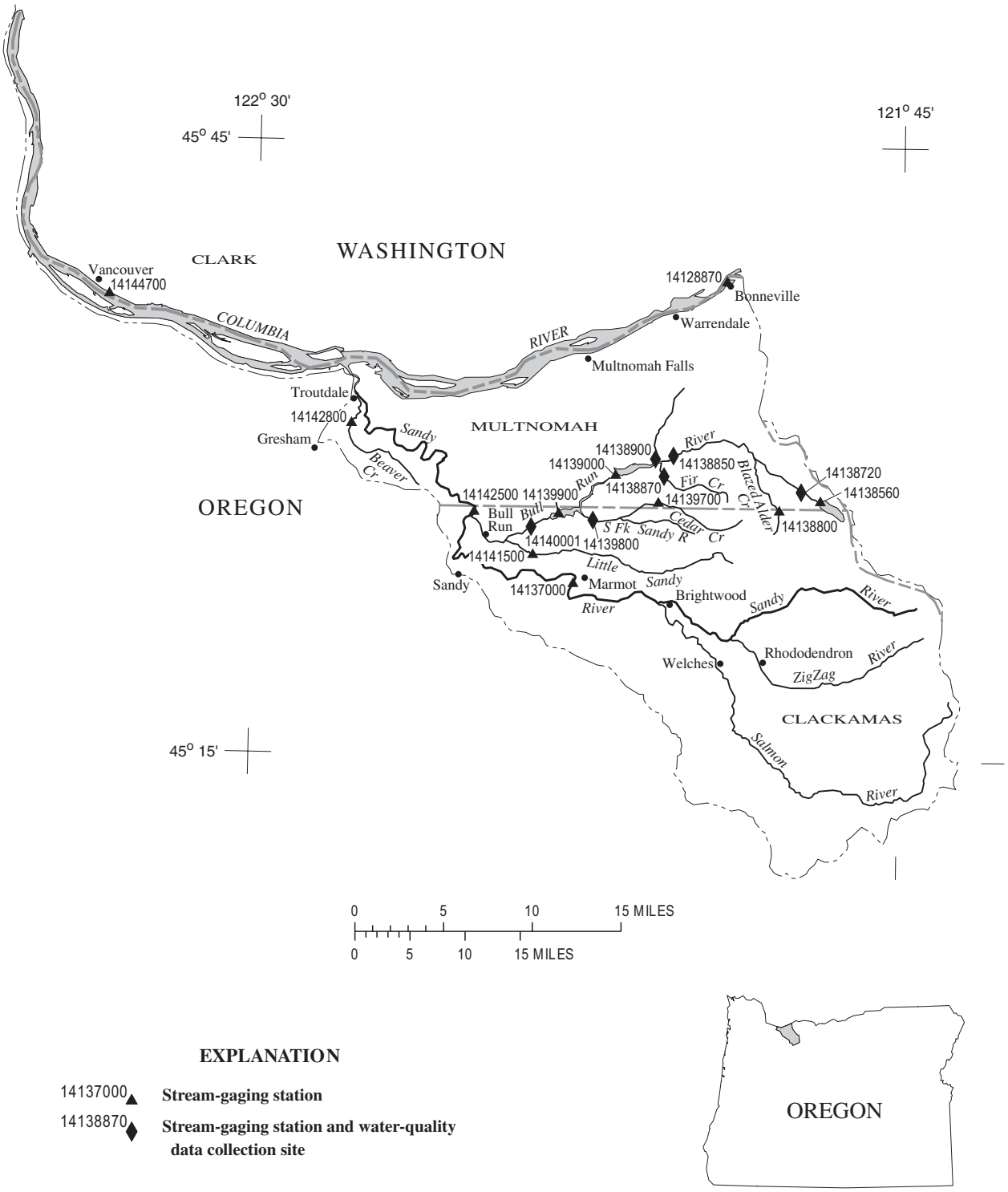


Figure 19. Location of surface-water and water-quality stations in the Columbia River between Bonneville Dam and confluence with the Willamette river and the Sandy River Basin.

14128870 COLUMBIA RIVER BELOW BONNEVILLE DAM, OR

LOCATION.--Lat 45°38'00", long 121°57'33", in sec.21, T.2 N., R.7 E., Multnomah County, Hydrologic Unit 17080001, on left bank 0.9 mi downstream from Bonneville Dam left bank powerhouse, 50 ft upstream from Tanner Creek, and at mile 144.5.

DRAINAGE AREA.--239,900 mi^2, approximately.

PERIOD OF RECORD.--May 1981 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to August 15, 1990, at a site 0.5 mi upstream at the same datum.

REMARKS.--Flow regulated by many reservoirs upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 35.11 ft Feb. 9, 1996; minimum, 6.14 ft July 15, 16, 2001.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 27.79 ft June 6; minimum, 6.20 ft Oct. 9.

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.69	6.75	8.38	10.26	8.83	9.50	17.34	11.70	13.80	11.98	11.36	11.68
2	11.36	7.61	9.31	10.37	8.25	9.50	17.14	11.45	13.80	12.22	11.54	11.77
3	10.54	7.74	8.78	9.77	8.10	8.89	16.77	11.59	13.58	11.96	11.57	11.73
4	8.27	6.58	7.32	9.89	7.03	8.23	15.79	11.26	13.11	12.07	11.45	11.67
5	9.26	6.32	7.35	10.55	7.49	8.58	17.22	11.42	13.37	13.31	11.54	12.26
6	9.47	7.06	7.81	11.24	9.59	10.23	16.57	11.47	13.25	13.42	11.54	12.41
7	8.57	6.60	7.39	11.41	9.47	10.32	14.72	11.50	12.65	14.80	12.41	14.02
8	8.01	6.35	6.96	12.73	9.38	10.73	13.52	11.50	12.20	15.33	13.94	14.57
9	7.97	6.20	6.85	12.87	9.67	10.96	13.27	11.37	11.90	18.09	14.50	15.80
10	9.85	6.66	8.15	11.34	7.65	9.23	13.78	11.50	12.19	18.11	15.54	16.82
11	10.03	7.58	8.60	8.66	7.35	7.88	15.41	11.51	12.70	15.85	13.62	14.78
12	8.82	7.31	7.96	10.70	7.39	9.24	16.19	11.43	13.38	13.95	12.75	13.35
13	8.04	6.49	7.28	10.27	8.61	9.52	17.31	11.44	13.28	15.24	13.42	14.02
14	8.87	6.53	7.58	12.92	8.88	10.79	17.19	12.08	14.40	15.03	12.10	13.37
15	10.75	7.91	9.19	12.01	9.56	10.71	16.91	12.02	14.46	17.53	11.45	13.30
16	10.51	7.47	9.19	11.39	9.64	10.32	18.00	11.56	13.88	18.31	15.90	17.15
17	13.68	9.08	10.59	13.02	9.51	10.91	18.55	12.15	14.82	17.55	13.78	15.87
18	13.16	9.94	11.05	12.94	9.51	10.67	19.27	12.33	16.72	16.10	12.36	15.02
19	11.25	7.86	9.32	11.23	8.19	9.51	18.78	12.96	16.22	14.52	11.82	13.14
20	8.93	6.96	7.96	11.70	9.80	11.01	18.30	11.68	14.43	15.40	11.66	12.93
21	8.41	6.51	7.31	11.56	10.89	11.26	18.82	13.21	16.49	15.47	12.02	14.07
22	8.86	6.54	7.41	11.71	11.12	11.33	18.63	11.47	13.94	15.59	11.87	13.99
23	9.05	7.38	8.05	11.57	11.05	11.24	16.55	11.47	13.41	16.81	14.04	15.67
24	10.12	7.42	9.23	13.19	11.09	11.88	13.82	11.53	11.82	17.43	14.19	16.21
25	9.70	7.29	8.09	12.81	11.02	11.66	11.84	11.55	11.70	16.22	11.52	13.48
26	9.88	6.67	7.83	13.01	11.01	11.70	13.52	11.28	11.75	17.37	13.37	16.02
27	9.63	7.62	8.63	16.31	11.01	12.77	12.02	11.37	11.70	16.33	13.82	14.64
28	9.58	7.60	8.53	15.94	11.07	13.16	13.05	11.38	11.84	16.68	13.55	15.26
29	10.01	9.01	9.46	17.19	11.45	13.84	12.18	11.54	11.74	18.26	13.73	16.42
30	9.97	8.02	9.03	17.50	11.46	13.92	12.07	11.48	11.73	18.09	14.06	16.67
31	9.47	7.36	8.39	---	---	---	12.01	11.31	11.67	18.13	13.65	16.27
MONTH	13.68	6.20	8.35	17.50	7.03	10.65	19.27	11.26	13.29	18.31	11.36	14.33

14128870 COLUMBIA RIVER BELOW BONNEVILLE DAM, OR--Continued

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	16.79	14.09	15.78	15.92	13.12	14.44	15.74	11.97	14.22	19.56	17.08	18.39
2	16.17	12.15	14.66	14.04	11.68	12.82	15.99	14.75	15.60	18.63	16.64	17.72
3	14.56	11.99	12.94	14.01	11.52	11.97	14.75	13.11	13.60	20.79	16.81	19.38
4	17.11	11.71	13.97	12.52	11.53	11.89	13.79	12.36	12.83	20.25	17.78	19.10
5	17.08	14.43	15.20	12.28	11.41	11.72	13.79	12.08	12.77	20.76	17.36	19.41
6	15.63	13.23	14.60	12.06	11.42	11.68	13.60	11.54	12.10	19.10	16.68	17.65
7	15.92	12.51	14.55	13.49	11.37	12.26	13.15	11.55	12.18	20.54	17.67	19.24
8	16.33	14.79	15.82	12.99	11.44	11.79	15.93	11.48	14.10	22.19	19.58	20.55
9	16.80	15.38	16.08	11.77	11.38	11.58	16.18	12.96	14.45	19.67	17.63	18.06
10	15.39	11.45	13.07	11.83	11.34	11.60	16.66	15.57	16.07	17.67	15.90	16.54
11	16.21	11.70	13.73	12.18	11.39	11.65	18.75	15.85	17.15	19.58	16.39	17.53
12	16.24	14.42	15.44	15.78	11.35	13.41	17.75	16.00	17.01	18.49	14.78	16.42
13	15.78	11.65	13.54	17.38	15.16	16.60	19.87	16.62	18.48	19.39	14.95	17.33
14	17.35	13.26	15.74	17.32	14.17	15.27	21.01	19.31	20.32	18.54	15.97	17.37
15	16.40	13.26	14.37	16.28	13.82	15.16	24.31	18.51	21.20	18.59	17.07	17.74
16	14.23	11.63	12.76	16.11	14.32	14.93	26.06	23.22	25.09	18.47	16.36	17.38
17	12.18	11.49	11.74	14.38	12.18	12.85	26.34	25.16	25.71	19.94	16.58	17.72
18	12.15	11.51	11.81	14.74	11.51	12.57	25.86	24.37	24.85	19.47	16.59	18.13
19	14.16	11.63	12.91	14.52	12.52	13.21	25.05	23.02	23.91	19.39	17.26	17.88
20	15.06	12.09	13.70	12.79	11.22	12.40	23.55	20.86	22.08	18.92	17.38	18.41
21	15.00	13.39	13.95	13.77	11.29	12.78	24.34	21.52	22.63	21.19	18.69	19.99
22	14.36	12.23	13.16	12.89	11.74	12.25	22.34	19.63	21.05	23.30	20.44	21.71
23	13.63	11.27	12.40	12.22	11.45	11.81	22.02	20.50	21.30	22.32	20.91	21.41
24	16.44	11.10	12.92	11.86	11.40	11.60	21.96	20.67	21.12	22.28	20.63	21.43
25	16.79	11.49	14.14	11.91	11.42	11.62	21.27	19.08	19.94	21.12	19.67	20.70
26	17.50	11.63	14.90	12.15	11.40	11.67	20.87	17.56	19.39	20.53	18.27	19.52
27	17.57	11.75	14.58	13.80	11.75	12.82	20.55	17.28	19.20	20.85	17.23	19.23
28	15.88	13.93	14.89	14.21	12.10	12.82	19.71	16.57	17.39	22.79	20.61	21.54
29	---	---	---	14.07	11.42	13.20	17.82	16.47	17.21	23.96	21.46	23.22
30	---	---	---	14.89	11.75	12.71	19.40	17.70	18.85	23.40	21.44	22.54
31	---	---	---	14.97	11.98	12.62	---	---	---	23.86	22.83	23.16
MONTH	17.57	11.10	14.05	17.38	11.22	12.76	26.34	11.48	18.39	23.96	14.78	19.24

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	27.27	23.34	24.83	25.70	20.42	23.54	16.29	13.50	14.51	14.67	10.30	11.52
2	25.87	23.48	23.99	24.58	22.88	23.67	15.36	13.63	14.21	12.17	7.95	9.60
3	24.96	21.14	23.10	24.17	21.71	22.79	15.07	14.10	14.50	10.04	7.95	9.36
4	25.50	22.74	24.33	23.43	22.58	23.10	14.92	11.50	12.90	12.53	8.15	10.76
5	27.69	23.41	25.68	23.25	20.87	21.53	15.72	12.04	14.15	12.36	9.97	10.89
6	27.79	26.01	26.85	21.71	18.05	19.87	15.90	13.64	14.81	11.93	8.96	10.76
7	26.76	24.84	25.65	21.75	18.30	19.54	13.84	12.69	12.99	10.83	9.00	9.78
8	26.57	24.96	25.73	21.59	18.46	19.35	15.60	12.96	14.53	9.77	8.18	9.01
9	25.08	22.97	24.13	20.00	16.12	18.06	16.94	14.45	15.66	9.86	8.05	8.82
10	23.95	21.96	23.02	19.71	16.68	17.60	14.46	12.58	13.28	12.50	8.17	10.11
11	25.90	21.76	24.24	20.70	17.45	18.79	15.69	12.32	14.01	11.91	9.18	10.43
12	25.76	20.95	22.66	22.07	18.57	20.15	15.03	11.61	13.28	10.36	7.54	8.58
13	24.31	21.13	22.80	22.01	18.08	19.74	15.58	11.86	14.03	9.08	7.24	7.91
14	23.72	20.31	21.87	20.51	17.75	19.34	14.73	12.89	13.92	11.68	8.01	9.96
15	23.07	21.45	22.23	21.19	18.73	19.62	15.52	13.19	14.18	11.92	7.51	8.86
16	22.95	20.59	21.34	19.28	16.96	17.93	15.62	13.36	14.90	8.71	6.66	7.79
17	23.99	19.84	22.29	21.39	16.50	18.28	15.99	11.59	12.83	10.93	7.38	9.14
18	23.80	20.81	22.30	20.90	18.60	19.70	12.73	11.75	12.03	11.05	8.53	10.30
19	25.25	23.52	24.55	19.55	16.93	18.08	13.99	11.73	12.71	11.32	8.91	10.43
20	26.10	24.97	25.68	20.54	16.37	17.76	14.40	13.18	13.60	12.52	8.53	11.04
21	26.02	25.00	25.46	20.53	18.21	18.83	14.74	13.49	14.00	12.48	9.32	10.91
22	25.87	23.32	24.14	19.95	17.75	18.89	14.72	12.56	13.20	11.70	8.45	9.53
23	24.13	21.42	22.60	17.91	15.94	16.57	13.76	12.73	13.23	13.58	10.30	12.16
24	25.16	21.97	23.69	17.88	16.31	17.06	15.18	12.22	13.58	13.24	9.98	10.93
25	23.65	21.37	22.28	17.82	15.08	16.72	14.11	10.54	11.86	12.29	7.88	10.68
26	23.13	20.67	21.77	16.60	12.80	14.63	13.11	10.04	11.68	12.96	8.95	11.57
27	23.93	21.62	22.80	15.27	13.89	14.83	13.01	11.24	11.98	13.09	9.88	11.46
28	25.31	23.11	23.79	14.89	13.24	14.05	14.22	11.60	12.87	12.04	8.38	9.35
29	27.30	24.62	25.54	16.15	12.76	13.75	13.48	11.08	12.00	9.91	7.77	8.72
30	25.62	22.07	23.41	16.97	15.18	15.87	14.15	10.64	11.80	9.15	7.55	8.34
31	---	---	---	15.90	12.74	14.11	14.64	11.50	12.67	---	---	---
MONTH	27.79	19.84	23.76	25.70	12.74	18.51	16.94	10.04	13.42	14.67	6.66	9.96
YEAR	27.79	6.20	14.72									

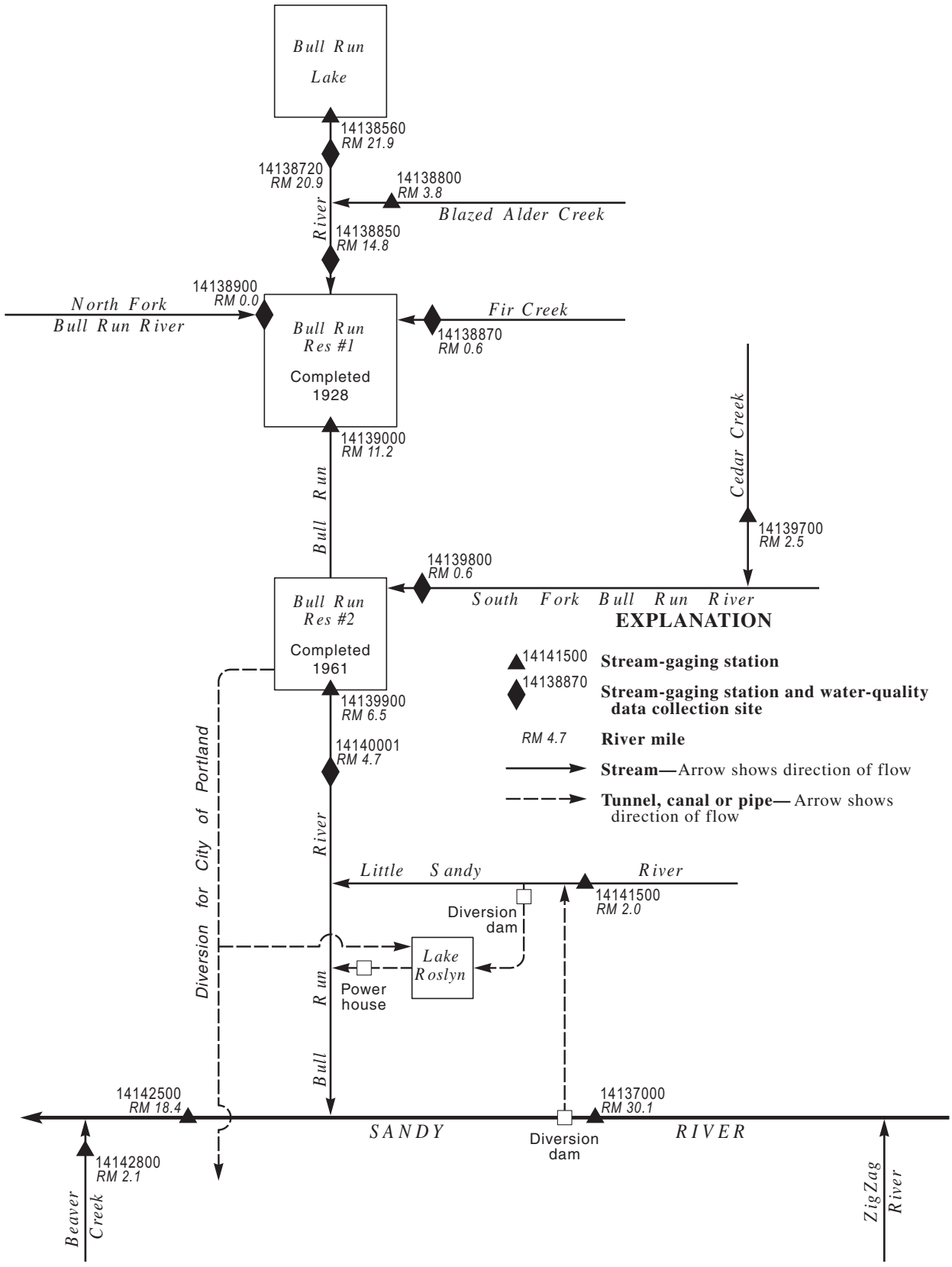


Figure 20. Schematic diagram showing gaging stations and diversions in the Sandy River Basin.

14137000 SANDY RIVER NEAR MARMOT, OR

LOCATION.--Lat 45°23'56", long 122°07'38", in NW 1/4 sec.18, T.2 S., R.6 E., Clackamas County, Hydrologic Unit 17080001, on right bank 0.6 mi west/northwest of Marmot, 0.3 mi upstream from Marmot Dam of Portland General Electric Co., 7.2 mi downstream from Salmon River, and at mile 30.3.

DRAINAGE AREA.--263 mi^2.

PERIOD OF RECORD.--August 1911 to current year. Monthly discharges only, January to September 1916, October 1918 to June 1919, published in WSP 1318. Published as "at Marmot" October 1912 to September 1913. Records for January 1916 to June 1919, published as "below dam, near Marmot," obtained by combining records for Sandy River below dam, near Marmot, with records for Sandy River Canal near Marmot.

REVISED RECORDS.--WSP 594: Drainage area. WSP 1288: 1912(M), 1915, 1922, 1924, 1934(M). WSP 1318: 1932(M), WDR OR-97-1: Drainage Area.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Portland General Electric). Aug. 15, 1911, to Dec. 20, 1915, and July 2, 1919, to Oct. 19, 1933, nonrecording gage at site 1.5 mi upstream at different datum. Oct. 20, 1933, to Sept. 30, 1958, water-stage recorder at site 1.1 mi upstream at different datum. Sept. 30, 1958 to Mar. 11, 1997, water-stage recorder at site 0.6 mi upstream, at different datum.

REMARKS.--Records poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--89 years (water years 1912-15, 1917-18, 1920-2002), 1,350 ft^3/s, 69.77 in/yr, 978,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 61,400 ft^3/s Dec. 22, 1964, gage height, 17.05 ft, site and datum then in use, from rating curve extended above 7,000 ft^3/s; maximum gage height, 20.40 ft, Feb. 7, 1996, site and datum then in use; minimum, 190 ft^3/s Oct. 13, 1994.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 14	0300	7,750	735.01	Apr. 14	0600	*10,900	*736.16

Minimum daily discharge, 264 ft^3/s Oct. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	269	2130	2640	951	1100	1160	1320	1560	2070	1040	470	417
2	271	2040	2890	1080	1050	1060	1360	1640	1940	940	462	421
3	264	1410	2320	1070	1050	981	1370	1710	1840	875	449	421
4	283	1090	1920	1030	1040	949	1490	1590	1770	810	455	422
5	281	1040	1700	1010	1020	954	1770	1560	1900	780	444	416
6	286	912	3190	1530	1030	1480	1860	1590	1860	773	425	415
7	280	829	4510	2700	1380	1520	2160	1470	1650	785	419	412
8	303	777	3000	4330	1780	1270	2110	1360	1500	806	e410	413
9	316	735	2470	3210	1580	1130	2120	1310	1420	748	426	416
10	313	706	2120	2270	1390	1080	3050	1220	1340	782	436	428
11	818	686	2040	1870	1360	2100	3290	1190	1360	767	429	434
12	446	700	1910	2090	1190	4290	3480	1290	1440	733	423	440
13	478	975	4600	2120	1070	2580	3760	1530	1580	745	433	438
14	462	2680	5980	1770	1010	2050	8180	1580	1710	709	428	428
15	443	1520	3460	1520	978	1750	4700	1580	1640	644	412	416
16	473	1330	4830	1370	971	1580	3270	1540	1510	623	398	410
17	462	1410	5000	1250	986	1420	2620	1620	1430	631	398	428
18	423	1170	3310	1200	1000	1280	2200	1700	1900	617	393	446
19	404	1060	2510	1250	1210	1810	1940	1730	1570	604	386	441
20	405	1060	2070	1710	1380	1880	1770	1790	1400	579	389	437
21	403	1110	1730	2310	1590	1690	1670	1830	1350	568	395	424
22	1110	2660	1490	1720	2180	1500	1590	2060	1330	573	395	415
23	2470	4010	1290	1460	3060	1370	1550	2010	1270	583	394	406
24	1450	2380	1160	1520	3160	1380	1470	1880	1180	554	401	400
25	970	1740	1100	3380	2110	1380	1450	1850	1110	549	399	397
26	838	1370	1030	2630	1670	1360	1460	1950	1150	557	408	393
27	762	1130	999	1930	1420	1440	1500	2060	1140	546	412	388
28	724	2030	994	1570	1250	1400	1430	2210	1080	522	425	378
29	683	3260	949	1340	---	1350	1450	2800	1620	550	431	369
30	1070	2500	913	1180	---	1280	1540	2610	1230	523	426	359
31	2460	---	924	1140	---	1290	---	2310	---	e490	422	---
TOTAL	20620	46450	75049	55511	40015	47764	68930	54130	45290	21006	12993	12428
MEAN	665	1548	2421	1791	1429	1541	2298	1746	1510	678	419	414
MAX	2470	4010	5980	4330	3160	4290	8180	2800	2070	1040	470	446
MIN	264	686	913	951	971	949	1320	1190	1080	490	386	359
AC-FT	40900	92130	148900	110100	79370	94740	136700	107400	89830	41670	25770	24650
CFSM	2.53	5.89	9.21	6.81	5.43	5.86	8.74	6.64	5.74	2.58	1.59	1.58
IN.	2.92	6.57	10.62	7.85	5.66	6.76	9.75	7.66	6.41	2.97	1.84	1.76

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	654	1605	2095	2011	1871	1647	1870	1800	1221	644	428	414
MAX	2168	4777	6278	4752	4971	3983	3134	3443	3457	1385	663	1056
(WY)	1960	1996	1965	1953	1996	1972	1962	1949	1917	1917	1974	1959
MIN	239	236	445	498	464	631	658	743	420	354	268	244
(WY)	1988	1937	1977	1937	1977	1941	1941	1992	1992	1992	1940	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	352408		500186			
ANNUAL MEAN	966		1370		1350	
HIGHEST ANNUAL MEAN					2018	1996
LOWEST ANNUAL MEAN					766	1977
HIGHEST DAILY MEAN	5980	Dec 14	8180	Apr 14	41400	Dec 22 1964
LOWEST DAILY MEAN	244	Sep 29	264	Oct 3	193	Oct 13 1994
ANNUAL SEVEN-DAY MINIMUM	252	Sep 16	276	Oct 1	196	Oct 7 1994
ANNUAL RUNOFF (AC-FT)	699000		992100		978400	
ANNUAL RUNOFF (CFSM)	3.67		5.21		5.13	
ANNUAL RUNOFF (INCHES)	49.85		70.75		69.77	
10 PERCENT EXCEEDS	2090		2480		2620	
50 PERCENT EXCEEDS	735		1250		998	
90 PERCENT EXCEEDS	294		412		352	

e Estimated

14138560 BULL RUN LAKE NEAR BRIGHTWOOD, OR

LOCATION.--Lat 45°27'40", long 121°50'37", in SE 1/4 SE 1/4 sec.20, T.1 S., R.8 E., Multnomah County, Hydrologic Unit 17080001, in Mount Hood National Forest, in main cabin on northwest side of Bull Run Lake, near outlet structure, 10.7 mi northeast of Brightwood, and at mile 21.9.

DRAINAGE AREA.--3.5 mi^2.

PERIOD OF RECORD.--October 1992 to current year.

REVISED RECORDS.--WDR OR-95-1: 1993, 1994.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929, Portland Water Bureau datum.

REMARKS.--Bull Run Lake was formed by natural processes, including a large landslide. A temporary log crib dam was constructed in 1917 to increase the capacity of the lake. In 1920 the log crib dam was reconstructed. A concrete dam and improved outlet valve were constructed in 1958. A lower outlet and tunnel was constructed in 1961. Portland Water Bureau releases water from the lake to augment streamflows during periods of low flow.

COOPERATION.--Capacity table provided by Portland Water Bureau, extended above 3,180 ft by U.S. Geological Survey, Oct. 1, 1996.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 48,340 acre-ft Feb. 9, 1996, elevation, 3,185.02 ft; minimum contents observed, 31,080 acre-ft Oct. 29, 1992, elevation, 3,143.97 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 44,550 acre-ft June 30, elevation, 3,176.60 ft; minimum contents, 36,650 acre-ft Oct. 21, elevation, 3,158.23 ft.

Capacity Table (elevation, in feet and contents, in acre-feet)

2,905	0	3,140	29,510
2,940	229	3,150	33,410
2,980	1,270	3,160	37,380
3,020	3,740	3,180	46,080
3,060	8,880	3,186	48,780
3,100	17,280		

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3159.31	3159.51	3162.62	3165.81	3168.06	3167.67	3168.03	3171.37	3174.18	3176.56	3173.34	3169.85
2	3159.23	3159.64	3162.67	3165.76	3167.98	3167.61	3167.98	3171.40	3174.29	3176.51	3173.22	3169.73
3	3159.14	3159.67	3162.74	3165.75	3167.95	3167.57	3167.95	3171.42	3174.38	3176.44	3173.10	3169.63
4	3159.00	3159.70	3162.91	3165.71	3167.87	3167.53	3167.92	3171.42	3174.50	3176.38	3173.01	3169.51
5	3158.95	3159.73	3163.03	3165.71	3167.81	3167.52	3167.92	3171.51	3174.69	3176.30	3172.88	3169.39
6	3158.87	3159.70	3163.28	3165.93	3167.81	3167.61	3167.99	3171.56	3174.78	3176.22	3172.76	3169.29
7	3158.80	3159.67	3163.32	3166.38	3167.85	3167.58	3168.11	3171.57	3174.85	3176.15	3172.65	3169.18
8	3158.77	3159.63	3163.38	3166.91	3167.89	3167.57	3168.17	3171.54	3174.89	3176.08	3172.54	3169.07
9	3158.69	3159.59	3163.38	3167.12	3167.82	3167.52	3168.31	3171.51	3174.91	3175.99	3172.43	3168.97
10	3158.79	3159.55	3163.46	3167.20	3167.76	3167.56	3168.64	3171.47	3174.93	3175.91	3172.31	3168.87
11	3158.78	3159.49	3163.49	3167.21	3167.71	3167.93	3168.97	3171.44	3174.99	3175.79	3172.20	3168.77
12	3158.77	3159.48	3163.58	3167.39	3167.62	3168.16	3169.35	3171.44	3175.09	3175.70	3172.07	3168.66
13	3158.68	3159.92	3164.27	3167.44	3167.53	3168.32	3170.01	3171.51	3175.22	3175.58	3171.96	3168.56
14	3158.68	3160.22	3164.80	3167.47	3167.49	3168.38	3171.07	3171.58	3175.38	3175.47	3171.84	3168.46
15	3158.60	3160.38	3164.98	3167.44	3167.39	3168.41	3171.40	3171.62	3175.50	3175.36	3171.73	3168.35
16	3158.56	3160.49	3165.58	3167.45	3167.30	3168.43	3171.56	3171.65	3175.57	3175.25	3171.60	3168.29
17	3158.49	3160.52	3165.88	3167.42	3167.23	3168.42	3171.63	3171.72	3175.75	3175.13	3171.47	3168.24
18	3158.42	3160.55	3166.04	3167.44	3167.15	3168.47	3171.64	3171.78	3175.98	3175.02	3171.37	3168.14
19	3158.35	3160.63	3166.09	3167.49	3167.18	3168.56	3171.63	3171.92	3176.07	3174.89	3171.25	3168.05
20	3158.28	3160.67	3166.15	3167.78	3167.11	3168.49	3171.62	3172.00	3176.12	3174.78	3171.14	3167.95
21	3158.28	3160.79	3166.15	3167.85	3167.19	3168.49	3171.59	3172.11	3176.18	3174.67	3171.03	3167.87
22	3158.60	3161.37	3166.14	3167.91	3167.24	3168.43	3171.56	3172.25	3176.24	3174.55	3170.92	3167.74
23	3158.80	3161.62	3166.10	3167.94	3167.58	3168.38	3171.53	3172.35	3176.27	3174.43	3170.81	3167.61
24	3158.79	3161.73	3166.07	3168.07	3167.73	3168.36	3171.49	3172.42	3176.28	3174.31	3170.71	3167.52
25	3158.79	3161.80	3166.01	3168.30	3167.77	3168.31	3171.46	3172.52	3176.30	3174.19	3170.60	3167.41
26	3158.75	3161.83	3165.93	3168.32	3167.76	3168.30	3171.45	3172.66	3176.31	3174.07	3170.49	3167.30
27	3158.73	3161.82	3165.94	3168.29	3167.73	3168.26	3171.43	3172.86	3176.28	3173.95	3170.38	3167.21
28	3158.67	3162.11	3165.92	3168.23	3167.71	3168.22	3171.40	3173.17	3176.44	3173.83	3170.29	3167.11
29	3158.66	3162.27	3165.86	3168.17	---	3168.16	3171.37	3173.60	3176.59	3173.71	3170.17	3167.15
30	3158.94	3162.35	3165.81	3168.11	---	3168.12	3171.36	3173.85	3176.59	3173.58	3170.05	3167.13
31	3159.31	---	3165.80	3168.12	---	3168.07	---	3174.04	---	3173.47	3169.96	---
MAX	3159.31	3162.35	3166.15	3168.32	3168.06	3168.56	3171.64	3174.04	3176.59	3176.56	3173.34	3169.85
MIN	3158.28	3159.48	3162.62	3165.71	3167.11	3167.52	3167.92	3171.37	3174.18	3173.47	3169.96	3167.11
(†)	37100	38360	39820	40820	40640	40800	42230	43410	44550	43160	41620	40390
(‡)	-30	+1260	+1460	+1000	-180	+160	+1430	+1180	+1140	-1390	-1540	-1230

CAL YR 2001 MAX 3166.15 MIN 59.39 AC-FT‡ +1440
WTR YR 2002 MAX 3176.59 MIN 3158.28 AC-FT‡ +3260

† Contents, in acre-feet, at 2400, on last day of month.
‡ Change in contents, in acre-feet.

14138720 BULL RUN RIVER AT LOWER FLUME, NEAR BRIGHTWOOD, OR

LOCATION.--(revised)Lat 45°28'16", long 121°51'51", in SE 1/4 NE 1/4 sec.19, T.1 S., R.8 E., Multnomah County, Hydrologic Unit 17080001, at flume, 1.0 mi downstream from outlet structure at Bull Run Lake, 10.4 mi northeast of Brightwood, and at mile 20.9.

DRAINAGE AREA.--5.08 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1992 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,840 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. Regulation at times by Bull Run Lake. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--10 years (water years 1993-2002), 26.4 ft^3/s, 19,120 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 148 ft^3/s Feb. 7, 1996, gage height, 3.05 ft, from rating curve extended above 63 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 8.2 ft^3/s Oct. 28, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 60 ft^3/s Apr. 14, gage height, 2.38 ft; minimum discharge, 12 ft^3/s Oct. 1-22, 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	16	23	23	23	24	24	30	38	32	25	20
2	12	16	24	23	23	23	24	30	39	32	24	20
3	12	16	23	23	23	23	24	30	39	32	24	20
4	12	15	22	22	23	23	24	30	39	31	24	20
5	12	15	22	22	22	23	25	30	38	31	24	20
6	12	14	23	23	22	23	25	30	38	31	24	20
7	12	14	24	28	22	23	26	29	38	30	23	19
8	12	14	24	33	22	23	27	29	37	30	23	19
9	12	14	23	33	22	23	27	29	37	30	23	19
10	12	14	23	31	21	22	30	28	36	30	23	19
11	13	14	23	29	21	26	32	28	35	29	23	19
12	12	14	22	29	21	32	35	28	35	29	23	19
13	12	15	29	29	21	29	38	29	35	29	23	19
14	12	19	34	29	21	28	54	29	35	29	23	19
15	12	18	31	28	20	27	46	30	35	28	22	19
16	12	17	34	28	20	26	43	30	34	28	22	19
17	12	17	35	28	20	26	42	30	34	28	22	19
18	12	17	33	27	20	25	41	31	35	28	22	19
19	12	17	32	27	20	25	40	31	34	27	22	19
20	12	17	31	27	20	25	39	31	34	27	22	18
21	12	17	30	27	22	25	37	32	34	27	22	18
22	13	20	30	26	24	25	36	32	34	27	22	18
23	14	23	28	26	27	25	35	32	34	27	21	18
24	13	22	28	25	29	24	34	33	33	26	21	18
25	13	22	27	26	27	24	33	33	33	26	21	18
26	13	21	26	26	26	24	32	33	33	26	21	18
27	13	20	25	25	25	24	32	33	32	26	21	18
28	13	21	25	25	24	24	31	34	32	25	21	18
29	12	23	25	24	---	24	31	37	33	25	20	18
30	13	23	24	24	---	23	30	39	32	25	20	18
31	16	---	23	24	---	24	---	38	---	25	20	---
TOTAL	386	525	826	820	631	765	997	968	1055	876	691	565
MEAN	12.5	17.5	26.6	26.5	22.5	24.7	33.2	31.2	35.2	28.3	22.3	18.8
MAX	16	23	35	33	29	32	54	39	39	32	25	20
MIN	12	14	22	22	20	22	24	28	32	25	20	18
AC-FT	766	1040	1640	1630	1250	1520	1980	1920	2090	1740	1370	1120

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2002, BY WATER YEAR (WY)

MEAN	15.8	21.4	29.2	32.3	30.4	31.2	31.8	33.7	29.1	22.5	20.7	19.0
MAX	22.8	37.0	49.1	67.3	55.8	62.7	57.6	67.0	42.7	28.3	40.0	32.4
(WY)	2000	1996	1996	1996	1996	1997	1997	1997	1999	2002	2000	2000
MIN	10.5	11.9	16.4	15.3	15.6	18.2	21.5	21.2	18.5	16.2	13.4	11.6
(WY)	1993	1994	1993	1993	1993	2001	2001	1994	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1993 - 2002	
ANNUAL TOTAL	6640		9105			
ANNUAL MEAN	18.2		24.9		26.4	
HIGHEST ANNUAL MEAN					37.5	1997
LOWEST ANNUAL MEAN					17.4	2001
HIGHEST DAILY MEAN	35	Dec 17	54	Apr 14	130	Feb 7 1996
LOWEST DAILY MEAN	12	Sep 28	12	Oct 1	8.4	Oct 27 1992
ANNUAL SEVEN-DAY MINIMUM	12	Sep 28	12	Oct 1	8.6	Oct 22 1992
ANNUAL RUNOFF (AC-FT)	13170		18060		19120	
10 PERCENT EXCEEDS	24		34		40	
50 PERCENT EXCEEDS	17		24		24	
90 PERCENT EXCEEDS	13		14		14	

14138720 BULL RUN RIVER AT LOWER FLUME, NEAR BRIGHTWOOD, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1996 to current year.
WATER TEMPERATURE: October 1995 to current year.

INSTRUMENTATION.--Water-quality monitor and data logger.

REMARKS.--Specific conductance and water temperature records excellent.

EXTREMES FOR PERIOD OF RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 32 microsiemens Oct. 10-16, 1996, but may have been higher during period of missing record; minimum, 18 microsiemens Dec. 27, 1998.
WATER TEMPERATURE: Maximum 9.0°C several days in September, 2000; minimum, 3.0°C Feb. 6, 1996.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 31 microsiemens June 16; minimum, 22 microsiemens Apr. 14.
WATER TEMPERATURE: Maximum, 6.7°C several days in October and November; minimum, 3.8°C Apr. 14.

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	28	27	28	29	29	29	29	28	28	30	30	30
2	28	27	28	29	29	29	29	28	29	30	30	30
3	28	27	28	29	29	29	30	27	29	30	30	30
4	28	28	28	29	29	29	30	28	29	30	30	30
5	28	28	28	29	29	29	30	28	30	30	30	30
6	28	28	28	29	28	29	30	28	29	30	30	30
7	28	27	28	29	28	29	30	28	30	30	29	29
8	28	27	28	29	28	28	30	30	30	29	28	29
9	28	27	27	29	28	28	30	30	30	30	29	29
10	28	27	27	29	28	28	30	30	30	30	29	30
11	29	28	29	29	28	28	30	30	30	30	30	30
12	28	28	28	29	28	28	30	29	30	30	29	30
13	28	28	28	29	28	28	30	26	28	30	30	30
14	29	28	28	29	28	29	29	27	29	30	30	30
15	29	28	28	29	29	29	30	29	29	30	30	30
16	29	28	29	29	29	29	30	29	29	30	30	30
17	29	28	28	29	29	29	29	29	29	30	30	30
18	29	28	28	29	29	29	30	29	30	30	30	30
19	28	28	28	29	29	29	30	30	30	30	30	30
20	28	28	28	29	29	29	30	30	30	30	30	30
21	28	28	28	29	29	29	30	30	30	30	30	30
22	30	28	28	29	28	29	30	30	30	30	30	30
23	30	29	29	29	28	29	30	30	30	30	30	30
24	29	28	28	29	29	29	30	30	30	30	30	30
25	28	28	28	29	29	29	30	30	30	30	30	30
26	28	28	28	29	29	29	30	30	30	30	30	30
27	28	28	28	29	28	29	30	30	30	30	30	30
28	28	28	28	29	28	28	30	30	30	30	30	30
29	28	28	28	29	28	28	30	30	30	30	30	30
30	29	28	28	29	28	29	30	30	30	30	30	30
31	29	28	29	---	---	---	30	30	30	30	30	30
MONTH	30	27	28	29	28	29	30	26	30	30	28	30

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	30	30	30	30	29	29	30	29	29	29	28	29
2	30	30	30	29	29	29	30	29	29	29	28	29
3	30	30	30	30	29	29	30	29	29	29	28	29
4	30	30	30	30	29	29	30	28	29	29	28	29
5	30	30	30	30	29	29	29	28	28	29	28	29
6	30	30	30	30	29	29	28	28	28	29	28	29
7	30	30	30	29	29	29	28	28	28	29	28	29
8	30	30	30	29	29	29	28	28	28	29	28	29
9	30	30	30	29	29	29	28	28	28	29	28	29
10	30	30	30	29	29	29	28	28	28	29	28	29
11	30	30	30	29	27	29	28	27	28	29	28	28
12	30	30	30	29	28	29	28	27	27	29	28	28
13	30	29	30	29	29	29	28	23	27	29	28	28
14	30	29	30	29	29	29	27	22	25	29	28	28
15	30	30	30	29	29	29	28	27	28	29	28	28
16	30	30	30	29	29	29	28	28	28	28	28	28
17	30	30	30	30	29	29	29	28	29	28	28	28
18	30	30	30	30	29	29	29	28	29	29	28	28
19	30	30	30	30	29	29	29	28	29	29	28	28
20	30	29	30	30	29	29	29	28	29	29	28	28
21	30	29	29	29	29	29	29	29	29	29	28	28
22	30	29	29	30	29	29	29	29	29	29	28	28
23	30	29	29	30	29	29	29	29	29	28	28	28
24	29	29	29	30	29	29	29	29	29	28	28	28
25	30	29	29	29	29	29	29	29	29	28	28	28
26	30	29	29	29	29	29	29	29	29	29	28	28
27	30	29	29	29	29	29	29	29	29	29	28	28
28	30	29	29	29	29	29	29	28	29	29	28	28
29	---	---	---	29	29	29	29	28	29	28	28	28
30	---	---	---	29	29	29	29	29	29	28	28	28
31	---	---	---	29	29	29	---	---	---	28	28	28
MONTH	30	29	30	30	27	29	30	22	28	29	28	28

14138720 BULL RUN RIVER AT LOWER FLUME, NEAR BRIGHTWOOD, OR--Continued

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	28	28	28	28	27	28	28	28	28	27	27	27
2	28	28	28	28	27	28	28	28	28	27	27	27
3	28	28	28	28	27	28	28	28	28	27	27	27
4	28	28	28	28	27	28	28	28	28	27	27	27
5	29	28	28	28	27	28	28	27	28	27	27	27
6	29	28	28	28	27	28	28	28	28	27	27	27
7	29	28	28	28	28	28	28	27	28	27	27	27
8	29	28	28	28	27	28	28	28	28	27	27	27
9	29	28	28	28	28	28	28	28	28	27	27	27
10	29	28	28	28	28	28	28	28	28	27	27	27
11	29	28	29	28	28	28	28	28	28	27	27	27
12	29	28	29	28	28	28	28	28	28	27	27	27
13	29	29	29	28	28	28	28	28	28	27	27	27
14	29	29	29	28	28	28	28	28	28	27	27	27
15	29	29	29	28	28	28	28	28	28	27	27	27
16	31	29	29	28	28	28	28	28	28	27	27	27
17	29	28	29	28	28	28	28	28	28	27	27	27
18	29	28	29	28	28	28	28	28	28	27	27	27
19	29	28	28	28	28	28	28	28	28	27	27	27
20	29	28	29	28	28	28	28	28	28	27	27	27
21	29	28	29	28	28	28	28	28	28	27	27	27
22	29	29	29	28	28	28	28	28	28	27	27	27
23	29	28	29	28	28	28	28	28	28	27	27	27
24	29	28	29	28	28	28	28	28	28	27	27	27
25	30	28	29	28	28	28	28	28	28	27	27	27
26	29	28	29	28	28	28	28	27	28	27	27	27
27	29	29	29	28	28	28	27	27	27	27	27	27
28	29	28	29	28	28	28	27	27	27	27	27	27
29	29	28	28	28	28	28	27	27	27	27	27	27
30	29	28	28	28	28	28	27	27	27	27	27	27
31	---	---	---	29	28	28	27	27	27	---	---	---
MONTH	31	28	29	29	27	28	28	27	28	27	27	27
YEAR	31	22	29									

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	6.5	6.4	6.5	6.7	6.6	6.6	6.1	6.0	6.1	6.0	5.9	5.9
2	6.5	6.4	6.4	6.7	6.6	6.6	6.1	6.0	6.1	6.1	5.9	5.9
3	6.6	6.4	6.6	6.6	6.6	6.6	6.1	6.0	6.1	6.1	6.0	6.0
4	6.6	6.5	6.6	6.6	6.5	6.6	6.1	5.8	6.0	6.1	6.0	6.0
5	6.6	6.5	6.5	6.6	6.5	6.6	6.1	5.5	6.1	6.1	6.0	6.0
6	6.6	6.5	6.6	6.6	6.4	6.5	6.1	6.0	6.1	6.1	5.9	6.0
7	6.6	6.5	6.5	6.5	6.4	6.4	6.0	6.0	6.0	5.9	5.7	5.8
8	6.6	6.5	6.5	6.5	6.4	6.4	6.1	6.0	6.0	5.8	5.5	5.6
9	6.6	6.5	6.5	6.5	6.4	6.5	6.1	5.9	6.0	5.7	5.6	5.7
10	6.6	6.5	6.5	6.5	6.4	6.4	6.0	5.9	5.9	5.8	5.7	5.8
11	6.6	6.5	6.6	6.5	6.4	6.4	6.0	5.8	6.0	5.9	5.8	5.9
12	6.6	6.5	6.6	6.5	6.4	6.4	6.0	5.9	6.0	5.9	5.8	5.9
13	6.6	6.5	6.6	6.5	6.4	6.5	6.0	5.1	5.7	6.0	5.8	5.9
14	6.6	6.5	6.6	6.6	6.5	6.5	5.7	5.4	5.6	6.0	5.9	6.0
15	6.6	6.5	6.6	6.5	6.5	6.5	5.8	5.7	5.7	6.0	6.0	6.0
16	6.6	6.5	6.6	6.5	6.4	6.5	5.8	5.4	5.6	6.1	6.0	6.0
17	6.6	6.5	6.6	6.5	6.3	6.4	5.7	5.5	5.6	6.2	6.0	6.2
18	6.6	6.5	6.6	6.4	6.3	6.3	5.7	5.6	5.7	6.2	6.1	6.2
19	6.6	6.5	6.6	6.4	6.3	6.3	5.8	5.7	5.8	6.2	6.1	6.2
20	6.6	6.5	6.6	6.4	6.3	6.3	5.9	5.7	5.8	6.2	6.1	6.2
21	6.6	6.5	6.6	6.4	6.3	6.3	5.8	5.7	5.8	6.2	6.1	6.1
22	6.7	6.5	6.6	6.4	6.3	6.3	5.9	5.8	5.8	6.2	6.1	6.2
23	6.7	6.6	6.7	6.4	6.3	6.3	5.9	5.8	5.9	6.2	6.1	6.2
24	6.7	6.6	6.6	6.3	6.3	6.3	5.9	5.8	5.9	6.2	6.1	6.2
25	6.6	6.6	6.6	6.3	6.2	6.3	5.9	5.9	5.9	6.2	6.0	6.1
26	6.6	6.6	6.6	6.3	6.2	6.3	5.9	5.9	5.9	6.2	6.0	6.1
27	6.6	6.5	6.6	6.3	6.2	6.3	5.9	5.8	5.9	6.2	6.1	6.2
28	6.6	6.5	6.6	6.3	6.0	6.2	6.0	5.9	5.9	6.2	6.1	6.2
29	6.6	6.5	6.6	6.2	6.0	6.1	5.9	5.9	5.9	6.2	6.1	6.2
30	6.7	6.5	6.6	6.2	6.1	6.1	6.0	5.9	5.9	6.3	6.0	6.2
31	6.7	6.6	6.7	---	---	---	6.0	5.9	5.9	6.4	6.2	6.3
MONTH	6.7	6.4	6.6	6.7	6.0	6.4	6.1	5.1	5.9	6.4	5.5	6.0

14138720 BULL RUN RIVER AT LOWER FLUME, NEAR BRIGHTWOOD, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	6.4	6.3	6.3	6.4	6.3	6.4	6.4	6.4	6.4	6.0	6.0	6.0
2	6.4	6.3	6.4	6.5	6.4	6.4	6.4	6.3	6.4	6.0	6.0	6.0
3	6.4	6.3	6.4	6.5	6.4	6.4	6.4	6.3	6.4	6.0	5.9	6.0
4	6.4	6.3	6.4	6.5	6.4	6.5	6.4	6.3	6.4	6.0	5.9	6.0
5	6.4	6.3	6.4	6.5	6.4	6.5	6.4	6.3	6.3	6.0	5.9	6.0
6	6.4	6.3	6.4	6.5	6.4	6.4	6.3	6.2	6.3	6.0	5.8	5.9
7	6.4	6.3	6.4	6.5	6.3	6.4	6.3	6.2	6.2	6.0	5.9	5.9
8	6.4	6.3	6.4	6.5	6.4	6.4	6.3	6.2	6.2	6.0	5.9	5.9
9	6.4	6.3	6.4	6.5	6.4	6.5	6.3	6.2	6.2	5.9	5.9	5.9
10	6.4	6.4	6.4	6.5	6.4	6.5	6.2	5.9	6.1	5.9	5.9	5.9
11	6.5	6.4	6.4	6.5	5.4	6.2	6.1	5.8	6.0	6.0	5.9	5.9
12	6.5	6.4	6.4	6.2	5.5	6.0	5.9	5.8	5.8	5.9	5.9	5.9
13	6.5	6.4	6.4	6.2	6.1	6.2	5.9	4.1	5.7	5.9	5.8	5.9
14	6.5	6.4	6.4	6.3	6.1	6.2	5.2	3.8	4.8	5.9	5.8	5.9
15	6.5	6.4	6.5	6.3	6.2	6.3	5.5	5.2	5.4	5.9	5.8	5.9
16	6.5	6.4	6.5	6.4	6.2	6.3	5.8	5.5	5.7	5.9	5.8	5.8
17	6.5	6.5	6.5	6.4	6.3	6.4	5.9	5.7	5.8	5.9	5.8	5.8
18	6.5	6.5	6.5	6.4	6.3	6.4	5.9	5.8	5.8	5.9	5.8	5.8
19	6.5	6.5	6.5	6.4	6.2	6.4	6.0	5.9	6.0	5.9	5.8	5.8
20	6.5	6.4	6.5	6.4	6.3	6.4	6.1	6.0	6.0	5.9	5.8	5.8
21	6.5	6.2	6.4	6.4	6.3	6.3	6.1	6.0	6.1	5.8	5.8	5.8
22	6.3	6.2	6.2	6.4	6.3	6.4	6.1	6.0	6.1	5.8	5.8	5.8
23	6.3	6.0	6.2	6.4	6.3	6.4	6.1	6.0	6.1	5.8	5.7	5.8
24	6.2	6.0	6.1	6.4	6.4	6.4	6.1	6.0	6.1	5.8	5.7	5.8
25	6.3	6.2	6.2	6.4	6.4	6.4	6.1	6.0	6.1	5.8	5.7	5.8
26	6.3	6.2	6.3	6.5	6.4	6.4	6.1	6.0	6.1	5.8	5.7	5.8
27	6.4	6.3	6.3	6.4	6.4	6.4	6.1	6.0	6.1	5.8	5.7	5.8
28	6.4	6.3	6.4	6.4	6.4	6.4	6.1	6.0	6.0	5.8	5.7	5.8
29	---	---	---	6.4	6.4	6.4	6.1	6.0	6.0	5.8	5.7	5.8
30	---	---	---	6.4	6.4	6.4	6.0	6.0	6.0	5.8	5.7	5.7
31	---	---	---	6.5	6.4	6.4	---	---	---	5.8	5.7	5.7
MONTH	6.5	6.0	6.4	6.5	5.4	6.4	6.4	3.8	6.0	6.0	5.7	5.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0
2	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0
3	5.8	5.7	5.7	5.7	5.6	5.6	5.7	5.6	5.6	6.0	6.0	6.0
4	5.8	5.7	5.7	5.7	5.6	5.6	5.7	5.6	5.6	6.2	6.0	6.0
5	5.8	5.7	5.8	5.6	5.6	5.6	5.6	5.6	5.6	6.3	6.0	6.1
6	5.8	5.7	5.7	5.6	5.6	5.6	5.7	5.6	5.6	6.3	6.1	6.1
7	5.8	5.7	5.7	5.6	5.5	5.6	5.6	5.6	5.6	6.3	6.1	6.1
8	5.7	5.6	5.7	5.6	5.6	5.6	5.7	5.6	5.6	6.3	6.1	6.1
9	5.7	5.6	5.7	5.7	5.6	5.6	5.7	5.6	5.6	6.3	6.1	6.2
10	5.7	5.6	5.7	5.7	5.6	5.6	5.7	5.6	5.6	6.3	6.1	6.1
11	5.7	5.6	5.7	5.7	5.5	5.5	5.7	5.5	5.6	6.3	6.1	6.2
12	5.8	5.7	5.7	5.6	5.5	5.5	5.7	5.5	5.6	6.3	6.1	6.3
13	5.8	5.7	5.7	5.6	5.5	5.6	5.7	5.6	5.6	6.3	6.3	6.3
14	5.8	5.7	5.7	5.6	5.5	5.5	5.7	5.6	5.6	6.3	6.3	6.3
15	5.8	5.7	5.7	5.6	5.5	5.5	5.7	5.6	5.6	6.3	6.3	6.3
16	5.8	5.7	5.7	5.6	5.5	5.5	5.7	5.6	5.7	6.3	6.3	6.3
17	5.8	5.7	5.7	5.6	5.5	5.5	5.7	5.6	5.7	6.3	6.3	6.3
18	5.7	5.7	5.7	5.6	5.5	5.5	5.7	5.6	5.7	6.3	6.3	6.3
19	5.7	5.6	5.7	5.6	5.5	5.5	5.7	5.7	5.7	6.3	6.3	6.3
20	5.7	5.6	5.7	5.6	5.5	5.5	5.7	5.6	5.7	6.3	6.3	6.3
21	5.7	5.6	5.7	5.6	5.5	5.5	5.7	5.7	5.7	6.4	6.3	6.3
22	5.8	5.7	5.7	5.6	5.5	5.6	5.8	5.7	5.7	6.4	6.3	6.3
23	5.7	5.6	5.7	5.6	5.5	5.6	5.8	5.7	5.7	6.5	6.3	6.3
24	5.7	5.6	5.7	5.6	5.5	5.6	5.8	5.7	5.7	6.6	6.3	6.4
25	5.7	5.6	5.7	5.6	5.6	5.6	5.8	5.7	5.7	6.6	6.4	6.5
26	5.7	5.6	5.7	5.6	5.6	5.6	5.8	5.7	5.8	6.6	6.4	6.5
27	5.7	5.6	5.7	5.7	5.6	5.6	6.0	5.8	5.8	6.6	6.5	6.5
28	5.7	5.6	5.7	5.6	5.6	5.6	6.0	5.8	5.8	6.6	6.5	6.5
29	5.8	5.7	5.7	5.6	5.6	5.6	6.0	5.8	5.8	6.5	6.5	6.5
30	5.7	5.6	5.7	5.6	5.6	5.6	6.0	5.8	5.9	6.5	6.4	6.5
31	---	---	---	5.6	5.5	5.6	6.0	5.8	6.0	---	---	---
MONTH	5.8	5.6	5.7	5.7	5.5	5.6	6.0	5.5	5.7	6.6	6.0	6.3
YEAR	6.7	3.8	6.1									

14138800 BLAZED ALDER CREEK NEAR RHODODENDRON, OR

LOCATION.--Lat 45°27'10", long 121°53'23", in NW 1/4 SE 1/4 sec.25, T.1 S., R.7 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on right bank 600 ft downstream from the confluence of Bedrock and Hickman Creeks and 8.6 mi north of Rhododendron, and at mile 3.78.

DRAINAGE AREA.--8.17 mi^2.

PERIOD OF RECORD.--October 1963 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,540 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--39 years (water years 1964-2002), 58.2 ft^3/s, 96.73 in/yr, 42,140 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,610 ft^3/s Dec. 22, 1964, gage height, 8.25 ft, from rating curve extended above 330 ft^3/s, on basis of slope-area measurement of peak flow; minimum discharge, 1.1 ft^3/s Sept. 24, 25, 2001.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 22	2000	581	3.95	Apr. 14	0200	*1,100	*5.20
Dec. 13	1930	563	3.90				

Minimum discharge, 1.4 ft^3/s Oct. 2-5, Sept. 13-15, 27-29.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	170	150	28	21	34	47	71	104	37	e4.8	2.1
2	1.6	156	135	39	19	29	50	76	92	e32	e4.6	1.9
3	1.4	87	79	41	19	26	52	78	83	e28	e4.4	1.9
4	1.4	54	54	42	20	24	60	67	82	e25	e4.4	1.9
5	1.5	50	43	41	18	26	83	76	98	e23	e4.6	1.9
6	1.6	37	173	132	20	56	113	80	86	e21	e4.2	1.8
7	1.6	29	178	283	39	51	157	63	66	e19	e3.8	1.8
8	3.0	24	97	374	38	40	133	52	55	e20	e3.6	1.8
9	2.7	19	70	193	32	33	129	46	48	e18	e3.4	1.8
10	9.3	17	53	110	28	37	284	40	49	e16	e3.4	1.7
11	21	15	44	75	28	201	264	41	54	e15	e3.4	1.6
12	7.9	15	51	131	25	265	278	54	63	e14	e3.2	1.6
13	12	103	355	120	23	122	314	84	72	e13	e3.2	1.6
14	13	234	309	77	20	75	655	104	72	e12	e3.2	1.5
15	9.8	115	140	54	19	55	204	93	62	e11	e3.2	1.5
16	7.6	97	343	43	18	46	121	81	54	e10	e3.2	2.0
17	7.3	82	257	36	17	38	85	90	54	e9.5	e3.0	6.5
18	5.9	56	138	32	19	33	65	93	106	e9.0	e3.0	2.8
19	5.2	49	93	34	33	71	54	98	71	e8.5	e3.0	2.1
20	4.8	53	63	74	38	69	48	99	57	e8.0	e3.0	1.9
21	5.8	70	47	75	77	53	45	95	50	e7.5	e2.8	1.8
22	94	293	39	45	132	43	43	127	46	e7.0	e2.8	1.7
23	178	255	32	36	280	38	44	110	41	e6.5	e2.8	1.6
24	87	114	28	53	245	39	43	94	37	e6.0	e2.6	1.6
25	46	70	24	155	115	41	45	97	33	e6.0	e2.6	1.6
26	32	50	22	79	69	40	49	111	32	e6.5	e2.6	1.6
27	24	39	20	48	51	48	54	120	30	e6.0	2.5	1.6
28	20	131	26	36	41	48	52	145	31	e5.5	2.3	1.4
29	18	187	23	29	---	48	55	220	76	e5.5	2.1	3.7
30	94	117	20	25	---	45	67	157	47	e5.0	2.1	13
31	258	---	21	23	---	45	---	124	---	e5.0	2.1	---
TOTAL	977.0	2788	3127	2563	1504	1819	3693	2886	1851	415.5	99.9	71.3
MEAN	31.52	92.93	100.9	82.68	53.71	58.68	123.1	93.10	61.70	13.40	3.223	2.377
MAX	258	293	355	374	280	265	655	220	106	37	4.8	13
MIN	1.4	15	20	23	17	24	43	40	30	5.0	2.1	1.4
AC-FT	1940	5530	6200	5080	2980	3610	7330	5720	3670	824	198	141
CFSM	3.86	11.4	12.3	10.1	6.57	7.18	15.1	11.4	7.55	1.64	0.39	0.29
IN.	4.45	12.69	14.24	11.67	6.85	8.28	16.82	13.14	8.43	1.89	0.45	0.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2002, BY WATER YEAR (WY)

MEAN	30.96	90.36	106.7	101.2	83.50	68.28	79.78	73.31	39.22	11.04	5.372	10.08
MAX	82.5	218	288	207	221	167	150	165	115	35.4	27.6	35.5
(WY)	1968	1996	1965	1974	1996	1972	1990	1969	1964	1983	1968	1977
MIN	1.57	12.5	22.6	19.2	17.5	17.7	33.1	18.1	4.74	3.95	2.32	1.67
(WY)	1988	1994	1977	1985	1969	1992	1983	1992	1992	1992	2000	1991

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1964 - 2002	
ANNUAL TOTAL	16443.1		21794.7			
ANNUAL MEAN	45.05		59.71		58.16	
HIGHEST ANNUAL MEAN					88.1	1974
LOWEST ANNUAL MEAN					33.5	1977
HIGHEST DAILY MEAN	355	Dec 13	655	Apr 14	1810	Nov 25 1999
LOWEST DAILY MEAN	1.1	Sep 24	1.4	Oct 3	1.1	Sep 24 2001
ANNUAL SEVEN-DAY MINIMUM	1.4	Sep 18	1.5	Oct 1	1.3	Oct 1 1991
ANNUAL RUNOFF (AC-FT)	32610		43230		42140	
ANNUAL RUNOFF (CFSM)	5.51		7.31		7.12	
ANNUAL RUNOFF (INCHES)	74.87		99.24		96.73	
10 PERCENT EXCEEDS	115		134		132	
50 PERCENT EXCEEDS	23		40		31	
90 PERCENT EXCEEDS	2.7		2.2		3.4	

e Estimated

14138850 BULL RUN RIVER NEAR MULTNOMAH FALLS, OR

LOCATION.--Lat 45°29'54", long 122°00'40", near center of sec.12, T.1 S., R.6 E., Multnomah County, Hydrologic Unit 17080001, in Mount Hood National Forest, on right bank 1.2 mi upstream from North Fork, 7.0 mi southeast of Multnomah Falls, and at mile 14.8.

DRAINAGE AREA.--47.9 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1966 to current year.

REVISED RECORDS.--WDR OR-91-1: 1990.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,080 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. Regulation at times since 1915 by Bull Run Lake, usable capacity, 12,270 acre-ft. No diversion upstream from station.

AVERAGE DISCHARGE.--36 years (water years 1967-2002), 410 ft^3/s, 116.22 in/yr, 296,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,800 ft^3/s Nov. 25, 1999, gage height, 14.46 ft; minimum discharge, 30 ft^3/s Oct. 28-31, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 22	2130	3,850	8.90	Mar. 11	2130	4,240	9.28
Dec. 13	2130	5,050	9.75	Apr. 14	0230	*6,630	*10.70

Minimum discharge, 33 ft^3/s Oct. 4-6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	1040	1220	235	165	239	332	396	530	355	71	49
2	36	1130	1120	324	155	211	335	405	462	301	69	48
3	35	631	694	325	176	189	343	407	427	267	68	49
4	34	420	501	328	186	179	388	371	411	237	69	48
5	34	405	398	295	174	201	471	402	477	211	72	47
6	34	312	1030	753	190	424	614	429	448	193	70	47
7	35	252	1110	1690	367	363	860	367	376	182	67	47
8	45	214	672	2240	403	284	710	325	333	189	65	47
9	44	183	593	1040	333	243	703	304	303	169	63	46
10	99	159	462	607	262	264	1490	277	299	156	62	46
11	224	140	428	446	250	1600	1420	279	304	148	61	45
12	94	146	452	731	215	1800	1670	328	334	140	61	45
13	153	671	2920	660	192	757	1750	423	372	133	59	44
14	192	1550	2430	456	171	502	4020	483	375	125	58	44
15	141	755	954	350	163	382	1360	447	344	119	57	44
16	102	698	2620	288	160	320	893	414	314	113	56	48
17	96	585	1820	246	159	265	651	439	315	108	55	77
18	79	434	905	229	197	234	496	442	591	103	55	54
19	72	404	667	261	374	457	427	446	424	100	55	48
20	67	418	489	502	390	494	384	450	347	97	55	47
21	75	494	389	603	710	388	361	450	311	93	55	45
22	571	1820	321	349	958	314	337	603	292	89	55	44
23	1000	1640	270	274	1920	271	332	527	270	87	53	44
24	560	740	235	387	1470	348	319	467	250	84	53	43
25	345	505	202	1240	643	360	324	458	232	82	53	43
26	259	414	176	566	423	337	335	486	222	81	53	42
27	215	339	159	357	331	370	362	514	213	80	53	42
28	190	957	217	269	277	372	347	727	237	78	51	42
29	170	1480	189	222	---	363	358	1300	794	76	50	49
30	611	881	167	196	---	333	393	913	452	74	50	142
31	1640	---	173	181	---	331	---	665	---	73	49	---
TOTAL	7288	19817	23983	16650	11414	13195	22785	14944	11059	4343	1823	1506
MEAN	235	661	774	537	408	426	760	482	369	140	58.8	50.2
MAX	1640	1820	2920	2240	1920	1800	4020	1300	794	355	72	142
MIN	34	140	159	181	155	179	319	277	213	73	49	42
AC-FT	14460	39310	47570	33030	22640	26170	45190	29640	21940	8610	3620	2990
CFSM	4.91	13.8	16.2	11.2	8.51	8.89	15.9	10.1	7.70	2.92	1.23	1.05
IN.	5.66	15.39	18.63	12.93	8.86	10.25	17.70	11.61	8.59	3.37	1.42	1.17

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2002, BY WATER YEAR (WY)

MEAN	244	618	722	679	608	502	517	441	285	116	81.1	117
MAX	535	1325	1434	1238	1216	1120	834	885	699	292	231	294
(WY)	1968	1996	1978	1975	1996	1972	1993	1969	1974	1983	1968	1977
MIN	36.5	72.4	193	177	167	148	242	150	54.8	54.0	43.7	39.9
(WY)	1988	1994	1977	1985	1993	1992	1967	1992	1992	1977	1967	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1967 - 2002	
ANNUAL TOTAL	117219		148807			
ANNUAL MEAN	321		408		410	
HIGHEST ANNUAL MEAN					643	1974
LOWEST ANNUAL MEAN					249	1977
HIGHEST DAILY MEAN	2920	Dec 13	4020	Apr 14	11900	Nov 25 1999
LOWEST DAILY MEAN	34	Oct 4	34	Oct 4	30	Oct 29 1987
ANNUAL SEVEN-DAY MINIMUM	35	Oct 1	35	Oct 1	31	Oct 25 1987
ANNUAL RUNOFF (AC-FT)	232500		295200		296800	
ANNUAL RUNOFF (CFSM)	6.70		8.51		8.55	
ANNUAL RUNOFF (INCHES)	91.03		115.57		116.22	
10 PERCENT EXCEEDS	732		898		864	
50 PERCENT EXCEEDS	209		311		261	
90 PERCENT EXCEEDS	44		49		59	

14138850 BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1977 to current year.
pH: August 1990 to September 1992.
WATER TEMPERATURE: October 1977 to current year.
TURBIDITY: August 1990 to July 1994.
SUSPENDED SEDIMENT DISCHARGE: October 1977 to September 1986.

INSTRUMENTATION.--Water-quality monitor.

REMARKS.--Records excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded, 44 microsiemens Sept. 17, 1988; minimum recorded, 9 microsiemens Jan. 23, 1982, Feb. 23, 1986, Dec. 4, 1989, Apr. 14, 2002.
pH: Maximum recorded, 8.1 units Aug. 30, Sept. 1, 1990; minimum recorded, 5.7 units Jan. 18, 1991.
WATER TEMPERATURE: Maximum, 18.0°C June 22-25, 1992, July 23, 1994; minimum, 0.0°C on many days during winter periods.
TURBIDITY: Maximum recorded, 44 NTU Jan. 15, 1991; minimum recorded, 0.08 NTU Aug. 30, 31, 1992.
SEDIMENT CONCENTRATION: Maximum daily, 290 mg/L Dec. 2, 1977; minimum, 0 mg/L on many days.
SEDIMENT DISCHARGE: Maximum daily, 5,930 tons Dec. 2, 1977; minimum, 0 tons on many days.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded, 32 microsiemens Sept. 10, 15; minimum recorded, 9 microsiemens Apr. 14.
WATER TEMPERATURE: Maximum, 16.5°C July 24; minimum, 1.1°C Jan. 29.

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	29	28	28	18	17	17	17	15	16	21	18	20
2	29	28	28	18	17	17	17	15	16	18	18	18
3	29	28	28	19	18	18	18	17	17	19	18	19
4	29	28	28	19	18	19	18	18	18	18	18	18
5	28	28	28	19	18	19	19	18	18	19	18	19
6	29	28	28	19	19	19	19	16	18	18	16	17
7	28	28	28	20	19	20	17	16	17	16	15	16
8	28	28	28	20	20	20	18	17	17	16	15	15
9	28	28	28	24	20	22	18	17	18	17	16	16
10	28	24	27	25	21	23	19	18	18	18	17	17
11	25	24	24	25	21	22	19	18	19	18	17	18
12	25	24	25	25	21	22	19	17	19	19	17	18
13	25	23	24	26	16	23	17	14	15	19	17	18
14	24	21	23	17	16	17	17	14	16	19	17	18
15	23	22	23	18	17	18	17	16	17	19	18	18
16	24	23	24	20	17	18	17	15	16	21	18	20
17	24	23	24	24	18	21	17	15	16	21	20	20
18	24	23	24	22	19	20	17	17	17	24	20	22
19	25	24	24	24	18	20	18	17	18	23	20	21
20	25	24	25	24	18	21	19	18	18	24	16	20
21	25	24	25	24	19	20	19	18	19	22	19	21
22	25	19	21	23	15	19	19	19	19	20	18	19
23	20	18	19	20	15	17	20	19	20	20	18	19
24	20	18	19	21	17	18	20	20	20	20	17	18
25	20	19	19	23	18	19	20	20	20	17	15	16
26	20	19	20	23	18	19	21	20	21	18	16	17
27	21	20	20	24	18	19	21	20	21	18	18	18
28	20	20	20	19	16	17	21	20	20	19	18	18
29	21	20	21	16	15	16	20	20	20	19	19	19
30	21	18	20	17	16	17	21	20	20	19	19	19
31	18	17	17	---	---	---	21	20	20	19	19	19
MONTH	29	17	24	26	15	19	21	14	18	24	15	18

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	20	19	19	20	20	20	20	19	19	19	19	19
2	20	19	20	21	20	20	20	19	19	19	19	19
3	20	19	19	21	20	21	20	19	19	19	18	19
4	20	19	19	21	20	21	20	19	19	19	19	19
5	20	19	20	21	20	21	19	18	19	19	18	19
6	20	19	20	20	18	19	24	18	19	19	18	18
7	19	18	18	19	18	19	18	17	18	19	19	19
8	18	17	18	20	19	19	18	18	18	20	19	19
9	18	18	18	20	19	20	18	17	18	20	19	19
10	19	18	18	20	19	20	18	16	17	20	19	20
11	19	18	19	19	15	17	17	16	17	20	20	20
12	21	19	20	17	15	16	17	16	16	20	19	20
13	23	20	21	18	17	17	17	15	17	19	18	19
14	22	20	21	19	18	18	16	9	14	19	18	18
15	26	20	24	19	19	19	17	16	17	19	18	18
16	27	20	23	20	19	19	18	17	18	19	18	19
17	24	20	21	20	19	20	18	18	18	19	18	18
18	20	19	20	20	20	20	19	18	19	18	18	18
19	19	17	18	20	18	19	19	19	19	19	18	18
20	21	18	18	19	18	18	20	19	19	19	18	18
21	21	17	19	19	18	19	20	19	19	19	18	18
22	19	16	17	19	19	19	20	19	20	18	17	18
23	17	15	16	20	19	19	20	19	20	18	18	18
24	17	15	16	20	19	19	20	19	20	19	18	18
25	17	16	17	19	19	19	20	19	20	19	18	18
26	19	17	19	19	19	19	20	19	19	18	18	18
27	19	19	19	19	19	19	19	19	19	18	18	18
28	20	19	20	19	19	19	20	19	19	18	17	17
29	---	---	---	19	19	19	19	19	19	17	16	16
30	---	---	---	20	19	19	19	19	19	17	16	17
31	---	---	---	19	19	19	---	---	---	18	17	18
MONTH	27	15	19	21	15	19	24	9	18	20	16	18

14138850 BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	18	18	18	20	19	20	29	26	27	30	29	29
2	19	18	18	21	20	20	27	26	26	30	29	29
3	19	18	19	22	20	21	28	26	27	29	28	29
4	19	18	19	22	21	21	27	26	26	30	28	29
5	19	18	18	22	21	21	27	26	26	30	29	29
6	19	18	18	22	22	22	27	26	26	30	29	29
7	19	19	19	23	22	22	28	26	27	30	28	29
8	19	19	19	22	21	22	28	26	27	30	28	29
9	20	19	20	23	22	22	29	27	28	30	29	29
10	20	19	20	23	22	23	29	28	29	32	29	30
11	20	19	20	24	23	23	29	28	28	31	29	30
12	20	19	19	24	23	23	29	28	29	31	29	30
13	19	18	19	24	23	24	30	28	29	30	29	30
14	19	18	18	24	23	23	30	29	29	31	29	30
15	19	18	19	24	23	24	29	29	29	32	29	30
16	20	19	19	25	24	24	29	28	29	30	29	29
17	20	19	20	25	24	25	29	28	29	31	28	29
18	19	17	18	25	24	25	29	28	28	30	28	29
19	19	18	18	25	24	25	29	27	28	30	29	30
20	19	19	19	26	24	25	28	27	28	29	26	27
21	20	19	19	26	25	25	28	27	28	29	26	27
22	20	19	20	26	25	26	29	27	28	29	26	27
23	20	20	20	27	25	26	29	27	28	29	26	27
24	21	20	20	26	25	26	29	28	29	29	26	27
25	21	20	21	26	26	26	29	28	29	30	26	27
26	21	20	21	26	25	26	29	28	29	30	26	27
27	21	20	21	26	25	26	29	28	29	29	26	27
28	21	20	21	27	26	26	30	29	29	29	26	27
29	20	17	18	27	26	26	30	28	29	29	26	27
30	19	18	19	27	26	26	29	28	29	26	24	25
31	---	---	---	29	26	27	29	28	29	---	---	---
MONTH	21	17	19	29	19	24	30	26	28	32	24	28
YEAR	32	9	21									

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.3	9.9	10.1	8.4	7.9	8.1	5.6	5.0	5.4	3.5	3.2	3.3
2	10.3	9.9	10.0	8.8	8.0	8.6	5.3	4.7	5.1	4.1	3.5	3.8
3	9.9	9.1	9.4	8.4	7.5	8.0	5.0	4.5	4.7	4.1	3.6	3.8
4	9.7	8.9	9.3	8.1	7.3	7.8	4.5	1.9	3.3	4.1	3.5	3.8
5	9.7	9.3	9.4	8.0	6.8	7.7	3.4	1.5	2.6	4.4	3.8	4.1
6	9.7	9.3	9.4	6.8	5.7	6.2	4.2	3.3	3.6	4.7	4.2	4.4
7	9.3	8.7	8.8	5.7	4.8	5.1	4.7	4.2	4.5	5.1	4.6	4.7
8	9.1	8.7	8.8	5.7	4.9	5.3	4.8	4.3	4.6	5.1	4.6	4.8
9	8.9	8.5	8.8	6.3	5.1	5.5	4.5	4.2	4.4	4.7	4.1	4.4
10	8.5	7.8	8.0	7.0	6.1	6.5	4.2	3.3	3.6	4.9	4.1	4.4
11	8.7	8.3	8.6	7.0	6.4	6.7	3.9	3.6	3.7	4.9	4.2	4.5
12	8.3	7.8	7.9	7.9	7.0	7.3	4.3	3.9	4.1	4.7	3.9	4.4
13	9.2	8.1	8.8	8.4	7.7	8.0	4.8	4.3	4.5	3.9	3.6	3.8
14	9.8	9.0	9.4	9.0	8.4	8.8	4.3	3.3	3.8	3.9	3.3	3.7
15	9.4	8.6	9.0	8.6	8.2	8.5	4.0	3.4	3.8	3.8	3.2	3.5
16	9.2	8.6	8.8	8.2	7.9	8.2	4.8	4.0	4.5	3.2	2.0	2.7
17	8.8	8.0	8.4	7.9	6.4	7.1	4.8	4.2	4.4	2.7	2.3	2.5
18	8.0	6.8	7.1	6.5	6.3	6.4	4.3	4.0	4.2	2.7	2.4	2.6
19	7.9	6.6	7.1	7.0	6.3	6.6	4.5	4.0	4.4	2.7	2.1	2.4
20	7.9	7.3	7.7	7.2	6.9	7.1	4.3	4.2	4.3	2.7	1.6	2.3
21	7.3	6.8	7.0	7.2	6.7	7.0	4.3	3.9	4.2	3.0	1.7	2.6
22	9.0	7.1	8.2	7.2	6.7	7.0	3.9	3.4	3.6	2.1	1.6	1.9
23	8.4	7.3	7.7	6.9	6.2	6.5	3.5	3.0	3.2	2.4	1.9	2.2
24	7.3	6.6	7.0	6.2	5.3	5.8	3.2	2.7	3.0	2.9	2.1	2.6
25	8.1	7.1	7.5	5.3	4.5	4.9	2.9	2.4	2.7	3.0	2.3	2.6
26	8.2	7.3	7.7	5.1	4.7	4.9	2.6	2.1	2.3	2.9	2.1	2.5
27	8.1	7.1	7.8	5.0	4.3	4.6	2.4	2.1	2.3	2.6	1.8	2.3
28	7.1	5.6	6.2	5.3	3.4	4.3	3.2	2.1	2.6	2.6	2.0	2.3
29	7.3	6.1	6.7	5.5	4.7	5.1	2.9	2.3	2.6	2.0	1.1	1.5
30	8.6	7.3	8.0	5.1	4.5	4.8	3.2	2.7	2.9	1.8	1.5	1.6
31	8.6	8.1	8.2	---	---	---	3.6	3.2	3.4	2.3	1.4	1.8
MONTH	10.3	5.6	8.3	9.0	3.4	6.6	5.6	1.5	3.8	5.1	1.1	3.2

14138850 BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.8	1.5	2.3	3.1	2.2	2.7	5.3	4.3	4.7	6.4	5.2	5.7
2	2.8	2.5	2.7	3.1	2.1	2.6	5.6	3.5	4.4	6.1	5.2	5.5
3	3.4	2.8	3.1	3.7	2.7	3.0	5.9	3.5	4.5	5.7	4.4	5.1
4	3.1	2.7	2.9	4.0	2.7	3.3	6.3	3.7	4.8	6.3	3.8	5.0
5	3.3	2.8	3.0	4.2	3.7	4.0	4.9	4.1	4.5	5.7	4.8	5.1
6	3.4	3.0	3.2	3.9	2.4	3.1	4.9	4.3	4.6	4.8	3.5	4.1
7	3.4	2.2	3.1	2.8	1.9	2.4	4.8	4.1	4.4	4.4	3.2	3.8
8	3.3	2.2	2.7	2.4	1.4	1.9	5.9	3.4	4.4	6.6	3.5	4.9
9	3.7	3.0	3.3	3.0	2.1	2.5	5.1	4.4	4.7	5.7	4.3	4.8
10	3.9	3.3	3.5	3.6	3.0	3.2	4.9	4.3	4.5	7.0	4.6	5.5
11	3.7	3.0	3.3	4.0	3.1	3.7	4.9	4.1	4.5	8.1	4.8	6.2
12	3.4	2.8	3.0	3.7	3.1	3.4	5.1	4.4	4.7	9.2	5.6	7.1
13	3.1	2.4	2.8	3.4	2.8	3.0	5.4	4.4	5.0	7.5	5.6	6.0
14	3.4	2.8	3.1	3.4	2.5	2.9	5.3	3.4	3.9	7.0	5.1	5.9
15	3.6	3.0	3.2	3.6	2.8	3.1	4.1	3.4	3.7	7.7	4.8	5.9
16	3.9	3.3	3.5	2.8	2.2	2.5	4.3	3.5	3.8	7.9	4.4	6.1
17	3.9	3.0	3.4	2.8	1.7	2.3	4.8	3.5	4.2	8.2	5.6	6.8
18	4.4	3.6	3.9	2.7	1.5	2.4	5.4	4.1	4.7	7.3	5.4	6.4
19	4.2	3.7	4.0	2.8	1.4	2.0	5.1	4.4	4.8	6.8	5.6	6.2
20	4.3	3.4	3.8	4.2	2.8	3.4	5.9	4.4	5.1	7.1	5.6	6.3
21	4.2	4.0	4.1	3.3	2.2	2.8	5.2	4.6	5.0	6.6	5.6	6.1
22	4.5	3.9	4.1	4.1	2.4	3.1	5.7	4.9	5.3	6.3	5.4	5.8
23	4.0	3.3	3.7	5.1	3.4	4.1	6.1	4.1	5.0	8.1	4.9	6.2
24	3.7	3.1	3.4	4.3	4.0	4.1	6.8	3.7	5.0	8.2	4.8	6.4
25	3.1	2.5	2.8	5.1	3.5	4.2	6.6	4.3	5.4	7.9	5.7	6.8
26	3.3	2.1	2.5	4.8	3.2	4.0	5.7	4.6	5.1	8.8	6.1	7.3
27	3.6	2.2	2.9	4.4	3.5	4.1	5.9	4.3	5.0	7.7	6.3	6.9
28	3.9	3.0	3.4	4.6	3.8	4.1	7.0	3.7	5.1	7.3	6.4	6.9
29	---	---	---	4.8	3.8	4.3	7.5	4.3	5.7	7.0	6.4	6.7
30	---	---	---	5.8	4.0	4.6	6.3	4.8	5.5	9.0	5.9	7.1
31	---	---	---	5.6	3.5	4.5	---	---	---	8.8	5.7	7.1
MONTH	4.5	1.5	3.2	5.8	1.4	3.3	7.5	3.4	4.7	9.2	3.2	6.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.2	6.3	7.5	12.1	9.3	10.3	13.7	11.2	12.4	13.2	12.0	12.7
2	8.8	6.4	7.5	12.1	8.5	10.1	13.2	11.6	12.6	13.2	12.0	12.6
3	9.0	6.3	7.6	10.7	9.5	10.0	13.0	10.7	11.9	13.2	12.3	12.7
4	8.6	7.1	7.8	10.5	8.9	9.6	12.7	11.6	11.9	12.3	10.5	11.0
5	9.2	7.5	8.2	12.1	8.3	9.9	12.0	10.5	11.3	10.7	9.5	10.1
6	7.9	6.6	7.2	13.2	9.7	11.3	11.8	10.7	11.2	10.2	9.2	9.8
7	7.3	6.3	6.7	13.0	11.0	11.9	12.3	9.9	11.0	10.4	10.0	10.2
8	7.3	5.7	6.4	12.5	10.7	11.6	12.7	10.5	11.6	10.2	9.4	9.9
9	7.3	6.4	6.8	14.2	10.1	11.9	13.4	11.2	12.3	10.9	9.6	10.2
10	10.2	7.0	8.1	15.7	11.8	13.5	13.9	12.3	13.2	11.3	10.2	10.7
11	11.1	7.1	8.9	16.0	12.7	14.3	14.2	12.3	13.3	11.7	10.8	11.2
12	11.7	7.9	9.7	16.3	13.0	14.5	14.4	12.5	13.5	12.2	11.5	11.8
13	12.4	8.8	10.3	15.5	13.9	14.7	15.2	12.7	13.9	12.2	11.5	11.8
14	11.7	8.8	10.2	14.9	12.7	13.9	14.9	13.4	14.3	12.0	11.5	11.8
15	11.9	8.6	10.1	14.4	11.6	13.1	14.9	13.2	14.1	11.9	11.3	11.5
16	10.2	8.4	9.0	14.7	11.8	13.3	14.4	12.7	13.6	11.3	10.9	11.1
17	8.8	7.7	8.3	15.2	12.3	13.7	14.2	12.7	13.5	11.7	10.9	11.2
18	8.6	7.7	8.0	15.5	13.0	14.1	13.7	11.8	12.8	11.3	10.2	10.6
19	10.7	7.2	8.6	14.9	13.2	13.6	13.4	12.3	12.9	10.6	9.8	10.2
20	11.6	7.8	9.5	15.2	12.3	13.6	13.4	12.3	12.7	11.1	10.4	10.7
21	12.7	8.7	10.4	15.5	12.5	14.0	12.3	11.2	11.7	10.6	9.8	10.1
22	12.0	9.9	10.9	15.7	13.0	14.4	12.5	10.3	11.2	10.2	9.6	9.9
23	12.3	9.9	10.9	16.3	13.9	15.2	13.0	11.6	12.3	10.4	9.6	10.1
24	12.7	9.7	11.0	16.5	14.2	15.3	13.0	12.0	12.7	10.4	10.0	10.3
25	13.7	9.7	11.5	16.0	14.4	15.3	13.0	12.3	12.5	10.6	10.0	10.3
26	14.2	11.2	12.6	15.7	13.9	14.5	12.3	11.6	12.0	10.6	10.0	10.3
27	13.2	11.4	11.9	13.9	12.5	13.2	13.0	11.2	11.9	11.1	10.4	10.7
28	11.4	10.5	10.9	13.4	11.8	12.8	13.9	12.5	13.1	10.9	10.0	10.3
29	11.0	9.7	10.2	14.9	12.5	13.6	13.9	13.2	13.7	10.2	9.6	10.0
30	10.7	9.1	9.8	14.7	13.0	13.6	13.9	13.0	13.2	9.6	8.4	8.9
31	---	---	---	13.4	11.6	12.6	13.0	12.0	12.6	---	---	---
MONTH	14.2	5.7	9.2	16.5	8.3	13.0	15.2	9.9	12.6	13.2	8.4	10.8
YEAR	16.5	1.1	7.1									

14138870 FIR CREEK NEAR BRIGHTWOOD, OR

LOCATION.--Lat 45°28'49", long 122°01'28", in NE 1/4 SE 1/4 sec.14, T.1 S., R.6 E., Multnomah County, Hydrologic Unit 17080001, on right bank, 6.4 mi north of Brightwood and 0.6 mi above Bull Run Reservoir Number One.

DRAINAGE AREA.--5.46 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1975 to current year.

REVISED RECORDS.--WDR OR-78-1: 1976. WDR OR-82-2: 1976(P), 1978-79(P), 1981, WDR OR-91-1: 1976.

GAGE.--Water-stage recorder. Elevation of gage is 1,440 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--27 years (water years 1976-2002), 34.8 ft^3/s, 86.47 in/yr, 25,170 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,290 ft^3/s Dec. 2, 1977, gage height, 5.64 ft; minimum discharge, 1.5 ft^3/s Oct. 19-21, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0100	*211	*3.58				

Minimum discharge, 1.9 ft^3/s Oct. 4-8.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	83	97	35	21	27	33	28	39	26	5.8	3.6
2	2.1	85	96	55	20	23	33	29	34	21	5.6	3.5
3	2.0	56	72	48	24	21	33	28	29	18	5.4	3.6
4	2.0	39	53	42	25	20	38	25	28	16	5.5	3.5
5	1.9	40	43	38	23	21	45	26	33	15	5.9	3.5
6	1.9	30	85	78	26	48	55	27	30	14	6.1	3.4
7	1.9	24	95	105	46	43	74	23	25	13	5.4	3.4
8	2.8	20	70	117	52	32	61	22	22	13	5.3	3.3
9	2.7	17	61	83	44	27	63	20	19	12	5.2	3.2
10	8.7	15	50	58	35	28	108	19	19	11	5.2	3.2
11	20	14	46	46	31	99	115	19	19	11	5.1	3.1
12	8.2	15	50	66	27	124	125	23	20	10	4.9	3.1
13	15	48	148	59	23	77	124	28	22	9.6	4.8	2.9
14	16	89	131	47	20	54	166	33	23	9.0	4.7	2.9
15	13	60	86	37	19	43	105	29	21	8.9	4.6	2.9
16	9.4	58	143	31	19	35	79	27	19	8.3	4.6	3.2
17	8.8	54	117	27	19	29	64	30	21	8.0	4.6	6.0
18	6.7	41	84	25	24	25	52	30	43	7.9	4.6	3.8
19	5.7	38	65	31	44	56	46	29	30	7.7	4.4	3.3
20	5.0	39	53	49	47	65	41	29	23	7.3	4.4	3.1
21	5.8	45	43	65	74	51	36	29	21	7.1	4.4	3.0
22	43	103	35	42	92	40	33	42	19	6.9	4.4	2.9
23	61	106	30	33	116	34	30	37	18	6.6	4.2	2.8
24	40	67	25	46	103	41	28	32	16	6.6	4.2	2.8
25	25	48	22	105	68	44	27	31	15	6.5	4.0	2.8
26	19	38	20	70	49	39	27	33	15	6.5	4.0	2.7
27	16	31	19	46	38	41	28	34	14	6.4	4.0	2.7
28	15	80	24	34	31	40	27	49	15	6.1	3.9	2.6
29	13	108	21	28	---	39	27	93	66	6.0	3.8	3.8
30	51	83	19	24	---	36	29	64	37	5.8	3.7	10
31	104	---	19	22	---	34	---	48	---	5.8	3.7	---
TOTAL	528.8	1574	1922	1592	1160	1336	1752	1016	755	317.0	146.4	104.6
MEAN	17.06	52.47	62.00	51.35	41.43	43.10	58.40	32.77	25.17	10.23	4.723	3.487
MAX	104	108	148	117	116	124	166	93	66	26	6.1	10
MIN	1.9	14	19	22	19	20	27	19	14	5.8	3.7	2.6
AC-FT	1050	3120	3810	3160	2300	2650	3480	2020	1500	629	290	207
CFSM	3.12	9.61	11.4	9.41	7.59	7.89	10.7	6.00	4.61	1.87	0.86	0.64
IN.	3.60	10.72	13.09	10.85	7.90	9.10	11.94	6.92	5.14	2.16	1.00	0.71

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1976 - 2002, BY WATER YEAR (WY)

MEAN	19.32	55.27	64.17	53.76	55.80	44.39	46.39	34.05	22.98	9.438	5.071	8.014
MAX	44.8	110	133	96.9	126	91.5	73.2	53.0	58.6	27.3	13.0	27.7
(WY)	1996	1996	1978	1976	1982	1997	1993	1977	1981	1983	1978	1977
MIN	1.97	6.09	15.3	15.8	16.9	14.0	24.9	14.6	3.80	3.50	2.95	2.40
(WY)	1988	1994	1977	2001	1977	1992	1998	1992	1992	1992	1996	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1976 - 2002	
ANNUAL TOTAL	8967.0		12203.8			
ANNUAL MEAN	24.57		33.44		34.75	
HIGHEST ANNUAL MEAN					53.5	1997
LOWEST ANNUAL MEAN					19.3	2001
HIGHEST DAILY MEAN	148	Dec 13	166	Apr 14	616	Dec 2 1977
LOWEST DAILY MEAN	1.8	Sep 22	1.9	Oct 5	1.5	Oct 19 1991
ANNUAL SEVEN-DAY MINIMUM	1.9	Sep 18	2.0	Oct 1	1.6	Oct 10 1991
ANNUAL RUNOFF (AC-FT)	17790		24210		25170	
ANNUAL RUNOFF (CFSM)	4.50		6.12		6.36	
ANNUAL RUNOFF (INCHES)	61.09		83.15		86.47	
10 PERCENT EXCEEDS	63		78		74	
50 PERCENT EXCEEDS	16		27		22	
90 PERCENT EXCEEDS	2.7		3.7		3.6	

14138870 FIR CREEK NEAR BRIGHTWOOD, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1977 to current year.
pH: August 1990 to September 1992.
WATER TEMPERATURE: October 1977 to current year.
TURBIDITY: August 1990 to September 1994.
SUSPENDED SEDIMENT DISCHARGE: October 1977 to September 1986.

INSTRUMENTATION.--Water-quality monitor.

REMARKS.--Specific conductance record excellent. Water temperature record good. Turbidity data prior to October 1990 are available in the files of the Portland field office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded, 49 microsiemens May 6, 1988, Aug. 13, 1990; minimum, 7 microsiemens Nov. 30, 1994.
pH: Maximum recorded, 7.7 units Sept. 13, 1990, but may have been higher during periods of missing record; minimum recorded, 6.0 units Sept. 5, 6, 8, 1991, but may have been lower during periods of missing record.
WATER TEMPERATURE: Maximum recorded, 16.0°C Sept. 1, 1987, June 23, 24, July 18, 19, 1992; minimum recorded, 0.0°C on several days during winter periods most years.
TURBIDITY: Maximum recorded, 11 NTU Nov. 25, 1991; minimum recorded, 0.04 NTU Feb. 15, 16, 1993.
SEDIMENT CONCENTRATION: Maximum, 200 mg/L Jan. 23, Feb. 20, 1982; minimum, 0 mg/L on many days.
SEDIMENT DISCHARGE: Maximum, 345 tons Dec. 2, 1977; minimum, 0 tons on many days.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 29 microsiemens Aug. 28 29, Sept. 12, 14, 19, 20; minimum, 14 microsiemens Apr. 14.
WATER TEMPERATURE: Maximum, 13.9°C July 23, 24; minimum, 2.4°C Jan. 31.

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	27	26	27	18	18	18	18	17	18	22	19	20
2	27	26	26	19	18	18	19	18	19	19	19	19
3	26	26	26	19	19	19	20	19	19	20	19	19
4	26	26	26	20	19	20	20	20	20	20	19	20
5	26	26	26	20	19	20	21	20	20	20	20	20
6	26	26	26	20	20	20	21	18	19	20	17	18
7	26	25	26	20	20	20	19	18	19	17	16	17
8	26	25	26	21	20	20	20	19	20	17	16	16
9	26	25	25	21	21	21	20	19	20	18	17	18
10	26	24	25	21	21	21	21	20	20	19	18	19
11	26	25	25	22	21	22	21	20	20	20	19	20
12	25	24	24	22	21	22	21	19	20	20	18	19
13	24	23	23	22	17	20	19	15	17	19	18	19
14	24	22	23	19	17	18	18	15	17	20	19	19
15	23	22	22	19	18	19	19	18	19	20	20	20
16	23	22	22	19	18	19	19	17	17	21	20	20
17	22	22	22	19	18	19	19	17	18	21	21	21
18	23	22	22	20	19	19	19	19	19	21	21	21
19	23	22	23	20	19	20	20	19	20	21	20	21
20	23	22	23	20	19	20	21	20	20	21	18	20
21	23	22	22	19	19	19	21	21	21	20	19	19
22	22	20	21	19	15	17	22	21	21	20	20	20
23	20	19	19	18	16	17	22	21	21	21	20	21
24	19	19	19	19	18	18	22	22	22	21	19	20
25	20	19	20	19	19	19	22	22	22	19	17	18
26	21	20	20	20	19	20	22	22	22	19	18	19
27	21	20	20	20	20	20	22	22	22	20	19	20
28	21	20	21	20	16	18	22	21	21	21	20	20
29	22	21	21	17	16	17	22	21	21	21	20	21
30	22	19	21	18	17	18	22	21	22	21	21	21
31	19	17	18	---	---	---	22	21	22	21	21	21
MONTH	27	17	23	22	15	19	22	15	20	22	16	20

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	21	21	21	21	20	21	20	20	20	20	20	20
2	22	21	21	21	21	21	20	20	20	20	19	20
3	21	21	21	21	21	21	20	20	20	20	19	19
4	21	21	21	22	21	21	20	19	20	20	19	20
5	21	21	21	22	21	21	19	19	19	20	19	20
6	21	20	21	21	19	20	19	18	19	20	19	19
7	20	19	20	20	19	19	18	17	18	20	19	20
8	20	19	19	20	20	20	18	18	18	20	20	20
9	20	20	20	21	20	20	19	18	18	21	20	20
10	20	20	20	21	20	20	18	16	17	21	20	20
11	21	20	20	20	15	18	17	16	17	21	20	21
12	21	20	21	18	16	17	17	16	16	20	19	20
13	21	21	21	19	18	18	17	15	17	20	19	19
14	21	21	21	19	19	19	17	14	15	19	19	19
15	21	21	21	20	19	19	18	17	18	19	19	19
16	21	21	21	20	20	20	19	18	19	19	19	19
17	21	21	21	21	20	20	20	19	19	19	18	19
18	21	21	21	21	20	21	20	20	20	19	18	19
19	21	19	20	20	19	19	21	20	20	19	18	19
20	20	19	20	19	19	19	21	20	20	19	18	18
21	20	18	19	20	19	19	21	20	21	19	18	18
22	18	18	18	20	20	20	21	21	21	18	17	18
23	18	16	17	20	20	20	21	20	21	18	18	18
24	18	16	17	20	20	20	21	20	21	19	18	18
25	19	18	18	20	19	20	21	20	21	19	18	18
26	20	19	19	20	20	20	21	20	21	19	18	18
27	20	19	20	20	20	20	21	20	20	18	18	18
28	21	20	20	20	20	20	21	20	20	18	17	17
29	---	---	---	20	19	20	20	20	20	17	16	16
30	---	---	---	20	20	20	20	20	20	17	16	17
31	---	---	---	20	20	20	---	---	---	18	17	17
MONTH	22	16	20	22	15	20	21	14	19	21	16	19

14138870 FIR CREEK NEAR BRIGHTWOOD, OR--Continued

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	18	18	18	20	19	20	26	25	26	28	27	28
2	19	18	18	21	20	20	26	25	26	28	28	28
3	19	18	19	21	20	21	26	25	26	28	27	28
4	19	19	19	21	20	21	26	25	26	28	27	27
5	20	18	19	22	21	21	26	25	26	28	27	27
6	19	18	18	22	22	22	26	25	26	28	27	27
7	19	18	19	23	22	22	26	26	26	28	27	27
8	20	19	19	23	21	22	27	26	26	28	27	27
9	21	19	20	23	22	22	27	26	27	28	27	28
10	21	20	20	24	23	23	28	26	27	28	28	28
11	21	20	20	24	23	23	27	26	27	28	28	28
12	21	20	20	25	23	24	27	27	27	29	28	28
13	20	19	19	24	23	24	28	27	27	28	28	28
14	20	19	19	24	23	23	28	27	28	29	28	28
15	20	19	19	24	23	24	28	27	27	28	27	28
16	20	19	19	25	24	24	28	27	27	28	28	28
17	20	19	20	25	24	24	28	27	27	28	27	28
18	19	18	18	25	24	24	27	27	27	28	28	28
19	19	18	19	25	24	24	28	27	27	29	28	28
20	20	19	19	25	24	25	28	27	27	29	28	28
21	21	19	20	25	25	25	27	27	27	28	27	28
22	20	19	20	26	25	25	28	27	27	28	28	28
23	21	19	20	26	25	26	28	27	28	28	28	28
24	21	20	20	26	25	26	28	27	28	28	28	28
25	21	20	21	26	25	25	28	27	28	28	28	28
26	21	20	21	26	25	25	28	27	28	28	27	28
27	21	21	21	26	25	25	28	28	28	28	27	28
28	21	20	21	26	25	25	29	28	28	28	27	28
29	20	17	18	26	26	26	29	28	28	28	27	28
30	20	19	19	26	25	26	28	27	27	28	27	27
31	---	---	---	26	25	26	28	27	28	---	---	---
MONTH	21	17	19	26	19	24	29	25	27	29	27	28
YEAR	29	14	21									

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.5	9.7	10.2	8.0	7.8	7.9	5.8	5.0	5.7	4.1	3.8	4.0
2	10.3	9.7	10.1	8.4	8.0	8.2	5.8	5.2	5.7	4.6	4.0	4.3
3	9.9	9.1	9.5	8.0	7.8	7.9	5.5	5.0	5.4	4.6	4.3	4.4
4	9.9	9.5	9.6	7.8	7.5	7.7	5.0	3.6	4.5	4.6	4.1	4.4
5	9.7	9.3	9.6	7.8	6.8	7.5	4.4	2.9	4.0	4.9	4.4	4.7
6	9.9	9.3	9.6	6.8	6.1	6.5	4.7	4.1	4.4	4.8	4.6	4.6
7	9.3	8.8	9.1	6.1	5.6	5.8	5.2	4.7	5.1	5.1	4.6	4.7
8	9.1	8.8	9.1	6.3	5.6	6.0	5.3	5.2	5.2	4.9	4.8	4.8
9	8.8	8.2	8.6	6.5	5.9	6.2	5.2	4.7	5.1	4.9	4.4	4.7
10	8.4	7.8	8.0	7.0	6.5	6.8	4.7	4.2	4.6	5.1	4.6	4.9
11	8.6	8.0	8.4	7.4	6.8	7.1	4.9	4.4	4.6	5.2	4.8	5.0
12	8.2	7.8	8.0	7.7	7.2	7.5	5.2	4.9	5.0	5.2	4.1	4.7
13	8.6	8.2	8.4	8.1	7.6	7.7	4.9	4.4	4.6	4.3	4.0	4.2
14	9.1	8.6	8.8	8.5	8.1	8.3	4.7	4.1	4.4	4.3	3.8	4.1
15	8.8	8.4	8.6	8.3	7.9	8.1	4.9	4.4	4.6	4.1	3.8	4.0
16	9.0	8.4	8.6	7.9	7.6	7.8	5.2	4.5	4.8	3.8	2.8	3.4
17	8.4	7.5	8.0	7.6	6.5	7.0	5.2	4.7	4.9	3.5	3.2	3.4
18	7.5	6.8	7.0	6.7	6.3	6.5	5.0	4.7	4.9	3.5	3.2	3.4
19	7.8	6.8	7.3	7.4	6.5	7.0	5.2	4.9	5.1	3.7	3.2	3.4
20	7.8	6.9	7.5	7.4	7.0	7.2	5.0	5.0	5.0	3.7	3.1	3.4
21	7.3	6.6	6.9	7.2	6.9	7.0	5.0	4.5	4.9	4.1	3.1	3.7
22	8.4	7.3	7.8	7.2	6.7	6.9	4.5	4.4	4.5	3.5	2.8	3.3
23	8.0	7.1	7.5	6.9	6.5	6.7	4.4	4.0	4.2	3.7	3.2	3.4
24	7.1	6.6	6.9	6.5	5.8	6.2	4.0	3.7	3.9	4.0	3.4	3.7
25	7.7	7.1	7.4	5.8	5.3	5.5	3.8	3.5	3.7	4.0	3.2	3.7
26	7.8	7.5	7.6	5.7	5.3	5.5	3.7	3.4	3.5	4.0	3.4	3.8
27	7.8	6.9	7.6	5.3	5.0	5.2	3.5	3.4	3.5	3.7	3.1	3.5
28	6.9	5.8	6.2	5.7	3.9	4.8	4.0	3.5	3.7	3.5	3.1	3.4
29	7.1	6.3	6.8	5.7	4.9	5.5	3.7	3.4	3.5	3.1	2.6	2.8
30	8.2	7.1	7.7	5.7	5.0	5.5	3.8	3.5	3.7	3.2	2.9	3.0
31	8.2	7.8	7.9	---	---	---	4.3	3.8	4.0	3.2	2.4	2.9
MONTH	10.5	5.8	8.2	8.5	3.9	6.8	5.8	2.9	4.5	5.2	2.4	3.9

14138870 FIR CREEK NEAR BRIGHTWOOD, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.5	2.8	3.2	3.6	3.2	3.4	4.9	4.1	4.5	5.8	5.2	5.5
2	3.7	3.4	3.5	3.5	3.0	3.3	4.9	3.8	4.3	5.5	5.2	5.3
3	3.8	3.5	3.7	3.8	3.3	3.6	4.9	3.8	4.4	5.2	4.5	4.9
4	3.8	3.5	3.7	4.1	3.5	3.8	5.0	3.9	4.5	5.5	4.1	4.8
5	4.0	3.7	3.8	4.2	3.9	4.1	4.4	4.1	4.3	5.2	4.6	4.9
6	4.1	3.8	3.9	4.1	3.0	3.6	4.6	4.2	4.3	4.6	3.3	3.9
7	4.0	3.1	3.8	3.2	2.6	3.0	4.2	3.9	4.1	4.1	3.2	3.6
8	4.0	3.2	3.7	3.2	2.5	2.8	4.9	3.6	4.2	5.3	3.3	4.4
9	4.3	4.0	4.1	3.5	2.9	3.3	4.7	4.2	4.4	4.9	4.2	4.5
10	4.3	4.0	4.2	3.8	3.5	3.6	4.4	4.1	4.3	5.5	4.4	4.9
11	4.1	3.7	3.9	4.1	3.0	3.7	4.5	3.9	4.2	6.5	4.5	5.5
12	4.0	3.7	3.8	3.9	3.2	3.6	4.6	3.9	4.3	7.4	5.2	6.3
13	3.8	3.4	3.6	3.8	3.3	3.6	5.0	4.4	4.6	6.5	5.3	5.7
14	3.8	3.5	3.7	3.6	3.3	3.5	4.6	3.5	3.9	6.0	5.0	5.5
15	3.8	3.7	3.7	3.9	3.3	3.5	4.4	3.9	4.1	6.3	4.7	5.5
16	4.0	3.7	3.8	3.3	3.0	3.2	4.5	3.9	4.2	6.9	4.7	5.8
17	4.1	3.7	3.9	3.3	2.6	3.0	4.9	4.1	4.4	6.9	5.7	6.2
18	4.4	4.0	4.1	3.3	2.6	3.1	5.2	4.5	4.8	6.4	5.5	6.0
19	4.1	4.0	4.1	3.5	2.5	3.0	5.2	4.7	4.9	6.1	5.4	5.8
20	4.3	3.8	4.0	4.2	3.5	3.8	5.3	4.7	5.0	6.2	5.1	5.7
21	4.3	3.8	4.1	3.8	3.2	3.5	5.2	4.7	5.0	6.1	5.4	5.7
22	4.3	4.0	4.1	4.2	3.5	3.8	5.5	4.9	5.2	5.6	4.9	5.3
23	4.1	3.5	3.8	4.5	3.9	4.2	5.2	4.2	4.7	6.4	4.6	5.5
24	4.0	3.5	3.7	4.4	4.1	4.2	5.7	3.9	4.9	6.8	5.1	5.9
25	3.7	3.1	3.3	4.4	3.8	4.1	5.8	4.5	5.2	6.9	5.6	6.3
26	3.5	2.9	3.3	4.5	3.8	4.2	5.2	4.7	5.0	7.3	5.7	6.6
27	3.9	3.3	3.6	4.4	3.8	4.1	5.2	4.2	4.7	6.8	6.1	6.3
28	4.1	3.5	3.8	4.5	4.1	4.2	5.8	3.9	4.9	6.4	6.1	6.2
29	---	---	---	4.5	4.1	4.3	6.2	4.4	5.4	6.1	5.6	5.9
30	---	---	---	4.9	4.1	4.4	5.7	4.9	5.4	7.1	5.4	6.1
31	---	---	---	4.9	3.9	4.4	---	---	---	7.1	5.6	6.4
MONTH	4.4	2.8	3.8	4.9	2.5	3.7	6.2	3.5	4.6	7.4	3.2	5.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.5	6.1	6.8	9.7	8.4	9.0	11.6	9.9	10.8	11.6	10.8	11.3
2	7.3	6.2	6.7	10.1	8.0	9.0	11.4	10.1	10.7	11.6	10.8	11.3
3	7.7	6.2	7.0	9.1	8.6	8.8	11.2	9.5	10.4	11.6	10.3	11.1
4	7.5	6.8	7.1	8.9	8.2	8.6	10.8	10.1	10.4	10.3	9.3	9.9
5	7.8	6.9	7.3	9.9	7.8	8.9	10.3	9.5	10.0	9.7	8.9	9.4
6	7.1	6.4	6.8	11.0	8.8	9.8	10.3	9.3	9.9	9.5	8.6	9.2
7	6.6	6.1	6.3	11.0	9.7	10.2	10.5	8.9	9.8	9.7	9.1	9.4
8	6.4	5.6	6.0	10.1	9.5	9.8	11.0	9.3	10.1	9.7	8.8	9.3
9	6.8	6.1	6.3	11.6	9.1	10.3	11.6	9.9	10.7	10.1	8.9	9.6
10	8.0	6.4	7.1	12.7	10.6	11.6	12.1	10.8	11.3	10.3	9.3	10.0
11	9.2	6.8	8.0	13.2	11.2	12.1	12.1	10.5	11.4	11.0	9.7	10.3
12	9.9	7.6	8.8	13.4	11.4	12.4	12.5	10.8	11.7	11.2	10.3	10.8
13	10.8	8.6	9.6	13.0	11.8	12.5	13.2	11.4	12.3	11.4	10.3	10.9
14	10.6	8.8	9.7	12.5	11.2	11.8	13.4	12.1	12.7	11.4	10.8	11.1
15	10.5	8.8	9.5	12.3	10.3	11.4	13.2	11.8	12.5	11.2	10.5	10.8
16	9.3	8.2	8.7	12.5	10.5	11.6	12.7	11.4	12.2	10.5	10.5	10.5
17	8.2	7.8	8.1	12.7	11.0	11.8	12.5	11.4	12.0	10.5	9.9	10.1
18	8.2	7.3	7.7	13.0	11.2	12.0	12.1	10.5	11.4	9.9	9.1	9.6
19	8.8	6.9	7.8	12.1	11.4	11.7	11.8	10.8	11.4	9.9	9.1	9.6
20	9.7	7.5	8.6	12.7	11.0	11.7	11.4	11.0	11.2	10.1	9.7	9.9
21	10.6	8.2	9.4	13.0	11.0	12.0	11.0	10.3	10.6	9.7	9.1	9.5
22	10.6	9.1	9.7	13.7	11.6	12.6	11.0	9.5	10.3	9.9	9.1	9.6
23	10.5	8.9	9.6	13.9	12.3	13.1	11.6	10.3	11.0	10.1	9.1	9.7
24	11.0	8.9	9.8	13.9	12.3	13.2	11.8	10.8	11.4	10.1	9.5	9.9
25	11.6	9.1	10.3	13.7	12.5	13.1	11.6	11.2	11.3	10.1	9.5	9.9
26	12.1	10.1	11.1	13.0	12.1	12.5	11.2	11.0	11.0	10.1	9.5	9.9
27	11.2	10.1	10.6	12.1	11.2	11.5	11.6	10.3	11.1	10.3	9.9	10.1
28	10.1	9.7	10.0	12.1	10.8	11.3	12.5	11.0	11.8	9.9	9.3	9.8
29	9.9	8.9	9.5	12.7	11.0	11.8	12.5	11.6	12.2	9.9	8.7	9.4
30	9.3	8.6	8.9	12.3	11.2	11.8	12.1	11.4	11.5	8.7	8.0	8.3
31	---	---	---	11.4	9.9	10.8	11.6	10.8	11.3	---	---	---
MONTH	12.1	5.6	8.4	13.9	7.8	11.2	13.4	8.9	11.2	11.6	8.0	10.0
YEAR	13.9	2.4	6.8									

14138900 NORTH FORK BULL RUN RIVER NEAR MULTNOMAH FALLS, OR

LOCATION.--Lat 45°29'40", long 122°02'05", near line between SE 1/4 and SW 1/4 sec.11, T.1 S., R.6 E., Multnomah County, Hydrologic Unit 17080001, Mount Hood National Forest, on left bank 7.0 mi southeast of Multnomah Falls and at mouth.

DRAINAGE AREA.--8.32 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1965 to current year.

REVISED RECORDS.--WDR OR-91-1: 1976.

GAGE.--Water-stage recorder. Elevation of gage is 1,060 ft above NGVD of 1929, from topographic map. Prior to Oct. 1, 1978, and from June 13, 1989 to July 1990 (during bridge construction), at site 700 ft upstream at datum 18.7 ft higher. From Oct. 1, 1978 to June 13, 1989, and July 1990 to present, site located 5 ft upstream from bridge, on left bank wing wall.

REMARKS.--No estimated daily discharges. Records fair. Regulation at times since 1958 by North Fork Reservoir, capacity, about 1,030 acre-ft. No diversion upstream from station.

AVERAGE DISCHARGE.--37 years (water years 1966-2002), 73.7 ft^3/s, 120.27 in/yr, 53,360 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,700 ft^3/s, probably affected by surge from release of water temporarily impounded by landslide upstream from station, Jan. 20, 1972, gage height, 9.89 ft, from floodmark, from rating curve extended above 850 ft^3/s on basis of estimate of peak flow from slope-area survey; minimum discharge, 8.6 ft^3/s Oct. 19-29, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 13	2100	757	5.07	Apr. 14	0330	*977	*5.51

Minimum discharge, 10 ft^3/s Oct. 2-6, Sept. 12-15, 22-29.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	187	258	91	71	54	62	66	102	63	15	12
2	11	239	242	112	68	47	62	68	88	53	15	11
3	11	129	166	99	74	44	63	66	78	46	15	12
4	11	92	123	94	74	42	70	62	74	43	15	11
5	11	94	101	90	70	45	79	76	86	39	15	11
6	11	73	233	191	74	112	99	75	78	36	15	11
7	11	62	230	306	108	82	153	63	68	34	15	11
8	16	55	153	387	116	61	123	60	63	37	15	11
9	15	50	138	225	100	52	143	56	58	31	14	11
10	31	46	110	147	85	57	312	52	58	28	14	11
11	50	43	110	116	81	248	289	57	54	26	14	11
12	26	46	118	177	73	312	308	68	56	25	14	11
13	38	137	521	145	68	175	361	72	62	24	13	11
14	42	212	422	113	63	117	616	77	64	23	13	11
15	32	136	234	95	62	87	264	72	60	22	13	11
16	26	135	544	84	61	71	189	71	55	22	13	12
17	26	112	358	75	62	60	134	78	70	21	13	16
18	22	88	213	75	70	53	104	75	144	20	13	12
19	20	98	159	93	106	150	89	74	90	20	13	11
20	19	99	122	148	103	141	80	75	70	19	13	11
21	22	107	102	167	180	93	70	76	61	19	13	11
22	94	333	88	103	224	70	65	97	55	18	13	11
23	155	318	77	88	383	62	61	84	50	18	13	10
24	92	170	70	129	300	85	60	78	46	17	13	10
25	63	117	65	290	157	85	60	77	42	17	12	10
26	51	97	60	169	101	73	61	79	39	17	13	10
27	46	83	58	114	77	74	70	85	38	17	13	10
28	44	218	87	92	63	71	65	141	51	17	12	10
29	44	338	71	79	---	67	67	249	188	16	12	13
30	162	206	64	72	---	63	68	174	83	16	12	25
31	284	---	67	71	---	62	---	129	---	16	12	---
TOTAL	1497	4120	5364	4237	3074	2815	4247	2632	2131	820	418	349
MEAN	48.29	137.3	173.0	136.7	109.8	90.81	141.6	84.90	71.03	26.45	13.48	11.63
MAX	284	338	544	387	383	312	616	249	188	63	15	25
MIN	11	43	58	71	61	42	60	52	38	16	12	10
AC-FT	2970	8170	10640	8400	6100	5580	8420	5220	4230	1630	829	692
CFSM	5.80	16.5	20.8	16.4	13.2	10.9	17.0	10.2	8.54	3.18	1.62	1.40
IN.	6.69	18.42	23.98	18.94	13.74	12.59	18.99	11.77	9.53	3.67	1.87	1.56

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2002, BY WATER YEAR (WY)

MEAN	43.62	108.2	132.3	128.2	109.2	88.54	88.37	73.71	48.77	24.87	17.22	23.08
MAX	95.9	222	285	309	231	200	147	137	111	62.7	35.2	54.4
(WY)	1998	1996	1976	1975	1996	1972	1993	1972	1974	1983	1968	1977
MIN	9.08	16.9	33.4	32.1	35.2	28.8	49.5	28.3	14.6	12.6	10.6	10.9
(WY)	1988	1994	1977	1979	1993	1992	1967	1992	1992	1992	1994	1987

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1966 - 2002	
ANNUAL TOTAL	22588.2		31704			
ANNUAL MEAN	61.89		86.86		73.65	
HIGHEST ANNUAL MEAN					121	1974
LOWEST ANNUAL MEAN					44.3	2001
HIGHEST DAILY MEAN	544	Dec 16	616	Apr 14	1910	Dec 2 1977
LOWEST DAILY MEAN	9.7	Sep 24	10	Sep 23	8.6	Oct 24 1987
ANNUAL SEVEN-DAY MINIMUM	9.9	Sep 18	10	Sep 22	8.7	Oct 23 1987
ANNUAL RUNOFF (AC-FT)	44800		62880		53360	
ANNUAL RUNOFF (CFSM)	7.44		10.4		8.85	
ANNUAL RUNOFF (INCHES)	101.00		141.75		120.27	
10 PERCENT EXCEEDS	153		188		152	
50 PERCENT EXCEEDS	36		67		48	
90 PERCENT EXCEEDS	12		12		14	

14138900 NORTH FORK BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1978 to current year.
pH: October 1980 to September 1981, August 1990 to September 1992.
WATER TEMPERATURE: October 1978 to current year.
TURBIDITY: August 1990 to September 1994.
SUSPENDED SEDIMENT DISCHARGE: October 1978 to September 1986.

INSTRUMENTATION.--Water-quality monitor.

REMARKS.--Turbidity data prior to October 1990 are available in the files of the Portland field office.
SPECIFIC CONDUCTANCE: Records good.
WATER TEMPERATURE: Records good.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 103 microsiemens Jan. 13, 1981 (cement spill); minimum, 7 microsiemens Jan. 31, 1995, Feb. 19, 1995.
pH: Maximum recorded, 9.8 units Jan. 13, 1981 (cement spill); minimum recorded, 6.3 units June 19, 1981.
WATER TEMPERATURE: Maximum, 15.0°C July 28, 1998; minimum, 0.0°C on several days during winter periods.
TURBIDITY: Maximum recorded, 25 NTU Nov. 24, 1990; minimum recorded, 0.06 NTU Sept. 7, 13, 14, 1992.
SEDIMENT CONCENTRATION: Maximum daily, 205 mg/L Dec. 25, 1980; minimum, 0 mg/L on many days.
SEDIMENT DISCHARGE: Maximum daily, 765 tons Feb. 23, 1986; minimum, 0 tons on many days.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 43 microsiemens Sept. 24-26; minimum, 12 microsiemens Nov. 22, Jan. 8.
WATER TEMPERATURE: Maximum recorded, 14.0°C July 12; minimum, 1.5°C Mar. 17.

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	40	39	39	20	18	19	20	19	20	23	18	21
2	40	39	40	18	17	18	20	19	20	19	18	18
3	40	39	40	20	18	19	21	20	20	19	18	19
4	40	39	40	21	20	21	21	21	21	20	19	19
5	40	39	39	21	20	21	23	21	22	20	19	20
6	40	39	40	22	21	22	22	20	21	19	16	17
7	40	39	39	23	22	23	20	20	20	16	14	15
8	39	37	38	24	22	23	20	20	20	14	12	13
9	38	37	38	24	23	24	21	20	20	15	14	14
10	39	29	36	25	24	24	21	21	21	17	15	16
11	33	29	31	26	25	25	22	21	21	17	17	17
12	34	33	34	26	25	25	23	20	22	18	15	16
13	34	31	32	25	16	21	20	16	18	17	15	16
14	34	29	31	18	16	16	17	16	17	18	16	17
15	33	31	31	18	17	18	18	17	18	19	18	18
16	34	33	33	18	17	18	18	15	16	20	19	19
17	34	33	33	19	18	18	17	16	16	21	20	21
18	35	34	34	20	18	19	18	17	18	21	19	21
19	36	35	35	19	17	18	18	17	18	20	19	19
20	36	35	36	19	17	18	19	18	19	19	15	18
21	36	32	35	18	16	18	20	19	20	17	15	16
22	32	23	27	17	12	15	21	19	20	19	17	18
23	24	22	23	20	17	19	21	20	21	19	19	19
24	24	22	23	21	20	21	22	21	22	19	16	18
25	26	24	25	24	21	22	23	22	22	16	14	15
26	27	26	26	24	23	24	24	23	23	17	15	16
27	28	27	28	25	24	25	24	23	24	18	17	18
28	28	27	27	25	19	23	23	21	22	20	18	19
29	29	27	29	20	18	19	23	22	22	---	---	---
30	27	19	24	20	20	20	23	23	23	---	---	---
31	19	18	18	---	---	---	23	23	23	---	---	---
MONTH	40	18	32	26	12	21	24	15	20	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	23	21	22	22	22	22	22	21	21
2	---	---	---	23	22	23	22	22	22	21	21	21
3	---	---	---	24	23	23	22	22	22	21	21	21
4	---	---	---	24	24	24	22	21	21	22	21	21
5	---	---	---	24	23	24	21	21	21	22	20	21
6	---	---	---	23	18	20	21	19	20	21	20	21
7	---	---	---	21	19	20	19	17	18	21	21	21
8	---	---	---	22	21	21	19	18	18	22	21	22
9	---	---	---	23	22	22	19	17	18	22	21	22
10	---	---	---	23	21	22	17	15	16	23	22	22
11	---	---	---	21	15	18	16	15	16	23	22	22
12	---	---	---	17	15	16	16	15	15	22	21	22
13	---	---	---	18	17	17	16	13	15	21	21	21
14	---	---	---	19	18	18	17	13	16	21	21	21
15	---	---	---	20	19	20	18	17	18	21	20	21
16	---	---	---	21	20	21	19	18	19	22	21	21
17	---	---	---	22	21	21	20	19	19	22	21	22
18	---	---	---	22	22	22	21	20	20	22	21	22
19	---	---	---	22	18	19	21	20	21	22	22	22
20	---	---	---	19	18	19	22	21	21	22	21	22
21	---	---	---	20	19	20	22	21	22	22	21	22
22	---	---	---	21	20	21	22	22	22	22	20	21
23	---	---	---	22	21	22	23	22	22	21	21	21
24	---	---	---	22	20	21	23	22	23	22	21	21
25	---	---	---	21	20	20	23	22	23	22	21	22
26	---	---	---	21	21	21	23	22	23	22	21	22
27	20	19	20	21	21	21	22	22	22	22	21	21
28	22	20	21	22	21	21	23	22	22	21	19	20
29	---	---	---	22	21	21	23	21	22	19	18	18
30	---	---	---	22	22	22	21	21	21	19	18	19
31	---	---	---	22	22	22	---	---	---	20	19	20
MONTH	---	---	---	24	15	21	23	13	20	23	18	21

14138900 NORTH FORK BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	21	20	20	24	22	23	37	36	37	41	40	41
2	21	20	20	25	23	24	37	36	37	41	40	41
3	21	20	20	25	24	25	37	37	37	41	40	41
4	21	20	21	26	25	25	37	37	37	41	40	41
5	21	20	20	27	26	26	38	36	37	41	40	41
6	21	20	20	29	27	27	38	37	37	41	41	41
7	21	20	21	29	28	28	38	37	38	41	40	41
8	21	21	21	28	27	28	38	37	38	41	41	41
9	22	21	22	30	28	29	39	38	38	42	41	41
10	22	22	22	31	29	30	39	38	38	42	41	41
11	23	22	22	31	30	31	39	38	39	42	41	42
12	23	22	22	32	31	31	39	38	39	42	41	42
13	22	22	22	32	31	32	40	38	39	42	41	42
14	22	22	22	33	31	32	40	39	39	42	41	42
15	22	22	22	33	32	33	40	39	39	42	41	42
16	23	22	22	34	33	33	40	39	39	42	41	41
17	23	20	22	34	33	34	40	39	39	41	38	40
18	20	19	19	35	34	34	40	39	39	41	39	40
19	21	19	20	35	33	34	40	39	39	42	41	41
20	22	21	22	35	34	35	40	39	39	42	41	41
21	23	22	22	35	34	34	40	39	39	42	41	42
22	24	23	23	35	34	35	40	39	40	42	41	42
23	24	23	24	36	34	35	41	39	40	42	41	42
24	25	24	25	36	34	35	41	39	40	43	41	42
25	26	25	25	36	34	35	41	39	40	43	41	42
26	27	26	26	36	35	35	41	40	40	43	41	42
27	27	26	27	36	35	35	41	40	40	42	41	42
28	27	21	26	36	35	36	41	40	41	42	41	42
29	21	17	19	37	36	36	42	40	41	42	39	41
30	22	20	21	37	36	36	41	40	40	39	35	37
31	---	---	---	37	36	36	41	40	41	---	---	---
MONTH	27	17	22	37	22	32	42	36	39	43	35	41

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.4	9.0	9.5	8.8	8.2	8.4	5.3	4.8	5.2	4.2	3.7	4.0
2	10.2	9.0	9.3	9.4	8.6	9.0	5.2	4.7	5.0	4.5	4.0	4.2
3	9.6	8.2	8.8	8.8	8.0	8.4	5.2	4.7	4.9	4.3	4.0	4.2
4	9.6	8.4	8.8	8.4	7.9	8.2	4.7	2.7	3.7	4.6	3.9	4.2
5	9.6	8.0	8.6	8.4	7.1	7.9	3.8	2.3	3.4	4.8	4.3	4.5
6	9.1	8.3	8.5	7.1	6.3	6.8	4.6	3.6	3.9	4.8	4.5	4.6
7	8.3	7.7	8.0	6.6	5.7	6.1	4.7	4.4	4.6	5.0	4.6	4.7
8	8.5	8.1	8.2	6.8	5.7	6.2	4.9	4.4	4.6	4.8	4.5	4.6
9	8.5	7.6	8.1	7.0	5.9	6.5	4.7	4.3	4.6	4.6	4.2	4.5
10	8.7	7.2	7.5	7.5	6.8	7.1	4.3	3.5	4.0	4.8	4.2	4.5
11	8.5	7.9	8.4	7.7	7.1	7.4	4.4	4.0	4.3	5.0	4.5	4.8
12	8.3	7.6	7.8	8.0	7.5	7.7	4.7	4.4	4.6	5.0	3.9	4.5
13	9.1	8.3	8.6	8.7	7.8	8.0	4.6	3.8	4.3	4.0	3.7	3.9
14	9.6	8.8	9.1	9.5	8.7	9.2	3.8	3.0	3.5	4.0	3.4	3.8
15	9.4	8.4	8.9	9.1	8.5	8.8	4.0	3.3	3.6	3.9	3.4	3.6
16	9.0	8.2	8.7	8.5	7.9	8.3	4.4	3.9	4.1	3.4	2.5	3.1
17	8.6	7.7	8.1	7.9	7.0	7.5	4.4	3.8	4.1	3.1	2.8	3.0
18	7.7	6.9	7.3	7.2	6.7	6.9	4.3	4.0	4.1	3.2	2.9	3.1
19	8.0	7.1	7.5	7.6	6.9	7.3	4.6	4.0	4.4	3.5	2.9	3.2
20	8.0	7.3	7.7	7.8	7.4	7.6	4.6	4.3	4.4	3.5	2.6	3.2
21	7.6	6.9	7.2	7.6	7.2	7.4	4.6	4.1	4.4	3.5	2.4	3.1
22	8.9	7.6	8.2	7.6	7.0	7.3	4.1	3.8	3.9	2.8	2.2	2.6
23	8.5	7.6	8.0	7.0	6.5	6.7	4.0	3.5	3.7	2.9	2.6	2.7
24	7.8	7.0	7.4	6.5	5.8	6.2	3.8	3.2	3.5	3.4	2.9	3.3
25	8.5	7.4	7.9	5.8	5.0	5.2	3.6	3.2	3.3	3.7	2.6	3.1
26	8.7	7.6	8.1	5.5	5.0	5.2	3.5	2.9	3.2	3.1	2.4	2.8
27	8.1	7.2	7.8	5.3	4.7	5.0	3.6	3.3	3.5	2.9	2.1	2.7
28	7.2	6.2	6.8	5.2	4.4	4.8	3.9	3.4	3.6	2.9	2.2	2.7
29	7.5	6.8	7.2	5.3	4.5	5.0	3.7	3.2	3.4	2.2	1.6	1.9
30	9.2	7.5	8.3	5.3	4.5	5.0	4.0	3.5	3.8	2.8	2.1	2.4
31	9.0	8.4	8.6	---	---	---	4.5	3.7	4.1	2.8	2.2	2.6
MONTH	10.4	6.2	8.2	9.5	4.4	7.0	5.3	2.3	4.1	5.0	1.6	3.6

14138900 NORTH FORK BULL RUN RIVER NEAR MULTNOMAH FALLS, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.2	2.6	2.9	3.4	2.4	2.8	4.9	3.9	4.4	5.9	5.0	5.4
2	3.4	2.8	3.1	3.6	2.4	2.9	5.2	3.4	4.2	5.5	5.2	5.3
3	3.6	3.1	3.3	4.1	2.8	3.3	5.5	3.6	4.4	5.3	4.5	4.9
4	3.6	2.8	3.2	4.4	3.1	3.6	5.9	3.6	4.6	5.9	4.0	4.9
5	3.6	3.0	3.3	4.2	3.8	3.9	4.5	4.1	4.3	5.3	4.5	5.0
6	3.8	3.4	3.6	3.8	2.4	3.1	4.2	4.0	4.1	4.5	3.4	3.9
7	3.8	2.1	3.2	2.7	2.1	2.4	4.4	3.7	4.0	4.2	3.1	3.7
8	3.3	2.4	2.9	2.5	1.7	2.2	5.3	3.3	4.1	6.0	3.6	4.7
9	3.9	3.1	3.5	3.1	2.3	2.7	4.4	3.9	4.2	5.2	4.7	4.8
10	4.1	3.3	3.6	3.6	3.0	3.3	3.9	3.4	3.7	6.0	4.7	5.2
11	3.9	3.3	3.6	3.8	2.8	3.4	3.9	3.4	3.7	7.5	5.0	6.0
12	3.9	3.0	3.3	3.0	2.6	2.8	4.4	3.6	3.9	8.4	5.8	7.0
13	3.8	2.8	3.2	2.7	2.1	2.5	4.7	3.9	4.2	7.3	6.0	6.4
14	4.1	3.1	3.5	3.0	2.1	2.6	4.0	2.7	3.3	6.9	5.3	6.1
15	4.1	3.3	3.6	3.4	2.7	2.9	3.3	2.7	3.0	7.4	5.3	6.3
16	4.4	3.4	3.8	2.7	1.7	2.3	3.6	3.0	3.3	7.8	5.5	6.6
17	4.2	3.3	3.7	2.7	1.5	2.1	4.0	3.3	3.7	8.2	6.5	7.3
18	4.4	3.8	4.0	2.7	2.3	2.4	4.5	3.9	4.2	7.6	6.7	7.2
19	4.1	3.6	3.9	2.8	2.4	2.6	4.7	4.2	4.5	7.3	6.5	6.9
20	4.2	3.4	3.8	3.9	2.8	3.3	5.2	4.2	4.7	7.6	6.4	6.9
21	4.1	3.6	3.8	3.6	2.7	3.1	4.8	4.4	4.6	7.3	6.4	6.8
22	3.9	3.4	3.6	4.4	3.0	3.5	5.2	4.4	4.7	6.9	6.2	6.4
23	3.6	2.1	3.3	4.7	3.4	4.0	5.3	3.7	4.5	7.8	5.7	6.7
24	3.1	2.5	2.8	4.1	3.6	3.9	6.0	3.9	4.8	8.2	6.0	7.0
25	3.1	2.1	2.5	4.9	3.3	3.9	6.0	4.4	5.2	8.4	6.9	7.7
26	3.3	2.1	2.7	4.6	3.3	3.9	5.2	4.7	4.9	9.2	7.3	8.2
27	3.6	2.4	3.0	4.2	3.5	3.9	5.2	4.2	4.6	8.4	7.6	8.1
28	3.8	2.8	3.3	4.2	3.8	3.9	6.2	3.9	4.9	8.4	7.6	8.1
29	---	---	---	4.5	3.6	4.0	6.7	4.5	5.5	8.2	7.3	7.7
30	---	---	---	5.4	3.8	4.4	5.9	4.8	5.4	9.2	6.5	7.8
31	---	---	---	5.0	3.8	4.3	---	---	---	9.2	6.9	8.2
MONTH	4.4	2.1	3.4	5.4	1.5	3.2	6.7	2.7	4.3	9.2	3.1	6.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.2	7.4	8.5	11.4	9.5	10.2	11.3	9.0	10.0	10.8	9.3	9.8
2	8.8	7.6	8.2	11.4	8.9	10	11.1	9.4	9.9	11.0	9.3	9.8
3	9.0	7.4	8.3	10.1	9.5	9.8	10.9	8.6	9.6	10.1	9.1	9.7
4	9.0	8.2	8.7	9.9	9.1	9.4	9.8	9.2	9.5	9.7	8.1	8.7
5	9.6	8.4	9.0	10.7	8.1	9.4	10.0	8.6	9.3	9.5	7.7	8.4
6	8.6	7.8	8.1	12.1	9.3	10.5	10.4	8.8	9.3	9.3	7.5	8.2
7	7.8	6.9	7.4	11.8	10.1	10.8	10.6	8.2	9.2	8.9	8.1	8.4
8	7.3	6.7	7.1	11.6	10.1	10.7	10.6	8.4	9.4	9.1	7.5	8.2
9	7.6	7.3	7.4	12.5	9.5	10.9	11.3	9.0	9.9	9.5	7.7	8.6
10	9.6	7.4	8.3	13.5	10.7	11.9	12.0	9.8	10.5	9.9	8.3	9.0
11	10.6	7.8	9.1	13.8	11.2	12.3	11.6	9.5	10.3	10.3	8.7	9.4
12	11.7	9.0	10.2	14.0	11.4	12.5	11.9	9.5	10.5	10.8	9.1	9.7
13	12.6	10.2	11.3	13.3	12.1	12.6	12.6	9.9	10.9	10.5	9.1	9.7
14	12.4	10.6	11.4	12.8	11.0	11.7	12.3	10.3	11.1	10.1	9.3	9.7
15	12.2	10.4	11.0	12.5	10.1	11.2	12.1	9.9	10.7	9.7	9.1	9.3
16	10.8	9.4	10.2	12.8	10.3	11.3	11.6	9.7	10.5	9.1	8.9	8.9
17	9.8	8.8	9.3	13.0	10.5	11.5	11.6	9.7	10.4	9.9	8.7	9.2
18	9.8	8.4	8.9	13.0	10.7	11.6	11.0	8.9	9.9	9.5	8.1	8.7
19	10.0	7.6	8.8	11.6	10.7	11.2	11.0	9.3	10	9.5	7.9	8.7
20	11.1	8.6	9.8	12.8	10.5	11.3	10.1	9.5	9.8	9.8	8.6	9.1
21	12.2	9.6	10.7	12.9	10.4	11.5	9.5	8.9	9.2	9.4	8.0	8.6
22	11.9	10.6	11.1	13.2	10.6	11.8	10.3	8.3	9.2	9.4	8.0	8.6
23	12.2	10.4	10.9	13.4	11.5	12.3	10.8	9.1	9.8	9.6	8.2	8.9
24	12.6	10.2	11.0	13.4	11.1	12.2	10.8	9.5	10	9.6	8.4	9.0
25	13.1	10.2	11.4	12.9	11.5	12.0	10.1	9.5	9.8	9.8	8.4	9.0
26	13.4	11.1	12.1	12.0	10.9	11.4	9.7	9.3	9.5	9.6	8.2	8.9
27	12.2	11.1	11.6	11.1	10.2	10.5	10.8	8.9	9.7	9.6	8.6	8.9
28	11.5	10.6	10.9	11.3	9.8	10.4	11.6	9.7	10.5	9.2	8.0	8.6
29	11.7	10.3	11.0	12.4	10.0	10.9	11.6	9.9	10.6	8.8	8.0	8.3
30	10.7	9.7	10.1	11.5	10.2	10.8	10.5	9.5	9.9	8.2	7.8	8.1
31	---	---	---	11.3	9.0	10.0	10.5	9.1	9.6	---	---	---
MONTH	13.4	6.7	9.7	14.0	8.1	11.1	12.6	8.2	10.0	11.0	7.5	8.9
YEAR	14.0	1.5	6.7									

14139000 BULL RUN RESERVOIR NUMBER ONE NEAR BULL RUN, OR

LOCATION.--Lat 45°28'58", long 122°04'56", in NW 1/4 SW 1/4 sec.16, T.1 S., R.6 E., Multnomah County, Hydrologic Unit 17080001, in Mount Hood National Forest, in control house of Bear Creek Dam on Bull Run River, 8.2 mi northeast of Bull Run, and at mile 11.2.

DRAINAGE AREA.--74.6 mi^2.

PERIOD OF RECORD.--October 1928 to current year. Prior to October 1937, published as Bull Run Reservoir. October 1937 to September 1967, published as Lake Ben Morrow. Prior to October 1975, monthend contents only.

REVISED RECORDS.--WSP 814: 1935(M). WSP 1935: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Portland Water Bureau). Prior to Oct. 9, 1930, Oct. 1, 1962 to Dec. 31, 1975, nonrecording gage. Oct. 9, 1930 to Sept. 30, 1962, water-stage recorder at present site and datum.

REMARKS.--Midnight elevations Mar. 25 to Apr. 11, furnished by Portland General Electric. Lake is formed by concrete dam completed in March 1929 for water supply of city of Portland. Storage began about Apr. 29, 1929; first filling occurred May 15, 1929. Capacity, 26,930 acre-ft at crest of spillway, elevation, 1,036.0 ft; capacity increased in October 1954 to 30,140 acre-ft at elevation 1,044.0 ft by installation of three gates 40 ft wide and 8 ft high. No dead storage. Water is used for power generation by Portland General Electric Co. and municipal supply for city of Portland.

COOPERATION.--Capacity table furnished by Portland Water Bureau.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 31,600 acre-ft Mar. 31, 1931, elevation, 1,047.40 ft; minimum contents observed, 169 acre-ft Jan. 10, 1960, elevation, 887.5 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 30,800 acre-ft June 20, July 4, 11, elevation, 1,045.46 ft; minimum contents, 8,130 acre-ft Oct. 5, elevation, 970.43 ft.

Capacity table (elevation, in feet, and capacity, in acre-feet)

870	0	970	8,050
890	213	990	12,370
910	1,130	1,010	17,950
930	2,680	1,030	24,680
950	4,900	1,048	31,860

ELEVATION, in FT (NGVD), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	975.49	1024.23	1036.59	1034.71	1034.81	1034.86	1035.24	1035.07	1041.29	1044.80	1044.87	1009.97
2	973.22	1033.28	1035.92	1034.85	1034.80	1034.80	1035.32	1035.08	1040.80	1044.89	1043.81	1008.74
3	971.88	1035.72	1035.67	1035.08	1034.74	1034.76	1035.06	1035.00	1041.05	1045.10	1043.40	1007.49
4	970.90	1034.99	1035.06	1034.80	1034.72	1035.01	1035.34	1035.24	1042.88	1045.05	1042.74	1006.23
5	970.63	1034.92	1035.60	1034.60	1034.84	1035.11	1035.18	1035.33	1044.96	1044.89	1042.14	1004.97
6	971.21	1035.31	1037.26	1035.79	1035.04	1034.84	1035.21	1035.01	1044.68	1044.90	1041.57	1003.66
7	971.80	1035.30	1035.53	1037.01	1035.11	1034.99	1035.87	1035.17	1044.53	1044.85	1041.14	1002.40
8	971.38	1036.43	1035.34	1037.39	1034.93	1034.98	1035.09	1035.00	1044.89	1045.27	1040.38	1001.44
9	970.71	1034.28	1035.31	1035.70	1034.53	1034.98	1035.58	1035.54	1044.77	1045.37	1039.49	1000.73
10	971.32	1034.10	1034.98	1034.94	1034.87	1035.23	1037.01	1035.67	1044.82	1045.26	1038.36	999.77
11	973.40	1032.65	1035.55	1035.18	1034.82	1038.75	1036.83	1036.12	1044.75	1045.34	1037.81	998.70
12	973.33	1032.34	1035.14	1035.58	1034.71	1036.54	1036.71	1036.86	1045.07	1045.15	1035.34	997.51
13	974.31	1034.77	1040.68	1034.95	1034.49	1035.74	1037.99	1037.99	1044.38	1044.85	1032.05	996.19
14	976.95	1035.17	1037.27	1034.85	1034.67	1035.00	1038.41	1039.83	1043.51	1044.77	1028.95	994.84
15	977.84	1034.81	1035.31	1035.15	1034.69	1035.18	1035.97	1041.03	1044.09	1044.89	1028.02	993.45
16	977.52	1034.88	1038.70	1035.03	1035.22	1035.04	1035.54	1041.12	1044.24	1044.67	1026.90	992.16
17	976.59	1034.54	1036.68	1034.81	1035.08	1034.82	1034.46	1041.20	1045.15	1044.84	1025.77	991.18
18	974.89	1034.89	1035.62	1034.63	1034.81	1034.64	1034.61	1041.13	1044.83	1044.86	1024.82	990.09
19	973.07	1034.80	1035.31	1035.35	1034.86	1035.61	1034.57	1041.21	1044.89	1044.89	1023.04	989.03
20	971.99	1035.01	1035.05	1035.68	1034.91	1034.99	1034.77	1041.18	1045.23	1044.98	1021.33	987.94
21	972.32	1034.75	1034.70	1035.15	1035.79	1034.98	1034.63	1041.21	1044.51	1044.97	1020.38	986.82
22	979.81	1040.89	1034.82	1034.97	1035.75	1034.94	1034.72	1041.37	1044.78	1044.88	1019.65	985.68
23	990.78	1038.89	1034.90	1034.54	1038.46	1034.93	1034.99	1040.89	1044.92	1044.78	1018.93	984.53
24	996.49	1036.75	1034.65	1035.46	1036.03	1035.37	1034.66	1040.69	1044.87	1044.78	1018.19	983.37
25	999.84	1034.92	1034.59	1036.28	1035.31	1035.20	1034.97	1040.89	1044.83	1044.03	1017.43	982.18
26	1002.26	1034.64	1035.41	1035.01	1035.06	1034.99	1035.17	1041.30	1044.88	1044.56	1016.70	981.49
27	1004.27	1034.38	1034.80	1034.39	1035.10	1034.85	1035.09	1041.05	1045.01	1045.08	1015.83	981.33
28	1006.12	1036.34	1034.98	1034.86	1035.28	1035.01	1035.08	1041.24	1044.95	1044.99	1014.75	981.19
29	1004.67	1036.18	1034.84	1034.99	---	1034.96	1035.28	1041.92	1044.92	1044.95	1013.57	981.22
30	1005.82	1035.97	1034.50	1035.04	---	1035.29	1035.25	1041.64	1044.92	1044.93	1012.38	982.37
31	1015.40	---	1034.75	1034.74	---	1035.10	---	1040.71	---	1044.85	1011.19	---
MAX	1015.40	1040.89	1040.68	1037.39	1038.46	1038.75	1038.41	1041.92	1045.23	1045.37	1044.87	1009.97
MIN	970.63	1024.23	1034.50	1034.39	1034.49	1034.64	1034.46	1035.00	1040.80	1044.03	1011.19	981.19
(†)	19700	26900	26500	26500	26700	26600	26600	28800	30500	30500	18300	10600
(‡)	+10090	+7200	-400	0	+200	-100	0	+2200	+1700	0	-12200	-7700

CAL YR 2001 MAX 1045.41 MIN 970.63 AC-FT‡ -100
WTR YR 2002 MAX 1045.37 MIN 970.63 AC-FT‡ +990

† Contents, in acre-feet, at 2400, on last day of month.
‡ Change in contents, in acre-feet.

14139700 CEDAR CREEK NEAR BRIGHTWOOD, OR

LOCATION.--Lat 45°27'30", long 122°01'50", in NE 1/4 sec.26, T.1 S., R.6 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on right bank 5.8 mi north of Brightwood and at mile 2.5.

DRAINAGE AREA.--7.93 mi^2.

PERIOD OF RECORD.--July to November 1964, June 1965 to current year.

REVISED RECORDS.--WDR OR 96-1: 1989(M), 1991 (M).

GAGE.--Water-stage recorder. Elevation of gage is 1,960 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--37 years (water years 1966-2002), 66.0 ft^3/s, 113.02 in/yr, 47,790 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,990 ft^3/s Dec. 22, 1964, gage height, 7.20 ft, from rating curve extended above 940 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 4.7 ft^3/s Oct. 28, 29, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 22	2100	543	3.70	Apr. 14	0500	*877	*4.22
Dec. 13	2130	520	3.66				

Minimum discharge, 6.0 ft^3/s Oct. 3-8.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.6	189	196	77	42	48	65	53	64	45	15	11
2	6.3	198	201	106	40	43	65	53	56	39	15	11
3	6.1	105	135	94	45	39	66	52	51	35	15	11
4	6.0	70	89	81	46	37	76	48	47	32	15	11
5	6.0	76	68	70	43	40	92	54	52	30	17	11
6	6.0	54	190	150	49	118	114	56	47	27	16	11
7	6.0	43	218	220	96	87	155	49	41	26	15	10
8	8.3	35	130	299	105	63	125	45	38	28	15	10
9	8.8	30	110	179	82	53	139	42	35	25	15	10
10	21	27	82	110	65	58	258	39	34	23	15	10
11	49	24	81	82	62	184	259	38	32	22	14	10
12	21	27	87	136	52	280	270	44	31	21	14	9.9
13	35	108	333	107	46	148	259	52	31	21	14	9.6
14	33	218	323	79	42	96	534	58	31	20	14	9.3
15	25	117	161	63	40	72	220	53	30	20	14	9.2
16	19	115	332	54	39	60	155	50	29	19	13	10
17	20	103	283	46	38	50	117	54	33	19	13	18
18	16	71	163	44	46	44	88	53	77	18	13	11
19	14	65	121	56	81	129	73	54	49	18	13	10
20	13	68	87	113	82	121	64	53	40	18	13	9.6
21	13	75	70	132	124	88	58	51	35	18	13	9.2
22	89	244	57	76	159	68	54	70	33	17	13	8.9
23	144	253	48	60	335	60	51	60	30	17	13	8.7
24	81	122	41	91	266	76	48	54	28	17	12	8.4
25	51	82	37	269	134	76	48	54	27	16	12	8.4
26	38	67	33	138	89	69	49	54	25	16	12	8.0
27	33	53	31	84	68	81	58	55	25	16	12	8.0
28	31	162	48	63	56	79	51	73	28	16	12	8.0
29	28	244	39	52	---	74	51	141	110	16	12	11
30	119	169	35	45	---	68	54	98	55	15	11	25
31	270	---	37	43	---	65	---	77	---	15	11	---
TOTAL	1223.1	3214	3866	3219	2372	2574	3716	1787	1244	685	421	316.2
MEAN	39.45	107.1	124.7	103.8	84.71	83.03	123.9	57.65	41.47	22.10	13.58	10.54
MAX	270	253	333	299	335	280	534	141	110	45	17	25
MIN	6.0	24	31	43	38	37	48	38	25	15	11	8.0
AC-FT	2430	6370	7670	6380	4700	5110	7370	3540	2470	1360	835	627
CFSM	4.98	13.5	15.7	13.1	10.7	10.5	15.6	7.27	5.23	2.79	1.71	1.33
IN.	5.74	15.08	18.14	15.10	11.13	12.07	17.43	8.38	5.84	3.21	1.97	1.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2002, BY WATER YEAR (WY)

MEAN	39.90	96.86	113.8	111.5	99.02	84.00	84.33	64.29	43.04	21.68	15.12	20.31
MAX	86.5	211	232	218	202	181	130	136	115	53.9	38.1	51.4
(WY)	1968	1996	1978	1975	1996	1972	1974	1969	1981	1983	1968	1977
MIN	5.43	15.5	29.4	31.9	29.8	22.6	46.0	30.6	12.8	10.9	8.68	7.43
(WY)	1988	1994	1977	1981	1993	1992	1998	1992	1992	1992	1970	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1966 - 2002	
ANNUAL TOTAL	18691.4		24637.3			
ANNUAL MEAN	51.21		67.50		65.96	
HIGHEST ANNUAL MEAN					105	1974
LOWEST ANNUAL MEAN					40.7	2001
HIGHEST DAILY MEAN	333	Dec 13	534	Apr 14	1510	Nov 25 1999
LOWEST DAILY MEAN	6.0	Sep 22	6.0	Oct 4	4.8	Oct 28 1987
ANNUAL SEVEN-DAY MINIMUM	6.1	Oct 1	6.1	Oct 1	4.9	Oct 23 1987
ANNUAL RUNOFF (AC-FT)	37070		48870		47790	
ANNUAL RUNOFF (CFSM)	6.46		8.51		8.32	
ANNUAL RUNOFF (INCHES)	87.68		115.57		113.02	
10 PERCENT EXCEEDS	122		152		141	
50 PERCENT EXCEEDS	31		49		41	
90 PERCENT EXCEEDS	8.3		11		12	

14139800 SOUTH FORK BULL RUN RIVER NEAR BULL RUN, OR

LOCATION.--Lat 45°26'41", long 122°06'30", in NE 1/4 NE 1/4 sec.31, T.1 S., R.6 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on right bank 6.2 mi northeast of Bull Run, and at mile 0.6.

DRAINAGE AREA.--15.4 mi^2

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to current year.

REVISED RECORDS.--WDR OR-91-1: 1989.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 990 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--28 years (water years 1975-2002), 112 ft^3/s, 98.65 in/yr, 81,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,630 ft^3/s Feb. 7, 1996, gage height, 9.54 ft, from rating curve extended above 1,800 ft^3/s on basis of slope-area measurement of peak flow; minimum discharge, 5.4 ft^3/s Oct. 13, 1994.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0530	*1,680	*7.10	No other peak greater than base discharge.			

Minimum discharge, 9.3 ft^3/s Oct. 5-7.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	343	350	125	87	93	105	85	102	82	19	14
2	10	374	392	196	83	81	104	85	88	70	18	14
3	9.8	224	289	182	90	72	104	83	78	61	18	14
4	9.7	149	208	159	96	65	113	76	73	54	19	14
5	9.5	152	160	135	90	67	133	81	78	48	20	13
6	9.4	115	336	227	94	184	167	85	73	44	19	13
7	9.5	92	465	346	170	172	221	77	63	42	18	13
8	12	75	282	512	205	130	197	70	58	43	18	13
9	13	63	240	325	179	107	204	65	52	38	17	13
10	21	54	188	212	146	109	371	60	50	34	17	13
11	75	46	182	161	131	271	396	58	47	32	17	13
12	33	49	184	211	111	488	444	64	46	30	17	12
13	59	150	557	190	96	275	396	77	47	29	16	12
14	60	358	632	151	85	191	967	87	47	27	16	12
15	51	211	331	120	77	147	346	83	43	26	16	12
16	39	207	585	101	74	118	233	77	40	26	16	13
17	37	194	535	86	72	96	188	81	43	25	16	23
18	29	146	319	81	82	80	151	81	99	24	15	15
19	25	128	240	109	134	204	126	82	70	24	15	13
20	23	129	184	188	152	217	111	81	58	23	16	13
21	23	136	145	268	195	169	99	79	51	22	16	12
22	116	383	117	176	249	134	90	102	47	22	15	12
23	220	483	97	133	532	113	84	97	43	21	15	12
24	160	252	83	176	494	129	78	86	40	21	15	12
25	106	173	72	502	261	133	76	82	37	20	15	12
26	79	136	64	298	183	121	78	82	34	20	15	11
27	66	107	60	192	139	132	92	84	32	20	15	11
28	60	272	84	141	112	130	85	105	37	20	15	11
29	51	470	71	111	---	128	84	191	157	19	14	13
30	173	322	65	94	---	117	87	155	103	19	14	32
31	461	---	68	90	---	109	---	123	---	19	14	---
TOTAL	2059.9	5993	7585	5998	4419	4582	5930	2724	1836	1005	506	410
MEAN	66.45	199.8	244.7	193.5	157.8	147.8	197.7	87.87	61.20	32.42	16.32	13.67
MAX	461	483	632	512	532	488	967	191	157	82	20	32
MIN	9.4	46	60	81	72	65	76	58	32	19	14	11
AC-FT	4090	11890	15040	11900	8770	9090	11760	5400	3640	1990	1000	813
CFSM	4.31	13.0	15.9	12.6	10.2	9.60	12.8	5.71	3.97	2.11	1.06	0.89
IN.	4.98	14.48	18.32	14.49	10.67	11.07	14.32	6.58	4.44	2.43	1.22	0.99

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2002, BY WATER YEAR (WY)

MEAN	63.95	169.4	202.7	182.7	179.7	146.2	143.9	104.0	71.67	32.59	21.14	29.63
MAX	146	313	413	321	353	275	215	163	180	91.2	53.2	93.4
(WY)	1997	1996	1997	1997	1996	1997	1976	1999	1981	1983	1978	1977
MIN	8.31	23.3	50.4	56.5	54.7	53.8	89.6	47.1	15.4	14.8	11.7	9.03
(WY)	1988	1994	1977	2001	1977	1992	1983	1992	1992	1992	1994	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1975 - 2002	
ANNUAL TOTAL	34839.2		43047.9			
ANNUAL MEAN	95.45		117.9		111.8	
HIGHEST ANNUAL MEAN					171	1997
LOWEST ANNUAL MEAN					74.9	2001
HIGHEST DAILY MEAN	632	Dec 14	967	Apr 14	2880	Nov 25 1999
LOWEST DAILY MEAN	9.3	Sep 24	9.4	Oct 6	5.6	Oct 11 1994
ANNUAL SEVEN-DAY MINIMUM	9.5	Sep 18	9.7	Oct 1	5.7	Oct 7 1994
ANNUAL RUNOFF (AC-FT)	69100		85390		81010	
ANNUAL RUNOFF (CFSM)	6.20		7.66		7.26	
ANNUAL RUNOFF (INCHES)	84.16		103.99		98.65	
10 PERCENT EXCEEDS	237		271		237	
50 PERCENT EXCEEDS	56		82		74	
90 PERCENT EXCEEDS	12		14		15	

14139800 SOUTH FORK BULL RUN RIVER NEAR BULL RUN, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1978 to current year.
pH: November 1980 to September 1981, June 1990 to September 1992.
WATER TEMPERATURE: October 1978 to current year.
TURBIDITY: June 1990 to September 1994.
SUSPENDED SEDIMENT DISCHARGE: October 1978 to September 1986.

INSTRUMENTATION.--Water-quality monitor.

REMARKS.--Specific conductance records good. Water temperature records excellent. Turbidity data prior to October 1990 are available in the files of the Portland field office.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded, 56 microsiemens Oct. 31, 1988; minimum, 9 microsiemens Jan. 4, 1983.
pH: Maximum recorded, 8.0 units Aug. 17, Oct. 2, 1990, but may have been higher in water year 1990, 1992 during period of missing record; minimum recorded, 6.4 units Dec. 6, 1991, but may have been lower during period of missing record.
WATER TEMPERATURE: Maximum, 18.0°C June 23, 24, July 18, 19, 1992; minimum, 0.0°C on many days during winter periods.
TURBIDITY: Maximum recorded, 16 NTU Oct. 16, 1993; minimum recorded, 0.08 NTU Sept. 2, 1994.
SEDIMENT CONCENTRATION: Maximum daily, 212 mg/L Nov. 7, 1985; minimum, 0 mg/L on many days.
SEDIMENT DISCHARGE: Maximum daily, 794 tons Nov. 7, 1985; minimum, 0 tons on many days.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 45 microsiemens several days in August and September; minimum, 14 microsiemens Apr. 14.
WATER TEMPERATURE: Maximum, 15.8°C July 23-25; minimum, 2.2°C Mar. 8.

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	18	17	18	19	17	18	25	20	23
2	---	---	---	18	18	18	18	17	18	20	20	20
3	---	---	---	19	18	19	20	18	19	21	20	20
4	---	---	---	20	19	20	20	19	20	21	20	21
5	---	---	---	20	20	20	22	20	21	22	21	21
6	---	---	---	21	20	21	22	18	20	21	19	20
7	---	---	---	22	21	22	19	18	19	19	18	19
8	---	---	---	23	22	22	21	19	20	18	17	17
9	---	---	---	23	23	23	21	20	20	19	18	18
10	---	---	---	24	23	24	22	21	21	20	19	20
11	---	---	---	24	24	24	22	21	22	21	20	21
12	27	27	27	25	24	24	22	21	22	21	19	20
13	27	25	26	25	19	23	21	15	18	20	19	20
14	26	25	25	19	18	18	18	15	17	21	20	21
15	25	24	24	20	19	19	19	18	19	22	21	21
16	26	25	25	20	19	19	19	17	18	22	22	22
17	26	25	25	21	19	20	18	17	17	24	22	23
18	26	25	25	23	20	21	19	18	19	24	23	24
19	26	26	26	23	20	21	20	19	20	23	22	23
20	27	26	27	21	20	21	21	20	21	23	19	22
21	28	27	27	21	20	21	22	21	21	21	19	20
22	27	21	24	21	15	19	22	22	22	22	21	21
23	21	20	20	18	15	17	24	22	23	23	22	22
24	20	19	20	19	18	19	24	23	23	23	20	22
25	21	20	20	20	19	20	25	24	24	20	18	19
26	22	21	21	21	20	20	25	24	24	21	19	20
27	23	22	22	21	21	21	25	24	25	22	21	21
28	23	22	22	22	17	19	24	23	24	23	22	22
29	24	23	23	18	17	17	24	24	24	24	23	23
30	24	19	22	19	18	18	26	24	25	24	24	24
31	19	17	18	---	---	---	25	24	24	25	24	24
MONTH	---	---	---	25	15	20	26	15	21	25	17	21

14139800 SOUTH FORK BULL RUN RIVER NEAR BULL RUN, OR--Continued

SPECIFIC CONDUCTANCE, in US/CM @ 25C, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	25	25	25	24	23	23	22	22	22	23	22	22
2	26	25	25	24	24	24	22	22	22	23	22	22
3	26	25	25	25	24	25	22	22	22	22	22	22
4	25	24	25	25	25	25	22	21	22	23	22	22
5	25	25	25	25	25	25	21	21	21	23	22	23
6	25	24	25	25	19	22	21	20	20	22	22	22
7	24	21	22	21	20	21	20	18	19	23	22	23
8	22	21	21	22	21	22	20	19	19	23	23	23
9	22	21	22	23	22	22	20	18	19	24	23	23
10	23	22	23	23	22	23	19	17	18	24	24	24
11	23	23	23	22	17	20	18	17	18	25	24	25
12	24	23	24	19	17	18	18	17	17	25	24	24
13	25	24	24	20	19	19	18	16	17	24	22	23
14	25	25	25	21	20	20	17	14	15	23	22	22
15	26	25	25	22	21	21	18	17	18	22	22	22
16	26	26	26	23	22	22	19	18	19	23	22	22
17	26	26	26	24	23	23	20	19	19	23	22	22
18	26	25	25	24	23	24	21	20	20	22	21	22
19	25	22	23	23	20	21	21	21	21	22	21	21
20	23	22	22	21	20	20	22	21	22	22	21	21
21	23	21	21	21	21	21	23	22	22	22	21	21
22	21	20	20	22	21	22	23	22	22	22	20	21
23	20	17	18	23	22	22	23	22	23	20	20	20
24	19	17	18	23	21	22	23	22	23	21	20	21
25	20	18	19	22	21	22	23	22	23	21	21	21
26	21	20	20	22	21	22	24	22	23	21	21	21
27	22	21	21	22	21	21	22	22	22	21	21	21
28	23	22	22	22	21	21	22	22	22	21	19	20
29	---	---	---	22	21	21	23	22	22	20	17	18
30	---	---	---	22	21	22	22	22	22	19	18	18
31	---	---	---	22	21	22	---	---	---	20	19	19
MONTH	26	17	23	25	17	22	24	14	20	25	17	22

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	21	20	20	25	24	25	40	38	39	44	43	43
2	21	21	21	26	25	25	40	38	39	44	43	44
3	22	21	22	28	26	26	40	39	39	44	42	43
4	23	22	22	28	26	27	42	38	39	43	43	43
5	24	21	22	31	27	28	41	38	39	43	43	43
6	22	21	22	31	28	29	40	38	39	43	43	43
7	23	22	23	32	29	30	41	39	39	43	42	43
8	25	23	24	31	29	30	41	39	40	44	42	43
9	25	24	24	32	30	30	42	40	40	44	43	44
10	26	24	25	33	31	31	42	40	41	44	44	44
11	27	25	25	34	31	32	42	40	41	45	44	44
12	27	25	26	34	32	33	44	41	41	45	44	44
13	27	25	25	35	33	34	43	41	42	45	44	44
14	27	25	25	34	33	33	44	41	42	45	44	44
15	28	25	26	34	33	34	44	41	43	45	43	44
16	28	26	26	37	34	35	45	41	42	45	43	44
17	29	26	27	36	34	35	44	41	42	44	39	41
18	27	22	23	36	35	35	43	41	42	42	40	41
19	24	22	23	36	35	35	44	41	42	43	42	42
20	25	24	24	36	36	36	44	41	42	44	43	43
21	28	25	25	37	36	36	43	41	42	43	43	43
22	27	26	26	37	36	37	44	42	42	43	41	42
23	29	26	27	38	37	37	45	42	43	42	41	42
24	30	27	27	38	37	38	43	42	43	42	41	42
25	29	28	28	39	37	37	43	42	43	42	41	42
26	31	29	29	39	37	37	43	42	43	42	41	42
27	31	29	30	39	37	37	43	43	43	42	41	42
28	30	28	29	40	37	38	44	43	43	42	41	42
29	29	22	24	41	38	39	44	43	43	42	39	41
30	24	23	23	41	38	39	43	42	43	39	33	36
31	---	---	---	39	38	38	44	43	43	---	---	---
MONTH	31	20	25	41	24	33	45	38	41	45	33	43

14139800 SOUTH FORK BULL RUN RIVER NEAR BULL RUN, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.4	9.6	10.0	8.5	8.1	8.3	6.3	5.8	6.1	4.5	4.0	4.2
2	10.2	9.8	10.0	8.9	8.3	8.6	6.1	5.6	5.8	5.1	4.5	4.8
3	10.0	9.2	9.5	8.3	7.7	8.1	5.9	5.2	5.5	4.8	4.5	4.7
4	9.8	9.2	9.4	8.3	7.7	8.0	5.4	3.3	4.4	4.8	4.2	4.6
5	9.6	9.2	9.4	8.3	7.2	7.9	4.4	2.7	3.7	5.1	4.7	4.9
6	10.0	9.4	9.7	7.2	6.3	6.8	4.6	4.1	4.4	5.1	5.1	5.1
7	9.6	9.0	9.3	6.3	5.6	5.8	5.4	4.3	5.0	5.5	5.1	5.3
8	9.4	9.0	9.3	6.1	5.4	5.8	5.8	5.2	5.4	5.5	5.1	5.3
9	9.2	8.4	8.9	6.3	5.6	5.9	5.4	4.9	5.3	5.3	4.8	5.1
10	8.4	8.0	8.2	7.0	6.3	6.6	4.9	4.4	4.6	5.3	4.8	5.0
11	8.8	8.2	8.6	7.5	6.8	7.2	4.8	4.5	4.6	5.5	5.0	5.2
12	8.6	8.0	8.3	8.1	7.5	7.8	5.1	4.8	5.0	5.3	4.7	5.1
13	9.2	8.6	8.8	8.3	8.1	8.1	5.3	4.7	5.1	4.7	4.3	4.4
14	9.6	9.2	9.3	9.1	8.3	8.7	4.7	4.3	4.5	4.5	4.2	4.3
15	9.2	8.6	8.8	8.7	8.5	8.6	4.8	4.3	4.7	4.3	3.7	4.0
16	9.0	8.6	8.8	8.5	8.1	8.4	5.3	4.8	5.0	3.7	2.9	3.4
17	8.6	7.8	8.3	8.1	6.8	7.6	5.3	4.8	5.0	3.4	2.9	3.1
18	7.8	7.1	7.2	7.0	6.4	6.7	5.1	4.8	5.0	3.4	3.2	3.3
19	7.6	6.7	7.2	7.9	6.8	7.5	5.1	4.8	5.0	3.4	2.8	3.1
20	7.6	7.2	7.5	7.9	7.5	7.7	5.1	5.0	5.0	3.2	2.6	3.0
21	7.2	6.9	7.0	7.7	7.3	7.5	5.0	4.3	4.8	3.7	2.6	3.1
22	8.6	7.2	7.9	7.7	7.3	7.5	4.5	4.2	4.3	3.1	2.6	2.8
23	8.4	7.4	7.9	7.3	7.0	7.2	4.2	3.7	3.9	3.4	2.9	3.1
24	7.5	6.8	7.2	7.0	6.3	6.7	3.7	3.4	3.6	3.5	3.1	3.4
25	8.1	7.3	7.8	6.3	5.7	5.9	3.7	3.2	3.4	3.4	2.5	3.1
26	7.9	7.3	7.7	5.9	5.6	5.8	3.4	3.1	3.2	3.8	2.9	3.4
27	7.9	7.2	7.7	5.6	5.1	5.3	3.7	3.4	3.5	3.5	3.1	3.4
28	7.2	6.1	6.5	5.7	4.3	4.9	4.2	3.7	3.9	3.5	2.9	3.4
29	7.3	6.4	6.9	5.9	5.7	5.8	3.8	3.4	3.6	2.9	2.3	2.7
30	8.7	7.3	8.0	5.9	5.6	5.8	4.2	3.5	3.8	3.2	2.9	3.1
31	8.7	8.3	8.4	---	---	---	4.7	4.0	4.3	3.3	2.7	3.1
MONTH	10.4	6.1	8.4	9.1	4.3	7.1	6.3	2.7	4.6	5.5	2.3	4.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.5	2.7	3.1	3.6	3.0	3.2	5.8	4.8	5.2	6.7	5.8	6.2
2	3.6	3.2	3.4	3.4	2.7	3.0	5.8	4.0	4.8	6.5	5.8	6.0
3	3.9	3.6	3.8	3.7	2.8	3.2	6.0	4.0	4.9	6.1	5.1	5.7
4	3.6	3.3	3.5	4.1	3.1	3.5	6.1	4.2	5.1	6.5	4.6	5.6
5	3.9	3.5	3.7	4.4	3.9	4.2	5.3	4.6	4.9	6.3	5.4	5.8
6	4.1	3.8	3.9	4.2	3.0	3.6	5.1	4.8	4.9	5.4	4.1	4.8
7	4.1	2.7	3.7	3.3	2.7	3.0	5.1	4.6	4.8	4.8	3.7	4.2
8	3.8	2.9	3.4	3.0	2.2	2.6	6.0	4.0	4.8	6.5	4.0	5.2
9	4.3	3.6	3.9	3.6	2.8	3.2	5.3	4.8	5.0	6.1	5.1	5.4
10	4.4	3.9	4.2	4.1	3.6	3.8	5.1	4.6	4.8	6.5	5.1	5.7
11	4.3	3.6	4.0	4.4	3.7	4.1	5.1	4.5	4.8	7.7	5.3	6.5
12	4.1	3.5	3.7	4.1	3.1	3.7	5.3	4.6	4.9	8.9	6.3	7.6
13	3.9	3.3	3.6	3.7	3.1	3.6	5.6	5.0	5.2	8.5	6.3	7.0
14	3.9	3.5	3.7	3.6	3.1	3.4	5.6	3.4	4.2	7.4	6.0	6.6
15	3.8	3.3	3.6	4.1	3.3	3.6	4.6	4.2	4.3	7.7	5.6	6.7
16	4.1	3.8	3.9	3.4	3.0	3.2	4.8	4.1	4.4	8.1	5.6	6.9
17	4.1	3.5	3.8	3.3	2.5	3.0	5.1	4.1	4.6	8.5	6.8	7.6
18	4.6	4.1	4.3	3.4	3.1	3.3	5.6	4.6	5.0	7.9	6.6	7.3
19	4.6	4.1	4.3	3.3	2.8	3.0	5.6	4.9	5.2	7.6	6.6	7.1
20	4.4	4.0	4.2	4.7	3.3	4.0	6.1	5.0	5.5	7.5	6.4	6.9
21	4.6	4.3	4.4	4.4	3.4	3.9	5.6	5.1	5.4	7.3	6.5	6.9
22	4.9	4.3	4.5	4.9	3.6	4.2	6.1	5.3	5.7	7.1	6.2	6.6
23	4.4	3.2	3.9	5.2	4.2	4.7	6.1	4.6	5.4	8.0	5.7	6.8
24	4.1	3.2	3.7	4.9	4.4	4.7	6.8	4.3	5.6	8.4	5.9	7.2
25	3.8	3.2	3.4	5.2	3.9	4.5	6.7	5.1	6.0	8.2	6.9	7.6
26	3.8	3.0	3.3	4.9	3.7	4.4	6.3	5.4	5.7	9.2	7.3	8.1
27	4.0	2.9	3.4	4.7	4.1	4.4	6.0	4.8	5.4	8.6	7.6	7.9
28	4.2	3.6	3.9	4.7	4.4	4.5	6.8	4.3	5.5	8.0	7.5	7.7
29	---	---	---	5.2	4.2	4.7	7.4	5.0	6.1	7.8	7.1	7.4
30	---	---	---	5.8	4.4	4.9	6.8	5.6	6.1	9.0	6.6	7.6
31	---	---	---	5.4	4.2	4.8	---	---	---	9.2	6.7	7.9
MONTH	4.9	2.7	3.8	5.8	2.2	3.8	7.4	3.4	5.1	9.2	3.7	6.7

14139800 SOUTH FORK BULL RUN RIVER NEAR BULL RUN, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.2	7.4	8.3	11.7	9.8	10.7	13.0	11.6	12.4	12.7	11.7	12.3
2	9.0	7.6	8.2	11.7	9.6	10.7	13.0	11.8	12.4	12.7	11.7	12.3
3	9.2	7.4	8.4	11.3	10.2	10.6	12.5	11.4	12.1	12.4	11.7	12.2
4	9.0	8.4	8.7	10.6	9.8	10.2	12.3	11.8	12.1	11.7	10.6	11.0
5	9.8	8.4	9.0	11.7	9.2	10.4	11.8	10.9	11.5	10.6	9.8	10.2
6	9.2	8.2	8.6	12.6	10.6	11.7	11.8	10.9	11.4	10.0	9.4	9.8
7	8.4	7.4	7.8	12.4	11.7	12.0	11.8	10.5	11.2	10.4	9.8	10.1
8	7.8	7.1	7.4	12.4	11.3	11.7	12.2	10.7	11.5	10.4	9.4	9.9
9	8.2	7.4	7.7	13.3	10.8	12.0	12.7	11.1	12.0	10.6	9.6	10.0
10	10.0	7.8	8.7	14.5	12.3	13.4	13.2	12.2	12.6	10.9	9.8	10.4
11	11.3	8.6	9.9	15.0	13.5	14.3	13.4	12.2	12.8	11.3	10.2	10.7
12	12.2	9.8	11.1	15.3	13.7	14.5	13.9	12.2	13.1	11.5	10.6	11.2
13	13.4	11.1	12.2	15.0	14.2	14.7	14.4	12.7	13.6	11.7	10.9	11.3
14	13.1	11.9	12.6	14.5	13.2	13.9	14.7	13.4	14.0	12.0	11.1	11.5
15	12.9	11.5	12.2	14.0	12.5	13.4	14.4	13.4	13.9	11.7	11.3	11.4
16	12.4	10.4	11.4	14.2	12.8	13.6	13.9	12.9	13.5	11.3	11.1	11.1
17	10.4	9.8	10.1	14.5	13.2	13.9	13.9	12.9	13.3	11.1	10.6	10.8
18	10.0	9.2	9.4	14.8	13.5	14.2	13.2	12.2	12.8	10.9	10.0	10.3
19	11.1	8.6	9.8	14.2	13.5	13.9	12.9	12.2	12.6	10.4	9.6	10.0
20	11.9	9.4	10.6	14.5	13.0	13.7	12.7	12.2	12.5	10.6	10.2	10.4
21	12.9	10.4	11.6	15.0	13.2	14.1	12.2	11.5	11.9	10.2	9.6	10.0
22	12.4	11.5	11.8	15.3	13.7	14.6	12.0	10.6	11.3	10.2	9.4	9.7
23	12.6	11.1	11.8	15.8	14.5	15.2	13.2	11.3	11.9	10.2	9.4	9.9
24	12.9	11.1	12.0	15.8	14.5	15.3	12.9	11.7	12.4	10.4	9.6	10.0
25	13.6	11.3	12.5	15.8	14.8	15.2	12.7	12.2	12.5	10.4	9.6	10.1
26	14.1	12.6	13.3	15.3	14.0	14.8	12.2	12.0	12.1	10.2	9.6	10.0
27	13.6	12.4	13.0	14.0	13.0	13.6	12.4	11.3	11.9	10.4	10.0	10.2
28	12.4	11.7	11.9	14.0	12.5	13.3	13.2	12.0	12.5	10.2	9.6	10.0
29	11.7	10.6	11.1	14.2	13.0	13.6	13.4	12.7	13.0	10.0	9.6	9.9
30	11.1	10.0	10.5	13.7	13.0	13.5	12.9	12.4	12.6	9.6	8.6	9.0
31	---	---	---	13.0	11.8	12.5	12.7	11.7	12.3	---	---	---
MONTH	14.1	7.1	10.4	15.8	9.2	13.2	14.7	10.5	12.4	12.7	8.6	10.5
YEAR	15.8	2.2	7.5									

14139900 BULL RUN RESERVOIR NUMBER TWO NEAR BULL RUN, OR

LOCATION.--Lat 45°26'52", long 122°08'52", on line between secs.25 and 26, T.1 S., R.5 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on headworks dam on Bull Run River, 4.1 mi northeast of Bull Run, and at mile 6.5.

DRAINAGE AREA.--102 mi^2.

PERIOD OF RECORD.--December 1961 to current year. Prior to October 1975, monthend contents only.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Portland Water Bureau). Prior to Dec. 31, 1975, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earth and rockfill dam with concrete spillway built by Portland Water Bureau. Storage began about Dec. 20, 1961; first filling occurred Dec. 24, 1961. Capacity, 20,990 acre-ft at crest of spillway, elevation, 860.0 ft. Dead storage negligible. Water is used as municipal supply for city of Portland and for power generation by Portland General Electric Co.

COOPERATION.--Capacity table furnished by Portland Water Bureau.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 23,660 acre-ft Dec. 22, 1964, elevation, 866.00 ft; no contents at times during low-flow periods.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 22,140 acre-ft Apr. 14, elevation, 862.59 ft; minimum contents, 13,080 acre-ft Oct. 8, elevation, 839.36 ft.

Capacity table (elevation, in feet, and capacity in acre-feet)

752	0	830	10,000
770	234	850	16,800
790	1,860	870	25,500
810	5,070		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	843.31	857.29	860.76	859.64	859.43	859.30	859.24	859.35	859.31	859.76	849.48	854.39
2	843.71	858.27	860.37	859.29	859.30	859.41	859.51	859.37	859.64	859.81	849.96	854.51
3	843.50	859.81	860.09	859.14	859.39	859.43	859.59	859.80	859.26	859.71	849.66	854.67
4	842.94	859.66	859.44	859.30	859.49	859.13	859.48	859.69	859.40	859.74	849.71	854.80
5	842.12	859.62	859.37	859.51	859.46	859.27	859.47	859.80	859.60	859.76	849.75	854.91
6	840.98	858.62	860.66	859.42	859.43	859.34	859.83	859.34	859.15	859.71	849.80	855.05
7	839.83	858.32	860.58	860.81	859.33	859.05	859.74	859.13	859.79	859.92	849.65	855.19
8	839.58	857.08	859.68	861.09	859.62	859.37	859.27	859.41	859.50	860.01	849.71	855.19
9	839.77	858.25	859.39	860.14	859.67	859.64	859.23	859.35	859.17	859.92	849.70	854.96
10	839.95	858.06	859.63	859.87	859.64	859.36	860.81	859.45	858.93	859.94	849.87	854.60
11	840.50	858.73	859.54	859.50	859.35	861.10	860.80	859.31	859.41	859.66	849.53	854.31
12	840.97	858.64	859.63	859.82	859.01	860.78	860.82	859.26	859.78	859.54	850.96	854.22
13	841.49	859.35	862.16	859.89	859.17	859.91	861.05	859.45	859.69	859.65	852.93	854.18
14	841.34	860.14	861.12	859.38	859.26	859.97	861.47	859.32	858.99	859.51	854.64	854.22
15	841.60	859.40	860.35	859.22	859.53	859.42	860.57	859.24	859.16	859.18	854.42	854.28
16	842.22	859.41	861.56	859.70	859.37	859.27	859.66	859.59	859.77	859.04	854.41	854.45
17	843.15	859.69	860.91	859.49	859.54	859.07	859.11	859.88	859.60	858.54	854.46	854.82
18	844.33	859.39	860.12	859.61	859.70	859.43	859.84	859.32	859.67	858.06	854.39	855.02
19	845.27	859.59	859.83	859.19	859.58	859.94	859.46	859.33	859.59	857.59	855.02	855.12
20	845.60	859.49	859.52	859.53	859.39	859.86	858.78	859.59	859.27	857.14	855.63	855.16
21	845.38	859.59	859.76	859.86	859.58	859.49	858.70	859.72	859.51	856.74	855.63	855.12
22	845.25	861.51	859.45	859.38	859.79	859.33	858.68	859.58	858.98	856.24	855.50	855.06
23	845.89	860.56	859.29	859.67	861.33	859.31	858.53	859.49	859.22	855.67	855.35	854.93
24	846.02	860.29	859.43	859.52	860.70	859.59	859.04	859.44	859.41	854.98	855.09	854.71
25	845.73	859.42	859.65	860.90	859.84	859.42	859.32	859.45	859.39	855.05	854.78	854.56
26	845.25	859.29	859.02	859.94	859.60	859.53	859.49	859.40	859.50	853.86	854.46	854.28
27	844.86	859.10	859.52	859.54	859.71	859.71	859.14	859.44	859.60	852.76	854.24	853.76
28	844.39	860.54	859.58	859.47	859.10	859.70	858.98	859.71	859.92	852.25	854.19	853.20
29	846.42	860.77	859.36	859.53	---	859.38	859.39	860.01	859.92	851.55	854.26	852.78
30	850.60	860.35	859.40	859.36	---	859.14	859.63	859.69	859.80	850.73	854.32	852.56
31	856.24	---	858.94	859.57	---	859.11	---	859.77	---	850.08	854.33	---
MAX	856.24	861.51	862.16	861.09	861.33	861.10	861.47	860.01	859.92	860.01	855.63	855.19
MIN	839.58	857.08	858.94	859.14	859.01	859.05	858.53	859.13	858.93	850.08	849.48	852.56
(†)	19350	21150	20530	20810	20600	20610	20840	20900	20910	16830	18530	17820
(‡)	+5090	+1800	-620	+280	-210	+10	+230	+60	+10	-4080	+1700	-710

CAL YR 2001 MAX 862.16 MIN 839.58 ‡AC-FT -210
WTR YR 2002 MAX 862.16 MIN 839.58 ‡AC-FT +3560

† Contents, in acre-feet, at 2400, on last day of month.
‡ Change in contents, in acre-feet.

14140000 BULL RUN RIVER NEAR BULL RUN, OR

LOCATION.--Lat 45°26'15", long 122°10'42", in NE 1/4 SW 1/4 sec.34, T.1 S., R.5 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on left bank 1.8 mi downstream from Bull Run Reservoir Number Two, 2.7 mi northeast of Bull Run, and at mile 4.7.

DRAINAGE AREA.--107 mi^2.

PERIOD OF DAILY RECORD.--December 2000 to current year.

INSTRUMENTATION.--Water-quality monitor.

REMARKS.--Record fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum, 21.8°C July 10, 2002; minimum, 2.8°C Feb. 12, 2001.

EXTREMES FOR CURRENT YEAR.--Maximum, 21.8°C July 10; minimum, 3.0°C Jan. 29, Feb. 27.

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	16.7	14.1	15.2	10.4	9.9	10.1	7.6	6.0	6.7	4.9	3.3	4.3
2	16.3	14.0	15.0	10.5	9.8	10.1	7.4	6.3	6.8	4.9	3.4	4.2
3	15.8	13.5	14.4	10.2	9.3	9.8	7.1	5.8	6.5	5.0	3.5	4.2
4	15.5	13.1	14.2	10.5	9.5	10.0	7.1	5.9	6.3	4.7	3.5	4.2
5	15.6	13.3	14.2	10.2	9.0	9.7	6.7	5.8	6.3	5.1	3.5	4.4
6	15.4	13.7	14.5	9.8	8.7	9.3	6.7	5.3	6.1	5.2	3.8	4.4
7	14.3	13.0	13.7	9.6	8.4	9.0	7.0	5.3	6.1	5.5	3.6	4.5
8	14.7	13.4	14.0	9.7	8.6	9.1	6.8	5.3	6.0	5.7	3.6	4.7
9	14.9	12.9	13.8	9.5	8.3	8.9	6.4	5.1	5.8	5.5	3.8	4.6
10	13.7	12.3	13.0	9.9	8.4	9.0	6.2	5.1	5.7	5.3	3.9	4.7
11	13.9	12.7	13.3	9.9	8.5	9.0	6.3	5.3	5.8	5.4	4.2	4.8
12	13.4	12.3	13.0	9.3	8.5	8.9	6.2	5.3	5.7	5.5	3.8	4.8
13	14.5	12.6	13.5	9.3	8.3	8.9	6.6	4.9	5.6	5.5	3.8	4.7
14	14.3	12.8	13.5	9.9	8.3	8.9	6.2	4.6	5.4	5.4	4.1	4.8
15	14.0	12.0	12.9	9.8	8.1	8.9	6.1	4.4	5.2	5.4	4.1	4.7
16	13.4	12.4	12.8	9.2	8.0	8.6	6.0	4.5	5.3	5.2	4.1	4.8
17	13.2	11.7	12.5	9.0	8.0	8.5	6.1	4.3	5.2	5.3	4.3	4.8
18	12.6	11.1	11.8	9.3	7.9	8.6	5.9	4.4	5.1	5.2	4.3	4.7
19	13.4	11.1	12.2	9.7	8.4	9.0	5.5	4.7	5.1	5.3	4.3	4.7
20	12.8	11.4	11.9	9.3	8.1	8.7	5.4	4.6	5.0	5.2	4.1	4.7
21	11.7	10.6	11.2	9.2	7.7	8.5	5.5	4.6	5.0	5.3	3.7	4.6
22	12.0	11.0	11.5	9.1	7.9	8.4	5.4	4.4	4.9	5.3	3.8	4.5
23	11.6	10.6	11.0	8.8	7.7	8.4	5.4	4.2	4.8	4.9	4.0	4.5
24	11.5	10.1	10.7	8.9	7.3	8.1	5.2	4.1	4.7	4.8	4.0	4.5
25	12.1	10.4	11.2	8.7	7.2	7.8	5.4	3.7	4.6	5.0	3.8	4.4
26	12.0	10.2	11.1	8.2	6.8	7.6	5.0	3.5	4.3	5.0	3.8	4.3
27	11.6	9.9	10.9	8.0	6.8	7.3	5.1	3.4	4.3	4.9	3.8	4.3
28	11.1	9.2	10.2	8.3	6.5	7.4	5.1	3.5	4.4	4.7	3.8	4.2
29	11.1	9.9	10.5	8.1	6.4	7.2	5.2	3.2	4.1	4.7	3.0	4.0
30	11.3	10.6	10.9	7.8	6.2	6.9	4.9	3.2	4.1	4.4	3.6	4.1
31	11.0	10.2	10.6	---	---	---	4.9	3.3	4.2	4.4	3.5	4.0
MONTH	16.7	9.2	12.6	10.5	6.2	8.7	7.6	3.2	5.3	5.7	3.0	4.5

14140000 BULL RUN RIVER NEAR BULL RUN, OR--Continued

WATER TEMPERATURE, in (DEGREES C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	4.4	3.6	4.0	4.8	3.4	4.2	6.1	3.8	5.0	7.3	5.4	6.3
2	4.9	3.4	4.0	5.0	3.3	4.2	6.7	4.0	5.3	7.1	5.0	6.2
3	4.9	3.6	4.1	5.3	3.5	4.4	6.5	4.3	5.4	7.8	5.1	6.3
4	4.6	3.4	4.0	5.5	4.0	4.6	6.6	4.5	5.6	7.6	4.9	6.4
5	4.4	3.7	4.1	5.1	3.8	4.6	6.3	4.4	5.4	7.1	5.5	6.4
6	4.5	3.5	4.1	5.1	4.1	4.6	6.0	4.6	5.3	7.0	5.4	6.4
7	4.4	3.5	4.0	5.0	3.8	4.4	6.4	4.5	5.3	7.3	5.4	6.5
8	4.4	3.5	4.0	4.9	3.9	4.4	6.2	4.7	5.6	8.5	5.7	7.0
9	4.5	3.5	4.0	5.1	3.9	4.4	6.0	4.7	5.5	7.5	5.6	6.7
10	4.8	3.3	4.2	5.0	4.0	4.5	6.8	4.8	5.7	9.0	5.7	7.1
11	4.5	3.7	4.1	5.3	3.8	4.5	6.9	5.3	6.1	9.8	5.8	7.5
12	4.6	3.3	4.1	5.1	3.7	4.4	6.8	5.1	5.8	10.6	6.2	7.8
13	4.6	3.3	4.0	4.9	3.8	4.3	6.9	5.1	6.0	8.0	6.1	7.1
14	4.8	3.5	4.2	4.8	3.8	4.3	6.7	5.0	5.7	8.9	6.3	7.5
15	5.0	3.5	4.2	4.8	3.7	4.3	6.3	4.6	5.5	9.2	5.7	7.4
16	5.0	3.8	4.3	4.9	3.9	4.3	6.1	4.6	5.4	8.9	6.0	7.4
17	5.1	3.4	4.3	4.6	3.6	4.2	5.9	4.7	5.2	8.9	6.5	7.7
18	5.0	3.4	4.4	4.8	3.8	4.3	5.6	4.5	5.2	8.8	6.4	7.4
19	4.9	3.9	4.4	4.9	3.6	4.3	6.0	4.6	5.2	8.3	6.9	7.5
20	5.0	3.5	4.4	5.2	3.8	4.4	6.3	4.8	5.3	8.6	7.0	7.7
21	5.2	4.2	4.7	5.2	3.7	4.3	6.3	4.7	5.4	8.7	6.9	7.8
22	5.3	3.7	4.5	5.8	3.6	4.5	6.4	4.6	5.6	8.2	7.1	7.7
23	5.6	3.8	4.7	5.6	3.7	4.7	7.0	4.5	5.7	8.9	7.1	7.9
24	5.1	3.5	4.4	5.3	3.9	4.6	7.5	4.8	5.9	9.3	7.1	8.1
25	4.8	3.6	4.3	5.5	3.6	4.5	7.7	5.1	6.2	9.2	7.3	8.1
26	4.9	3.1	4.0	5.9	3.9	4.8	6.6	4.8	5.8	9.6	7.3	8.3
27	5.1	3.0	4.2	5.5	3.8	4.7	6.7	5.3	6.0	9.1	7.4	8.3
28	4.7	3.1	4.2	5.4	4.0	4.8	7.9	5.2	6.1	9.2	7.7	8.3
29	---	---	---	5.6	4.0	4.9	7.8	5.2	6.5	9.1	7.6	8.4
30	---	---	---	6.1	4.1	5.0	7.2	5.0	6.2	9.4	7.6	8.6
31	---	---	---	6.0	4.2	5.0	---	---	---	9.5	7.9	8.6
MONTH	5.6	3.0	4.2	6.1	3.3	4.5	7.9	3.8	5.6	10.6	4.9	7.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.6	7.7	8.7	12.4	10.9	11.5	19.8	13.3	15.8	18.4	14.1	16.1
2	10.0	7.9	8.8	13.5	10.8	11.8	19.6	13.9	15.9	18.5	14.4	16.2
3	9.9	7.7	8.8	12.3	11.0	11.7	19.6	13.2	15.8	17.6	14.7	15.9
4	10.5	8.5	9.4	13.0	11.2	11.8	16.8	14.4	15.5	17.6	13.8	15.3
5	11.5	8.7	9.7	14.2	10.9	12.2	17.9	13.6	15.4	17.1	13.2	14.9
6	9.9	8.3	9.0	15.5	11.3	12.8	18.7	14.2	15.8	17.5	13.1	14.9
7	9.9	8.0	9.0	14.5	11.8	12.9	19.6	13.6	15.9	17.2	13.9	15.4
8	9.9	8.3	9.1	17.5	12.2	13.8	19.5	13.8	16.0	17.3	13.2	15.1
9	9.9	8.6	9.3	19.7	12.2	15.7	19.7	14.3	16.3	18.0	13.8	15.4
10	10.6	9.0	9.6	21.8	15.7	17.8	18.7	14.4	16.2	17.8	14.4	15.8
11	12.5	8.9	10.3	20.6	14.2	16.7	19.0	13.8	16.1	18.3	14.6	16.0
12	13.4	9.0	10.6	20.6	14.2	16.7	19.2	14.3	16.2	18.2	14.8	16.2
13	11.5	8.7	10	18.7	14.5	16.2	18.9	14.2	16.1	18.2	14.7	16.2
14	11.1	8.4	9.9	19.2	13.7	15.6	19.2	14.4	16.2	17.4	14.9	16.1
15	12.4	8.8	10.4	19.8	13.1	15.7	19.4	13.9	16.0	16.4	15.2	15.7
16	10.9	9.3	10.0	19.6	13.4	15.8	19.5	13.5	16.0	16.2	15.0	15.7
17	10.8	9.3	10	20.0	13.4	15.9	18.6	14.1	15.9	17.3	14.7	15.8
18	10.6	9.3	10	19.6	13.7	15.9	18.6	13.8	15.6	17.5	14.3	15.5
19	11.5	9.6	10.4	16.6	14.2	15.2	18.8	14.2	15.9	17.6	14.4	15.7
20	11.7	9.7	10.6	20.2	13.5	15.9	16.7	14.8	15.6	17.8	15.0	16.0
21	11.8	10.1	10.8	20.7	13.5	16.3	15.5	14.4	14.9	17.0	14.3	15.4
22	11.5	10.2	10.8	20.4	14.1	16.6	17.8	13.3	15.0	17.6	14.3	15.6
23	12.9	10.3	11.2	20.4	14.5	16.8	17.8	13.8	15.4	17.9	14.5	15.8
24	13.3	10.3	11.4	20.5	14.4	16.8	18.5	13.9	15.6	17.6	14.8	15.9
25	13.9	10.4	11.7	20.2	14.7	16.7	15.9	14.2	15.1	17.6	14.7	15.9
26	15.2	10.8	12.5	18.0	14.7	15.9	16.2	13.8	15.1	17.0	14.6	15.7
27	12.6	11.3	12.1	18.1	13.5	15.1	18.5	13.8	15.7	17.5	14.9	15.9
28	12.5	10.8	11.8	18.8	13.3	15.4	18.7	14.5	16.2	17.4	14.3	15.6
29	11.9	10.8	11.2	20.5	14.0	16.3	18.6	14.7	16.3	16.1	14.6	15.2
30	12.2	10.9	11.4	17.1	14.2	15.4	18.0	14.5	15.9	15.0	14.0	14.6
31	---	---	---	19.1	12.9	15.3	18.1	13.8	15.9	---	---	---
MONTH	15.2	7.7	10.3	21.8	10.8	15.1	19.8	13.2	15.8	18.5	13.1	15.7
YEAR	21.8	3.0	9.2									

14140001 BULL RUN RIVER NEAR BULL RUN, OR

LOCATION.--Lat 45°26'15", long 122°10'42", in NE 1/4 SW 1/4 sec.34, T.1 S., R.5 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on left bank 1.8 mi downstream from Bull Run Reservoir Number Two, 2.7 mi northeast of Bull Run, and at mile 4.7.

DRAINAGE AREA.--107 mi^2.

PERIOD OF RECORD.--September 1907 to current year. Records for January 1895 to August 1907, published in WSP 370, have been found to be unreliable and should not be used.

REVISED RECORDS.--WSP 1288: 1910-11, 1913, 1920-23, 1926, 1929. WSP 1318: 1919(M). WSP 1568: 1952. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 567.90 ft above NGVD of 1929 (levels by Portland Water Bureau). Prior to July 27, 1909, nonrecording gage at site 1.5 mi upstream at different datum. July 27, 1909, to Sept. 30, 1959, water-stage recorder at site 2.5 mi upstream at different datums.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1915 by Bull Run Lake capacity, 12,270 acre-ft, since 1929 by Bull Run Reservoir Number One (station 14139000), since 1958 by North Fork Reservoir, capacity, 1,030 acre-ft, and since 1961 by Bull Run Reservoir Number Two (station 14139900). All records given herein include flow diverted from Bull Run Reservoir Number Two for city of Portland, and that used by Portland General Electric Co. for power generation, which returns to Bull Run River downstream from station. Total diversion, 169,100 acre-ft of which 50,540 acre-ft were used for power generation and returned to Bull Run River.

COOPERATION.--Records of daily diversion furnished by Portland Water Bureau.

AVERAGE DISCHARGE.--95 years (water years 1908-2002), 777 ft^3/s, 98.61 in/yr, 562,900 acre-ft/yr, adjusted for storage in Bull Run Reservoir Number One since 1929 and Bull Run Reservoir Number Two since 1961.

EXTREMES FOR PERIOD OF RECORD.--River only, maximum discharge, 24,800 ft^3/s Dec. 22, 1964, gage height, 17.21 ft, from rating curve extended above 8,800 ft^3/s on basis of computation of peak flow over dam; minimum discharge, 1.1 ft^3/s Oct. 4, 1974.

Combined flow, maximum discharge, 25,100 ft^3/s Dec. 22, 1964; minimum daily, 11 ft^3/s Nov. 16, 1987.

EXTREMES FOR CURRENT YEAR.--River only, maximum discharge, 7,720 ft^3/s Apr. 14, gage height, 11.43 ft; minimum discharge, 20 ft^3/s July 18-26, 29.

Combined flow, maximum discharge, 8,030 ft^3/s (of which approximately 132 ft^3/s were diverted for Portland water supply) Apr. 14; minimum daily, 115 ft^3/s (of which approximately 84 ft^3/s were diverted for Portland water supply) Oct. 15, 18.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	210	237	2280	500	607	605	644	764	891	604	233	258
2	214	270	2730	896	567	495	617	694	821	441	243	242
3	221	398	1900	839	596	460	704	623	737	390	253	238
4	246	1030	1670	810	581	444	736	603	308	378	253	242
5	228	835	1010	718	556	418	937	641	306	371	243	241
6	209	801	1640	1300	553	1080	1050	882	862	326	227	235
7	206	573	2860	2230	1030	948	1470	663	488	264	232	231
8	157	508	1900	3580	1160	660	1570	541	522	216	254	214
9	117	513	1500	2600	1070	539	1300	434	580	272	284	224
10	125	435	1210	1520	781	660	1990	432	539	275	300	278
11	126	425	1040	1050	824	1430	2640	421	386	288	277	278
12	120	417	1230	1310	744	3720	2910	421	362	294	311	255
13	120	508	3140	1420	574	2110	2780	433	685	255	327	254
14	116	2070	5470	1130	454	1450	6040	449	930	249	322	242
15	115	1570	2780	759	414	1160	3220	498	362	248	309	235
16	128	1260	3810	583	399	936	2080	563	306	255	292	224
17	120	1130	4100	654	438	831	1730	638	382	267	280	194
18	115	845	2410	588	518	610	943	848	995	267	276	186
19	147	773	1640	708	840	1130	1030	718	727	263	261	192
20	179	821	1270	1140	911	1580	948	681	561	253	257	200
21	185	939	937	1690	1160	1200	800	690	596	250	253	215
22	173	1310	819	1240	1790	912	682	954	526	274	243	214
23	172	3700	669	900	2550	781	626	995	357	293	244	229
24	167	2020	578	1020	3450	752	566	809	365	282	265	245
25	186	1670	460	2660	1830	956	493	693	378	282	273	233
26	186	956	431	2300	1140	842	550	705	320	271	278	204
27	172	781	430	1420	779	818	774	842	292	248	271	195
28	170	1220	508	806	781	815	683	1020	324	245	271	197
29	165	2960	540	680	---	888	537	1780	1310	272	256	196
30	168	2150	483	637	---	745	623	1560	767	287	257	178
31	198	---	499	638	---	751	---	1240	---	264	266	---
TOTAL	5161	33125	51944	38326	27097	30726	41673	23235	16985	9144	8311	6769
MEAN	166.5	1104	1676	1236	967.8	991.2	1389	749.5	566.2	295.0	268.1	225.6
MAX	246	3700	5470	3580	3450	3720	6040	1780	1310	604	327	278
MIN	115	237	430	500	399	418	493	421	292	216	227	178
AC-FT	10240	65700	103000	76020	53750	60950	82660	46090	33690	18140	16480	13430
MEAN†	413	1255	1658	1240	967	990	1392	786	595	229	97.3	84.4
CFSM†	3.86	11.7	15.5	11.6	9.04	9.25	13.0	7.35	5.56	2.14	0.91	0.79
IN.†	4.46	13.09	17.87	13.37	9.41	10.67	14.52	8.48	6.20	2.46	1.05	0.88
AC-FT†	25420	74670	102000	76260	53710	60860	82850	48350	35390	14060	5980	5020

CAL YR 2001 TOTAL 223856 MEAN 613.3 MAX 5470 MIN 115 AC-FT 444000 MEAN† 613 CFSM† 5.73 IN.† 77.78 AC-FT† 443700
WTR YR 2002 TOTAL 292496 MEAN 801.4 MAX 6040 MIN 115 AC-FT 580200 MEAN† 807 CFSM† 7.55 IN.† 102.46 AC-FT† 584600

† Adjusted for change in contents in Bull Run Reservoir Number One and Bull Run Reservoir Number Two.

14141500 LITTLE SANDY RIVER NEAR BULL RUN, OR

LOCATION.--Lat 45°24'56", long 122°10'13", in NE 1/4 NE 1/4 sec.10, T.2 S., R.5 E., Clackamas County, Hydrologic Unit 17080001, in Mount Hood National Forest, on left bank 0.25 mi upstream from Portland General Electric Co. dam and tunnel from Sandy River, 3.0 mi east of Bull Run, and at mile 1.95.

DRAINAGE AREA.--22.3 mi^2.

PERIOD OF RECORD.--May to July 1911, October 1911 to March 1912, June 1912 to April 1913, July 1919 to current year. Monthly discharge only for some periods in water years 1911-13, published in WSP 1318.

REVISED RECORDS.--WSP 1154: 1949. WSP 1248: Drainage area. WSP 1288: 1912, 1920-21(M), 1922-23, 1931, 1945. WSP 1318: 1920. WDR OR-82-2: 1972(P), 1974-76(P), 1978-81(P).

GAGE.--Water-stage recorder. Elevation of gage is 720 ft above NGVD of 1929, from topographic map. May 23, 1911, to Apr. 29, 1913, nonrecording gage at site 0.85 mi downstream at different datum, 0.5 mi downstream from Sandy River diversion tunnel. July 1, 1919, to Sept. 30, 1931, water-stage recorder at site 0.1 mi downstream at different datum. Oct 1, 1931, to Nov. 3, 1967, at site 0.1 mi downstream at datum 712 ft above sea level. Nov. 4, 1967, to Aug. 8, 1971, water-stage recorder at site 0.1 mi downstream at datum 697.44 ft above sea level (Portland General Electric Co. bench mark).

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--83 years (water years 1920-2002), 144 ft^3/s, 87.75 in/yr, 104,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,320 ft^3/s Nov. 20, 1921, gage height, 9.18 ft, site and datum then in use, from rating curve extended above 2,200 ft^3/s; minimum discharge, 8.0 ft^3/s Aug. 20, Sept. 16, 17, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 14	0400	*1,590	*5.55	No other peak greater than base discharge.			

Minimum discharge, 11 ft^3/s Oct. 4-7.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	388	324	124	126	98	120	126	e160	78	21	13
2	12	396	337	206	117	87	117	129	e140	66	21	13
3	12	234	295	189	117	78	116	132	e120	58	21	13
4	11	153	249	166	114	73	127	e125	e110	54	21	13
5	11	173	227	139	110	73	155	e130	e130	49	22	13
6	11	127	487	251	111	191	213	e135	e120	44	21	13
7	11	100	567	389	159	186	340	e115	e100	42	20	13
8	15	82	367	544	227	138	258	e110	e90	45	20	13
9	18	70	308	341	207	117	232	e100	e75	40	18	12
10	24	60	265	222	180	109	407	e95	e75	36	18	12
11	120	54	264	172	161	263	411	e90	e75	34	18	12
12	49	59	260	246	138	491	450	e110	e80	32	18	12
13	101	179	583	224	122	294	455	e125	e90	31	17	12
14	93	380	614	162	107	227	974	e140	e90	29	16	12
15	68	212	405	128	98	184	402	e130	e85	28	16	12
16	46	221	615	112	94	154	289	e120	e80	27	15	13
17	45	205	572	100	90	129	233	e125	e85	26	15	26
18	34	154	379	95	97	112	198	e125	e180	25	15	17
19	29	133	283	112	135	190	174	e120	e115	25	15	14
20	26	136	227	172	153	247	156	e120	e85	24	15	13
21	25	142	186	287	190	200	143	e120	e70	24	15	13
22	184	429	153	218	260	162	128	e175	63	24	15	12
23	397	502	127	176	451	137	123	e160	58	23	14	12
24	208	273	110	195	445	152	116	e140	54	23	14	12
25	118	193	97	471	245	157	117	e135	49	23	14	12
26	86	146	88	385	174	139	119	e140	46	23	14	12
27	72	120	82	263	134	150	144	e150	42	23	14	12
28	66	299	102	200	114	159	127	e200	48	23	14	12
29	57	448	89	157	---	158	126	e400	180	23	13	18
30	229	314	79	132	---	133	134	e270	99	22	13	42
31	542	---	83	129	---	127	---	e200	---	22	13	---
TOTAL	2732	6382	8824	6707	4676	5115	7104	4492	2794	1046	516	428
MEAN	88.13	212.7	284.6	216.4	167.0	165.0	236.8	144.9	93.13	33.74	16.65	14.27
MAX	542	502	615	544	451	491	974	400	180	78	22	42
MIN	11	54	79	95	90	73	116	90	42	22	13	12
AC-FT	5420	12660	17500	13300	9270	10150	14090	8910	5540	2070	1020	849
CFSM	3.95	9.54	12.8	9.70	7.49	7.40	10.6	6.50	4.18	1.51	0.75	0.64
IN.	4.56	10.65	14.72	11.19	7.80	8.53	11.85	7.49	4.66	1.74	0.86	0.71

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1920 - 2002, BY WATER YEAR (WY)

MEAN	86.73	209.8	246.7	236.7	209.5	185.1	194.0	162.2	102.2	39.62	23.08	37.40
MAX	271	588	585	589	452	407	325	328	268	121	96.1	184
(WY)	1960	1956	1965	1953	1961	1932	1920	1945	1933	1983	1968	1927
MIN	10.6	14.3	57.5	45.9	59.2	49.9	54.0	55.8	19.2	13.8	10.1	12.4
(WY)	1988	1930	1977	1937	1977	1941	1941	1947	1992	1940	1940	1938

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1920 - 2002	
ANNUAL TOTAL	41851		50816			
ANNUAL MEAN	114.7		139.2		144.0	
HIGHEST ANNUAL MEAN					223	1974
LOWEST ANNUAL MEAN					87.6	1944
HIGHEST DAILY MEAN	637	Mar 19	974	Apr 14	3500	Mar 31 1931
LOWEST DAILY MEAN	11	Sep 19	11	Oct 4	8.0	Sep 16 1940
ANNUAL SEVEN-DAY MINIMUM	11	Sep 18	11	Oct 1	9.0	Aug 16 1940
ANNUAL RUNOFF (AC-FT)	83010		100800		104300	
ANNUAL RUNOFF (CFSM)	5.14		6.24		6.46	
ANNUAL RUNOFF (INCHES)	69.81		84.77		87.75	
10 PERCENT EXCEEDS	283		310		302	
50 PERCENT EXCEEDS	75		117		97	
90 PERCENT EXCEEDS	15		14		18	

e Estimated

14142500 SANDY RIVER BELOW BULL RUN RIVER, NEAR BULL RUN, OR

LOCATION.--Lat 45°26'57", long 122°14'38", in SW 1/4 sec.30, T.1 S., R.5 E., Clackamas County, Hydrologic Unit 17080001, on left bank 0.1 mi downstream from Bull Run River, 0.2 mi downstream from Dodge Park, 400 ft below city of Portland water conduit crossing Sandy River, and at mile 18.4.

DRAINAGE AREA.--436 mi^2.

PERIOD OF RECORD.--April 1910 to September 1914, October 1929 to September 1966, May 1984 to current year. Monthly discharge only for some periods during the 1911, 1912, and water years, published in WSP 1318.

REVISED RECORDS.--WDR OR-96-1: 1986 (P).

GAGE.--Water-stage recorder. Elevation of gage is 240 ft above NGVD of 1929, from topographic map. April 1910 to September 1914, staff gage at present site at different datum. October 1929 to September 1966, water-stage recorder at site 0.8 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since 1915 by Bull Run Lake, since 1929 by Bull Run Reservoir Number One (station 14139000), and since 1961 by Bull Run Reservoir Number Two (station 14139900). Some fluctuation caused by Bull Run powerplant of Portland General Electric Company. Portland Water Bureau diverted 169,100 acre-ft from Bull Run River, of which 50,540 acre-ft were used for power generation by Portland General Electric Company and returned to Bull Run River. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--4 years (water years 1911-14) 2,321 ft^3/s, 1,681,000 acre-ft/yr.
55 years (water years 1930-66, 1985-2002), 2,287 ft^3/s, 1,657,000 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 84,400 ft^3/s Dec. 22, 1964, gage height, 22.3 ft, site and datum then in use; minimum discharge, 45 ft^3/s Sept. 26, 1962, minimum daily, 63 ft^3/s Oct. 12, Nov. 9, 1952.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19,800 ft^3/s Apr. 14, gage height, 15.91 ft; minimum discharge, 188 ft^3/s Oct. 6.

DISCHARGE, in CFS, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	321	2560	5050	1590	2120	1950	2140	2440	3180	1710	552	411
2	298	2560	5870	2260	1970	1730	2190	2470	2900	1410	535	428
3	281	2040	4560	2190	1970	1580	2230	2490	2690	1280	518	440
4	294	2230	3940	2080	1940	1530	2320	2320	2200	1200	515	410
5	284	2040	3170	1920	1870	1490	2970	2330	2320	1130	523	369
6	254	1810	4940	3000	1850	2780	3250	2630	2840	1070	493	359
7	279	1430	7410	5320	2710	2880	4100	2250	2220	999	455	365
8	310	1240	5100	8180	3550	2240	4180	1970	2100	1020	500	358
9	387	1120	4260	6360	3230	1910	3810	1800	2070	982	468	381
10	389	1020	3590	4260	2640	1990	5630	1700	1900	936	524	412
11	1160	964	3400	3270	2600	3550	6560	1650	1710	940	518	373
12	658	969	3440	3720	2350	9010	7030	1730	1720	893	479	379
13	701	1290	7300	3980	2020	5430	7120	2030	2130	904	561	384
14	686	4660	12200	3270	1750	4070	15200	2120	2610	871	482	387
15	621	3250	6980	2560	1620	3380	8680	2160	1990	789	532	382
16	516	2820	9070	2220	1580	2920	5940	2180	1830	752	460	446
17	470	2780	10100	2140	1630	2610	4850	2320	1780	747	461	548
18	384	2290	6540	1980	1740	2170	3560	2660	3020	738	462	443
19	417	2020	4760	2170	2260	3330	3280	2570	2420	725	456	398
20	414	2090	3890	3010	2660	4070	2980	2630	2000	690	430	374
21	348	2230	3150	4650	2980	3400	2700	2700	1890	664	434	309
22	895	3830	2730	3500	4390	2790	2430	3280	1780	672	444	347
23	2780	7720	2360	2770	6180	2480	2320	3280	1590	695	430	333
24	1830	4630	2070	2840	7230	2420	2160	2890	1500	662	435	332
25	1250	3670	1810	6710	4460	2640	2050	2690	1400	619	425	327
26	923	2610	1690	5860	3190	2470	2120	2800	1340	640	436	319
27	803	2170	1590	4090	2480	2510	2470	3070	1320	644	448	299
28	775	3370	1710	2940	2300	2470	2250	3440	1330	605	456	281
29	688	6360	1630	2470	---	2520	2080	5020	3050	643	458	367
30	1140	4840	1490	2220	---	2270	2260	4570	2140	614	428	608
31	2760	---	1520	2170	---	2240	---	3800	---	567	409	---
TOTAL	23316	82613	137320	105700	77270	88830	120860	81990	62970	26811	14727	11569
MEAN	752.1	2754	4430	3410	2760	2865	4029	2645	2099	864.9	475.1	385.6
MAX	2780	7720	12200	8180	7230	9010	15200	5020	3180	1710	561	608
MIN	254	964	1490	1590	1580	1490	2050	1650	1320	567	409	281
AC-FT	46250	163900	272400	209700	153300	176200	239700	162600	124900	53180	29210	22950

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2002, BY WATER YEAR (WY)

MEAN	1122	3090	3838	3440	3400	2982	3293	2792	1787	800.7	494.7	512.0
MAX	4086	7882	10700	8955	8793	6426	5176	5357	4887	1756	731	1947
(WY)	1960	1996	1965	1953	1996	1932	1937	1949	1933	1955	1964	1959
MIN	242	294	992	791	1196	997	980	998	479	390	308	310
(WY)	1988	1953	1953	1937	1993	1941	1941	1992	1992	1992	1992	1994

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1930 - 2002	
ANNUAL TOTAL	609577		833976			
ANNUAL MEAN	1670		2285		2287	
HIGHEST ANNUAL MEAN					3456	1996
LOWEST ANNUAL MEAN					1334	2001
HIGHEST DAILY MEAN	12200	Dec 14	15200	Apr 14	57800	Dec 22 1964
LOWEST DAILY MEAN	239	Sep 19	254	Oct 6	63	Oct 12 1952
ANNUAL SEVEN-DAY MINIMUM	286	Oct 2	286	Oct 2	228	Oct 19 1942
ANNUAL RUNOFF (AC-FT)	1209000		1654000		1657000	
10 PERCENT EXCEEDS	3780		4590		4700	
50 PERCENT EXCEEDS	1120		2070		1610	
90 PERCENT EXCEEDS	367		412		406	

14142800 BEAVER CREEK AT TROUTDALE, OR

LOCATION.--Lat. 45°31'10", long 122°23'16" in Land Grant parcel number 50, T.1N., R.3E., Multnomah County, Hydrologic Unit 17080001, on right bank, 100 ft downstream from Stark Street culvert outlet, 2.1 mi upstream from mouth.

DRAINAGE AREA.--8.91 mi^2.

PERIOD OF RECORD.--October 1999 to current year.

Gage.--Water stage recorder. Datum of gage is 195 ft above NGVD of 1929, from topographic map.

REMARKS.--Records fair except those for the period July 18 to Sept. 27, which are poor. No known diversions. Kelly Creek, an upstream tributary, is impounded at Mt. Hood Comumity College. The pond is approximately 10 acre-ft. Maintenance of the structure may effect downstream flow. Irrigation by the Gresham Golf Course, upstream from pond, may increase flow over the pond spillway during summer months.

AVERAGE DISCHARGE.--3 years (water year 2000-02), 20.5 ft^3/s, 31.20 in/yr, 14,820 acre-ft/yr.

EXTREMES FOR PERIOF OF RECORD.--Maximum discharge, 579 ft3/s Mar. 11, 2002, gage height, 10.28 ft; minimum discharge, 0.06 ft^3/s Aug. 29, 2000, Aug. 25, 30, 31, Sept. 6-11, 14, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 25	1030	541	10.04	Mar. 11	1930	*579	*10.28

Minimum discharge, 0.06 ft^3/s Aug. 25, 30, 31, Sept. 6-11, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	25	203	83	59	6.8	5.7	7.3	2.7	5.5	0.33	0.10
2	1.3	17	177	65	33	5.7	5.5	6.4	2.4	5.4	0.31	0.33
3	1.4	8.0	142	39	30	4.9	4.9	5.6	2.2	3.4	0.19	0.12
4	1.3	8.5	158	27	21	4.4	4.5	5.3	2.7	1.9	0.37	0.13
5	1.2	40	205	35	28	6.2	5.4	5.3	2.1	1.3	0.37	0.13
6	1.3	11	113	107	60	235	4.4	6.3	2.2	2.3	0.26	0.09
7	1.3	6.9	88	169	171	68	5.8	6.5	1.8	8.0	0.21	0.07
8	2.9	5.3	58	154	154	29	4.3	4.5	4.6	17	0.19	0.08
9	1.8	4.3	44	55	54	21	26	4.1	4.1	3.2	0.17	0.08
10	19	3.8	69	34	40	28	18	4.1	4.3	3.2	0.30	0.07
11	6.4	3.5	90	25	28	170	17	3.7	2.3	2.2	0.18	0.06
12	4.4	18	77	37	20	158	10	3.5	2.4	2.3	0.15	0.09
13	5.6	39	208	24	15	94	39	3.3	2.1	1.8	0.27	0.13
14	3.0	42	162	19	12	66	101	3.2	1.9	1.6	0.14	0.09
15	2.4	30	94	15	9.3	56	32	3.3	1.7	1.4	0.22	0.09
16	4.1	52	156	21	8.4	58	61	2.7	1.7	1.1	0.17	2.4
17	2.6	43	143	20	7.0	58	69	5.2	22	1.3	0.16	8.0
18	1.7	17	91	23	8.5	43	32	2.7	7.6	0.98	0.13	0.72
19	1.6	39	66	45	45	202	21	4.2	2.9	0.87	0.15	0.42
20	1.4	40	62	77	15	72	16	4.6	2.5	0.79	0.14	0.36
21	4.9	44	43	88	16	37	13	2.8	2.4	0.86	0.15	0.34
22	11	99	32	101	11	25	11	3.9	2.0	0.44	0.20	0.21
23	15	51	23	50	138	19	9.8	3.1	2.0	1.1	0.14	0.17
24	4.6	33	19	64	32	17	7.5	2.4	1.9	0.59	0.12	0.37
25	2.6	29	15	312	19	17	6.6	2.2	1.8	0.73	0.08	0.62
26	2.2	17	13	118	14	12	20	2.0	1.7	0.65	0.10	0.30
27	13	13	18	94	10	11	68	3.1	1.6	0.28	0.09	0.26
28	4.7	246	33	73	8.6	9.0	15	19	30	0.27	0.11	1.3
29	7.2	160	16	43	---	7.9	11	11	34	0.22	0.11	26
30	56	139	13	33	---	6.9	8.9	3.6	4.9	0.38	0.08	49
31	40	---	21	57	---	6.3	---	2.9	---	0.21	0.10	---
TOTAL	227.3	1284.3	2652	2107	1066.8	1554.1	653.3	147.8	158.5	71.27	5.69	92.13
MEAN	7.33	42.8	85.5	68.0	38.1	50.1	21.8	4.77	5.28	2.30	0.18	3.07
MAX	56	246	208	312	171	235	101	19	34	17	0.37	49
MIN	1.2	3.5	13	15	7.0	4.4	4.3	2.0	1.6	0.21	0.08	0.06
AC-FT	451	2550	5260	4180	2120	3080	1300	293	314	141	11	183
CFSM	0.82	4.80	9.60	7.63	4.28	5.63	2.44	0.54	0.59	0.26	0.02	0.34
IN.	0.95	5.36	11.07	8.80	4.45	6.49	2.73	0.62	0.66	0.30	0.02	0.38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2002, BY WATER YEAR (WY)

MEAN	6.35	31.1	54.0	43.7	37.9	37.2	16.3	9.77	4.74	1.54	1.00	2.47
MAX	7.75	42.8	85.5	68.0	58.0	50.1	21.8	15.2	5.28	2.30	2.14	3.07
(WY)	2001	2002	2002	2002	2000	2002	2002	2000	2002	2002	2001	2002
MIN	3.97	10.8	25.7	12.5	16.9	28.7	9.72	4.77	4.23	1.02	0.18	1.60
(WY)	2000	2001	2001	2001	2001	2001	2000	2002	2000	2000	2002	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 2000 - 2002	
ANNUAL TOTAL	7023.57		10020.19			
ANNUAL MEAN	19.2		27.5		20.5	
HIGHEST ANNUAL MEAN					27.5	2002
LOWEST ANNUAL MEAN					11.6	2001
HIGHEST DAILY MEAN	246	Nov 28	312	Jan 25	315	Nov 25 1999
LOWEST DAILY MEAN	0.50	Aug 21	0.06	Sep 11	0.06	Sep 11 2002
ANNUAL SEVEN-DAY MINIMUM	0.59	Aug 15	0.08	Sep 6	0.08	Sep 6 2002
ANNUAL RUNOFF (AC-FT)	13930		19880		14820	
ANNUAL RUNOFF (CFSM)	2.16		3.08		2.30	
ANNUAL RUNOFF (INCHES)	29.32		41.84		31.20	
10 PERCENT EXCEEDS	45		79		56	
50 PERCENT EXCEEDS	7.2		6.6		6.6	
90 PERCENT EXCEEDS	0.75		0.20		0.63	

14144700 COLUMBIA RIVER AT VANCOUVER, WA

LOCATION.--Lat 45°37'15", long 122°40'20", in NE 1/4 NW 1/4 sec.34, T.2 N., R.1 E., Clark County, Hydrologic Unit 17080001, near right bank in control house of Interstate Highway 5 bridge at south edge of Vancouver, 5.0 mi upstream from Willamette River, and at mile 106.5.

DRAINAGE AREA.--241,000 mi^2, approximately.

PERIOD OF RECORD.--October 1963 to June 1970 (discharge), February 1998 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 1.82 ft above NGVD of 1929. Prior to February 1998, datum of gage was NGVD of 1929.

REMARKS.--Considerable regulation by many large reservoirs. Diurnal fluctuations caused by powerplant operations at Bonneville Dam and tides. Gage maintained by National Weather Service.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 27.60 ft Dec. 25, 1964, present datum, (backwater from Willamette River).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 7, 1894, reached a stage of 34.4 ft, present datum, from information provided by U.S. Army Corps of Engineers. Flood of June 13, 14, 1948, reached a stage of 31.0 ft, present datum, from Weather Bureau records.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 12.92 ft Apr. 18; minimum, -0.68 ft Oct. 26.

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	3.30	-0.02	1.62	4.60	1.28	2.74	8.32	6.42	7.37	---	---	---
2	3.68	0.42	1.99	4.72	1.38	2.81	8.22	7.12	7.84	6.72	---	---
3	3.72	0.50	2.04	4.44	1.30	2.57	8.32	6.92	7.65	5.62	3.72	4.63
4	3.24	0.16	1.66	4.04	0.86	2.18	7.22	6.12	6.75	5.02	3.12	4.14
5	3.78	0.00	1.68	3.88	0.80	2.10	6.92	5.82	6.49	5.12	2.92	4.04
6	3.64	0.48	1.84	4.04	0.72	2.23	6.82	5.72	6.40	5.52	3.12	4.27
7	3.32	0.20	1.50	3.32	0.98	1.97	6.72	5.42	6.04	7.42	4.22	5.90
8	3.28	-0.10	1.32	3.24	0.56	1.74	6.02	4.92	5.50	8.42	6.82	7.48
9	2.88	-0.26	1.06	3.22	0.92	2.05	5.92	4.52	5.30	8.12	7.12	7.60
10	3.44	-0.64	1.03	3.68	0.72	2.11	6.02	4.02	4.91	8.52	7.52	7.97
11	3.48	0.22	1.60	3.68	0.32	1.97	6.22	4.02	5.05	7.72	6.22	7.24
12	2.98	-0.46	1.28	4.36	0.64	2.41	6.12	4.32	5.15	7.02	5.42	6.16
13	3.28	-0.26	1.42	4.82	1.40	2.94	7.02	4.42	5.65	6.62	5.02	5.64
14	3.28	0.00	1.68	6.42	1.62	4.05	8.22	6.32	7.54	6.02	4.62	5.37
15	3.96	0.36	2.08	6.52	3.42	4.69	8.02	6.82	7.55	5.32	3.92	4.76
16	4.40	0.90	2.48	6.02	2.92	4.20	8.62	7.02	7.77	6.52	4.32	5.48
17	4.60	1.00	2.56	5.42	2.52	3.67	9.22	8.12	8.67	6.22	5.02	5.58
18	4.76	1.50	2.92	4.92	2.42	3.44	9.52	8.02	8.67	5.42	4.22	4.77
19	4.42	1.04	2.51	4.92	1.62	2.97	9.52	8.02	8.81	5.02	3.72	4.30
20	3.84	0.64	1.99	5.02	2.02	3.45	8.82	6.62	7.61	4.92	2.92	3.98
21	3.52	0.14	1.60	4.52	2.42	3.61	7.82	6.82	7.18	5.62	3.82	4.84
22	3.80	0.00	1.62	5.12	2.32	3.90	7.82	5.52	6.69	5.92	4.42	5.27
23	3.40	0.76	1.94	4.72	3.42	4.06	6.12	4.72	5.51	6.52	5.32	5.93
24	2.28	-0.40	1.12	5.02	3.52	4.17	5.32	3.92	4.68	7.22	5.82	6.51
25	2.48	-0.08	1.21	4.82	3.32	4.06	4.72	3.12	3.86	7.22	6.12	6.74
26	2.44	-0.68	0.97	4.42	2.72	3.54	4.82	2.92	3.68	8.72	6.82	7.84
27	3.04	-0.08	1.48	4.62	2.72	3.56	5.42	3.02	3.85	8.42	7.52	8.01
28	2.92	-0.16	1.33	6.72	3.32	4.87	6.02	3.02	4.21	8.62	7.42	7.91
29	3.44	0.28	1.71	7.22	4.92	6.33	6.12	3.32	4.37	8.52	7.12	7.64
30	4.12	0.68	2.15	7.22	5.82	6.61	6.22	3.22	4.36	8.22	6.82	7.47
31	4.44	0.98	2.59	---	---	---	6.32	3.22	4.42	7.72	6.12	6.95
MONTH	4.76	-0.68	1.74	7.22	0.32	3.37	9.52	2.92	6.11	---	---	---

14144700 COLUMBIA RIVER AT VANCOUVER, WA--Continued

GAGE HEIGHT, in FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	7.22	5.92	6.54	5.92	4.02	4.89	5.42	2.62	3.92	6.82	5.42	6.07
2	6.52	5.02	5.78	5.42	2.92	4.07	5.72	3.72	4.54	6.42	4.92	5.66
3	6.12	4.22	5.10	5.32	2.52	3.65	5.02	2.82	3.93	6.12	4.92	5.53
4	5.12	3.22	4.20	5.12	2.12	3.31	4.12	2.12	3.16	6.02	4.92	5.58
5	6.02	4.32	4.98	5.22	2.22	3.31	3.92	2.12	3.17	6.02	5.12	5.61
6	5.82	4.02	4.81	5.02	2.32	3.32	3.72	1.82	3.00	5.72	4.32	4.96
7	6.22	4.32	5.11	4.62	2.72	3.42	3.82	1.92	3.04	5.82	4.32	5.27
8	6.92	4.82	6.04	4.32	2.22	3.46	4.22	1.82	3.21	6.62	5.12	6.03
9	7.12	5.92	6.51	4.32	2.12	3.17	4.92	3.12	4.13	6.62	4.82	5.77
10	6.42	4.62	5.76	5.12	2.12	3.71	5.82	3.42	4.86	5.82	4.02	4.83
11	5.62	3.92	4.78	6.02	2.72	4.27	6.72	4.72	5.83	5.32	3.82	4.63
12	6.02	4.42	5.14	6.92	3.92	5.55	6.82	5.72	6.31	6.02	4.22	4.96
13	5.62	3.72	4.79	7.82	5.82	6.95	7.62	5.92	6.81	5.52	3.92	4.66
14	5.72	3.62	4.64	7.62	6.22	7.07	9.62	7.32	8.82	6.02	4.42	5.18
15	5.22	3.32	4.51	6.72	5.52	6.15	10.32	9.02	9.51	6.12	4.52	5.24
16	4.52	2.22	3.56	6.82	5.52	6.10	12.42	10.32	11.45	6.12	4.42	5.21
17	4.72	2.62	3.46	5.92	4.22	5.04	12.92	12.42	12.67	5.72	4.32	4.95
18	4.52	2.22	3.21	4.92	3.02	4.02	12.92	12.02	12.46	6.32	4.72	5.47
19	5.32	2.42	3.71	5.32	3.82	4.40	12.02	10.82	11.49	5.62	4.42	5.05
20	4.62	3.02	3.63	5.22	3.82	4.35	10.82	8.92	9.92	5.72	4.82	5.33
21	5.02	3.22	3.90	4.42	3.22	3.78	9.42	8.62	9.15	6.32	5.32	5.94
22	5.12	3.32	4.08	4.42	2.82	3.64	8.82	7.42	8.24	7.42	6.02	7.10
23	5.52	3.52	4.32	4.32	2.42	3.38	7.92	7.32	7.63	8.42	7.22	7.79
24	5.62	3.52	4.48	4.42	2.32	3.32	7.92	7.22	7.55	8.32	7.32	7.73
25	5.62	3.92	4.84	4.72	2.32	3.45	8.12	6.72	7.36	---	7.32	---
26	6.22	3.92	4.96	5.22	2.52	3.71	7.82	6.62	7.11	8.22	6.62	7.32
27	6.22	3.92	5.17	5.52	2.72	4.04	7.62	6.22	6.87	7.72	6.02	6.84
28	6.02	4.12	5.02	5.62	3.32	4.37	7.82	5.62	6.61	8.42	6.72	7.71
29	---	---	---	5.42	3.12	4.20	6.82	5.02	5.77	9.52	8.02	8.91
30	---	---	---	5.52	2.92	4.05	7.12	5.22	6.09	9.42	8.82	9.14
31	---	---	---	5.62	2.92	3.94	---	---	---	9.42	8.92	9.14
MONTH	7.22	2.22	4.75	7.82	2.12	4.26	12.92	1.82	6.82	---	3.82	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.22	9.12	9.44	9.22	8.32	8.68	4.24	2.05	2.92	3.90	1.05	1.98
2	10.42	9.22	9.82	9.02	8.42	8.63	4.30	1.90	2.81	3.52	0.60	1.68
3	9.42	8.32	8.78	8.92	7.52	8.24	4.27	2.24	2.93	3.50	0.05	1.72
4	9.22	8.62	8.97	8.22	7.62	7.86	4.42	1.79	2.84	4.06	0.38	2.26
5	10.42	9.12	9.67	8.32	6.72	7.49	4.28	1.51	2.84	4.87	1.28	2.87
6	11.32	10.42	11.08	7.52	5.62	6.34	5.36	2.73	3.81	4.93	1.31	2.97
7	11.42	10.52	11.03	7.22	5.42	6.11	5.35	---	---	4.99	1.30	2.97
8	10.72	10.42	10.59	7.12	5.22	6.07	5.39	2.31	3.62	4.51	0.95	2.61
9	10.62	9.42	10.01	6.62	---	---	5.92	3.06	4.35	4.32	0.73	2.40
10	9.82	8.52	9.15	---	---	---	5.81	2.59	4.05	5.02	0.94	2.59
11	9.62	8.42	8.89	6.99	4.95	5.78	5.40	2.65	3.87	4.93	1.22	2.85
12	9.92	8.22	9.10	7.28	5.66	6.37	5.25	2.17	3.60	4.08	0.66	2.31
13	9.12	8.12	8.64	7.79	5.97	6.82	5.69	2.34	3.67	3.67	0.31	1.64
14	9.32	7.82	8.60	7.07	5.42	6.29	5.78	2.53	3.81	4.03	0.33	1.85
15	8.42	7.52	7.97	6.98	5.58	6.15	5.67	2.43	3.69	4.22	0.86	2.03
16	8.22	7.02	7.75	6.98	4.63	5.78	5.66	2.70	3.71	3.42	0.01	1.62
17	8.22	6.82	7.31	6.27	4.29	5.00	5.33	2.10	3.33	3.55	0.19	1.95
18	8.62	7.52	7.99	6.73	5.25	5.81	4.66	1.54	2.79	4.17	0.80	2.41
19	9.32	8.12	8.79	7.03	4.59	5.55	4.83	1.86	3.11	4.03	0.88	2.43
20	10.32	9.32	10.11	6.61	4.34	5.24	5.03	2.13	3.38	4.07	1.03	2.58
21	10.82	10.22	10.45	6.70	4.50	5.65	5.23	2.46	3.59	4.16	1.16	2.62
22	10.82	9.32	10.07	6.70	4.97	5.77	5.22	2.22	3.52	3.93	0.78	2.37
23	9.82	8.22	8.92	7.03	4.50	5.63	5.00	2.23	3.46	4.77	1.06	2.74
24	9.62	8.32	8.92	6.53	4.21	5.23	4.90	2.25	3.49	4.55	1.64	3.03
25	9.62	8.22	8.83	6.47	4.17	5.16	4.61	1.70	3.17	4.34	1.07	2.42
26	8.82	7.62	8.18	5.89	3.38	4.56	3.87	1.31	2.50	4.65	1.28	2.54
27	8.62	7.72	8.18	5.14	2.89	3.94	4.08	1.11	2.41	4.42	1.48	2.64
28	9.22	8.32	8.74	4.41	2.19	3.44	4.39	1.37	2.59	3.73	0.83	2.10
29	10.42	9.22	9.98	4.10	1.75	3.07	3.99	1.49	2.63	3.38	0.53	1.65
30	10.42	9.02	9.67	4.81	2.70	3.39	3.97	0.91	1.99	3.25	0.13	1.41
31	---	---	---	4.75	1.91	3.18	3.87	1.26	2.08	---	---	---
MONTH	11.42	6.82	9.19	---	---	---	5.92	---	---	5.02	0.01	2.31